



Draft report to

Independent Pricing and Regulatory Tribunal of NSW

Review of demand forecasts for the AGL Gas Network
(AGLGN)

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EXECUTIVE SUMMARY

Background

The Independent Pricing and Regulatory Tribunal of New South Wales (the Tribunal) has asked McLennan Magasanik Associates (MMA) to review demand forecasts proposed by the gas network companies AGL Gas Networks (AGLGN) and Country Energy Gas (CEG) for its Wagga Wagga network to ensure that they meet the Gas Code criteria of “..best estimates arrived at on a reasonable basis”.

MMA has carried out the review as a combination of desktop exercise and detailed interaction with the companies. At this draft report stage MMA has established a number of detailed recommendations for both companies which, if adopted, would allow the forecasts to be considered by MMA to meet the criteria.

AGLGN forecasts in the context of recent history

Recent AGLGN history and forecasts are best summarised in Figure 1, Figure 5 and Figure 6 for the residential, small business and contract markets respectively contained in the main text. In all cases the results show a reduction of growth compared to recent trend which needs to be explained.

Review disaggregation and methodology

The AGLGN forecasts have been reviewed disaggregated into:

- Residential customer numbers
- Residential average usage
- Business customer usage
- Contract customer usage and MDQ

In most cases MMA has considered the methodology adopted by AGLGN to be reasonable. However, in many cases the assumptions made are either considered to be unreasonable or to require further analysis or justification.

Recommendations

The 26 detailed recommendations are contained in the main text. The following sections only provide a brief overview of the main areas of recommendation.

Residential market

AGLGN has forecast customer numbers through use of external forecasts and historical penetration rates. It has analysed future average usage across a range of customer types against a background of a slight warming trend in weather, 2002/03 usage being low because of the mildness of the weather and the likely impact of a government program on new houses. Major recommendations are:

- AGLGN should use the latest BIS Shrapnel numbers for forecasting purposes
- AGLGN should use trend analysis for the purposes of forecasting gas penetration by housing type. This will also allow the incorporation of some increased penetration due to the Government's new program, Basix, which aims to improve the sustainability of new houses.
- AGLGN should update its analysis of increases in average usage by residential customers.
- Further detailed analysis is required by AGLGN to justify its forecasts of changes to consumption in new houses caused by Basix.
- The starting point for expected use in all types of new connections should be the average over the past three years.

Small business usage

AGLGN has forecast small business growth in line with recent history, after removing the impact of recent new projects. Major recommendations are:

- AGLGN should update its analysis of underlying growth in usage by small business customers
- Net Tariff to Contract movements need to be reviewed not in the light of what AGLGN considers is rational, but what customers have actually asked for.
- Existing new projects growth should continue to be separately counted.

Contract usage and MDQ

The contract market has been divided into 17 majors each consuming more than 800 TJ and the non-majors which have been divided into industry categories.

- AGLGN has forecast reductions to MDQ for several of the majors as the current levels do not appear rational. These MDQ reductions need to be re-assessed not in the light of what AGLGN considers is rational, but what customers actually plan to do.

- AGLGN should consider relationships other than linear time analysis in its forecasting of growth in consumption by the non-major industry groups. Better relationships can be established with, for example, correlation against sector output. In most cases the relationships with the best coefficients should be used.
- There should be a reconciliation made between numbers contained in the contract market report and those used in forecasting and the adjustments made in the baseline year, 2002/03.
- The methodology used by AGLGN of combining trend analysis and known additions and closures risks double-counting. AGLGN should consider other methods to reduce the risk of such double-counting.

Impact of the changes

The implementation of these recommendations will result in a material change to the AGLGN forecasts. AGLGN has already been advised of the gist of many of these recommendations and has, in some cases begun to implement them.

1 INTRODUCTION

The Independent Pricing and Regulatory Tribunal of New South Wales (the Tribunal) is the regulator of the gas distribution businesses in NSW under the National Third Party Access Code for Natural Gas Pipelines (the Gas Code). The Tribunal is currently undertaking a review of the regulatory arrangements to apply to the covered NSW gas distribution networks of gas network companies (GNCs) AGL Gas Networks (AGLGN) and Country Energy Gas (CEG) from 1 January 2005. Demand forecasts are important in the determination in the following areas:

- In calculating tariffs. Here the regulated or required revenue is generally divided by the forecast demand parameters (volumes, customer numbers and maximum daily quantity (MDQs) to determine tariffs
- In assessing the reasonableness of capital and operating costs over the coming regulatory period.
- In reviewing marketing budgets

The Tribunal has asked McLennan Magasanik Associates (MMA) to carry out an independent critical review of review forecasts by the GNCs and to recommend any changes or improvements to the forecasting methodology and assumptions. This report considers the AGLGN forecasts.

1.1 SCOPE OF AGLGN OPERATIONS

In 2002/03, AGLGN distributed about 97 PJ to 893,000 customers in Sydney, Newcastle, Wollongong and country areas of NSW. AGLGN distributes gas to tariff customers (those who consume less than 10 TJ of gas pa) and contract customers (those who consume 10 TJ of gas or more pa). The approximate proportion of customer numbers, volume and revenue represented by the tariff and contract markets is provided in Table 1.

Table 1: Tariff and contract markets as approximate proportions of company volumes, customers and revenues

	Customers	Volumes	Revenue
AGLGN tariff market	99.95%	32%	85%
AGLGN contract market	0.05%	68%	15%

1.2 THE REVIEW PROCESS

Demand and customer number forecasts were provided by AGLGN for the period 1/7/2004 to 30/6/2010. MMA's main brief has been to review the forecasts and establish

that the forecasts can be said to represent ...“best estimates arrived at on a reasonable basis” as required under Section 8.2 of the Gas Code.

In reviewing the growth forecasts, MMA has asked the following questions:

- Is the approach taken the best that could be reasonably expected?
- Are the assumptions made the best that could reasonably be expected?
- Is the information/data that are used the latest obtainable?
- Is there a balance between use of “historical trends” and “key drivers” in forecasting?
- Is the methodology properly applied?

