

# **Natural gas forecasts and customer number forecasts for the Multinet distribution region to 2021**

**(Calendar year basis)**

**A report for  
Multinet**

**Prepared by the  
National Institute of Economic and Industry Research**

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***While the National Institute endeavours to provide reliable forecasts and believes the material is accurate it will not be liable for any claim by any party acting on such information.***

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# 1. Introduction

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This report presents projections of Multinet natural gas demand by class, tariff and ASIC division to 2021. Forecasts were prepared on a calendar year basis to 2021. This report focuses on the baseline scenario. The forecasts in this report build on modelling work undertaken by NIEIR over the last 12 years for Multinet.

The objectives of the project as outlined in the study brief were to:

- produce sets of annual calendar year energy and meter number forecasts for Multinet covering the period 2013 until 2017 for the most likely or baseline forecast;
- provide class level energy and meter number forecasts for the following classes:
  - Tariff V (residential and business); and
  - Tariff D;
- provide a forecast for ASIC divisions and the manufacturing division components for Tariff D; and
- provide a concise report which defines and identifies the key modelling parameters and assumptions used in this study.

This report is structured as follows:

- Section 2 summarises the national economic outlook;
- Section 3 summarises the state economic outlook;
- Section 4 outlines the overall methodological approach for the Multinet region;
- Section 5 outlines the impact of Federal and State energy and greenhouse policies on residential gas usage; and
- Section 6 presents the forecasts by tariff and class for volumes and customer numbers.

The terms of reference for the forecasting work is reproduced below.

## **Forecast volumes for each DB's distribution area 2011-2017**

### ***Scope of the forecast***

A forecast of customer numbers and associated gas consumption and demand is required to inform each Distribution Business' (DB) 2013-17 Access Arrangement Proposal to the Australian Energy Regulator (AER).

The forecasts are required to meet National Gas Rule (NGR) 74 provided below.

## **NGR 74 Forecasts and estimates**

- (1) Information in the nature of a forecast or estimate must be supported by a statement of the basis of the forecast or estimate.
- (2) A forecast or estimate:
  - (a) must be arrived at on a reasonable basis; and
  - (b) must represent the best forecast or estimate possible in the circumstances.

Given the above as acceptance criteria, the following sections describe deliverable requirements and verification processes to inform each DB's proposal.

### **1. Volume based tariffs**

Distinct customer number and demand forecasts are required for the residential and non-residential categories for each DB.

The forecasts will also require disaggregation into the individual tariff components utilised by each of the DBs, which components vary from DB to DB. The various components utilised by the DBs are listed below:

- Pricing Zone;
- Fixed (proportional to customer numbers);
- Peak Energy by block (or band) of consumption (June to September);
- 2 x Shoulder Energy by block of consumption (May and October – Multinet only); and
- Off Peak Energy by block of consumption (October to May – Env & SPA, November to April – Multinet)

### **2. Demand based tariffs**

Customer numbers and associated gas demand forecasts are required by DB by MHQ for the rolling 12 month maximum demand for the Industrial D tariff.

### **3. Considerations**

The following issues will have an impact on forecasts of customer numbers, volume and demand, and should be included where appropriate.

- Economic growth: new housing activity, household discretionary spending on energy and energy consuming appliances, business production levels, business longevity.
- Weather normalisation: Forecast of HDDs, EDDs, El-nino/La-nina weather effects. The weather standards, used by AEMO and other agencies should be examined, where it is appropriate to do so.
- Introduction of Carbon Tax and other price related effects that will drive gas consumption, fuel substitution and appliance lifetime economics.
- Review of price elasticity and energy intensity/income elasticity currently applied.



- New Customer versus Existing Customer analysis taking account of:
  - new dwelling construction comprising apartments, higher density infill houses and residences in new estates built in the last five years;
  - associated changes in gas connection rates and appliance penetration rates as a result of a shift in customer preferences. The greater efficiency of new appliances should also be taken into consideration; and
  - replacement of existing appliance stock with more efficient appliances (e.g. storage water heaters with instantaneous heaters or solar heaters, appliance stock efficiency improvements, appliance stock being replaced by other fuels (RCAC replacing gas heating)).
- Effect of policy initiatives such as 5/6-star housing (for new and retrofit), commercial building standards, solar hot water incentives, MEPS, water initiatives (shower-heads and mixing valves), VEET.
- D tariff customer survey results covering consumption change expectations of 20 top customers by DB and normalised to types of business interviewed and to prevailing business sentiment.
- Include known pipeline of new/expansion/closure from engineering for D tariff.
- Only one scenario is to be created assuming business as usual.

Forecasts should be prepared having regard to the most recent AEMO Gas Annual Planning Report, and where forecasting assumptions are adopted that are materially different from those used by AEMO, the differences should be identified and an explanation provided for the alternative assumptions.

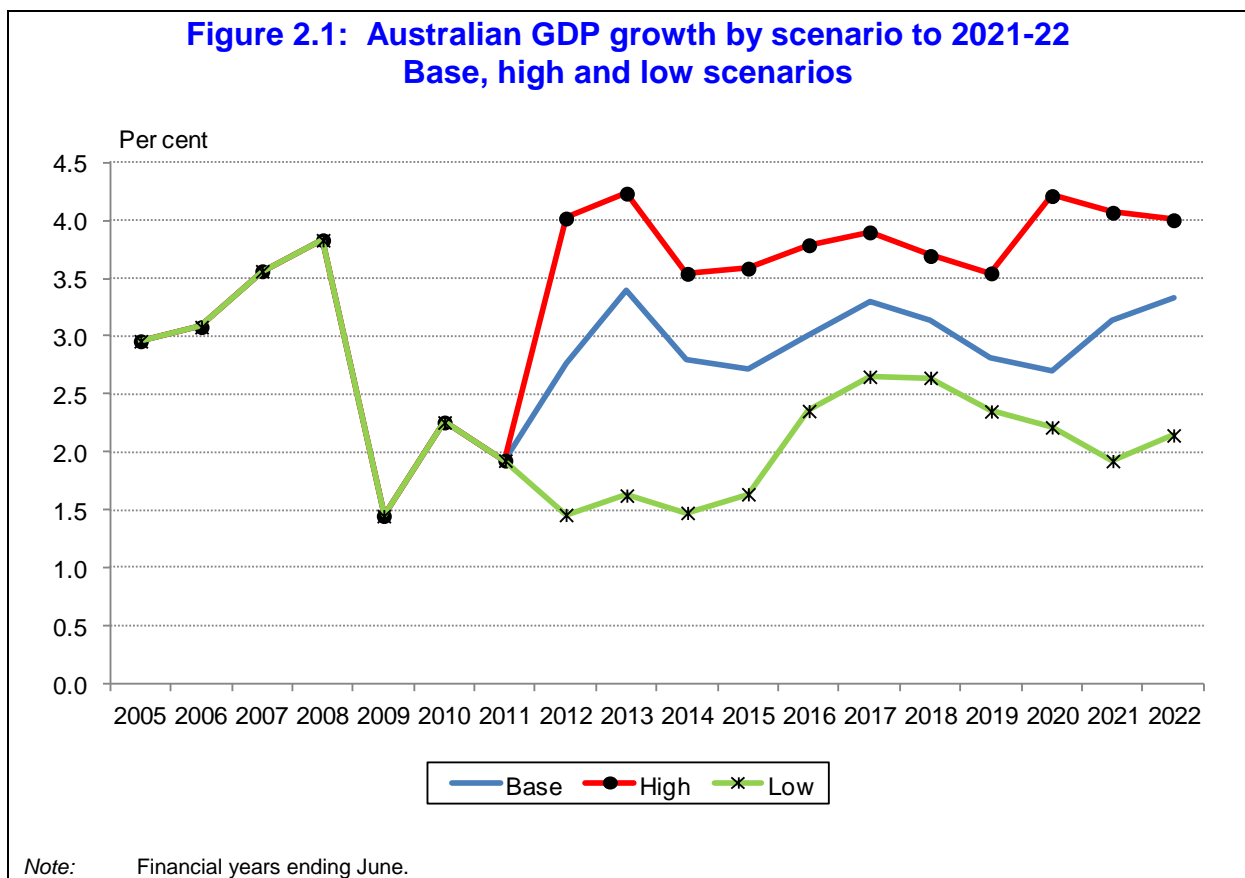
In order to submit information to the AER, the following is required, at a minimum:

- clear and detailed description of the methodologies used to derive the forecasts;
- a qualitative and quantitative summary of the inputs, assumptions and sources of data used in the demand forecast methodology;
- discrete calculations of policy impacts;
- provision of any appliance turnover model;
- historic and forecast information on demand; and
- demonstration of some form of quality control/checking of model inputs and outputs.

## 2. The economic outlook for Australia to 2021-22

### 2.1 Introduction

This section provides an outline of the economic outlook for Australia to 2021-22 for the base, high and low growth scenarios. Figure 2.1 shows the outlook for Australian gross domestic product to 2021-22 by scenario. Table 2.1 shows the projected annual Australian GDP growth rates to 2021-22 for the base, high and low growth scenarios. Part 2.2 of this section provides a more detailed outlook for the Australian economy to 2017-18 for the base scenario. These economic scenarios were prepared in September 2011.



**Table 2.1 Australian GDP growth 2004-05 to 2021-22 – base, high and low growth scenarios**

	Base	High	Low
<b>Per cent change</b>			
2005	3.0	3.0	3.0
2006	3.1	3.1	3.1
2007	3.6	3.6	3.6
2008	3.8	3.8	3.8
2009	1.4	1.4	1.4
2010	2.3	2.3	2.3
2011	1.9	1.9	1.9
2012	2.8	4.0	1.5
2013	3.4	4.2	1.6
2014	2.8	3.5	1.5
2015	2.7	3.6	1.6
2016	3.0	3.8	2.4
2017	3.3	3.9	2.7
2018	3.1	3.7	2.6
2019	2.8	3.5	2.4
2020	2.7	4.2	2.2
2021	3.1	4.1	1.9
2022	3.3	4.0	2.1
<b>Compound growth rate (per cent)</b>			
2011-2015	2.9	3.8	1.5
2011-2022	3.0	3.9	2.0

Note: All growth rates refer to financial years ending June.

## **2.2 An overview of the medium-term outlook for the world and Australian economies**

### **2.2.1 Introduction**

This section summarises the medium-term outlook for the world and Australian economies. The Australian economic outlook includes an assessment of the strategic factors that will influence Australian growth outcomes.

### **2.2.2 The outlook for the world economy**

#### ***GDP growth***

Revisions to world economic growth over the 2012 to 2014 period reflect an adjustment in expectations over the course of 2011 and, in particular, in August and September 2011.

Expectations have adjusted due to the following factors:

- a slowing in US growth became apparent throughout 2011 as the initial fiscal stimulus wore off;
- the realisation that the damage done by the Global Financial Crisis (GFC) to private and public sector balance sheets has been very large, especially in developed economies; and
- on-going negative expectations being generated by the European debt crisis.

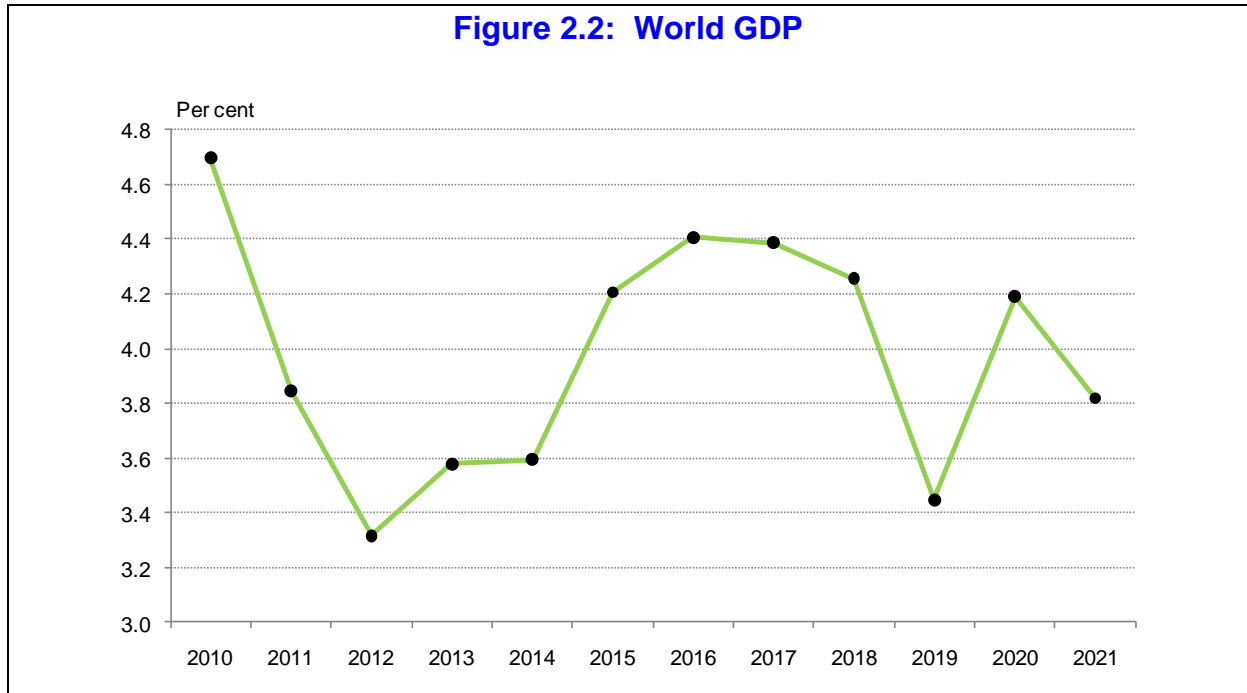
Over the next two years the United States could slip back into recession, or at least struggle to achieve GDP growth by 1.5 to 2.0 per cent per annum. The share market volatility in August-September 2011 may reinforce this outcome.

Asian growth has remained relatively robust, helping keep commodity prices at relatively high levels. However, Asian growth is expected to decline from 8.0 per cent in 2010 to 5.4 per cent in 2012. World growth in 2012 is expected to be 3.2 per cent with growth in the 67 economies in 2012 at only 1.2 per cent.

China continues to grow at a relatively rapid pace, with GDP growth of around 9.0 per cent in 2011, following growth of 10 per cent in 2010. Inflation in China reached 6.4 per cent in June 2011, mainly fuelled by food price inflation. The Bank of China has tightened credit conditions over the past year, increasing interest rates and bank reserve requirement ratios. China's growth is projected to be 8.0 per cent in 2012 and 7.0 per cent in 2013.

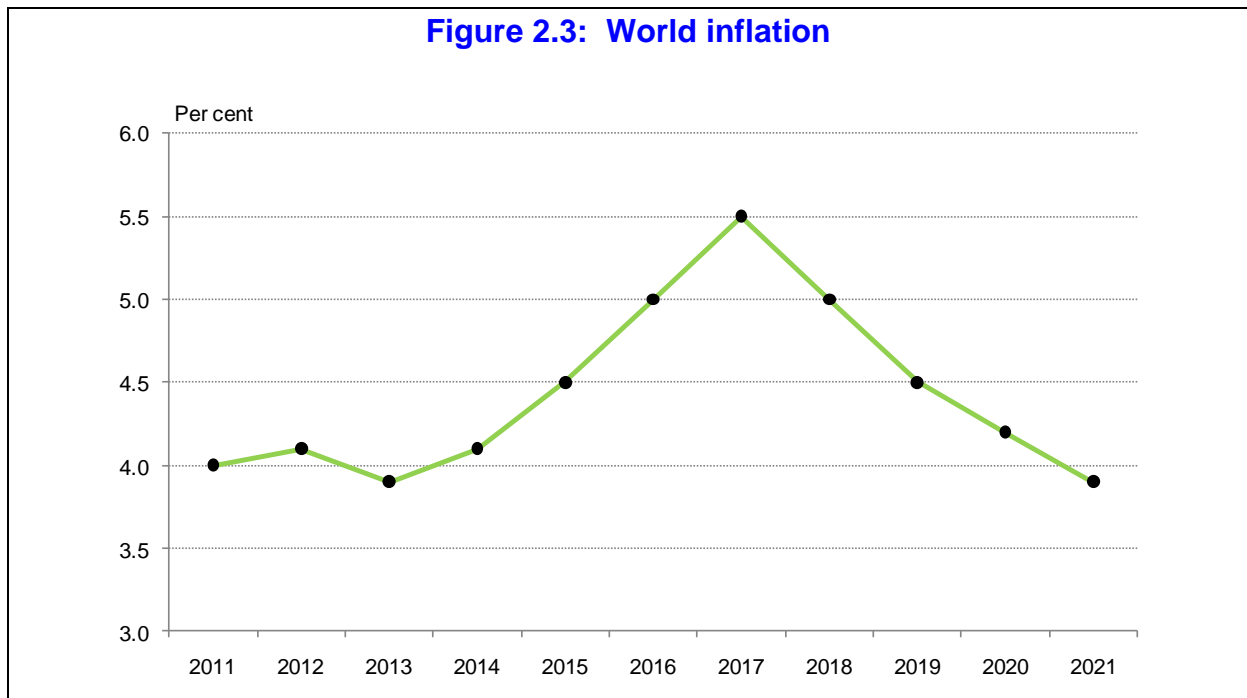
At this stage an optimistic assumption in relation to the resolution of the debt issues has been adopted. In all likelihood, it will take a number of economic and financial crises over the next two to three years before there is a sensibly coordinated set of policies to lift the trend rate of growth of the world economy.

The legacy of the 2008 GFC is that until a lengthy period of sustained economic growth occurs to dull the memories of households and corporations, future crisis even if of "a storm in a teacup" status, will inevitably impact negatively on expectations and real outcomes. Politics and the quality of political leadership will now have a much greater role in determining economic outcomes than at any time since the end of World War II.

**Figure 2.2: World GDP**

### ***Oil prices and inflation***

World inflation is now expected to be around 4.0 per cent over the next two years instead of between 5.0 and 6.0 per cent as previously projected. This will allow emerging economies to minimise the impact of the downgrading of growth in developed economies on their growth rates. The impact of this mechanism on the Chinese economy cannot be underestimated.

**Figure 2.3: World inflation**

### **2.2.3 Australian economic outlook**

There are a range of factors which could result in Australia's trend rate of economic growth over the next decade being lower than that was observed over the 1995 to 2008 period. These factors are discussed in turn below.

#### ***Savings adjustment***

The Australian household savings ratio has improved with the net savings ratio increasing from negligible levels before the GFC to the current 8.0 to 10 per cent range.

The savings ratio has, however, improved because of compulsory saving contributions paid to superannuation funds plus imputed interest superannuation funds currently are around 8.0 to 10 per cent of household income. Reductions in headline savings ratio below this level involves households borrowing for consumption expenditures. As the household debt to income ratio on a net basis (that is excluding depreciation expenditures) is currently just under 200 per cent of income there seems little scope for any sustained reduction in headline savings ratio.

#### ***The availability and cost of finance***

There is not likely to be a return to the easy access to credit regimes that existed before the GFC. The reliance of Australian banks is on wholesale markets and, in particular, foreign wholesale markets.

#### ***Inflationary pressures***

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

- (i) housing costs;
- (ii) energy costs (of which the proposed carbon tax is only one of a number of drivers);
- (iii) insurance and finance costs; and
- (iv) food costs,
- (v) plus the general inflationary pressures from low labour productivity growth.

Over the next three years inflationary pressures may 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 lower real wages growth and profit margins are constrained within reasonable limits.

### ***Increased volatility***

Increased volatility in commodity markets, oil markets and financial markets can be expected over the next decade compared to the 1995 to 2008 period. This will increase uncertainty and perceptions of risk which will lower the trend equity price/earnings ratio and increase the cost of equity financing. This could be a negative for economic growth.

The current mining boom in Australia and with it high exchange rates, interest rates, skill shortages and inflationary pressures can crowd out other forms of economic activity leading to:

- under-investment in non-resource industries;
- increased import penetration into manufacturing industries; and
- loss of export markets from key service industries such as tourism.

### ***GDP formation***

Provided mining exports fully recover over 2011-12 from the flood damage, then the contribution of exports to GDP growth over 2011-12 will be 1.6 percentage points, more than half the projected GDP growth of 2.8 per cent. Given this, 2011-12 is projected to have low underlying growth because of:

- the continuation of modest per capita consumption growth, around 1.5 per cent;
- the withdrawal of fiscal stimulus as reflected by the decline in public sector investment;
- the increase in imports partially offsetting the growth in private investment; and
- the decline in the contribution of stocks to growth due to the recovery in mining production from flood damage.

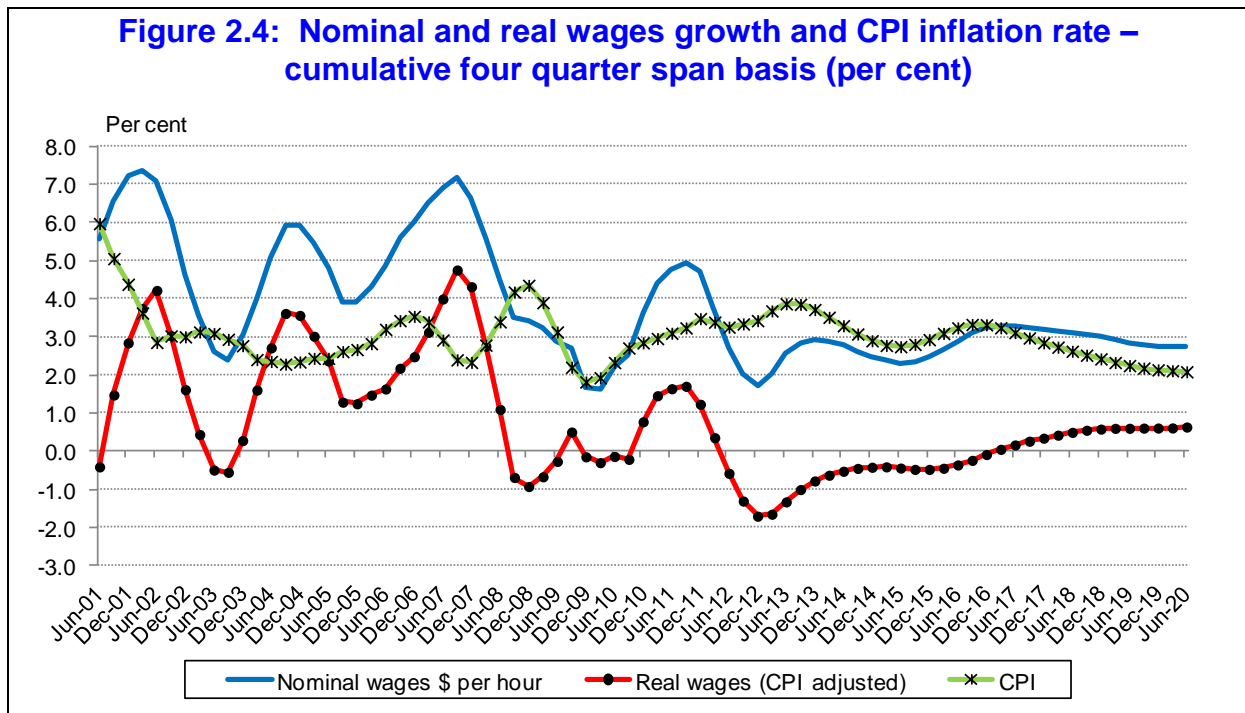
The tightening monetary and fiscal policies over 2012-13 and passing of peaks in mining investment lead to declining GDP growth rates over 2014 to 2016. With inflation under control by 2016 and interest rates falling GDP growth accelerates towards historical trend levels.

### ***Inflation and wages***

The June quarter headline CPI increased by 0.9 per cent. This increase partly reflected the lag effect of the summer floods and storms on food prices which can be expected to become a negative on inflation as supplies return to normal. There are various measures of underlying inflation used by the RBA and the Treasury. For the June quarter the various measures showed an increase of anywhere between 0.5 and 0.9 per cent. Certainly the Treasury measure of underlying inflation has been increasing steadily since December quarter 2010. In the December quarter 2010 the underlying inflation rate by the RBA/Treasury measure was between 2.2 and 2.7 per cent.

There will be increasing underlying inflation pressure over the next one to two years. Trend labour productivity per hour is currently running at about 1.5 per cent per annum while wages growth is running at between 4.0 and 5.0 per cent per annum. In the following fiscal year, with the plan to introduce CO<sub>2</sub> pricing, the headline inflation rate as measured by the CPI will increase to about 4.0 per cent per annum.

The key to the reduction in Australia's inflation rate is the fall in real wages growth over 2013. Over 2014 real wages growth is negative and this situation continues into 2015. Nominal wages growth declines from just under 5.0 per cent in 2011 to less than 3.0 per cent over the next two to three years.



### ***The balance of payments***

Most important reason for Australia's low current account deficit is the current high terms of trade due to high commodity prices. The slowing world economy and increasing supply of iron ore especially and other minerals due to Chinese supply expansion, both internally and elsewhere in the world, is likely to ensure that Australia's terms of trade have peaked. The financial instability of August-October 2011 is likely to lead to a significant decline in commodity prices. However some recovery is assumed over the first half of 2012.

The second reason for a medium-term sharp deterioration in Australia's current account deficit is the rapid increase in property income paid overseas. This is the result of high foreign ownership of Australian mineral resources and the increased interest margin on foreign debt because of increased risks and higher criteria that will apply to the rollover of Australian foreign debt.

The high capital intensity of LNG projects, high foreign ownership, and high foreign borrowings to fund the investment will mean that in the first decade of operation up to 70 per cent of gross export receipts will be returned overseas.



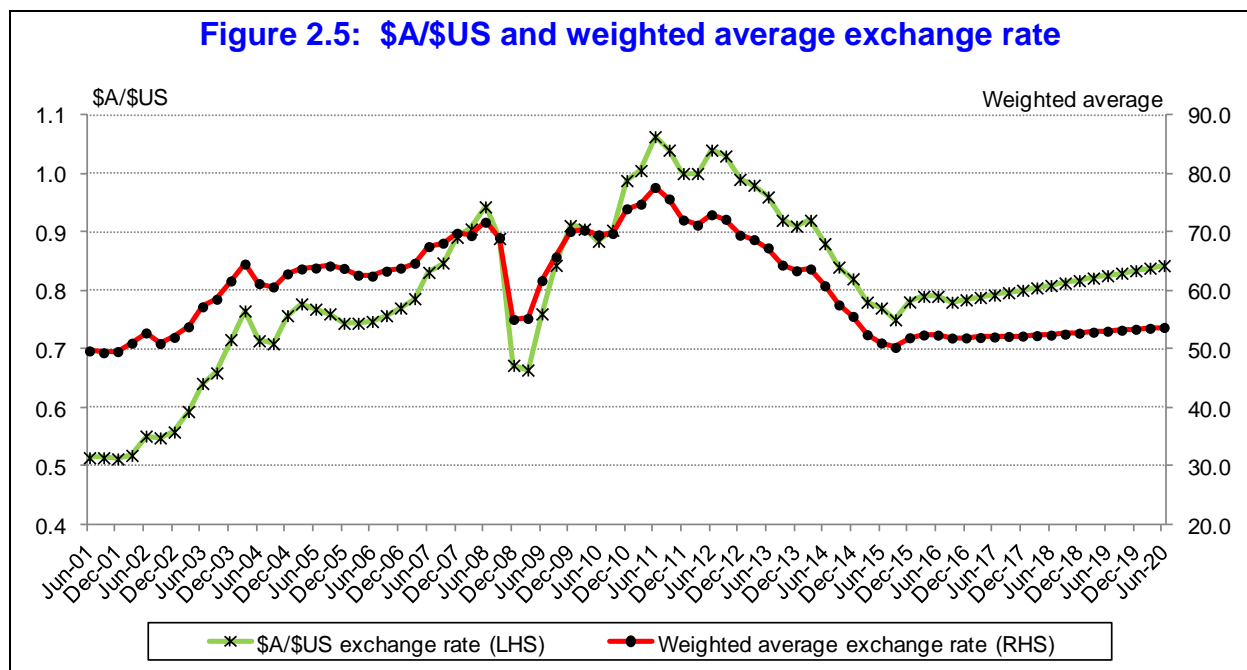
Another reason for the pessimistic current account outcome over the projection period is the long term downward trend in Australia's crude oil production and upward pressure on oil prices. Real fuel imports (mainly oil products) are projected to double over the next decade.

### **The exchange rate**

There are a number of plausible scenarios for the Australian exchange rate over the next two years.

The first scenario focuses on the US economy and the fact that the debate over the appropriate direction of US economic policy over the next eighteen months if anything is likely to become more polarised than what is currently the case. Periods of optimism and pessimism will correspond with an unstable strengthening/weakening cycle. Under this scenario the US dollar will be at its weakest in the run up to the presidential election next year. If the election results in some resolution which is credible for markets then exchange rates will revert to being driven by fundamentals with the Australian currency commencing a long term decline. This scenario assumes that China and Asia growth rates are relatively unaffected by the bleak growth prospects for developed countries and the Australian currency remains for another two years at least a proxy currency for the not fully convertible Yuan. This is the scenario adopted in this projection.

Another possible scenario is one where the Australian currency begins a long run decline from now on. A third scenario is one where all other currencies strengthen against the \$US. That is the Australian weighted average exchange rate falls. This would allow for a significant fall in "real" commodity prices if not in \$US terms. This scenario is as plausible as the scenario adopted.



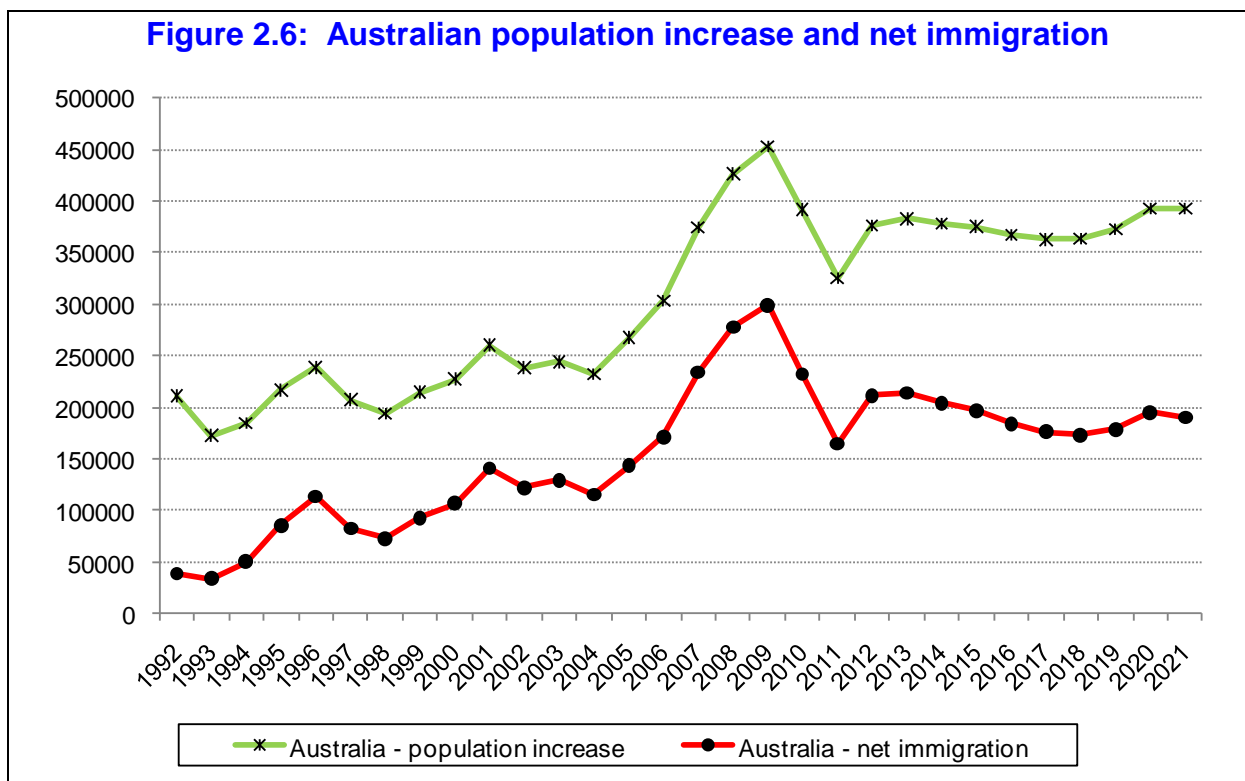
## Population

During 2009 the Australian net international immigration was running at near 300,000, on an annualised basis, which produced a national population growth rate of 2.2 per cent per annum.

The immigration intake is projected to decline below 250,000 for 2010 and between 200,000 and 220,000 for 2011. As a result the population growth rate will decline to 1.6 per cent over 2011.

The rise in the unemployment rate over 2012 due to high interest rates is projected to further reduce the migration rate to a little above 150,000, on an annualised basis, by 2013, with the population growth rate further falling to 1.4 per cent. The higher unemployment rate over 2015-2017 is projected to keep the net immigration rate to between 150,000 and 170,000 and the population growth rate at 1.4 per cent.

The high GDP growth rates at the end of the projection period allow the net immigration rate to return to the 220,000 mark by the end of the projection period, with a population growth rate of 1.5 per cent.



