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Final report to  
**Queensland Competition Authority**

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**Demand forecasts for Envestra**

22 November 2005



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## **EXECUTIVE SUMMARY**

### **Introduction**

The Queensland Competition Authority (the Authority) regulates third party access to the Queensland gas distribution networks through approval of Access Arrangements. Envestra, the natural gas distributor for the northern part of Brisbane, Ipswich, Gladstone and Rockhampton has submitted proposed Access Arrangements (AA) revisions and supporting AA information (AAI) covering the period 1 July 2006 to 30 June 2011.

The AAI include forecasts of gas demand for reference services, the Volume Haulage service for residential and small business customers consuming less than 10 TJ pa and the Demand Customer service for customers consuming more than 10 TJ pa. Distribution revenue from the Volume Haulage service is earned largely according to customer numbers and consumption, while in the Demand service it is earned mainly according to the maximum daily quantity (MDQ) capacity contracted by customers.

The Authority has asked McLennan Magasanik Associates (MMA) to forecast customer numbers and consumption for the Volume Haulage services and MDQ for the Demand market to help in the Authority's review of the proposed AA revisions.

MMA has prepared financial year forecasts for the Residential and Small Business markets, and the Demand market.

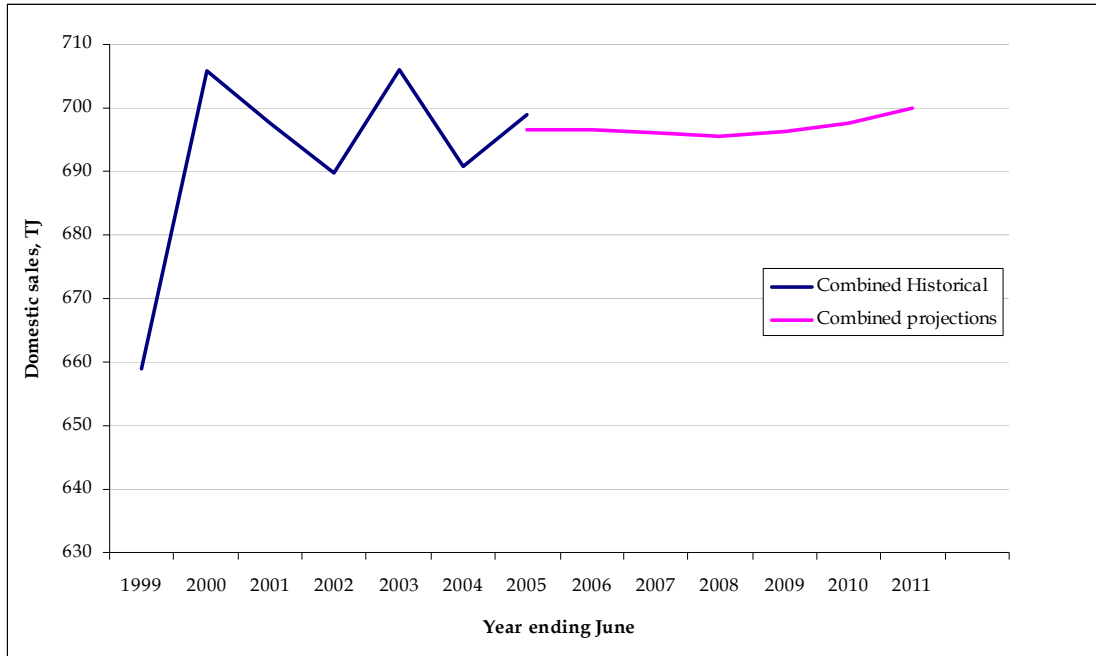
### **Residential market**

The Envestra residential market has been flat over the past five years, largely explainable by the lack of incentive for retailers to grow this market and the relatively poor economics of natural gas compared to competitive fuels. Thus growth in customer numbers has been slow (0.9% pa) while average usage per customer has been declining.

The key drivers likely to affect the residential sector over the next few years include the growth in dwellings for the region, forecast to be about 2.4% pa, the Queensland Government's sustainable housing initiative due to commence on 1 March 2006, which means that gas hot water systems are likely to be the cheapest to install in new homes with access to natural gas and the significant price increases recently experienced by the residential market.

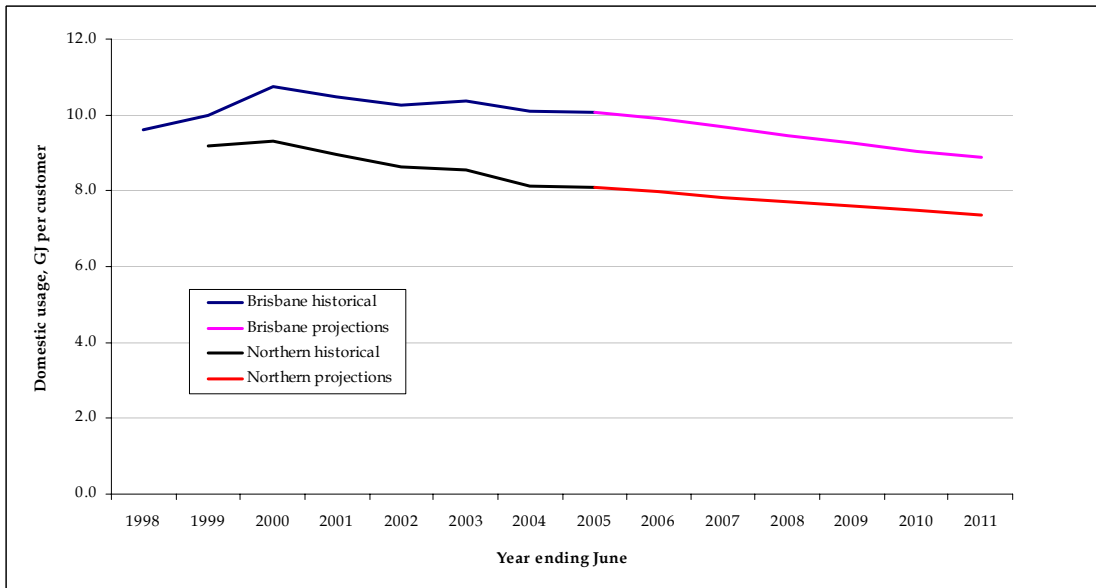
MMA has assumed that after the Sustainable Housing Initiative is fully implemented the growth of Envestra customer numbers will be in line with that for the region. MMA has forecast that average usage will continue to fall due to appliance and end-user efficiencies and the impact of price increases. The history of the Envestra residential market and MMA forecasts are provided in Exec Figure 1 for the Brisbane and Northern regions combined.

**Exec Figure 1 History and MMA forecasts of domestic consumption**



The domestic market is forecast to remain flat over the coming regulatory period. Although residential customer numbers are forecast to grow at a rate of about 2.1% pa this is offset by the forecast reduction in average usage per customer as seen in Exec Figure 2.

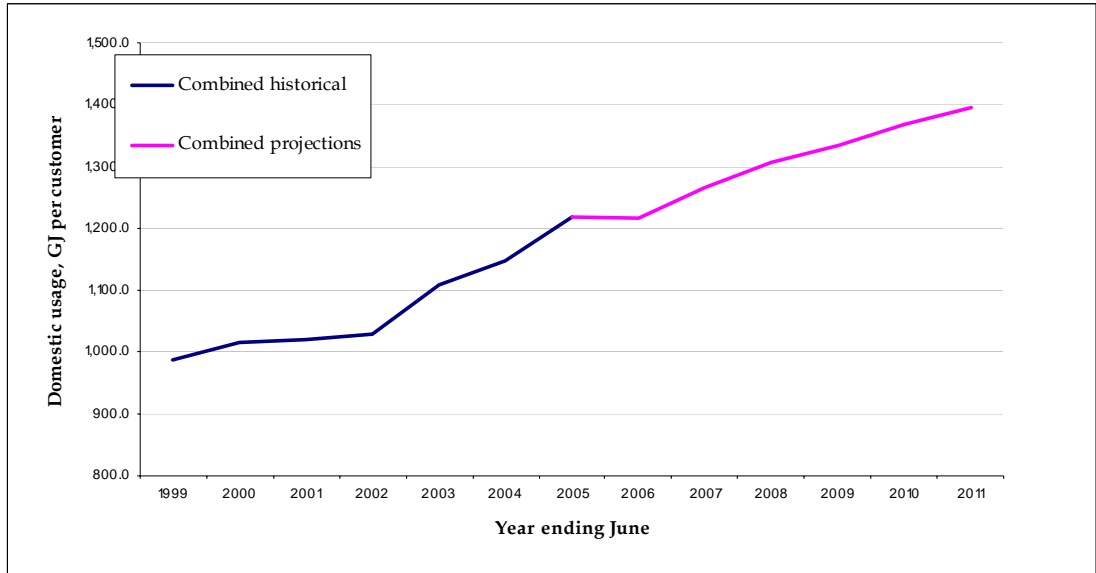
**Exec Figure 2 History and MMA forecasts of average usage per domestic customer, GJ**



**Small business or C&I market**

Historical and MMA forecast growth in the small business market are illustrated in Exec Figure 3 for the combined Brisbane and Northern networks. The Envestra small business market has grown at about 3.5% pa over the past six years. As the economy is expected to grow at a slightly reduced rate and as growth in the last year appears anomalously high, MMA has forecast that the small business market will grow only moderately at about 2.4% pa.

**Exec Figure 3 History and MMA forecasts of consumption by small business customers, TJ**

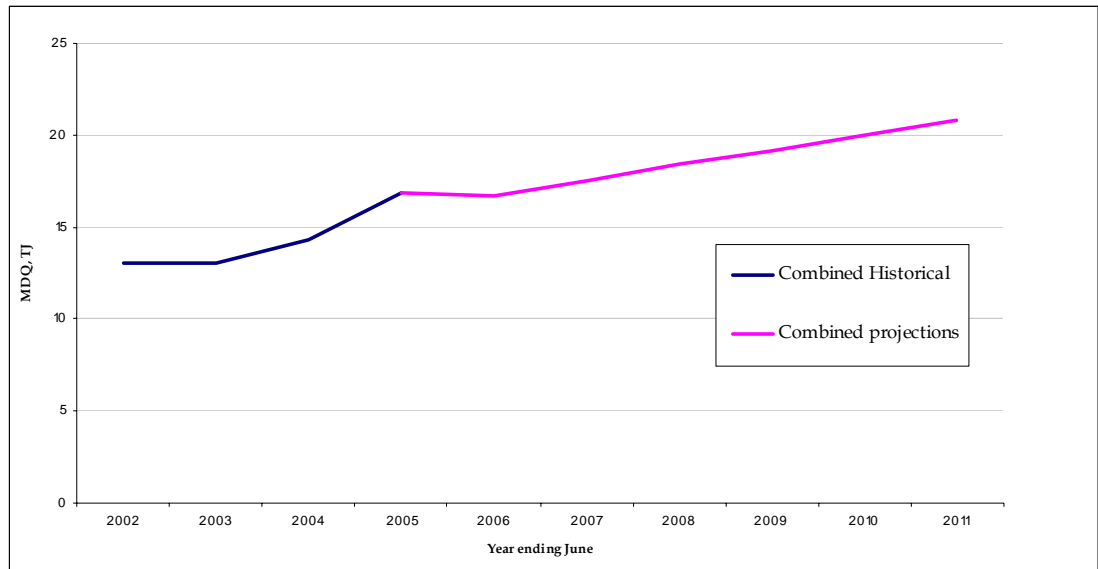


### Demand market

Based on a combination of data provided by Envestra (2002 to 2005) and information previously provided by Envestra to the Authority (1996 to 2000) MMA has assessed that consumption in the demand market has grown at about 4.5% pa over the past six years, with the rate increasing slightly to 5.1% pa over the past three years. MDQ growth has been even more rapid, about 9% pa over the past three years. This means that the load factor (the relationship between average daily consumption and MDQ contracted) has been reducing for the market as a whole.

MMA has initially forecast consumption, based on a derived relationship between consumption and Gross State Product (GSP, a measure of economic growth) and has then used a reducing load factor to convert this to MDQ. MMA has also talked to some of Envestra’s largest customers to discuss their gas consumption and MDQ outlook, taking this into account where relevant. The historical (only available since 2002) and MMA forecast of MDQ are provided in Exec Figure 4.

**Exec Figure 4 History and MMA forecasts of contracted MDQ, GJ**



MMA is forecasting Envestra’s contracted MDQ to grow at about 3.7% pa in the Brisbane region while reducing from 2005 levels in the Northern region due to the loss of two customers.

**Summary of MMA forecasts**

MMA’s forecasts for the domestic and small business markets and combined Volume Haulage service (customer numbers and consumption) and the Demand market (MDQ) are set out in Exec Table 1 by network.

**Exec Table 1 Summary of MMA forecasts**

	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Domestic customer numbers							
Brisbane	67000	68046	69434	71101	72807	74555	76344
Northern	2913	2926	2947	2974	3000	3027	3055
Domestic consumption, TJ							
Brisbane	673	673	673	673	673	675	677
Northern	24	23	23	23	23	23	23
Commercial customer numbers							
Brisbane	4,357	4,351	4,540	4,701	4,817	4,940	5,056
Northern	371	370	383	394	402	410	418
Commercial consumption, TJ							
Brisbane	1058	1055	1099	1135	1161	1189	1214
Northern	161	160	166	171	174	178	181
Volume customer numbers							
Brisbane	71357	72397	73974	75802	77625	79495	81400
Northern	3284	3296	3330	3368	3402	3438	3473
Volume consumption, TJ							
Brisbane	1731	1728	1772	1808	1835	1864	1892
Northern	185	184	189	194	197	201	204
Demand MDQ, GJ							
Brisbane	16468	16499	17291	18151	18900	19699	20476
Northern	375	244	260	274	284	295	305

Over the period 2005 to 2011 domestic customer numbers are forecast to increase at about 2.1%pa while domestic consumption is forecast to be flat. Both commercial customer numbers and Commercial consumption are forecast to increase at about 2.4% pa. Overall, consumption in the Volume market is forecast to grow at about 1.5% pa while customer numbers are forecast to increase at about 2.2% pa. Contracted MDQ is forecast to increase by 3.6% pa.

