Natural gas projections for ActewAGL Distribution

A report for
ActewAGL Distribution

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1. Introduction

ActewAGL Distribution (ACT) commissioned the National Institute of Economic and Industry Research (NIEIR) to develop forecasts of natural gas sales and customer numbers.

These forecasts were to be prepared on a financial year basis and to cover each major tariff group.

This report summarises the economic outlook for Australia and Australian Capital Territory, outlines the methodologies employed and then summarises the forecasts of volumes by tariff group.

The background and scope for the study is reproduced below.

1.1 Background

ActewAGL Distribution is preparing its revised access arrangement proposal with supporting information for the Australian Energy Regulators (AERs) consideration. The revised access arrangements cover the period 2010-11 to 2014-15 (July to June financial years).

Two major elements of this process are:

- the formulation of both network augmentation capital expenditure requirements; and

- forecast gas demand across New South Wales and the Australian Capital Territory.

Both these elements are heavily dependent on expectations of gas usage per customer. Key drivers of gas usage are:

- current market trends;

- Government energy policies; and

- general economic conditions.

When considering approval of ActewAGL Distribution's revised access arrangement, the AER will have regard to the National Gas Objective, which is:

"*to promote efficient investment in, and efficient operation and use of, natural gas services for the long term interests of consumers of natural gas with respect to price, quality, safety, reliability and security of supply of natural gas.*"

The AER can also take into account the pricing principles in Section 24(2) of the National Gas Law, and must do so when considering whether to approve a reference tariff:

A service provider should be provided with a reasonable opportunity to recover at least the efficient costs the service provider incurs in:

(a) providing reference services; and

(b) complying with a regulatory obligation or requirement or making a regulatory payment.

And Section 74 of the National Gas Rules

> *(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.*

Accordingly, ActewAGL Distribution sought the opinion of a recognised independent expert to develop the forecast ActewAGL Distribution will use in preparing the volumes of gas to be transported for the period relating to revised access arrangement submission.

1.2   Scope of work – forecasts of demand for the services provided by ActewAGL Distribution

The objectives of the project as outlined in the study brief was that, a recognised independent expert develops the forecast ActewAGL Distribution will use in preparing the volumes of gas to be transported for the period relating to revised access arrangement submission.

ActewAGL Distribution required an opinion report detailing the quantitative incremental impacts (both positive and negative) of each of the following contributing factors during the period 2008-09 to 2015-16 upon:

1.   annual gas consumption of ActewAGL Distribution's existing residential, business and large industrial consumers;

2.   annual gas consumption of ActewAGL Distribution's new residential, business and large industrial consumers; and

3.   hourly and daily demand for business and large industrial consumers using more than 10 terajoules per annum.

The contributing factors which were considered are:

(a)   market trends affecting the installation of existing gas appliances, including but not limited to, the impacts of installing alternative appliances such as reverse cycle air conditioning in lieu of gas heating, continuous flow gas systems in lieu of storage gas systems, solar or electrical systems, and the impacts of water conservation measures on the consumption of hot water;

(b)   government energy efficiency policies including but not limited to, minimum efficiency performance standards for gas hot water systems, energy efficiency home rating schemes, business energy efficiency reporting schemes and hot water rebate schemes for solar and heat pump hot water system replacements; and

(c)   implementation of the Government's Carbon Pollution Reduction Scheme including the impacts on fuel substitution, reduction in demand of increased cost of gas especially in the large industrial market, economics of small and large scale cogeneration and electricity production.

2.   The economic outlook for Australia to 2018-19

2.1   Introduction

This section provides an outline of NIEIR's economic outlook for Australia to 2018-19. Figure 2.1 shows the outlook for Australian gross domestic product to 2018-19. Table 2.1 shows the projected annual Australian GDP growth rates to 2018-19. Part 2.2 of this section provides a more detailed outlook for the Australian economy to 2013-14. This economic outlook was prepared in December 2008.

Figure 2.1: Australian GDP growth 2004-05 to 2018-19
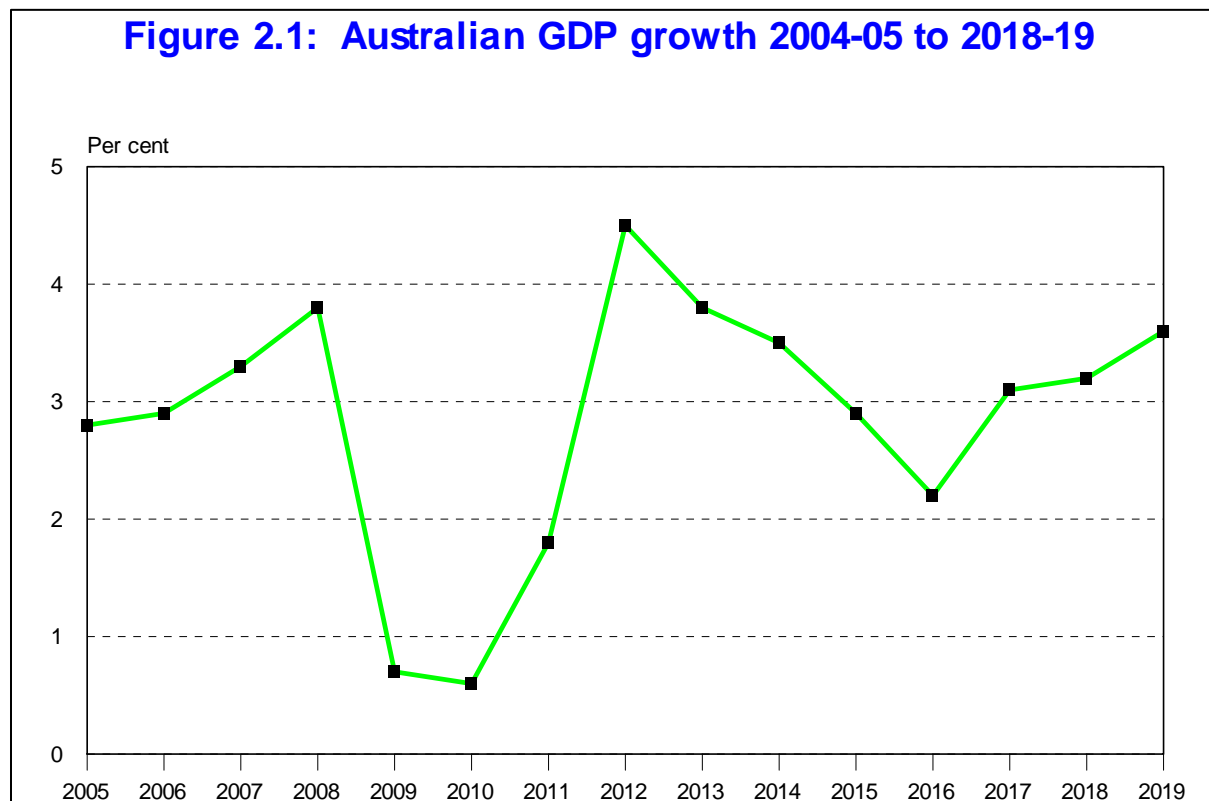
Note: Financial years ending June.

Table 2.1 Australian GDP growth 2004-05 to 2018-19

Per cent change

2005	2.8
2006	2.9
2007	3.3
2008	3.8
2009	0.7
2010	0.6
2011	1.8
2012	4.5
2013	3.8
2014	3.5
2015	2.9
2016	2.2
2017	3.1
2018	3.2
2019	3.6
Compound growth rate (per cent)	
2008-2010	0.6
2010-2019	3.2
2009-2019	2.9

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 The world economy

It is now obvious that the world economy faces its most difficult period since the Great Depression. It will not be as severe as the Great Depression (although the scale of wealth destruction will be of the same order of magnitude), because governments now are willing to use whatever tools are available to place a floor under activity. Before recovery can occur, necessary further measures will probably include:

(i) direct (via central banks) financing of credit markets (wholesale, commercial); and

(ii) turning fully or partly nationalised banks into utilities directed in the first instance and the maintenance of trade credit and project financing, along with cutting interest rates to low levels and injecting fiscal stimulus packages of between 2 to 4 per cent of GDP.

However, the shock to confidence and the scale of wealth destruction so great, self funded retirees and those nearing retirement can now expect only a half to one third of the standard of living they expected three months ago.

But in North America and Europe deferred benefit schemes are the norm. The reforms here will be painful and politically diverse. The role of companies in providing pensions and health care costs in the United States will send many firms into liquidation, and will force the "socialisation" of the provisions of these services onto the United States Government, which will involve large increases in the revenue accruing to the Government which could only be done in a crisis that is now prevailing.

Massive stimulatory packages will be applied. However, in the short term, that is over the next two years at least, these measures will not be enough to stop negative growth outcomes. The reason is that the negative factors unleashed by the financial crisis of September-October 2008 will be powerful and ongoing. These include:

(i) households rapidly increasing their savings ratios from a combination of motives, including:

- loss of long run expected post retirement incomes;

- aversion to any further increases in debt;

- to build-up cash balances as a precautionary motive against an uncertain future;

(ii) unavailability of trade and roll-over finance as financial institutions also build cash balances. This will probably require direct public sector donations to unblock. It is now clear that lack of trade credit and loss of confidence in payment will have a significant short term impact on Australia's export performance, especially in mining;

(iii) non-finance firms also building their cash balances to qualify for future financing and allow resources for the low cost take-over opportunities that will be in abundance. This will be a negative for economic activity because it will involve:

- cuts to employment;

- rapid reductions in inventories; and

- postponement or cancellation of investment projects.

Rapid destocking by customers will also impact on Australia's export performance and lead to significant declines in mining production.

As a partial offset the rapid declines in commodity prices, in general, and oil, in particular, will also act as powerful built-in stabilisers to support real incomes. It will, of course, have the negative effect of transferring economic growth from commodity producing to commodity consuming countries.

In this environment what world growth will be in 2009 and 2010 is largely guesswork. A reasonable assessment would seem to be that United States growth will be in the range of -4 to -1 per cent, while Europe will be in the range of -2 to 0 per cent. The rest of the world will be in the range of 0 to 2 per cent, with Asia in the range of 1.5 to 3 per cent, excluding China. The question then becomes, what happens to China? The problem here is that China simply lies about its growth rate.

Figure 2.2: World GDP growth - 2006 to 2014
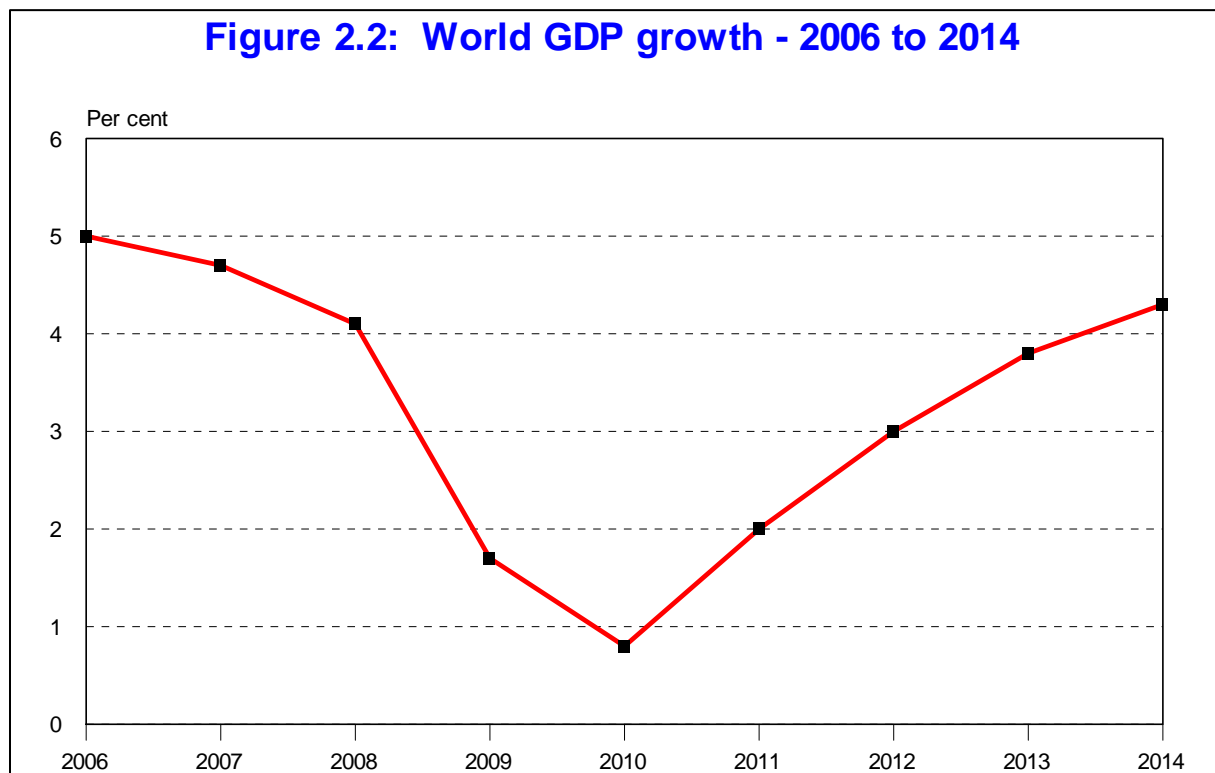
China

The world places much hope in China maintaining relatively high economic growth rates over the next two to three years by offsetting the fall off in export demand by accelerated growth in domestic demand. For 2009 and into 2010 this expectation is unlikely to be realised.

It was always expected that China would experience a post Olympic Games slowdown in growth, as has been the experience of most countries in recent times. This is because the Games have the effect of "pulling forward" expenditures, both for consumers and investment, which leads to a natural downturn in growth after the event.

The world economic crisis has reinforced this effect. As a result, economic growth in China is slowing rapidly, as evidenced by:

(i)   large falls in imports in October;

(ii)   month on month a year earlier Chinese industrial production was running at an increase of 8 to 12 per cent during the first half of 2008. In October the fall was 17 per cent, with production of white goods and cars falling and cement production being the same as a year earlier;

(iii)   earlier in the year electricity production was running at 17 per cent above the levels of a year earlier. In October the increase had fallen to 4 per cent;

(iv)   millions of workers are now being laid off in the construction sector;

(v)   forward export orders show no growth; and

(vi)   falls in Chinese equity prices have, like elsewhere, created large scale wealth destruction.

The Chinese Government has just announced a major stimulatory package. However, the assessment is that at least two thirds, and perhaps 80 per cent, were projects that would have gone ahead in any case.

The forward indicators suggest that in 2009 the Chinese growth rate will be around 3 to 5 per cent, although the Government statistics will show a growth of 7 to 8 per cent.

China is a state capitalist economy with latent or formal controls over almost all aspects of economic life. Like the German fascist economy of the 1930s, it has powerful instruments to "command" growth. There will be massive uplift in infrastructure expenditures which will start to have an effect from 2010. Therefore, this projection does have Chinese growth averaging 7 per cent over the next five years. However, growth is 2 per cent for 2009, 4 per cent for 2010, 8 per cent for 2011, 10 per cent for 2012 and 12 per cent for 2013.

The projection therefore allows for the likelihood, over the next two years, that policy to stimulate the economy will be largely, though not completely, offset by the cyclical down-saving now operating on the economy.

2.2.2   The financial whirlwind facing Australia over the next three years

The causal mechanisms and the cumulative outcome over the past 15 years that have led to Australia's current financial vulnerability can be demonstrated by reference to a small number of statistical series.

One series in the following figure is the ratio of employer social security contributions plus household imputed interest on superannuation assets to household gross disposable income net of cash transfers. Driven in part by compulsory superannuation, this ratio has increased from 14 per cent in 1994 to 18 per cent in 2007.