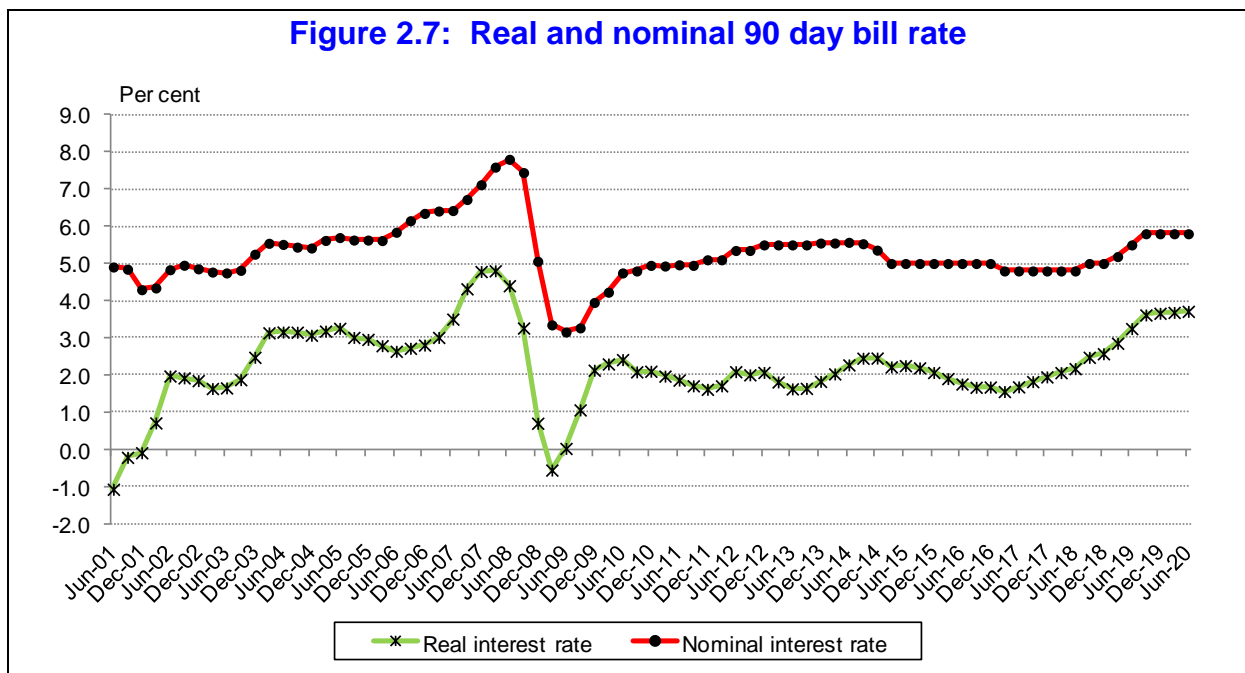
## Interest rates

The more subdued world outlook and as a result a decline in inflationary pressure will mean that neither inflation nor interest rates will reach the levels that would have been expected six months ago.

Over the next two years there will be conflicting pressure on the setting of interest rates. There will be sustained upward pressure on interest rates from the perspective of inflation control especially if, as predicted, the underlying inflation rate exceeds the upper acceptable threshold of 3.0 per cent. The counter pressure will be for interest rates to fall as growth remains below trend and unemployment starts to rise.

The medium-term scenario of rising interest rates embedded in the current projections is not inconsistent with a near-term small reduction in rates. That is, if the financial instability of August-October 2011 continues there may well be a near-term reduction in interest rates.

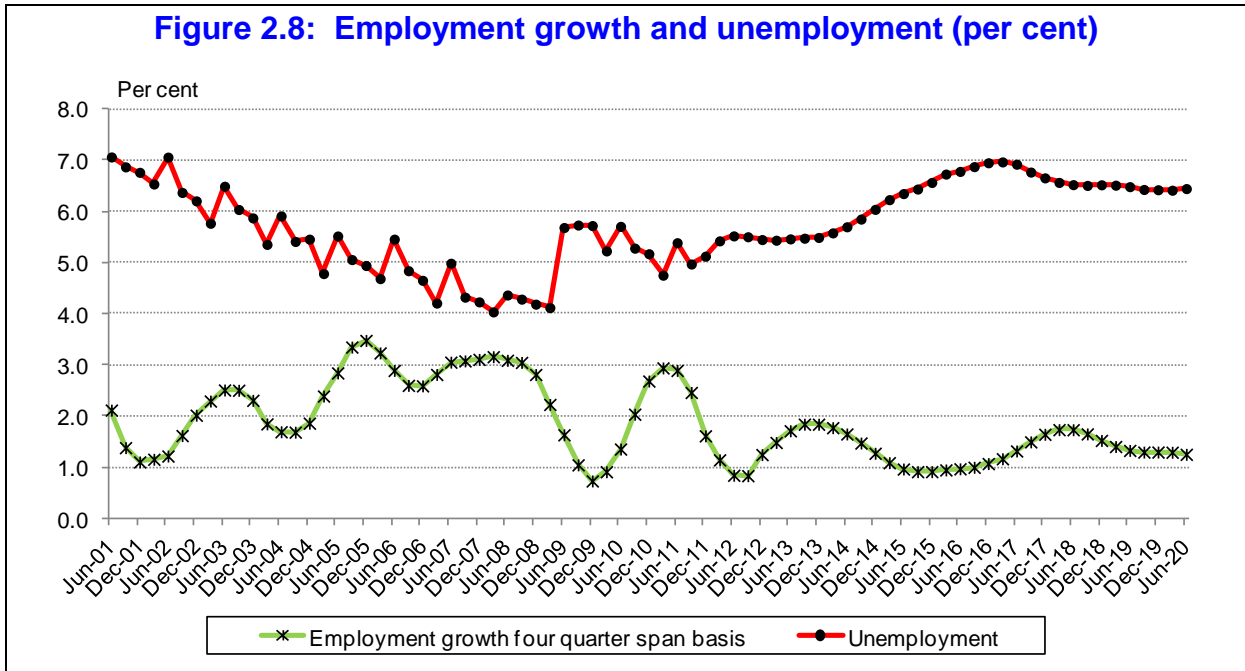
As can be seen from the attached figure, after 2014 when inflationary pressures are brought under control the interest rate cycle follows the traditional economic cycle.



## Employment and unemployment

In the short term, the annual rate of growth of employment will fall to below 2.0 per cent. However, the need to constrain the economy because of the emergence of a 4.0 per cent underlying inflation rate will sustain the relatively low unemployment rate per annum and push the unemployment rate back up to 6.0 per cent by 2015.

The general drag on economic growth from the factors noted above will work to keep the unemployment rate high.

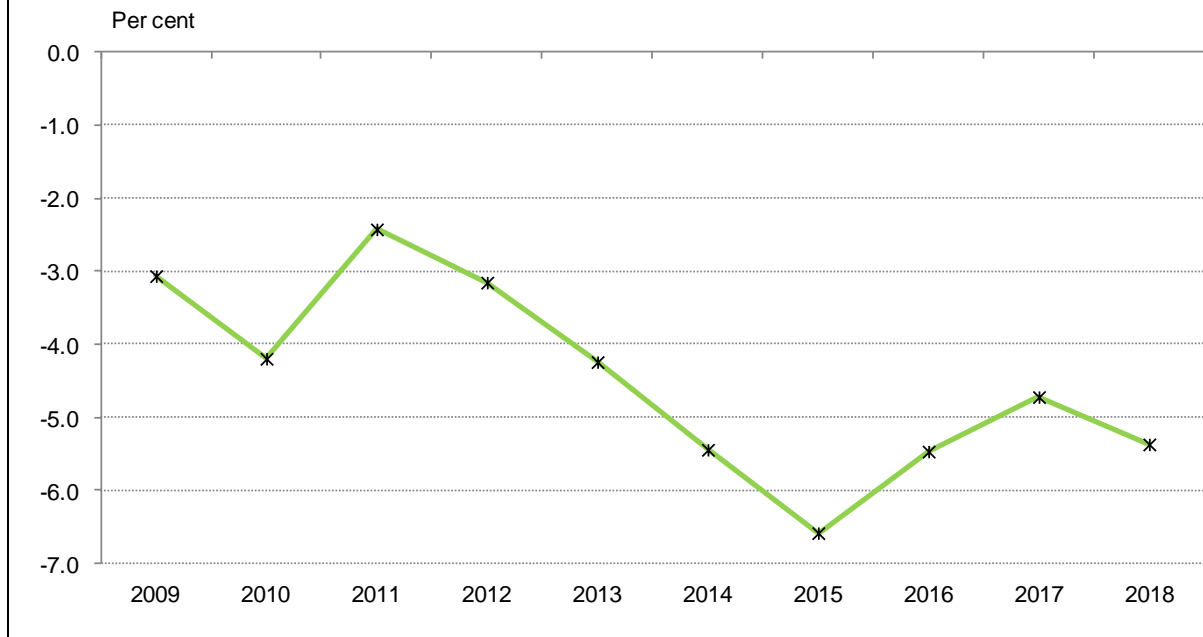


**Table 2.2 Major Australian economic aggregates: fiscal year averages  
(annual per cent rate of change)**

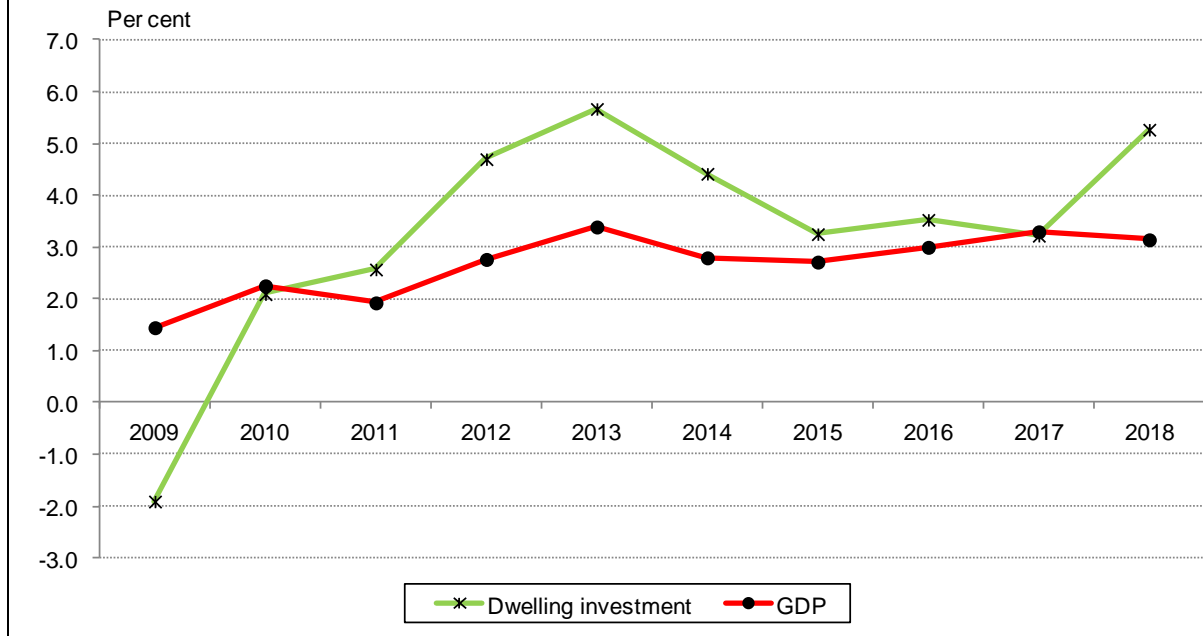
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
<b>International</b>										
World GDP (fiscal year)	-0.9	4.7	3.6	3.2	3.6	3.6	4.2	4.4	4.4	4.3
<b>Demand</b>										
Private consumption	0.2	2.1	3.3	3.0	2.4	3.5	2.9	1.7	1.3	3.0
Business investment	-0.4	-2.3	4.0	9.0	6.9	5.1	-2.4	-1.8	2.4	5.8
Housing	-1.9	2.1	2.6	4.7	5.7	4.4	3.3	3.5	3.2	5.3
Public expenditure	3.6	6.7	4.5	-0.4	0.2	1.1	4.6	4.7	4.3	3.3
Total expenditure	0.8	2.1	3.8	3.5	3.0	3.4	2.0	1.5	2.2	3.7
GDP	1.4	2.3	1.9	2.8	3.4	2.8	2.7	3.0	3.3	3.1
<b>External sector</b>										
Current account deficit (\$B)	-38.5	-53.4	-33.8	-47.5	-67.5	-91.3	-115.6	-100.8	-92.2	-107.9
CAD as per cent of nominal GDP	-3.1	-4.2	-2.4	-3.2	-4.2	-5.4	-6.6	-5.5	-4.7	-5.4
<b>Labour market</b>										
Employment	1.6	1.4	2.9	0.8	1.7	1.7	1.0	1.0	1.3	1.7
Unemployment rate (%)	4.9	5.5	5.1	5.4	5.5	5.7	6.3	6.7	6.9	6.6
Participation rate (%)	65.5	65.4	65.7	65.5	65.4	65.3	65.1	64.9	64.7	64.5
<b>Finance</b>										
90 day bank bill (%)	4.8	4.0	4.9	5.1	5.5	5.5	5.2	5.0	4.9	4.8
10 year bond rate (%)	5.0	5.5	5.3	5.2	5.2	5.0	4.8	4.9	5.2	5.1
\$A/US\$	74.6	88.6	99.0	102.0	99.0	90.8	80.3	77.8	78.6	79.4
Trade weighted index	60.2	68.9	74.0	73.0	69.4	63.1	54.1	51.7	51.9	52.1
<b>Wages and prices</b>										
Wage cost Index	5.1	5.2	4.3	2.2	2.7	2.9	2.4	3.0	3.4	3.3
CPI	3.1	2.3	3.1	3.3	3.9	3.3	2.7	3.2	3.1	2.6

Figures 2.9 and 2.10 show graphically selected indicators for the base scenarios for the Australian economy over the medium term.

**Figure 2.9: Current account deficit as a per cent of nominal GDP**



**Figure 2.10: Housing sector**



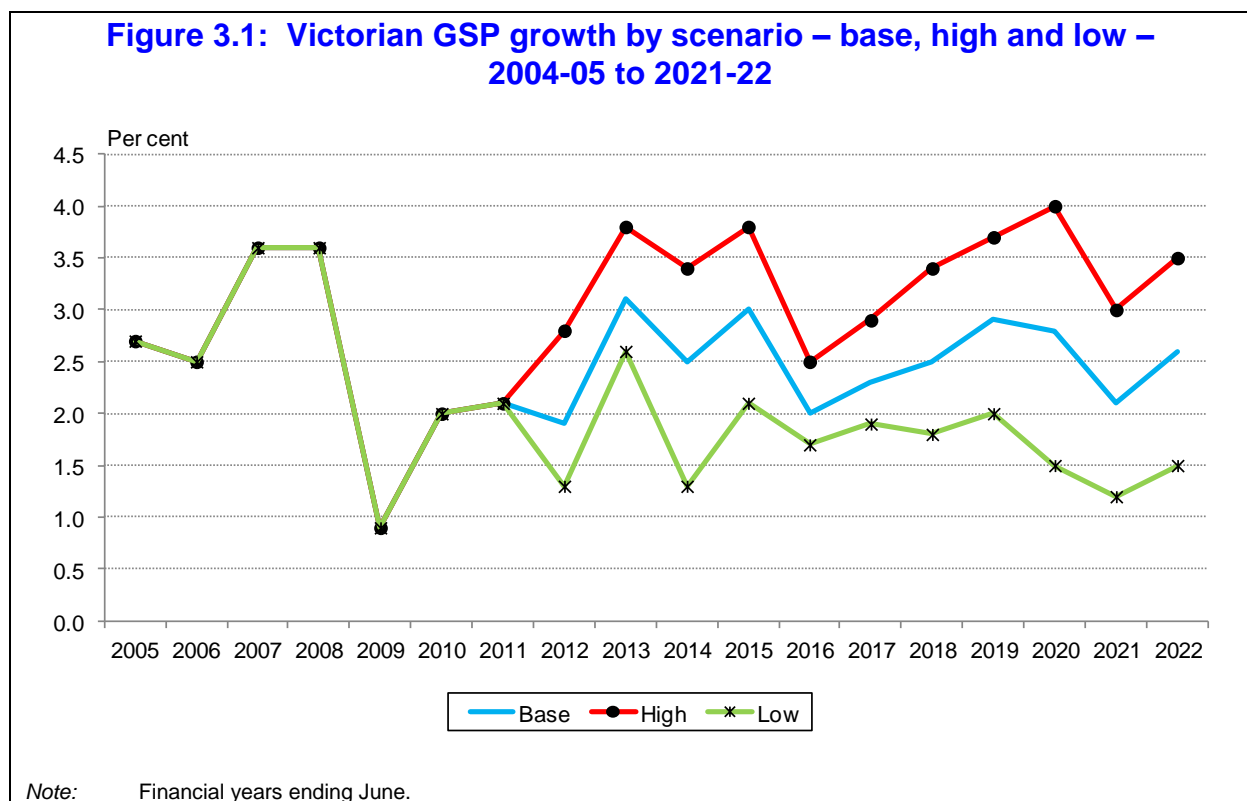
## 3. The outlook for Victoria to 2021-22

### 3.1 Introduction

This section outlines the economic outlook for Victoria to 2021-22, focusing on the base scenario to 2015-16. Selected indicators are, however, provided for the base, medium and high growth scenarios for the Victorian economy.

### 3.2 Summary of scenarios

Figure 3.1 shows the outlook for Victorian GSP growth over the period to 2021-22 for the base, high and low growth scenarios. Victorian GSP growth averages 2.5 per cent per annum under the base scenario between 2010-11 and 2021-22, 3.3 per cent under the high scenario and 1.7 per cent under the low scenario. Table 3.1 shows the projected annual growth rates in GSP for Australia and Victoria by scenario for the period 2010-11 to 2021-22.



**Table 3.1 Projected Australian and Victorian GDP growth rate by scenario – 2004-05 to 2021-22**

	Australia			Victoria		
	Base	High	Low	Base	High	Low
<b>Per cent change</b>						
2005	3.0	3.0	3.0	2.7	2.7	2.7
2006	3.1	3.1	3.1	2.5	2.5	2.5
2007	3.6	3.6	3.6	3.6	3.6	3.6
2008	3.8	3.8	3.8	3.6	3.6	3.6
2009	1.4	1.4	1.4	0.9	0.9	0.9
2010	2.3	2.3	2.3	2.0	2.0	2.0
2011	1.9	1.9	1.9	2.1	2.1	2.1
2012	2.8	4.0	1.5	1.9	2.8	1.3
2013	3.4	4.2	1.6	3.1	3.8	2.6
2014	2.8	3.5	1.5	2.5	3.4	1.3
2015	2.7	3.6	1.6	3.0	3.8	2.1
2016	3.0	3.8	2.4	2.0	2.5	1.7
2017	3.3	3.9	2.7	2.3	2.9	1.9
2018	3.1	3.7	2.6	2.5	3.4	1.8
2019	2.8	3.5	2.4	2.9	3.7	2.0
2020	2.7	4.2	2.2	2.8	4.0	1.5
2021	3.1	4.1	1.9	2.1	3.0	1.2
2022	3.3	4.0	2.1	2.6	3.5	1.5
<b>Compound growth rate (per cent)</b>						
2011-2015	2.9	3.8	1.5	2.6	3.5	1.8
2011-2022	3.0	3.9	2.0	2.5	3.3	1.7

Note: All growth rates refer to financial years ending June.



### 3.3 The base scenario outlook for Victoria to 2015-16

Table 3.2 presents selected economic aggregates for Victoria to 2015-16 for the base scenario. A commentary on the main indicators is provided below.

<b>Table 3.2 Macroeconomic aggregates and selected indicators – Victoria (per cent change)</b>									
	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	Compound growth rate 2010-11 to 2015-16
Private consumption	0.2	2.2	3.9	3.7	2.4	3.5	3.1	1.8	2.9
Private business investment	-3.4	0.1	-2.7	-8.4	9.4	11.1	-0.5	-9.9	0.4
Private dwelling investment	7.9	6.1	7.9	7.5	0.0	0.2	-0.8	-7.7	-0.2
Government consumption	2.8	2.6	3.0	2.9	2.9	3.4	2.8	3.0	3.0
Government investment	15.9	25.7	14.6	-7.8	-4.3	-9.4	13.7	15.3	1.5
State final demand	0.8	3.3	3.4	1.4	2.9	3.7	2.7	0.4	2.2
Gross state product	0.9	2.0	2.1	1.9	3.1	2.5	3.0	2.0	2.5
Population	2.2	2.0	1.6	1.7	1.7	1.7	1.7	1.6	1.7
Employment	0.8	2.8	3.5	1.1	1.8	1.6	1.5	1.2	1.4

Source: NIEIR and ABS.

#### **Gross state product**

Victorian GSP growth is forecast to be 1.9 per cent in 2011-12, before strengthening to 3.1 per cent in 2012-13.

The growth in Victoria GSP in 2010-11 follows two years of growth of around 2.0 per cent. Victorian GSP growth has been near the national GDP growth rate over the last two years.

Stronger GSP growth in Victoria in 2012-13 is underpinned by strong household expenditure growth, a rise in private business investment and a high level of dwelling construction expenditure. Victorian GSP growth is forecast to be 3.1 per cent in 2012-13.

Victorian GSP growth slows to 2.5 per cent in 2013-14 and then to 3.0 per cent in 2014-15. Falls in both dwelling construction and business investment expenditures in 2015-16 lead to a weaker Victorian GSP growth of 2.0 per cent.

Over the 2010-11 to 2015-16 period Victorian GSP growth averages 2.5 per cent per annum. This is only around 0.4 percentage points below the projected national GDP growth rate over the same period.

## ***Population***

Victorian population growth slowed to 1.6 per cent in 2010-11 as net overseas migration gains fell to more sustainable levels.

Victorian recorded population growth of 2.2 per cent in 2008-09 and 2.0 per cent in 2009-10. These high levels of population growth were supported by very large increases in net overseas migration following the GFC. For example, Victoria recorded a net overseas migration gain of nearly 84,000 persons in 2009-10. In 2010-11, Victoria's net overseas migration gain should be around 52,000 persons.

Despite reduced levels of net overseas migration, strong employment growth in Victoria has helped support small net interstate migration gains. The net interstate migration gain by Victoria in 2009-10 was around 2,500 persons and in 2010-11 it is expected to be around 3,500 persons.

Victoria's projected population growth rate remains relatively strong over the next five years, averaging 1.7 per cent per annum over the 2010-11 to 2015-16 period.

## ***Private consumption expenditure***

Victorian private consumption expenditure growth was 3.9 per cent in 2010-11, following growth of 2.2 per cent in 2009-10. Private consumption expenditure growth following the GFC in 2008-09 was only 0.2 per cent. The slowdown in private spending following the GFC, however, did lead to a significant improvement in the household savings ratio.

Victorian private consumption expenditure will be supported by strong income and employment growth, partly reflecting a strong housing construction sector over 2011-12 and 2012-13. Growth is projected to be 3.7 per cent in 2011-12 and 2.4 per cent in 2012-13.

Overall, Victorian private consumption expenditure growth averages 2.9 per cent per annum over the 2010-11 to 2015-16 period.

## ***Private business investment***

Victorian private business investment fell by 2.7 per cent in 2010-11 and a further 8.4 per cent in 2011-12.

Taken in context, however, overall levels of Victorian business investment remain high. Indeed, up to 2009 business investment in Victoria had risen every year since 1998-99. Overall expenditure levels were some \$43 billion in 2010-11, with around \$14 billion in building and construction and \$29 billion in machinery and equipment expenditures.

Private business investment in Victoria is forecast to rise by 9.4 per cent in 2012-13 and 11.1 per cent in 2013-14. These increases should partly offset the projected falls in public capital expenditure, the latter associated with the winding down of capital expenditures associated with the Government's stimulus packages.

Overall, growth in Victorian private business investment is 0.4 per cent over the 2010-11 to 2015-16 period.

### ***Private housing expenditure***

Private dwelling investment rose by 7.9 per cent in 2010-11 and is forecast to rise by nearly 8.0 per cent in 2011-12.

Very strong underlying demand conditions were generated in Victoria despite the Global Financial Crisis. Population growth exceeded 2.0 per cent in 2008-09 and was 2.0 per cent in 2009-10.

Private dwelling approvals rose from 41,280 in 2008-09 in Victoria to 55,204 in 2009-10, an increase of around 34 per cent. In 2010-11, private sector dwelling approvals rose to over 58,000 units in Victoria.

In Victoria overall levels of expenditure on new dwellings are expected to remain high through 2012-13 and 2013-14, before declining in 2014-15 and 2015-16. The latter partly reflects higher nominal interest rates by 2014.

### ***Government expenditure***

Public consumption expenditure in Victoria has increased quite rapidly over recent years. Growth of 2.6 per cent was recorded in 2009-10 and 3.0 per cent growth is forecast for 2010-11. On average, Victorian public consumption expenditure averages 3.0 per cent growth between 2010-11 and 2015-16, partly reflecting continued solid population and economic growth.

Victorian Government investment expenditure rose by 25.7 per cent in 2009-10 and is expected to rise by a further 14.6 per cent in 2010-11. These increases reflect the Commonwealth's stimulus package as well as increased Victorian Government capital outlays. In the 2009-10 Budget, the Government announced net infrastructure spending of \$7 billion in 2009-10 and an average \$4.4 billion per year from 2010-11 to 2012-13. These expenditures are being reviewed by the new Government elected in late 2010.

Government investment falls quite sharply over the 2011-12 to 2013-14 period as expenditures associated with State and Commonwealth initiatives are completed. Government capital expenditures rise again by 2014-15 and 2015-16.

<b>Table 3.3 Multinet – selected indicators</b>			
	<b>Gross regional product</b>	<b>Population</b>	<b>Dwelling stock</b>
2005	75118	1649860	621410
2010	85133	1762968	640714
2011	86475	1785538	645357
2012	88109	1813273	650135
2013	90705	1843072	655051
2014	92373	1868862	659956
2015	94282	1893588	664884
2016	95795	1915717	669500
2017	97666	1933720	673980
2018	99566	1950478	678429
2019	101734	1969089	682890
2020	104001	1989207	687451
2021	106214	2011415	692054
<b>Compound growth rate (per cent)</b>			
2005-2010	2.5	1.3	0.6
2010-2021	2.0	1.2	0.7

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## 4. Natural gas forecasting methodologies and modelling assumptions

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This section outlines the methodologies employed and the key modelling assumptions used in developing Victorian natural gas consumption forecasts by tariff and class for each distribution business.

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

Other key components of the methodology were:

- The application of NIEIR's Victorian regional energy model;
- a survey of the top 200 industrial contract customers in Victoria; and
- **as far as possible achieving consistency in the input assumptions and forecasts with the AEMO (Australian Energy Market Operator) gas forecasting work and the 2011 VAPR update.**

Victoria's regional energy model is an economic and energy model. It is based on 11 Statistical Sub-Divisions and 31 Local Government Areas in greater Melbourne. The model produces forecasts of population, the dwelling stock growth and estimates of gross regional product for these Statistical Divisions and Local Government Areas. The allocation of these regions across the gas distribution businesses and by pricing zone is outlined in Appendix A.

The energy projections for each business are directly linked to economic indicators for each business, although as noted above, many components of the forecast were made consistent with the AEMO projection.

### 4.1 Methodology – natural gas consumption forecasts

Natural gas consumption forecasts were prepared on a calendar year basis for each distribution business to 2021.

Calendar year forecasts were prepared for the following tariff groups for each distribution region (and pricing zone):

- Tariff D; and
- Tariff V.

Tariff D was disaggregated and forecast by ANZSIC sector as indicated in Table 4.1.

Multinet provided the following information to NIEIR to develop the gas forecasts.

- Total daily gas usage for the Multinet region from 2005 to December 2010.
- Total Tariff D daily usage, including UFAG estimates.
- Tariff D daily usage by customer from 2005 to 2010.
- Consumption history of 80,000 existing customers.

- New customer MIRNS from 2006 to 2010 and their billings history to the end of 2010.
- Actual annual MHQs by customer for 2005 to 2010.
- Other information describing the Multinet network in Victoria.

### ***Tariff V – Residential volumes and customers***

Tariff V sales for each business were determined from the total boundary gas usage for each business less Tariff D sales, including losses.

The loss rates for Tariff V were as follows:

Multinet	0.044
Envestra	0.033

Billed information, usually supplied on a billed or billed linearised basis, was used to allocate Tariff V sales into residential and business sales.

The pricing zone Tariff V data was similarly derived by using the billed data by class to split up the total distribution Tariff V sales by class into pricing zones.

It is important to note that the residential and business Tariff V volumes will differ from those reported by distribution businesses in their templates for the Commission. The templates may contain billed or accrued billings data. Given this difference, the businesses should apply the NIEIR growth rates to the billings based data to obtain forecast volumes on a consistent basis.

Residential sales were forecast using an end-use type modelling approach. Average gas usages of new and existing customers were modelled separately. This allowed the major policy changes such as the 6-Star Standard for new homes and changes to Minimum Energy Performance Standards (MEPs) to be directly modelled.

NIEIR undertook a detailed analysis of residential customer accounts data from Multinet and Envestra Victorian distribution businesses. Samples were taken of both new and existing residential customers. The weather normalised new customer average usage was identified from the sample of new meters.

Section 4 of this report outlines in further detail the specific modelling methodology for projecting residential Tariff V usage.

The approach adopted by NIEIR in modelling residential sales virtually duplicates exactly the approach adopted in preparing the AEMO 2011 forecast. That is, the reduction in new customer usage per year is identical to the AEMO assumptions, after taking into account losses.

The distribution businesses' projections for dwelling stock growth and new gas connections are consistent with NIEIR's State-wide projections and the 2011 AEMO projection.

### **Tariff V – Business volumes and customers**

Most businesses supplied four to five years of billing information for Tariff V customers. It was disaggregated into residential class and business class.

Given the short time series of annual billed data, NIEIR did not estimate new forecasting equations for Tariff V business sales for each business. Instead, NIEIR used an existing commercial equation estimated previously using ABARE energy consumption data for Victoria. This equation uses commercial output and real gas prices to drive Tariff V business sales by business.

### **Tariff D – Volumes, customers and MHQ**

The forecasts for Tariff D for volumes, customers and maximum hourly quantity were prepared on an industry basis. Tariff D for each business was modelled on the basis of actual Tariff D usage plus losses.

NIEIR obtained individual Tariff D customer data from each business. These customers were then ANZSIC or industry coded. In some cases, NIEIR drew on previous work in this area for AEMO and the individual businesses. Where zone based data was required, postcode identifiers were used to allocate Tariff D customers to each pricing zone.

Table 4.1 shows the Australian and New Zealand Standard Industrial Classification (ANZSIC) categories included in NIEIR's Victorian gas forecasting model. Table 4.1 also shows the concordance between customer class categories and ASIC industry categories. Gas consumption forecasts for Tariff D are based on econometric models which link Victorian gas consumption by industry to real output growth by industry, real natural gas prices and weather conditions. The Tariff D forecasts were also partly determined by the results of a survey of major Tariff D customers.

<b>Table 4.1 Reconciliation of customer class categories with ASIC industries</b>	
<b>Customer class category</b>	<b>ANZSIC</b>
<b>Residential<sup>1</sup></b>	
<b>Commercial</b>	Electricity, gas, water and sewerage Construction Wholesale and retail trade Transport and storage, communication services Finance, property, business services Public administration and defence and community services Accommodation, cafes, restaurants and recreation, personal and other services
<b>Industrial</b>	Agriculture, forestry, fishing, hunting Mining Food, beverages, tobacco manufacturing Textiles, clothing and footwear manufacturing Wood, wood products manufacturing, paper products manufacturing Chemicals, petroleum, coal manufacturing Non-metallic minerals manufacturing Basic and fabricated metal products manufacturing Transport and other machinery and equipment manufacturing Miscellaneous manufacturing

Notes: ASIC refers to Australian and New Zealand Standard Industrial Classification.

1. The farm class which excludes residential farm is included in the industrial sector.

The rationale for adopting an industry based approach for Tariff D is that the sectoral outlooks for each sector can then feed through and affects volume and MHQ movements over the forecast period. For example, if manufacturing is in decline and commercial is growing, these compositional changes are directly reflected in the forecast for Tariff D for each distribution business. This is the same methodological approach adopted for the AEMO Tariff D forecast.

Projections of maximum hourly quantity (MHQ) for each business were again derived on an industry basis. The projections of MHQ are linked to the energy growth by industry and a load factor by industry.

In a number of industries the change in MHQ will be closely related to energy use. These would typically only be in a small number of energy intensive industries that operate with very high capacity factors. The vast majority of Tariff D customers, however, would operate at much lower capacity factors.



## 4.2 Gas demand and weather conditions

The level of gas demand in any given year is highly sensitive to the weather conditions experienced during the year. Particularly in the residential segment of the gas market where gas is widely used for space and water heating, variations in weather patterns between years can lead to quite significant fluctuations in levels of annual gas demand.

Because of the highly unpredictable nature of future weather conditions, it is conventional to prepare forecasts of gas demand assuming that typical or “normal” weather conditions will prevail in future years; that is, weather conditions will be neither seasonally colder nor warmer than normal.