## 1 INTRODUCTION

### 1.1 Background

The Queensland Competition Authority (the Authority) regulates the gas distribution businesses or service providers (SPs) in Queensland under the National Third Party Access Code for Natural Gas Pipeline Systems (the Code).

There are two major Queensland gas SPs:

- Allgas (Energex)<sup>1</sup> which reticulates the southern part of Brisbane, Gold Coast, Toowoomba and Oakey
- Envestra which reticulates the northern part of Brisbane, Ipswich, Gladstone, Rockhampton and the Wide Bay area<sup>2</sup>.

Allgas and Envestra are regulated through Access Arrangements (AA) approved by the Authority in 2001 which remain in force until 30 June 2006. A new regulatory period, the second to be regulated by the Authority, is to commence on 1 July 2006. The SPs provided their proposed AAs for the next regulatory period in October 2005.

### 1.2 Role of demand forecasts

Demand forecasts play a significant role under the combined building block and price cap regulatory approach expected to apply over the next period:

- Firstly the level of demand acts as a divisor of regulated revenue in setting actual tariffs.
- Secondly, demand levels act as input into assessing the capital and operating costs required over the regulatory period.

Under the price cap regulatory approach the SPs benefit from demand exceeding forecasts and are adversely affected if demand is less than forecast. As a result the SPs have an incentive to understate their demand expectations.

Under the Code demand forecasts are required to be "...best estimates arrived at on a reasonable basis". The Authority has commissioned McLennan Magasanik Associates (MMA) to prepare independent advice regarding demand forecasts for the two SPs covering the period 1 July 2006 to 30 June 2011.

### 1.3 Process

MMA has adopted the following process in undertaking its forecasts:

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<sup>1</sup> Energex purchased the Allgas gas utility but in the regulatory context the name Allgas is still used. Allgas is still the name of the company and is the term used in this report.

<sup>2</sup> Supply to the Wide Bay area and also the supply by Envestra to the BP refinery and cogeneration facility are not under consideration by the Authority and not reviewed in this report.

- Initially requesting historical information and information with respect to the expected key drivers of gas demand from the SPs.
- Clarifying the information provided through discussions with the SPs.
- Reviewing the history of gas demand.
- Considering and modelling the key drivers likely to apply over the forecast period.
- Holding discussions with some of the largest users.
- Modelling gas demand for the residential, small business and large “demand” customers.

Although the two SPs operate in a very similar location geographically, they are quite distinct in terms of the history and make-up of the business, their approaches to strategic growth and the information they were able to provide. For this reason the analysis and modelling has been done separately, although in general terms the key drivers are similar.

This report is laid out as follows:

- Chapter 2 provides an overview of recent history of the Envestra network
- Chapter 3 reviews key drivers expected to operate over the coming regulatory period
- MMA’s forecasts for the domestic, small business and large demand customers are provided in Chapter 4. The Envestra forecasts are also provided for comparison.

#### **1.4 Conventions:**

All the analysis has been carried out using financial year data. Unless otherwise specified all results and tables refer to financial years. The convention followed in the report has been to refer to the financial year as either both the years covered or as the year which contains the 30<sup>th</sup> June. Thus, the financial year commencing 1 July 2003 and concluding on 30 June 2004 is referred to in the text as either 2003/04 or 2004.

We have in some cases derived relationships which use logarithmic functions. Generally we use the natural logarithm (ln) for these relationships but sometimes refer to them as log.

This report to the Authority contains information which may be considered confidential by Envestra and Allgas. MMA recommends that the businesses be asked to specify which information they consider needs to be removed from any public report.

Tables and percentages may not appear to completely reconcile in some cases. This could be for a number of reasons including rounding and use of trend estimates.

This report has generally relied on the historical data provided by Envestra. While the Envestra forecasts have been reviewed it has been assumed that the historical data are accurate and comment has been made only where data appears anomalous.

The review is only for the Envestra load connected to “covered” pipes and networks. This excludes the network in the Wide Bay area and also the substantial load supplied to a refinery and cogeneration plant in Brisbane.

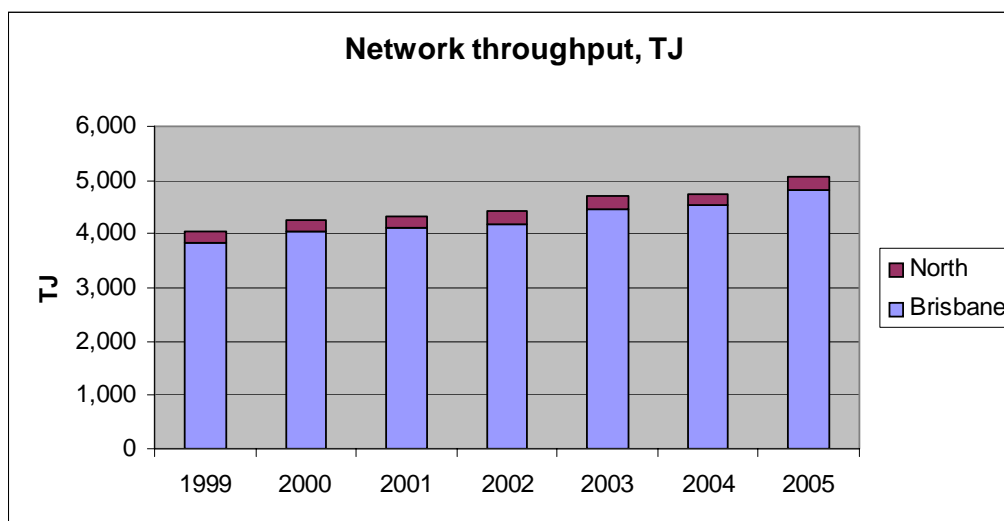
## 2 HISTORICAL

In this section of the report the demand history of the covered network as a whole (including the Brisbane and Northern components) is reviewed and then the different components of the market. As discussed in Section 1.4, the following analysis excludes consideration of networks and pipelines which are not “covered”.

### 2.1 Overall network throughput

Total gas throughput by the utility over the period 1998/99 to 2004/05 is shown in Figure 2-1<sup>3</sup>. Over the period consumption has grown at about 3.8% pa for the network as a whole and the Brisbane network (which has about 95% of total throughput through covered pipelines) and a slightly slower 3.5% pa for the Northern (Gladstone and Rockhampton) network.

Figure 2-1 Overall historical Envestra throughput, TJ



However, growth has clearly not been steady, with more rapid increases in years like 2003 and 2005 as well as slow growth or even decline in some years. The uneven-ness of growth emphasises the importance of three considerations in forecasting, division of forecasting into suitable categories for which the drivers are expected to be similar, review over a suitable period, with selection of a starting year being important, and judicious use of trend rather than point estimates for forecasting purposes. Based on trend estimates, growth over the past three years, from 2002 to 2005, has averaged about 4.3% pa, a little higher than the growth over the entire period.

<sup>3</sup> It should be noted that Envestra did not provide any information for the demand customers prior to 2002. MMA has relied on information previously provided by Envestra to the Authority and an average number for the year 2000/01.

## 2.2 Division into markets

Envestra has separated its historical information into four markets:

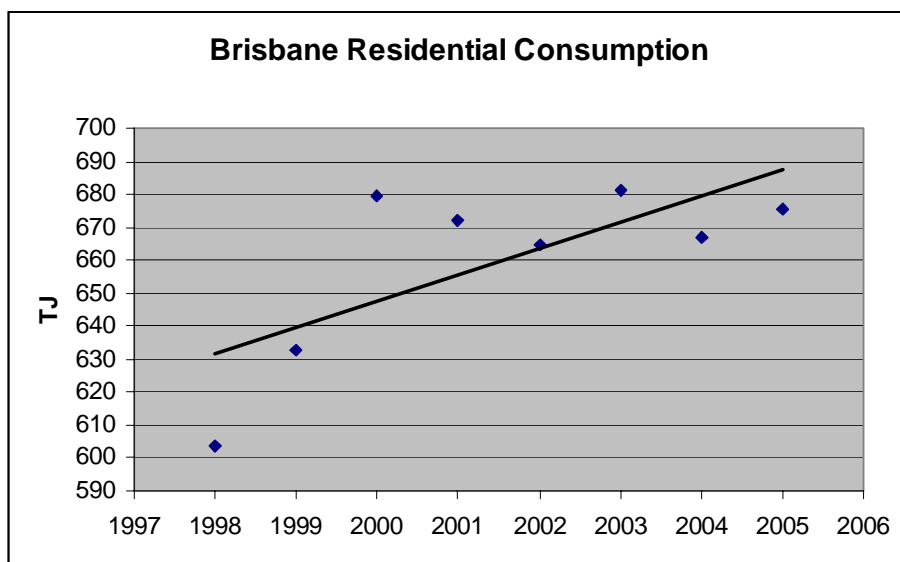
- Residential (this excludes apartment blocks which are supplied by serviced hot water (SHW) which, unlike for Allgas, are included within the small business category.
- Small business or C&I customers who consume less than 10 TJ pa. These have been divided by Envestra into commercial (< 1 TJ) and small industrial (1 – 10 TJ) classes.
- Large or demand customers who nominally take over 10 TJ of gas pa.

Envestra has provided historical data divided into the residential, commercial and small industrial categories for the period 1998 to 2005<sup>4</sup>. Envestra has provided data for demand customers from 2002 but not before this. MMA has relied on data previously provided by Envestra to the Authority for information for earlier years.

## 2.3 Residential market

Growth in the Brisbane residential market is illustrated in Figure 2-2, Growth has been about 1.6% pa over the period from 1998 as seen by the trend line. However, over the last few years since 2000 usage appears to have been reasonably flat. The northern network has actually seen a decline in residential consumption, by about 2% pa.

**Figure 2-2 Residential sales, Brisbane network, TJ**



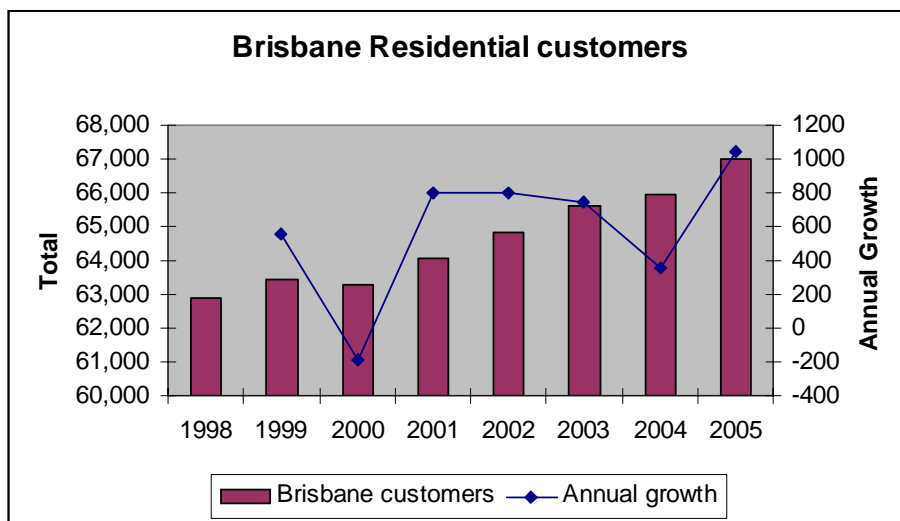
<sup>4</sup> Because the data for the Northern network from the year 1998 appear anomalous these have been excluded from analysis. However, Brisbane network data from 1998 have been included.

It is important to understand the reason behind the slowing of growth in the domestic sector. Generally, residential growth is divided into two components, growth in customer numbers and growth in average usage.

### 2.3.1 Residential customer numbers

Envestra has provided a history of residential customer numbers for the Brisbane network from 1997/98 to 2004/05. These are illustrated in Figure 2-3, together with the annual growth in customer numbers (right hand axis) over the period.

**Figure 2-3 Brisbane residential customer numbers and annual growth**



According to Envestra, residential customer numbers in Brisbane have grown from 62,900 in 1997/98 to 67,000 in 2004/05. Growth in net domestic customers has been uneven. There have been significant falls which have not been explained<sup>5</sup> as well as increases. Overall growth in customer numbers at 0.9% pa has been slow, significantly less than the growth in dwellings over the period (see Section 3.1.1).

In the Northern network growth has been even weaker, at 0.2% pa. Residential customer numbers have increased from 2870 in 1999 to 2913 in 2005, an average increase of only 7 customers per year.

Envestra has attributed the low rates of residential growth to the lack of retailer incentive to grow the market, the high price of gas making it relatively uncompetitive with other energy forms, in particular electricity and LPG, and an inadequate allowance for network marketing in the first access arrangement period. The growth rate over the last few years of the period in Brisbane have been somewhat better, attributed by Envestra to a better targeted network development program.

<sup>5</sup> The lack of explanation of the fall in customer numbers in 2000 together with growth which is identical in the following two years raises some doubts about the accuracy of customer numbers provided.

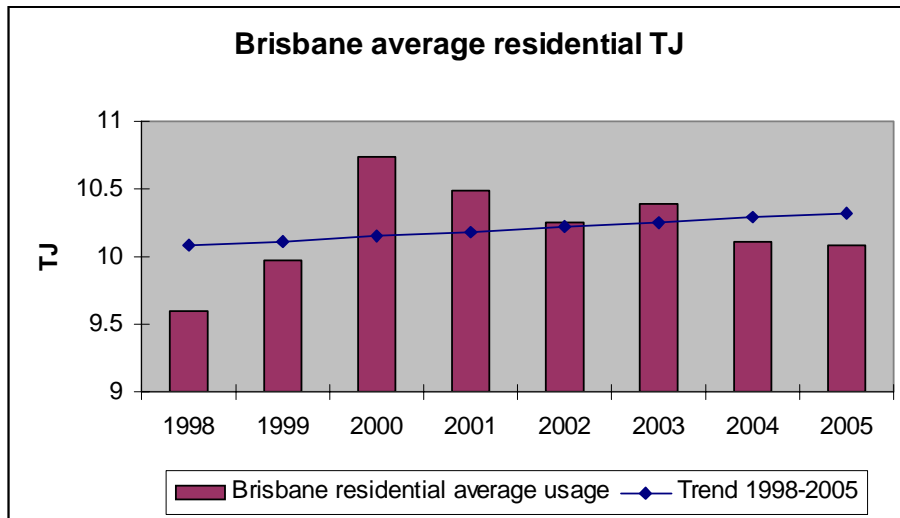
### 2.3.2 Average usage per customer

The other constituent of domestic consumption is average usage per customer. The average usage of Envestra’s residential customers is about 10 GJ pa. This is substantially lower than the Allgas average residential usage of about 13.6 GJ. Part of the reason for this is undoubtedly the inclusion of some 13,000 Allgas customers in Toowoomba which has a substantial heating load. However, this would only explain some 1 - 2 GJ of the difference. Further reasons are unclear but may include different proportions of low usage “cooker-only” customers, different classification systems (for example inclusion of small commercial customers as domestic), socio-economic or demographic differences and possibly the different levels of marketing effort applied in the different regions.