Figure 2.3: Household non-discretionary and total savings rate

Legend:
- Household employer contributions and imputed interest as % of household disposable income
- Gross household savings ratio

Source: ABS Australian National Accounts, Cat. No. 5204.
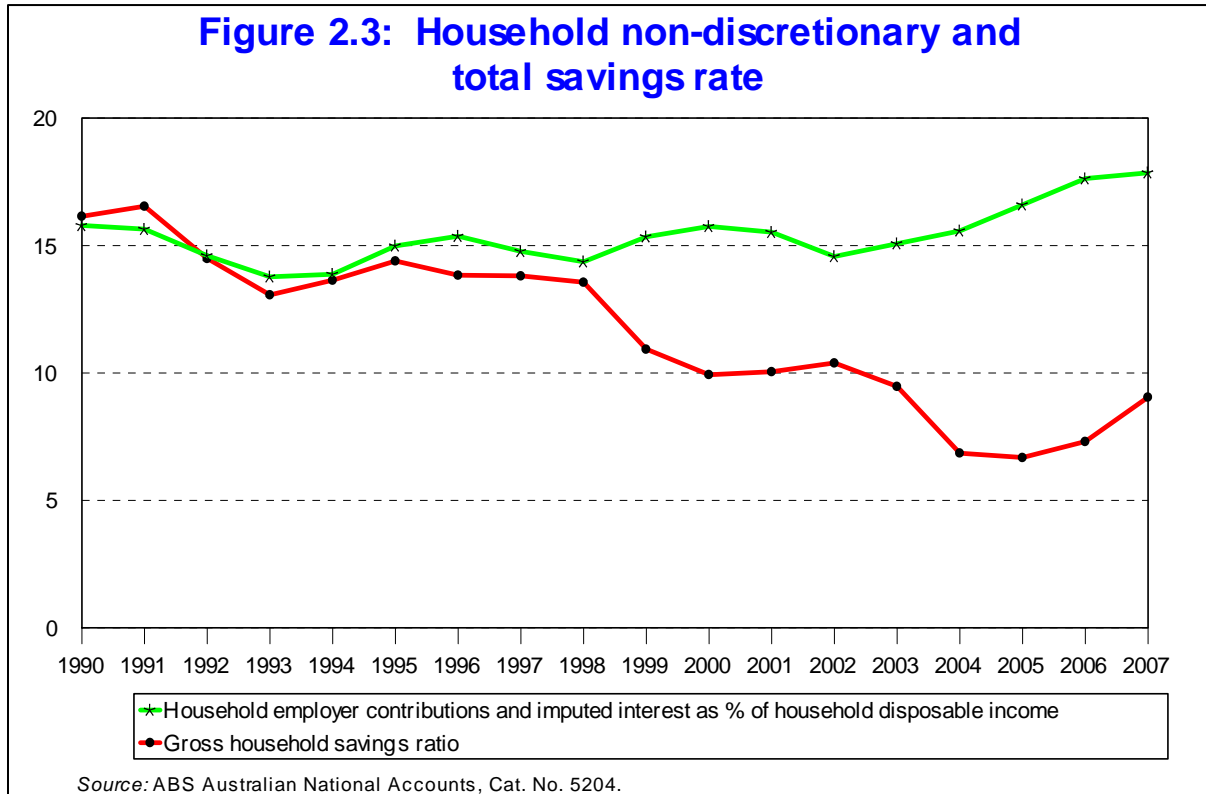
Over the same time period the gross household savings ratio has fallen by more than 4 percentage points. This is perverse since both employer contributions and imputed interest are treated as part of household income in the Australian National Accounts, with no disbursement entered on the outlay side of the household accounts. That is, premiums and imputed interest are included in gross savings. The expectation, therefore, would have been that gross savings should increase in parallel with the premiums/imputed interest series. This after all was one of the objectives of the policy.

The conclusion is that the household sector simply used the deregulation of the financial system to offset the increased savings pressure of compulsory superannuation by borrowing to finance consumption.

This conclusion is consistent with the evidence provided in Figure 2.4. This figure shows the ratio of gross saving to household disposable income less the average for the gross household savings to income ratio from 1970 to 1990, during which period the household debt to income ratio exhibited a relatively slow upward trend, at least compared to post mid 1990s experience as indicated by the figure on the next page.

Also plotted in Figure 2.4 is the change in the household debt income ratio less 75 per cent of the change in the household gross investment (dwellings plus unincorporated enterprises) to income ratio. This series attempts to estimate the increase in debt to income ratio that was, in whole or part, used to finance consumption. The close correlation between the two series in the figure suggests that the build-up in household debt has largely been used to finance consumption. This in turn implies that, to stabilise the debt to income ratio, the household savings ratio will have to increase by at 8 to 10 percentage points, that is, almost double.

Figure 2.4: Ratio of gross savings to household disposable income less average gross household savings to income ratio
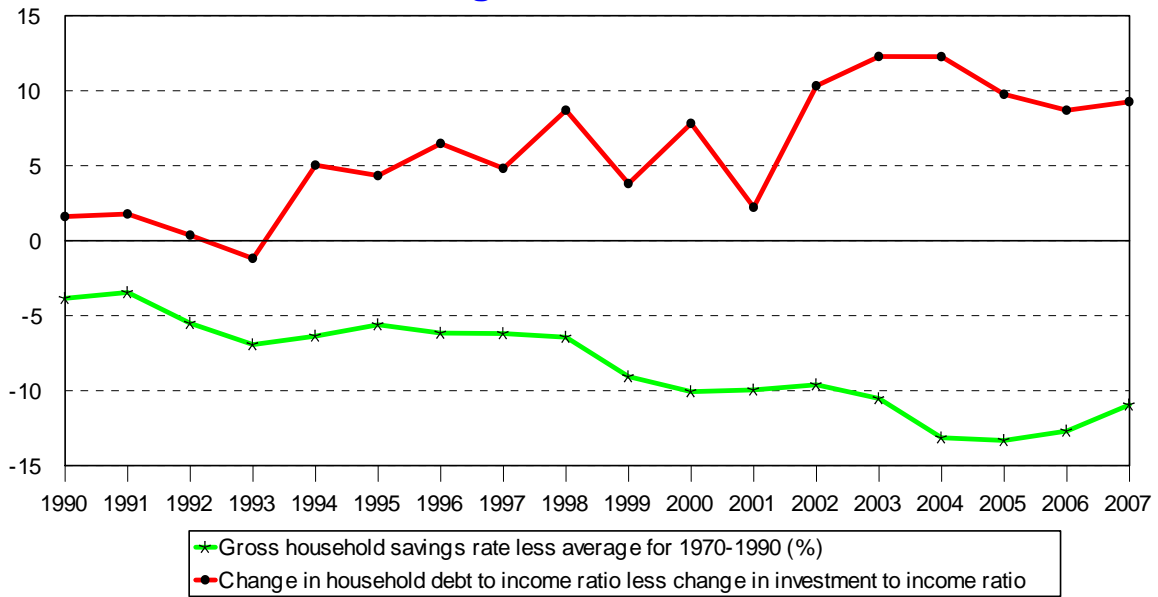
Gross household savings rate less average for 1970-1990 (%)

Change in household debt to income ratio less change in investment to income ratio

Source: ABS Australian National Accounts: Financial Accounts, Cat No. 5232 and Australian National Accounts, Cat No. 5204

Figure 2.5: Household debt to income ratio
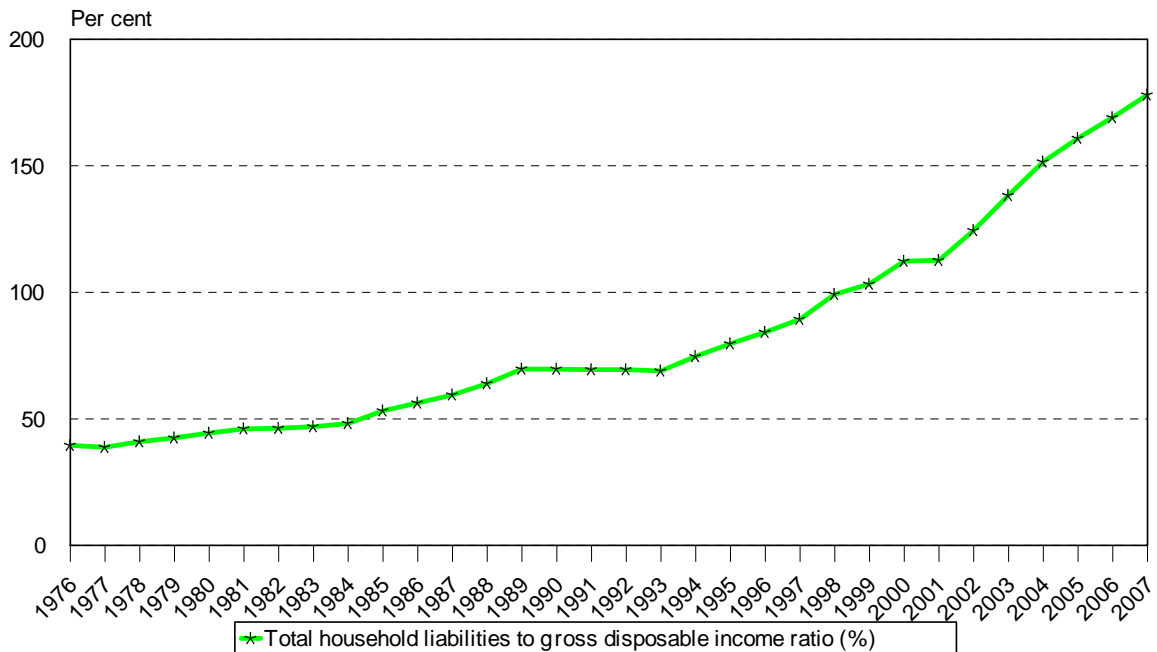
Per cent

Total household liabilities to gross disposable income ratio (%)

Source: ABS Australian National Accounts: Financial Accounts, Cat No. 5232 and Australian National Accounts, Cat. No. 5204.

The analysis suggests that if household borrowing for consumption were to cease suddenly, then consumption would fall directly by between 5 and 10 per cent from what otherwise would have been the case, or an absolute fall of between 1 and 6 per cent. With multipliers this would plunge the economy into a recession. The severity of the recession would depend on the drawdown in financial assets.

In addition any economy-wide response to a cessation of household borrowing for consumption will be aggravated by the vulnerability of the banking system. The following figure indicates that the banks' holdings of Australia's total gross non-equity foreign financial liabilities have doubled from the 30 per cent to 60 per cent since the mid 1990s, with the result that the banks' share of total foreign non-equity liabilities as a percentage of total bank financial assets has increased by 83 per cent over the same period to a third. The increase in Banks' net foreign liabilities as a percentage of their assets has been 70 per cent. To what extent the foreign banks' gross foreign assets are a hedge against their gross foreign liabilities is unknown.

Figure 2.6: The banking sector - foreign assets and liabilities Rest of world total financial assets less equities

Per cent

Legend:
- Share of banks' total non-equity foreign liabillities in total bank financial assets
- Share of banks' total non-equity foreign liabillities in total Australian non-equity financial liabilities
- Share of banks' total non-equity foreign assets in total bank financial assets

Source: ABS Australian National Accounts: Financial Accounts, Cat. No. 5232.

Any household cessation of lending for consumption is expected to reduce the banks' demand for new foreign liabilities, which in turn will result in a depreciation of the currency. Once hedging positions are unwound, this will increase bank costs, force the banks to increase domestic and lending margins, so reinforcing the contraction in economic activity. Furthermore, uncertain times would force up bank hedging costs as debt is rolled over, as well as force the acceptance of a greater proportion of foreign liabilities denominated in foreign currency.

In any case, the level of bank holdings of Australia's international debt is so high that any loss of confidence in the Australian economy and its banking system will result in a sharp plunge in the exchange rate, as per Iceland over the past 18 months, which, by itself, could result in the banks being unable to roll over international debt, forcing them at best into a

partial nationalisation arrangement with government as per the recent experience of the United States and United Kingdom banks. By itself, the banks' balance sheet structure could trigger a sequence of actions, by which the unavailability of bank finance for consumption expenditure is a consequence of, not a trigger for, the descent of the Australian economy into recession or at worst depression.

Finally, as noted above, the issue of climate change itself could be a catalyst for financial and economic crisis. If the projections of the damage from climate change increase and the acceptance of low common per capita emissions cap is forced on the world, then the recognition by investors of just how far Australia has to go to achieve required outcomes in terms of CO_2 reduction in the context of unsustainable bank and household balance sheets could trigger exchange-rate-lending-economic crisis. If Australia was unprepared, or did not understand the reasons, or responded poorly, then the crisis could easily be translated into a depression, as in Iceland.

If there is a loss of confidence, problems could arise with refinancing of bank overseas liabilities. A particular worry is what might happen to the banks' balance sheets if overseas borrowings have to be re-financed at a reduced exchange rate and in the face of overseas pessimism about Australian economic prospects – in particular, pessimism about Australia's capacity to repay promptly in creditor currencies. Worse, what would happen if Australia's creditors apply the principles of sound finance, and demand prompt repayment? Suppose that they refuse to refinance the net liability. Official overseas reserves of foreign currency amount to only about 20 per cent of this. This demand, should it arise, is accordingly serious: it would take virtually the whole of one year's export earnings to satisfy it. The adjustment required would be at least as serious as that which faced the Asian economies in the financial crisis a decade ago.

At this point the best that could be expected from a sound-finance approach would be a major effort to increase export earnings and devote them to debt repayment. However, the scope for this is limited: there is little that the Australian government can do to increase exports rapidly, and accordingly the main way to release foreign exchange to repay debts is by cutting imports drastically. The market mechanism to do this would be a drastic fall in the exchange rate, making imported goods much more expensive and making exporting much more attractive. The fall in the exchange rate would affect not only the price of consumers' goods (thus reducing the standard of living) but also the price of equipment – for example, computers would become much more expensive. Even worse, from a domestic point of view, the Australian dollar value of debt which is fixed on overseas currency terms would rise, meaning that the Australian dollar earnings required for debt service will rise. A major reorganisation of the economy is required, and in the process a high rate of unemployment would be inevitable. There would also be a financial meltdown, with a high threat of bank closures and the bankruptcy of other businesses with overseas borrowings to repay.

A slightly more palatable alternative, on the precedent of several of the countries involved in the 1998 Asian crisis and various of the Latin American countries which suffered financial crises in the 1980s is to take a loan from the International Monetary Fund. The Fund represents the major international creditors, and its loans are intended to provide bridging finance to over-indebted countries while they make the necessary domestic adjustments to allow them to repay their debts. Loans from the IMF are thus conditional on economic reforms which, in the judgement of the Fund's generally neo-liberal economists, will help repay the borrowing country's creditors as fast as possible. The IMF was able to play a major role in the Latin American and Asian financial crises, but has not previously had to face up to a financial crisis originating in the United States. We have yet to see how its policies will develop, but there is no guarantee that, as a representative of international creditors, it will be at all sympathetic to a rich country like Australia which has got itself into trouble by adopting foolish policies – and in this court foolishness will be judged in retrospect, not by the economic fashions of the 1990s.

A third alternative was pioneered by the Malaysian response to the Asian financial crisis, and is associated with Dr Mahatir, the then Malaysian prime minister. This was essentially a domestically-managed variant of the IMF loan response, with the following main elements.

- Suspension of currency convertibility on capital account, with a promise that this would be temporary. The effect was that central bank permission was required for domestic investors to shift funds overseas, and likewise for overseas investors to repatriate funds. The effect was to reduce downward pressure on the exchange rate while measures were put in place to deal with the over-indebtedness which was the root cause of the problem.

- Implementation of a plan to repay overseas debt so that it falls to sustainable levels. Essential elements in such a plan include reduced reliance on overseas borrowing and an emphasis on increasing the capacity to service the stock of overseas debt already incurred. Reliance on overseas borrowing can only be reduced if domestic saving is increased, while the capacity to service debt requires expanding export revenues relative to import costs.

The major difference from the IMF loan alternative was the imposition of exchange controls (which were anathema to the neo-liberal establishment running the IMF). The immediate benefit of this was the avoidance of further indebtedness to the IMF, but the major benefit was that the adjustment program was kept under local control, rather than ceded to the IMF. It was thus possible to take advantage of local knowledge to draft a more efficient adjustment program. However, an important point was that the program had to be drastic enough to rid the country of excess debt within a matter of a few years – and to convince international creditors that this would happen.

Interest rates

Currently there is a general expectation that interest rate reductions to very low levels will come to the rescue and keep the economy moving along at a reasonable growth rate.