To develop forecasts on this basis, historical annual demand readings need to be first adjusted for “abnormal” weather conditions – a process often called weather normalisation.

### 4.2.1 Weather normalisation

The weather normalisation of historical gas demand is typically undertaken in three steps:

- (a) identifying normal – year weather conditions;
- (b) establishing a relationship between gas demand and weather conditions; and
- (c) combining information derived in (a) and (b) and computing weather normalised estimates.

#### (a) Normal weather

Temperature is the primary contributor to variations in demand for gas within a year; other factors such as wind and sunshine also appear to be important particularly during extreme cold weather events. The Australian Energy Market Operator (AEMO) maintains a composite weather measures – called the Effective Degree Days Index – which combined together a number of weather metrics into a single summary indicator. This Index was developed by the Victorian Gas and Fuel Corporation of Victoria in late 1970s and has been extensively used by gas market participants to gauge the impact of weather on gas demand in the Victorian gas market.

For this study, the effective degree index has been used to measure historical weather conditions. An extensive discussion of the Index’s design is provided in the AEMO’s 2009 Victorian Annual Planning Report Update.<sup>1</sup> The Index’s current formulation is as follows:

$$\begin{aligned} \text{Effective Degree Day} = & \text{Degree Days} && \text{(Temperature Effect)} \\ & + \alpha * (\text{Degree Days}) * (\text{Wind Speed}) && \text{(Wind Chill)} \\ & + \beta * (\text{Sunshine}) && \text{(Sunshine Hours)} \\ & + 2 * \text{Cosine} (2\pi(\text{day} - 200)/365) && \text{(Seasonality)} \end{aligned}$$

Where:

Degree Day = 18 minus Temperature if Temperature is less than 18, otherwise zero.  
 $\alpha = 0.023$  and  $\beta = - 0.18$ .

---

<sup>1</sup> See AEMO (2009), ‘Victorian Annual Planning Report: Update’, December 2009, Appendix A2 <http://www.aemo.com.au/planning/0400-0003.pdf>.

The daily readings of the index are published on the AEMO website at <http://www.aemo.com.au/>.

In 2010, the total annual number of Effective Degree Days (or EDDs for short) was 1,415. Over recent decades, the annual number of Effective Degree Days has been trending downwards; on average, the rate of decline has been around 7.7 EDDs per annum. The declining trend is consistent with well-documented global and urban warming effects impacting Victoria's climate.

The tendency towards warmer weather (i.e., a lower annual number of Effective Degree Days) suggests that weather conditions that might have been considered as typical or "normal" a few decades ago would be regarded as very cold weather conditions today and a simple historical average of the annual totals would provide a misleading picture of normal-year weather conditions.

A long-term trend arguably provides a more representative measure of normal-year weather conditions. On this basis, if weather conditions were "normal" in 2010 one would have expected the annual number of Effective Degree Days to be around 1,327. This result implies that weather conditions in 2010 were 'colder than normal' and that the level of annual gas demand in 2010 has been somewhat inflated by the cold weather conditions.

It is important to note that the Effective Degree Day index has been designed primarily to measure the weather conditions experienced during the non-summer months. It does not reflect weather conditions in the summer months; typically daily readings of the index during the summer months are zero. However, extremely hot (or conversely usual cool) summer can also affect the level of gas demand; for instance, the need for water heating is reduced by hot weather conditions, with consumers more likely to have a cooler-than-normal showers on a hot summer day.

For this study, a counterpart index of summer weather conditions has been used in the normalisation process. This index is based on the popular 'cooling degree day' indicator, which measure the number of degree above a threshold temperature. It is formulated as follows:

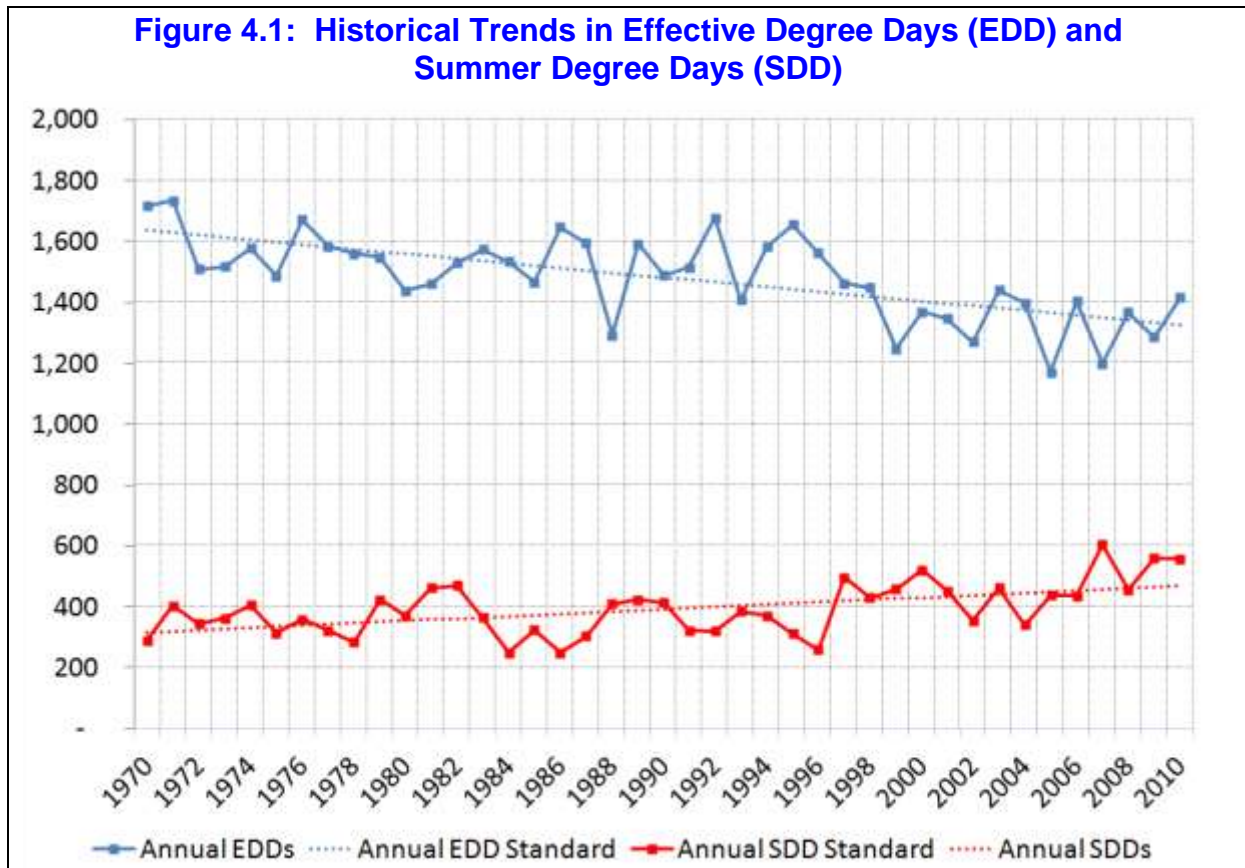
(Summer) Degree Days = Temperature minus 18 if Temperature is greater than 18,  
otherwise zero.

Where:

Temperature = the arithmetic mean of daily minimum and maximum temperatures.

In 2010, the annual number of 'Summer Degree Days' was 557. In contrast with the Effective Degree Days Index, the annual number of summer degree days has steadily trended upwards over recent decades. On average, the rate of increase has been around 9 per annum.

Based on long-term trend estimation, if summer weather conditions were "normal" in 2010 one would have expected the annual number of Summer Degree Days to be around 469. This results suggests that summer weather conditions in 2010 were 'hotter than normal' and that the level of annual gas demand in 2010 has been somewhat depressed by the hotter-than-normal weather conditions.



**(b) Modelling gas demand and weather**

Using daily data, the following model was estimated using regression analysis for each tariff:

$$\begin{aligned}
 \text{Demand} = & \text{constant} \\
 & + a * (\text{Effective Degree Day}) \\
 & + b * (\text{Summer Degree Day}) \\
 & + c * (\text{Saturday flag, 1 if true; zero otherwise}) \\
 & + d * (\text{Sunday flag, 1 if true; zero otherwise}) \\
 & \dots (\text{Other deterministic variables}) \\
 & + (\text{error})
 \end{aligned}$$

Where  $a$ ,  $b$ ,  $c$ ,  $d$  ... are estimate coefficients.

Tables 4.2 and 4.3 present estimated coefficients from the regression analysis for Multinet and Envestra, respectively.

<b>Table 4.2 Regression analysis for Multinet*</b>								
<b>Tariff V (Uafg adjusted)</b>								
<b>Yr</b>	<b>Constant</b>	<b>EDD</b>	<b>SDD</b>	<b>Monday</b>	<b>Friday</b>	<b>Saturday</b>	<b>Sunday</b>	<b>R Sqd</b>
2006	57.0	19.8	-2.1	NA	NA	-7.3	1.0	0.97
2007	58.4	19.4	-2.4	NA	NA	-6.8	-7.5	0.98
2008	61.7	19.5	-2.8	NA	NA	-6.8	-6.7	0.97
2009	60.5	19.9	-2.5	NA	NA	-7.2	-10.9	0.97
2010	58.2	19.9	-2.5	NA	NA	-1.4	-5.7	0.98
<b>Tariff D (Uafg adjusted)</b>								
<b>Yr</b>	<b>Constant</b>	<b>EDD</b>	<b>SDD</b>	<b>Monday</b>	<b>Friday</b>	<b>Saturday</b>	<b>Sunday</b>	<b>R Sqd</b>
2006	40.7	1.0	-0.4	-1.9	-4.4	-15.3	-13.2	0.77
2007	38.9	0.9	-0.4	-2.0	-2.7	-13.2	-14.0	0.79
2008	36.3	0.4	-0.4	-1.2	-2.6	-12.5	-13.0	0.76
2009	33.7	1.0	-0.3	-1.2	-3.1	-12.5	-13.0	0.83
2010	33.1	1.0	-0.2	-1.3	-3.2	-11.8	-12.3	0.84

Note: \* Excludes South Gippsland.

<b>Table 4.3 Regression analysis for Envestra*</b>								
<b>Network injections less telemetry customers</b>								
<b>Yr</b>	<b>Constant</b>	<b>EDD</b>	<b>SDD</b>	<b>Monday</b>	<b>Friday</b>	<b>Saturday</b>	<b>Sunday</b>	<b>R Sqd</b>
2006	45.9	13.7	-1.5	NA	NA	-7.9	-1.4	0.97
2007	48.6	13.6	-2.0	NA	NA	-6.7	-6.8	0.98
2008	50.0	13.9	-1.9	NA	NA	-7.5	-7.7	0.97
2009	51.1	14.4	-1.3	NA	NA	-7.8	-10.5	0.96
2010	46.9	14.8	-1.7	NA	NA	-1.1	-5.8	0.98
<b>Telemetry metered customers</b>								
<b>Yr</b>	<b>Constant</b>	<b>EDD</b>	<b>SDD</b>	<b>Monday</b>	<b>Friday</b>	<b>Saturday</b>	<b>Sunday</b>	<b>R Sqd</b>
2006	69.0	0.2	-0.6	-1.0	-4.1	-16.5	-12.9	0.58
2007	65.7	0.8	-0.5	-0.3	-3.6	-17.3	-16.1	0.66
2008	63.0	0.9	-0.5	0.0	-1.0	-14.6	-14.3	0.59
2009	60.4	0.6	-0.5	-2.3	-3.3	-15.4	-18.2	0.64
2010	63.7	0.9	-0.6	-0.7	-3.8	-15.9	-15.4	0.78

Note: \* Combined Central and North.

### (c) Computing weather normalised estimates

The weather normalised estimates of annual gas demand are computed by fitting the following equation:

$$\begin{aligned} \text{Weather normalised annual demand} = & \\ & \text{constant} * (\text{Number of days in the year}) \\ & + a * (\text{Annual number of Effective Degree Days in a normal year}) \\ & + b * (\text{Annual number of Summer Degree Days in a normal year}) \\ & + c * (\text{Number of Saturdays in the year}) \\ & + d * (\text{Number of Sundays in the year}) \\ & + \dots \end{aligned}$$

Weather normalised estimates of gas demand for each tariff period (peak, off-peak and shoulder) are computed in similar manner:

$$\begin{aligned} \text{Weather normalised tariff period demand} = & \\ & \text{constant} * (\text{Number of days in tariff period}) \\ & + a * (\text{Number of Effective Degree Day sin tariff period in a normal year}) \\ & + b * (\text{Number of Summer Degree Days in tariff period in a normal year}) \\ & + c * (\text{Number of Saturdays in tariff period}) \\ & + d * (\text{Number of Sundays in tariff period}) \\ & + \dots \end{aligned}$$

The gas demand due to abnormal weather conditions can be computed using the following equation:

$$\text{Abnormal Gas Demand} = \text{Observed Gas Demand} - \text{Weather Normalised Gas Demand}$$

Tables 4.4 and 4.5 present observed and normalised annual gas flows for Multinet and Envestra, respectively.

<b>Table 4.4 Observed and normalised annual gas flows for Multinet*</b>								
<b>Tariff V (Uafg adjusted)</b>								
<b>Year</b>	<b>Observed gas flows</b>				<b>Normalised gas flows</b>			
	<b>Peak</b>	<b>Off-peak</b>	<b>Shoulder</b>	<b>Total</b>	<b>Peak</b>	<b>Off-peak</b>	<b>Shoulder</b>	<b>Total</b>
2006	26,115	12,223	9,006	47,343	26,502	11,433	8,459	46,394
2007	26,109	9,616	6,621	42,346	26,067	11,240	8,346	45,653
2008	26,577	12,207	8,454	47,237	26,476	11,716	8,530	46,722
2009	25,510	10,916	8,909	45,335	26,569	11,492	8,475	46,536
2010	28,815	10,568	8,230	47,614	26,377	11,306	8,398	46,082
<b>Tariff D (Uafg adjusted)</b>								
<b>Year</b>	<b>Observed gas flows</b>				<b>Normalised gas flows</b>			
	<b>Peak</b>	<b>Off-peak</b>	<b>Shoulder</b>	<b>Total</b>	<b>Peak</b>	<b>Off-peak</b>	<b>Shoulder</b>	<b>Total</b>
2006	5,320	6,448	2,500	14,268	5,341	6,401	2,474	14,216
2007	5,091	6,002	2,296	13,388	5,088	6,124	2,381	13,593
2008	4,351	5,720	2,096	12,167	4,350	5,702	2,101	12,153
2009	4,491	5,240	2,059	11,790	4,542	5,289	2,039	11,870
2010	4,647	5,259	2,005	11,911	4,524	5,299	2,013	11,836

Note: \* Excludes South Gippsland.

**Table 4.5 Observed and normalised annual gas flows for Envestra\***

Network injections less telemetry customers								
Year	Observed Gas Flows				Normalised Gas Flows			
	Peak	Off-peak	Shoulder	Total	Peak	Off-peak	Shoulder	Total
2006	18,752	9,451	6,582	34,785	19,020	8,903	6,205	34,128
2007	19,156	7,899	5,081	32,135	19,126	9,071	6,290	34,487
2008	19,609	9,699	6,361	35,669	19,537	9,351	6,414	35,302
2009	19,250	9,359	6,857	35,466	20,016	9,729	6,542	36,287
2010	21,866	8,584	6,335	36,785	20,050	9,113	6,461	35,625
Telemetry metered customers								
Year	Observed Gas Flows				Normalised Gas Flows			
	Peak	Off-peak	Shoulder	Total	Peak	Off-peak	Shoulder	Total
2006	8,026	11,352	4,036	23,413	8,032	11,326	4,033	23,391
2007	8,143	10,685	3,893	22,721	8,140	10,803	3,969	22,911
2008	8,007	10,586	3,848	22,440	8,004	10,557	3,855	22,416
2009	7,211	9,735	3,515	20,461	7,240	9,787	3,504	20,531
2010	8,151	10,347	3,800	22,298	8,038	10,431	3,805	22,274

Note: \* Combined Central and North.

#### 4.2.2 Long-term impact of global and urban warming on future annual gas demand

As noted above, weather conditions have been warming over recent decades. This has reduced the need for heating and in turn, reduced gas demand. If this trends continues (and current scientific opinion suggest it will), future demand for gas will be further reduced.

Estimates of the annual historical impact of global and urban warming on gas demand can be computed using the following formulation:

$$\begin{aligned} \text{Annual impact of global and urban warming} = & \\ & a * (\text{change in annual number of Effective Degree Day in a normal year}) \\ & + b * (\text{change in annual number of Summer Degree Day in a normal year}) \end{aligned}$$

Using the above regression results and trend analysis of weather conditions, Table 4.6 presents indicative estimates of the annual historical impact of global and urban warming on gas demand for both Multinet and Envestra.

<b>Table 4.6 Annual historical impact of global and urban warming on gas demand (TJ)</b>				
	<b>Multinet*</b>		<b>Envestra**</b>	
	<b>Tariff V</b>	<b>Tariff D</b>	<b>Non-telemetry</b>	<b>Telemetry</b>
2006	-161.3	-8.2	-111.8	-4.2
2007	-159.8	-8.0	-112.8	-8.0
2008	-161.9	-4.0	-115.2	-8.6
2009	-163.7	-7.9	-116.4	-6.0
2010	-163.9	-7.8	-121.2	-9.4
Annual Average	-162.1	-7.2	-115.5	-7.3

Notes: \* Excludes South Gippsland.  
 \*\* Combined Central and North.

Based on these estimates, if this warming trend continues the level of annual gas demand for Multinet in 2018 is likely to be (all other things constant) around 0.85 PJ lower than its level in 2012. Similarly, annual gas demand for Envestra in 2018 is likely to be around 0.7 PJ lower than its level in 2012.

### **4.3 Survey of major gas customers' expected gas usage**

NIEIR surveyed almost 200 Victorian major gas customers regarding recent and future consumption of gas. The survey results have been summarised by AEMO in the "Gas *Statement of Opportunities 2011*, Attachment A1, Victorian gas DTS medium term outlook".

The survey returned a very high response rate and the individual Tariff D customers are industry coded. The survey requests Tariff D customers to supply volume forecasts to 2020-21 and the reasons for any changes in gas usage (e.g. plant expansion, closure, fuel conversion).

The survey also requests details of cogeneration plant installed at each site, and any planned cogeneration plant in the future.

The collated survey results were used by NIEIR to complete the industry based Tariff D forecast. The survey results were also collated on an industry and distribution business basis. The survey results cannot be reproduced in this report due to confidentiality issues.



## 4.4 Other impacts on Tariff D use in Victoria

### 4.4.1 Recent public announcements

In addition to undertaking a survey, the National Institute also gathers information released by major gas customers about planned changes to their operations.

In recent years, there has been a steady stream of public announcements of plant closures and downsizings from the Victorian manufacturing sector, notably:

- in 2008, South Pacific Tyres cease manufacturing at Somerton;<sup>2</sup> and
- Huntsman Chemicals closed its West Footscray styrene plant at year end 2009, and closed its polystyrene and expandable polystyrene plants in early 2010<sup>3</sup>

These closures coincided with a scaling back of production at a number of other manufacturing operations across the state in the wake of the Global Financial Crisis; for instance, Alcoa announced reduced production at its Portland Aluminium operations in April 2009.<sup>4</sup> While production levels for some plants have since recovered, at many site they remain at reduced levels.

Looking forward, there are some further foreshadowed closures scheduled for the next few years; these include:

- the planned closure of the Amcor paper mill in Alphington at the end of 2012;<sup>5</sup> and
- the planned closure of Austral Brick (formerly Nubrik) plants at Craigieburn and Summerhill during 2011;<sup>6</sup>

Over the past year with the strengthening Australian dollar, the number of announced closures has increased sharply. Some new announcements this year include:

- closure of BlueScope Steels Western Port Hot Strip Mill;<sup>7</sup>
- closure of CSR's Viridian glass plant at Dandenong and Ingleburn;<sup>8</sup>
- closure of Coca-Cola Amatil's SPC Ardmona food processing plant at Mooroopna;<sup>9</sup> and
- closure of Heinz's food processing plant at Girgarre.<sup>10</sup>

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<sup>2</sup> <http://www.beaurepaires.com.au/about-us/history/>.

<sup>3</sup> Huntsman Chemicals (2009) 'Huntsman to Close Australian Styrenics Operations', 07 Sep 2009.

<sup>4</sup> Alcoa (2009) "Plan for management of Portland Aluminium through downturn", media release, 29 April 2009.

<sup>5</sup> <http://www.yarracity.vic.gov.au/Planning--Building/Major-developments/Amcor-Site-Alphington/>.

<sup>6</sup> Brickwork (2011) 'NEW BRICK PLANT A WIN FOR SHAREHOLDERS, CUSTOMERS AND THE ENVIRONMENT', media release 1 July 2011.

<sup>7</sup> BlueScope Steel (2011), 'BLUESCOPE ANNOUNCES MAJOR RESTRUCTURE TO AUSTRALIAN OPERATIONS AND REINFORCES COMMITMENT TO STEEL PRODUCTION IN AUSTRALIA', media release 22<sup>nd</sup> August 2011.

<sup>8</sup> CSR (2011) 'Restructure of Viridian glass business and trading update', media release 1<sup>st</sup> September 2011.

<sup>9</sup> Coca-Cola Amatil (2011) 'Result of SPC Ardmona business review', media release, 8 August 2011.

<sup>10</sup> Heinz Australia announces productivity initiative to accelerate future growth, media release.

#### 4.4.2 On-site gas-fired power generation

In preparing the projections for Annual Tariff D Gas Consumption, the National Institute examines the prospects for the gas-fired power generation at industrial and commercial sites.

The economics of on-site power generation are significantly different to those for gas-fired generators solely operating to supply the National Electricity Market (NEM). On-site power generation tends to be used at sites where there is also a significant thermal (heating and/or cooling) requirement as well as power need. Cogeneration, which is also referred to as combined heat and power (CHP), is a means of supplying power and thermal energy needs from the combustion of a single fuel and as such is significantly more fuel efficient than conventional technologies while tri-generation is a similar electricity production technology that takes cogeneration one step further. Tri-generation is the production of electricity, heat and cooling.

Common applications of cogeneration and tri-generation include:

- industrial applications: pulp and paper, food manufacturing (such as sugar), petrochemicals, iron and steel, alumina, brewing, textiles and building products manufacture; and
- commercial applications: hotels, hospitals, schools/universities, swimming complexes, public offices, large commercial developments and medium/high density residential developments.

In Victoria, natural gas is often used for cogeneration and tri-generation.

While the need for heating/cooling tends to be the prerequisite for installing the cogeneration/tri-generation, it is often the value of electricity output that determines the commercial feasibility of a new plant. The electricity output has a double effect on the decision to install, as it affects

- the costs of the alternatives (for instance, how much it would cost if electricity were purchased from the grid) and
- the revenue stream realised from exporting electricity back to the distribution network.

The feasibility of cogeneration/tri-generation, however, is rather more complex than the relative costs of on-site and grid-supplied electricity. The plant feasibility is often limited by technical factors surrounding design of production facilities and access to secure and cost-effective fuel sources. To some extent, these technical factors have somewhat limited the take up of cogeneration/tri-generation in the past despite the sizeable cost savings on electricity.

In preparing the forecasts, the National Institute recognises that new on-site power generation may not be completely captured by the econometric modelling. The factors underlying their development are so complex and diverse, no single or combination of variables could adequately reflect potential future developments. As a consequence (and given lumpiness of these new sources of gas demand), the projections are augmented with known new plants. It is important to note however, that some of the proposals may be delayed depending on Australia electricity markets and other public policy development.

### ***Recent developments***

In recent years, the interest in on-site power generation has perceptibly increased. For instance, a number of new small-scale natural gas tri-generation systems have been installed in commercial building in and around the Melbourne central business district over the past few years. These include:

- a 386 kW unit at 200 Victoria Street, Melbourne (in December 2009);<sup>11</sup>
- a unit at ANZ Centre, 833 Collins Street in Docklands (building opened in late 2009);<sup>12</sup>
- a 2MW unit at a National Australia Bank (NAB) data centre (in February 2010);<sup>13</sup> and
- a unit at Toyota Australia's Port Melbourne headquarters (in August 2010).<sup>14</sup>

The uptake of tri-generation has been to some extent driven by the new National Energy Efficiency Mandatory Disclosure requirements (which commence in October 2010). The new requirements obligate commercial building owners to provide prospective buyers or tenants with information on the building's energy ratings. Arguably, the increased interest also may be driven by the prospect of rising electricity costs due to the carbon price impost and rising network costs.

Looking ahead, there are a number of proposals for new gas-fired on-site power generation currently being considered; see Table 4.7 for examples of public announced projects. These proposals are at varying stages of developments.

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<sup>11</sup> Cogentenergy, Case Study, "200 Victoria Street Melbourne".

<sup>12</sup> ANZ – New Workplace – Corporate Responsibility Fact Sheet.

<sup>13</sup> NAB (2010) 'NAB wins '2010 Socially Responsible Bank of the Year' Award in Money', Media Releases/ASX Announcement 2 June 2010.

<sup>14</sup> <http://www.themotorreport.com.au/50690/toyota-australia-hq-going-greener-with-tri-generation-power>.

<b>Table 4.7 Planned on-site gas-fired power generation developments</b>		
<b>Site</b>	<b>Unit</b>	<b>Commissioning date</b>
New Royal Children's Hospital <sup>15</sup>	2.4 MW gas tri-generation plant; heat produced in the generation of electricity from the plant will be captured and used for heating, domestic hot water and cooling.	2011
Qenos Altona <sup>16</sup>	The replacement of existing steam boilers with a 21MW Cogeneration (combined heat and power) plant.	Investment approved in March 2011. The cogeneration unit is expected to begin operations in late 2012.
Norske Skog Albury <sup>17</sup>	<b>Phase 1:</b> 8 MW cogeneration plant (6 MW biomass and 2 MW gas). 75 per cent less natural gas than used now. <b>Phase 2:</b> 33 MW cogeneration plant (6 MW biomass and 27 MW gas). Requires new high pressure gas pipeline infrastructure	Phase 1 to be completed by 31 December 2011, given requisite corporate planning and governmental approvals.
Barrett Burston <sup>18</sup>	Energy production produced by cogeneration, with heat utilised in the kilns	
Fawkner Leisure Centre <sup>19</sup>	Installation a pilot cogeneration plant	

For some of these projects, gas consumption may be reducing as a result of the displacement of existing gas boiler or switch to a renewable fuel sources from gas.

<sup>15</sup> RCH website 'A Green Hospital'.

<sup>16</sup> Qenos (2011) 'Qenos to Install New Cogeneration Plant' media release, 10 March 2011.

<sup>17</sup> Norske Skog (2011) 'Albury Mill Biomass/Gas Cogeneration', presentation slides 3 March 2011.

<sup>18</sup> Barrett Burston Malting (2010) 'Energy Efficiency Opportunities', public report.

<sup>19</sup> Urgent Business Council Meeting 11 May, agenda.

## 4.5 Average residential gas consumption in Victoria

### 4.5.1 Background

This section outlines recent trends in average residential gas usage in Victoria. It includes an assessment of average residential gas usage for new and established customers in Victoria. This assessment is based on work completed for the current GAAR in 2005 and 2006 and more recent data supplied by Multinet and Envestra (VIC).

Historically, average residential gas usage in Victoria rose very rapidly over the 1970s and 1980s. Gas usage rose on a per customer basis as households replaced electric hot water systems with gas hot water and space heaters (originally oil) were replaced with gas room heaters and/or gas central heating systems.

In March 1991, government regulations were introduced into Victoria specifying minimum insulation levels for all new homes and extensions. For existing dwellings with gas heating, the savings of 25 to 30 per cent in space heating gas usage from ceiling insulation was sufficient incentive to drive ceiling insulation into the existing stock of dwellings.

As indicated in Figure 4.2, average residential usage in Victoria increased to around 59 GJ per dwelling by 2000, from 57.4 GJ in 1990. Mandated and voluntary installation of insulation over the 1990s had a very significant impact on the growth in average use per dwelling. Increases in the efficiency of water and space heating appliances also had a significant impact on constraining the growth in average use by residential customers.

Since 2000, overall residential average usage has fallen from around 59 GJ per customer to 55.6 GJ per customer in 2010. The 5-star standard for new homes came into effect from 1 July 2005. The 5-star standard applied to all new houses and apartments and requires a:

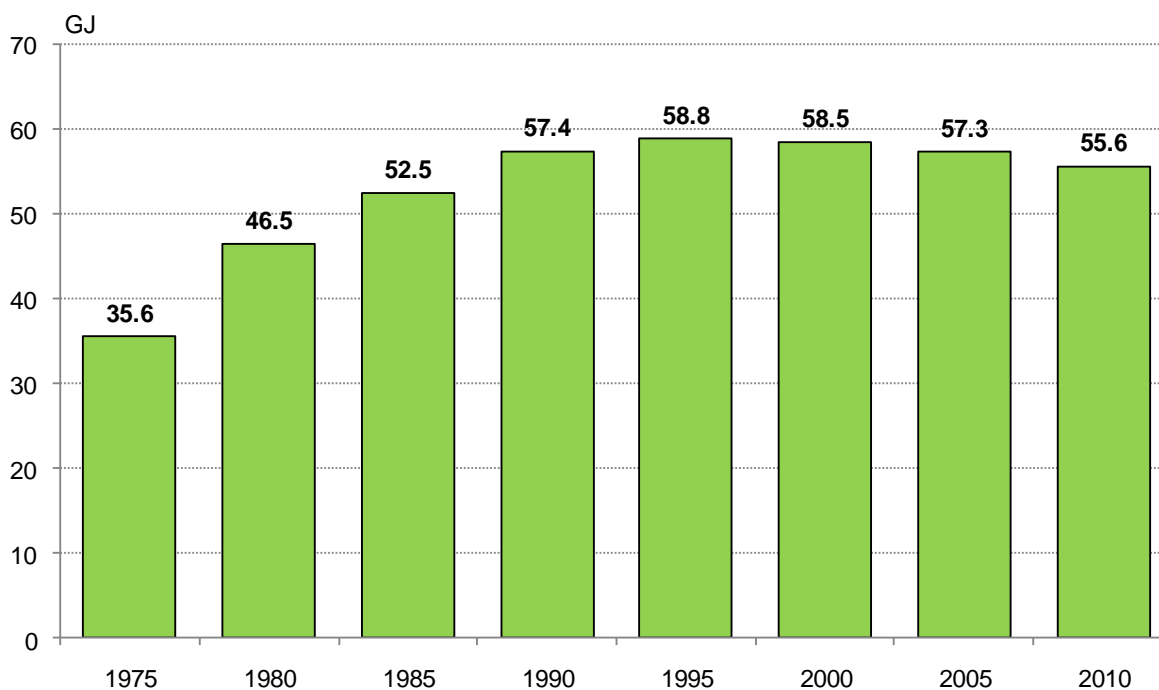
- 5-star energy rating for the building fabric; and
- either a rainwater tank for toilet flushing; or
- solar hot water system (Class 1 buildings only).

The theoretical savings from the 5-star energy rating were not insignificant, at around 20 GJ per annum.

The slowing in Victorian average residential gas usage over the last two decades needs to be seen against the fact that average floor areas of new dwellings have increased rapidly. Table 4.8 shows estimated floor areas for houses, other dwellings and total dwellings for Victoria for selected years.

Floor areas for houses have risen significantly since 1984-85. Floor areas reflect the total building area so unheated areas, such as double garages and second floor external patios, etc. could bias these data in terms of heating loads. Floor areas for other dwellings also increased up to 2000 and were 139 square metres in 2008-09.

The total floor area for new dwellings (adjusted for the mix of houses and other dwellings completed in Victoria) rose by 30.6 metres between 1999-00 and 2008-09. This represents a 15 per cent increase in floor areas for new dwellings over a period where total residential average usage actually fell by 5 per cent.

**Figure 4.2: Average residential gas usage – Victoria (selected years)**

*Note:* Normalised average usage from 2000 to 2010. Actual prior to 2000.  
*Sources:* Statistics, Gas Fuel Corporation of Victoria, 1984, 1990.  
 GAAR information provided by Multinet, Envestra and SP-AusNet 2006.  
 Gas Industry Statistics, AGA, selected years.  
 GAAR information provided by Multinet, Envestra 2010 and estimate SP-AusNet, 2010.

**Table 4.8 Average floor areas (m<sup>2</sup>)**

	House	Other	Total <sup>(1)</sup>
1984-85	163.6	100.7	153.1
1993-94	177.4	115.3	170.2
1999-00	212.1	134.9	194.2
2004-05	238.8	139.6	209.5
2008-09	252.8	139.0	224.8
Change 1999-00 to 2008-09	40.7	4.1	30.6

*Note:* (1) Total weighted by completions of houses and other dwellings in Victoria.  
*Source:* ABS 8781.0 Building Approvals, Selected Issues.

## **4.5.2 Gas consumption by new and established residential customers in Victoria – an assessment of recent data**

### ***Introduction***

As part of preparing forecasts for the Gas Access Arrangement Review (GAAR), NIEIR undertook a detailed assessment of new and established customers for Multinet and Envestra.

The objective of examining new customer usage was to identify what average usage is for new customers up to 2010. The objective of examining existing customer usage was to identify existing customer usage and assess trends in average existing customer usage.