For the residential market as a whole the change in average consumption over the past 7 years is illustrated in Figure 2-4. A trend line is included as the consumption in any year is likely to be influenced by weather.

Over the past 7 years there has been trend growth of average usage by about 0.3% pa. However, the growth rate may have reduced over the latter years of the period. Over the past three years, for example, trend growth has been -0.7% pa. In the year 2004/05 average usage per residential customer is estimated to have been about 10.1 GJ.

**Figure 2-4 Average residential usage and linear trend, GJ per customer**

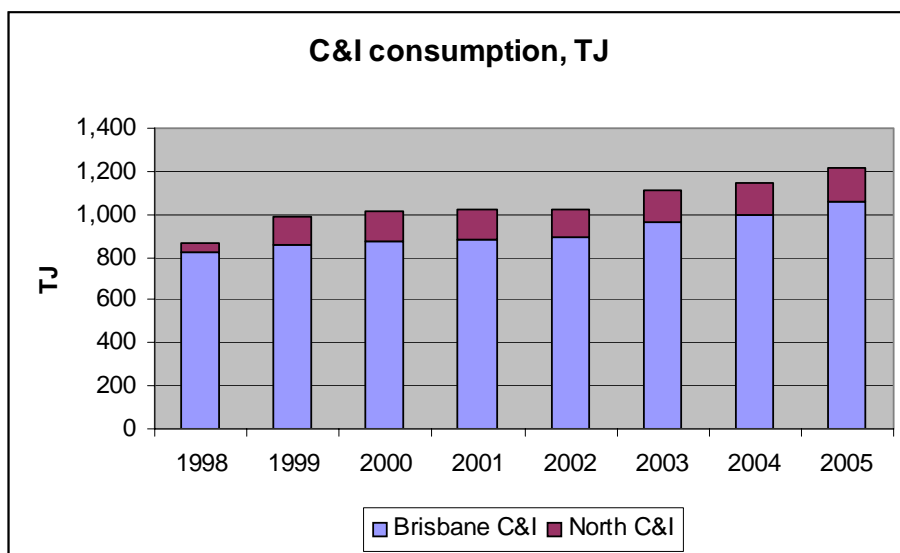


Northern average residential usage has been declining at a rate of some 2% pa, presumably largely because of the absence of gas company marketing in the region. Without an effective gas company presence this may result in existing customers turning to alternative fuels when appliances need to be replaced.

## 2.4 Small business or C&I class

Small business or C&I customers are those not identified as residential<sup>6</sup> and generally using less than 10 TJ pa. Almost 90% of the C&I load is in the Brisbane network. Growth in C&I consumption for both Envestra Brisbane and Envestra North over the past six to seven years has been reasonable at about 3.7% pa, and even stronger over the past three years at about 6% pa. Figure 2-5 shows consumption for the C&I component of the network as a whole over the period 1999 to 2005.

Figure 2-5 C&I consumption, TJ



Envestra has separated the history and forecasts of this market into commercial (< 1 TJ pa) and small industrial (1-10 TJ pa) sectors. While the commercial sector has been growing at about 6% pa the small industrial sector has been growing at only about 1% pa.

For reasons discussed in Section 3.5.1, MMA has combined its analysis of the commercial and small industrial into the C&I market.

### 2.4.1 C&I customer numbers

Growth in C&I numbers is a driver of growth in this market. Growth of C&I customer numbers for the network as a whole has averaged about 3.1% pa. Over 90% of the C&I customers are on the Brisbane network.

### 2.4.2 Average usage by C&I customers

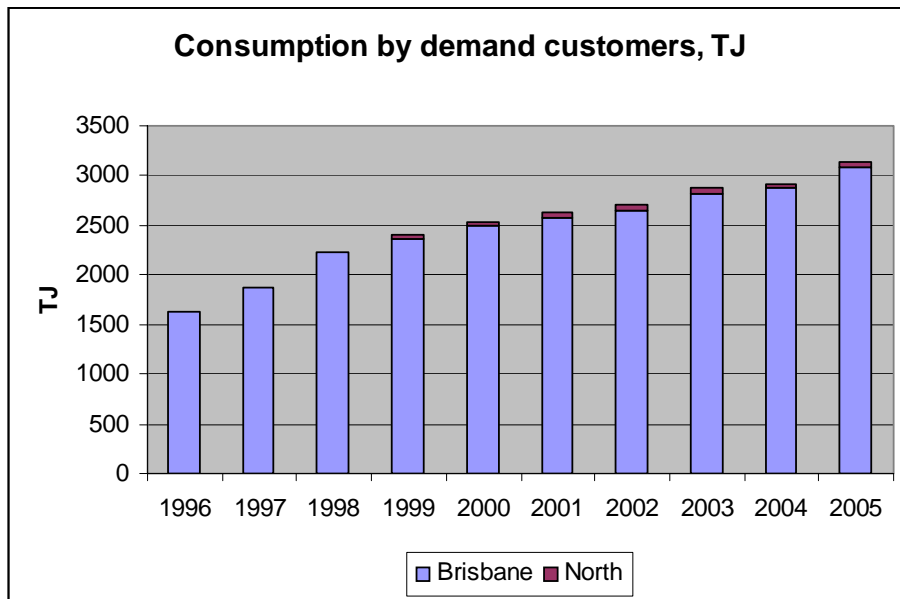
Consideration of average usage by C&I customers provides an indication of what kind of growth is being seen by the network. Over the past six years growth in average usage has been growing slowly at about 0.5% pa. This, combined with the 3.1% pa growth in customer numbers, has made up the C&I growth rate.

<sup>6</sup> Note that for Envestra, unlike for Allgas, the Serviced Hot Water (SHW) market is included within C&I rather than domestic.

## 2.5 Demand customers

The volumes consumed by customers defined as Demand customers have been provided by Envestra on an annual basis only from 2001/02. In order to gain a reasonable historical perspective MMA has relied on data previously provided to the Authority and has needed to average quantities to determine values for the 2000/01 year<sup>7</sup>. The total data available is provided in Figure 2-6.

Figure 2-6 Demand consumption, TJ

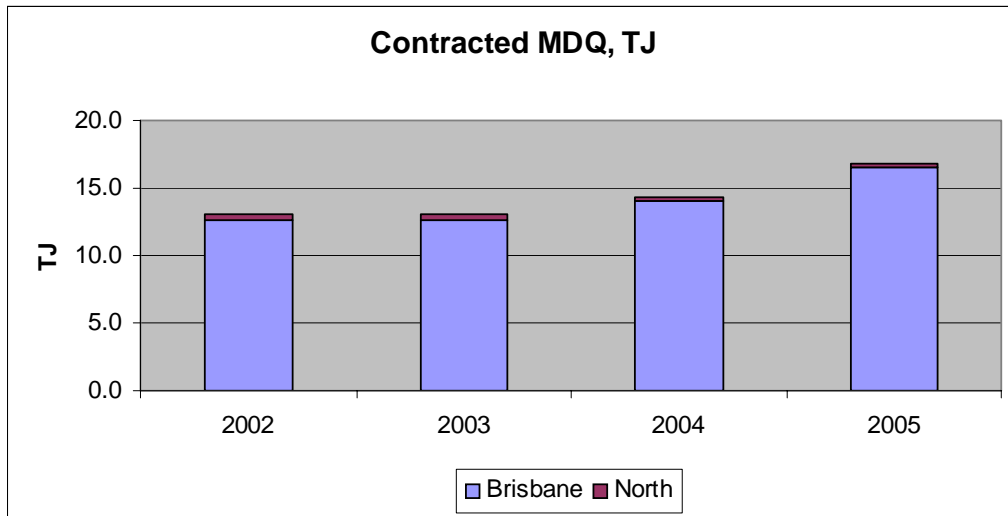


Using information from previous plus current sources, growth from 1999 to 2005 has averaged about 4.5% pa. Over the past few years, from 2002 to 2005, using data recently provided by Envestra, the growth has been a little faster, at 5.1% pa, however, the distribution of growth has changed slightly with the Northern region growing at only 1.5% pa while Brisbane has grown at 5.2% pa.

The Maximum Daily Quantity (MDQ) contracted by demand customers is the key demand parameter. MDQ data is available only from 2002 and this is provided in Figure 2-7.

<sup>7</sup> It may be that these numbers are not quite consistent with the latest numbers provided by Envestra..

Figure 2-7 Contracted MDQ, TJ



Growth in MDQ in the Brisbane network over the past three years has been strong, some 9% pa while it has grown at about 5% pa in the Northern network. MDQ growth by demand customers appears to have been significantly greater than consumption growth, meaning that the load factor (average daily quantity divided by MDQ) is reducing. A possible explanation of this is the addition and growth of customers who have a lower load factor than the market as a whole.

**2.6 Summary**

In summary, the Envestra residential market has been growing slowly. Customer number increases have been low, at about 0.9% pa and average usage has been flat and possibly declining towards the end of the period.

The C&I market has been growing moderately at about 3-4% pa over the past 6 years in both the Brisbane and Northern networks. This has been largely a result of growth in customer numbers as usage has stayed reasonably constant.

Growth in consumption by the demand market has been about 4.5% pa over the period 1999 to 2005 for both the Brisbane and the Northern networks. Growth has continued at a similar pace in the Brisbane region over the past three years but appears to have slowed in the Northern network where two large users in this region have recently curtailed fuel use. However, according to MDQ data from 2002, growth in MDQ has been significantly stronger than this, meaning that load factors have reduced.

### 3 KEY DRIVERS

Key drivers for forecasting gas demand include both macro and microeconomic parameters, weather and government policy. As the state of the economy is considered to be a significant macro driver for the network as a whole an economic overview for Queensland and the Brisbane region is initially provided. Following that specific key drivers are considered for both the residential and non-residential sectors.

#### 3.1 Economic overview

In assessing the general economic outlook over the next five or six years MMA has utilised forecasts by Econtech<sup>8</sup> and the National Institute of Economic and Industry Research (NIEIR)<sup>9</sup>. MMA has also utilised various economic and demographic indicators from the Australian Bureau of Statistics (ABS) and the Queensland Department of Local Government and Planning including Gross State Product (GSP) and historical population and housing statistics.

Over the past few years growth in Queensland has been strong. Between 1998 and 2005 the Queensland economy grew by about 5% pa, significantly higher than the Australian economic growth rate of 3.5%.

Econtech has forecast domestic demand in Australia to weaken in 2005/06 due to slower growth in private consumption and a further weakening of the housing market. However, the external sector is expected to rebound. High commodity prices and a downward correction in the Australian dollar should stimulate an improved contribution of net exports to growth in the years ahead. Queensland as a state with significant exposure to mining, tourism and agriculture is expected to benefit from the improvement in the external sector.

After a low estimated growth rate in 2004/05 of 2.5%, Econtech has forecast Queensland GSP to grow by 4.1% per annum to 2011 compared to the Australian GDP average growth of 3.3% pa over the same period. Over the same period NIEIR has forecast that the Queensland GSP would grow by 3.8% pa, a little slower than the Econtech forecast<sup>10</sup>. While the Queensland economy is fairly broadly based, a number of sectors are particularly important. These include the tourism, agriculture, mining and metals sectors. The state's manufacturing sector relies more heavily on commodity type exports than the rest of Australia. The Queensland economy is thus relatively exposed to changes in the global economic environment.

Table 3-1 provides a summary of the Queensland economic growth outlook to 2010.

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<sup>8</sup> Econtech, "Australian State and Industry Outlook", 8 July 2005

<sup>9</sup> Three NIEIR documents have been used: Report to NEMMCO, Economic Outlook for NEM States to 2014/15 (May 2005), Report to Energex "Electricity consumption and maximum demand projections for the ENERGEX region to 2014 (August 2004) and forecast information provided in spreadsheet form to Envestra, Queensland (October 2005)..

<sup>10</sup> But NIEIR has a higher estimated 2004/05 outcome.

**Table 3-1 Queensland Economic Outlook (% Growth)**

Fin Year ending June	Actual	Est	Forecast					
	2004	2005	2006	2007	2008	2009	2010	2011
<b>Private consumption</b>	8.5	5.5	4.6	4	3.3	2.5	2.6	3.2
<b>Private Investment</b>								
- in Dwellings	12.2	5.1	3.5	5.7	-0.8	-1	3.1	-0.5
- in other Building & Structures	-0.3	15.4	8.9	5.2	5	3.3	2.8	2.4
- in Machinery & Equipment	12.8	14.1	3.8	5.2	5.5	3	2.3	2.2
<b>GSP</b>	5.8	2.5	4.9	5.8	4.7	3.2	3.3	3.0
<b>Employment</b>	3.1	4.9	2.4	2.8	2.5	1.4	1.1	1.1
<b>Population</b>	2.2	1.8	1.9	2.1	2.2	1.9	2.0	

Sources: Econtech, Australian State & Industry Outlook, 8 July 2005.

### 3.1.1 Population and housing growth

Population in Queensland has consistently grown faster than in the rest of Australia over the last few decades. Although the growth rate slowed in the mid 1990s it accelerated again in the early 2000s, with growth of about 2.2% to 2.5% pa over the past few years. The return to strong population growth has been due to strong net population inflows from both overseas and interstate.