The review has been largely based on desktop research, clarification of forecasting methodologies, parameters, assumptions, issues and drivers and discussion and debate about these matters with AGLGN and brief discussions with personnel from some of AGLGN’s largest customers.

It must be stressed that while this has been a detailed review of methodologies it has not been intended to validate the actual application of the methodologies through spreadsheets calculations and specific forecasts except in an overview sense.

The review has to draft report stage been carried out as follows:

- The GNCs provided their forecasts and some accompanying information in their Access Arrangement Information.
- MMA formulated a series of detailed questions related to historical information, forecasting methodology and key parameters and assumptions. These were sent by MMA to the GNCs.
- The responses were supplied to MMA, generally in the form of spreadsheet tables and reports.
- MMA followed up with questions for clarification which were discussed in detail at lengthy meetings with the GNCs.
- MMA held brief discussions with some of the largest customers of both GNCs to check the information provided by the GNCs.
- Key points of difference between the company forecast methodologies and assumptions and those considered reasonable by MMA were also raised during the

meetings and in further telephone conversations. In some cases the companies responded to the MMA comments and in some cases further work is underway.

- MMA's draft report provides a review of the GNC's demand forecasts and includes a series of recommendations on methodologies and assumptions.

The future course of the review is expected to be:

- The draft report with confidential material removed will be made public.
- The GNCs and other stakeholders will be given a chance to respond to the MMA review and recommendations. (Note that the companies have already agreed to adopt several of the recommendations) either in writing or at a public forum.
- After GNC and stakeholder comment the Tribunal, with the assistance of MMA, will determine whether the forecasts, as revised, are considered "best estimates arrived at on a reasonable basis".

If the Tribunal does not consider that the revised forecasts meet the criteria of the Gas Code it will ask MMA to prepare forecasts which MMA considers to be "best estimates arrived at on a reasonable basis". The approach taken in this review has been similar to that applied in many similar independent reviews of demand forecasts for regulators of gas assets in recent years. The companies have initially been asked to provide their forecasts together with appropriately disaggregated historical, methodological and forecast information. Through a process of questions, answers and discussions with the companies and research and consideration of historical results and key drivers the consultant has formed an independent view as to whether the forecast methodologies and key assumptions can be considered to meet the requirements of the Gas Code. If the forecasts do not meet the requirements of the Gas Code the consultant is expected to prepare independent forecasts.

The process for this particular review has been more cooperative than has often been the case elsewhere, in that the consultant and the companies have in some cases worked together towards finding a methodological and assumption outcome which will meet the requirements of the Gas Code.

While MMA has reviewed in some detail the forecasts for both tariff/volume and contract markets for both GNCs, it has taken materiality into account in its extent of review of each GNC and market.

1.3 CONVENTIONS FOLLOWED AND LAYOUT

Historical and forecast information provided by both AGLGN and CEG have been for financial years. Information provided in this report is also in financial year terms unless otherwise stated. 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 30th 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.

Note that if calendar year forecast information is required by the Tribunal this needs to be calculated using load proportions from each half of the financial year. Typically some 60% or so of tariff gas load is consumed between July and December while the remaining 40% is consumed during the warmer months of January to June¹.

This report to the Tribunal contains information which is considered confidential to AGLGN. AGLGN is to be asked to specify which information it considers needs to be removed from the public report.

This report is organized as follows:

- Section 2 reviews forecasts for the AGLGN tariff market, both residential and small business. The tariff market is that in which individual customers generally consume less than 10 TJ per annum (pa).
- Section 3 reviews the AGLGN contract market. The contract market is that in which individual customers generally consume more than 10 TJ of gas pa.

¹ Both companies have provided specific factors to allow proportions to be calculated.

2 REVIEW OF THE AGLGN TARIFF MARKET

2.1 REPORTS AND INFORMATION SUPPLIED

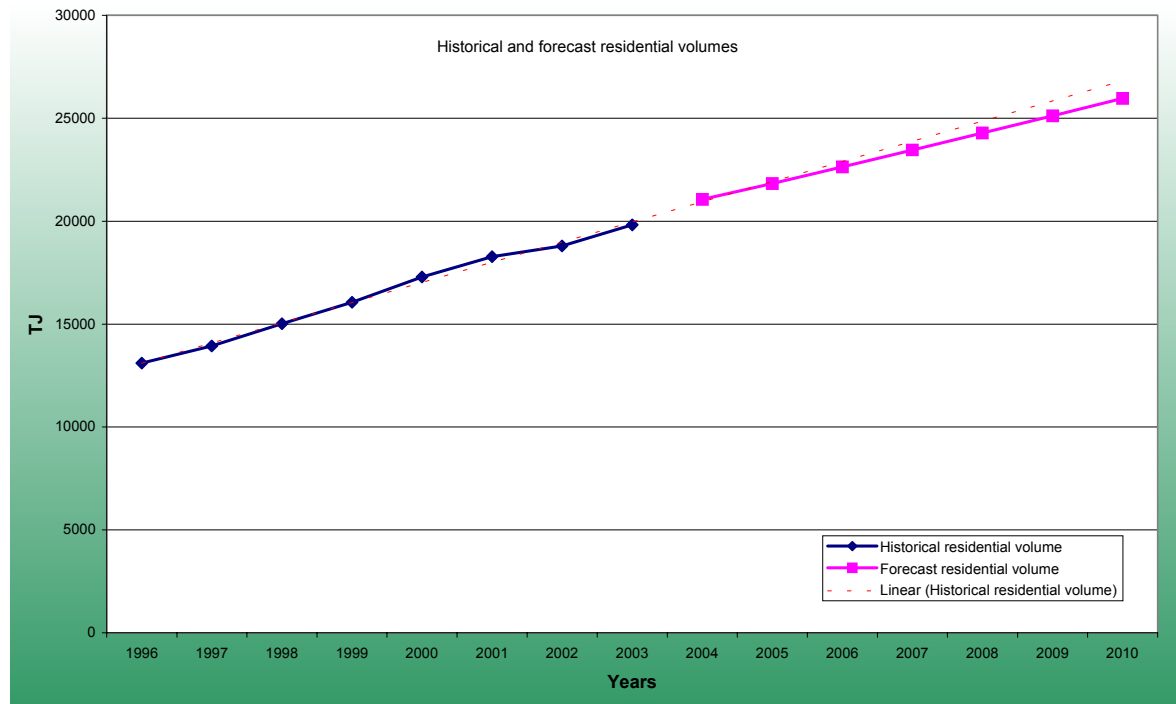
AGLGN has supplied the following information:

- A report by Agility entitled “Gas Networks – 2004 Access Arrangement Market Forecast Methodology, dated January 2004
- A report by Agility entitled “AGLGN Contract Market Forecast “2004 Access Arrangement” dated January 2004
- A report by ACIL Tasman prepared for Agility entitled “Review of AGLGN gas demand methodology and forecasts” dated January 2004
- A report by Agility comparing AGLGN and ABARE forecasts
- Tables in spreadsheet format in response to MMA’s initial data request
- A draft written response to MMA’s follow-up and clarification questions for AGLGN
- A number of update spreadsheets and emails during and following discussion on methodology.

AGLGN has also provided telephone and personal access to key Agility forecasting personnel.

2.2 HISTORICAL AND FORECAST GROWTH IN THE RESIDENTIAL MARKET

Figure 1 provides an overview of historical and forecast sales in the AGLGN residential market. As can be seen from the Figure, growth has been reasonably strong over the period but is expected by AGLGN to moderate over the coming AA period.

Figure 1: Historical and forecast growth of the residential market, TJ

An examination of recent history in appropriately disaggregated components plays an important part in constructing forecasts. Generally, in the absence of fundamental changes in key drivers, recent history is a good indicator of future expectations. Historical trends are routinely used to help forecast future patterns. In this section, historical information provided by AGLGN is used to examine recent trends in customer numbers and average usage by residential customers. The methodologies used by AGLGN are discussed and reviewed in further sections of this Chapter.

Table 2: Comparison of residential sales, customer numbers and average usage

FY ending June 30 th	1998	1999	2000	2001	2002	2003	Growth
Sales, TJ	15,013	16,055	17,285	18,272	18,793	19,822	5.7% pa
Customer Numbers	692,146	727,498	763,385	801,877	835,394	868,679	4.6% pa
Average usage, GJ/customer	21.69	22.07	22.64	22.79	22.50	22.82	1% pa

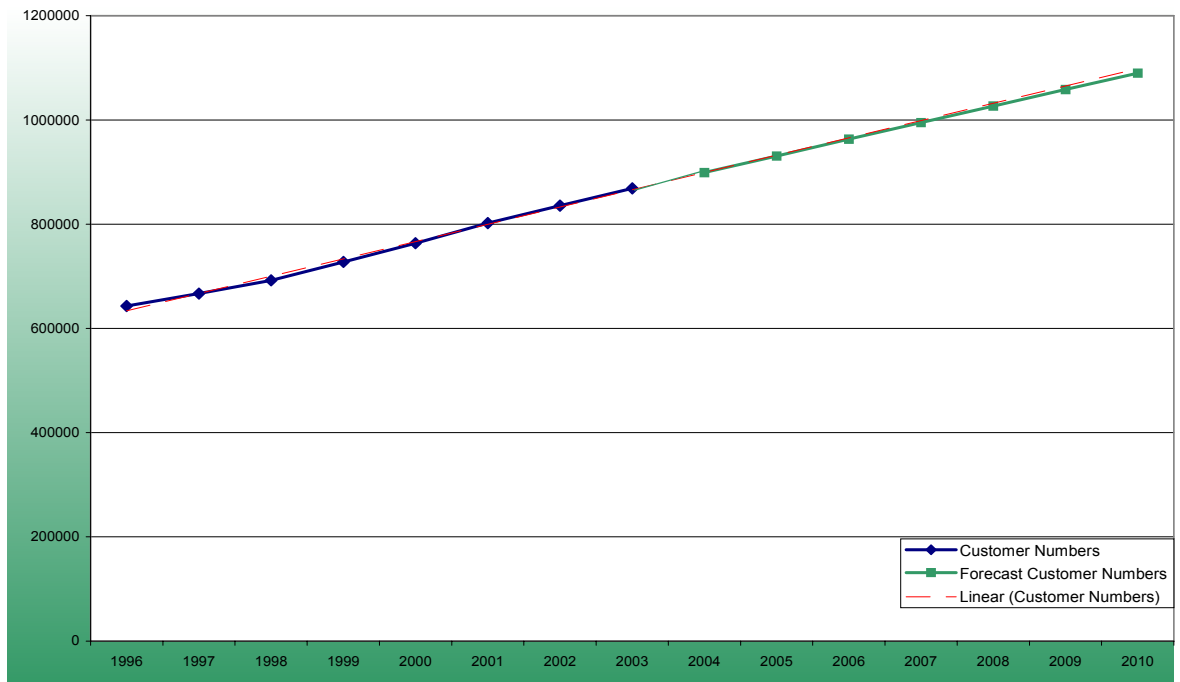
Source: AGL Tables 1 and 3 supplied to MMA. Note that the usages and average usages in the Table are based on actuals in the starting and ending year, not weather normalised or trend values.

Table 2 allows the strong recent growth to be divided between the growth in customer numbers and that in average usage. Residential growth over the past few years has been strong, averaging 5.7% pa. Most of this growth has been from new customers (4.6% pa) with additional contribution from increases in average usage per residential customer.

2.3 GROWTH IN CUSTOMER NUMBERS

An overview of customer number growth over the past few years and that forecast by AGLGN is provided in Figure 2.

Figure 2: Historical and forecast residential customer growth



AGLGN is forecasting that customer numbers will grow approximately in line but a little slower than recent trends over the coming AA period. The source of the growth in customer numbers is described in Table 3.