For established customers, average usage was based on existing customers prior to 2006. The sample size was extraordinarily large, at around 220,000 customers across two distribution businesses (DBs). This represented 18 per cent of total residential gas customers for Multinet and Envestra.

For new customers, the priority was to identify average residential usage for new customers, the launch point for the forecast. Average customer usage for each year between 2006 and 2010 for customers connected between 2006 and 2009 were analysed. All new active residential meters for each DB were used for these years. The assessment of average usage for new customers was not based on a sample, but all new residential meters.

### ***Methodological approach and raw data used***

NIEIR collected billings information from each distribution business. This included information on:

- MIRN;
- meter installation date;
- year of consumption;
- postcode;
- tariff and class; and
- volumes.

As noted above, the objective of analysing the billings information was to:

- identify average usage for new residential customers up to 2010; and
- identify any trends in established residential customer usage.

### ***New customer usage***

Table 4.9 shows new residential average customer usage for 2010, on a weather normalised basis, for meters installed in 2006, 2007, 2008 and 2009.

In this table, the headings 2006 to 2009 refers to the years that new meters actually became active.

<b>Table 4.9 New residential customers in Multinet and Envestra – average usage 2010 (excluding losses), weather normalised</b>				
	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>
Multinet	57.4	55.1	52.5	48.3
Envestra	53.1	50.2	49.6	48.9

As indicated in Table 4.9, average usage for new customers has been declining significantly. This fall reflects a number of factors:

- a higher share of other dwellings (i.e. multi-unit) being completed in Victoria;
- the significant impact of 5-star building standard phasing in post 2005 (compliance issues could have generated the phase in effect rather than a step change);
- ongoing improvements in the energy efficiency of new gas appliances; and
- a shift away from the rainwater tank option following the end of the drought to a much higher share opting for solar-gas hot water under the mandated 5-star standard.

It is significant to note that despite average usage for new dwellings declining over the 2005 to 2010 period, it did not fall by as much as anticipated by regulatory impact statements and government studies associated with the 5-star standard. In its regulatory impact statement, the Plumbing Industry Commission (2004) reported weighted average annual gas savings of 23.6 GJ for houses with 5-star and a rainwater tank. Total savings for a house with solar-gas hot water were reported at 33.6 GJ of gas per annum.

In preparing for the last GAAR, NIEIR and the distribution businesses undertook their own analysis of 5-star using billed data for 2003, 2004 and 2006 meters. Based on this analysis, the actual savings on building shell improvements associated with the 5-star regulation were 9-10 GJ per dwelling.

Based on the analysis above, the observed actual decline associated with building shell improvements related to 5-star was around 5-6 GJs per annum. This lower reduction in gas usage probably reflects two important factors:

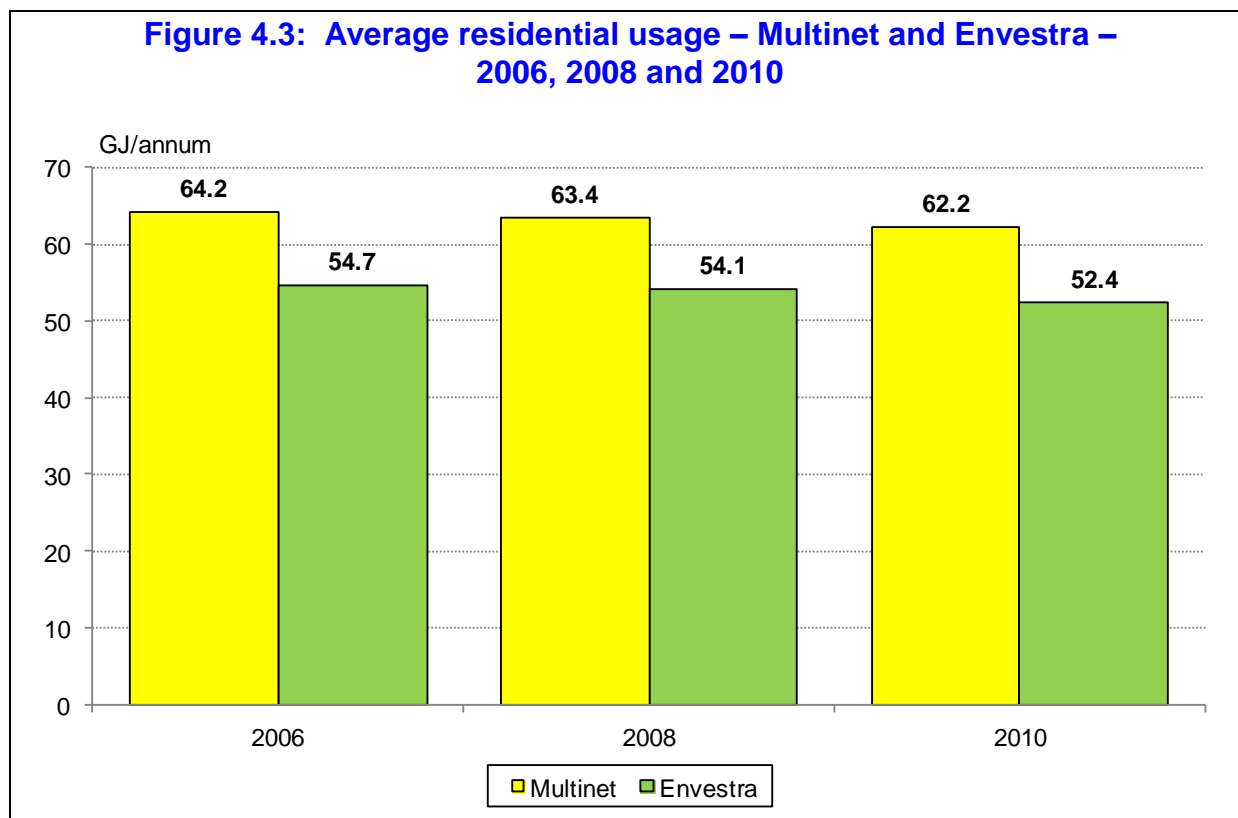
- (i) possible compliance issues associated with ensuring actual 5-star ratings for new dwellings are achieved; and
- (ii) the increase in average floor areas of new dwellings completed in Victoria between 2005 and 2010 of around 15 square metres, or 7 per cent.

Figure 4.3 shows average usage for established customers in 2006 for 2008 and 2010. There is a clear downward trend in the case of both DBs.

The downward trend in established dwellings usage reflects a number of factors, including:

- socio-demographic factors such as falling household size;
- established dwellings replacing old gas appliances and equipment with more efficient ones; and
- perhaps more importantly, behavioural changes such as increased use of reverse cycle air conditioning and reduced hot water usage given the drought and higher penetrations of solar-gas water heaters in existing dwellings.





Multinet's average usage is significantly higher than Envestra's. This reflects a number of factors, including:

- higher per capita incomes in the Multinet region;
- the age of the dwelling stock in Multinet and the age of gas consuming appliances; and
- a much larger share of new energy efficient dwellings in the Envestra region compared to the Multinet region.

#### 4.5.3 Gas usage in Victoria

The Australian Bureau of Statistics (ABS) has, every three years since 1994, produced information relating to domestic energy use through the use of the monthly Labour Force Survey (LFS) and supplemented by the Energy Use and Conservation Survey (latest, March 2011).

The latter covers a range of issues including energy sources, appliances and energy saving measures used in households. As the ABS notes, the statistics are subject to normal sampling errors and may be biased by changes in the methodologies in collecting the data. Despite this, they provide a useful overall picture of gas usage by households in Victoria.

Table 4.10 below shows the main energy source used in the four main end-uses for New South Wales in 2008. The four end-uses are:

- ovens;
- cook tops;
- space heating; and
- water heating

Based on the 2008 ABS data, natural gas is used in 34.6 per cent of ovens, 63.1 per cent of cook tops, 66.5 per cent of space heating appliances and 64.2 per cent of water heaters. Around 40 per cent of gas heaters in Victoria are ducted. Also, 23.9 per cent of households do not use a heater.

	Electricity	Mains gas	Electricity and gas combined	LP bottle gas	Solar	Wood	Other*
<b>Main source of energy used</b>							
Ovens	62.4	34.6	n.a.	2.8	n.p.	n.p.	–
Cook tops	32.0	63.1	0.4	4.3	n.p.	0.2	n.a.
Space heating	18.5	66.5	n.a.	1.6	n.a.	8.9	3.8
Water heating	28.6	64.2	n.a.	11.5	2.6	n.p.	3.1

Notes: \* Includes didn't know and oil.  
n.a. Not applicable.  
n.p. Not available for publications but included in the totals.

Source: ABS, Tables 3.6, 3.7, 3.8, 3.10, Catalogue 4602.0.55.001.

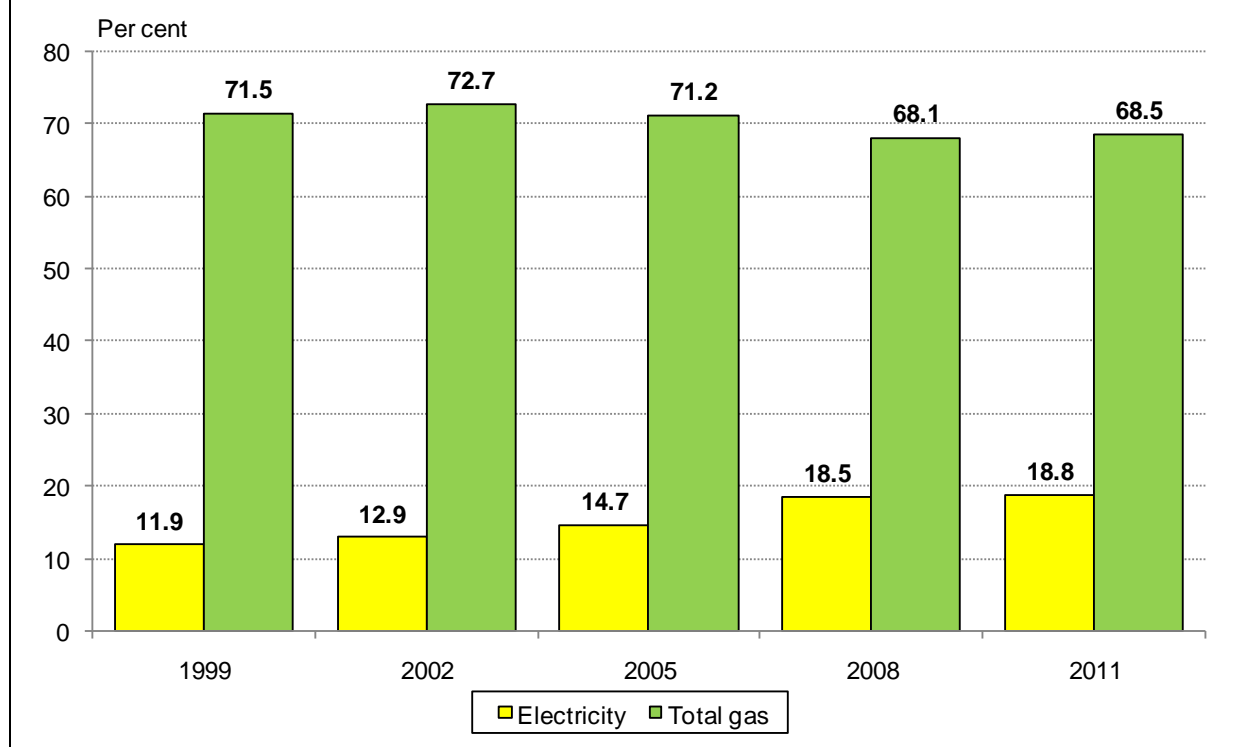
### Space heating

Table 4.11 below, shows the main energy source in space heating in Victoria for 1999 to 2011 for selected years. The table highlights that:

- natural gas' share of the main energy source used in space heating has decreased slightly from 71.5 per cent in 1999 to 68.5 per cent in 2011. The highest share was in 2002, with 72.7 per cent of heaters using gas. Wood heating is also on the decline, having lost nearly 5 percentage points of its share at 8.9 per cent in 2011; and
- electricity's share in space heating has been increasing since 1999, having risen by 6.9 per cent to a share of 18.8 per cent by 2011.

	Electricity	Mains gas	LPG	Total gas	Wood	Oil	No heater
1999	11.9	71.5	n.a.	71.5	13.8	1.0	1.2
2002	12.9	72.7	n.a.	72.7	12.4	0.5	1.0
2005	14.7	69.7	2.1	71.2	11.2	0.2	1.9
2008	18.5	66.5	1.6	68.1	8.9	0.1	2.6
2011	18.8	68.5	n.a.	68.5	8.9	1.6	2.2

Note: n.a. = Not applicable.  
Source: ABS, Table 3.9, Catalogue 4602.0.55.001.

**Figure 4.4: Main source of energy in space heating, Victoria – 1999 to 2011****Table 4.12 Insulation in dwellings by State – proportion with or without 2011**

	Dwellings with insulation	Dwellings with no insulation*	Don't know
New South Wales	63.4	18.2	18.4
Victoria	76.5	7.8	15.6
Queensland	61.7	20.3	18.0
South Australia	78.0	8.1	13.9
Western Australia	73.7	12.8	13.5
Tasmania	78.9	10.1	11.0
Northern Territory	43.8	24.2	32.0
Australian Capital Territory	80.5	4.3	15.1
<b>Australia</b>	<b>69.0</b>	<b>14.3</b>	<b>16.7</b>

Note: \* Pro-rata distribution of 'did not know'.  
Source: ABS, Table 2.12, Catalogue 4602.0.55.001.

Table 4.12 shows that 76.5 per cent of dwellings in Victoria have insulation, which is greater than the Australian average of 69 per cent of dwellings with insulation. With the Commonwealth stimulus package announced in March 2009, the Government aimed to install insulation into 2.7 million Australian homes. According to the 2011 ABS publication, between 2008 and 2011 the number of Victorian dwellings with no insulation fell by 0.7 percentage points, or around 15,000 dwellings.

## Water heating

Table 4.13 shows the main energy source used in water heating in Victoria for 1999 to 2011 for selected years. The table highlights that:

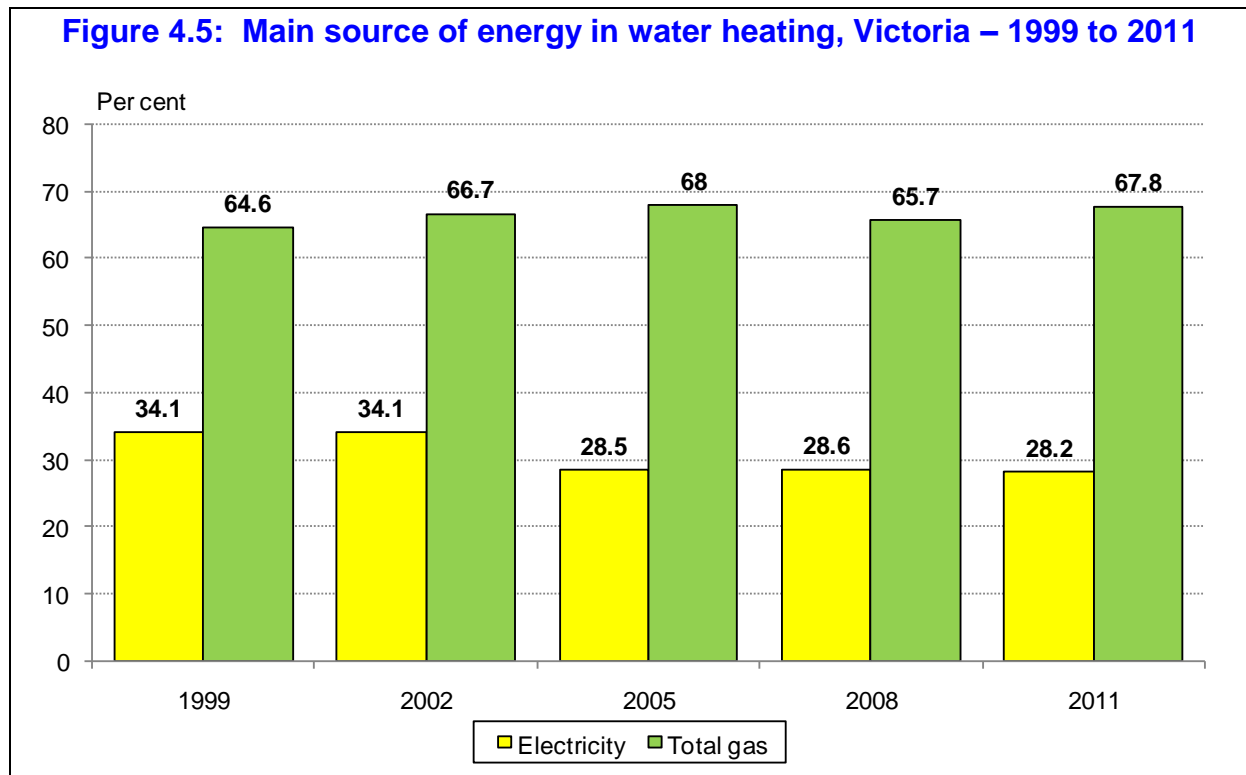
- natural gas's share of the main energy source used water heating increased from 64.6 per cent in 1999 to 66 per cent in 2011;
- electricity's share has been slowly declining having lost nearly 6.0 per cent of its share as a main source of energy as households shift towards solar and gas; and
- solar energy as a source for heating water has been increasing rapidly, but is still only 4.0 per cent of the share of energy used in water heating.

<b>Table 4.13 Main source of energy used in water heating – Victoria (per cent)</b>							
	<b>Electricity</b>	<b>Mains gas</b>	<b>LPG</b>	<b>Total gas</b>	<b>Wood</b>	<b>Solar</b>	<b>Other*</b>
1999	34.1	64.6	n.a.	64.6	1.4	0.9	0.4
2002	34.1	66.7	n.a.	66.7	0.6	0.6	1.2
2005	28.5	66.6	1.4	68.0	0.6	1.0	3.2
2008	28.6	64.2	1.5	65.7	n.p.	2.6	5.4
2011	28.2	66.0	1.8	67.8	n.p.	3.8	3.2

Notes: n.a. = Not applicable.

\* Includes didn't know and oil.

Source: ABS, Table 3.11, Catalogue 4602.0.55.001.

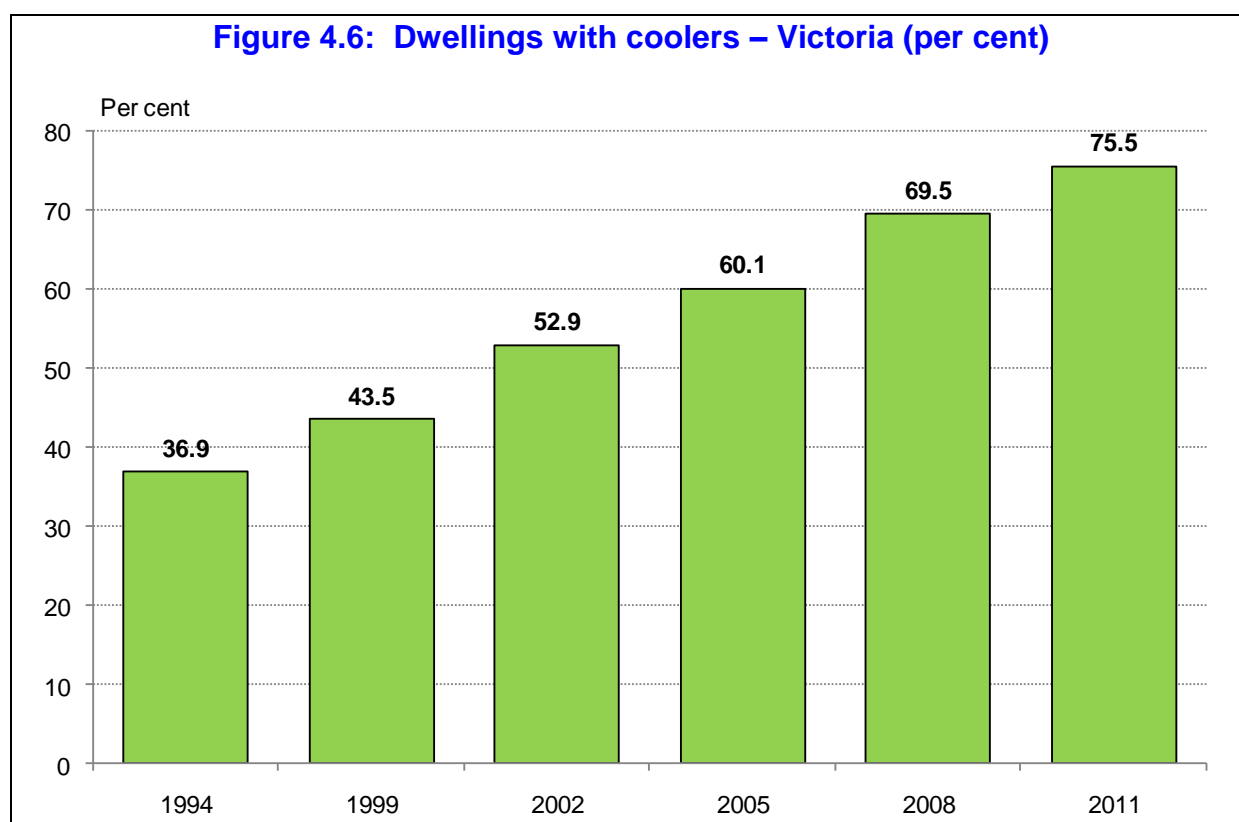


The number of dwellings with a cooler has been on an increasing trend in Victoria, from 36.9 per cent of households in 1994, to 75.5 per cent of households in 2011, according to the ABS survey<sup>20</sup>. The types of coolers being purchased are presented in Table 4.14 below.

<b>Table 4.14 Main cooler in dwelling – Victoria (per cent)</b>				
	<b>Reverse cycle/ heat pump</b>	<b>Refrigerated</b>	<b>Evaporative</b>	<b>Don't know</b>
1994	41.6	36.7	16.8	4.8
1999	30.3	40.8	24.3	4.6
2002	30.3	35.7	29.7	4.3
2005	36.3	29.4	31.3	3.0
2008	41.9	28.4	27.1	2.6
2011	43.7	26.1	29.7	0.5

Source: ABS, Table 4.12, Catalogue 4602.0.55.001.

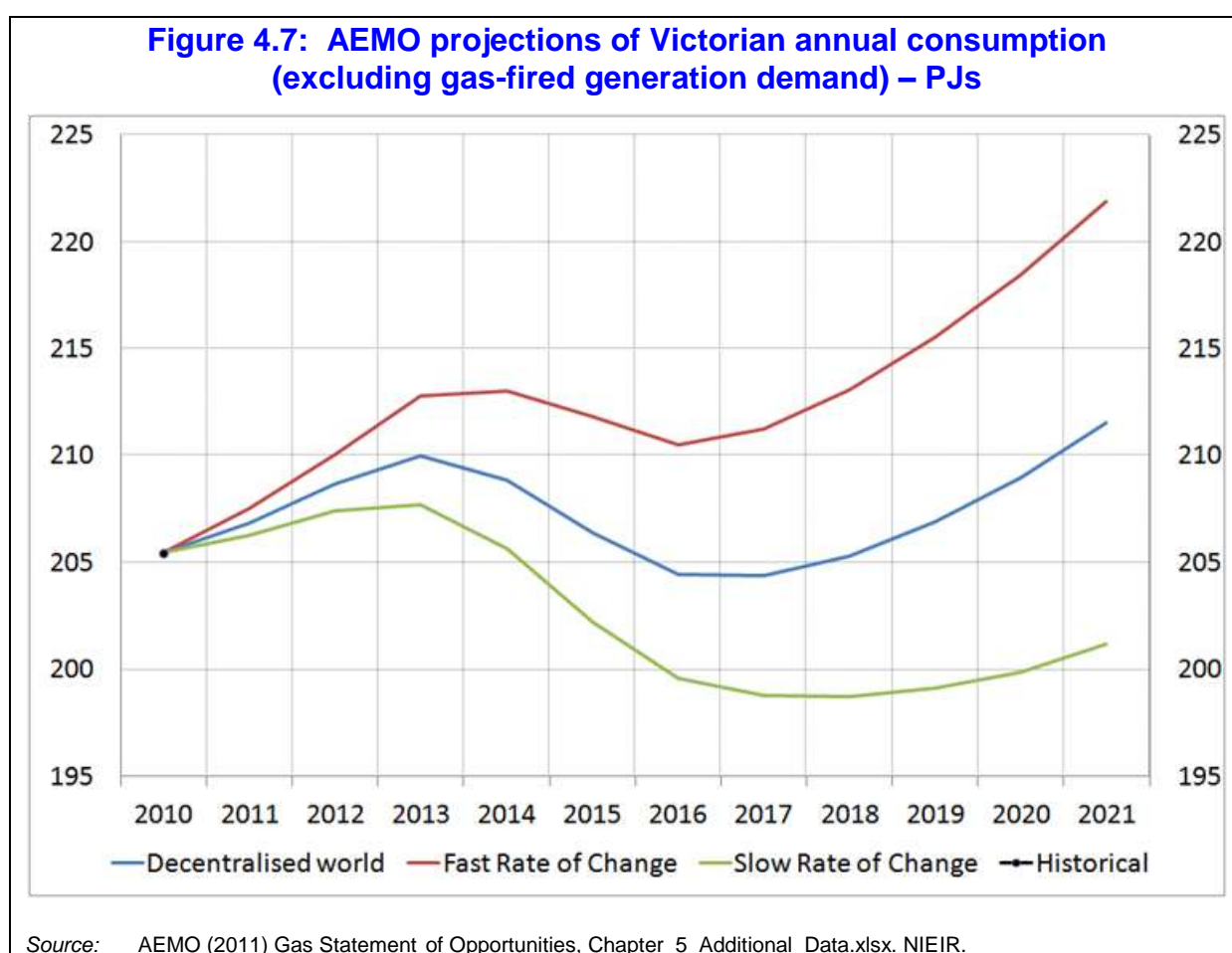
Figure 4.6 shows the proportion of Victorian dwellings with a cooler for selected years since 1994.



<sup>20</sup> Source: ABS, Table 4.11 Catalogue 4602.0.55.001.

## 4.6 AEMO gas consumption forecasts

In December 2011, the Australian Energy Market Operator (AEMO) published projections of annual natural gas consumption for the Victorian Declared Transmission System. Figure 4.7 below presents projections excluding gas fired power generation under three alternative AEMO economic scenarios. These projections were prepared in line with scenario assumptions set out by the AEMO including economic growth, greenhouse policy and carbon policy. These assumptions underlying the AEMO scenarios were prepared in late 2010 and early 2011. More recent economic developments, such as the financial crisis in Europe, are not incorporated in the scenarios. More recently announced closures by major industrials such as Bluescope Steel are also not included. The base scenario for AEMO is denoted as the decentralised world scenario.



The Multinet region represents a distribution business with established customers in middle eastern and southern Melbourne. It is landlocked in the sense that there are limited opportunities for greenfield growth. Both Tariff V and D in the Multinet region are expected to decline, consistent with the AEMO forecast.

As indicated in Figure 4.7, there is little or no growth in gas consumption in Victoria over the period to 2018.



## 4.8 Gas prices and the CPRS

The Federal Government's "Clean Energy Future" was released in July 2011. This energy policy announcement combined the introduction of a carbon tax with general tax cuts for individuals and subsidies and emission permits for businesses in Australia.

For the carbon price, which will be introduced from July 2012, it will be fixed like a tax before moving to an emissions trading scheme by 2015.

The proposed tax is to start at \$23 per tonne in 2012, rising by 2.5 per cent in real terms. From 2015-16, the price will be set by the market and the number of permits issued by the Government each year will be capped.

Revenue from the carbon tax will be used by the Government to:

- fund general tax cuts and increasing payments;
- support jobs and competitiveness in affected industries; and
- promote clean energy technologies.

In NIEIR's projection, we have assumed the carbon tax would continue to rise by 2.5 per cent per annum out to 2021. This may or may not be the actual outcome.

The \$23 per tonne carbon price results in an increase in residential gas prices of around 8 per cent and business prices of around 20 per cent in 2012-13. The business gas price reflects the mix of large, medium and small business customers in Victoria.<sup>21</sup>

For modelling purposes the fiscal year prices in Table 4.15 were converted to calendar year prices to be consistent with gas volume forecasts.

In addition to the impact of the price on carbon, wholesale gas prices in Eastern Australia could increase significantly given the development of LNG facilities in Queensland. The impact remains uncertain and will depend on the outlook for global growth and gas supply developments amongst many other factors.

This projection of natural gas prices includes an increase in the wholesale price of as of \$1 per gigajoule from 2012-13, and rising to \$1.50 by 2016-17. This is a relatively conservative assumption. ACIL Tasman recently suggested netback LNG prices of around \$6/GJ by 2013-14, suggesting wholesale price increases in the Eastern seaboard gas markets could be much more significant than assumed for these projections.<sup>22</sup> If, on the other hand, shale gas exploration develops in Australia similarly to the United States, this could limit the upward pressure on Eastern seaboard gas wholesale prices.

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<sup>21</sup> The impact on residential prices is consistent with Australian Treasury modelling, [http://www.treasury.gov.au/documents/1999/PDF/110201\\_EM\\_Preliminary\\_Carbon\\_Price\\_Household\\_Price\\_Impacts.pdf](http://www.treasury.gov.au/documents/1999/PDF/110201_EM_Preliminary_Carbon_Price_Household_Price_Impacts.pdf).

<sup>22</sup> Fuel cost projections, natural gas and coal outlooks for AEMO modelling, prepared for Worley Parsons, December 2011, ACIL Tasman.



<b>Table 4.15 Victorian gas prices – 2005-06 (\$/GJ)</b>			
	<b>Residential</b>	<b>Business</b>	<b>Total</b>
2009-10	15.1	5.8	10.4
2010-11	15.4	5.8	10.6
2011-12	15.8	5.9	10.8
2012-13	17.2	7.2	12.2
2013-14	17.6	7.4	12.5
2014-15	18.0	7.5	12.8
2015-16	18.5	7.9	13.2
2016-17	18.9	8.1	13.5
2017-18	19.3	8.3	13.8
2018-19	19.8	8.5	14.1
2019-20	20.2	8.7	14.5
2020-21	20.2	8.7	14.5

Source: Estimated by NIEIR.

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## 5. The impact of national and state greenhouse and energy policies on Victorian gas usage

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### 5.1 Introduction

The recent passing of the Clean Energy Future bills was a big step towards cutting greenhouse gas emissions in Australia. This energy policy announcement combined the introduction of a carbon tax with general tax cuts for individuals and subsidies and emission permits for businesses in Australia. That action shows a commitment to a direction into alternative energy sources and provides a step to changing the way in which we use energy, including gas.

There are a number of complementary energy and greenhouse gas abatement policies which currently, and in the future, will also impact on Victorian gas usage. National and State government initiatives such as subsidies and rebates are enabling changes in gas demand in both residential and commercial sectors. Policies and market mechanisms described in detail further in this chapter are the driving forces in reducing average gas use.

Gas usage is also impacted by many other trends, such as technological improvements, which are enabling uses of co-generation and tri-generation in commercial and multi-apartment residential buildings, technology is also assisting with appliance efficiency which is another key component of gas use reduction.

Victorian average gas use per year per residential customer has been dropping historically and is forecast to continue to decline. Changes in water heating and space heating by households are particularly pertinent to the declining average gas use.

Some of the key impacts on water heating are from:

- improvements in gas appliance efficiency mainly driven by Minimum Energy Performance Standards (MEPS);
- water conservation initiatives impacting on hot water loads (e.g. low flow shower heads);
- shifts to solar hot water and heat pumps for water heating.

Impacts on residential demand for gas for space heating is affected by:

- increasing market penetration of reverse cycle air conditioners (RACs) which are used for heating as well as cooling; and
- improved envelope thermal efficiency of existing and new dwellings due to changes to building standards and shell upgrades (e.g. 5-star, 6-star).

In modelling gas demand, residential policy impacts are usually separated into their impacts on new and existing dwellings, since this allows the quantitative impact of individual policies to be assessed.

**Table 5.1 Key policy impacts on Victorian natural gas demands**

<b>Jurisdiction</b>	<b>Measure</b>	<b>Description of impact</b>
<b>National</b>		
Greenhouse Response (2012-14)	Carbon tax.	Via impact on price and price elasticity of demand by sector.
Renewable Energy Target (RET)	Targeted renewable energy production through certificate scheme – hot water eligible.	Significant impact via switch to gas boosted solar hot water in Victoria.
Energy Efficiency Opportunities Act (2006)	Targeted at large energy users.	Large energy user's efficiency measures by site.
Energy Efficiency Programs	MEPS for hot water heaters.	Calculated assuming asset lives and dwelling stocks by State/region.
	Energy labelling for gas space heaters and cookers.	Possible future standards or MEPS.
National Strategy on Energy Efficiency (2009)	All gas appliances across all sectors. National standards.	Impact uncertain and difficult to quantify.
Mandatory Disclosure (Energy Efficiency Performance Act 2010)	Residential and commercial energy performance when sold or leased (existing buildings).	Impact on space heating.
Ministerial Council on Energy (2010-12)	Phase-out of electric resistance hot water.	Victoria addressing through Solar HW rebate program
Federal Insulation Program 2009-2010	Insulation subsidy for existing uninsulated dwellings.	Program abandoned early 2010.
Renewable Energy Bonus Scheme	Solar hot water rebate.	Funding curtailed following Queensland floods.
<b>State</b>		
5 and 6 Star Building Standards	Building standards for new dwellings.	Significant savings in gas space heating in Victoria.
Victorian Energy Efficiency Target (VEET) Phase Two	Retailers required to meet targets mainly through energy efficiency measures.	Small impact on natural gas. Main impact on electricity through lighting (CFLs).
Other State-based programs, including incentive and rebate programs	Cash rebates for installing solar hot water.	Usually small programs but with some impacts on gas use.
Victorian Climate Change White Paper, July 2010	Various measures (uncertain following change of Government).	Awaiting announcement of new measures/policies.