According to NIEIR<sup>11</sup>, Queensland population growth over the next few years and to 2011 is expected to be around 2.1% pa. While this growth rate is expected to be faster than the Australian average growth rate of about 1% over the same period, it is below the level experienced in the early 1990s when growth of around 2.5% pa was realised. It can be expected that the South East Queensland (SEQ) region will enjoy higher population growth rates than Queensland as a whole given that this region is continuing to experience a higher share of interstate and international migration than other parts of the state. This is expected to result in a population growth in SEQ some 0.1% to 0.2% pa greater than in Queensland as a whole<sup>12</sup>.

Dwelling growth in the south east Queensland and Brisbane regions is forecast to grow by about 0.2% to 0.3% pa more than the change in population. This is because of a continuing trend towards smaller household sizes. A dwelling growth rate of about 2.4% to 2.5% pa is forecast for the Brisbane region.

<sup>11</sup> NIEIR's Economic Outlook for NEM States to 2014/15 (May 2005). And NIEIR information provided by Envestra

<sup>12</sup> In its report to Energex, "Electricity consumption and maximum demand projections for the Energex region to 2014", August 2004, NIEIR forecast that the population growth rate for the Energex region would be some 0.2% pa higher than that for Queensland.

### **3.1.2 Private consumption expenditure**

Private consumption expenditure in Queensland rose by a strong 8.5% in 2003/4. The strong rise in expenditure was supported by the strong growth in housing construction (12.1%), low nominal interest rates and stronger employment, income and population growth. These factors more than offset the negative impact of the drought.

The strong growth in private consumption expenditure is forecast to slow over the coming period to 2011. Higher nominal interest rates and declines in the household goods sector are expected to constrain Queensland's private consumption expenditure growth to around 3.4% pa.

### **3.1.3 Dwellings investment**

Private dwelling investment in Queensland rose by 12.2% in 2003/04. The boom in housing construction in Queensland was initially driven by the First Home Owner's Grant and low nominal interest rates. The resumption of much stronger population growth in Queensland over recent years and stronger levels of investor activity has supported growth over the recent past.

While Queensland has avoided the large slowdown in residential investment affecting Victoria and NSW in 2004/05, private new dwelling investment in Queensland is nevertheless forecast to also slow to around 2.1% over the coming period.

### **3.1.4 Private business investment**

Queensland private business investment in machinery and equipment rose by 12.8% in 2003/4 while investment in building and structures were relatively stable. Business investment in Queensland is expected to be supported by ongoing investment activity in the mining and manufacturing sectors.

Expenditure on machinery and equipment will be supported by the high Australian dollar and falling prices of information technology products and sustained high commodity prices. Any fall in commodity prices and further appreciations in the Australian dollar, however, could choke off growth in investment in Queensland over the medium term.

Business investment in machinery and equipment is expected to grow by 4.0% pa and business investment in buildings and structures by 5.0% pa between 2006 and 2010.

### **3.1.5 Employment**

Queensland's employment growth has been very rapid over the last few years. Employment growth was 3.1% in 2003/04. Queensland's industry employment has risen significantly in the construction and tertiary sectors. The key growth sectors within the tertiary sector are retail trade, property and business services, government administration and defence, health and community services and cultural and recreational services.

Queensland's employment growth is forecast to slow to around 2.0% over the next period as construction employment falls and GSP growth slows somewhat.

### 3.1.6 Summary

Overall, the Queensland economy is expected to continue to outperform the Australian economy over the next regulatory period, but to slow somewhat from growth seen over the past few years. The Queensland Gross State Product is forecast to grow by 4.2% pa over the period to 2011 compared to a growth rate of about 5% pa between 1998 and 2005. Population growth is expected to slow a little to 2.1% pa approximately in line with growth over the past decade. Dwelling investment is also forecast to fall from the high rates of growth recently although this is likely to be tempered in the Brisbane region with the area experiencing a larger share of interstate and international migration.

## 3.2 Residential drivers

Many factors impact on the gas residential market. In the Queensland context these can be divided into two components, those that impact on the number of gas customers, and those that impact on the average usage per customer.

### 3.2.1 Impacts on customer numbers

Estimating growth of electricity customers within a region is relatively straight-forward. As virtually all dwellings within a region consume electricity, the number of electricity customers corresponds well with the number of dwellings. The growth in electricity customer numbers should similarly correspond well with the growth of dwellings.

However, natural gas is generally considered to be a discretionary fuel in Queensland. A low heating requirement in most parts of Queensland, together with the fact that reticulated natural gas is relatively expensive (which is largely a consequence of the low heating use<sup>13</sup>), has meant that only a small proportion of Queenslanders and even of residents of Brisbane are connected to gas, and also that natural gas is not available to a very significant part of the state and the south eastern corner.

This, in turn, has meant that the growth of residential customer numbers has been limited despite population and dwelling growth in the region serviced by the service providers being relatively high.

Future growth in residential gas customer numbers is likely to be defined by a combination of a number of inter-related factors including:

- Growth of the region.
- The availability of reticulated gas within economical reach.
- The economics of gas connection
- Imperatives for gas retailers and distributors and

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<sup>13</sup> There are significant capital costs in establishing a gas network and in connecting individual customers. For Queensland customers these costs have to be allocated across a fairly low average residential consumption (about 10-14 GJ) compared to NSW and South Australian customers who consume approximately double this amount and Victorian customers who consume, on average, some four times this amount.

- Government policy

### 3.2.2 Dwelling growth in the region

As stated previously, dwelling growth for the Energex electricity region, which contains both the Allgas and Envestra Brisbane regions was forecast by MMA to be about 2.3% to 2.6% pa<sup>14</sup>.

Within this, growth in both the Envestra and Allgas regions is forecast to be about 2.4% pa. A discussion on population and dwelling growth is provided in APPENDIX A .

### 3.2.3 Availability of reticulated gas nearby

Although Brisbane and regions are forecast to grow at about 2.4%, the region is not growing uniformly and not all new homes have access to nearby natural gas. There are parts of greater Brisbane which are unlikely to be reticulated because they are not sufficiently close to the current network to make the extension economical.

As well, Allgas has confirmed that it will not proceed with reticulation of a new housing development unless it has an agreement in place with the developer that a great majority of the new houses will have both gas hot water and gas cooking connected. Envestra has stated that it currently has a penetration rate of about 45% in new home subdivisions but is also seeking to have entire new developments considered “gas only”.

Without detailed analysis of the actual prospects it would appear to be reasonable to assume that the growth rate sufficiently near existing mains will be the same as the region as a whole. In other words, if the growth of a particular region is expected to be 2.4%, this assumption would also hold true for regions with reasonably economic access to natural gas. This has been confirmed by initial modelling of recent housing growth rates by region.

### 3.2.4 Economics of gas connection to a consumer

According to research previously conducted by MMA, the economics of natural gas hot water systems in new households<sup>15</sup>, relative to electricity, have not been particularly attractive. This is because the cost of a gas hot water system is about the same or slightly higher than that of an electric system, while the operating costs, taking into account the different appliance efficiencies, are also higher.

Thus, while we understand that many new home customers have a preference for gas cooking (hotplates at least), the inferior economic position of natural gas for hot water systems relative to off-peak electricity has tended to limit the number of connections to

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<sup>14</sup> McLennan Magasanik Associates, “Demand Forecasts for Distribution Network Services in Queensland” final report to the Queensland Competition Authority, September 2004.

<sup>15</sup> A summary of the analysis is available in the Regulatory Impact Statement (RIS) published by the Queensland Department of Local Government and Planning and Queensland Environmental Protection Agency (EPA), “Proposed amendments to building and plumbing regulations to improve sustainability of new houses”, December 2004. The work was based on a report by MMA.

new homes. Generally natural gas systems have been attractive only if a homeowner wished to have the benefits offered by natural gas systems (eg continuous access to hot water) or a preference for gas for cooking or heating.

### **3.2.5 Economics for housing developers of gas connection**

Capital costs are the key consideration for new home developers. Generally, for items such as hot water systems developers will minimise their outlays within the constraint of ensuring that systems provide the level of utility required and that regulations are met.

As discussed previously, connection to electricity is a necessity for all new homes, connection to gas is not. If developers are faced by additional costs to supply gas hot water systems<sup>16</sup> and potentially additional costs or effort to connect to gas they will generally not do so unless this is a feature considered attractive to new home owners.

For these reasons there seems to have been relatively little imperative for developers to specify gas hot water systems in new houses. However, as discussed below, gas hot water systems are the mainstay of gas connections for distributors. Without a guaranteed gas hot water system as a minimum, distributors are unlikely to be keen to connect a new house.

### **3.2.6 Economics for distributors of gas connections**

Both Allgas and Envestra have stated that they try to restrict new residential customer connections to those where customers connect, at a minimum, both hot water and cooking gas appliances. Without connection to a hot water system the required returns for new connections are unlikely to be met.

The reasoning behind this is straightforward. Cooking with natural gas (both cooker and some oven) is estimated to use of the order of 2 GJ of gas pa. Gas hot water is estimated to use about 9 - 15 GJ of gas pa, depending on both the size and efficiency of the gas appliance. Space heating may add a significant amount of gas, perhaps 10 GJ pa in colder areas, but is typically only connected by a proportion of households in colder areas such as Toowoomba.

The capital costs of connecting a gas customer are such that unless the customer uses at least of the order of 10 GJ pa the investment costs are unlikely to be recovered over a reasonable timeframe. This makes gas usage for hot water a necessity prior to any connection.

### **3.2.7 Economics for gas retailers**

There are two domestic retailers currently operating in the Queensland market, Energex and Origin and the residential market has not been contestable. The economics of residential connections for gas retailers are summarised below.

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<sup>16</sup> MMA has estimated in the report to DLGP and EPA that the cost of a continuous system would be some \$250 or more greater than the costs of an electric storage system.

For most of the current regulatory period there has been little or no incentive for a “stand-alone” retailer to connect new residential gas customers. This is because the gross margin available to the retailer, after paying the regulated distribution charges, and for gas and transmission, was negative or very low – certainly lower than the average costs actually incurred by the retailer. This has meant that stand-alone retailers actually had a disincentive to connect gas customers.

However, this has changed over the past year, with two increases, each of 10%, being applied to residential customers. The first of these increases was in March 2005 and the second on 1 October 2005.

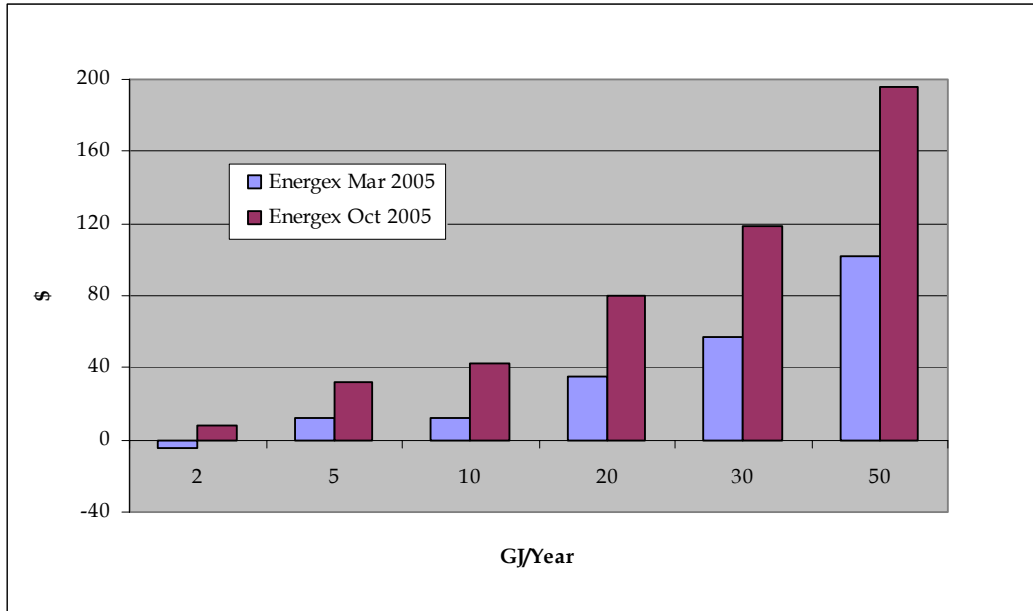
In its revised Access Arrangement documentation Envestra has provided indicative estimates of the costs of delivered gas to a residential customer, presumably consuming about 10 GJ pa, the Envestra average. (Network Development Report p 20 Ch 3). The retail charges were presumably those applicable prior to the 1 October 2005 increases.

From this assessment it can be seen that the retail cost of gas is about \$29/GJ, or \$290/customer pa, while the network cost is about \$21/GJ or \$210/customer pa. Envestra has assessed the cost of gas and transmission at about \$6/GJ (\$60/customer pa) and this leaves, therefore, a retail margin of about \$2/GJ or \$20/customer pa.

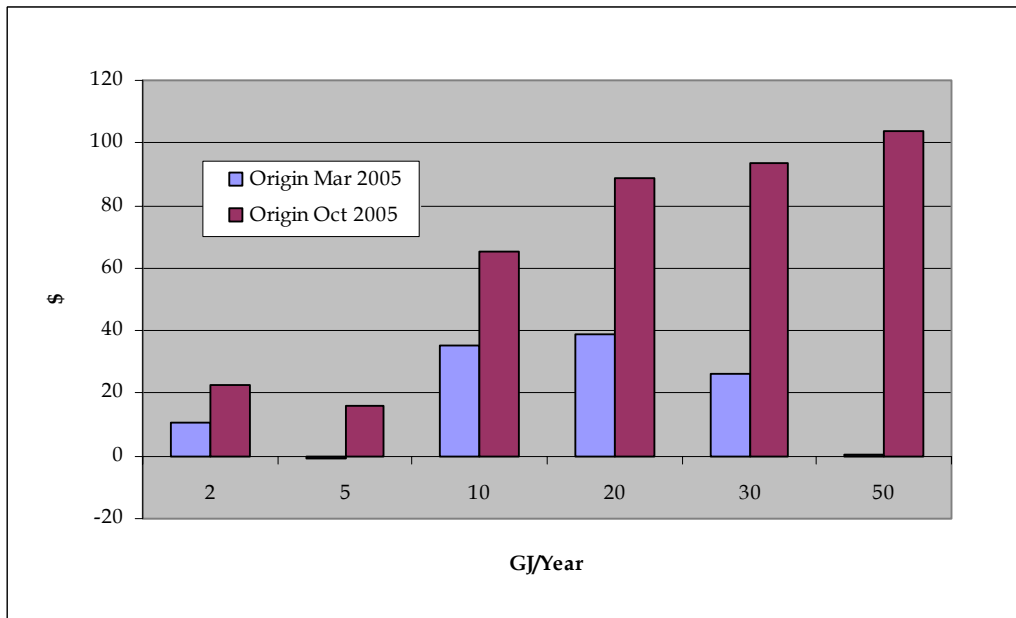
These numbers are reasonably consistent with MMA’s assessment of the prices and costs at the time.