Table 3: Historical incremental residential customer numbers

Financial year ending June 30 th	1999	2000	2001	2002	2003
Starting numbers	692,146	727,498	763,385	801,879	835,394
New Houses	█	█	█	█	█
New Medium Density-Non Central Hot Water	█	█	█	█	█
Central Hot Water (CHW)	█	█	█	█	█
Electricity to Gas	█	█	█	█	█
Project	█	█	█	█	█
Disconnections	█	█	█	█	█
Ending numbers	727,498	763,385	801,879	835,394	868,680
Customer growth	35,352	35,887	38,494	33,515	33,286

Source: AGL Market forecast methodology, Attachment 1.

Over the period 1999 to 2003, almost [REDACTED] of new customer growth was from new dwellings, either stand-alone dwellings [REDACTED], other (non-stand-alone) dwellings apart from those taking Central Hot Water [REDACTED] or Central Hot Water (CHW) units [REDACTED].

The remainder of customer number growth was from:

- Electricity to Gas conversions (existing houses which are on line of mains which convert from all-electricity to gas usage) [REDACTED]
- Project areas (areas such as the Blue Mountains and Central West) which have been newly reticulated with resulting high initial levels conversions of electricity to gas houses [REDACTED].

Disconnections which, according to AGLGN, are generally the result of redevelopment of residential properties which previously had a gas supply point, have run at about [REDACTED] of all new connections or [REDACTED] of all new dwellings connected.

2.4 FORECAST GROWTH IN RESIDENTIAL CUSTOMER NUMBERS

AGLGN has forecast growth in net customer numbers in six categories according to the methodology outlined in Table 4 and described in more detail below.

Table 4: AGLGN methodology for forecasting customer number growth

	Basis	Information and assumptions
New stand-alone houses	<p>BIS Shrapnel (BS) forecasts of underlying demand for all housing in NSW</p> <p>Multiplied by the trend proportion of stand-alone houses</p> <p>Multiplied by recent penetration of gas in such houses in NSW</p>	<p>Used March 2003 BS forecasts of "underlying demand for new dwellings".</p> <p>Assumed the ratio of houses to medium/high density dwellings from trend analysis.</p> <p>Assumed penetration rate is that achieved in 2002/03 which is, according to AGLGN, approximately the average over the past seven years.</p>
New medium density houses (non CHW)	<p>BIS Shrapnel (BS) forecasts of underlying demand for all housing in NSW.</p> <p>Multiplied by the trend proportion of medium density houses.</p> <p>Multiplied by recent penetration of gas in such houses in NSW</p>	<p>Used March 2003 BS forecasts of "underlying demand for new dwellings".</p> <p>Assumed the ratio of houses to medium/high density dwellings from trend analysis</p> <p>Assumed penetration rate in medium/high density dwellings is that achieved in the average of five</p>

	Basis	Information and assumptions
	Multiplied by the trend proportion of Non-CHW connections as % medium density houses.	of the past seven years (excluded two outlier years) Multiplied by the 2002/03 proportion of non-CHW of medium/high density
New Central Hot Water customers	BIS Shrapnel (BS) forecasts of underlying demand for all housing in NSW. Multiplied by the trend proportion of medium density houses. Multiplied by recent penetration of gas in such houses in NSW Multiplied by the trend proportion of CHW connections as % medium density houses.	Used March 2003 BS forecasts of "underlying demand for new dwellings". Assumed the ratio of houses medium/high density dwellings from trend analysis Assumed penetration rate in medium/high density dwellings is that achieved in the average of five of the past seven years (excluded two outlier years) Multiplied by the 2002/03 proportion of CHW of medium/high density
E to G customers	Recent history after drop in marketing expenditure	Average of 2001/02 and 2002/03
Projects (existing Blue Mountains and Central West, expected new in Singleton)	Blue Mountains connections to decline Central West to remain constant at 2002/03 Singleton based on business case numbers	Mature, to decline by 15% pa Less mature to stay approx constant Start 2006, 1500 till end of period.
Disconnections	As a proportion of total customers	0.33% pa based on net customer calculations.

2.5 NEW DWELLING FORECASTS

2.5.1 Underlying BIS Shrapnel forecasts

AGLGN's new dwellings forecasts are premised on BIS Shrapnel forecasts of dwelling completions in 2003/04 and thereafter underlying demand for new dwellings, considered to be an indicator of future building activity. BIS Shrapnel produce quarterly dwellings forecasts and ideally, the latest forecasts need to be used to derive incremental customer numbers. The most current BIS Shrapnel report available to AGLGN before the January publication of the "Gas Networks - 2004 Access Arrangement: Market Forecast Methodology" report was the September 2003 report. However, as AGLGN, finalised its

demand forecast prior to the September 2003 report due to the need to incorporate the demand forecasts into capital planning, operating costs, cost allocation and pricing it used the March 2003 report, since which both historical and forecast numbers have been updated.

MMA accepts the use of BIS Shrapnel forecasts for growth in housing. BIS Shrapnel is an authoritative and well-credentialed independent forecaster of building trends across Australia. While it is not clear how the BIS Shrapnel forecasts will change, it is considered good practice and prudent to use the most recent data available at the time of forecasting. MMA has recommended to AGLGN that it utilise the latest BS forecasts and actuals for 2002/03, from the Building Industry Prospects publication in its forecasting.

The latest available BIS Shrapnel numbers (March 2004) for completions in 2002/03, forecast completions in 2003/04 and 2004/05 and average underlying demand for new dwellings for the period to 2008/09 are:

- 23623 houses and 20368 other dwellings in 2002/03
- 22802 houses and 22350 other dwellings in 2003/04
- 24050 houses and 21,350 other dwellings in 2004/05
- 47,600 dwelling underlying demand from 2004/05 to 2008/09

The 2003/04 forecasts are 105% of the average over 1997 to 2003, while those for the period 2006 to 2009 are 105% to 110% those of the average. AGLGN has extended the 2006 to 2009 forecasts to 2010. While it is accepted that housing construction is impacted by macro-economic factors, MMA accepts that the extension of the forecasts for one year is reasonable in this context.

Recommendation 1: MMA recommends that forecasts for 2004 to 2009 and actual completions for 2002/03 from the March 2004 BIS Shrapnel report be used in forecasting by AGLGN.