## 5.2 Water heating in Victoria

A number of Federal and State policies are impacting on hot water use in Victoria.

For new Class 1 dwellings in gas available areas, they must be fitted with either a solar water heater or a plumbed water tank under the 5-star standard introduced in 2005. Over the 2006 to 2011 period, surveys (BIS, ABS) have indicated that around 50 per cent of new residences in gas available areas choose the solar hot water option. As the drought has eased in Victoria, it is now estimated that around 70-80 per cent of new residences are choosing the solar hot water option over the rainwater tank plumbed for sanitary use.

For existing dwellings in Victoria, solar gas water heating units are replacing straight gas water heaters and electric heaters. This is being stimulated by the Federal Renewable Energy Target (RET), the Victorian Energy Efficiency Target (VEET) and Sustainability Victoria rebates for solar hot water. The increasing efficiency of these water heating units is also reducing gas usage.

The Victorian Solar Hot Water Rebate program is administered by Sustainability Victoria. Rebates for installations range from \$300 to \$1,600. The program provides rebates for:

- (i) the replacement of a natural gas (or LPG) water heater with a gas boosted solar system;
- (ii) adding solar to an existing natural gas (or LPG) water heater as a pie-heater;
- (iii) adding solar to an existing electric water heater by installing a retrofit kit;
- (iv) replacing an existing solar, solid fuel or oil fired water heater with a solar system. It is required to be natural gas boosted if available in the street; and
- (v) replacing an electric water heater with a gas boosted or electric boosted solar system (when natural gas is not available).

For existing dwellings, the Federal and State Governments are working to phase out electric hot water systems. The Victorian Solar Hot Water Rebate program addresses this requirement. Stage 1 of the phase-out applied to:

- new detached dwellings or terrace or townhouses; and
- existing detached dwellings or terrace or townhouses that have access to piped natural gas.

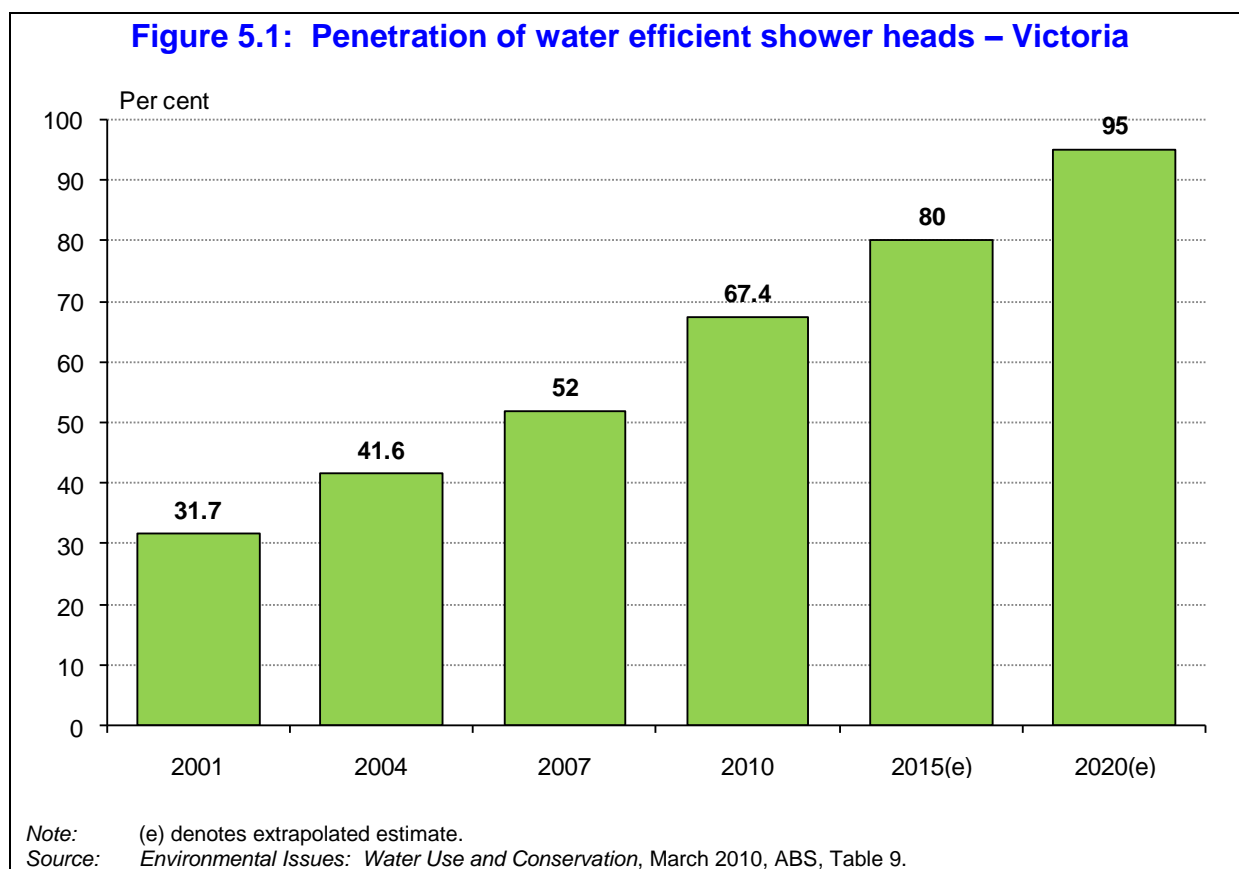
Stage 2 of the phase-out extends the ban to all existing detached dwellings, terraces and townhouses. Whilst resistance hot water is not banned, very few new or replacements would be installed in Victoria given the policies and programs in place.

In gas reticulated areas of Victoria, the phase out of resistance hot water is not likely to have a significant effect given the dominance of gas for water heating in Victorian residences. For existing residences located off the gas distribution system in Victoria, this ban would reinforce bottled gas use for water heating. Older Victorian residences with resistance electric hot water could connect to solar-electric, solar-gas or straight gas.

### Low flow shower heads

All new Victorian homes, including flats, must have water efficient showers and taps (low flow) to comply with Victoria's 5-star Building Standard. In existing homes, Figure 5.1 shows the penetration of water efficient shower heads and taps has been steadily increasing over time, with free or subsidised exchange programs being offered by Victorian Water Authorities.

Low flow shower heads reduce water use per shower and therefore the amount of hot water and gas use in dwellings with gas hot water.



### 5.3 Minimum Energy Performance Standards (MEPS)

MEPS and energy rating labelling have been applied in Australia to a range of appliances and equipment since the late 1980s, the range being continuously expanded and the MEPS upgraded. The MEPS have been developed in cognisance with world best practice which has strongly influenced the energy performance of appliances in Australia as many appliances are imported. (However, without MEPS, sub-standard appliances could have been “dumped” in Australia.)

MEPS are based on the costs and benefits of enhancing energy performance of the items to which they are applied. Introduction and upgrading is subject to rigorous analysis in Regulatory Impact Statements (RISs). MEPS are closely associated with energy labelling and rating. The labelling of MEPS compliant appliances, which are mainly purchased by households, is controlled by a labelling standard and provides information on the appliance's star rating (up to 6-stars with the intention to go to 10-stars) and the energy use per year under standard test conditions.

Gas water heaters and space heaters are required to carry an energy label and various appliance types also have MEPS requirements. Governments are working with the gas industry to revise the energy label and MEPS requirements for gas appliances.

The following reports/notices have been released for gas products over the last five years:

- *Product Profile: Outdoor Radiant Gas Heaters*, Report No 2010/07 (published 2010 September);
- *Regulatory Impact Statement – Proposal to introduce a Minimum Energy Performance Standard for Gas Water Heaters*, Report No 2009/22 (published 2009 October);
- *Consultation Regulatory Impact Statement of Proposal to Introduce a Minimum Energy Performance Standard for Gas Water Heaters*, Report No 200807 (published 2008 August);
- *E3 Gas Committee Cost-Benefit Analysis: Proposal to Introduce a Minimum Energy Performance Standard for Gas Water Heaters*, Report No 2007/06 (published 2007 June);
- *Notice of Governments Regulatory Plans for Gas Water Heaters* (24 May 2007);
- *Gas Water Heater Comparative Testing Round-Robin 2005/06 – Part of the E3 Gas Workplan 2007 to 2007/08*, Report 2006/12 (published 2006 October);
- *Switch on Gas – Revised Gas Workplan for 2007 to 2007/08*, Report 2006/11 (published 2006 October); and
- *Switch on Gas – Work Plan 2005/06 – 2007/08*, Report 2005/10 (published 2005 April).

Source: <http://www.energyrating.gov.au>

MEPS for gas water heaters are likely to be introduced in 2011. There are currently no MEPS for gas space heaters, although they are under consideration by the E3 program.

## 5.4 The Victorian Energy Efficiency Target (VEET)

The Victorian Energy Efficiency Target (VEET) commenced on 1 January 2009 and sets targets for energy savings, and requires energy retailers to meet their own targets through energy efficiency initiatives.

Phase 1 of the VEET Scheme set a target of 2.7 Mt of CO<sub>2</sub> abatement for 2009, 2010 and 2011. Further phases in the VEET Scheme allow targets to be set for subsequent three year periods to 31 December 2029. Phase 1 applied to the residential sector only.

Phase 2 targets were announced by the Victorian Government in 2011 following a Regulatory Impact Statement. Phase 2 targets are 5.4 Mt CO<sub>2</sub> abatement for 2012, 2013 and 2014. Under Phase 2, the Scheme is also to be expanded to include small and medium sized enterprises.

In estimating the impact of VEET on Victorian energy demands, consideration needs to be given to whether other policy programs have contributed to the energy savings. In hot water, for example, this could include Federal and State rebate programs for solar hot water. Other important issues in assessing the impact of VEET include rebound effects, additionality and compliance.

Based on the first phase of VEET, the Essential Services Commission reported VEET prescribed activities for the period 1 January 2009 to 31 January 2010 in “VEET Performance Report, September 2010, ESC”. The key findings from this performance report were that:

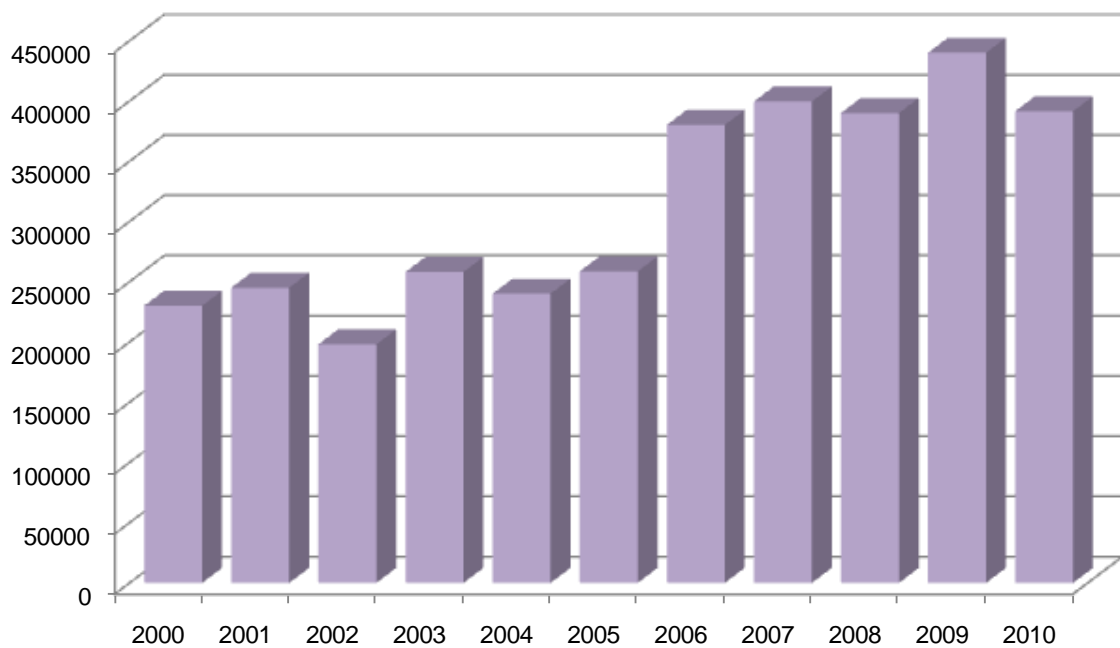
- nearly 80 per cent of all VEECs generated in 2009 were for lighting (replacing incandescents with CFLs);
- around 16 per cent were for activities associated with solar hot water; and
- in 2009, 200,367 VEECs were created by activities that would increase gas use and 242,512 from activities reducing gas usage (e.g. solar gas).

Based on the phase 1 of VEET activities, NIEIR estimates that the VEET program will reduce Victorian gas usage by 0.284 petajoules per annum through to 2016. Allowing for additionality, attribution, rebound and compliance, the VEET impact could be discounted by around 30 per cent. This implies annual saving would be 0.2 PJ per year for gas from VEET in existing dwellings.

## 5.5 Penetration of reverse cycle air conditioners (RACs) in Victoria

RAC penetrations are increasing and they are increasingly used for space heating as well as space cooling. This largely reflects the shift to apartment and townhouse construction in Victoria, and in particular in Melbourne CDB and surrounds and the inner suburbs of Melbourne. This trend is reducing residential per connection gas usage for space heating.

**Figure 5.2: Victorian annual air-conditioner sales – calendar year (KW)**



Note: Estimated from actual air conditioning sales data for Victoria.



## **5.6 The Federal Insulation Package (HIP)**

The Insulation scheme was introduced by the Federal government in February 2009 as part of the first phase of the Economic Stimulus Package. The program offered a \$1000 rebate for householders installing ceiling insulation from June 2009.

The program operated for around 9 months before it was suspended by the Government. The program was closed on 19 February 2010 due to safety and compliance concerns, including installer deaths and a number of fire incidents in households.

The Government stated that there were 1.2 million installations nationwide, and around 280,000 in Victoria. The Government's modelling also stated that between 2010 and 2020 around 25 petajoules of energy savings would be realised.

In Victoria, with higher heating loads, the approximate savings from the HIP program are around 1.0-1.3 petajoules per annum.

## **5.7 Residential mandatory disclosure (RMD)**

RMD is potentially commencing in 2012-13 when a residence is sold or leased/rented, RMD would require the vendor/lessor to provide an accredited energy rating for the residence. This is expected to raise awareness of the energy performance of residences, and to stimulate improvements in that performance in existing residences by one or both parties to a residence sale or lease.

The extent of the performance improvement is difficult to estimate in advance of RMD proceeding. However, a similar measure has been operating in the ACT since 2005.

The impact of mandatory disclosure beyond the impact of other measures will depend on the uptake of the opportunities presented to parties subject to mandatory disclosure. There is likely to be some additional take-up as a result of the report (design, presentation and marketing of the report will be very important), but quantification of the measure impact is difficult. Accordingly, in the absence of any reliable data we have not quantified the impact, but will continue to monitor the measure implementation.

### ***RMD and current Victorian Government policy***

In August 2011 we understand, although it has not been announced, that the Victorian Government has decided not to proceed with RMD.

## 5.8 Commercial mandatory disclosure (CMD)

CMD has been in place for sale or lease/rental of commercial Class 5 office building space of >2,000 m<sup>2</sup> since 2010, which could represent about 30 per cent of commercial sector energy use. As yet no review of the impacts of CMD has been undertaken but anecdotal reports indicate greater attention to energy performance in buildings liable for CMD. For example, improvements in HVAC systems and lighting and the installation of cogeneration and tri-generation systems.

Energy efficiency improvement (EEI) will reduce gas use for space and water heating. But substitution of gas for electricity in these energy services and increased installation of cogeneration and tri-generation systems, mainly based on gas, will increase gas use in the commercial sector.

### ***Commercial building standards***

New standards and promotion of higher star ratings will reduce gas demands per m<sup>2</sup> in new commercial buildings. In a 2007 report for Sustainability Victoria, EMET estimated new commercial building standards would reduce energy use/m<sup>2</sup> by about 10 per cent compared with business-as-usual.

### ***Commercial building retrofit***

Anecdotal evidence, for example, in several articles over 2011 (examples of comments are presented below) suggests a significant drive for improved energy performance of existing commercial buildings. Drivers are higher energy prices (now and future) and lease/renting market demands for sustainability and higher performance ratings (NABERS, AGBC) issues, distributor data, comments on energy use trends.

**Grocon chief, David Grollo, at an American Chamber of Commerce meeting on 6 August 2011, claimed that buildings with a Green Star rating of <5 or 6 were a significant liability for asset valuation. He predicted that 5 and 6 star buildings would soon be the norm for new commercial space (AFR, 8 August 2011).**

**In June 2011 the IPD Green Property Index reported that the highest returns for commercial space was 10.8 per cent for 4 star, 7.4 per cent for all star rated buildings compared with 4.0 per cent for non-rated buildings (5.4 per cent for 5 and 6 star). The report was based on assessment of 500 buildings worth \$38 billion (Age, 15 June 2011 and AFR, 1 March 2011).**

**Again in an AFR article of 2 August 2011, Ben Leeson of the Dexu Property Group reported that all the Group's office properties have been rated using the NABERS energy and water ratings and are now in the process of being upgraded to an average of 4.5 stars by 2012.**

**This AFR article also reported that a recent industry survey by the Property Funds Association found 41.7 per cent of property fund managers viewed sustainability issues as an opportunity for business development. But the survey also found almost 50 per cent of property fund managers had little appreciation of their tenants' interest in sustainability issues, such as water efficiency, green star ratings and carbon management.**

**Indications are that mandatory disclosure by requiring building space (>2,000 m<sup>2</sup>) ratings is promoting better energy performance investment in new and existing buildings. This will result in lower electricity and gas use per m<sup>2</sup> in these buildings.**

## 5.9 Industrial/Business programs

### *Introduction*

Over the period to 2020 gas use will be affected by:

- price increases due to carbon pricing and non-carbon pricing factors<sup>23</sup>;
- structural change influenced by carbon pricing and global competition;
- equipment efficiency and technology improvements; and
- specific measures (MEPS, energy efficiency such as the federal Energy Efficiency Opportunities Act (EEOA) (extended to 2017), Climate Change measures and in Victoria the Environment Resource and Efficiency Program (EREP).

Each of these factors will dampen BAU growth in gas use, the extent depending on actual changes occurring. Most of the foreseen changes are incorporated into NIEIR's modelling framework.

Efficiency improvements result from price increases, stock turnover at constant prices (autonomous energy efficiency improvement: AEEI) and specific measures.

### *Energy Efficiency Opportunities Assessment Act (EEOA)*

This Federal program mandates that businesses using >0.5 PJ of energy per year must report on energy savings opportunities with  $\leq 4$  year payback and report on implementation (not mandatory) of these opportunities. The first phase of EEOA extended over 2006-2011. The second five year phase, 2011-2017, is now being planned.

In 2008 Energetics undertook a survey of participating companies. Key results of the survey follow.

- The survey was sent to 175 entities, about 80 per cent of registered companies. 70 per cent responded to the survey, about 25 per cent of registered companies.
- Over 45 per cent of respondents identified savings of up to 10 per cent with a payback of up to 4 years, with a further 10 per cent identified savings of 10-20 per cent. This indicates for the respondent cohort that despite EEI progress over the past 10 years significant opportunities remain. Most (67 per cent) identified opportunities had a payback of <2 years, destroying the myth that <2 year payback EEOs are automatically picked up by the market.
- Over 70 per cent indicated **some** or **all** (13 per cent all or most) opportunities identified would be implemented in the next 1-2 years; 28 per cent few or none.
- Energetics estimated 50 per cent of EEOA related work was undertaken by external consultants.

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<sup>23</sup> NOTE the carbon pricing design includes compensation (but with energy efficiency improvement (EEI) inducements) to energy intensive trade exposed industries (EITEIs) which may enable growth in these sectors.

- Ongoing barriers to EEI identification and take-up were stated by respondents to be lack of a carbon price signal (that is, higher prices), and of incentives and internal resource limitations (personnel, management constraints, investment dollars).
- 16 per cent of respondents had not completed their required initial EEI assessments.
- 69 per cent reported EEO had raised the priority of EEI in their organisation and EEI knowledge was enhanced in 74 per cent of respondents.
- 39 per cent were using EEO to drive energy management beyond minimum EEO requirements and same proportion indicated EEO was a continuation of BAU.
- 21 per cent reported they had undertaken corporate and multi-site assessments as required under EEOA. Implementation on a compliance only basis.
- 40 per cent viewed assistance with R, D, D and C of EEI technologies was important; 31 per cent wished assistance to build internal EEI analysis/implementation capacity.
- 29 per cent reported a hurdle rate of <4 year payback.

In addition a 2010 report, First Opportunities: A look at the results from 2006-2008 for the EEO program, released by the Department of Resources, Energy and Tourism, noted that:

- up to four year payback EEOs had to be reported;
- 43 per cent of identified EEOs were based on natural gas, 17.5 per cent on electricity, 12.2 per cent on coal, 7.7 per cent on diesel;
- 31 per cent of EEO's energy use reported was natural gas;
- 199 entities (out of 225 registered for EEO) applied the EEO assessment framework to 57 per cent of their total energy use and EEO entities have until 2011 to assess 80 per cent of their total energy use at all sites using >0.5 PJ/a;
- by 2010 EEO entities had implemented or committed to GHGA of 3.9 Mt CO<sub>2</sub>e/a (but gave no indication of how much would have been achieved without EEO);
- EEO entities accounted for 62 per cent of energy used in all Australian businesses; and
- by 2009 EEO entities had identified 67.7 PJ/a of total; 61 per cent (41.6 PJ/a) of identified savings were, or were in the process of, being implemented and of these 60 per cent had paybacks of <2 years.

### ***Assessment of EEOA***

On the basis of the Energetics report we estimate that over the period to 2016 EEI energy savings of about 10 per cent could be achieved in the business sector. This estimate is based on higher energy prices and the DETR and Energetics studies. Most of this amount is already built into NIEIR forecasting models. Perhaps 2 per cent of additional savings might be achieved in the business sector as a result of EEO.

***Environment Resource and Efficiency Program (EREP)***

In 2008 the Environment and Resource Efficiency Plans program (EREP) was initiated by the Victorian EPA. EREP applies to any large energy and water using sites. EREP applies to the approximately 250 businesses that use more than 100 TJ of energy and 100 ML of water per year per site. Annual EREP plans must be submitted by 31 December each year and implementation of  $\leq 3$  year paybacks is mandated. EREP requires these sites to improve overall resource efficiency, reducing energy water and waste, rather than focussing solely on energy and greenhouse emissions. The program requires participating sites to implement efficiency actions with a payback period of 3 years or less.

Sites participating in EREP have committed to saving 900,000t CO<sub>2</sub>e/a GHG through actions in their plans.

Assuming half of the savings are from gas, and discounting for additionality and attribution (50 per cent), the EREP program could realise savings of around 4 PJs of Tariff D gas sales in Victoria.

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## 6. Natural gas sales and customer number forecasts to 2021 – Multinet region

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### 6.1 Introduction

This section presents natural gas demand forecasts by class and tariff to 2021 for the Multinet distribution region. Forecast numbers were prepared on a calendar year basis to 2021.

Forecasts of natural gas sales, customer numbers and MHQ are presented for the following:

- Tariff V by class; and
- Tariff D by class and industry.

### 6.2 Natural gas sales forecasts to 2021

The forecasts for each metric are presented for:

- (i) total Multinet;
- (ii) Multinet-Melbourne;
- (iii) Yarra Valley; and
- (iv) South Gippsland.

The commentary below focuses on total Multinet. Projections for Melbourne, Yarra Valley and South Gippsland are tabulated separately.

Table 6.1 shows forecasts of natural gas sales by tariff and class on a calendar year basis to 2021 for the Multinet distribution region. It also shows customers by tariff and class and MHQ for Tariff D. The Tariff D volume forecasts include unaccounted for gas or losses. The Tariff V forecasts are shown on a class basis, excluding unaccounted for gas. The loss factor for Tariff V used for Multinet was 4.4 per cent. Tariff L volumes and customers are also shown in Table 6.1.

#### ***Tariff V***

- Tariff V volumes for Multinet represent around 79 per cent of total volumes in 2011. As indicated in Table 6.1, total Tariff V volume growth is forecast to be -0.4 per cent per annum over the 2013 to 2017 period. The slow residential volume growth in the Multinet region reflects slow customer growth, the impact of the 6-star efficiency standard and gas price increases resulting from the price on carbon.

Residential volume growth on a weather normalised basis is -0.3 per cent per annum over the 2011 to 2021 period. Residential volumes for Multinet represent around 70 per cent of total gas sales.

Table 6.2 shows the forecasts for Tariff V gas volumes by tariff and block for total Multinet.

Average residential usage for both existing and new dwellings is projected to continue to fall over the projection period. The customer numbers forecasts developed take into account both net and gross customer movements.

The tables for customers show both net and gross customers. 'Net customers' refers to the absolute change in customer numbers between two specified periods, say 31 December. 'Gross customers' include all disconnections and reconnections within this period.

Total average residential usage falls from 62.2 GJ per dwelling in 2010 to 59.5 GJ by 2013 and 56.7 GJ per dwelling by 2017. New customer usage falls from nearly 49 GJ per dwelling in 2010 to 40 GJ per dwelling by 2017. These movements in average consumption reflect:

- (i) the volume reductions associated with higher gas prices projected, including the impact of the carbon price;
- (ii) a warming trend for Tariff V; and
- (iii) the impact of Federal and State greenhouse and energy policies outlined in Section 5 of this report.

The assumptions and drivers underlying the Tariff V projections are consistent with the assumptions and drivers underlying the AEMO 2011 Victorian Annual Planning Review gas projections.

Figure 6.1 shows the percentage growth in volumes by class and tariff over the 2013 to 2017 period for Multinet. Figure 6.2 shows total volume growth by class and tariff over the same period.

- Business Tariff V gas consumption represented around 9.0 per cent of total Multinet sales volumes in 2010. Forecast growth over the 2013 to 2017 period is negative 0.4 per cent per annum. This is offset by the growth in Tariff L volumes which increase to over 500 TJs by 2021.

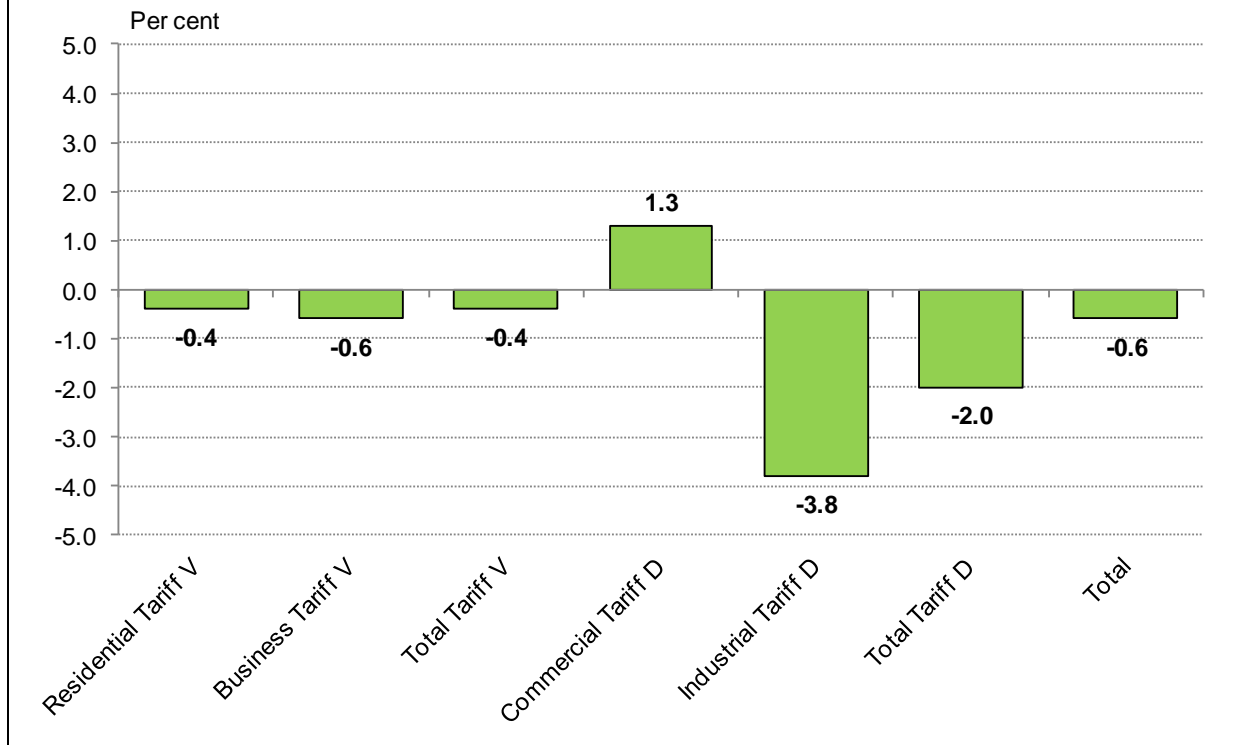
### **Tariff D**

- Industrial Tariff D natural gas consumption from the Multinet region falls by 4.0 per cent per year. There have been a number of major customer losses over recent years in Victoria. Many manufacturers have either closed their Victorian production facilities altogether, or shifted their operations overseas, to countries like China.

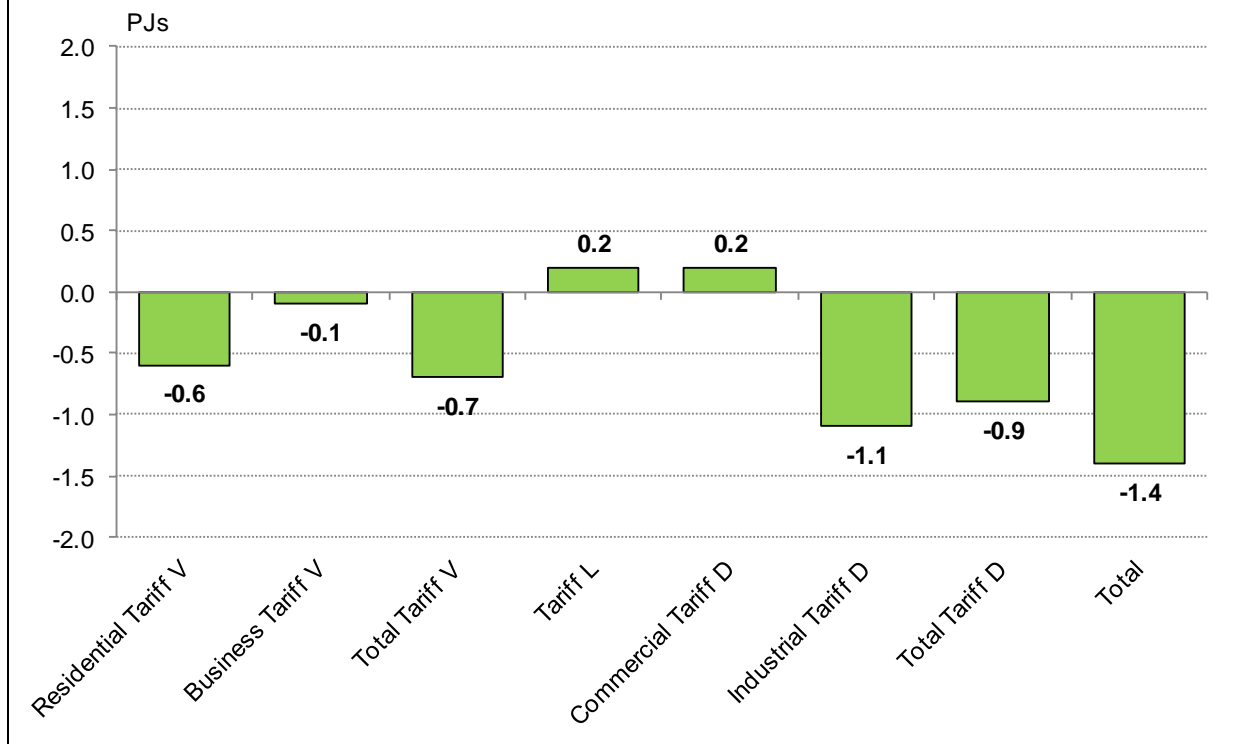
Projections of Tariff D volumes, customer numbers and maximum hourly quantities are presented in Table 6.4 on an industry basis.