In order to understand the economic drivers for retailers, MMA has analysed the gross margins available to retailers across various consumption sizes in the residential and C&I markets. The gross margins have been calculated as the published retail price minus the published distribution price and minus an estimated cost of gas and transmission to Brisbane. The columns show the gross margins to retailers in dollar terms after the first and second price increases, each of 10%.

**Figure 3-1 Gross retail margin Energex, based on the two recent tariff structures**



**Figure 3-2 Gross retail margin Origin, based on the two recent tariff structures**



As can be seen from these graphs even after the first increase the gross margins available to a retailer were very low for consumption less than 5 GJ and not more than about \$40 in total for any customer of about average size. This is significantly less than the expected average retail costs incurred of around \$80 - \$100 per customer. Gross retail margins of

less than \$30 or so per year may well be less than the marginal retail cost of supplying domestic customers.

There appears to have been very little incentive for Origin to seek to connect new customers on its own behalf. While it is a part owner of the Envestra network (18%)<sup>17</sup>, this appears to provide relatively little incentive for Origin. Thus, while Envestra has an incentive to grow its load in Queensland, Origin appears to have very little. This appears to provide a good rationale for why the Envestra network has seen relatively little residential expansion over the past few years.

While Energex would appear to similarly have very little financial incentive to grow the Allgas network the situation is somewhat different. This is because the Allgas network is entirely owned by Energex. Although the retail margin is likely to be inadequate to fuel growth, the combined distribution and retail margin (taking into account that much of the distribution return is related to capital that has previously been spent) are presumably more attractive.

As can be seen from Figure 3-1 and Figure 3-2, the tariffs now allow retailers to earn a margin closer to the \$100 or so considered reasonable. This may mean that there will be some competition when full retail contestability (FRC) is introduced on 1 July 2007. Retailers may even take some interest in extending the network.

On the other hand, the price increases will further exacerbate the difference in operating costs between electricity and gas. This is likely to have a depressing impact on consumption by existing users (see discussion under average usage) and may make new users more resistant to connecting until Government policy makes gas relatively more attractive.

### **3.2.8 Price of LPG**

Although the price of natural gas is likely to increase relative to electricity, this may not be the case relative to LPG. The world price of LPG commodity has increased significantly over the past year, by about 25% in US\$ terms over the past few months alone. Although the commodity price of LPG is only a component of the price of LPG cylinders delivered to customers, the price of delivered LPG will certainly also have increased. This price increase for LPG means that gas will not necessarily be disadvantaged relative to this fuel.

### **3.2.9 Government policy**

On 2 August 2005 the Queensland Government announced a “Sustainable Housing Initiative”<sup>18</sup> which will require planning submissions for new Class 1 (separate) houses from 1 March 2006 to include:

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<sup>17</sup> ‘Financial Statements 2005’, Origin, June 2005.

<sup>18</sup> Media statement by D Boyle, Minister for Environment, Local Government, Planning and Women, “Smart state to get smarter houses”, 2 August 2005 available at <http://statements.cabinet.qld.gov.au>.

- Greenhouse efficient hot water systems (defined as solar, gas or electric heat pump).
- Energy efficient lighting for at least 40% of internal space.
- AAA rated showerheads.
- Dual flush toilets.
- Pressure limiters to restrict household water pressure to less than 500 kPa.

According to the media statement, about 40,000 new homes need to be built in Queensland each year and these steps will make new houses more sustainable. New units and townhouses will not be required to have the greenhouse efficient hot water systems, but will be required to have the water efficient showerheads, dual flush toilets and energy efficient lighting.

The statement goes on to say that the additional cost for new houses will be low, adding an extra \$260 per house if a gas hot water system is used or \$1500 if a solar hot water system is used.

Discussions with Queensland government personnel have clarified the requirements pertinent to the hot water systems and AAA showerhead requirements for the current study:

- To qualify, gas hot water systems must be considered efficient, either continuous or high (5-star) efficiency.
- The hot water system requirement is for Class 1<sup>19</sup> houses while the AAA showerhead requirement is for both Class 1 and Class 2.
- The requirements are to be uniform across Queensland. Local councils may not elect to vary the requirements. If a council tries to do this, the Department of Local Government will object.
- The new requirement starts on 1 March 2006 for plans submitted after that date.
- The solar hot water rebate scheme ended on 30 June 2005 and there are no moves in place to replace it.
- There has been consideration given to extending the initiative to broader policy objectives such as safety and security, however, these were expected to take some time.
- There has been some consideration given to mandatory disclosure of energy performance in houses upon sale (eg house thermal rating) but this is not expected to impact materially on energy usage within the timeframe.

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<sup>19</sup> Class 1 buildings include all separate houses and all semi-detached row or terrace houses and townhouses. Flats and apartments are the only major class of building excluded.

As a consequence, MMA understands that from 1 March 2006 all new house plans will be required to meet the new requirements. Assuming that new houses take, on average, about nine months between submission of plans and occupation<sup>20</sup>, this means that the impact will start to be felt by about 1 December 2006.

The hot water system impact is expected to be on all Class 1 houses in the area. The impact of the AAA showerheads is expected to apply to all new houses from that date.

MMA expects the policy will also impact on the penetration of gas into new houses. As stated above, although gas hot water systems are more expensive than the electric systems, they are significantly cheaper than the alternatives, solar and heat pump, available to new house builders from 1 March 2006, especially after the removal of the solar rebate. This significant advantage in purchase price is likely to make gas the fuel of choice for hot water systems installed by price conscious buyers and builders.

### **3.2.10 Summary of drivers for customer numbers**

Envestra has forecast that without significant additional market incentives it will grow the market by an average of about 775 net new residential customers pa. This is a little higher than the average achieved over the period 2000 to 2005, but at 1.1% to 1.2% pa significantly lower than the 2.4% pa growth rate forecast for the Envestra region.

However, there are several factors which MMA considers will lead towards an increase in customer numbers even without significant additional marketing effort by Envestra<sup>21</sup>. These are:

- Market development which has already taken place. Envestra has given an indication that it expects to reticulate several new housing estates in the Ipswich area, a key centre of growth for SEQ.
- Marketing improvements which have already taken place over the past year or so. These allowed an increase of over 1000 residential customers to be achieved in 2004/05.
- The Government's Sustainable Housing Initiative, discussed in 3.2.9, which MMA considers will ensure that most new homes with access to gas will choose gas hot water systems from March 2006.
- The increase in price achieved by retailers, discussed in 3.2.7, which means that retailers will now have more incentive to market gas.

Overall we expect that these drivers will, by the middle of the coming regulatory period, mean that penetration of gas into new houses with access to reticulation will almost reach 100%, meaning that growth in net customer numbers will equal or exceed the growth rate of dwellings in the region.

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<sup>20</sup> McLennan Magasanik Associates, report to the Independent Pricing and Regulatory Tribunal of NSW, "Review of consumption forecasts, NSW metropolitan water agencies", December 2004, page 31.

<sup>21</sup> Provided that there are sufficient personnel available to facilitate the growth.

### 3.2.11 Average usage per residential customer

Average usage per customer relies on a multitude of factors. Some of these are listed below.

- **Demographics.** Household size, the number of persons per household, is reducing slowly. This tends to reduce average usage per customer as households with fewer people tend to use less energy for cooking, hot water and heating. Probably as a result of the above change, more Queenslanders are also choosing to live in apartments and town-houses. About one third of new housing approvals in Brisbane over the past few years have been for dwellings other than separate houses. The trend to such dwellings is likely to have been important in the strong trend towards continuous rather than storage gas hot water heating.
- **Weather.** Weather in any given year will have an impact, not only on the amount of gas used in space heating, but also in heating hot water. Despite this neither Allgas nor Envestra have taken weather into account in their forecasts. An additional consideration is that a slight warming trend is evident in Brisbane as it is in other urban parts of the country.
- **Comfort.** Despite household sizes reducing, there is evidence to show that the floor space of houses is increasing, either as new houses are built or renovations made. This, together with an increase in comfort requirements seen in other jurisdictions and increased usage of natural gas in newer applications such as in spas, connections for barbecues and pool heating, acts to increase average usage.
- **Appliance mix and efficiencies.** Although the key uses of natural gas in Queensland, hot water and cooking, remain unchanged, there is evidence that the mix, penetration rates and efficiencies of the appliances are changing. Thus, for example, Envestra has stated that the mix of gas hot water systems in new homes has shifted from 60% storage and 40% continuous flow five years ago to 20% storage and 80% continuous flow now. This is a significant shift with an associated significant shift in average usage per hot water system. As well, Envestra has commented that the increased availability and reduced cost of reverse cycle air conditioning will reduce gas usage for heating.
- **Reduction in hot water use.** Showers are a major contributor to hot water usage. The trend towards water efficient showerheads which has been seen over the past decade has tended to reduce water usage, and hence energy used in providing hot water.
- **Selection of customers.** The transfer of small customers to LPG, to the extent it happens, and decision to connect only hot water and cooker customers will act to increase the average usage of residential customers.

- Government policy. The Government sustainability initiative announced on 2 August 2005 is expected to result in reduced gas usage in hot water systems for new houses as only efficient hot water systems<sup>22</sup> will be allowed.
- Price. Residential prices have increased significantly over the past year. The own price elasticity of natural gas for residential customers has been estimated by one set of researchers to be -0.78<sup>23</sup> and by other researchers to fall between 0 and -1<sup>24</sup>. The price increases will undoubtedly have an impact over the longer term.
- Marketing and availability of gas appliances. Without a reasonable level of marketing and availability of gas appliances there is a possibility that at a change-over consumers might prefer a fuel other than gas.

Overall, there are a great number of drivers impacting on average residential usage. The overall impact of individual drivers will change over time. An assessment of changes in historical average usage should provide the best estimate of recent trends in average usage. Trend estimates are the most relevant to use as they help to take into account impacts such as changes in weather and billing cycles.

### 3.3 Changes in average usage over time

Determining a trend in average usage for either the Envestra or the Allgas networks is not particularly straightforward.

In the case of Allgas we have used the estimated residential usage (after subtracting SHW) over the period 1996-2005. This analysis shows average usage overall to be declining by about 0.1% pa with an average usage in 2005 of about 13.5 GJ.

In the case of Envestra for the Brisbane network the longest series of data available is from 1998 to 2005. This series suggests an increase in trend average usage by about 0.5% pa. Using shorter series, however results in an estimated trend reduction of average usage. On balance, MMA has used a six-year trend including some simple weather normalisation resulting in an estimated annual reduction in average usage of 0.66% pa with an estimated average usage in 2005 of 10.05 GJ.

#### 3.3.1 Forecasting changes in average usage

Once appliances have been chosen they tend to remain unchanged for a lengthy period, of the order of ten to twenty years. Key changes and Government policy, therefore, tend to be applied to new houses when the initial appliance choices are made. Many changes to the residential sector are likely to have most impact on new houses. In order to estimate the impact of these it is necessary to estimate the trend in average usage of new houses and existing houses.

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<sup>22</sup> Taken to mean the efficiency associated with instantaneous or continuous hot water systems.

<sup>23</sup> Australian Gsa Association Research Paper No 3, "Price Elasticities of Australian Energy Demand," September 1996.

<sup>24</sup> M Akmal and DI Stern, "The structure of Australian residential energy demand", February 2001, available from the Australian National University, Working Papers in Ecological Economics at <http://cres.anu.edu.au>.

Using a historical “reconstruction” of estimated changes to average usage, we have estimated the following parameters for the two distributors.

**Table 3-2 Estimated historical and modelling parameters for residential usage**

	Annual change in average usage by existing customers	Starting average use in 2004/05	Estimated new users in 2004/05
Allgas	-0.4%	13.55 GJ	13.4 GJ
Envestra	-1.25%	10.05 GJ	12.7 GJ

We have also factored in the impact of:

- A continuing move towards continuous hot water systems.
- Changing efficiencies of new gas hot water systems and AAA showerheads with the Government Sustainable Housing Initiative.
- The cumulative 20% price increases on 1 October 2005 as an additional annual reduction of 1% pa on existing users<sup>25</sup>. This assumption takes into account a number of factors including the limited capability for short-term response by the residential sector, potential for existing users to switch fuels over time as appliances are replaced, the relatively low size of the annual gas bill in Queensland and a preference for continuing to use gas by existing gas users (according to the Envestra survey “Flying in Formation”, see for example page 16 for hot water replacement intentions). As appliances generally have lives of some 10-15 years this means that some 8% of existing usage will be re-considered every year. Actual switches will depend on customer preferences, convenience and the prices of competing fuels, principally electricity and LPG. While the significant gas price increases are expected to have an influence at the time of appliance replacement, the amount of switching is expected to be tempered by the above considerations. We have assumed that some 10-15% of existing gas customers (a combination of those who according to the Envestra survey were quite likely to choose gas hot water or uncertain about the choice), who are switching appliances annually will choose to switch from gas to another fuel.

### 3.4 Non-residential growth

Non-residential growth is made up of two components:

- Small business (or C&I)
- Large demand customers

<sup>25</sup> TNew users, from 1 March 2006 are still considered likely to use natural gas as the main fuel for hot water systems because of its initial price advantage.

Both are likely to be driven largely by the economy as well as any network extension policies under the network development plan. We consider the C&I and Demand markets separately.