This is not likely. This is because of the inflation problem. The decline of the exchange rate to current levels will aggravate inflationary pressures although somewhat offset by falls in commodity prices. Further falls in the exchange rate almost certainly will lead to substantially higher inflation. The RBA, therefore, will have constraints on lowering interest rates, which will be compounded by increases in the current account deficit. Hence, the base scenario puts a floor under the interest rate declines.

The exchange rate

The Australian exchange rate could collapse at any point. That is, fall to the 30 to 40 cents range. The reason is straight forward. Over the next year Australia, and the banks in particular, will have to roll-over between $300 billion to $400 billion in foreign debt, as well as raise $40 billion o $60 billion in new liabilities to fund a widening current account deficit resulting from the rapid destruction in the terms of trade. In the context of the continuation of new foreign credit markets it will be difficult.

Further, if Australian households significantly reduce their lending for consumption, then there will be little incentive for the banks to borrow overseas. This will leave a very large deficit in the foreign account and, give the limited foreign reserves of the RBA, the exchange rate will fall to low levels, that is, below 40 cents to the US dollar. If this happens then the Banking Meltdown scenario will in all probability be triggered.

In any case, the exchange rate will go to relatively low levels. That is, to the 50 to 60 cents range. In part this will be due to the sharp decline that is expected in the terms of trade over the next one to two years due to slow world growth, and the likelihood that China will follow the world down in the short term.

Climate change

In the context of the gloom concerning the world economic growth outlook, the pressure for aggressive action on climate change will increase. The scientific consensus is that the world will have to target a return to 350 ppm (now 387 ppm) to have any chance of surviving in an environment near its current form to 2100. This will require targets similar to 80 per cent below 2000 levels by 2005, which are now being adopted in Europe at least, and no doubt in the United States over the next few years.

Australia will not have the option of "opting out". If it does it will simply be subjected to trade and financial embargoes. However, as is now being pointed out regularly overseas, the necessary war on climate change offers a platform for the developed world to reflate their economies, similarly to how World War II gave the impetus for restoring full employment from the Great Depression.

Table 2.2	Major Australian economic aggregates: calendar year averages (annual per cent rate of change)								
	2006	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
International									
World GDP (fiscal year)	5.0	4.7	4.1	1.7	0.8	2.0	3.0	3.8	4.3
Demand									
Private consumption	2.6	4.1	3.7	1.1	1.6	2.0	3.6	3.9	3.5
Business investment	15.2	6.6	13.1	-0.9	-13.3	-10.6	3.8	6.9	11.5
Housing	-3.9	2.0	1.3	-3.3	5.4	3.2	6.9	5.0	-1.4
Public expenditure	3.7	4.1	4.0	4.7	4.2	4.4	4.6	3.8	4.5
Total expenditure	4.3	4.4	5.2	1.3	-0.2	0.7	4.0	4.3	4.5
GDP	2.9	3.3	3.8	0.7	0.6	1.8	4.5	3.8	3.5
External sector									
Current account deficit ($B)	-52.8	-59.0	-70.2	-49.0	-76.7	-95.0	-111.6	-112.6	-123.2
CAD as per cent of GDP	5.5	5.7	6.2	3.9	5.5	6.3	7.0	6.5	6.8
Labour market									
Employment	2.4	2.7	2.6	1.3	-0.7	1.2	1.8	2.3	2.5
Unemployment rate (%)	5.0	4.5	4.2	4.6	6.6	6.7	6.3	5.9	5.5
Finance									
90 day bank bill (%)	5.7	6.3	7.3	5.4	4.5	4.7	5.6	6.6	6.9
10 year bond rate (%)	5.4	5.8	6.2	5.2	4.8	5.1	6.0	6.8	6.7
$US/$A	0.7	0.8	0.9	0.7	0.6	0.6	0.6	0.7	0.7
Trade weighted index	63.3	64.8	69.7	55.6	46.8	45.0	45.0	46.3	47.8
Wages and prices									
Average weekly ordinary time earnings	4.7	3.7	5.0	4.7	4.0	3.7	3.7	3.7	4.1
CPI	3.2	2.9	3.4	4.1	3.2	2.1	1.8	2.1	2.7

Figures 2.7 to 2.13 show graphically selected indicators for the base scenarios for the Australian economy over the medium term.

Figure 2.7: Consumer spending and GDP

Per cent

Legend: Consumer spending, GDP

Figure 2.8: GDP and employment

Per cent

Legend: GDP, Employment
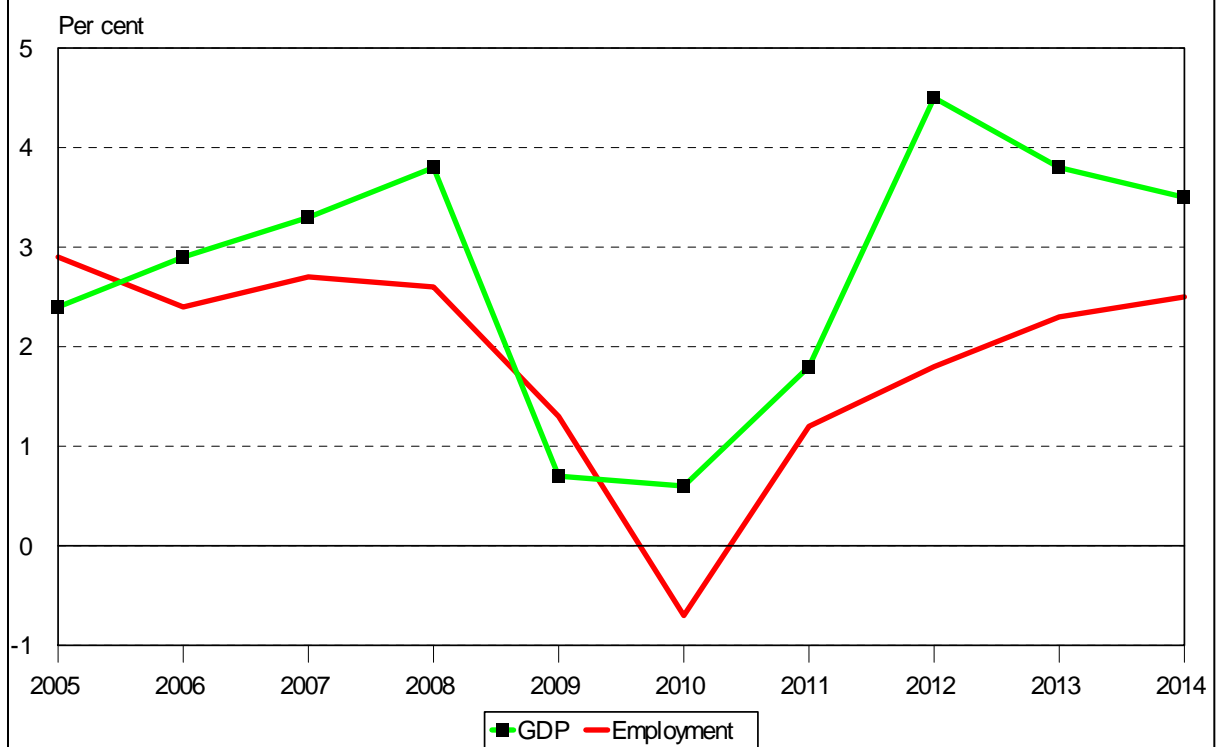
Figure 2.9: Employment and unemployment

Per cent growth

Per cent

Employment (LHS)   Unemployment (RHS)
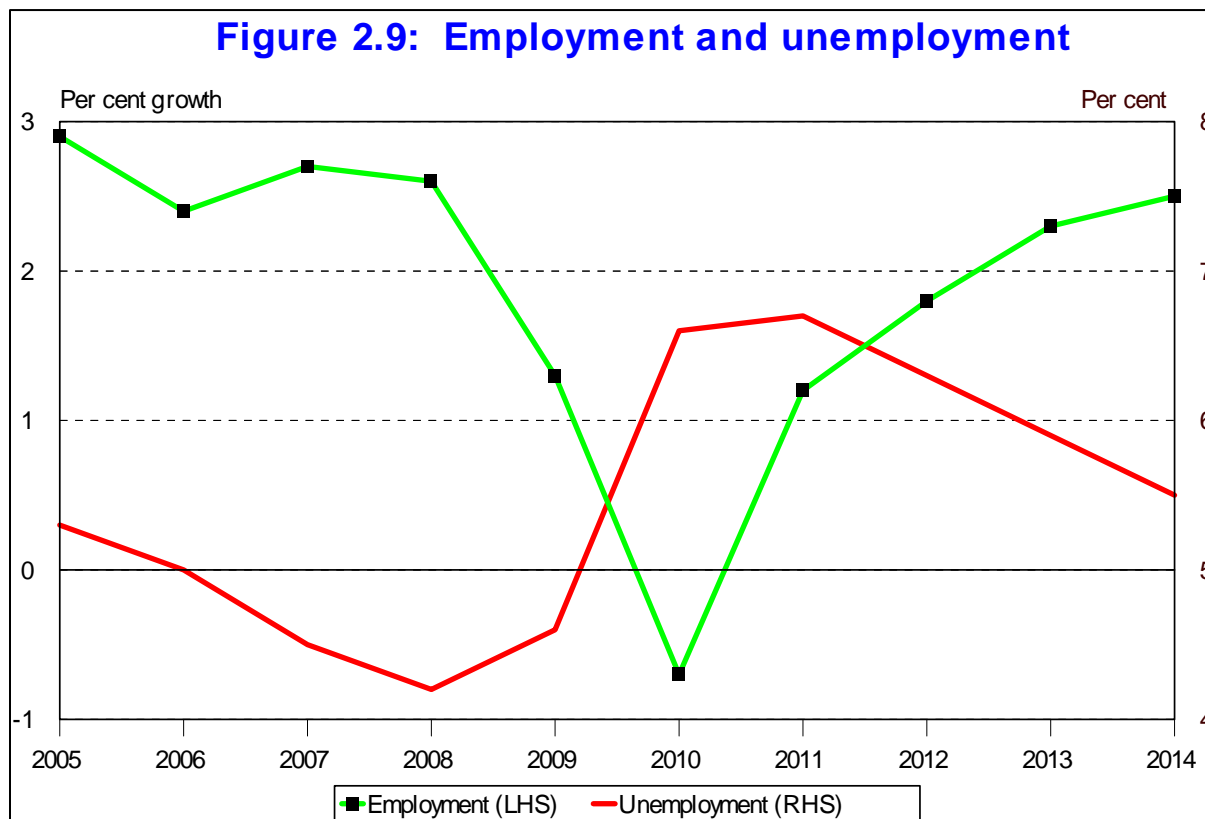
Figure 2.10: Consumer price index and wages

Per cent growth

CPI   Wage cost index
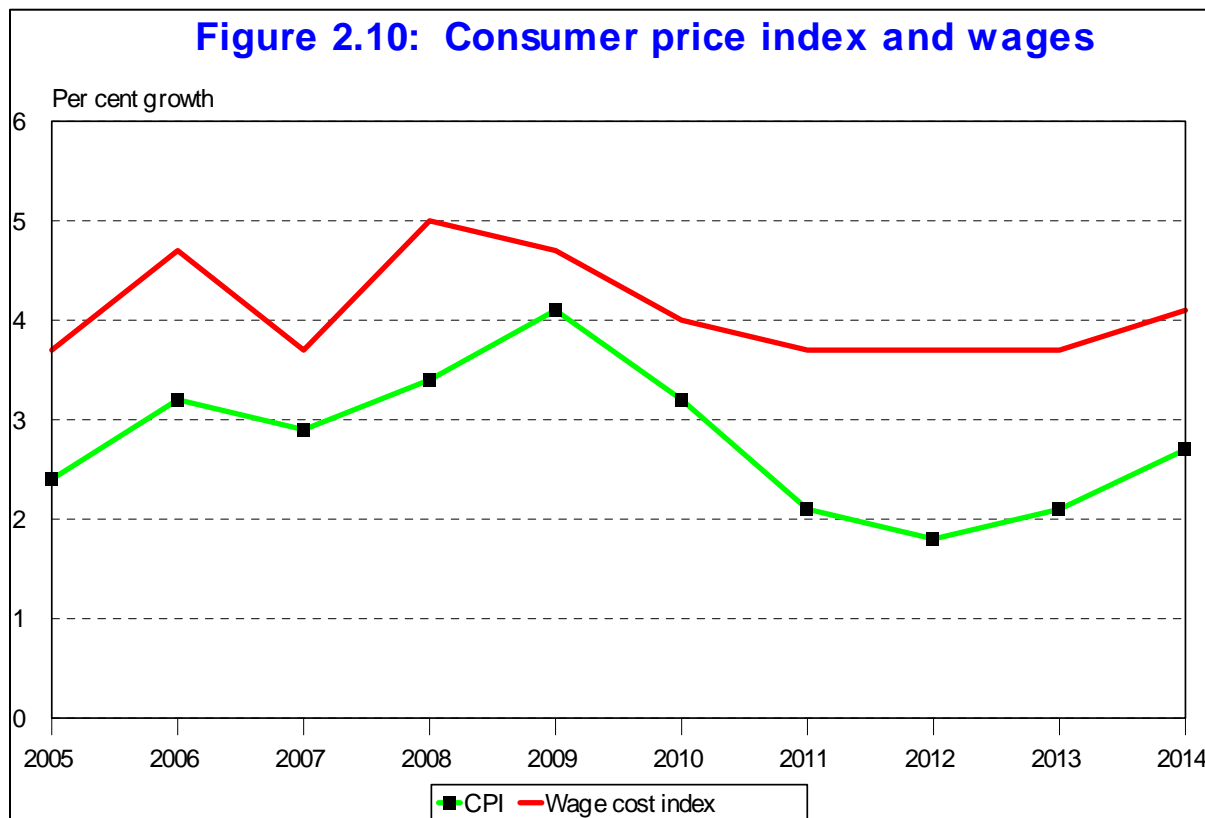
Figure 2.11: Domestic interest rates

Per cent

90 day bank bills — 10 year bond yields
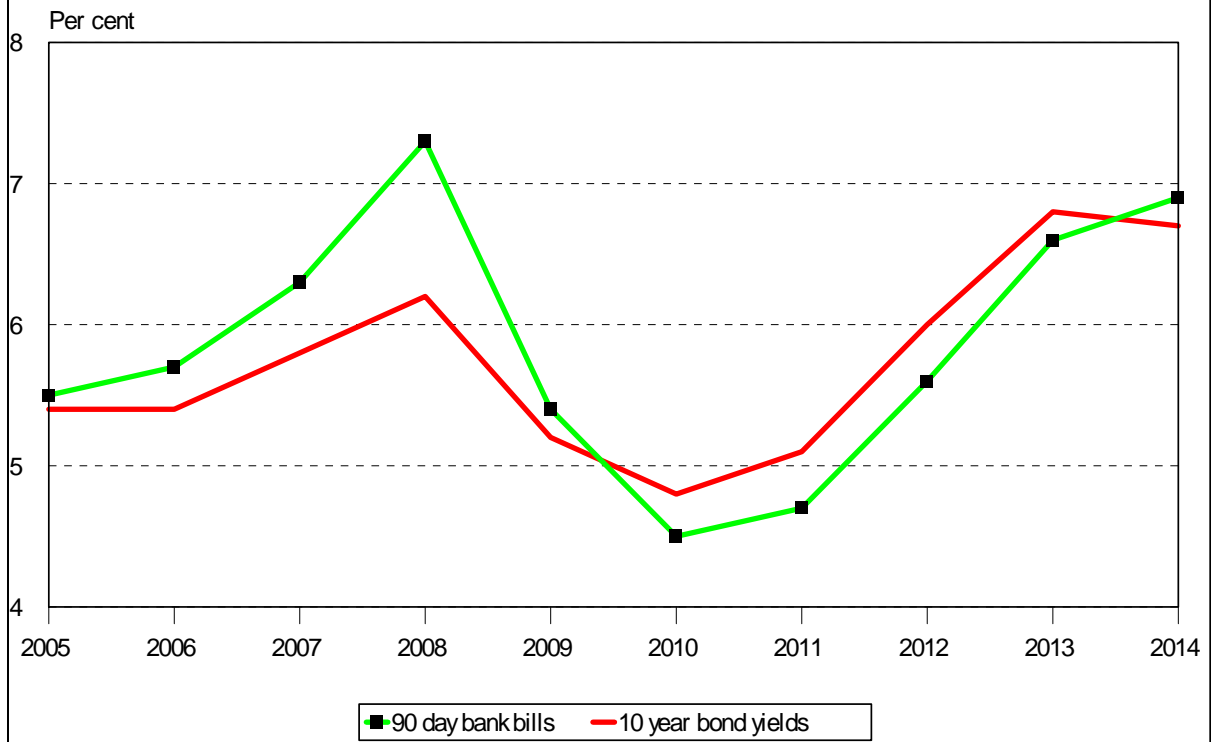
Figure 2.12: Exchange rate