**Figure 6.1: Natural gas sales by tariff and class – 2013 to 2017  
(percentage annual growth)**



**Figure 6.2: Natural gas sales by tariff and class –  
volume growth 2013 to 2017 (PJs)**



The projections for Tariff D to 2021 reflect a number of alternative sources of information:

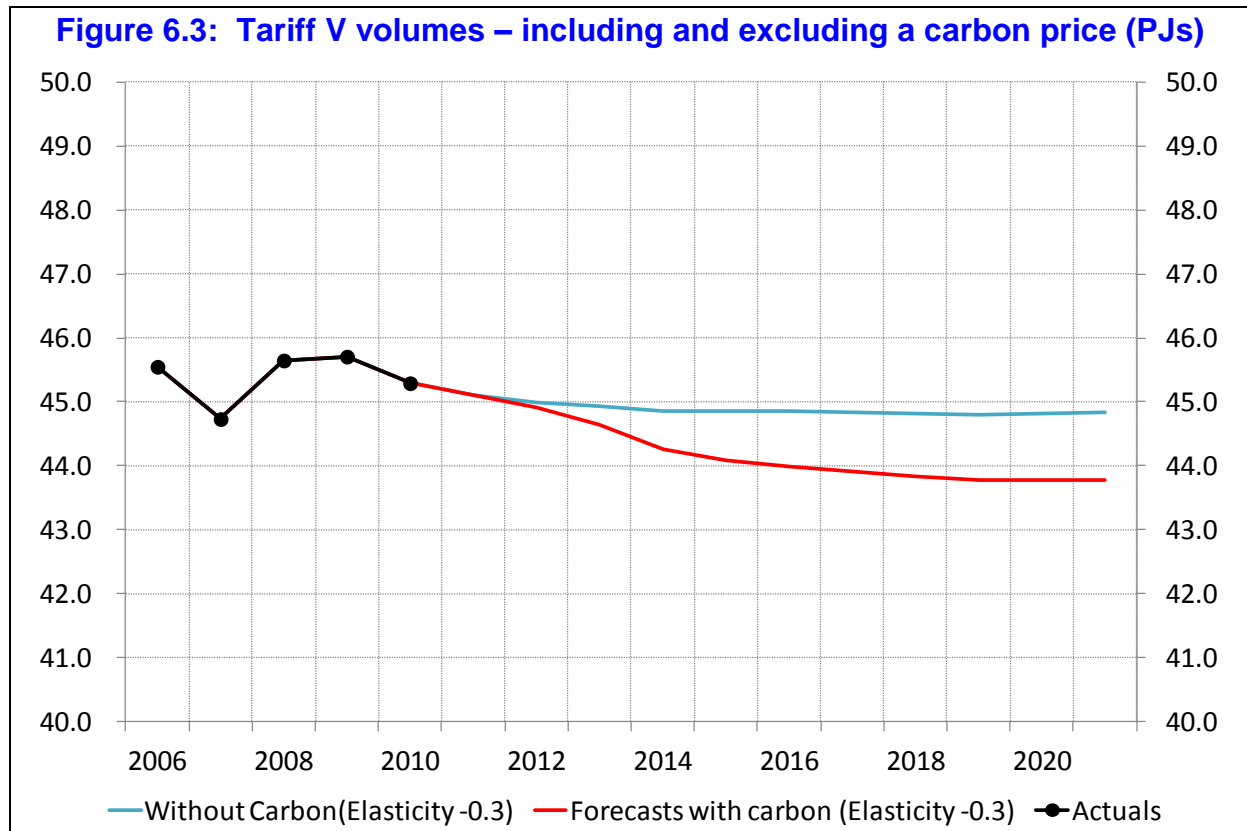
- assessed industry closures and expansions from information obtained by AEMO and NIEIR;
- short term expected changes in gas use collated from a survey of major Tariff D customers by NIEIR; and
- the economic prospects for each sector, in terms of overall real output growth projections to 2021. These are produced as part of NIEIR's economic forecast.

Section 4.4 of this report briefly reviewed recent downsizing and closures in the Victorian manufacturing sector, as well as developments in cogeneration.

### ***The impact of the carbon signal on Tariff V***

The introduction of a carbon signal by 2012-13 has a significant negative impact on Multinet Tariff V volumes.

Figure 6.3 shows total Tariff V volumes for Multinet to 2021, including and excluding this carbon tax. By 2017, Tariff V total volumes are down by nearly 1 petajoule under the projection including carbon. This is a relatively conservative assumption since the price elasticity included in the model for residential gas sales is only -0.28. Given the current environment of rising electricity and other fuel prices, it is quite possible that the elasticity could be double -0.28, or -0.56. Under this price elasticity, this would imply the Government's carbon tax would reduce Multinet Tariff V volumes by 2 petajoules by 2017.



Average overall residential gas usage for Multinet falls from around 61.3 GJ per connection in 2011 to around 56.7 GJ per connection in 2017 and 54.8 GJ per connection in 2021.

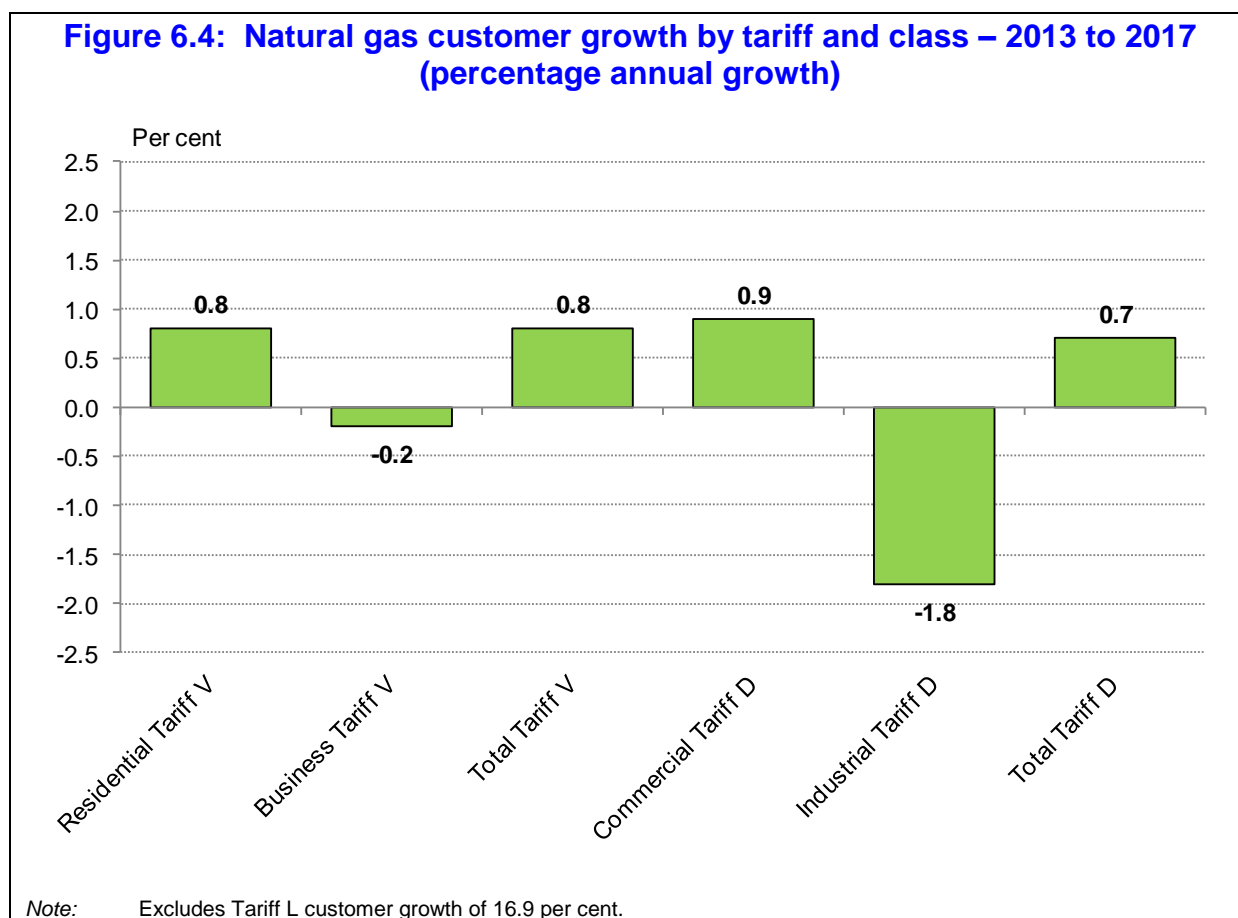
Decomposing the movement in average residential usage between 2011 and 2017 into its components implies the following contributions:

(i)	policy impacts	existing	-0.8
		new	-0.3
(ii)	warming trend		-1.2;
(iii)	carbon signal		-1.1; and
(iv)	other (including wholesale gas price increases)		-1.1.

### 6.3 Customer number and MHQ forecasts to 2021

Table 6.1 also presents average customer number forecasts by tariff and class to 2021, as well as Tariff D maximum hourly quantity projections. As noted above, more detailed projections for Tariff D are presented in Table 6.4. Forecasts of customer numbers for Tariff L are also provided in Table 6.1.

Figure 6.4 shows customer growth by tariff and class over the 2013 to 2017 period for the Multinet distribution region. Figure 6.5 shows the average annual percentage change for Tariff D between 2013 and 2017 in total volumes, total customers and total MHQs.



**Figure 6.5: Tariff D volume, customer and MHQ growth – 2013 to 2017  
(average percentage change)**

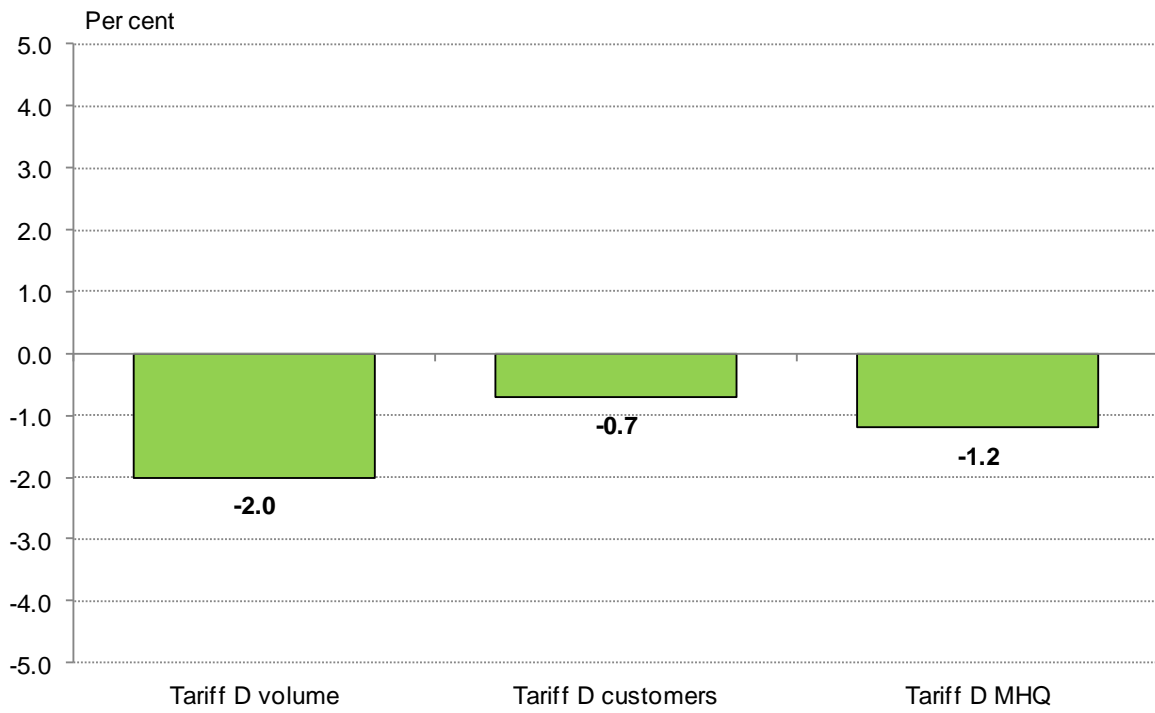


Table 6.1 Tariff V, L and D – Volumes, customers and MHQ – TOTAL MULTINET

Sum of Data				Year												Annual Average % Chg	
Measure	Tariff Type	Sector	Unit	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2013-17	2011-21	
Billed Linearised Volumes	Tariff V	Residential	TJ	39,479	39,318	39,074	38,753	38,592	38,519	38,446	38,388	38,349	38,352	38,344	-0.4%	-0.3%	
		Business	TJ	5,624	5,602	5,564	5,515	5,487	5,472	5,457	5,445	5,437	5,432	5,427	-0.5%	-0.4%	
	Tariff V Total			45,102	44,920	44,638	44,268	44,079	43,991	43,903	43,833	43,786	43,784	43,770	-0.4%	-0.3%	
	Tariff L	Business	TJ	113	152	192	235	276	317	359	400	441	482	524	16.9%	16.5%	
	Tariff L Total			113	152	192	235	276	317	359	400	441	482	524	16.9%	16.5%	
Billed Linearised Volumes (Pre-2011 Not Normalised) Total				45,216	45,071	44,830	44,503	44,354	44,308	44,262	44,233	44,227	44,266	44,294	-0.3%	-0.2%	
Gas Flows	Tariff V	Residential	TJ	40,314	40,050	39,786	39,488	39,335	39,253	39,165	39,085	39,019	38,998	38,987	-0.4%	-0.3%	
		Business	TJ	4,792	4,876	4,860	4,790	4,755	4,750	4,760	4,760	4,779	4,798	4,796	-0.6%	0.0%	
	Tariff V Total			45,105	44,926	44,646	44,278	44,090	44,003	43,915	43,845	43,798	43,796	43,782	-0.4%	-0.3%	
	Tariff L	Business	TJ	118	158	201	246	288	331	374	417	461	504	547	16.9%	16.5%	
	Tariff L Total			118	158	201	246	288	331	374	417	461	504	547	16.9%	16.5%	
Tariff D	Commercial	TJ	3,589	3,610	3,625	3,672	3,730	3,775	3,824	3,888	3,966	4,043	4,096	4,133	1.3%	1.3%	
	Industrial	TJ	8,417	8,103	7,640	7,252	6,945	6,727	6,556	6,283	5,973	5,790	5,622	5,478	-3.8%	-4.0%	
	Tariff D Total			12,006	11,713	11,266	10,924	10,674	10,503	10,380	10,171	9,938	9,833	9,718	-2.0%	-2.1%	
Gas Flows Total				57,230	56,797	56,112	55,448	55,052	54,837	54,670	54,433	54,197	54,133	54,047	-0.6%	-0.6%	
MHQ	Tariff L	Business	GJ	68	86	104	122	139	155	172	187	202	217	232	13.3%	13.0%	
		Tariff L Total			68	86	104	122	139	155	172	187	202	217	232	13.3%	13.0%
	Tariff D	Commercial	GJ	1,209	1,212	1,215	1,220	1,225	1,230	1,236	1,242	1,250	1,257	1,260	0.4%	0.4%	
		Industrial	GJ	2,335	2,285	2,226	2,167	2,118	2,080	2,044	2,002	1,958	1,918	1,901	-2.1%	-2.0%	
Tariff D Total			3,544	3,497	3,441	3,386	3,343	3,310	3,279	3,244	3,208	3,175	3,162	-1.2%	-1.1%		
MHQ Total				3,612	3,583	3,546	3,509	3,482	3,466	3,451	3,431	3,410	3,392	3,394	-0.7%	-0.6%	
Peak MHQ	Tariff L	Business	GJ	66	83	100	118	134	150	165	180	195	210	224	13.3%	13.0%	
		Tariff L Total			66	83	100	118	134	150	165	180	195	210	224	13.3%	13.0%
Peak MHQ Total				66	83	100	118	134	150	165	180	195	210	224	13.3%	13.0%	
Customers	Tariff V	Residential	Numbers	657,176	662,822	668,510	674,188	679,803	685,066	690,193	695,402	700,625	705,869	711,103	0.8%	0.8%	
		Business	Numbers	16,519	16,505	16,450	16,312	16,283	16,298	16,294	16,304	16,328	16,363	16,339	-0.2%	-0.1%	
	Tariff V Total			673,695	679,327	684,961	690,501	696,086	701,364	706,487	711,706	716,953	722,232	727,442	0.8%	0.8%	
	Tariff L	Business	Numbers	18	24	31	37	44	51	57	64	70	77	84	16.7%	16.8%	
	Tariff L Total			18	24	31	37	44	51	57	64	70	77	84	16.7%	16.8%	
Tariff D	Commercial	Numbers	109	110	110	111	112	113	114	115	116	118	119	0.9%	0.8%		
	Industrial	Numbers	161	157	153	149	146	143	142	139	136	134	132	-1.8%	-2.0%		
	Tariff D Total			270	267	263	260	258	256	256	254	252	252	250	-0.7%	-0.8%	
Customers Total				673,983	679,618	685,254	690,798	696,388	701,670	706,800	712,023	717,276	722,561	727,776	0.8%	0.8%	
Annual Gross Customers	Tariff V	Residential	Numbers	8,605	8,535	8,600	8,613	8,573	8,243	8,128	8,232	8,267	8,309	8,321	-1.4%	-0.3%	
		Business	Numbers	178	200	197	196	195	196	195	196	196	196	196	-0.3%	0.9%	
	Tariff V Total			8,784	8,735	8,797	8,809	8,768	8,439	8,323	8,427	8,463	8,505	8,517	-1.4%	-0.3%	
Annual Gross Customers Movement Total				8,784	8,735	8,797	8,809	8,768	8,439	8,323	8,427	8,463	8,505	8,517	-1.4%	-0.3%	
Annual Net Customers Growth	Tariff V	Residential	Numbers	5,625	5,646	5,688	5,678	5,615	5,263	5,127	5,209	5,224	5,243	5,235	-2.6%	-0.7%	
		Business	Numbers	-18	-14	-55	-138	-29	14	4	10	24	35	24	-49.3%	2.9%	
	Tariff V Total			5,607	5,632	5,634	5,540	5,586	5,277	5,123	5,219	5,247	5,278	5,211	-2.3%	-0.7%	
Annual Net Customers Growth Total				5,607	5,632	5,634	5,540	5,586	5,277	5,123	5,219	5,247	5,278	5,211	-2.3%	-0.7%	

**Table 6.2 Tariff V – Residential and business volumes (by block) and customers – TOTAL MULTINET**

Sum of Data						Year											Annual Average % Chg		
Measure	Sector	Segment	Period	Block	Unit	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2013-17	2011-21	
Billed Linearised V	Residential	Residential	Peak	1	TJ	3,687	3,686	3,678	3,663	3,663	3,671	3,678	3,687	3,698	3,713	3,727	0.0%	0.1%	
				2	TJ	3,273	3,272	3,265	3,252	3,252	3,259	3,265	3,273	3,283	3,296	3,308	0.0%	0.1%	
				3	TJ	2,893	2,893	2,887	2,875	2,874	2,880	2,886	2,894	2,902	2,914	2,924	0.0%	0.1%	
				4	TJ	4,664	4,665	4,655	4,636	4,635	4,645	4,655	4,666	4,680	4,698	4,715	0.0%	0.1%	
				5	TJ	8,743	8,745	8,726	8,689	8,688	8,706	8,724	8,744	8,770	8,804	8,836	0.0%	0.1%	
			Off Peak	1	TJ	4,256	4,214	4,163	4,104	4,063	4,031	3,999	3,969	3,941	3,917	3,892	-1.0%	-0.9%	
				2	TJ	2,035	2,016	1,991	1,963	1,943	1,928	1,912	1,898	1,885	1,873	1,861	-1.0%	-0.9%	
				3	TJ	937	928	916	903	894	887	880	873	867	862	857	-1.0%	-0.9%	
				4	TJ	828	821	811	799	791	785	779	773	767	763	758	-1.0%	-0.9%	
				5	TJ	991	978	966	952	943	936	928	921	915	909	904	-1.0%	-0.9%	
			Shoulder	1	TJ	1,696	1,679	1,658	1,635	1,619	1,606	1,594	1,582	1,571	1,562	1,552	-1.0%	-0.9%	
				2	TJ	1,357	1,344	1,327	1,309	1,296	1,285	1,275	1,266	1,257	1,249	1,242	-1.0%	-0.9%	
				3	TJ	1,035	1,025	1,012	998	988	980	973	965	958	953	947	-1.0%	-0.9%	
				4	TJ	1,346	1,334	1,318	1,299	1,286	1,276	1,266	1,256	1,247	1,240	1,232	-1.0%	-0.9%	
				5	TJ	1,738	1,719	1,699	1,675	1,658	1,645	1,632	1,619	1,608	1,598	1,588	-1.0%	-0.9%	
	Business	Business	Peak	1	TJ	333	333	332	331	331	331	331	332	333	334	335	337	0.0%	0.1%
				2	TJ	529	529	528	526	526	527	528	530	531	533	535	0.0%	0.1%	
				3	TJ	207	207	207	206	206	207	207	208	208	209	210	0.0%	0.1%	
				4	TJ	712	712	711	708	708	710	711	713	716	719	722	0.0%	0.1%	
				5	TJ	892	895	894	892	892	894	897	900	903	907	911	0.1%	0.2%	
			Off Peak	1	TJ	322	319	315	311	308	305	303	301	299	297	295	-1.0%	-0.9%	
				2	TJ	460	456	450	444	440	436	433	430	427	425	422	-1.0%	-0.9%	
				3	TJ	175	173	171	169	167	166	165	164	163	162	161	-1.0%	-0.9%	
				4	TJ	531	526	520	513	508	505	501	497	494	492	489	-0.9%	-0.8%	
				5	TJ	458	456	451	445	441	437	434	431	428	426	424	-1.0%	-0.8%	
Shoulder			1	TJ	142	140	139	137	135	134	133	132	131	131	130	-1.0%	-0.9%		
			2	TJ	211	209	206	204	201	200	198	197	196	194	193	-1.0%	-0.9%		
			3	TJ	82	81	80	79	78	78	77	77	76	76	75	-1.0%	-0.9%		
			4	TJ	275	272	269	266	263	261	259	258	256	254	253	-0.9%	-0.8%		
			5	TJ	294	292	289	285	282	280	278	276	274	273	271	-0.9%	-0.8%		
<b>Billed Linearised Volumes (Pre-2011 Not Normalised) Total</b>						<b>45,102</b>	<b>44,920</b>	<b>44,638</b>	<b>44,268</b>	<b>44,079</b>	<b>43,991</b>	<b>43,903</b>	<b>43,833</b>	<b>43,786</b>	<b>43,784</b>	<b>43,770</b>	<b>-0.4%</b>	<b>-0.3%</b>	
Gas Flows	Residential	Residential	Year	(blank)	TJ	40,314	40,050	39,786	39,488	39,335	39,253	39,165	39,085	39,019	38,998	38,987	-0.4%	-0.3%	
	Business	Business	Year	(blank)	TJ	4,792	4,876	4,860	4,790	4,755	4,750	4,760	4,779	4,798	4,796	4,796	-0.6%	0.0%	
<b>Gas Flows Total</b>						<b>45,105</b>	<b>44,926</b>	<b>44,646</b>	<b>44,278</b>	<b>44,090</b>	<b>44,003</b>	<b>43,915</b>	<b>43,845</b>	<b>43,798</b>	<b>43,796</b>	<b>43,782</b>	<b>-0.4%</b>	<b>-0.3%</b>	
Customers	Residential	Residential	Year	(blank)	Numbers	657,176	662,822	668,510	674,188	679,803	685,066	690,193	695,402	700,625	705,869	711,103	0.8%	0.8%	
	Business	Business	Year	(blank)	Numbers	16,519	16,505	16,450	16,312	16,283	16,298	16,294	16,304	16,328	16,363	16,339	-0.2%	-0.1%	
<b>Customers Total</b>						<b>673,695</b>	<b>679,327</b>	<b>684,961</b>	<b>690,501</b>	<b>696,086</b>	<b>701,364</b>	<b>706,487</b>	<b>711,706</b>	<b>716,953</b>	<b>722,232</b>	<b>727,442</b>	<b>0.8%</b>	<b>0.8%</b>	
Annual Gross Cust	Residential	Residential	Year	(blank)	Numbers	8,605	8,535	8,600	8,613	8,573	8,243	8,128	8,232	8,267	8,309	8,321	-1.4%	-0.3%	
	Business	Business	Year	(blank)	Numbers	178	200	197	196	195	196	195	195	196	196	196	-0.3%	0.9%	
<b>Annual Gross Customers Movement Total</b>						<b>8,784</b>	<b>8,735</b>	<b>8,797</b>	<b>8,809</b>	<b>8,768</b>	<b>8,439</b>	<b>8,323</b>	<b>8,427</b>	<b>8,463</b>	<b>8,505</b>	<b>8,517</b>	<b>-1.4%</b>	<b>-0.3%</b>	
Annual Net Custor	Residential	New Custom	Year	(blank)	Numbers	5,625	5,646	5,688	5,678	5,615	5,263	5,127	5,209	5,224	5,243	5,235	-2.6%	-0.7%	
	Business	New Custom	Year	(blank)	Numbers	-18	-14	-55	-138	-29	14	-4	10	24	35	-24	-49.3%	2.9%	
<b>Annual Net Customers Growth Total</b>						<b>5,607</b>	<b>5,632</b>	<b>5,634</b>	<b>5,540</b>	<b>5,586</b>	<b>5,277</b>	<b>5,123</b>	<b>5,219</b>	<b>5,247</b>	<b>5,278</b>	<b>5,211</b>	<b>-2.3%</b>	<b>-0.7%</b>	

**Table 6.3 Tariff L – Volumes (by block), MHQ, peak MHQ and customers – TOTAL MULTINET**

Sum of Data							Year											Annual Average % Chg	
Measure	Sector	Segment	Period	Block	Unit		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2013-17	2011-21
Billed Linearised Volumes	Business	Business	Peak	1	TJ		11	14	18	22	26	30	34	38	42	46	49	16.8%	16.7%
				2	TJ		41	56	71	86	101	117	132	147	162	177	193	16.8%	16.6%
			Off Peak	1	TJ		14	19	24	29	34	39	44	50	55	60	65	16.8%	16.7%
				2	TJ		26	34	44	54	63	72	82	91	100	110	119	17.0%	16.3%
			Shoulder	1	TJ		5	7	9	11	13	15	17	19	21	23	25	16.8%	16.7%
				2	TJ		16	21	27	33	38	44	50	56	61	67	73	17.1%	16.5%
<b>Billed Linearised Volumes (Pre-2011 Not Normalised) Total</b>							<b>113</b>	<b>152</b>	<b>192</b>	<b>235</b>	<b>276</b>	<b>317</b>	<b>359</b>	<b>400</b>	<b>441</b>	<b>482</b>	<b>524</b>	<b>16.9%</b>	<b>16.5%</b>
Gas Flows	Business	Business	Year	(blank)	TJ		118	158	201	246	288	331	374	417	461	504	547	16.9%	16.5%
<b>Gas Flows Total</b>							<b>118</b>	<b>158</b>	<b>201</b>	<b>246</b>	<b>288</b>	<b>331</b>	<b>374</b>	<b>417</b>	<b>461</b>	<b>504</b>	<b>547</b>	<b>16.9%</b>	<b>16.5%</b>
MHQ	Business	Business	Year	(blank)	GJ		68	86	104	122	139	155	172	187	202	217	232	13.3%	13.0%
<b>MHQ Total</b>							<b>68</b>	<b>86</b>	<b>104</b>	<b>122</b>	<b>139</b>	<b>155</b>	<b>172</b>	<b>187</b>	<b>202</b>	<b>217</b>	<b>232</b>	<b>13.3%</b>	<b>13.0%</b>
Peak MHQ	Business	Business	Year	(blank)	GJ		66	83	100	118	134	150	165	180	195	210	224	13.3%	13.0%
<b>Peak MHQ Total</b>							<b>66</b>	<b>83</b>	<b>100</b>	<b>118</b>	<b>134</b>	<b>150</b>	<b>165</b>	<b>180</b>	<b>195</b>	<b>210</b>	<b>224</b>	<b>13.3%</b>	<b>13.0%</b>
Customers	Business	Business	Year	(blank)	Numbers		18	24	31	37	44	51	57	64	70	77	84	16.7%	16.8%
<b>Customers Total</b>							<b>18</b>	<b>24</b>	<b>31</b>	<b>37</b>	<b>44</b>	<b>51</b>	<b>57</b>	<b>64</b>	<b>70</b>	<b>77</b>	<b>84</b>	<b>16.7%</b>	<b>16.8%</b>



Table 6.4 Tariff D – Volumes, MHQ customers by industry – TOTAL MULTINET

Sum of Data Measure		Sector	Segment	Unit	Year											Annual Average % Chg	
					2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2013-17	2011-21
Gas Flows	Commercial	Electricity, Gas & Water (ex GPG)		TJ	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
		Construction		TJ	164	165	166	164	161	161	161	163	164	163	163	-0.7%	-0.1%
		Wholesale Trade and Retail Trade		TJ	193	195	198	200	204	206	209	213	217	220	222	1.5%	1.4%
		Transport & Storage and Communication Services		TJ	20	21	21	22	22	22	23	23	23	24	24	1.8%	1.7%
		Finance Insurance Property & Business Services		TJ	256	263	267	267	268	272	276	280	285	290	294	0.9%	1.4%
		Government Administration, Defence, Education		TJ	1,800	1,781	1,767	1,784	1,809	1,822	1,836	1,859	1,887	1,916	1,936	1.0%	0.7%
		Accommodation, Cafes, Restaurants, Cultural		TJ	1,155	1,184	1,207	1,235	1,266	1,292	1,319	1,350	1,390	1,431	1,457	2.2%	2.4%
		<b>Commercial Total</b>			<b>3,589</b>	<b>3,610</b>	<b>3,625</b>	<b>3,672</b>	<b>3,730</b>	<b>3,775</b>	<b>3,824</b>	<b>3,888</b>	<b>3,966</b>	<b>4,043</b>	<b>4,096</b>	<b>1.3%</b>	<b>1.3%</b>
	Industrial	Agriculture		TJ	123	124	123	122	122	123	124	126	127	129	131	0.2%	0.6%
		Mining		TJ	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
		Food, beverages, tobacco manufacturing		TJ	1,609	1,585	1,569	1,561	1,543	1,538	1,551	1,550	1,563	1,591	1,605	-0.3%	0.0%
		Textiles, clothing and footwear manufacturing		TJ	25	23	21	20	19	17	17	16	15	14	14	-6.2%	-5.9%
		Wood and paper, wood products and paper		TJ	1,298	1,238	1,169	1,098	1,032	976	927	875	827	784	734	-5.6%	-5.5%
		Chemicals, petroleum, coal manufacturing		TJ	860	834	816	803	783	772	770	761	759	765	766	-1.4%	-1.2%
		Non-metallic minerals manufacturing		TJ	2,826	2,737	2,480	2,260	2,134	2,038	1,943	1,785	1,571	1,448	1,360	-5.9%	-7.0%
		Basic & fabricated metal products manufacturing		TJ	573	537	504	476	444	420	401	370	337	316	298	-5.5%	-6.3%
		Transport and other machinery equipment manufacturing		TJ	592	530	481	444	404	380	356	333	309	283	253	-7.3%	-8.2%
		Miscellaneous manufacturing		TJ	512	495	477	469	464	463	467	467	464	462	462	-0.5%	-1.0%
		<b>Industrial Total</b>			<b>8,417</b>	<b>8,103</b>	<b>7,640</b>	<b>7,252</b>	<b>6,945</b>	<b>6,727</b>	<b>6,556</b>	<b>6,283</b>	<b>5,973</b>	<b>5,790</b>	<b>5,622</b>	<b>-3.8%</b>	<b>-4.0%</b>
<b>Gas Flows Total</b>					<b>12,006</b>	<b>11,713</b>	<b>11,266</b>	<b>10,924</b>	<b>10,674</b>	<b>10,503</b>	<b>10,380</b>	<b>10,171</b>	<b>9,938</b>	<b>9,833</b>	<b>9,718</b>	<b>-2.0%</b>	<b>-2.1%</b>
MHQ	Commercial	Electricity, Gas & Water (ex GPG)		GJ	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
		Construction		GJ	30	30	30	30	30	30	30	30	30	30	30	-0.3%	0.0%
		Wholesale Trade and Retail Trade		GJ	131	131	131	132	132	132	132	133	133	134	134	0.2%	0.2%
		Transport & Storage and Communication Services		GJ	9	9	9	9	9	9	9	9	9	10	10	0.4%	0.4%
		Finance Insurance Property & Business Services		GJ	72	72	73	73	73	73	74	74	75	75	75	0.4%	0.5%
		Government Administration, Defence, Education		GJ	602	602	601	602	604	606	608	610	613	616	617	0.3%	0.2%
		Accommodation, Cafes, Restaurants, Cultural		GJ	365	368	371	374	377	380	382	386	389	393	395	0.0%	0.8%
		<b>Commercial Total</b>			<b>1,209</b>	<b>1,212</b>	<b>1,215</b>	<b>1,220</b>	<b>1,225</b>	<b>1,230</b>	<b>1,236</b>	<b>1,242</b>	<b>1,250</b>	<b>1,257</b>	<b>1,260</b>	<b>0.4%</b>	<b>0.4%</b>
	Industrial	Agriculture		GJ	60	60	60	60	60	60	60	60	60	61	61	0.1%	0.1%
		Mining		GJ	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
		Food, beverages, tobacco manufacturing		GJ	474	470	467	465	463	462	462	464	467	470	472	-0.3%	0.0%
		Textiles, clothing and footwear manufacturing		GJ	16	16	16	15	15	15	15	14	14	14	14	-1.4%	-1.3%
		Wood and paper, wood products and paper		GJ	255	245	235	224	214	205	197	189	181	174	170	-4.3%	-4.0%
		Chemicals, petroleum, coal manufacturing		GJ	359	356	354	352	350	348	348	347	347	347	347	-0.4%	-0.3%
		Non-metallic minerals manufacturing		GJ	525	512	486	458	437	422	405	382	357	334	325	-4.4%	-4.7%
		Basic & fabricated metal products manufacturing		GJ	214	208	203	198	193	189	184	179	174	169	166	-2.4%	-2.5%
		Transport and other machinery equipment manufacturing		GJ	297	285	274	265	256	249	242	236	229	221	216	-3.0%	-3.1%
		Miscellaneous manufacturing		GJ	135	133	131	130	130	129	130	130	129	129	129	-0.4%	-0.5%
		<b>Industrial Total</b>			<b>2,335</b>	<b>2,285</b>	<b>2,226</b>	<b>2,167</b>	<b>2,118</b>	<b>2,080</b>	<b>2,044</b>	<b>2,002</b>	<b>1,958</b>	<b>1,918</b>	<b>1,901</b>	<b>-2.1%</b>	<b>-2.0%</b>
<b>MHQ Total</b>					<b>3,544</b>	<b>3,497</b>	<b>3,441</b>	<b>3,386</b>	<b>3,343</b>	<b>3,310</b>	<b>3,279</b>	<b>3,244</b>	<b>3,208</b>	<b>3,175</b>	<b>3,162</b>	<b>-1.2%</b>	<b>-1.1%</b>
Customers	Commercial	Electricity, Gas & Water (ex GPG)		Numbers	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
		Construction		Numbers	2	2	2	2	2	2	2	2	2	2	2	-0.3%	0.0%
		Wholesale Trade and Retail Trade		Numbers	11	11	11	11	12	12	12	12	12	12	12	1.0%	1.0%
		Transport & Storage and Communication Services		Numbers	2	2	2	2	2	2	2	2	2	2	2	1.1%	1.0%
		Finance Insurance Property & Business Services		Numbers	7	7	7	7	7	7	7	7	8	8	8	0.4%	0.8%
		Government Administration, Defence, Education		Numbers	50	50	50	50	50	50	51	51	51	52	52	0.5%	0.4%
		Accommodation, Cafes, Restaurants, Cultural		Numbers	37	37	38	38	39	39	40	40	41	42	42	1.3%	1.4%
		<b>Commercial Total</b>			<b>109</b>	<b>110</b>	<b>110</b>	<b>111</b>	<b>112</b>	<b>113</b>	<b>114</b>	<b>115</b>	<b>116</b>	<b>118</b>	<b>119</b>	<b>0.9%</b>	<b>0.8%</b>
	Industrial	Agriculture		Numbers	9	9	9	9	9	9	9	9	9	9	10	0.1%	0.4%
		Mining		Numbers	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
		Food, beverages, tobacco manufacturing		Numbers	33	33	32	32	32	32	32	32	32	33	33	-0.1%	0.0%
		Textiles, clothing and footwear manufacturing		Numbers	5	4	4	4	4	4	3	3	3	3	3	-4.7%	-4.5%
		Wood and paper, wood products and paper		Numbers	16	15	15	14	14	14	13	13	13	12	12	-2.6%	-2.7%
		Chemicals, petroleum, coal manufacturing		Numbers	26	25	25	24	24	24	24	24	23	24	24	-0.9%	-0.7%
		Non-metallic minerals manufacturing		Numbers	15	15	14	14	13	13	13	13	12	11	11	-2.2%	-3.1%
		Basic & fabricated metal products manufacturing		Numbers	27	26	25	24	23	22	22	21	19	19	18	-3.2%	-3.9%
		Transport and other machinery equipment manufacturing		Numbers	20	18	17	16	15	14	14	13	12	12	11	-5.1%	-5.9%
		Miscellaneous manufacturing		Numbers	12	12	11	11	11	11	11	11	11	11	11	-0.2%	-0.5%
		<b>Industrial Total</b>			<b>161</b>	<b>157</b>	<b>153</b>	<b>149</b>	<b>146</b>	<b>143</b>	<b>142</b>	<b>139</b>	<b>136</b>	<b>134</b>	<b>132</b>	<b>-1.8%</b>	<b>-2.0%</b>
<b>Customers Total</b>					<b>270</b>	<b>267</b>	<b>263</b>	<b>260</b>	<b>258</b>	<b>256</b>	<b>256</b>	<b>254</b>	<b>252</b>	<b>252</b>	<b>250</b>	<b>-0.7%</b>	<b>-0.8%</b>