### **3.5 C&I**

#### **3.5.1 Treating small business as a whole**

Envestra has provided information for the small business component of the Volume Haulage service divided into commercial and small industrial customers. However, these are classified by Envestra on the basis of annual consumption, not on the basis of whether they actually are commercial or industrial customers. Thus, a customer which is classified as “commercial” by Envestra will change to being classified as “small industrial” if it increases consumption to over 1 TJ and vice versa.

Thus the history of commercial customers provided by Envestra presumably contains the impact of movements between the commercial and small industrial customers. For a market which is growing this would tend to understate the growth in the commercial market and overstate the growth in the small industrial market.

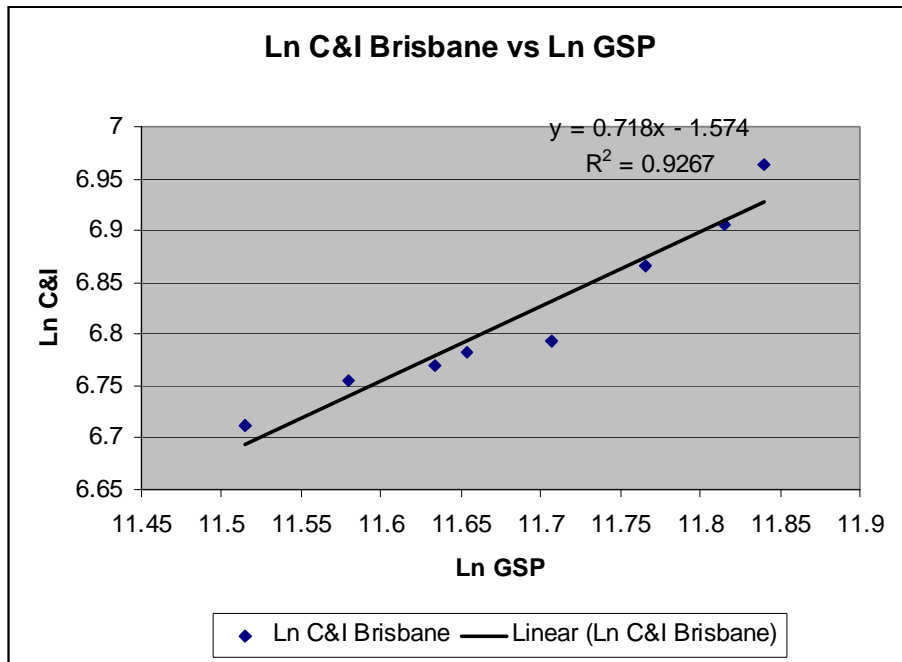
The small industrial classification suffers the same problem – but at both the upper and lower ends of the consumption scale. Thus, small commercial customers which consume more than 1 TJ become “small industrial” while small industrial which consume more than 10 TJ become “large industrial” or demand customers and vice versa.

Because of the uncertainty as to which customers actually are commercial and which small industrial, and the potential distortions caused by such movements between classes, MMA considers it more appropriate to consider the small business class as a whole.

#### **3.5.2 Growth and GSP**

As has been seen in Section 2.4, the Envestra small business category has been growing at about 3.5% pa over the period 1999-2005. The history of Envestra C&I sales is reasonably described by a relationship with Queensland GSP. This relationship is shown in Figure 3-3.

**Figure 3-3 Relationship between Ln C&I consumption and Ln GSP**



As seen from the graph, growth in the most recent year (the point at the far right of the graph) appears anomalously high. Continuing this trend results in a similar consumption outcome in 2006 as 2005 with overall forecast growth being about 2.4% pa. A linear time-trend has much the same outcome.

The results have been, and will in the future certainly be, impacted by the movement between the Volume to Demand classes. Over the past 3 years this has resulted in a net movement of about 60 TJ from the Volume Tariff to the Demand Tariff. Thus it is clear that the small business market is growing more rapidly than the above relationship demonstrates, but the relationship probably realistically illustrates the natural capping of growth in this market by customers migrating to the Demand Tariff.

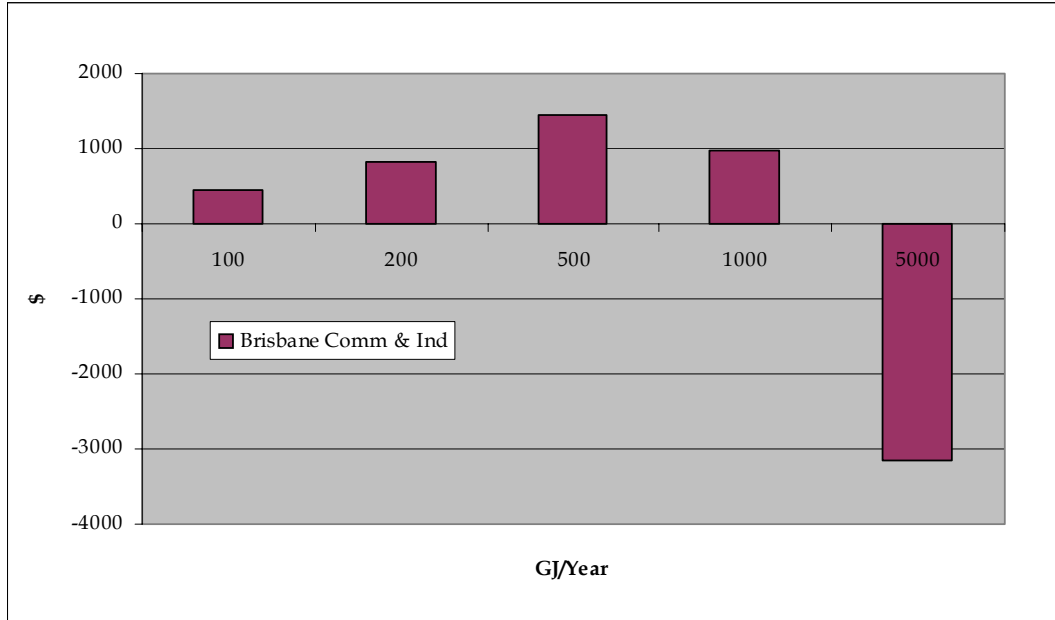
Use of the similar relationship for the Northern region results in a projected growth rate of just over 2% pa.

**3.5.3 Pricing and retail contestability**

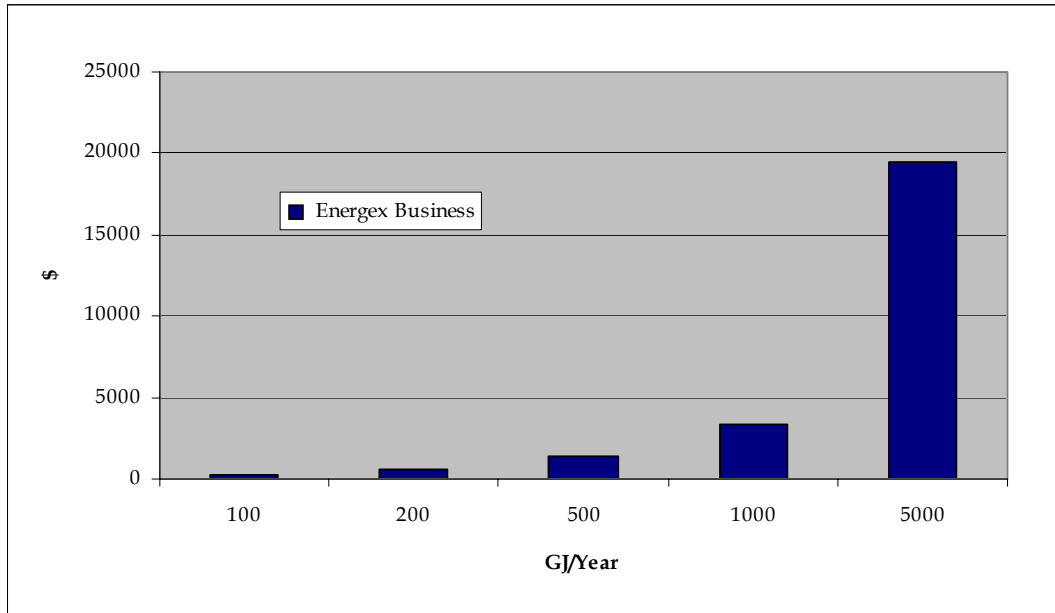
Customers of size greater than 100 TJ have been contestable since January 2003. Retail contestability for commercial and industrial customers of size greater than 1 TJ commenced in October 2005 while full retail contestability is scheduled to commence on 1 July 2007.

We would expect retail contestability to allow price competition in some, but not necessarily all sections of the market. This is illustrated in the following Figures which provide indicative gross retail margins (published retail tariffs minus published distribution tariffs minus estimated cost of gas plus transmission) for the Origin/Envestra and Energex/Allgas C&I market between 100 GJ and 5 TJ.

**Figure 3-4 Indicative gross retail margins, \$ pa, for C&I customers on the Envestra Brisbane network**



**Figure 3-5 Indicative gross retail margins for C&I customers on the Allgas network, \$ pa**



While it must be stressed that the above margins are indicative only, as we have used estimated costs of gas and transmission by customer size and based our analysis on published tariffs, some issues are highlighted by this analysis.

Firstly, the dollar margins on the Envestra network appear anomalously low for the larger customers approaching the 10 TJ threshold. Retail customer costs and margins in \$ terms generally increase with size, therefore the shape of the Allgas margin curve appears more normal.

Secondly, it would appear that, based on the published tariffs, there has been little incentive for Origin to pursue growth by customers of size 1 TJ or above. While it may be that gas and transmission are less expensive than we have assumed, based on our assessment the distribution pricing structure provides limited scope for any retail margin. We do not see retail contestability having a price impact on these customers<sup>26</sup> unless the distribution price structure changes.

There does appear to be some scope for retail price competition in the Allgas C&I market of size greater than 1 TJ.

We do not have information about prices paid by demand customers (> 10 TJ pa), but anecdotal information does suggest that there will also be scope for some price competition in these markets as well.

One of the SPs has commented that despite contestability being announced this did not mean any would actually ensue, as the market is very small, barely profitable and as the two incumbent retailers have contracted the entire capacity of the Roma to Brisbane Pipeline. While MMA agrees that this may limit entry by new retailers, it does not, however, preclude competition between the incumbent retailers. For example, there has been some churn among customers of size greater than 100 TJ, and evidence of price competition even when churn did not eventuate.

Given the size of the margins available for commercial and industrial customers, MMA considers it likely that there will be some price competition, even if only between incumbent retailers, but this will be patchy, and network and size specific. However, there is also the possibility that retail contestability might, in some cases, result in price increases. The own-price elasticity of demand by the commercial and industrial customers at about -0.1 to -0.3<sup>27</sup> are lower than that of the domestic customers. While we do expect some impact from competition, given the uncertainty about extent and location we have not modelled these.

## 3.6 Demand customers

### 3.6.1 Economic drivers

Unless there are extensions to the network the main drivers of consumption in the demand market are likely to be economic. Figure 3-6 shows the relationship between natural logarithm (ln) of GSP and the ln consumption by the large demand customers using historical data derived from a number of sources. The correlation coefficient for the

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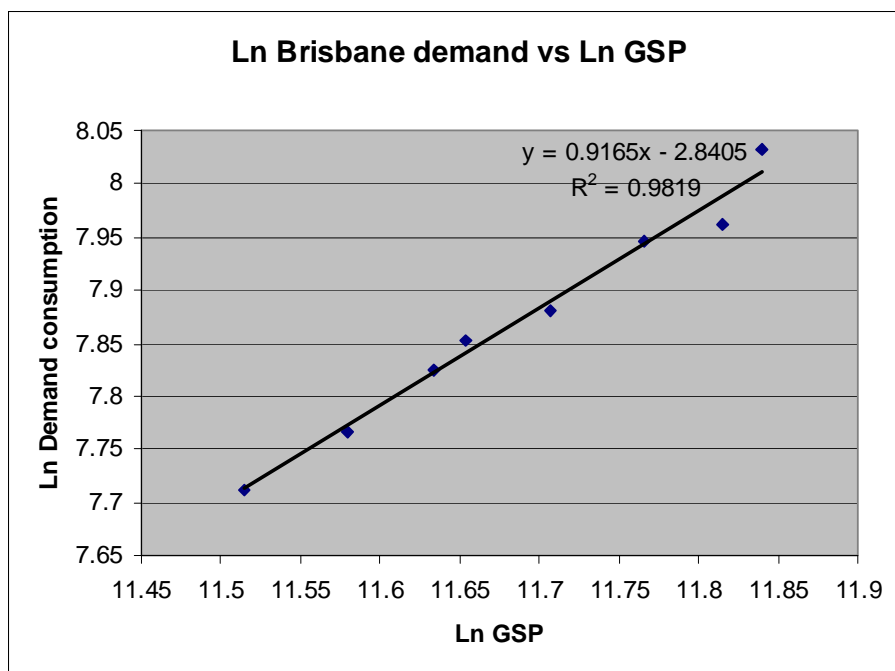
<sup>26</sup> The 1 to 100 TJ market became contestable on 1 November 2005.

<sup>27</sup> Australian Gas Association Research Paper No 3, "Price Elasticities of Australian Energy Demand," September 1996.

relationship is quite strong ( $R^2$  of 0.98). The equation shows that a 1% increase in GSP historically results in approximately a 0.9% increase in gas usage<sup>28</sup>.

The correlation coefficient for the Northern market has a lower correlation coefficient ( $R^2 = 0.68$ ) and shows gas demand increasing at about 1.1% for every 1% increase in GSP.

**Figure 3-6 Log-log relationship of GSP and large customer demand**



### 3.6.2 Discussions with large customers

Significant changes by large customers such as curtailment, closure, expansion, process changes and relocation may well have a have a significant impact on gas consumption, especially for small networks. Discussions with these customers are likely to provide an overview of expected change and provide an alert to major developments.

However, while important, relying purely on such information is likely to be inadequate for forecasting purposes as this will likely ignore growth from the smaller and new sectors.

### 3.6.3 Volume Tariff to Demand Tariff transfers

A further source of growth is transfers of customers from the Volume Tariff to the Demand Tariff. As we have seen previously (Section 3.5.2), over the past few years there has been a net transfer in of at least 60 TJ of consumption from such customers. While these transfers have capped growth in the C&I market, they contribute to it here.