2.5.2 Ratio of Houses to “Other” (middle and high density dwellings)

Because AGLGN forecasts different capital cost characteristics and average usages for new dwellings of different types, it has developed separate forecasts for new houses, new medium/high density without CHW and new medium/high density with CHW.

The forecasts are developed through analysis of the split between houses and medium/high density dwellings from BIS Shrapnel historical data and then through assessment of gas penetration into different dwelling types.

Historical dwelling completions in NSW based on BIS Shrapnel publications supplied by AGLGN are provided in Table 5.

Table 5: Historical completions for NSW

FY ending June 30 th	1997	1998	1999	2000	2001	2002	2003
Houses	23500	25385	26318	28551	23091	21554	23623
Medium/high density	16700	17194	21456	21475	19554	14507	20368
Total	40200	42579	47774	50026	42645	36061	43991

Source: AGLGN, Supplementary answer with changes to final column from BIS Shrapnel, March 2004

According to AGLGN the ratio of separate houses to medium density houses is in decline. AGLGN states that it has used the trend over the past seven years after excluding the outlier year of 2001/02 which it states was “influenced by the first homebuyer’s grant”. This results in houses being only 49% of all NSW dwellings by 2010.

While it appears reasonable to assume that the decline in houses as a proportion of total dwellings will continue, there appears to be no valid reason for excluding the year 2001/02. The new homebuyer grant operated in other years and similar schemes may operate in future. As well, BIS Shrapnel has provided more authoritative forecasts of the division for 2003/04 and 2004/05.

Recommendation 2: MMA recommends that the division of growth between houses and others be based on the BIS Shrapnel numbers over the period 1997 to 2005, including the forecasts for 2004 and 2005 and trend analysis of these numbers from 2005 to 2010.

2.5.3 Gas penetration

AGLGN has assumed that gas penetration will be:

- 48.9% of houses. This is the 2002/03 actual percentage which, according to AGLGN is similar to the average over the past seven years and has been used as no trend is obvious.
- 69.5% of other dwellings based on the average of five of the past seven years with two years, 1999 and 2002, being excluded as outliers.

Unlike AGLGN, MMA considers it to be likely that there is an increasing trend in penetration of gas into both houses and medium/high density dwellings. Given the assumption that BASIX will become law over the next year or two (see Section 2.10.2), we are confident that the penetration of gas into new dwellings will increase. As we understand it, most new homes are likely to be within economic access of gas.

Recommendation 3: MMA recommends that the trend analysis penetration of gas from 1997 to 2003 be incorporated into forecasts for stand-alone houses and that the trend analysis capped at 85% be factored into forecasts for medium/high density houses.

2.5.4 Ratio of medium/high density with Central Hot Water

AGLGN divides “other dwellings” into those with a centralised gas hot water system and those without a centralised gas hot water system on the basis that there is a difference in average gas usage between these two types of installations. The forecast split between gas centralised hot water and non-gas centralised hot water was based on 2002/03 connection figures and was assumed to remain constant at 47.7% to 52.3% respectively.

The proportion with CHW proposed, 52.3%, is lower than the average achieved over the past seven years, 57.7%. Unless AGLGN has reason to expect that the CHW proportion will be less than the average, we recommend that the average CHW penetration, 57.7% be used.

Recommendation 4: MMA recommends that the average CHW proportion of 57.7% be used in forecasting unless AGLGN has reason to expect that this level of CHW will not continue.

2.6 ELECTRIC TO GAS HOUSES

As seen in Table 3, the number of electric to gas (E to G) homes has reduced substantially over the past few years, from 11,450 in 1999 to 7,400 in 2002/03. AGLGN has attributed this reduction to two main causes:

- A reduction in marketing expenditure. According to AGLGN, a substantial proportion of marketing expenditure relates to incentive payments for customers to switch to gas. Marketing expenditure reduced from \$23.3 M in 1999/2000 to \$17.1 M in 2000/01 and then \$12.4 M in 2001/02 and \$13.1 M in 2002/03. A further \$13.1 M is expected to be spent on marketing in 2003/04.

According to AGLGN, AGL Retail dropped its “Connect 12” program, which was designed to encourage new E to E network connections, and to increase the average consumption of E to G customers. In August 2001 as a response to reduction in AGLGN incentive payments, which were in turn dropped as a consequence of the 2000 Final Decision. The timing of the cessation of Connect 12 coincides reasonably with a step change in E to G connection between the 2001 and 2002 financial years.

- Reduced opportunities for E to G as the market approaches saturation. According to AGLGN, from survey data it has concluded that:
 - Gas is available on line of mains (LOM) to 60% of all dwellings in NSW
 - Only 63% of all dwellings on LOM use gas
 - Thus 38% of all dwellings in NSW use gas.

According to this information, there are currently some 1.4 M homes on LOM in NSW. The conversion of 10,000 E to G homes in one year will raise the proportion of homes by 0.7%. This is unlikely to result in the market approaching saturation.

AGL has assumed that E to G conversions over the coming period will be the same as in 2002/03 unless significant additional expenditure for marketing is allowed for. Given the observed link between marketing expenditure and E to G conversions, this appears a reasonable assumption.

2.7 PROJECT AREAS

AGLGN has had two significant project areas over the past access arrangement period, the Blue Mountains and the Central West. AGLGN states that in the early years of project, connections tend to be higher due to conversions from LPG and a concentration of marketing activity. Penetration reaches maturity and the number of new connections decreases as shown the cases of the Blue Mountains and Central West project areas (see Figure 3). New connections in the more mature Blue Mountains area have declined consistently over the current AA period and growth in the Central West area, while less mature, appears also to have started to decline.

Figure 3: Historical and forecast customer number growth in current and planned project areas



AGLGN has assumed that new connections in the Blue Mountains will decline at 15% pa, while those in the Central West will stay at 2002/03 levels over the next AA period. Given

the expectation that there will not be significant additional reticulations in these areas, both seem reasonable assumptions in terms of recent history.

The only new project area expected over the coming AA period is Singleton. AGLGN has forecast connections of 1500 homes between 2006 and 2010.