Per cent

$US/$A exchange rate
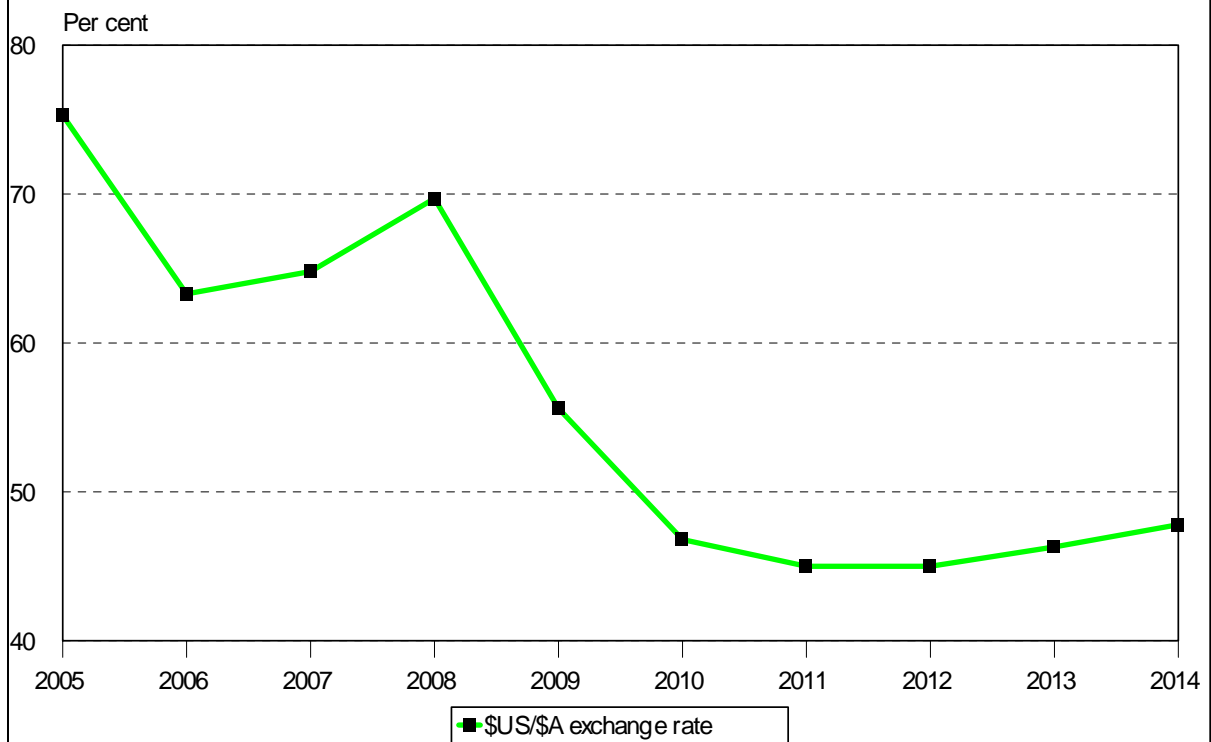
Figure 2.13: Housing sector
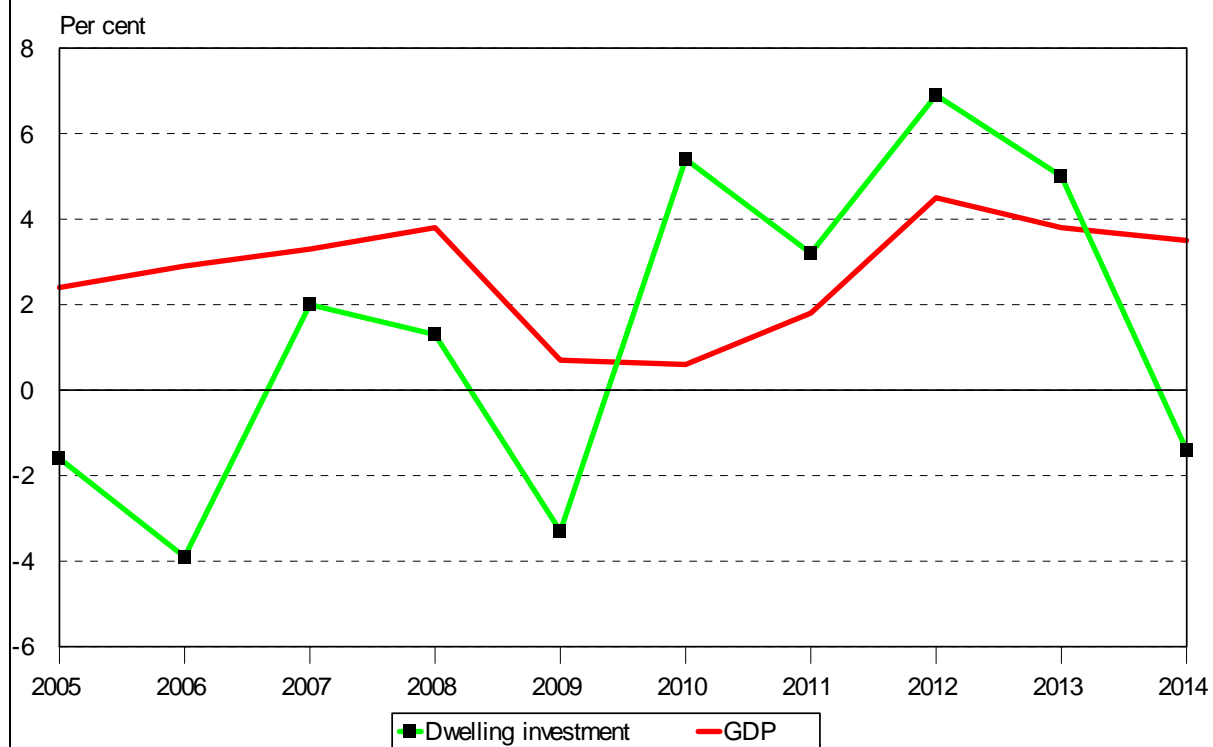
3. The outlook for the Australian Capital Territory to 2018-19

3.1 Introduction

This section outlines the economic outlook for Australian Capital Territory (ACT) to 2018-19, focusing on the medium-term to 2013-14. Although ActewAGL Distribution region also covers Queanbeyan in New South Wales, as well as the ACT, for the purpose of this forecast econometric modelling has solely used the ACT economy as it has a dominant effect on the surrounding region of Queanbeyan.

3.2 Summary of outlook

Figure 3.1 shows the outlook for ACT GSP growth over the period to 2018-19. ACT GSP growth averages 2.6 per cent per annum between 2008-09 and 2018-19, Table 3.1 shows the projected annual growth rates in GSP for Australia and ACT for the period 2004-05 to 2018-19.

Figure 3.1: Australian Capital Territory GSP growth - 2005-06 to 2018-19
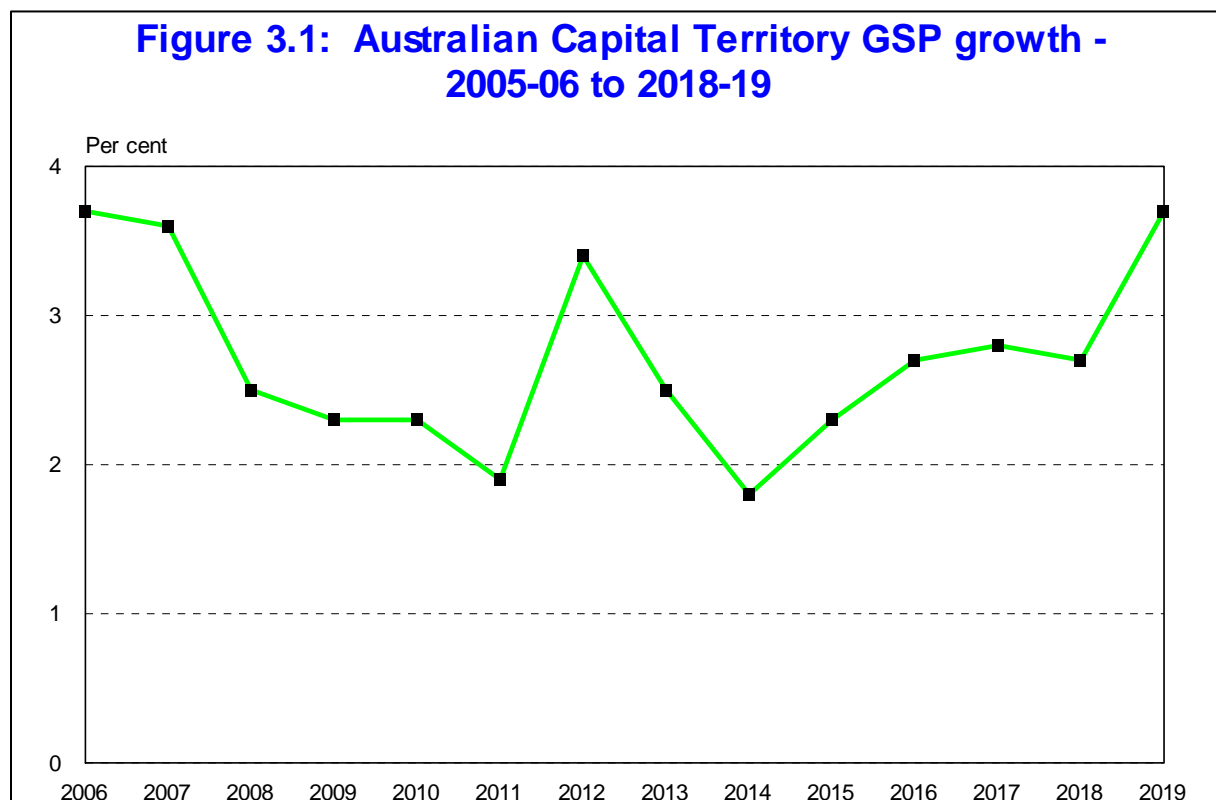
Note: Financial years ending June.

Table 3.1	Projected Australian and Australian Capital Territory GDP growth rate – 2004-05 to 2018-19	
	Australia	**Australian Capital Territory**
Per cent change		
2005	2.8	2.3
2006	2.9	3.7
2007	3.3	3.6
2008	3.8	2.5
2009	0.7	2.3
2010	0.6	2.3
2011	1.8	1.9
2012	4.5	3.4
2013	3.8	2.5
2014	3.5	1.8
2015	2.9	2.3
2016	2.2	2.7
2017	3.1	2.8
2018	3.2	2.7
2019	3.6	3.7
Compound growth rate (per cent)		
2008-2010	0.6	2.3
2010-2019	3.2	2.6
2009-2019	2.9	2.6

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

3.3   The outlook for the Australian Capital Territory to 2014-15

Table 3.2 presents selected economic aggregates for ACT to 2014-15. A commentary on the main indicators is provided below.

Table 3.2	Macroeconomic aggregates and selected indicators – Australian Capital Territory (per cent change)								
		2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	Compound growth rate 2007-08 to 2014-15
Private consumption		2.8	1.6	-3.0	1.5	3.9	4.1	3.4	3.5	2.2
Private business investment		-9.0	4.4	-22.7	-24.6	-2.7	-2.4	11.5	15.8	-3.7
Private dwelling investment		-6.0	-8.9	1.3	0.8	1.5	-2.4	-7.6	-12.3	-4.2
Government consumption		2.9	4.2	4.6	5.0	4.7	3.7	2.3	2.3	3.7
Government investment		10.3	0.8	-6.9	-8.9	0.2	-1.9	12.4	10.7	2.1
State final demand		2.2	2.9	-0.4	1.4	3.9	3.2	3.3	3.4	2.5
Gross state product		2.5	2.3	4.1	2.5	3.1	2.1	0.8	0.9	2.3
Population		1.4	1.4	1.3	1.3	1.2	1.3	1.4	1.2	1.3
Employment		1.0	1.5	1.1	1.3	1.1	1.9	1.2	0.3	1.2

Source: NIEIR and ABS.

Gross state product

ACT GSP growth was 2.5 per cent in 2007-08, 1.2 percentage points below the national GDP growth rate. Public sector outlays are the main determinant of ACT GSP growth.

Growth in the ACT economy is expected to slow very significantly in the 2008-09 to 2010-11 period. Business investment is forecast to fall sharply and consumption expenditure growth to weaken significantly. ACT GSP growth slows to 2.3 per cent in 2008-09 and is expected to rise to 4.1 per cent in 2009-10.

Economic growth in ACT post 2011-12 is expected to slow with GSP rising only by 0.8 per cent in 2013-14. ACT's weak underlying GSP growth rate is supported by relatively weak population growth and an even weaker employment growth, which on average falls below the population growth rate by 0.1 percentage points.

Population

ACT's population growth in 2007-08 was 1.0 per cent, slightly below the national population growth rate (1.1 per cent).

A large element contributing to ACT population growth in 2007-08 was the net overseas migration, which doubled in 2007-08, with 1600 people arriving in ACT. Natural population increase also contributed to the growth with over 3,000 births in 2007-08. However net interstate migration went to negative compared to the huge growth in the previous years.

ACT population growth slows over the 2009-10 and 2010-11 period. Growth is 1.3 per cent in 2010-11 and is expected to stay fairly stable over the forecast period averaging 1.3 per cent.

Private consumption expenditure

Private consumption expenditure in ACT has grown by 2.8 and 1.6 per cent per annum over the last two years respectively. Growth has been supported by relatively strong employment and income growth.

Private consumption expenditure is expected to fall dramatically in 2009-10 period to -3.0 per cent. Growth is projected to be 1.5 per cent in 2009-10. Falling employment, a weak housing construction sector and low levels of consumer confidence all constrain household expenditure growth.

Stronger private consumption expenditure growth resumes by 2011-12, peaking at around 4.1 percent in 2012-13 in ACT. Growth is around the 3.5 per cent level between 2013-14 and 2014-15.

Private business investment

Private business investment in ACT is projected to fall sharply over the 2008-09 to 2010-11 period. Business investment levels peaked in 2006-07 at $2.8 billion, this level has slowly been decreasing over the last few years. In 2007-08, private business investment represented 12 per cent of total ACT GSP, this is projected to drop to about 6 per cent of GSP by 2011-12.

Total private business investment falls by around 3.7 per cent per annually over 2007-09 to 2014-15, This reflects a fall across all sectors, including manufacturing, mining and tertiary investments.

A recovery in private business investment in ACT is forecast by 2013-14, and another strong increase in 2014-15. Overall, expenditure levels are not expected to reach the current level by 2014-15, only reaching the levels of 2004-05 of approximately $2 billion.

Private housing expenditure

Private dwelling investment is expected to fall the most in ACT as the annual average declines by -4.2 per cent. The number of new dwelling approvals rose in ACT by 4.1 per cent in 2007-08 despite interest rate increases however this is not reflected in dwelling investment as it saw a drop of 6 per cent in that year. New dwelling construction is forecast to recover in ACT in 2009-10 only to start decreasing substantially 2012-13 to 2014-14

Government expenditure

ACT public consumption expenditure rose by 2.9 per cent in 2007-08. The ACT 2008-09 budget is significantly targeted at infrastructure investment, Government's long-term financial objectives are to maintain budget surpluses at 1.7 per cent, to maintain net financial liabilities at prudent levels and to deliver strategic infrastructure projects to ACT. This may be difficult to achieve over the 2008-09 to 2010-11 period.