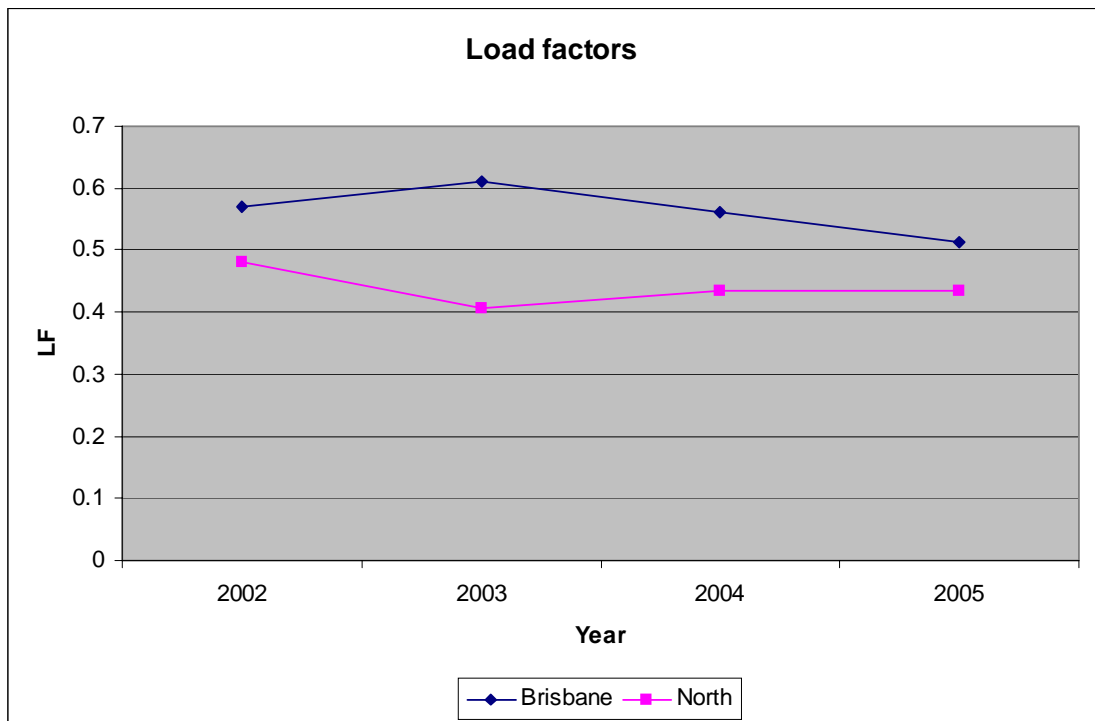
<sup>28</sup> Note that as GSP has been increasing over the period the later years are to the right of the Figure, with the year 2005 being represented by the point furthest to the right.

### 3.6.4 Maximum daily quantity

As has been seen in Section 2.5, the MDQ of large customers in the Brisbane region has increased significantly over the past few years, about half being due to increases in consumption and half to reductions in load factor.

A graph of load factors implied by the ratio of Average Daily Quantity (ADQ which is the consumption divided by the number of days in the year) to MDQ for the Brisbane and Northern networks is provided in Figure 3-7. As can be seen the load factor appears to have dropped for the Brisbane network while remaining reasonably constant for the Northern network. In general we would consider it reasonable to expect that smaller new customers entering the market (for example Volume Tariff to Demand Tariff movements) will tend to reduce the load factor over time. Consideration must be given to the potential for changing load factors in forecasts.

**Figure 3-7 Load factors for demand customers in the Brisbane and Northern networks**



## 4 FORECASTS FOR ENVESTRA

### 4.1 Residential market

MMA has forecast separately the customer numbers and average usage components of the residential market.

#### 4.1.1 Residential customer numbers

As seen in Sections 3.1.1 and 3.2.2, the number of dwellings in Brisbane has been growing by the order of 2.5% pa and a similar growth rate is expected over the coming regulatory period. Envestra’s residential customer numbers have been growing at a substantially lower rate, some 0.9% pa. Some of the reasons behind this have been provided in Section 3.2.1.

As discussed in that section, MMA believes that several key drivers have changed with respect to customer number connections suggesting that these should increase significantly over the coming regulatory period. After the Government Sustainable Housing Initiative is fully implemented MMA expects that virtually all new houses in the region will move to natural gas hot water services. We have forecast net customer growth for the network to be the same as the forecast growth rate for the regions, 2.4% pa for Brisbane and 0.9% pa for the Northern region.

Before then MMA considers that the growth achieved in 2004/05 for the Brisbane market and the average growth achieved over the past few years in the Northern market can be maintained.

#### 4.1.2 Net and gross residential customer number growth

The net residential customer numbers and forecasts of new connections are provided in Table 4-1.

**Table 4-1 Projections of residential customer numbers and new connections**

	2005	2006	2007	2008	2009	2010	2011
Brisbane Residential	67000	68046	69434	71101	72807	74555	76344
Northern Residential	2913	2926	2947	2974	3000	3027	3055
Net Residential	69913	70972	72382	74074	75808	77582	79399
Growth in residential customer numbers		1059	1409	1693	1733	1774	1817
Disconnections	477	484	494	505	517	529	541
New connections		1543	1903	2198	2250	2303	2358

Envestra has experienced an average disconnection rate of 477 customers across both regions over the past few years. While MMA has not been able to check these for

consistency they do not appear unreasonable. We have assumed that all the disconnections are residential. The number of new connections (net new customer numbers plus disconnections) is provided in Table 4-1.

## 4.2 Average usage per residential customer

### 4.2.1 Residential

As discussed in Section 3.3, MMA has assessed and applied a decline in average usage by existing gas users of -1.25% pa to take into account recent trends. Superimposed on these has been a further decline of 1.0% pa to take into account the expected impact of the recent price increases on existing users.

New Brisbane users have also been forecast with gas load reducing from 12.7 GJ in 2005 to 11.1 GJ in 2011, due to the new sustainability initiatives requiring efficient gas hot water systems and efficient showerheads. We have not factored in any increased average usage (from other appliances such as heating or spas) in the first five years by these new home customers.

This has resulted in the average usage for all residential users dropping from 10.0 GJ to 8.9 GJ over the period. A similar approach has been taken for the Northern market<sup>29</sup>.

The results are provided in Table 4-2. Also provided in this Table are the resulting forecast loads for Brisbane and Northern and the Envestra network as a whole.

**Table 4-2 Residential market forecasts, customer numbers, average usage and consumption by network.**

<b>Residential</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>
<b>Brisbane</b>							
Number of customers	67000	68046	69434	71101	72807	74555	76344
Average usage, GJ	10.0	9.9	9.7	9.5	9.2	9.1	8.9
Brisbane Consumption, TJ	673	673	673	673	673	675	677
<b>Northern</b>							
Number of customers	2913	2926	2947	2974	3000	3027	3055
Average usage, GJ	8.1	8.0	7.8	7.7	7.6	7.5	7.4
Northern load	24	23	23	23	23	23	23
<b>Total residential</b>							
Number of customers	69913	70972	72382	74074	75808	77582	79399
Average usage	10.0	9.8	9.6	9.4	9.2	9.0	8.8
Residential load	697	696	696	696	696	698	700

MMA is forecasting the total Envestra residential market to essentially remain flat, at some 700 TJ pa over the period 2005 to 2011. We forecast that customer numbers will increase

<sup>29</sup> We have used the same reduction in average usage for existing customers in Northern as we have for Brisbane.

by about 2% pa due largely to the effects of the Queensland Sustainable Housing Initiative. However, this is expected to be accompanied by a reduction in residential average usage of about the same order. The expected decline is due to a continuation of the factors that have prevailed over the past few years, together with the effect of the recent price increases and appliance efficiencies brought about through the Sustainable Housing Initiative.

### 4.3 Comparison with the Envestra forecasts

The MMA and Envestra load forecasts for the domestic market are compared in Table 4-3.

**Table 4-3 Comparison of MMA and Envestra forecasts for the Residential market**

<b>Customer Numbers</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>
<b>Brisbane</b>							
MMA Customer Numbers	67000	68046	69434	71101	72807	74555	76344
Envestra customer numbers with marketing		67719	69441	71498	73742	76184	78850
<b>Northern</b>							
MMA Customer Numbers	2913	2926	2947	2974	3000	3027	3055
Envestra customer numbers with marketing		2936	2958	2980	3001	3023	3047
<b>Consumption, TJ</b>							
<b>Brisbane</b>							
MMA Residential load forecast	673	673	673	673	673	675	677
Envestra load with marketing		680	695	695	723	754	789
<b>Northern</b>							
MMA Residential load forecast	24	23	23	23	23	23	23
Envestra load with marketing		24	24	23	23	23	23

According to Envestra the impact of the marketing is an increase in customer numbers on line of mains by about 7200 over the period and an increase in total load of 111 TJ by 2011. Subtracting the marketing loads would bring them approximately into line with the MMA residential forecasts.

## 4.4 C&I market

### 4.4.1 Consumption forecasts

MMA has assessed small business consumption by using a regression analysis of ln C&I usage against ln GSP. This is because growth in this segment is expected to result largely from economic growth.

This results in forecast growth rate of 2.3% pa, a reduction on the 3.5% pa seen over the past six years. A linear time analysis produces a similar result. The reduction in growth possibly over-reflects the expected slight slow-down in the economy and the potential for movement from Tariff V to Tariff D classes.

MMA’s forecasting of customer numbers has been derived by dividing the annual loads by the expected average usages per customer.

### 4.5 Comparison with the Envestra forecasts

Actual 2004/05 numbers together with the MMA and Envestra forecasts are provided in Table 4-4.

**Table 4-4 Comparison of MMA and Envestra forecasts for the C&I market**

	2005	2006	2007	2008	2009	2010	2011
<b>Consumption forecasts, TJ</b>							
<b>Brisbane</b>							
MMA Forecast	1058	1055	1099	1135	1161	1189	1214
Envestra forecast	1058	1083	1133	1183	1234	1292	1356
<b>Northern</b>							
MMA Forecast	161	160	166	171	174	178	181
Envestra forecast	161	167	171	175	178	182	186
<b>Customer number forecasts</b>							
<b>Brisbane</b>							
MMA Forecast	4,357	4,351	4,540	4,701	4,817	4,940	5,056
Envestra forecast	4,357	4,815	5,047	5,268	5,441	5,656	5,915
<b>Northern</b>							
MMA Forecast	371	370	383	394	402	410	418
Envestra forecast	371	380	391	400	409	418	429

The consumption forecasts produced by Envestra for the Brisbane C&I market are significantly higher than those of MMA as are the customer numbers. Envestra has proposed some additional marketing expenditure for the C&I market, specifically in the

areas of employing an additional engineer<sup>30</sup>. However, Envestra has stated that it has not directly attributed any additional load to this expenditure over the next AA period.

The MMA and Envestra forecasts for the Northern network are similar.

## **4.6 Demand load**

MMA has forecast consumption for the Envestra demand market by:

- Considering growth achieved over the periods 1996 to 2005.
- Holding discussions with several of the largest Envestra customers
- Using the relationship derived between GSP and consumption to forecast growth in consumption by region.
- Deriving an estimated MDQ from the derived relationship between consumption and MDQ
- Taking into account an announced curtailment due to change of location.

### **4.6.1 Relationship between consumption and GSP**

MMA has used the linear relationship between ln consumption and ln GSP over the period 1998 to 2005 in its forecasting. The relationship is graphed in Figure 3-6.

This relationship, together with the Econtech GSP forecasts results in a forecast growth rate between 2005 and 2011 of about 3.4% pa for the Brisbane network and 4.3% pa for the Northern network.

### **4.6.2 Discussions with large customers**

MMA has held discussions with a number of Envestra's largest customers. Most of the customers foresee consumption staying reasonably flat over the next five years, although a couple expect to grow, one significantly, while one has foreshadowed that part of its business will relocate. Overall, without the relocation, the users we have spoken to in aggregate foresee consumption growth of over 3% pa, and this does not take into account growth from smaller and new users. It also does not take into account some demand increase expected from retail contestability which has been recently introduced in the 1 to 100 TJ market. These should allow continued growth in the market.

Probably the key findings from the discussion with large Brisbane customers are the confirmation that some growth is expected by a few while one expects to move and thus curtail usage. In the Northern region Envestra has advised the curtailing of usage by two large customers from the 2004/05 year. Austicks, an ice-cream stick manufacturer, has switched to alternative fuels while Naturally Australian Foods has closed. Between them these two were responsible for almost half of the contracted MDQ in this region. The

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<sup>30</sup> Envestra "Additional activities proposed", Attachment 3 to the Network Development Paper.

changes in MDQ have been factored into the MMA consumption forecasts for the demand market which are provided in Table 4-5.

**Table 4-5 Historical and forecast consumption growth rates for the demand market**

Consumption	1998-2005	2001-2005	Forecast 2005-2011
Brisbane	4.7%	5.2%	2.7%
Northern	5.1%	1.5%	-4.2%

**4.6.3 Load factor and MDQ forecasting**

As discussed in Section 3.6.4, load factors have reduced over the past few years, meaning that the growth rate of MDQ has been significantly higher than that of consumption.

MMA has considered trending the load factor in line with changes seen from 2002 to 2005. However, given the lack of history and lack of understanding as to the causes of this reduction in load factor, MMA believes it reasonable to be cautious and assume that the reduction over the next period will be limited to 0.5 percentage points pa, about one third that experienced over the past three years in Brisbane while the load factor is forecast to remain constant in the Northern region..

The resultant MDQ forecasts, by region, are provided in Table 4-6.

**Table 4-6 Comparison of MMA and Envestra MDQ forecasts for the Demand market, TJ**

MMA MDQ forecasts, TJ	2005	2006	2007	2008	2009	2010	2011
Brisbane	16.5	16.5	17.3	18.2	18.9	19.7	20.5
Northern	0.38	0.24	0.26	0.27	0.28	0.29	0.30
Envestra MDQ forecasts, TJ	2005	2006	2007	2008	2009	2010	2011
Brisbane	16.5	16.5	17.3	17.3	17.3	17.3	17.3
Northern	0.38	0.25	0.25	0.25	0.25	0.25	0.25

The MMA forecasts are greater than the Envestra forecasts in the Brisbane network from 2008. In the Northern region the loss of two customers has resulted in an initial fall of MDQ. However, MMA is forecasting an increase in gas usage in the region while Envestra is forecasting that the MDQ will remain flat.