Table 6.5 Tariff V, L and D – Volumes, customers and MHQ – MELBOURNE

Sum of Data														Annual Average % Chg				
Tariff Zone	Measure	Tariff Type	Sector	Unit	Year												2013-17	2011-21
					2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021			
Melbourne	Billed Linearised Volumes	Tariff V	Residential	TJ	39,200	39,029	38,777	38,449	38,279	38,200	38,120	38,054	38,008	38,003	37,989	-0.4%	-0.3%	
			Business	TJ	5,565	5,538	5,496	5,443	5,413	5,396	5,378	5,363	5,350	5,343	5,335	-0.5%	-0.4%	
		Tariff V Total			44,765	44,567	44,273	43,892	43,692	43,595	43,498	43,417	43,358	43,346	43,324	-0.4%	-0.3%	
		Tariff L	Business	TJ	113	152	192	235	276	317	359	400	441	482	524	16.9%	16.5%	
		Tariff L Total			113	152	192	235	276	317	359	400	441	482	524	16.9%	16.5%	
	<b>Billed Linearised Volumes (Pre-2011 Not Normalised) Total</b>					<b>44,878</b>	<b>44,719</b>	<b>44,466</b>	<b>44,128</b>	<b>43,968</b>	<b>43,912</b>	<b>43,857</b>	<b>43,817</b>	<b>43,800</b>	<b>43,829</b>	<b>43,848</b>	<b>-0.3%</b>	<b>-0.2%</b>
	Gas Flows	Tariff V	Residential	TJ	40,023	39,745	39,469	39,159	38,995	38,905	38,808	38,717	38,640	38,609	38,590	-0.4%	-0.4%	
			Business	TJ	4,742	4,822	4,804	4,733	4,697	4,690	4,700	4,718	4,737	4,734	4,734	-0.6%	0.0%	
		Tariff V Total			44,765	44,567	44,273	43,892	43,692	43,595	43,498	43,417	43,358	43,346	43,324	-0.4%	-0.3%	
		Tariff L	Business	TJ	118	158	201	246	288	331	374	417	461	504	547	16.9%	16.5%	
		Tariff L Total			118	158	201	246	288	331	374	417	461	504	547	16.9%	16.5%	
		Tariff D	Commercial	TJ	3,589	3,610	3,625	3,672	3,730	3,775	3,824	3,888	3,966	4,043	4,096	1.3%	1.3%	
		Tariff D Total	Industrial	TJ	8,106	7,796	7,337	6,950	6,646	6,430	6,256	5,983	5,670	5,482	5,312	-3.9%	-4.1%	
	<b>Gas Flows Total</b>					<b>56,578</b>	<b>56,131</b>	<b>55,436</b>	<b>54,760</b>	<b>54,356</b>	<b>54,131</b>	<b>53,953</b>	<b>53,705</b>	<b>53,455</b>	<b>53,375</b>	<b>53,278</b>	<b>-0.7%</b>	<b>-0.6%</b>
	MHQ	Tariff L	Business	GJ	68	86	104	122	139	155	172	187	202	217	232	232	13.3%	13.0%
			Tariff L Total			68	86	104	122	139	155	172	187	202	217	232	13.3%	13.0%
		Tariff D	Commercial	GJ	1,209	1,212	1,215	1,220	1,225	1,230	1,236	1,242	1,250	1,257	1,260	1,260	0.4%	0.4%
		Tariff D Total	Industrial	GJ	2,274	2,224	2,165	2,106	2,058	2,020	1,983	1,941	1,897	1,857	1,840	-2.2%	-2.1%	
	<b>MHQ Total</b>					<b>3,550</b>	<b>3,522</b>	<b>3,485</b>	<b>3,448</b>	<b>3,422</b>	<b>3,405</b>	<b>3,390</b>	<b>3,370</b>	<b>3,349</b>	<b>3,331</b>	<b>3,332</b>	<b>-0.7%</b>	<b>-0.6%</b>
	Peak MHQ	Tariff L	Business	GJ	66	83	100	118	134	150	165	180	195	210	224	224	13.3%	13.0%
			Tariff L Total			66	83	100	118	134	150	165	180	195	210	224	13.3%	13.0%
	<b>Peak MHQ Total</b>					<b>66</b>	<b>83</b>	<b>100</b>	<b>118</b>	<b>134</b>	<b>150</b>	<b>165</b>	<b>180</b>	<b>195</b>	<b>210</b>	<b>224</b>	<b>13.3%</b>	<b>13.0%</b>
	Customers	Tariff V	Residential	Numbers	650,411	655,451	660,621	665,781	670,962	675,847	680,603	685,330	690,068	694,901	699,773	704,600	0.7%	0.7%
Business			Numbers	16,419	16,402	16,348	16,210	16,181	16,195	16,192	16,202	16,226	16,261	16,237	16,237	-0.2%	-0.1%	
Tariff V Total				666,830	671,853	676,968	681,991	687,144	692,042	696,795	701,532	706,293	711,161	716,010	720,837	0.7%	0.7%	
Tariff L		Business	Numbers	18	24	31	37	44	51	57	64	70	77	84	91	16.7%	16.8%	
Tariff L Total				18	24	31	37	44	51	57	64	70	77	84	91	16.7%	16.8%	
Tariff D		Commercial	Numbers	109	110	110	111	112	113	114	115	116	118	119	119	0.9%	0.8%	
Tariff D Total		Industrial	Numbers	160	156	152	148	145	142	141	138	135	133	131	131	-1.8%	-2.0%	
<b>Customers Total</b>					<b>667,117</b>	<b>672,143</b>	<b>677,261</b>	<b>682,288</b>	<b>687,444</b>	<b>692,348</b>	<b>697,107</b>	<b>701,849</b>	<b>706,615</b>	<b>711,490</b>	<b>716,343</b>	<b>0.7%</b>	<b>0.7%</b>	
Annual Gross Customers Movement	Tariff V	Residential	Numbers	7,883	7,922	8,076	8,089	8,133	7,858	7,750	7,741	7,773	7,890	7,951	7,951	-1.0%	0.1%	
		Business	Numbers	177	196	195	194	193	193	193	193	194	194	194	194	-0.2%	0.9%	
	Tariff V Total			8,060	8,118	8,271	8,283	8,326	8,051	7,943	7,935	7,967	8,084	8,144	8,144	-1.0%	0.1%	
<b>Annual Gross Customers Movement Total</b>					<b>8,060</b>	<b>8,118</b>	<b>8,271</b>	<b>8,283</b>	<b>8,326</b>	<b>8,051</b>	<b>7,943</b>	<b>7,935</b>	<b>7,967</b>	<b>8,084</b>	<b>8,144</b>	<b>-1.0%</b>	<b>0.1%</b>	
Annual Net Customers Growth	Tariff V	Residential	Numbers	4,910	5,039	5,170	5,160	5,181	4,885	4,756	4,727	4,738	4,833	4,872	4,872	-2.1%	-0.1%	
		Business	Numbers	-19	-16	-54	-138	-29	14	3	10	24	35	23	23	-50.9%	1.9%	
	Tariff V Total			4,891	5,023	5,115	5,022	5,153	4,899	4,753	4,737	4,761	4,868	4,895	4,895	-1.8%	-0.1%	
<b>Annual Net Customers Growth Total</b>					<b>4,891</b>	<b>5,023</b>	<b>5,115</b>	<b>5,022</b>	<b>5,153</b>	<b>4,899</b>	<b>4,753</b>	<b>4,737</b>	<b>4,761</b>	<b>4,868</b>	<b>4,849</b>	<b>-1.8%</b>	<b>-0.1%</b>	

Table 6.6 Tariff V, L and D – Volumes, customers and MHQ – YARRA VALLEY

Sum of Data				Year													Annual Average % Chg	
Tariff Zone	Measure	Tariff Type	Sector	Unit	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2013-17	2011-21	
Yarra Valley	Billed Linearised Volumes (	Tariff V	Residential	TJ	220	223	227	231	236	240	243	247	251	255	259	1.7%	1.6%	
			Business	TJ	8	9	9	9	9	9	9	9	10	10	10	1.7%	1.6%	
		Tariff V Total			229	232	236	239	245	249	252	256	260	265	269	1.7%	1.6%	
	<b>Billed Linearised Volumes (Pre-2011 Not Normalised) Total</b>				<b>229</b>	<b>232</b>	<b>236</b>	<b>239</b>	<b>245</b>	<b>249</b>	<b>252</b>	<b>256</b>	<b>260</b>	<b>265</b>	<b>269</b>	<b>1.7%</b>	<b>1.6%</b>	
	Gas Flows	Tariff V	Residential	TJ	225	228	232	236	242	246	249	253	257	262	266	1.8%	1.7%	
			Business	TJ	4	4	4	3	3	3	3	3	3	3	3	-3.3%	-2.7%	
			Tariff V Total		229	232	236	239	245	249	252	256	260	265	269	1.7%	1.6%	
		Tariff D	Commercial	TJ	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Industrial	TJ	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
		Tariff D Total		-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
	<b>Gas Flows Total</b>				<b>229</b>	<b>232</b>	<b>236</b>	<b>239</b>	<b>245</b>	<b>249</b>	<b>252</b>	<b>256</b>	<b>260</b>	<b>265</b>	<b>269</b>	<b>1.7%</b>	<b>1.6%</b>	
	MHQ	Tariff D	Commercial	GJ	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Industrial	GJ	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Tariff D Total		-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
	<b>MHQ Total</b>				<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>0.0%</b>	<b>0.0%</b>
	Customers	Tariff V	Residential	Numbers	4,285	4,492	4,710	4,927	5,161	5,339	5,510	5,692	5,878	6,088	6,250	4.0%	3.8%	
			Business	Numbers	37	37	37	36	36	35	35	35	35	35	35	34	-1.0%	-0.8%
			Tariff V Total		4,322	4,529	4,746	4,963	5,196	5,374	5,545	5,727	5,913	6,123	6,284	4.0%	3.8%	
		Tariff D	Commercial	Numbers	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Industrial	Numbers	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
		Tariff D Total		-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
	<b>Customers Total</b>				<b>4,322</b>	<b>4,529</b>	<b>4,746</b>	<b>4,963</b>	<b>5,196</b>	<b>5,374</b>	<b>5,545</b>	<b>5,727</b>	<b>5,913</b>	<b>6,123</b>	<b>6,284</b>	<b>4.0%</b>	<b>3.8%</b>	
	Annual Gross Customers M	Tariff V	Residential	Numbers	219	211	222	222	237	183	175	187	191	215	167	-5.8%	-2.7%	
			Business	Numbers	-	1	1	1	1	1	1	1	1	1	1	6.2%	0.0%	
			Tariff V Total		219	212	223	222	238	184	176	188	192	216	168	-5.7%	-2.6%	
	<b>Annual Gross Customers Movement Total</b>				<b>219</b>	<b>212</b>	<b>223</b>	<b>222</b>	<b>238</b>	<b>184</b>	<b>176</b>	<b>188</b>	<b>192</b>	<b>216</b>	<b>168</b>	<b>-5.7%</b>	<b>-2.6%</b>	
	Annual Net Customers Gro	Tariff V	Residential	Numbers	215	207	218	218	233	178	171	182	186	210	162	-6.0%	-2.8%	
Business			Numbers	-	0	-	-	-	-	-	-	-	-	-	-	-15.8%	41.7%	
		Tariff V Total		215	207	218	217	233	178	170	182	186	210	161	-6.0%	-2.8%		
<b>Annual Net Customers Growth Total</b>				<b>215</b>	<b>207</b>	<b>218</b>	<b>217</b>	<b>233</b>	<b>178</b>	<b>170</b>	<b>182</b>	<b>186</b>	<b>210</b>	<b>161</b>	<b>-6.0%</b>	<b>-2.8%</b>		

Table 6.7 Tariff V, L and D – Volumes, customers and MHQ – SOUTH GIPPSLAND

Sum of Data																Annual Average % Chg			
Tariff Zone	Measure	Tariff Type	Sector	Unit	Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2013-17	2011-21	
South Gippsland	Billed Linearised Volumes	Tariff V	Residential	TJ		59	65	70	74	77	80	82	87	91	93	96	4.3%	5.0%	
			Business	TJ		50	55	59	62	65	67	70	73	77	79	81	4.3%	5.0%	
		Tariff V Total				109	120	129	136	141	147	152	160	167	173	178	4.3%	5.0%	
	<b>Billed Linearised Volumes (Pre-2011 Not Normalised) Total</b>					<b>109</b>	<b>120</b>	<b>129</b>	<b>136</b>	<b>141</b>	<b>147</b>	<b>152</b>	<b>160</b>	<b>167</b>	<b>173</b>	<b>178</b>	<b>4.3%</b>	<b>5.0%</b>	
	Gas Flows	Tariff V	Residential	TJ		66	76	85	92	98	103	108	115	122	126	131	6.2%	7.2%	
			Business	TJ		46	50	52	54	55	56	57	57	58	58	59	2.1%	2.4%	
		Tariff V Total				112	126	137	146	152	159	164	172	179	185	190	4.7%	5.4%	
		Tariff D	Commercial	TJ		-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
			Industrial			312	307	304	302	299	298	300	300	303	308	311	-0.3%	0.0%	
	<b>Gas Flows Total</b>					<b>423</b>	<b>433</b>	<b>441</b>	<b>448</b>	<b>451</b>	<b>457</b>	<b>464</b>	<b>472</b>	<b>482</b>	<b>493</b>	<b>500</b>	<b>1.3%</b>	<b>1.7%</b>	
	MHQ	Tariff D	Commercial	GJ		-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Industrial			62	61	61	61	61	61	61	61	61	61	61	61	-0.2%	0.0%
		Tariff D Total				62	61	61	61	61	61	61	61	61	61	61	61	-0.2%	0.0%
	<b>MHQ Total</b>					<b>62</b>	<b>61</b>	<b>61</b>	<b>61</b>	<b>61</b>	<b>61</b>	<b>61</b>	<b>61</b>	<b>61</b>	<b>61</b>	<b>61</b>	<b>61</b>	<b>-0.2%</b>	<b>0.0%</b>
	Customers	Tariff V	Residential	Numbers		2,480	2,880	3,180	3,480	3,680	3,880	4,080	4,380	4,680	4,880	5,080	6.4%	7.4%	
			Business	Numbers		63	65	66	66	66	67	67	67	67	68	68	0.5%	0.7%	
		Tariff V Total				2,543	2,945	3,246	3,546	3,746	3,947	4,147	4,447	4,747	4,948	5,148	6.3%	7.3%	
		Tariff D	Commercial	Numbers		-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Industrial			1	1	1	1	1	1	1	1	1	1	1	1	-0.1%	0.0%
	<b>Customers Total</b>					<b>2,544</b>	<b>2,946</b>	<b>3,247</b>	<b>3,547</b>	<b>3,747</b>	<b>3,948</b>	<b>4,148</b>	<b>4,448</b>	<b>4,748</b>	<b>4,949</b>	<b>5,149</b>	<b>6.3%</b>	<b>7.3%</b>	
	Annual Gross Customers M	Tariff V	Residential	Numbers		503	402	302	303	203	203	203	303	303	204	204	204	-9.5%	-8.6%
			Business	Numbers		1	3	1	1	1	2	1	1	1	1	1	1	-13.7%	-2.8%
		Tariff V Total				504	405	304	304	204	204	204	304	304	205	205	205	-9.5%	-8.6%
	<b>Annual Gross Customers Movement Total</b>					<b>504</b>	<b>405</b>	<b>304</b>	<b>304</b>	<b>204</b>	<b>204</b>	<b>204</b>	<b>304</b>	<b>304</b>	<b>205</b>	<b>205</b>	<b>205</b>	<b>-9.5%</b>	<b>-8.6%</b>
	Annual Net Customers Gro	Tariff V	Residential	Numbers		500	400	300	300	200	200	200	300	300	200	200	200	-9.6%	-8.8%
			Business	Numbers		1	2	0	1	0	1	-	0	0	0	0	0	0.0%	-17.4%
		Tariff V Total				501	402	300	301	200	201	200	300	300	200	200	200	-9.7%	-8.8%
<b>Annual Net Customers Growth Total</b>					<b>501</b>	<b>402</b>	<b>300</b>	<b>301</b>	<b>200</b>	<b>201</b>	<b>200</b>	<b>300</b>	<b>300</b>	<b>200</b>	<b>200</b>	<b>200</b>	<b>-9.7%</b>	<b>-8.8%</b>	

Table 6.8 Tariff V – Residential and business volumes (by block) and customers – MELBOURNE

Sum of Data												Year		Annual Average % Chg							
Tariff Zone	Measure	Sector	Segment	Period	Block	Unit	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2013-17	2011-21		
Melbourne	Billed Linearised Volumes (Pre-2011 Not Normalised)	Residential	Residential	Peak	1	TJ	3,656	3,655	3,646	3,630	3,629	3,636	3,643	3,651	3,661	3,675	3,688	0.0%	0.1%		
					2	TJ	3,246	3,246	3,238	3,224	3,222	3,229	3,235	3,242	3,251	3,264	3,275	0.0%	0.1%		
					3	TJ	2,870	2,870	2,863	2,850	2,849	2,855	2,860	2,867	2,875	2,886	2,896	0.0%	0.1%		
					4	TJ	4,631	4,630	4,619	4,599	4,597	4,606	4,615	4,625	4,638	4,655	4,672	0.0%	0.1%		
					5	TJ	8,686	8,685	8,664	8,626	8,623	8,639	8,656	8,675	8,699	8,732	8,763	0.0%	0.1%		
				Off Peak	1	TJ	4,231	4,187	4,135	4,075	4,033	4,000	3,968	3,937	3,908	3,884	3,859	-1.0%	-0.9%		
					2	TJ	2,025	2,004	1,979	1,951	1,930	1,915	1,899	1,884	1,871	1,859	1,847	-1.0%	-0.9%		
					3	TJ	932	922	911	898	888	881	874	867	861	855	850	-1.0%	-0.9%		
					4	TJ	825	816	806	794	786	780	774	767	762	757	752	-1.0%	-0.9%		
					5	TJ	980	970	958	944	934	927	919	912	906	900	894	-1.0%	-0.9%		
				Shoulder	1	TJ	1,681	1,664	1,643	1,620	1,603	1,590	1,577	1,565	1,553	1,544	1,534	-1.0%	-0.9%		
					2	TJ	1,347	1,333	1,317	1,298	1,284	1,274	1,263	1,254	1,244	1,237	1,229	-1.0%	-0.9%		
					3	TJ	1,028	1,017	1,004	990	980	972	964	956	949	944	937	-1.0%	-0.9%		
					4	TJ	1,338	1,324	1,308	1,289	1,276	1,266	1,255	1,246	1,236	1,229	1,221	-1.0%	-0.9%		
					5	TJ	1,725	1,707	1,686	1,662	1,644	1,631	1,618	1,605	1,594	1,584	1,573	-1.0%	-0.9%		
				Business	Business	Peak	1	TJ	331	331	330	329	329	329	330	331	332	333	334	0.0%	0.1%
							2	TJ	525	525	524	522	522	523	524	525	526	528	530	0.0%	0.1%
							3	TJ	206	206	205	204	204	205	205	205	206	207	208	0.0%	0.1%
							4	TJ	704	704	702	699	698	700	701	703	705	707	710	0.0%	0.1%
							5	TJ	879	879	877	873	873	874	876	878	880	884	887	0.0%	0.1%
						Off Peak	1	TJ	320	317	313	309	306	303	301	298	296	294	292	-1.0%	-0.9%
							2	TJ	456	452	446	440	435	432	428	425	422	419	416	-1.0%	-0.9%
							3	TJ	173	172	169	167	165	164	163	161	160	159	158	-1.0%	-0.9%
							4	TJ	525	519	513	506	500	496	492	488	485	482	479	-1.0%	-0.9%
							5	TJ	453	450	445	438	434	430	427	424	420	418	415	-1.0%	-0.9%
		Shoulder	1			TJ	141	139	138	136	134	133	132	131	130	129	129	-1.0%	-0.9%		
			2			TJ	209	207	205	202	199	198	196	195	193	192	191	-1.0%	-0.9%		
			3			TJ	81	80	79	78	77	77	76	76	75	75	74	-1.0%	-0.9%		
			4			TJ	272	269	266	262	259	257	255	253	251	249	248	-1.0%	-0.9%		
			5			TJ	290	287	284	280	277	275	272	270	268	267	265	-1.0%	-0.9%		
		<b>Billed Linearised Volumes (Pre-2011 Not Normalised) Total</b>							<b>44,765</b>	<b>44,567</b>	<b>44,273</b>	<b>43,892</b>	<b>43,692</b>	<b>43,595</b>	<b>43,498</b>	<b>43,417</b>	<b>43,358</b>	<b>43,346</b>	<b>43,324</b>	<b>-0.4%</b>	<b>-0.3%</b>
		Gas Flows		Residential	Residential	Year	(blank)	TJ	40,023	39,745	39,469	39,159	38,995	38,905	38,808	38,717	38,640	38,609	38,590	-0.4%	-0.4%
				Business	Business	Year	(blank)	TJ	4,742	4,822	4,804	4,733	4,697	4,690	4,690	4,700	4,718	4,737	4,734	-0.6%	0.0%
		<b>Gas Flows Total</b>							<b>44,765</b>	<b>44,567</b>	<b>44,273</b>	<b>43,892</b>	<b>43,692</b>	<b>43,595</b>	<b>43,498</b>	<b>43,417</b>	<b>43,358</b>	<b>43,346</b>	<b>43,324</b>	<b>-0.4%</b>	<b>-0.3%</b>
		Customers		Residential	Residential	Year	(blank)	Numbers	650,411	655,451	660,621	665,781	670,962	675,847	680,603	685,330	690,068	694,901	699,773	0.7%	0.7%
				Business	Business	Year	(blank)	Numbers	16,419	16,402	16,348	16,210	16,181	16,195	16,192	16,202	16,226	16,261	16,237	-0.2%	-0.1%
		<b>Customers Total</b>							<b>666,830</b>	<b>671,853</b>	<b>676,968</b>	<b>681,991</b>	<b>687,144</b>	<b>692,042</b>	<b>696,795</b>	<b>701,532</b>	<b>706,293</b>	<b>711,161</b>	<b>716,010</b>	<b>0.7%</b>	<b>0.7%</b>
		Annual Gross Customers Movement		Residential	Residential	Year	(blank)	Numbers	7,883	7,922	8,076	8,089	8,133	7,858	7,750	7,741	7,773	7,890	7,951	-1.0%	0.1%
				Business	Business	Year	(blank)	Numbers	177	196	195	194	193	193	193	193	194	194	194	-0.2%	0.9%
		<b>Annual Gross Customers Movement Total</b>							<b>8,060</b>	<b>8,118</b>	<b>8,271</b>	<b>8,283</b>	<b>8,326</b>	<b>8,051</b>	<b>7,943</b>	<b>7,935</b>	<b>7,967</b>	<b>8,084</b>	<b>8,144</b>	<b>-1.0%</b>	<b>0.1%</b>
		Annual Net Customers Growth		Residential	New Customers	Year	(blank)	Numbers	4,910	5,039	5,170	5,160	5,181	4,885	4,756	4,727	4,738	4,833	4,872	-2.1%	-0.1%
				Business	New Customers	Year	(blank)	Numbers	-19	-16	-54	-138	-29	14	-3	10	24	35	-23	-50.9%	1.9%
		<b>Annual Net Customers Growth Total</b>							<b>4,891</b>	<b>5,023</b>	<b>5,115</b>	<b>5,022</b>	<b>5,153</b>	<b>4,899</b>	<b>4,753</b>	<b>4,737</b>	<b>4,761</b>	<b>4,868</b>	<b>4,849</b>	<b>-1.8%</b>	<b>-0.1%</b>

Table 6.9 Tariff V – Residential and business volumes (by block) and customers – YARRA VALLEY

Sum of Data		Year													Annual Average % Chg							
Tariff Zone	Measure	Sector	Segment	Period	Block	Unit	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2013-17	2011-21			
Yarra Valley	Billed Linearised Volumes (	Residential	Residential	Peak	1	TJ	23	21	22	22	23	23	23	24	24	25	25	1.7%	0.9%			
					2	TJ	19	19	19	20	20	20	21	21	21	22	22	1.7%	1.3%			
					3	TJ	17	17	17	17	18	18	18	19	19	19	20	1.7%	1.6%			
					4	TJ	26	27	28	28	29	29	30	30	31	31	32	1.7%	2.0%			
					5	TJ	49	51	52	53	54	55	56	56	57	58	59	1.7%	2.0%			
				Off Peak	1	TJ	20	21	21	21	22	22	22	23	23	24	24	1.7%	2.0%			
					2	TJ	8	10	10	10	10	11	11	11	11	11	11	1.7%	3.4%			
					3	TJ	4	5	5	5	5	5	5	5	5	5	5	1.7%	3.0%			
					4	TJ	3	4	4	4	4	4	4	4	4	5	5	1.7%	4.0%			
					5	TJ	8	5	5	5	5	5	5	5	5	5	6	1.7%	-4.1%			
				Shoulder	1	TJ	11	10	11	11	11	11	11	11	11	11	12	12	12	1.7%	1.4%	
					2	TJ	8	8	8	9	9	9	9	9	9	10	10	1.7%	1.9%			
					3	TJ	6	6	6	7	7	7	7	7	7	7	7	1.7%	2.2%			
					4	TJ	7	8	8	9	9	9	9	9	9	9	10	1.7%	2.9%			
					5	TJ	12	11	11	11	11	11	12	12	12	12	12	1.7%	0.4%			
		Business	Business	Peak	Business	1	TJ	1	0	1	1	1	1	1	1	1	1	1	1	1.7%	-2.7%	
						2	TJ	1	1	1	1	1	1	1	1	1	1	1	1.7%	-3.2%		
						3	TJ	0	0	0	0	0	0	0	0	0	0	0	1.7%	-2.4%		
						4	TJ	1	1	1	1	1	1	1	1	1	1	1	1.7%	-0.8%		
						5	TJ	0	1	1	1	1	1	1	1	1	2	2	1.7%	30.3%		
				Off Peak	1	TJ	1	0	0	0	1	1	1	1	1	1	1	1	1	1.7%	-2.6%	
					2	TJ	1	1	1	1	1	1	1	1	1	1	1	1.7%	-3.1%			
					3	TJ	0	0	0	0	0	0	0	0	0	0	0	1.7%	-1.5%			
					4	TJ	1	1	1	1	1	1	1	1	1	1	1	1.7%	3.1%			
					5	TJ	0	1	1	1	1	1	1	1	1	1	1	1.7%	40.7%			
				Shoulder	1	TJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.7%	-2.1%
					2	TJ	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1.7%	-2.8%
					3	TJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.7%	-2.4%
					4	TJ	1	0	0	0	0	0	0	0	0	1	1	1	1	1.7%	0.2%	
					5	TJ	0	0	0	1	1	1	1	1	1	1	1	1	1	1.7%	27.9%	
		<b>Billed Linearised Volumes (Pre-2011 Not Normalised) Total</b>							<b>229</b>	<b>232</b>	<b>236</b>	<b>239</b>	<b>245</b>	<b>249</b>	<b>252</b>	<b>256</b>	<b>260</b>	<b>265</b>	<b>269</b>	<b>1.7%</b>	<b>1.6%</b>	
		Gas Flows		Residential	Residential	Year	(blank)	TJ	225	228	232	236	242	246	249	253	257	262	266	1.8%	1.7%	
				Business	Business	Year	(blank)	TJ	4	4	4	3	3	3	3	3	3	3	3	-3.3%	-2.7%	
<b>Gas Flows Total</b>							<b>229</b>	<b>232</b>	<b>236</b>	<b>239</b>	<b>245</b>	<b>249</b>	<b>252</b>	<b>256</b>	<b>260</b>	<b>265</b>	<b>269</b>	<b>1.7%</b>	<b>1.6%</b>			
Customers		Residential	Residential	Year	(blank)	Numbers	4,285	4,492	4,710	4,927	5,161	5,339	5,510	5,692	5,878	6,088	6,250	4.0%	3.8%			
		Business	Business	Year	(blank)	Numbers	37	37	37	36	36	35	35	35	35	35	34	-1.0%	-0.8%			
<b>Customers Total</b>							<b>4,322</b>	<b>4,529</b>	<b>4,746</b>	<b>4,963</b>	<b>5,196</b>	<b>5,374</b>	<b>5,545</b>	<b>5,727</b>	<b>5,913</b>	<b>6,123</b>	<b>6,284</b>	<b>4.0%</b>	<b>3.8%</b>			
Annual Gross Customers M		Residential	Residential	Year	(blank)	Numbers	219	211	222	222	237	183	175	187	191	215	167	-5.8%	-2.7%			
		Business	Business	Year	(blank)	Numbers	0	1	1	1	1	1	1	1	1	1	1	6.2%	0.0%			
<b>Annual Gross Customers Movement Total</b>							<b>219</b>	<b>212</b>	<b>223</b>	<b>222</b>	<b>238</b>	<b>184</b>	<b>176</b>	<b>188</b>	<b>192</b>	<b>216</b>	<b>168</b>	<b>-5.7%</b>	<b>-2.6%</b>			
Annual Net Customers Gro		Residential	New Customers	Year	(blank)	Numbers	215	207	218	218	233	178	171	182	186	210	162	-6.0%	-2.8%			
		Business	New Customers	Year	(blank)	Numbers	0	0	-1	-1	0	0	0	0	0	0	-1	-15.8%	41.7%			
<b>Annual Net Customers Growth Total</b>							<b>215</b>	<b>207</b>	<b>218</b>	<b>217</b>	<b>233</b>	<b>178</b>	<b>170</b>	<b>182</b>	<b>186</b>	<b>210</b>	<b>161</b>	<b>-6.0%</b>	<b>-2.8%</b>			