ACT Government investment expenditure fell by 19 per cent in 2007-08, although this follows solid growth over the previous two years. Government investment is focussing on infrastructure assets ('Building the Future's' $1 billion investment over 5 years) responding to the skills shortage. ACT Government investment expenditure is negative over the forecast period of 2009-10 to 2012-13, setting to recover in 2013-14 to a solid 12.4 per cent growth.

4. Methodological approach

4.1 Introduction

This section outlines the key methodologies employed in developing the forecasts for ActewAGL Distribution. ActewAGL is a multi-utility business formed in October 2000 as two partnerships – ActewAGL Distribution and ActewAGL Retail – with the ACT Government owned ACTEW Corporation (ACTEW) and the Australian Gas Light Company (AGL) being equal joint venturers. It is based in Canberra and serves the capital region of southern New South Wales. During 2008, Jemena Networks (ACT) Pty Ltd became the distribution partner with ACTEW. ActewAGL Distribution owns the natural gas distribution network in the Australian Capital Territory and the Queanbeyan and Palerang LGAs of New South Wales. This gas network consists of approximately 4,200 km of mains and serves 115,000 customers.

4.2 Information supplied by ActewAGL

The following data was supplied by ActewAGL:

- gas consumption data for the various markets (tariff and contract), and for various customer types including new residential customers, electricity to gas customers (E to G) and business customers; and

- contract customers by individual customer including annual consumption and MDQ.

These data allowed NIEIR to develop a history of actual data for sales and customer growth for the Jemena distribution area, extending back around 10 years, previously supplied to NIEIR.

The issue of weather and normalisation of the sales data is described later in this section and boundary data on a daily basis for the ActewAGL Distribution.

4.3   Overall modelling approach

Forecasts of the ActewAGL Distribution area natural gas sales were developed within a regional economic model of the ACT economy. This model takes NIEIR's State forecast of gross State product (by industry) and disaggregates it into statistical sub-divisions across ACT. Figure 4.1 illustrates the link between NIEIR's national economic models and regional natural gas sales.

Forecasts of economic outlook

NIEIR's national and State economic models were used to generate economic forecasts to 2018-19. The regional economic model of ACT will separately imply how the economic scenario maps down to the ActewAGL Distribution area.

Key indicators at the regional level will be population, dwelling stock and gross regional product (by industry).

Projections of ActewAGL Distribution annual gas usage were prepared for:

- tariff volumes (annual loads of less than 10 TJs); and

- contract volumes on an industry basis.

Tariff volumes were separated into residential and business. Residential were further disaggregated into existing, E to G and new estates and high rise.

The annual gas demand projections include the impact of Federal and State Government greenhouse and other energy policies.

Tariff customers and volumes

Residential gas usage dominates Tariff consumption. Residential gas usage is modelled using an end-use type model that disaggregates residential usage into new and established dwellings usage. Residential new usage was separated further to net new customers and E to G customers, the latter referring to new customers on the existing gas network. Actual data in the customer number and average usage by market segment were provided by ActewAGL Distribution.

Figure 4.1: NIEIR's regional energy model
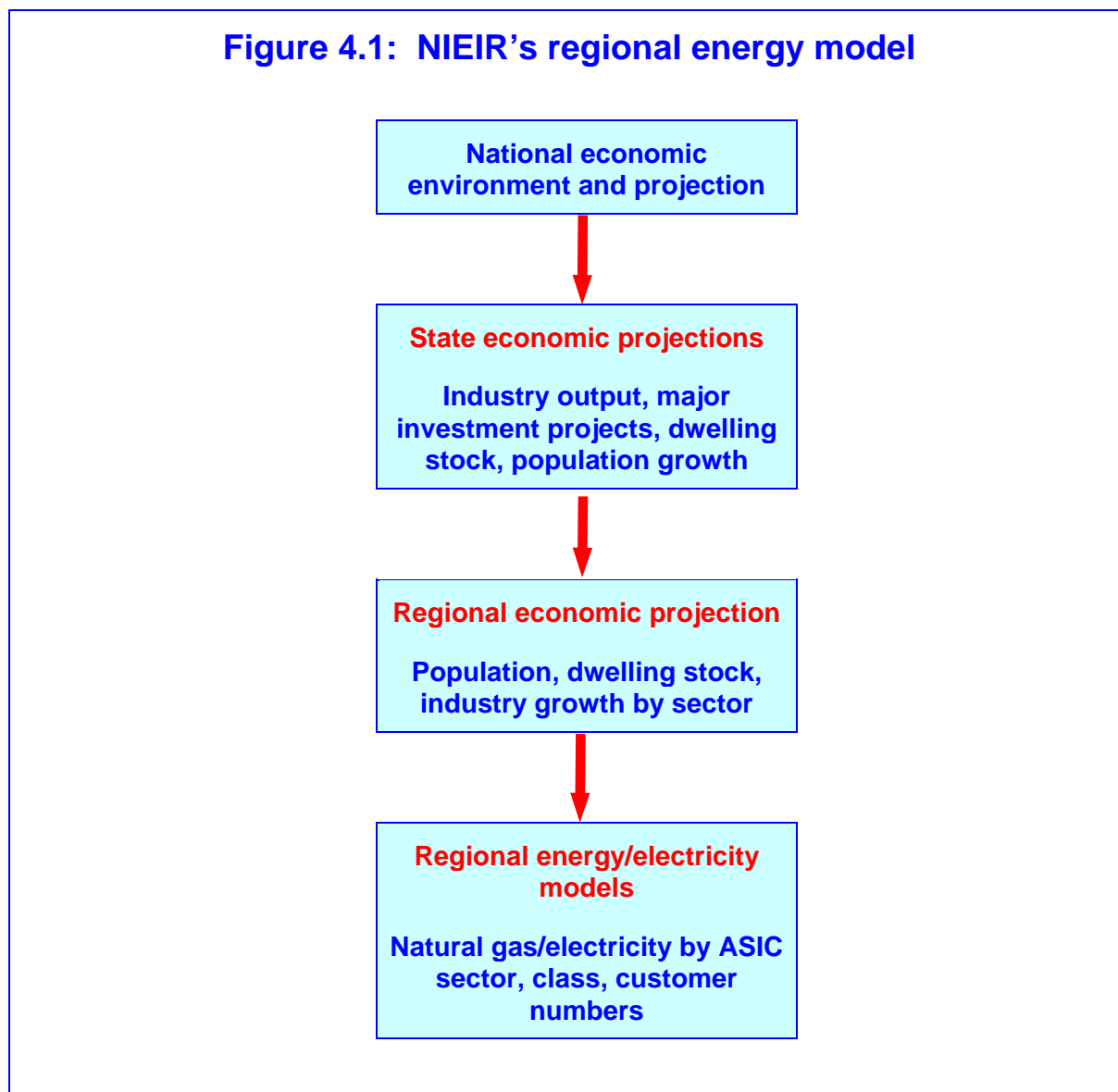
The residential forecasts are prepared on a weather normalised basis and incorporate the impact of real household disposable income and real gas prices.

Residential customer number forecasts are linked to NIEIR's projections of the dwelling stock.

The residential gas consumption forecast model also took account of Federal and State Energy and greenhouse policies included:

- ACTHERS - Energy Rating Process;

- the program to review and standardise energy labelling of gas appliances followed with the development of MEPS for new gas appliances;

- the increased penetration of energy efficient showerheads;

- the effective banning of electric resistance hot water appliances from 2012;

- the ongoing negative impact of high sales of reverse cycle air conditioning equipment;

- Commonwealth stimulus package with subsidies towards insulation; and

- tariff business projections are derived using a regression model which takes account of commercial output growth and movements in real gas prices.

In summary, the residential sales forecast were developed by first determining an econometric forecast (where the key drivers are household incomes and prices) and then adjusting the forecast for the impact of new energy policies model for hot water as developed for the ActewAGL Distribution by market segment (new, E to G and existing). This model is outlined later in this section.

Contract customers and volumes

Projections of gas volumes for contract customers were developed on an industry basis. ActewAGL Distribution supplied NIEIR with around 8 years of contract customer gas usage and MDQ's by customers. NIEIR industry coded these data on a customer by customer basis.

Gas demand models have been parameterised using NIEIR's existing State gas forecasting model. Regional gas demand models were parameterised using NIEIR's existing State gas forecasting model. The structure of this model in terms of industry coverage is shown in Table 4.1.

The industry regression models specifically relate gas consumption to:

- the change in output for that industry within the gas distribution area; and

- the change in real gas prices for that industry (incorporating lags in real prices to proxy the long run response or price elasticity).

The output and price elasticities at the regional level were adjusted to reflect differences in the gas intensity between industries and regions. Forecasts of MDQ were also developed on an industry basis. The MDQ forecasts were determined from the energy growth by industry and an industry specific load factor.

Table 4.1	Reconciliation of major customer class categories with ASIC industries
Customer class category	**ASIC**
Residential	
Commercial	Water and sewerage
	Construction
	Wholesale and retail trade
	Transport and storage
	Communication
	Finance, property, business services
	Public administration and defence
	Community services
	Recreation, personal and other services
Industrial	Mining
	Food, beverages, tobacco manufacturing
	Textiles, clothing and footwear manufacturing
	Wood, wood products manufacturing
	Chemicals, petroleum, coal manufacturing
	Paper, paper products manufacturing
	Non-metallic minerals manufacturing
	Basic metal products manufacturing
	Fabricated metal products manufacturing
	Transport equipment manufacturing
	Other machinery and equipment manufacturing
	Miscellaneous manufacturing
Farm[1]	Agriculture, forestry, fishing, hunting

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

4.4   Weather normalisation of ActewAGL Distribution gas data

Weather data was obtained from the Bureau of Meteorology for the Canberra Airport weather station.

It is widely accepted that gas demand is a function of temperature expressed as heating degree days (HDD) where the number of HDD for a day is defined as the difference between the average temperature for the day and 18 degrees Celsius except that HDD for a day is zero if the average temperature is greater than 18 degrees Celsius.

In order to make meaningful comparisons of consumption from year to year and to establish a datum from which to forecast future consumption, it is necessary to normalise observed consumption for the differences in HDD between years. The normalising adjustment is obtained by taking the difference between the observed number of HDD for the year and the standard number of HDD for a year and multiplying that difference – referred to here as "abnormal HDD" – by a temperature sensitivity coefficient for the relevant market (TJ/HDD). The coefficient is estimated by analysing historical market performance. In our analysis we have determined separate coefficients for the tariff and contract markets.

NIEIR estimates the standard number of HDD for a year to be 1,812 HDD which is the average number of HDD for the years 2003 to 2008.

Table 4.2 shows billed volumes, temperature sensitivity coefficients, observed HDDs, standard HDDs and normalised billed volumes for the tariff and contract markets for the years 2004 to 2009.

There is a long term trend of declining annual HDD and this trend has been factored into the forecast.

Table 4.2	Macroeconomic aggregates and selected indicators – Australian Capital Territory (per cent change)							
Tariff market	**Unit**	**Source**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Residential	TJ	JEMENA, NIEIR	4,748	4,654	4,774	4,625	4,825	5,104
Business	TJ	JEMENA, NIEIR	1,447	1,448	1,468	1,405	1,554	1,625
Total Billed Volumes	TJ	JEMENA, NIEIR	6,195	6,102	6,242	6,030	6,380	6,729
Temperature Sensitivity	TJ/HDD	NIEIR	3	3	3	3	3	3
Actual HDD	HDD	Bureau of Meteorology, NIEIR	1,914	1,827	1,900	1,653	1,751	1,836
Standard HDD	HDD	NIEIR	1,812	1,812	1,812	1,812	1,812	1,812
Abnormal HDD	HDD	NIEIR	101	14	87	-159	-62	24
Weather Normalised Billed	TJ	NIEIR	5,918	6,062	5,990	6,501	6,567	6,654
Abnormal Weather Volumes	TJ	NIEIR	277	40	252	-470	-187	75
Contract market	**Unit**	**Source**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Billed Volumes	TJ	JEMENA, NIEIR	–	1,018	1,082	1,038	1,020	1,107
Temperature Sensitivity	TJ	NIEIR	–	0.24	0.25	0.25	0.26	0.26
Actual HDD	HDD	Bureau of Meteorology, NIEIR	1,914	1,827	1,900	1,653	1,751	1,836
Standard HDD	HDD	NIEIR	1,812	1,812	1,812	1,812	1,812	1,812
Abnormal HDD	HDD	NIEIR	101	14	87	-159	-62	24
Weather Normalised Billed	TJ	NIEIR	–	1,015	1,060	1,078	1,036	1,100
Abnormal Weather Volumes	TJ	NIEIR		3	22	-40	-16	7

4.5   Old/new residential customer usage – ActewAGL Distribution

Table 4.3	Average residential customer usage – existing and new customers – ActewAGL Distribution [(a)] (GJs)	
		2008-09
Existing residential		46.3
Electricity to gas		24.3
New estates and high rise		33.2

Note: (a)   Weather normalised.

As indicated in Table 4.3, new residential customers consume on average around 13 GJ's less than existing customers. The result is not surprising and reflects a number of interacting factors, including:

- the efficiency of new versus existing water and space heating appliances;

- the fact that minimum energy performance standards for gas hot water appliances have not increased for a number of years; and

- the continued use of electric, solar-electric and heat pumps for hot water and the increased usage of reverse cycle air conditioners in ACT and the rest of Australia.

Figure 4.2: Average residential usage by market segment - 2008-09 (estimate)
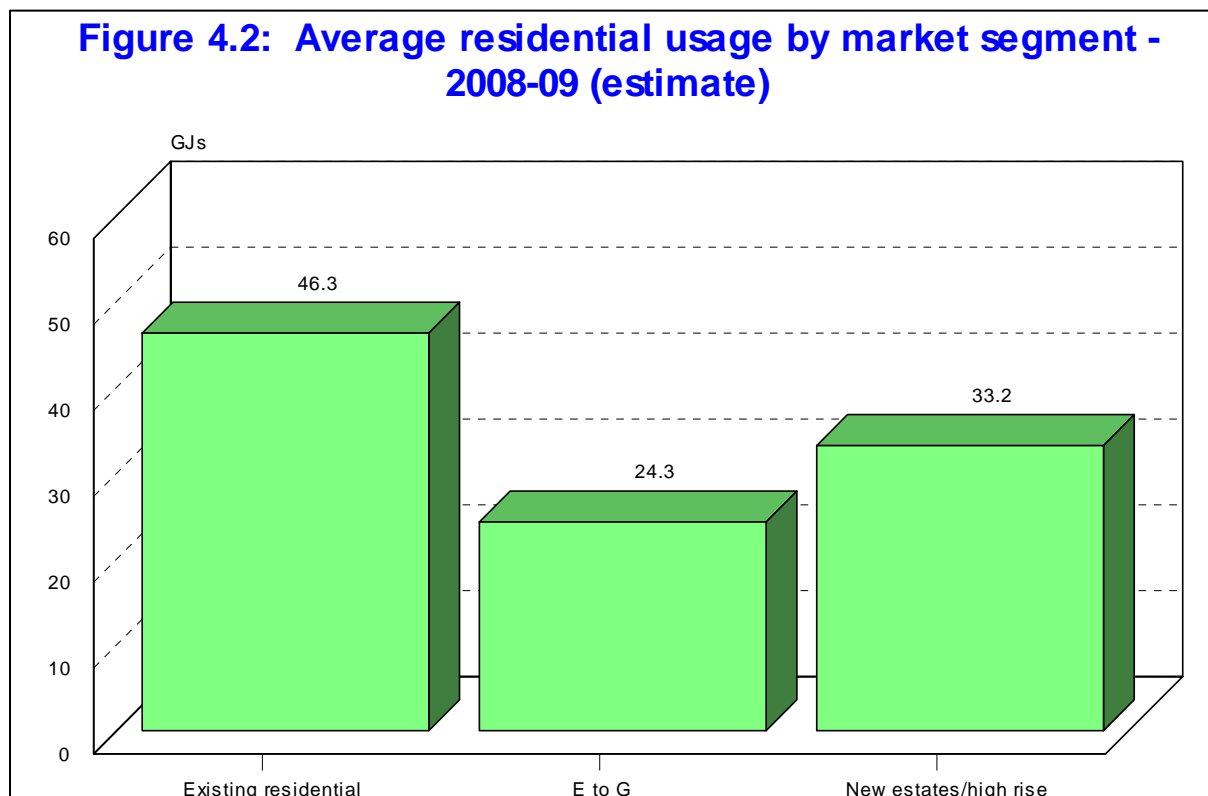
4.6   Gas usage in the Australian Capital Territory

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 2008).