## APPENDIX A POPULATION AND DWELLING GROWTH

### A.1 Population Growth

#### A.1.1 Overview of Queensland growth

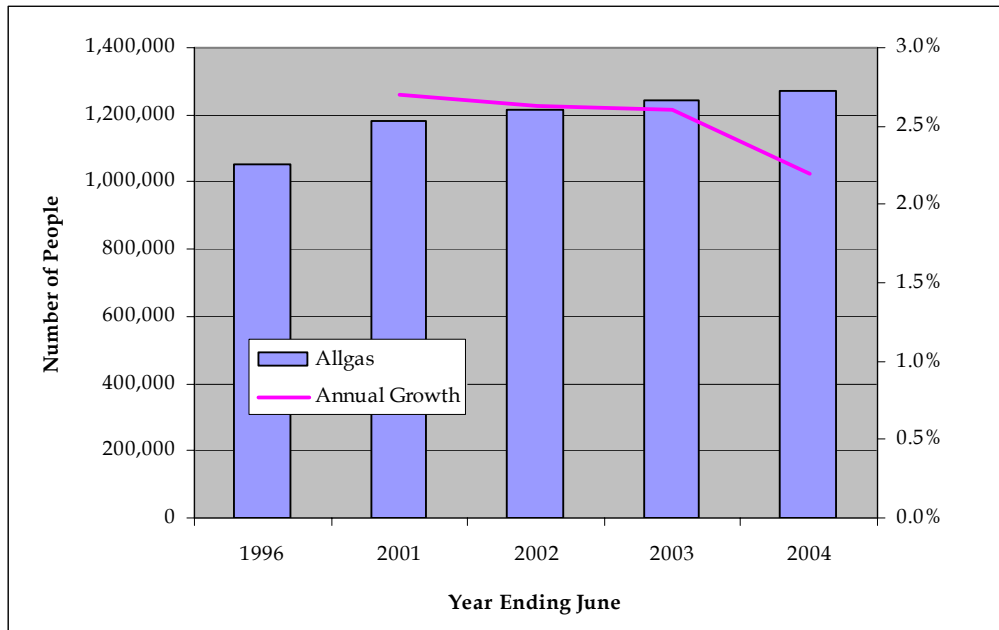
Queensland population is growing relatively rapidly, achieving a growth rate of 2.1%, about 80,000 people, compared with the rest of Australia at 1.2%, in the year to 30 June 2004.<sup>31</sup> The high growth has been maintained over the last decade with average growth at about 2% pa to 31 Dec 2004.<sup>32</sup> The majority (76%) of this growth was in SE Queensland, at about 62,000 people.<sup>33</sup> In absolute terms Brisbane and the Gold Coast are well above any other region in Queensland with growth at about 18,000 and 13,000 people respectively.<sup>34</sup>

The historical population growth for the regions serviced by the SPs was analysed on an LGA level using data provided by the Queensland Government.

#### A.1.2 Allgas Region Historical

Using data provided by the Queensland Government, MMA has assessed the historical population numbers and growth for the Allgas distribution area, illustrated below in Figure A-1.

Figure A-1 Historical growth for the Allgas region



Source: 'Population Growth- Highlights & Trends 2005', Qld Gov, Planning Information & Forecasting Unit.

<sup>31</sup> Queensland Government, 'Population growth - highlights and trends, Queensland 2005'

<sup>32</sup> 'Housing Update, No 18', October 2005 PIFU, Qld Government

<sup>33</sup> Queensland Government, 'Population growth - highlights and trends, Queensland 2005'

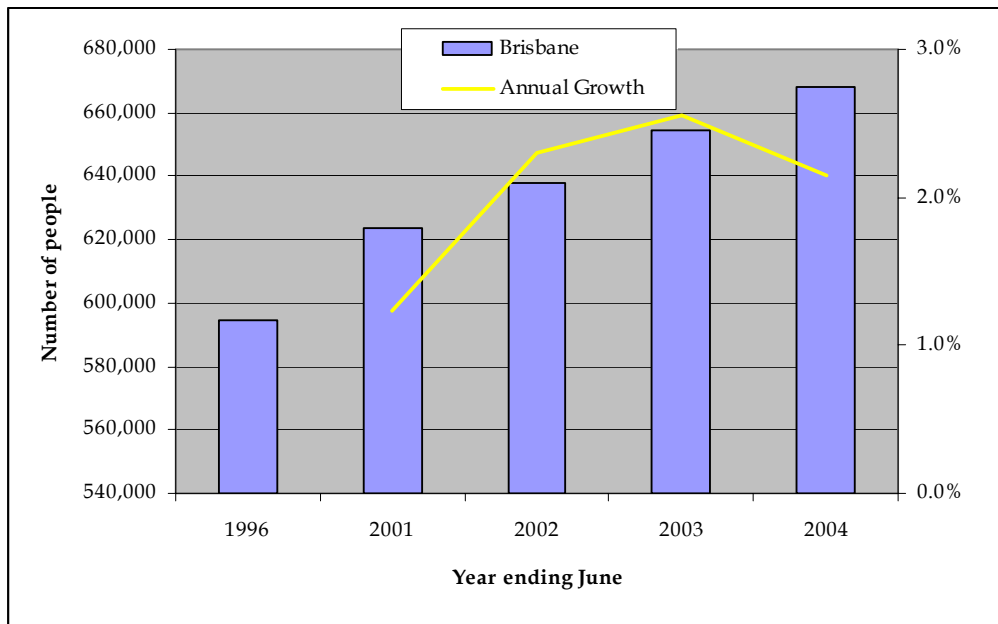
<sup>34</sup> Queensland Government, 'Population growth - highlights and trends, Queensland 2005'

Population in the Allgas distribution area has undergone substantial growth, having a compound annual growth rate of 2.4 % for the 1996-2004 period. This increased for the period 2001-2004 to 2.5 %. Despite there being a slow-down in 2004, it still remained strong at about 2.2% in that year.

While not all the population presented here as Allgas has reticulated gas, the growth is representative of the reticulated area.

**A.1.3 Investra Region Historical**

**Figure A-2 Historical growth for the Investra Brisbane network**



Source: 'Population Growth- Highlights & Trends 2005', Qld Gov, Planning Information & Forecasting Unit.

The Investra region grew at just 1% pa for the period 1996-2001 however this increased significantly to about 2.3% pa for the period 2001-2004. A further breakdown of the Investra area was able to limit the LGAs included to only those with reticulation. This revealed only a slight difference in growth with growth over the period 2001-2004 being 2.4% pa. In light of this small difference MMA has used the whole Investra region for its analysis.

**A.1.4 Forecasts of Population**

MMA has assessed several different population growth forecasts which are provided in Table A-1.

**Table A-1 Population projections, % change**

Source	Growth, % pa	Years
NIEIR(Energex Elec Region)	2.26%	2006-2010
NIEIR-NEM States(Qld)	2.1%	2004-2009

Sources: NIEIR Reports 'The economic outlook for the NEM states to 2014-15', May 2005 and 'Electricity consumption and maximum demand projections for the ENERGEX region to 2014', August 2004.

MMA considers a rate of population growth of 2.0% - 2.1% pa for Queensland to be reasonable to assume for the coming regulatory period. As the South East Queensland population is growing more rapidly than the Queensland population, MMA considers a population growth rate for the region of about 2.2% to 2.3% to be reasonable.

## **A.2 Housing Growth**

### *A.2.1 Overview of Queensland growth*

As for population, growth in dwellings has been strong, again particularly in SEQ. The following analysis is based on ABS census data from 2001 and housing approvals from the Queensland Government by LGA<sup>35</sup>.

Queensland as a whole saw growth in dwellings of about 2.6% pa over the period 2000/01 to 2004/05. The Statistical Division (SD) of Brisbane (SD) also saw a 2.6% pa increase in dwelling stock. In the year to June 2005, Ipswich (C) - East and Coomera-Cedar Creek had the highest number of dwelling approvals with 1,271 and 1,169 respectively.<sup>36</sup>

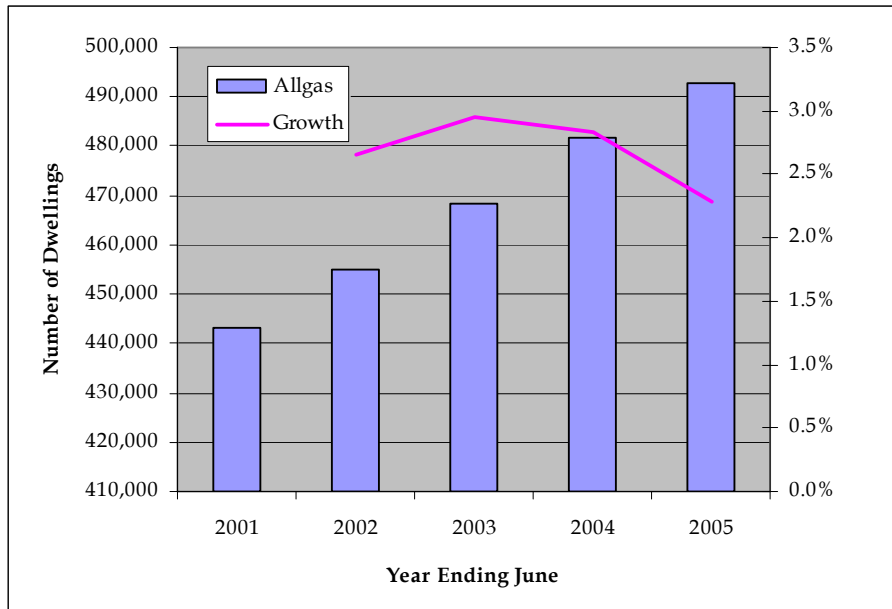
### *A.2.2 Allgas Region Historical*

MMA estimates of historical housing growth for the Allgas area are illustrated in Figure A-3.

<sup>35</sup> We have assumed that 90% of the dwelling approvals translate into net dwellings with no time lag.

<sup>36</sup> Housing Update 18, October 2005, PIFU- Qld Government.

**Figure A-3 Dwelling Stock Growth for the Allgas Distribution Area**

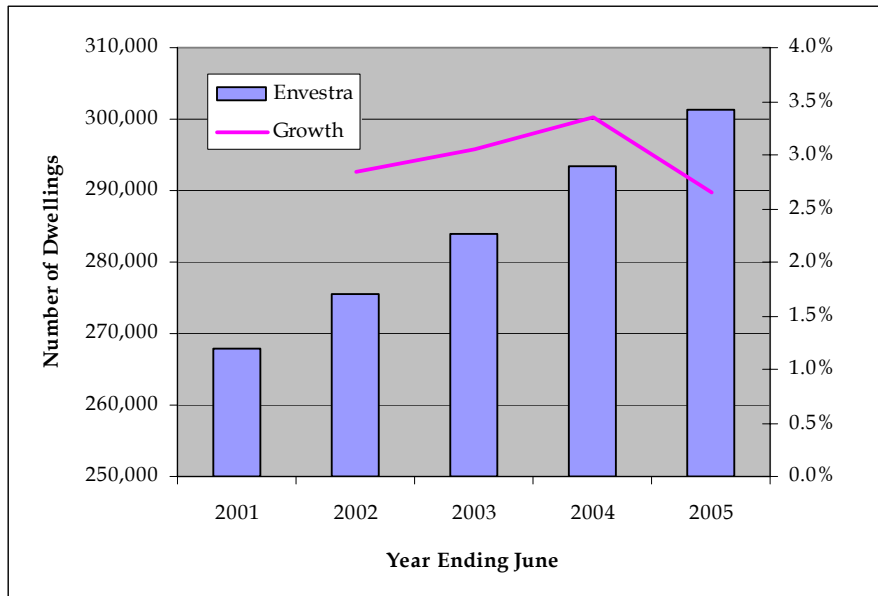


The Allgas distribution area has seen strong dwelling growth over the past few years, with growth at about 2.7% pa since 2001. This is due to the very strong growth in the Gold Coast region at around 3.5% for the period while South Brisbane had average growth of 2.3% pa. The peak in 2003 was 2.9%, with a drop in growth for the financial years 2004 and 2005.

### ***A.2.3 Envestra Region Historical***

The historical housing growth for the whole Envestra region is shown in Figure A-4. Envestra has seen average growth of around 2.7% pa for the period 2001-2005. There has been extremely strong growth in Ipswich (SD) at over 5% pa, while North Brisbane has seen growth of around 2.7% pa. The statistical divisions of Gladstone and Rockhampton have seen 2.3% pa and 1.0% pa respectively.

**Figure A-4 Dwelling stock growth for the Envestra region**



**A.2.4 Forecasts of Dwelling Numbers**

Table A-2 contains various projections of dwelling growth for Brisbane and Queensland and the Energex electricity distribution area.

**Table A-2 Forecast Dwelling Growth Rates, % pa**

	CAGR	Years
NIEIR(Energex Elec Dist)	2.35	2006-2010
NIEIR(Qld, for Energex)	2.21	2006-2010
ABS(Qld)	2.34	2005-2011
ABS(Brisbane)	2.26	2005-2011

Sources: NIEIR Reports. 'The economic outlook for the NEM states to 2014-15', May 2005 and 'Electricity consumption and maximum demand projections for the ENERGEX region to 2014', August 2004. Projected Households, Series II 'Family & Household Projections 2001-2026' (3236.0) , ABS 2002.

Projected growth rates range from 2.2% pa to 2.5% pa. The ABS projections are older projections than the NIEIR ones, so MMA considers these to not have fully factored in recent rapid growth rates and thus to slightly underestimate the likely growth in dwellings.

**Envestra**

MMA expects Envestra’s Brisbane region growth to be about 2.4% pa.

**Allgas**

MMA expects the growth in dwellings for the Allgas region to be about 2.4% pa for the period 2005-2011.