Recommendation 5: AGLGN should be asked to provide a summary of the Singleton business case as evidence to support the new connection numbers.

2.8 DISCONNECTIONS

The recent history of estimated disconnections is provided in Table 3. The average calculated number of disconnections has been 2744 over the past five years. AGLGN has assumed that the number of disconnections is related to the customer base, forecasting an increasing disconnection rate with increasing customer numbers.

There has been no evidence over the past five years that the number of disconnections is proportional to the number of customers. If anything, the number of disconnections has dropped over the past three years compared to the previous two. MMA has suggested that it is more likely that the number of disconnections is proportional to the number of new homes, but AGLGN has argued against the use of such a driver.

Recommendation 6: MMA recommends that the average number of disconnections over the past five years, 2,744, be used to estimate disconnections over the next period.

2.9 SUMMARY OF CUSTOMER NUMBER FORECASTS

After the implementation of the recommendations we would expect that customer number growth will match or exceed that of recent history. Losses in the project areas and E to G conversions should be made up for by the increasing penetration of gas into new houses expected due to the implementation of Basix.

2.10 KEY DRIVERS TO CHANGES IN AVERAGE CONSUMPTION

Key drivers in changes to average usage per residential customer over time include:

- Weather changes. Many areas across Australia are seeing a reduction in the “coldness” of weather as measured by heating degree days (HDDs)². If such a warming trend exists it will act to reduce the amount of use of appliances in heating and hot water applications.

² For any given day the number of Heating Degree Days is the greater of zero or the difference between the reference temperature (18C used in this case by AGLGN) and the average temperature recorded for the day (average of maximum and minimum used in this case by AGLGN). Thus, if the average temperature for a day is 15C then there are 3 HDDs recorded for the day. If the average temperature is 21 then the HDDs recorded is zero.

- Increased penetration in new houses (see 2.5.3 above).
- Increased appliance penetration for economic or environmental reasons.
- Increased use of appliances due to “comfort factors”. Such comfort factors include the move towards central rather than space heating and increased size of houses. A factor acting counter to this trend is the reducing number of persons per dwelling
- Increased appliance efficiency over time. New gas appliances are generally becoming more energy-efficient over time. The increasing use of instantaneous rather than storage hot water heaters in new houses is a good example of this.
- New or expanded uses for gas including spas, pool heating etc.
- Displacement of gas by alternative technologies, such as by reverse cycle air conditioning or solar hot water.
- Legislation or housing code requirements, including Basix (discussed below), are tending to result in increased gas appliance penetration, but potentially reduced usage per household.

It is only through an examination of average use per customer that the net overall impact of these, and the myriad other potential drivers over recent periods can be ascertained.

2.10.1 Weather

AGLGN has provided a graph of HDDs versus time for the Observatory Hill weather station over the past 37 years. According to AGLGN this station is an appropriate weather measure because 85% of gas consumed by tariff customers is consumed along the coast between Wollongong and Newcastle. The trendline established by AGLGN to fit the data shows a reduction in average HDDs per year of about 3 out of a total of about 536 in 2003. However, the r^2 of the line is relatively weak at less than 0.5.

The reducing HDD trend has been factored into forecasts by AGLGN. AGLGN has assumed that the reducing HDD trend will continue over the forecast period.

A reducing HDD trend has been observed in other weather stations across southern Australia in recent years. However, the nature of weather means that there can be significant variation between years, which may result in a low correlation despite a trend being evident. For example, an artificial weather pattern which has a starting value of HDDs, an annual swings of + or - 30 HDDs and a steady decline of -1 HDD provides a very poor r^2 but a statistically significant finding that the slope is less than zero.

Despite the low correlation coefficient, MMA considers it reasonable to assume an underlying trend of 3 HDDs per year if it can be demonstrated that the slope is less than

zero at a level of confidence of 95%. The impact of this reduction is expected to be less than 20 TJ pa and is more than balanced by underlying increases in average usage by the tariff market.

Recommendation 7: AGLGN is asked to provide statistical analysis to demonstrate that the HDD trend slope line is less than zero at a statistically significant level.

AGLGN has conducted further daily receipt analysis of its tariff market to demonstrate a HDD sensitivity for the entire tariff market including unaccounted for gas (UAG) of 7.1 TJ/d. A strong relationship ($r^2 = 0.96$) was established between the HDDs and the usage on any given day.

AGLGN has assumed that the 7.1 TJ/d is divided between the residential and business tariff markets according to annual load after UAG is removed. Thus, the tariff market is estimated to have a sensitivity of 6.7 TJ/d of which the residential market contributes 64% and the business tariff market the remaining 36%.

MMA has conducted sensitivity analysis which demonstrates that the forecasting results for the market as a whole is relatively insensitive to the allocation of weather sensitivity between the residential and tariff markets, and thus considers this assumption to be reasonable.

2.10.2 Likely implementation of Basix

Local and state governments have become increasingly active in requiring that new housing become more environmentally sustainable. For example, the Victorian Government has required implementation of various energy and water efficiency requirements in new houses, while the South East Queensland Regional Organisation of Councils (SEQROC) is considering the adoption of a Sustainable Housing Code with similar requirements. These requirements generally impact on the appliances selected in new homes. Some councils in NSW have also been active in this regard leading, for example, to increased adoption of gas hot water in new houses.

The NSW Department of Infrastructure, Planning and Natural Resources (DIPNR) has foreshadowed the introduction of Basix, a building sustainability index, to require improved energy and water sustainability for new houses built in NSW. As we understand it, the BASIX requirement is for new homes to be designed and use appliances which allow reduction of water and energy usage of between 25% and 40% compared to that of comparable average housing.

Basix is intended to apply to all residential developments in Sydney from 1/7/2004 and in the rest of NSW from 1/7/2005. It is intended to replace other local planning requirements.

According to DIPNR³, Basix requirements will effectively be met if:

- AAA showerheads and tap fittings are used
- Rainwater tanks and/or dual flush toilets are included
- The hot water system is efficient (assumed to be five star gas or solar)
- Houses are well designed to make the most of natural cooling, heating and lighting.