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 ACT.

Table 4.4 below shows the main energy source used in the four main end-uses for ACT in 2008. The four end-uses are:

- ovens;

- cook tops;

- space heating; and

- water heating

Natural gas is used in 19.9 per cent of ovens, 37.0 per cent of cook tops, 57.3 per cent of space heating appliances and 36.4 per cent of water heaters.

Table 4.4	Appliance penetration in gas end-uses – Australian Capital Territory – 2008 (per cent)			
	Electricity	**Mains gas**	**Wood**	**Other***
Main source of energy used				
Ovens	86.1	13.6	n.a.	n.p
Cook tops	61.8	37.0	n.a.	n.a
Space heating	35.3	57.3	3.9	2.3
Water heating	47.1	36.4	n.a.	13.1

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.

Table 4.5	Insulation in dwellings by State		
	Dwellings with insulation (000's)*	**Dwellings with no insulation (000's)***	**% of households with no insulation**
New South Wales	1,728.4	978.5	36
Victoria	1,700.1	356.5	17
Queensland	943.9	671.3	42
South Australia	543.8	103.7	16
Western Australia	633.2	193.6	23
Tasmania	165.1	36.6	18
Northern Territory	38.8	22.2	36
Australian Capital Territory	110.9	17.6	14
Australia	**5,863.9**	**2,379.8**	**29**

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

Table 4.5 shows that 14 per cent of dwellings in ACT do not have insulation, this is the lowest proportion of uninsulated dwellings compared to all other States/Territories. With the Commonwealth stimulus package announced in March 2009, the Government aims to assist the installation of insulation in up to 2.7 million Australian homes. According to the ABS publication, approximately 2.4 million dwellings currently have no insulation.

Unfortunately the rest of the survey data presented in the publication for ACT is not reliable.

4.7   Gas prices and the CPRS

Greenhouse policy

At the time these projections were prepared, a number of Federal and State Government policies were impacting on gas prices.

On the 15 December 2008, the Australian government released the White Paper on the Carbon Pollution Reduction Scheme. This paper confirmed an emission trading scheme is to be introduced by 2010-11. The White Paper outlines the final design of the Carbon Pollution Reduction Scheme, and a target range for reducing carbon pollution. NIEIR's assessment of the White Paper and the implications for permit and gas prices is provided below.

Permit (CO_2e) prices and electricity prices ($/MWh), 2010-2030

Over this period the CPRS will apply and lead to increases in gas prices. The quantitative impact will be determined by a range of factors: the CPRS caps set, the costs of reducing GHG emissions domestically (which will depend on the prices of black coal and natural gas, and GHGA technologies such as CCS and renewable), the price and availability of international permits (no restrictions on their use to meet domestic caps, but price in A$s of supply is an issue) and other specific design features of the CPRs.

In our base (most likely) scenario out to 2030, we have assumed the Treasury CPRS-5 scenario applies out to 2015 (the caps to 2015 will be announced in early 2010), gradual change to the CPRS-15 scenario by 2025 (will largely depend on the global Copenhagen, December 2009 results), similar gas coal and renewable and CCS prices to Treasury and similar impacts (pass through) of permit prices on gas prices given in the White Paper.

We are reasonably confident that the magnitudes are reasonable out to 2015, but uncertainty increases past that point in the absence at this time of better information and data.

Caps – domestic permits and international permits

The interaction of these two (unrestricted) sources of eligible CPRS permits could have a significant impact on GHGA under the CPRS in Australia.

International permit prices in A$s will determine their contribution to attainment of CPRS caps. Some Treasury scenarios have international permits contributing over 50 per cent of cap attainment.

The CPRS cap determines the number of carbon pollution permits that will be issued by the Government. Allowable emissions across the sources covered by the Scheme will be able to exceed the cap only if the excess is matched by the surrender of eligible international units, additional domestic permits issued as a result of forestry activities, additional permits issued under the price cap mechanism or, if allowed, Scheme offsets (see Chapter 6 of the White Paper).

In a system with little or no international linkage, the interaction between the cap and the demand for permits is the primary determinant of the carbon price: the more stringent the Scheme cap, the higher the price, all other things being equal. However, the Government has decided to allow unlimited imports of eligible international units from Scheme commencement and to review the scope for exporting permits over time (see Chapter 11 of the White Paper). This means, depending on the level of international prices and the longer term Scheme linking policy, the domestic Scheme cap may be a less significant determinant of domestic carbon prices. Over time, the domestic carbon price is expected to converge on the international price, which in turn will be determined by global abatement demand and supply conditions.

The Scheme cap-setting arrangements remain important, however, because the Scheme cap will reflect national emissions targets and Australia's international obligations. As the number of eligible international units that may need to be purchased will be determined by the ambition of national targets, targets will be the key to the overall cost to the Australian economy.

The projections for real ACT gas prices to 2018-19 is summarised in Table 4.6 below by major customer class.

Table 4.6	Australian Capital Territory gas prices (per cent growth)		
	Residential	**Business**	**Total**
2006-07	0.33	-0.66	-0.30
2007-08	1.17	0.19	0.54
2008-09	-0.67	0.29	-0.05
2009-10	-1.31	-0.35	-0.69
2010-11	6.64	17.02	13.31
2011-12	0.30	0.70	0.56
2012-13	0.31	0.73	0.59
2013-14	0.33	0.76	0.61
2014-15	0.34	0.79	0.64
2015-16	0.62	1.41	1.15
2016-17	0.66	1.51	1.23
2017-18	0.71	1.61	1.32
2018-19	0.77	1.72	1.41

4.8 Policies relating to gas (and electricity) consumption in ACT

There are a number of policies and initiatives through Federal and State Governments which consider the future gas emissions and climate change related to energy use and gas consumption. These policies cover construction of homes, alterations and extensions, and purchasing/replacement of household appliances. All of these have an impact on the future gas consumption in the ACT.

The following sections look at the impacts from NATHERS, introduction of MEPS for gas hot water heaters, the increased penetration of energy efficient shower heads as well as the newly announced Commonwealth stimulus package, which has a focus on mass scale dwelling insulation across Australia, plus some other initiatives related to energy and water use which may also influence consumer behaviors towards end uses of gas.

4.8.1 Energy Rating Process for the ACT - NATHERS

The ACT's program is called ACTHERS. It requires all new housing to achieve a minimum energy efficiency requirement, which must be demonstrated at the time of both building approval and developmental approval application.

Development approval requires the submission of an Energy Efficiency Rating (EER) Statement, demonstrating that the building meets 5 star energy efficiency requirements based on these design factors:

- orientation;
- insulation;
- air leakage;
- design features;
- floor type;
- zoning;
- glazing;
- thermal mass;
- width of eaves;
- cross ventilation; and
- common walls.

If the rating is acceptable, an Energy Efficiency Rating Statement (EER) is issued.

Building approval requires a mandatory minimum 5 star energy performance, as outlined in the 2006 Building Code of Australia, for new Class 1 buildings (which include detached dwellings, single-storey units and some multi-storey units).

A minimum 4 star energy performance is required for any buildings that are Class 2 (multi-storey units or apartments) or Class 4 (a dwelling built into a commercial or public building and which is the only residence in the building, such as a caretaker's unit).

4.8.2   Mandatory Energy Performance Standards (MEPS)

Requirements for gas space heaters, gas water heaters and gas cookers

Energy labels can be found on gas space heaters and gas water heaters (both storage and instantaneous). The gas labelling program is currently an industry voluntary scheme. A review of the scheme is under way by the Gas Industry and Governments. In the meantime a 10 year strategy is in place called 'Switch on Gas'.

Strategy and work program for gas appliances

'Switch on Gas' is a ten year strategic plan intended to implement a nationally consistent regulation scheme for energy efficiency of gas appliances and equipment. This strategy is an important part of the package of measures being implemented by the MCE under the National Framework for Energy Efficiency (NFEE).

Switch on Gas will make a contribution to national efforts to reduce greenhouse gas emissions. Natural gas currently supplies about 30 per cent of total household energy in Australia. Within 20 years it is projected that Switch on Gas has the potential to reduce:

• the expenditure on natural gas of Australian consumers by up to $115 million per annum; and

• consumption by over 5 per cent below business as usual.

Changes to the gas labelling and MEPS scheme for appliances

In November 2002, a joint government-industry working group comprising SEAV, OGS, AGO, AGA and the GAMAA formed a group to work on enhancing the effectiveness of the gas appliance efficiency scheme.

The proposed initiative of the MEPS for gas water heating requires the phasing out of all appliances below a 4.5 star rating. This will have a great impact on the overall consumption in the ACT, as the consumption level from a 3 star hot water heater to a 5 star is a reduction of at least 15 per cent (see table below).

	Storage water heaters (MJ/year)	Instantaneous water heaters (MJ/year)
6 star	n.a.	17,837
5 Star	20,559	20,076
4 Star	22,466	23,325
3 Star	24,221	24,988
2 Star	25,601	n.a.
1 Star	27,599	n.a.

Note: The above average actual consumption figures are derived from test conditions and overstate average actual gas use by these appliances.
Source: AGA and NIEIR.

A hot water model was developed to estimate this saving, and looks at changing trends in replacing failed or scrapped units in existing dwellings and household preferences for purchasing HWS in new dwellings.

The hot water model

A representative hot water model was developed in order to assist in projecting hot water gas usage from new and existing customers. ActewAGL Distribution assisted NIEIR in parameterising parts of the hot water model developed.

The hot water model covered the key three residential market segments:

(i)   existing customers (irrespective of whether they have gas hot water);

(ii)   new connections from new dwelling; and

(iii) new connections from existing dwellings (known as E to G).

The hot water model segmented hot water systems into mains gas, solar gas, solar electric, heat pumps and electric storage.

The model in each market segment recognised that conventional electric resistance waters will be banned in all new and existing homes in gas reticulated areas from 2010. This policy extends to new flats and apartments in reticulated areas and established houses in non-gas reticulated areas from 2012.

New dwellings

For new dwellings, hot water is dominated by mains storage and instantaneous gas systems, although the banning of storage hot water leads to solar electric and heat pumps significantly increasing their market share. By 2015, the share of gas for new hot water systems in new dwellings falls to 67 per cent, the residual is solar electric and heat pumps.

Average gas usage for hot water in new dwellings is assumed to be 10.5 GJ per annum, and forecast to improve by a further 1 per cent per annum out to 2018-19.

Existing dwellings

For existing dwellings, a failure or scrappage rate was assumed for each type of hot water system (i.e. mains gas, storage, electric, etc.). A fuel switching matrix was developed for each type of system. This matrix took into account the phasing out of storage electric systems between 2010 and 2012. For example for storage electric, it was assumed that by 2012, 43 per cent of replacements of resistance heaters were mains gas and 49.5 per cent were solar electric or heat pumps.

For existing customers, the increase in gas usage in hot water represented:

•   the net decrease from pre-existing storage and instantaneous gas hot water heater customers replacing it with a more efficient has hot water unit; and

•   the increase from previously electric hot water systems switching to storage gas and instantaneous gas hot water.

E to G dwellings

For E to G (or new gas connections from dwellings using electricity or other fuels) it was assumed 60 per cent switched to storage or instantaneous gas hot water in year 1. For the remainder of E to G customers (mainly still with resistance electric or hot water systems) a failure or scrappage rate was assumed similar to existing dwellings.

4.8.3   Energy efficient showerheads

The ACT Government introduced a Greenhouse Gas Reduction Scheme which commenced on 1 January 2005 and mirrors the NSW Greenhouse Gas Reduction Scheme (GGAS). GGAS and the ACT Scheme use the same abatement certificates and eligible abatement projects in the ACT will be accredited under GGAS. Under this scheme is it possible to get water-efficient showerheads and home energy audits.

The Australian Government, in collaboration with state and territory governments, has introduced a Water Efficiency Labelling and Standards (WELS) Scheme.

The WELS scheme requires certain types of household water-using products to carry rating labels to reflect their relative water-use efficiency

The WELS Scheme applies to showers intended solely for personal bathing as specified in *AS/NZS 3662:2005 – Performance of showers for bathing*. Showers generate about 25 per cent of water savings under the WELS Scheme because:

- a standard showerhead uses about 15 to 25 litres of water per minute-a four star rated water efficient showerhead uses as little as 6 or 7 litres per minute.

- a standard showerhead uses at least 120 litres of water per eight-minute shower whereas a water efficient model uses less than 72 litres or 40 per cent less water

- installing a water-efficient showerhead saves about 14,500 litres per household each year *and*

- gas hot water costs for a standard showerhead are around $1,500 over ten years whereas gas hot water costs for a water-efficient shower head are only $790 over ten years or a 47 per cent reduction.

Under the WELS Scheme a rating is given to a showerhead and any additional component supplied with the head such as pivoting arm, flexible hose or flow controller. However, additional components cannot be rated separately from the head.

GGAS and WELS have an indirect impact on gas consumption in ACT. With a reduction in water consumption, those dwellings with gas hot water heaters will see a reduction in their gas consumption, depending on the energy efficiency of the water heater, gas savings will vary between dwellings, but a saving due to energy efficient shower heads is expected.

The penetration of low flow showerheads is assumed to rise by around 3 per cent per annum, consistent with historic trends. This leads to a very small reduction in gas usage by existing dwellings for hot water. On an annual basis it is 0.1 GJ per annum.

4.8.4   The ACT Climate Change Strategy 2007-2025

The ACT Climate Change Strategy replaces the *ACT Greenhouse Strategy 2000* and complements People, Place, Prosperity and the Think Water, Act Water Strategy.

The strategy sets out the approaches the Government will pursue between now and 2025 to support the broader community response to climate change. Detailed Action Plans will be developed at regular intervals during the life of the Strategy. The Strategy and subsequent Action Plans address four objectives:

- to be smarter in how we use resources;

- to design and plan our city to be more sustainable;

- to build our capacity to adapt to and manage the changes to climate that we are now beginning to face, and possible future changes; and

- to improve our understanding of climate change, its causes and effects, and how we need to respond.

The first Action Plan states 43 actions to be completed by 2011, some of these are directly related to energy use and relevant to this study.

- Develop an Energy Policy.

- Pursue Carbon Neutrality in Government Buildings.

- Establish a $1million Energy Efficiency Fund for ACT Government Agencies.

- Legislate for Green Power to be offered to all new electricity customers.

- Implement a renewable energy target (RET) in line with the NSWRET.

- Implement energy efficiency improvements in government housing.

- Provide a solar hot water rebate.

- Pursue national emissions trading and reporting.

- Assist schools become carbon neutral.

- Pursue Energy Efficiency Rating for all Buildings.

- Investigate Mandatory Solar Hot Water for new houses.

- Introduce a Feed-in Tariff for renewable micro generation.

These action plans are not expected to impact gas demand in the forecast period as no specific dates for implementation are mentioned, as well as any certainty on their completion.

4.8.5   Insulation and heating

The federal government is giving up to $1,600 rebates for home owners across the country to insulate their homes.

From 1 July 2009, the Rudd Government, as a part of Energy Efficient Homes, will install free ceiling insulation in around 2.7 million Australian homes. The Energy Efficient Homes investment will:

- install ceiling insulation in around 2.7 million Australian homes;

- cut around $200 per year off the energy bills for households benefiting from these ceiling insulation programs; and

- reduce greenhouse gas emissions by around 49.4 million tonnes by 2020, the equivalent of taking more than 1 million cars off the road.

The Rudd Government will also double the rebate available under the Low Emissions Plan for Renters for landlords to install insulation in their rental properties – from $500 to up to $1,000 – from now until 30 June 2011. The Government estimates 500,000 rented homes will benefit from this program.

For existing dwellings, this scheme will provide a saving to those dwellings which use gas space heaters, so although most houses without insulation are expected to partake in this scheme (about 90 per cent of households without insulation), only those with gas space heaters will benefit in reduced gas consumption for the household.