Table 6.10 Tariff V – Residential and business volumes (by block) and customers – SOUTH GIPPSLAND

Sum of Data							Year														Annual Average % Chg	
Tariff Zone	Measure	Sector	Segment	Period	Block	Unit	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2013-17	2011-21			
South Gippsland	Billed Linearised Volumes (	Residential	Residential	Peak	1	TJ	9	10	10	11	11	12	12	13	14	14	14	4.3%	5.0%			
					2	TJ	7	8	8	9	9	10	10	11	11	11	11	4.3%	5.0%			
					3	TJ	5	6	6	7	7	7	8	8	8	9	9	4.3%	5.0%			
					4	TJ	7	8	9	9	10	10	10	11	11	12	12	4.3%	5.0%			
					5	TJ	9	10	10	11	11	12	12	13	13	14	14	4.3%	5.0%			
				Off Peak	1	TJ	6	7	7	8	8	8	8	9	9	10	10	10	10	4.3%	5.0%	
					2	TJ	2	2	2	2	2	3	3	3	3	3	3	3	3	4.3%	5.0%	
					3	TJ	1	1	1	1	1	1	1	1	1	1	1	1	1	4.3%	5.0%	
					4	TJ	1	1	1	1	1	1	1	1	1	1	1	1	1	4.3%	5.0%	
					5	TJ	3	3	3	3	3	4	4	4	4	4	4	4	4	4.3%	5.0%	
				Shoulder	1	TJ	4	4	5	5	5	5	5	6	6	6	6	6	6	6	4.3%	5.0%
					2	TJ	2	2	2	3	3	3	3	3	3	3	3	3	3	3	4.3%	5.0%
					3	TJ	1	1	1	2	2	2	2	2	2	2	2	2	2	2	4.3%	5.0%
					4	TJ	1	1	1	1	1	1	2	2	2	2	2	2	2	2	4.3%	5.0%
					5	TJ	1	2	2	2	2	2	2	2	2	2	2	2	2	2	4.3%	5.0%
		Business	Business	Peak	1	TJ	1	1	1	1	2	2	2	2	2	2	2	2	2	4.3%	5.0%	
					2	TJ	3	3	3	3	3	3	4	4	4	4	4	4	4	4.3%	5.0%	
					3	TJ	1	1	1	2	2	2	2	2	2	2	2	2	2	4.3%	5.0%	
					4	TJ	6	7	8	8	8	9	9	10	10	11	11	11	11	4.3%	5.0%	
					5	TJ	14	15	16	17	18	18	19	20	21	22	22	22	22	4.3%	5.0%	
				Off Peak	1	TJ	1	2	2	2	2	2	2	2	2	2	2	2	2	2	4.3%	5.0%
					2	TJ	3	3	4	4	4	4	4	4	5	5	5	5	5	5	4.3%	5.0%
					3	TJ	1	2	2	2	2	2	2	2	2	2	2	2	2	2	4.3%	5.0%
					4	TJ	6	6	7	7	7	8	8	8	9	9	9	9	9	9	4.3%	5.0%
					5	TJ	5	5	6	6	6	6	7	7	7	7	8	8	8	8	4.3%	5.0%
				Shoulder	1	TJ	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4.3%	5.0%
					2	TJ	1	1	1	2	2	2	2	2	2	2	2	2	2	2	4.3%	5.0%
					3	TJ	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4.3%	5.0%
					4	TJ	3	3	3	4	4	4	4	4	4	5	5	5	5	5	4.3%	5.0%
					5	TJ	3	4	4	4	5	5	5	5	5	5	5	5	6	6	4.3%	5.0%
		<b>Billed Linearised Volumes (Pre-2011 Not Normalised) Total</b>							<b>109</b>	<b>120</b>	<b>129</b>	<b>136</b>	<b>141</b>	<b>147</b>	<b>152</b>	<b>160</b>	<b>167</b>	<b>173</b>	<b>178</b>	<b>4.3%</b>	<b>5.0%</b>	
		Gas Flows		Residential	Residential	Year	(blank)	TJ	66	76	85	92	98	103	108	115	122	126	131	6.2%	7.2%	
				Business	Business	Year	(blank)	TJ	46	50	52	54	55	56	57	57	58	58	59	2.1%	2.4%	
<b>Gas Flows Total</b>							<b>112</b>	<b>126</b>	<b>137</b>	<b>146</b>	<b>152</b>	<b>159</b>	<b>164</b>	<b>172</b>	<b>179</b>	<b>185</b>	<b>190</b>	<b>4.7%</b>	<b>5.4%</b>			
Customers		Residential	Residential	Year	(blank)	Numbers	2,480	2,880	3,180	3,480	3,680	3,880	4,080	4,380	4,680	4,880	5,080	6.4%	7.4%			
		Business	Business	Year	(blank)	Numbers	63	65	66	66	66	67	67	67	67	68	68	0.5%	0.7%			
<b>Customers Total</b>							<b>2,543</b>	<b>2,945</b>	<b>3,246</b>	<b>3,546</b>	<b>3,746</b>	<b>3,947</b>	<b>4,147</b>	<b>4,447</b>	<b>4,747</b>	<b>4,948</b>	<b>5,148</b>	<b>6.3%</b>	<b>7.3%</b>			
Annual Gross Customers M		Residential	Residential	Year	(blank)	Numbers	503	402	302	303	203	203	203	303	303	204	204	-9.5%	-8.6%			
		Business	Business	Year	(blank)	Numbers	1	3	1	1	1	2	1	1	1	1	1	-13.7%	-2.8%			
<b>Annual Gross Customers Movement Total</b>							<b>504</b>	<b>405</b>	<b>304</b>	<b>304</b>	<b>204</b>	<b>204</b>	<b>204</b>	<b>304</b>	<b>304</b>	<b>205</b>	<b>205</b>	<b>-9.5%</b>	<b>-8.6%</b>			
Annual Net Customers Gro		Residential	New Customers	Year	(blank)	Numbers	500	400	300	300	200	200	200	300	300	200	200	-9.6%	-8.8%			
		Business	New Customers	Year	(blank)	Numbers	1	2	0	1	0	1	0	0	0	0	0	0.0%	-17.4%			
<b>Annual Net Customers Growth Total</b>							<b>501</b>	<b>402</b>	<b>300</b>	<b>301</b>	<b>200</b>	<b>201</b>	<b>200</b>	<b>300</b>	<b>300</b>	<b>200</b>	<b>200</b>	<b>-9.7%</b>	<b>-8.8%</b>			

Table 6.11 Tariff L – Volumes (by block), MHQ, peak MHQ and customers – MELBOURNE

Sum of Data							Year														Annual Average % Chg	
Tariff Zone	Measure	Sector	Segment	Period	Block	Unit	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2013-17	2011-21			
Melbourne	Billed Linearised Volumes (	Business	Business	Peak	1	TJ	11	14	18	22	26	30	34	38	42	46	49	16.8%	16.7%			
					2	TJ	41	56	71	86	101	117	132	147	162	177	193	16.8%	16.6%			
				Off Peak	1	TJ	14	19	24	29	34	39	44	50	55	60	65	16.8%	16.7%			
					2	TJ	26	34	44	54	63	72	82	91	100	110	119	17.0%	16.3%			
				Shoulder	1	TJ	5	7	9	11	13	15	17	19	21	23	25	16.8%	16.7%			
					2	TJ	16	21	27	33	38	44	50	56	61	67	73	17.1%	16.5%			
	<b>Billed Linearised Volumes (Pre-2011 Not Normalised) Total</b>							<b>113</b>	<b>152</b>	<b>192</b>	<b>235</b>	<b>276</b>	<b>317</b>	<b>359</b>	<b>400</b>	<b>441</b>	<b>482</b>	<b>524</b>	<b>16.9%</b>	<b>16.5%</b>		
	Gas Flows	Business	Business	Year	(blank)	TJ	118	158	201	246	288	331	374	417	461	504	547	16.9%	16.5%			
	<b>Gas Flows Total</b>							<b>118</b>	<b>158</b>	<b>201</b>	<b>246</b>	<b>288</b>	<b>331</b>	<b>374</b>	<b>417</b>	<b>461</b>	<b>504</b>	<b>547</b>	<b>16.9%</b>	<b>16.5%</b>		
	MHQ	Business	Business	Year	(blank)	GJ	68	86	104	122	139	155	172	187	202	217	232	13.3%	13.0%			
	<b>MHQ Total</b>							<b>68</b>	<b>86</b>	<b>104</b>	<b>122</b>	<b>139</b>	<b>155</b>	<b>172</b>	<b>187</b>	<b>202</b>	<b>217</b>	<b>232</b>	<b>13.3%</b>	<b>13.0%</b>		
	Peak MHQ	Business	Business	Year	(blank)	GJ	66	83	100	118	134	150	165	180	195	210	224	13.3%	13.0%			
	<b>Peak MHQ Total</b>							<b>66</b>	<b>83</b>	<b>100</b>	<b>118</b>	<b>134</b>	<b>150</b>	<b>165</b>	<b>180</b>	<b>195</b>	<b>210</b>	<b>224</b>	<b>13.3%</b>	<b>13.0%</b>		
	Customers	Business	Business	Year	(blank)	Numbers	18	24	31	37	44	51	57	64	70	77	84	16.7%	16.8%			
<b>Customers Total</b>							<b>18</b>	<b>24</b>	<b>31</b>	<b>37</b>	<b>44</b>	<b>51</b>	<b>57</b>	<b>64</b>	<b>70</b>	<b>77</b>	<b>84</b>	<b>16.7%</b>	<b>16.8%</b>			



Table 6.12 Tariff D – Volumes, MHQ customers by industry – MELBOURNE

Sum of Data Tariff Zone	Measure	Sector	Segment	Unit	Year											Annual Average % Chg					
					2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2013-17	2011-21				
Melbourne	Gas Flows	Commercial	Electricity, Gas & Water (ex GPG)	TJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%		
			Construction	TJ	164	165	166	164	161	161	161	163	164	163	163	163	163	163	-0.7%	-0.1%	
			Wholesale Trade and Retail Trade	TJ	193	195	198	200	204	206	209	213	217	220	222	222	222	222	1.5%	1.4%	
			Transport & Storage and Communication	TJ	20	21	21	22	22	22	23	23	23	24	24	24	24	24	1.8%	1.7%	
			Finance Insurance Property & Business	TJ	256	263	267	267	268	272	276	280	285	290	294	294	294	294	0.9%	1.4%	
			Government Administration, Defence, Ed	TJ	1,800	1,781	1,767	1,784	1,809	1,822	1,836	1,859	1,887	1,916	1,936	1,936	1,936	1,936	1.0%	0.7%	
			Accommodation, Cafes, Restaurants, Ct	TJ	1,155	1,184	1,207	1,235	1,266	1,292	1,319	1,350	1,390	1,431	1,457	1,457	1,457	1,457	2.2%	2.4%	
			<b>Commercial Total</b>		<b>3,589</b>	<b>3,610</b>	<b>3,625</b>	<b>3,672</b>	<b>3,730</b>	<b>3,775</b>	<b>3,824</b>	<b>3,888</b>	<b>3,966</b>	<b>4,043</b>	<b>4,096</b>	<b>4,096</b>	<b>4,096</b>	<b>4,096</b>	<b>1.3%</b>	<b>1.3%</b>	
			Industrial	Agriculture	TJ	123	124	123	122	122	123	124	126	127	129	131	131	131	131	0.2%	0.6%
				Mining	TJ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
		Food, beverages, tobacco manufacturing		TJ	1,298	1,278	1,266	1,259	1,244	1,240	1,251	1,250	1,260	1,283	1,294	1,294	1,294	1,294	-0.3%	0.0%	
		Textiles, clothing and footwear manufact		TJ	25	23	21	20	19	17	17	16	15	14	14	14	14	14	-6.2%	-5.9%	
		Wood and paper, wood products and pap		TJ	1,298	1,238	1,169	1,098	1,032	976	927	875	827	784	734	734	734	734	-5.6%	-5.5%	
		Chemicals, petroleum, coal manufacturin		TJ	860	834	816	803	783	772	770	761	759	765	766	766	766	766	-1.4%	-1.2%	
		Non-metallic minerals manufacturing		TJ	2,826	2,737	2,480	2,260	2,134	2,038	1,943	1,785	1,571	1,448	1,360	1,360	1,360	1,360	-5.9%	-7.0%	
		Basic & fabricated metal products manuf		TJ	573	537	504	476	444	420	401	370	337	316	298	298	298	298	-5.5%	-6.3%	
		Transport and other machinery equipmen		TJ	592	530	481	444	404	380	356	333	309	283	253	253	253	253	-7.3%	-8.2%	
		Miscellaneous manufacturing		TJ	512	495	477	469	464	463	467	467	464	462	462	462	462	462	-0.5%	-1.0%	
		<b>Industrial Total</b>		<b>8,106</b>	<b>7,796</b>	<b>7,337</b>	<b>6,950</b>	<b>6,646</b>	<b>6,430</b>	<b>6,256</b>	<b>5,983</b>	<b>5,670</b>	<b>5,482</b>	<b>5,312</b>	<b>5,312</b>	<b>5,312</b>	<b>5,312</b>	<b>-3.9%</b>	<b>-4.1%</b>		
		<b>Gas Flows Total</b>		<b>11,694</b>	<b>11,406</b>	<b>10,962</b>	<b>10,622</b>	<b>10,376</b>	<b>10,205</b>	<b>10,080</b>	<b>9,871</b>	<b>9,636</b>	<b>9,525</b>	<b>9,407</b>	<b>9,407</b>	<b>9,407</b>	<b>9,407</b>	<b>-2.1%</b>	<b>-2.2%</b>		
	MHQ	Commercial	Electricity, Gas & Water (ex GPG)	GJ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
			Construction	GJ	30	30	30	30	30	30	30	30	30	30	30	30	30	30	-0.3%	0.0%	
			Wholesale Trade and Retail Trade	GJ	131	131	131	132	132	132	132	133	133	134	134	134	134	134	0.2%	0.2%	
			Transport & Storage and Communication	GJ	9	9	9	9	9	9	9	9	9	10	10	10	10	10	0.4%	0.4%	
			Finance Insurance Property & Business	GJ	72	72	73	73	73	73	74	74	75	75	75	75	75	75	0.4%	0.5%	
			Government Administration, Defence, Ed	GJ	602	602	601	602	604	606	608	610	613	616	617	617	617	617	0.3%	0.2%	
			Accommodation, Cafes, Restaurants, Ct	GJ	365	368	371	374	377	380	382	386	389	393	395	395	395	395	0.8%	0.8%	
			<b>Commercial Total</b>		<b>1,209</b>	<b>1,212</b>	<b>1,215</b>	<b>1,220</b>	<b>1,225</b>	<b>1,230</b>	<b>1,236</b>	<b>1,242</b>	<b>1,250</b>	<b>1,257</b>	<b>1,260</b>	<b>1,260</b>	<b>1,260</b>	<b>1,260</b>	<b>0.4%</b>	<b>0.4%</b>	
			Industrial	Agriculture	GJ	60	60	60	60	60	60	60	60	60	61	61	61	61	61	0.1%	0.1%
				Mining	GJ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
		Food, beverages, tobacco manufacturing		GJ	412	409	406	404	402	401	402	403	406	409	411	411	411	411	-0.3%	0.0%	
		Textiles, clothing and footwear manufact		GJ	16	16	16	15	15	15	15	14	14	14	14	14	14	14	-1.4%	-1.3%	
		Wood and paper, wood products and pap		GJ	255	245	235	224	214	205	197	189	181	174	170	170	170	170	-4.3%	-4.0%	
		Chemicals, petroleum, coal manufacturin		GJ	359	356	354	352	350	348	348	347	347	347	347	347	347	347	-0.4%	-0.3%	
		Non-metallic minerals manufacturing		GJ	525	512	486	458	437	422	405	382	357	334	325	325	325	325	-4.4%	-4.7%	
		Basic & fabricated metal products manuf		GJ	214	208	203	198	193	189	184	179	174	169	166	166	166	166	-2.4%	-2.5%	
		Transport and other machinery equipmen		GJ	297	285	274	265	256	249	242	236	229	221	216	216	216	216	-3.0%	-3.1%	
		Miscellaneous manufacturing		GJ	135	133	131	130	130	129	130	130	129	129	129	129	129	129	-0.4%	-0.5%	
		<b>Industrial Total</b>		<b>2,274</b>	<b>2,224</b>	<b>2,165</b>	<b>2,106</b>	<b>2,058</b>	<b>2,020</b>	<b>1,983</b>	<b>1,941</b>	<b>1,897</b>	<b>1,857</b>	<b>1,840</b>	<b>1,840</b>	<b>1,840</b>	<b>1,840</b>	<b>-2.2%</b>	<b>-2.1%</b>		
		<b>MHQ Total</b>		<b>3,482</b>	<b>3,436</b>	<b>3,380</b>	<b>3,326</b>	<b>3,283</b>	<b>3,250</b>	<b>3,219</b>	<b>3,183</b>	<b>3,147</b>	<b>3,114</b>	<b>3,100</b>	<b>3,100</b>	<b>3,100</b>	<b>3,100</b>	<b>-1.2%</b>	<b>-1.2%</b>		
Customers	Commercial	Electricity, Gas & Water (ex GPG)	Numbers	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%		
		Construction	Numbers	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-0.3%	0.0%		
		Wholesale Trade and Retail Trade	Numbers	11	11	11	11	12	12	12	12	12	12	12	12	12	12	1.0%	1.0%		
		Transport & Storage and Communication	Numbers	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1.1%	1.0%		
		Finance Insurance Property & Business	Numbers	7	7	7	7	7	7	7	7	8	8	8	8	8	8	0.4%	0.8%		
		Government Administration, Defence, Ed	Numbers	50	50	50	50	50	50	51	51	51	52	52	52	52	52	0.5%	0.4%		
		Accommodation, Cafes, Restaurants, Ct	Numbers	37	37	38	38	39	39	40	40	41	42	42	42	42	42	1.3%	1.4%		
		<b>Commercial Total</b>		<b>109</b>	<b>110</b>	<b>110</b>	<b>111</b>	<b>112</b>	<b>113</b>	<b>114</b>	<b>115</b>	<b>116</b>	<b>118</b>	<b>119</b>	<b>119</b>	<b>119</b>	<b>119</b>	<b>0.9%</b>	<b>0.8%</b>		
		Industrial	Agriculture	Numbers	9	9	9	9	9	9	9	9	9	10	10	10	10	10	0.1%	0.4%	
			Mining	Numbers	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
	Food, beverages, tobacco manufacturing		Numbers	32	32	31	31	31	31	31	31	31	32	32	32	32	32	-0.1%	0.0%		
	Textiles, clothing and footwear manufact		Numbers	5	4	4	4	4	4	3	3	3	3	3	3	3	3	-4.7%	-4.5%		
	Wood and paper, wood products and pap		Numbers	16	15	15	14	14	14	13	13	13	12	12	12	12	12	-2.6%	-2.7%		
	Chemicals, petroleum, coal manufacturin		Numbers	26	25	25	24	24	24	24	24	23	24	24	24	24	24	-0.9%	-0.7%		
	Non-metallic minerals manufacturing		Numbers	15	15	14	14	13	13	13	13	12	11	11	11	11	11	-2.2%	-3.1%		
	Basic & fabricated metal products manuf		Numbers	27	26	25	24	23	22	22	21	19	19	18	18	18	18	-3.2%	-3.9%		
	Transport and other machinery equipmen		Numbers	20	18	17	16	15	14	14	13	12	12	11	11	11	11	-5.1%	-5.9%		
	Miscellaneous manufacturing		Numbers	12	12	11	11	11	11	11	11	11	11	11	11	11	11	-0.2%	-0.5%		
	<b>Industrial Total</b>		<b>160</b>	<b>156</b>	<b>152</b>	<b>148</b>	<b>145</b>	<b>142</b>	<b>141</b>	<b>138</b>	<b>135</b>	<b>133</b>	<b>131</b>	<b>131</b>	<b>131</b>	<b>131</b>	<b>-1.8%</b>	<b>-2.0%</b>			
	<b>Customers Total</b>		<b>269</b>	<b>266</b>	<b>262</b>	<b>259</b>	<b>257</b>	<b>255</b>	<b>255</b>	<b>253</b>	<b>251</b>	<b>251</b>	<b>249</b>	<b>249</b>	<b>249</b>	<b>249</b>	<b>-0.7%</b>	<b>-0.8%</b>			

**Table 6.13 Tariff D – Volumes, MHQ customers by industry – YARRA VALLEY**

Sum of Data				Year													Annual Average % Chg		
Tariff Zone	Measure	Sector	Segment	Unit	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2013-17	2011-21		
Yarra Valley	Gas Flows	Commercial	Electricity, Gas & Water (ex GPG)	TJ	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%		
			Construction	TJ	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
			Wholesale Trade and Retail Trade	TJ	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
			Transport & Storage and Communication	TJ	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
			Finance Insurance Property & Business	TJ	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
			Government Administration, Defence, Ed	TJ	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
			Accommodation, Cafes, Restaurants, Ct	TJ	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
		<b>Commercial Total</b>				-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
		Industrial	Agriculture	TJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Mining	TJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Food, beverages, tobacco manufacturing	TJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Textiles, clothing and footwear manufact	TJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Wood and paper, wood products and pap	TJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Chemicals, petroleum, coal manufacturin	TJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Non-metalic minerals manufacturing	TJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Basic & fabricated metal products manuf	TJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Transport and other machinery equipmen	TJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Miscellaneous manufacturing	TJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
		<b>Industrial Total</b>				-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
	<b>Gas Flows Total</b>																<b>0.0%</b>	<b>0.0%</b>	
	MHQ	Commercial	Electricity, Gas & Water (ex GPG)	GJ	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
			Construction	GJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Wholesale Trade and Retail Trade	GJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Transport & Storage and Communication	GJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Finance Insurance Property & Business	GJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Government Administration, Defence, Ed	GJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Accommodation, Cafes, Restaurants, Ct	GJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
		<b>Commercial Total</b>				-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
		Industrial	Agriculture	GJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Mining	GJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Food, beverages, tobacco manufacturing	GJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Textiles, clothing and footwear manufact	GJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Wood and paper, wood products and pap	GJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Chemicals, petroleum, coal manufacturin	GJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Non-metalic minerals manufacturing	GJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Basic & fabricated metal products manuf	GJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Transport and other machinery equipmen	GJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Miscellaneous manufacturing	GJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
	<b>Industrial Total</b>					-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
	<b>MHQ Total</b>																<b>0.0%</b>	<b>0.0%</b>	
	Customers	Commercial	Electricity, Gas & Water (ex GPG)	Numbers	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
			Construction	Numbers	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Wholesale Trade and Retail Trade	Numbers	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Transport & Storage and Communication	Numbers	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Finance Insurance Property & Business	Numbers	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Government Administration, Defence, Ed	Numbers	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Accommodation, Cafes, Restaurants, Ct	Numbers	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
<b>Commercial Total</b>					-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%		
Industrial		Agriculture	Numbers	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
		Mining	Numbers	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
		Food, beverages, tobacco manufacturing	Numbers	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
		Textiles, clothing and footwear manufact	Numbers	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
		Wood and paper, wood products and pap	Numbers	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
		Chemicals, petroleum, coal manufacturin	Numbers	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
		Non-metalic minerals manufacturing	Numbers	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
		Basic & fabricated metal products manuf	Numbers	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
		Transport and other machinery equipmen	Numbers	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
		Miscellaneous manufacturing	Numbers	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
		<b>Industrial Total</b>				-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
	<b>Customers Total</b>																<b>0.0%</b>	<b>0.0%</b>	

Table 6.14 Tariff D – Volumes, MHQ customers by industry– SOUTH GIPPSLAND

Sum of Data						Year											Annual Average % Chg		
Tariff Zone	Measure	Sector	Segment	Unit	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2013-17	2011-21		
South Gippsland	Gas Flows	Commercial	Electricity, Gas & Water (ex GPG)	TJ	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%		
			Construction	TJ	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
			Wholesale Trade and Retail Trade	TJ	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
			Transport & Storage and Communication	TJ	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
			Finance Insurance Property & Business	TJ	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
			Government Administration, Defence, Ed	TJ	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
		Accommodation, Cafes, Restaurants, Cu	TJ	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%		
		Commercial Total				-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
		Industrial	Agriculture	TJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Mining	TJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Food, beverages, tobacco manufacturing	TJ	312	307	304	302	299	298	300	300	303	308	311		-0.3%	0.0%	
			Textiles, clothing and footwear manufact	TJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Wood and paper, wood products and pap	TJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Chemicals, petroleum, coal manufactur	TJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Non-metallic minerals manufacturing	TJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Basic & fabricated metal products manuf	TJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
		Transport and other machinery equipmen	TJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
		Miscellaneous manufacturing	TJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
		Industrial Total			312	307	304	302	299	298	300	300	303	308	311		-0.3%	0.0%	
	<b>Gas Flows Total</b>			<b>312</b>	<b>307</b>	<b>304</b>	<b>302</b>	<b>299</b>	<b>298</b>	<b>300</b>	<b>300</b>	<b>303</b>	<b>308</b>	<b>311</b>		<b>-0.3%</b>	<b>0.0%</b>		
	MHQ	Commercial	Electricity, Gas & Water (ex GPG)	GJ	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
			Construction	GJ	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
			Wholesale Trade and Retail Trade	GJ	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
			Transport & Storage and Communication	GJ	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
			Finance Insurance Property & Business	GJ	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
			Government Administration, Defence, Ed	GJ	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
		Accommodation, Cafes, Restaurants, Cu	GJ	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%		
		Commercial Total			-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
		Industrial	Agriculture	GJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Mining	GJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Food, beverages, tobacco manufacturing	GJ	62	61	61	61	61	61	61	61	61	61	61	61		-0.2%	0.0%
			Textiles, clothing and footwear manufact	GJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Wood and paper, wood products and pap	GJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Chemicals, petroleum, coal manufactur	GJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Non-metallic minerals manufacturing	GJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
			Basic & fabricated metal products manuf	GJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
		Transport and other machinery equipmen	GJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
		Miscellaneous manufacturing	GJ	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
		Industrial Total			62	61	61	61	61	61	61	61	61	61	61	61		-0.2%	0.0%
<b>MHQ Total</b>			<b>62</b>	<b>61</b>	<b>61</b>	<b>61</b>	<b>61</b>	<b>61</b>	<b>61</b>	<b>61</b>	<b>61</b>	<b>61</b>	<b>61</b>	<b>61</b>		<b>-0.2%</b>	<b>0.0%</b>		
Customers	Commercial	Electricity, Gas & Water (ex GPG)	Numbers	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%		
		Construction	Numbers	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%		
		Wholesale Trade and Retail Trade	Numbers	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%		
		Transport & Storage and Communication	Numbers	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%		
		Finance Insurance Property & Business	Numbers	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%		
		Government Administration, Defence, Ed	Numbers	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%		
	Accommodation, Cafes, Restaurants, Cu	Numbers	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%			
	Commercial Total			-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%		
	Industrial	Agriculture	Numbers	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
		Mining	Numbers	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
		Food, beverages, tobacco manufacturing	Numbers	1	1	1	1	1	1	1	1	1	1	1	1		-0.1%	0.0%	
		Textiles, clothing and footwear manufact	Numbers	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
		Wood and paper, wood products and pap	Numbers	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
		Chemicals, petroleum, coal manufactur	Numbers	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
		Non-metallic minerals manufacturing	Numbers	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
		Basic & fabricated metal products manuf	Numbers	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	
	Transport and other machinery equipmen	Numbers	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%		
	Miscellaneous manufacturing	Numbers	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%		
	Industrial Total			1	1	1	1	1	1	1	1	1	1	1	1		-0.1%	0.0%	
<b>Customers Total</b>			<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>		<b>-0.1%</b>	<b>0.0%</b>		

## **Appendix A**

# **Reconciliation of ABS Divisions and Local Government Areas with gas distribution regions**

<b>Table A.1 Victorian Statistical Division and Gas Distribution Zones</b>		
<b>SD Name</b>	<b>Company zone</b>	<b>Weight based on new pop</b>
Barwon	SP AusNet Central	0.81
Barwon	SP AusNet West	0.07
Barwon	Unassigned	0.12
Central Highlands	SP AusNet West	0.85
Central Highlands	Unassigned	0.15
East Gippsland	Envestra Bairnsdale	0.23
East Gippsland	Envestra Central	0.35
East Gippsland	Unassigned	0.41
Gippsland	Envestra Central	0.63
Gippsland	Unassigned	0.37
Goulburn	Envestra Central	0.01
Goulburn	Envestra Murray NSW	0.03
Goulburn	Envestra Murray Vic	0.07
Goulburn	Envestra North	0.63
Goulburn	SP AusNet West	0.00
Goulburn	Unassigned	0.25
Loddon	SP AusNet West	0.73
Loddon	Unassigned	0.27
Mallee	Envestra Mildura	0.62
Mallee	Unassigned	0.38
Melbourne	Envestra Cardinia	0.00
Melbourne	Envestra Central	0.30
Melbourne	Envestra North	0.00
Melbourne	Multinet	0.46
Melbourne	SP AusNet Central	0.23
Melbourne	Unassigned	0.01
Ovens-Murray	Envestra Central	0.05
Ovens-Murray	Envestra Murray Vic	0.06
Ovens-Murray	Envestra North	0.53
Ovens-Murray	Unassigned	0.36
Western District	SP AusNet West	0.59
Western District	Unassigned	0.41
Wimmera	SP AusNet West	0.40
Wimmera	Unassigned	0.60

<b>Table A.2 Melbourne LGAs and Gas Distribution Zones – 2001 boundaries</b>		
<b>SD Name</b>	<b>Company zone</b>	<b>Weight based on new pop</b>
Banyule (C)	Envestra Central	1.00
Bayside (C)	Multinet	1.00
Boroondara (C)	Multinet	1.00
Brimbank (C)	SP AusNet Central	1.00
Cardinia (S)	Envestra Cardinia	0.16
Cardinia (S)	Envestra Central	0.46
Cardinia (S)	Multinet	0.27
Cardinia (S)	Unassigned	0.11
Casey (C)	Envestra Central	0.78
Casey (C)	Multinet	0.21
Casey (C)	Unassigned	0.01
Darebin (C)	Envestra Central	1.00
Frankston (C)	Envestra Central	1.00
Glen Eira (C)	Multinet	1.00
Greater Dandenong (C)	Envestra Central	0.36
Greater Dandenong (C)	Multinet	0.64
Hobsons Bay (C)	SP AusNet Central	1.00
Hume (C)	SP AusNet Central	1.00
Kingston (C)	Multinet	1.00
Knox (C)	Multinet	1.00
Manningham (C)	Multinet	1.00
Maribyrnong (C)	SP AusNet Central	1.00
Maroondah (C)	Multinet	1.00
Melbourne (C)	Envestra Central	0.76
Melbourne (C)	Multinet	0.17
Melbourne (C)	SP AusNet Central	0.07
Melton (S)	SP AusNet Central	1.00
Monash (C)	Multinet	1.00
Moonee Valley (C)	Envestra Central	0.02
Moonee Valley (C)	SP AusNet Central	0.98
Moreland (C)	Envestra Central	0.21
Moreland (C)	SP AusNet Central	0.79
Mornington Peninsula (S)	Envestra Central	1.00
Nillumbik (S)	Envestra Central	0.92
Nillumbik (S)	Envestra North	0.01
Nillumbik (S)	Multinet	0.04
Nillumbik (S)	Unassigned	0.03
Port Phillip (C)	Multinet	1.00
Stonnington (C)	Multinet	1.00
Whitehorse (C)	Multinet	1.00
Whittlesea (C)	Envestra Central	0.99
Whittlesea (C)	Unassigned	0.01
Wyndham (C)	SP AusNet Central	1.00
Yarra (C)	Envestra Central	1.00
Yarra Ranges (S)	Envestra Central	0.18
Yarra Ranges (S)	Multinet	0.76
Yarra Ranges (S)	Unassigned	0.06