As a result of the expected implementation of Basix, MMA expects gas to increase its penetration rate in terms of both new houses and appliances and AAA showerheads and fittings are expected to be adopted.

However the move to AAA showerheads and the move to houses with improved underlying thermal comfort will also affect the average usage of appliances.

AGLGN established its forecast based on the Nathers scheme which has since been superseded by Basix. Under Nathers AGLGN had assumed that the use of AAA fittings and high efficiency gas hot water systems would be compulsory. We do not understand this to be the case under Basix. We understand that only the achieving of Basix targets will be compulsory. How the targets are met will be discretionary. While the use of the above features will allow the Basix targets to be met cost-effectively, we do not believe they are necessarily required.

AGL has estimated that the average use of gas by new homes for hot water will reduce by:

- 5.4 GJ for high efficiency gas hot water plus a further 3.1 GJ pa because of the AAA fittings, taking average usage in new homes from 24 GJ pa to 15.5 GJ pa
- A total of 6.5 GJ pa in CHW houses, reducing average consumption from 20.5 GJ pa to 14.3 GJ pa.

The above AGLGN analysis appears to be flawed or requiring substantiation in a number of areas:

- It is unclear whether the entire average usage in new homes is modelled to be made up of hot water heaters. Clearly this is not the case and other uses, eg gas heating and cooking, may well increase after Basix is adopted.
- The basis of the 24% reduction in hot water usage assumed due to adoption of AAA showerheads and fittings is most uncertain. Only about half of hot water

³ Document entitled Building Sustainability Index, dated November 2003 at www.dipnr.nsw.gov.au and discussions with DIPNR personnel.

usage is in showers⁴ and there is little certainty about the actual level of water savings in showers. For example, the domestic water study in Perth⁵, which measured actual water usage with normal and “water-efficient” showerheads, found that water efficient showers used about 10% less than normal showerheads in single residential houses and less than 3% less in multi-residential dwellings. As water efficient fittings were taken to include those with A rating and above, this may be an understatement of the likely savings with AAA showerheads.

- There is likely to be no water saving from “volumetric” use of taps which are estimated by Wilkenfeld to make up some 55% of tap use, nor in clothes washers or dishwashers.
- It is also not clear that the comparison should be against the normal showerheads, as current new houses also have some penetration of water efficient showerheads. AGLGN referred to work by Mark Ellis and Associates in its Market Forecast Methodology report, but satisfactory evidence to support the analysis against the status quo in new houses is required.
- According to AGLGN a high proportion of gas hot water systems in new homes already are the higher efficiency instantaneous water heaters. In such water heaters we would expect that the energy savings would be almost proportional to the hot water saved. This hot water might range from 5% to 20% (saving of 10% - 40% of shower usage which constitutes some half of total hot water usage). In storage systems we would expect the proportional savings to be less as the maintenance rate is still required.
- The savings available from moving to an efficient gas hot water heater are assumed to be some 1 - 2 GJ pa for an instantaneous heater and 4 - 5 GJ pa for a storage water heater against 2-3 star average current standards.
- CHW units already use efficient boilers.
- Only Sydney will be covered by Basix in 2003/04 with the remainder from 1/7/2005. From 1/7/2006 energy efficiency standards are raised from 25% to 40%.

In the absence of further information, MMA assumes that:

- Hot water constitutes only about 80% of gas usage in new homes
- AAA showerheads and fittings result in hot water savings of 10%-15% of hot water compared to current systems.

⁴ G Wilkenfeld and Associates Pty Ltd et al, “A mandatory water efficiency labelling scheme for Australia, draft report to Environment Australia, April 2003.

⁵ M Loh and P Coghlan, for the Water Corporation, “Domestic water use study ub Perth, Western Australia, 1998-2001, March 2003.

- Efficient hot water systems to be introduced in Sydney in 1/7/2004 and the remainder of NSW in 1/7/2005 will reduce average hot water usage by some 3 GJ pa
- Penetration of gas will increase. This will result in increased gas usage for heating and cooking. However, this may be balanced by reduced heating requirements due to well designed houses from 1/7/2006
- Gas CHW systems will have no efficiency gains but will have loads reduced by perhaps 10%-15%.

We understand that AGLGN has commenced further detailed analysis on the likely impact of Basix.

Recommendation 8: AGLGN will need to substantiate in much greater detail its forecasts of new home energy usage after Basix is introduced compared to that of current new homes.

AGLGN has forecast a reduction in average consumption for new homes from 1/7/2004, despite Basix only being introduced between July 2004 and July 2005. AGLGN has argued that other councils are already introducing such schemes which also have similar effects. While MMA accepts that this may be the case, such changes should already be factored into growth and average usage calculations. The impact of Basix should only be modelled from the dates of introduction.

Recommendation 9: The modelling of Basix impact should reflect that Basix is only to be introduced into Sydney in mid 2004 and into the rest of NSW by 1/7/2005.

As well as increasing penetration in new homes, MMA considers that Basix is also likely to stimulate increased usage of gas in non-hot water applications. While this may not be the major impact, some assessment should be made of the potential for Basix to increase penetration of such appliances in new homes and hence also increase average usage.

Recommendation 10: The modelling of Basix impact should also take some account of the potential of Basix to stimulate gas usage in appliances other than hot water.