Only 14 per cent of homes are uninsulated in ACT, assuming 50 per cent take up the Energy Efficient Homes initiative, and apportioning the 25 per cent savings in energy use from insulation, average heating gas usage for existing dwellings falls by around 0.4 GJ per annum over the life of the policy initiative, 2010, 2011 and 2012.

Substitution to electricity

The projections also allow for the substitution towards electricity for existing customers. The projections assume that as gas space heaters break down, 25 per cent of existing customers substitute to reverse cycle air conditioning. This leads to a small reduction in total usage for heating in existing dwellings of 0.1 GJ per annum.

4.8.6   RET – Renewable Energy Target

The Australian Government is committed to ensuring 20 per cent of Australia's electricity supply comes from renewable energy by 2020.

To deliver on this commitment, the Government is establishing an expanded national Renewable Energy Target (RET) scheme.

The national Renewable Energy Target scheme will:

- increase the existing Mandatory Renewable Energy Target (MRET) by more than four times to 45,000 gigawatt-hours in 2020;

- contribute to meeting Australia's targets for the reduction of greenhouse gas emissions;

- provide a market incentive to accelerate uptake of Australia's abundant renewable energy sources, which include solar, wind and geothermal energy; and

- reduce red tape by bringing existing state-based targets into a single, national scheme.

It is important to note that certificates under RET apply both to new and existing dwelling replacements of hot water systems.

5. Natural gas sales and customer number forecasts to 2019 – ACT Natural Gas Distribution Network

5.1 Introduction

This section presents natural gas demand forecasts by class and tariff to 2019 for the ACT Natural Gas Distribution Network. Forecast numbers were prepared on a financial year basis to 2019.

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

- tariff by class; and

- contract by class and industry.

5.2 Natural gas sales forecasts to 2019

Table 5.1 shows forecasts of natural gas sales by tariff and class on a financial year basis to 2019 for the ActewAGL Distribution Network. The tariff forecasts are shown on a class basis, residential and business.

The data in Table 5.1 is presented on a weather normalised basis. This table shows volumes by class for tariff and contract by class and industry volumes. These volume forecasts are weather normalised to a standard of 1,812 HDDs.

Tariff

- Tariff volumes for the ActewAGL Distribution Network represent around 86 per cent of total volumes. Total tariff volume growth is forecast to be 0.7 per cent per annum over the 2009 to 2019 period. The slow volume growth in the ActewAGL Distribution Network price effects associated with the CPRS and the impact of the Federal and State energy policies on residential volume growth. These policies were outlined in Section 4.8.

  Residential volume growth on a weather normalised basis is 0.2 per cent per annum over the 2009 to 2019 period. Residential volumes for the ActewAGL Distribution Network represent around 62 per cent of total gas sales.

  Table 5.2 shows the formation of the forecasts for residential tariff gas volumes. This table separates out existing and new residential customers. Existing customer gas usage is expected to remain relatively stable, but decline slightly in average usage terms. New customers are separated into E to G and new estates and high rise.

  Average usage by new customers, however, reflects the impact of Commonwealth and State policy measures identified in Chapter 4 of this report (e.g. NATHERS, resistance hot water phase-out). Average usage by new customers (excluding E to G) falls to around 33.2 GJs in 2009 (excluding losses) and 28.9 GJ by 2015.

  Figure 5.1 shows the percentage growth in volumes by class and tariff over the 2009 to 2019 period for the ActewAGL Distribution Network. Figure 5.2 shows total volume growth by class and tariff over the same period.

- Business tariff gas consumption represents around 53 per cent of total ActewAGL Distribution Network sales volumes. Forecast growth over the 2009 to 2019 period is around 251.5 TJs, or 1.5 per cent per annum.

Contract

- Industrial contract natural gas consumption from the ActewAGL Distribution Network rise by 1.8 per cent a year.

- Projections of contract volumes, customer numbers and maximum daily quantities are presented in Tables 5.1, 5.3 and 5.4.

  The projections for contract to 2019 reflect a number of alternative sources of information:

  - the impact of price increases associated with the proposed Emissions Trading Scheme; and

  - the economic prospects for each sector, in terms of overall real output growth projections to 2019. These are produced as part of NIEIR's economic forecast.

  On the balance of probabilities, the NIEIR volume forecast for contract may prove far too optimistic.

Figure 5.1: Natural gas sales by tariff and class - 2009 to 2019 (Average annual percentage growth)
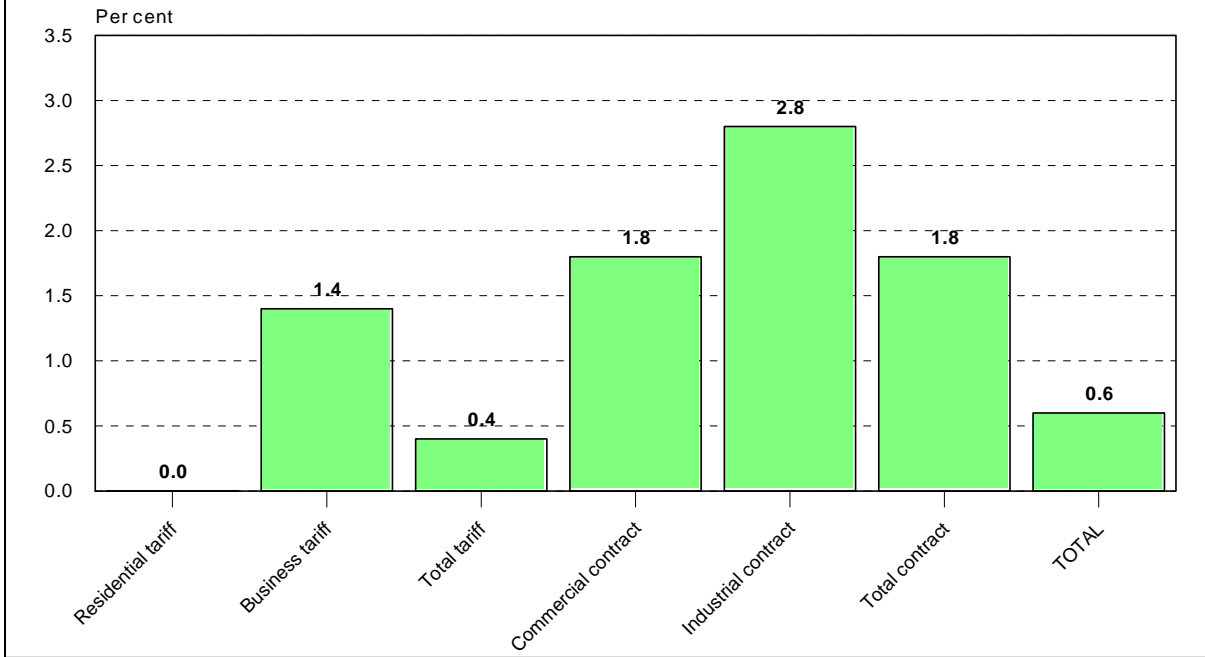
Figure 5.2: Natural gas sales by tariff and class - Volume growth - 2009 to 2019 (TJs)
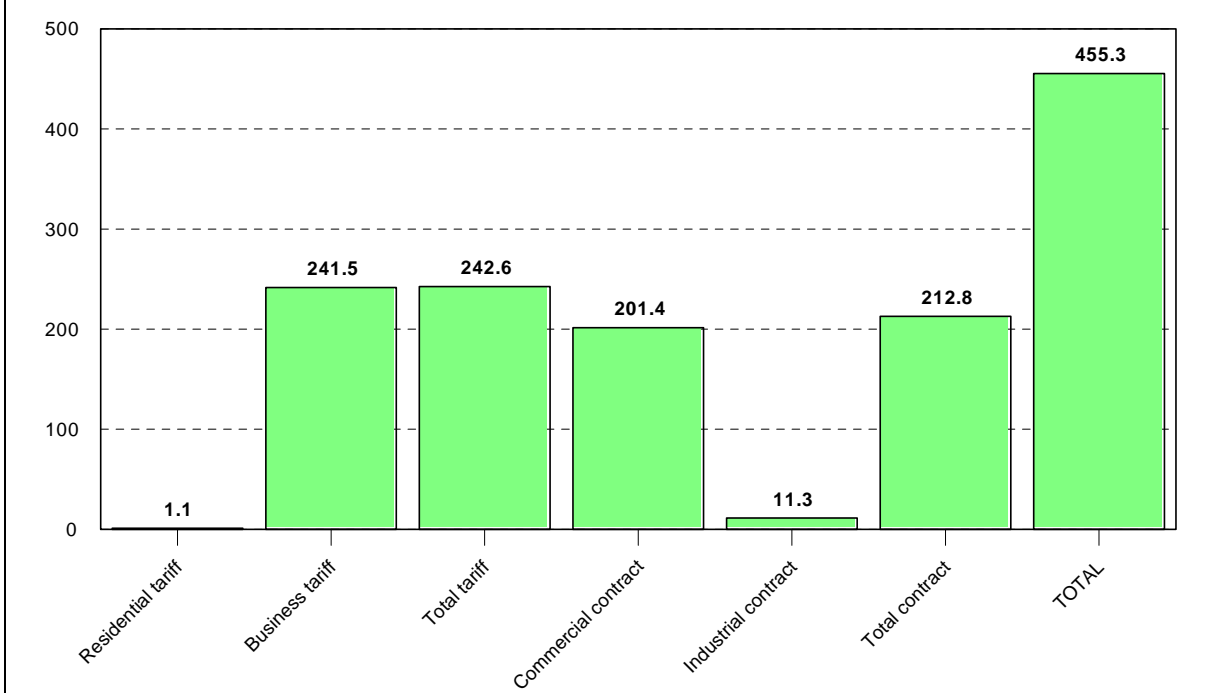
Table 5.1	Natural gas sales projections to 2018-19 by class and industry – ACT Gas Distribution Network (TJs)[1]											
	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
System Total	7,601.1	7,755.0	7,663.4	7,693.3	7,659.8	7,690.2	7,762.1	7,856.2	7,935.0	8,031.7	8,118.3	8,210.3
Tariff	6,567.2	6,654.6	6,514.9	6,527.0	6,489.2	6,511.5	6,569.6	6,646.0	6,699.4	6,771.7	6,835.3	6,897.2
Residential Tariff	4,969.6	5,088.5	4,971.3	4,974.2	4,937.5	4,948.8	4,967.3	4,989.7	5,004.3	5,039.8	5,068.7	5,089.6
Existing customers	4,969.6	5,088.5	4,881.6	4,787.9	4,648.6	4,558.9	4,488.8	4,430.2	4,373.6	4,316.0	4,260.2	4,199.9
New customers	–	–	89.7	186.3	288.9	389.9	478.4	559.5	630.7	723.8	808.5	889.6
Business Tariff	1,597.6	1,566.1	1,543.6	1,552.8	1,551.8	1,562.7	1,602.3	1,656.4	1,695.1	1,731.9	1,766.7	1,807.6
Contract	1,033.9	1,100.4	1,148.5	1,166.2	1,170.6	1,178.7	1,192.4	1,210.2	1,235.6	1,260.0	1,283.0	1,313.1
Commercial Contract	968.6	1,032.8	1,080.6	1,093.9	1,097.0	1,106.2	1,118.8	1,134.5	1,159.6	1,183.4	1,205.7	1,234.3
Electricity, gas and water (ex GPG)	–	–	–	–	–	–	–	–	–	–	–	–
Wholesale trade and retail trade	–	–	–	–	–	–	–	–	–	–	–	–
Transport and storage and communication services	96.5	96.3	91.7	88.7	87.9	87.7	93.0	96.6	99.3	101.9	104.4	107.6
Finance insurance property and business services plus distributed cogeneration assumption	81.2	79.9	78.8	78.8	77.9	77.5	78.1	79.7	80.4	81.1	81.7	82.4
Government administration, defence, education, health and community services	624.5	665.4	717.8	729.5	730.0	734.4	734.4	736.7	751.0	764.4	776.7	793.1
Accommodation, cafes, restaurants, cultural and recreational services, personal and other services	166.5	191.2	192.4	196.9	201.2	206.6	213.3	221.6	228.9	236.0	243.0	251.2
Industrial Contract	65.3	67.5	67.9	72.3	73.7	72.5	73.7	75.7	76.0	76.6	77.2	78.8
Agriculture	–	–	–	–	–	–	–	–	–	–	–	–
Mining	–	–	–	–	–	–	–	–	–	–	–	–
Food, beverages, tobacco manufacturing	42.2	44.0	44.5	47.3	48.2	47.7	48.6	50.0	50.5	51.1	51.8	53.0
Textiles, clothing and footwear manufacturing	–	–	–	–	–	–	–	–	–	–	–	–
Wood and paper, wood products and paper product manufacturing	–	–	–	–	–	–	–	–	–	–	–	–
Chemicals, petroleum, coal manufacturing	–	–	–	–	–	–	–	–	–	–	–	–
Non-metallic minerals manufacturing	23.0	23.5	23.4	25.1	25.5	24.8	25.1	25.6	25.5	25.5	25.5	25.9
Basic and fabricated metal products manufacturing	–	–	–	–	–	–	–	–	–	–	–	–
Transport and other machinery equipment manufacturing	–	–	–	–	–	–	–	–	–	–	–	–
Miscellaneous manufacturing	–	–	–	–	–	–	–	–	–	–	–	–

Note: 1.   These figures are weather normalised.

Table 5.2	Residential gas sales by customer type to 2018-19 – ACT Gas Distribution Network											
	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Customer numbers												
Tariff meter												
Residential tariff meters	106,917	112,816	116,119	119,694	123,363	126,904	130,093	133,167	135,858	139,387	142,669	145,885
Existing customer meters	106,917	106,917	106,917	106,917	106,917	106,917	106,917	106,917	106,917	106,917	106,917	106,917
New customer meters		2,895	3,304	3,574	3,669	3,541	3,189	3,075	2,691	3,529	3,282	3,216
Electricity To Gas(E to G)	849	902	786	799	811	809	805	800	793	789	783	777
New estates	1,353	1,315	1,610	1,768	1,760	1,739	1,489	1,437	1,160	1,738	1,581	1,539
High rise	987	678	908	1,007	1,097	993	894	838	738	1,002	918	900
Total new	3189	2895	3304	3574	3669	3541	3189	3075	2691	3529	3282	3216
Business Tariff Meters	2,874	2,914	2,968	3,021	3,071	3,130	3,196	3,257	3,317	3,379	3,448	3,514
Average usage (GJ per year) – on weather normalised basis												
Tariff												
Residential tariff												
Existing customers	46.5	46.8	45.7	44.8	43.5	42.6	42.0	41.4	40.9	40.4	39.8	39.3
Electricity to gas(E to G)	26.2	24.3	24.1	23.7	23.2	22.9	22.6	22.3	22.1	21.8	21.6	21.3
New Estates and High rise		33.2	32.6	31.9	31.0	30.2	29.5	28.9	28.3	27.7	27.1	26.5
Total volumes by market segment (TJs)												
Existing customers	4969.6	5088.5	4881.6	4787.9	4648.6	4558.9	4488.8	4430.2	4373.6	4316.0	4260.2	4199.9
Electricity to gas(E to G)			18.9	37.8	56.7	75.2	93.3	111.2	128.7	145.9	162.8	179.4
New estates and high rise			82.0	170.6	259.2	341.8	412.2	477.9	531.7	607.6	675.3	739.9
Total	4969.6	5088.5	4982.5	4996.3	4964.5	4975.8	4994.3	5019.3	5034.0	5069.5	5098.3	5119.2
Average usage – overall residential	46.5	46.3	44.0	42.8	41.2	40.2	39.3	38.6	37.9	37.2	36.5	35.8

Table 5.3	MDQ projections to 2018-19 by class and industry – ACT Gas Distribution Network											
	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
System total (GJ)	6116	6,384	6,596	6,677	6,693	6,721	6,764	6,827	6,921	7,012	7,096	7,208
Tariff												
Residential tariff	0	0	–	–	–	–	–	–	–	–	–	–
Existing customers	0	0	–	–	–	–	–	–	–	–	–	–
New customers												
Business tariff	0	0	–	–	–	–	–	–	–	–	–	–
Contract	6116	6384	6,596	6,677	6,693	6,721	6,764	6,827	6,921	7,012	7,096	7,208
Commercial Contract	5734	5992	6,203	6,261	6,271	6,305	6,343	6,397	6,491	6,580	6,662	6,767
Electricity, gas and water (ex GPG)	0	–	–	–	–	–	–	–	–	–	–	–
Wholesale trade and retail trade	0	–	–	–	–	–	–	–	–	–	–	–
Transport and storage and communication services	316	315	305	298	296	295	308	316	322	328	334	341
Finance insurance property and business services plus distributed cogeneration assumption	630	623	617	617	612	610	613	622	626	630	633	637
Government administration, defence, education, health and community services	3937	4116	4,340	4,390	4,392	4,410	4,410	4,420	4,480	4,536	4,586	4,654
Accommodation, cafes, restaurants, cultural and recreational services, personal and other services	851	938	942	957	972	990	1,012	1,040	1,063	1,087	1,109	1,135
Industrial contract	382	392	393	416	422	415	420	430	430	432	434	442
Agriculture	0	0	–	–	–	–	–	–	–	–	–	–
Mining	0	0	–	–	–	–	–	–	–	–	–	–
Food, beverages, tobacco manufacturing	192	198	200	210	213	212	215	220	221	224	226	230
Textiles, clothing and footwear manufacturing	0	0	–	–	–	–	–	–	–	–	–	–
Wood and paper, wood products and paper product manufacturing	0	0	–	–	–	–	–	–	–	–	–	–
Chemicals, petroleum, coal manufacturing	0	0	–	–	–	–	–	–	–	–	–	–
Non-metallic minerals manufacturing	190	194	193	205	209	204	206	210	209	209	208	211
Basic and fabricated metal products manufacturing	0	0	–	–	–	–	–	–	–	–	–	–
Transport and other machinery equipment manufacturing	0	0	–	–	–	–	–	–	–	–	–	–
Miscellaneous manufacturing	0	0	0	0	0	0	0	0	0	0	0	0

| Table 5.4	Customer number projections to 2018-19 by class and industry – ACT Gas Distribution Network											
	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
System total	109829	112765	116123	119751	123470	127071	130326	133462	136213	139805	143156	146439
Tariff	109791	112725	116083	119711	123429	127030	130284	133420	136171	139762	143113	146395
Residential tariff	106917	109812	113115	116689	120359	123900	127089	130163	132854	136383	139665	142881
Existing customers	106917	106917	106917	106917	106917	106917	106917	106917	106917	106917	106917	106917
New customers	0	2895	3304	3574	3669	3541	3189	3075	2691	3529	3282	3216
Business tariff	2874	2914	2968	3021	3071	3130	3196	3257	3317	3379	3448	3514
Contract	38	40	41	41	41	41	41	42	42	43	43	44
Commercial contract	35	37	38	38	38	38	38	39	39	40	40	41
Electricity, gas and water (ex GPG)	0	–	–	–	–	–	–	–	–	–	–	–
Wholesale trade and retail trade	0	–	–	–	–	–	–	–	–	–	–	–
Transport and storage and communication services	1	1	1	1	1	1	1	1	1	1	1	1
Finance insurance property and business services plus distributed cogeneration assumption	4	4	4	4	4	4	4	4	4	4	4	4
Government administration, defence, education, health and community services	20	21	22	22	22	22	22	22	23	23	23	23
Accommodation, cafes, restaurants, cultural and recreational services, personal and other services	10	11	11	11	11	11	11	12	12	12	12	12
Industrial contract	3	3	3	3	3	3	3	3	3	3	3	3
Agriculture	0	–	–	–	–	–	–	–	–	–	–	–
Mining	0	–	–	–	–	–	–	–	–	–	–	–
Food, beverages, tobacco manufacturing	2	2	2	2	2	2	2	2	2	2	2	2
Textiles, clothing and footwear manufacturing	0	–	–	–	–	–	–	–	–	–	–	–
Wood and paper, wood products and paper product manufacturing	0	–	–	–	–	–	–	–	–	–	–	–
Chemicals, petroleum, coal manufacturing	0	–	–	–	–	–	–	–	–	–	–	–
Non-metallic minerals manufacturing	1	1	1	1	1	1	1	1	1	1	1	1
Basic and fabricated metal products manufacturing	0	–	–	–	–	–	–	–	–	–	–	–
Transport and other machinery equipment manufacturing	0	–	–	–	–	–	–	–	–	–	–	–
Miscellaneous manufacturing	0	–	–	–	–	–	–	–	–	–	–	–

5.3 Customer number and MDQ forecasts to 2019

Table 5.4 presents customer number forecasts by tariff and class to 2019, as well as contract maximum daily quantity projections.

Figure 5.3 shows customer growth by tariff and class over the 2009 to 2019 period for the ActewAGL Distribution region. Figure 5.4 shows the average annual percentage change for contract between 2009 and 2019 in total volumes, total customers and total MDQs.

Figure 5.3: Natural gas customer growth by tariff and class - 2009 to 2019 (Percentage annual growth)
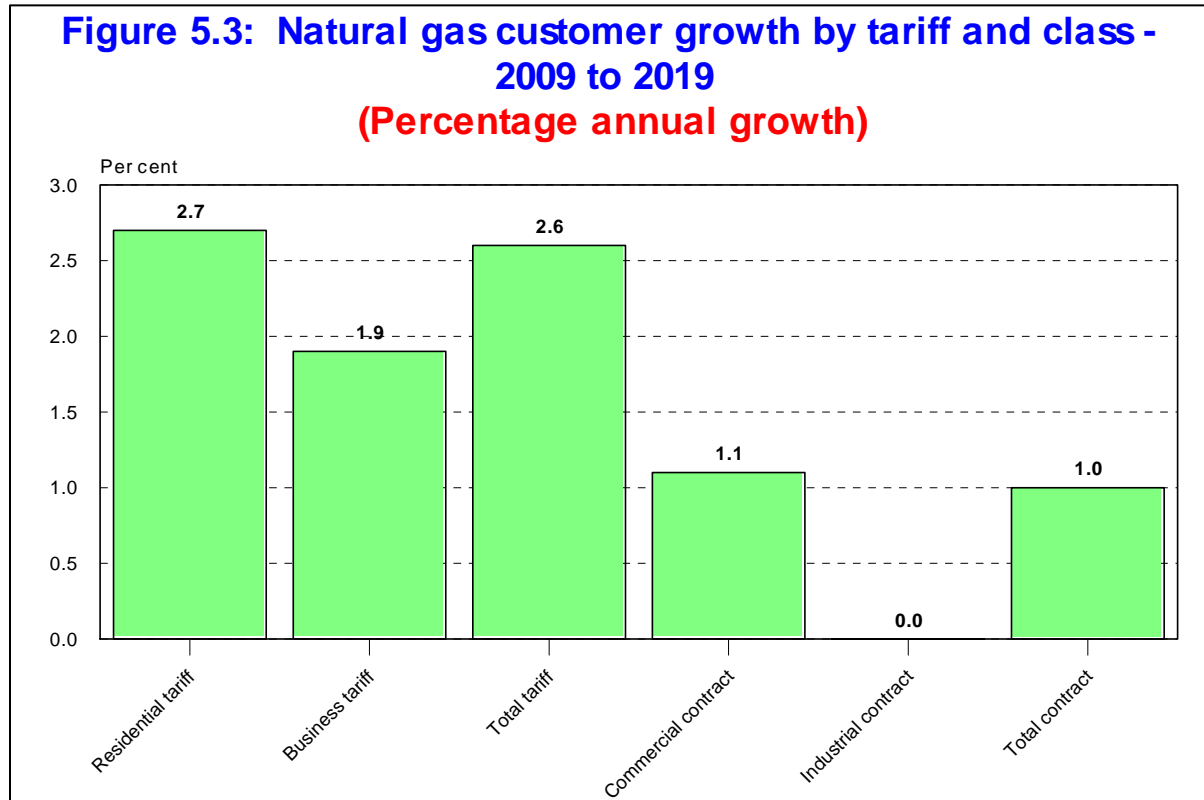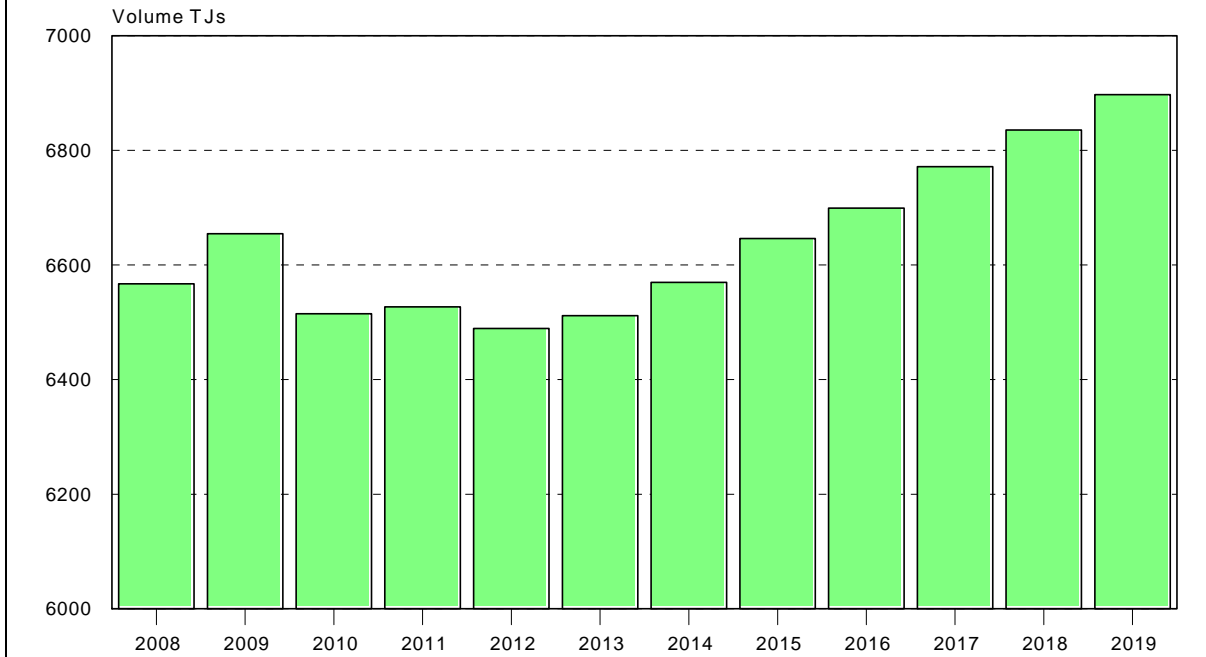
Figure 5.4: Contract volume, customer and MDQ growth - 2009 to 2019
(Average percentage change)
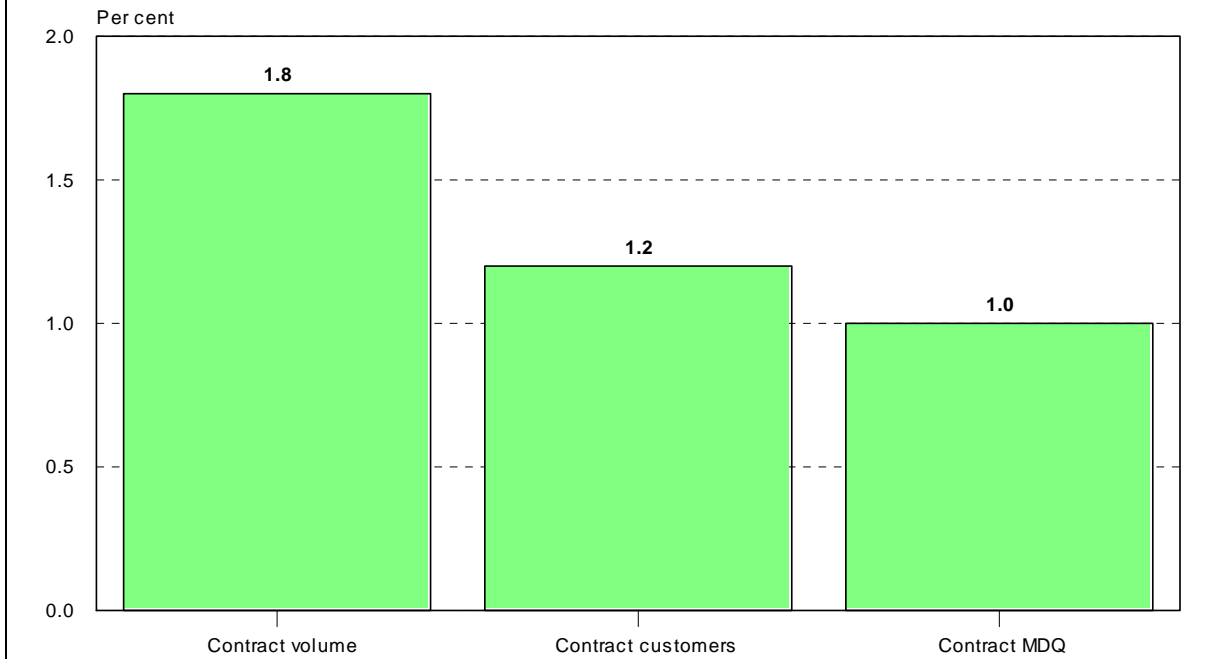
Figure 5.5: Natural gas sales - System total - 2007 to 2019
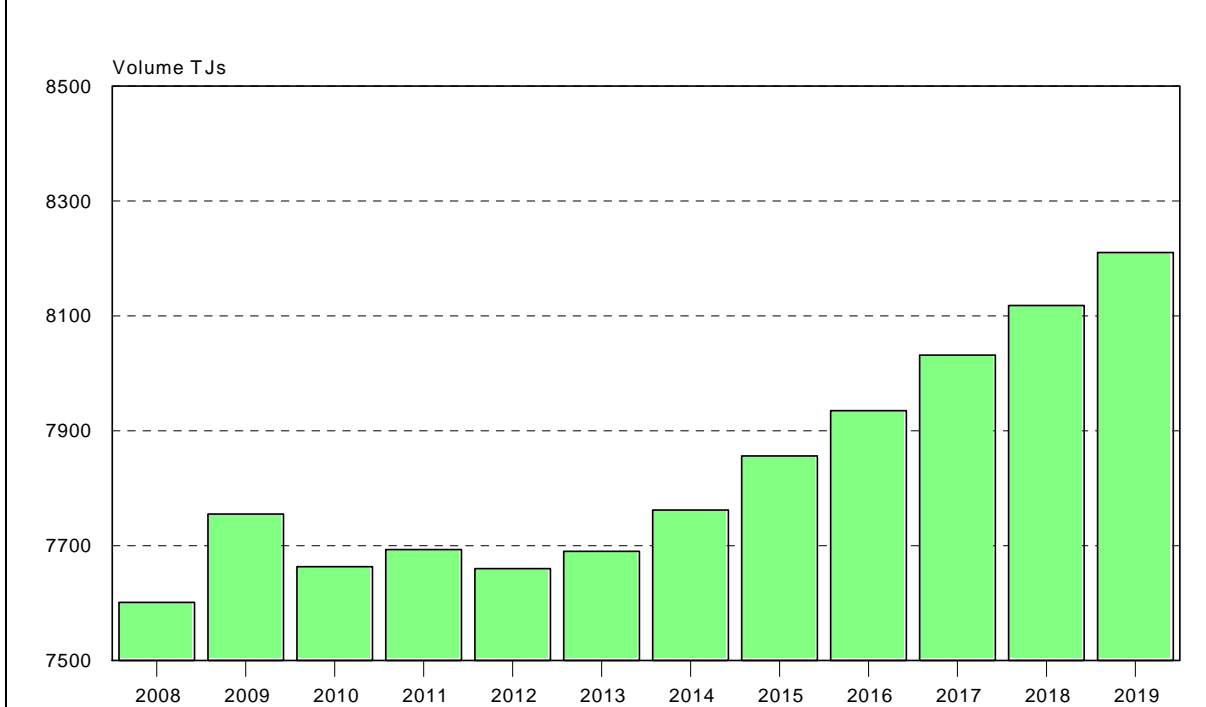
Figure 5.6: Natural gas sales - Tariff - 2007 to 2019

Figure 5.7: Natural gas sales - Contract - 2007 to 2019