2.11 AVERAGE RESIDENTIAL USAGE

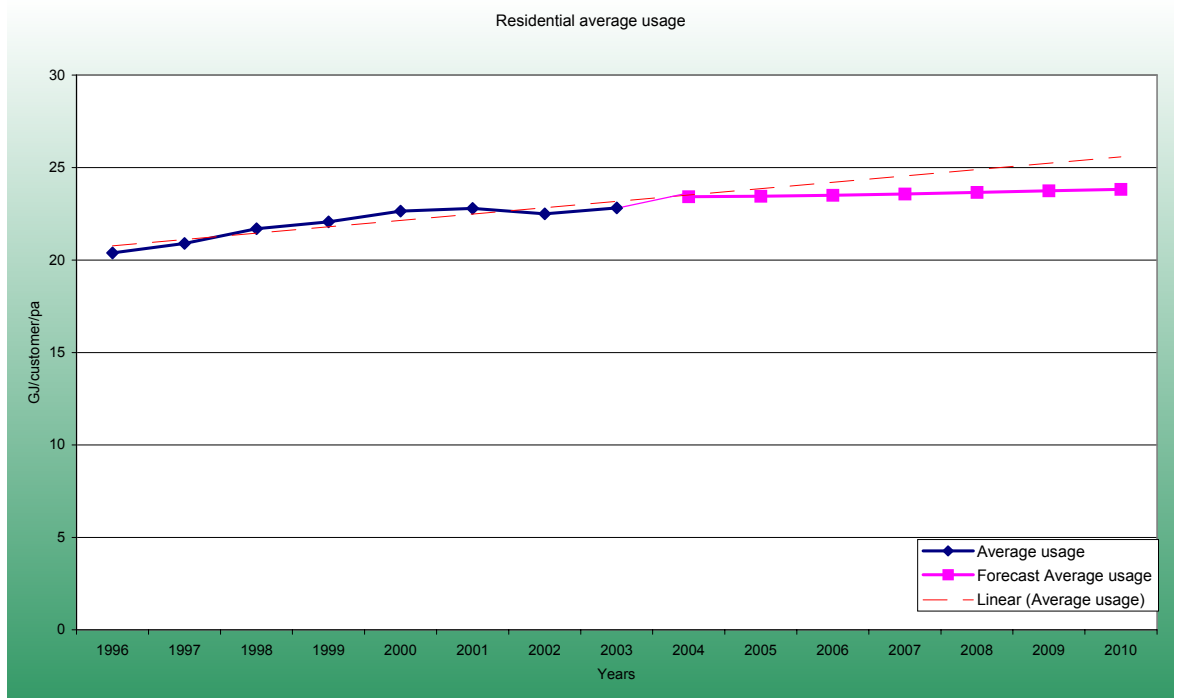
Changes in average usage per residential customer over time are a good summary of the “net” direction of the key drivers of consumption. If the average usage per customer is increasing it generally means that customers are, on average, either using more gas appliances or making more use of their appliances. This could be because of a number of reasons, including increased comfort requirements of new or existing customers or increasing penetration of gas appliances for economic or environmental reasons. Conversely, a declining average usage is generally a reflection of reduced appliance

penetration for reasons of economics, improving appliance efficiency over time or technological or regulatory change.

The historical average usage by residential customers is obtained by dividing the total volumes by the number of customers at June 30th of each year as provided by AGLGN. The long term trend shows steady increases in average usage from 1990 to 2003. The average growth rate over the entire period has been 1.63% pa, however, there is some evidence that the growth rate has reduced slightly over the past few years. This increase is despite the trend towards reducing HDDs discussed in Section 2.10.1.

Figure 4 provides an overview of the historical and forecast growth in average usage per residential customer. As can be seen, AGLGN is forecasting that average usage will stay flat or even decline slightly over the coming AA period. Given the recent trend, this needs to be explained.

Figure 4: Historical and forecasts average residential usage



The forecast average residential usage provided by AGLGN is a composite of consumption by new customers, the impact of warming weather projections and changes in consumption by existing residential customers. Table 6 shows the forecast average growth over the forecast period in more detail.

Table 6: Forecast average residential usage

Average Consumption	2004	2005	2006	2007	2008	2009	2010
Residential load TJ	21,058	21,827	22,640	23,460	24,287	25,122	25,965
Customer numbers	898,904	930,758	963,271	995,057	1,026,733	1,058,258	1,089,695
Average in GJ/pa	23.43	23.45	23.50	23.58	23.65	23.74	23.83
Growth pa	2.7%	0.10%	0.22%	0.31%	0.33%	0.36%	0.37%

After the initial increase in average usage in 2003/04 due to the unseasonably warm weather experienced in 2002/03, AGLGN is forecasting a very significant change to annual average consumption.

2.11.1 Average usage assumptions

AGLGN has forecast future changes in average usage by examining likely changes in average usage by each customer sub-sector. These are outlined in Table 7.

Table 7: Forecast average usage by customer sub-sector

Average Consumption	Assumptions
All continuing customers	Average usage for these customers (including connections from previous year) assumed to continue growing at 2.08% pa (subsequently changed to 1.5% pa then 1.25% pa as a result of the review process with MMA)
New house/ medium density	Assumed to reduce from 24 GJ pa to 21.7 in 2003/04 and then 15.5 thereafter for houses, 14.3 GJ pa for medium density*.
New Central Hot Water connections	Assumed to increase from 19.1 GJ to 19.4 GJ in 2004 and then to reduce to 14.3 GJ thereafter*.
New E to G connections	Assumed to stay approximately 17.3 GJ pa throughout (some anomalies in the assumptions) *.
Project areas - Blue Mountains/Central West	Historically 33 - 40 GJ pa. Not included specifically in the forecasts, but included at the weighted average of all new E to G connections.
Project areas - Singleton	17.3 GJ pa In the first year of consumption.*
Disconnections	At average usage.

* The figures quoted above are only for the first year of consumption. It is assumed that consumption increases by 1.25% pa thereafter.

As is clear from Table 7, there are some significant assumptions being made by AGLGN in terms of consumption by the various residential customer categories in 2003/04 and thereafter.

2.11.2 Initial normalisation for 2002/03

The year 2002/03 was significantly warmer than the standard year. Assuming that the standard year in 2002/03 had 536 HDDs and that the billing HDDs⁶ were 467 in that year results in required weather normalisation of about 193 TJ in that year. This would result in an average usage of 23.04 GJ/customer, not significantly different from the 23.16 GJ derived from trend analysis.

Note that AGLGN does not escalate the weather normalisation by the assumed percentage annual increase in average consumption between years 2002/3 and 2003/4.

Recommendation 11: In its tariff volume summary, the weather normalisation should be applied to the 2002/03 year and this should then be multiplied by the calculated increase to provide the starting 2003/04 usage by existing customers.

2.11.3 Growth by existing customers

AGLGN has estimated that each year usage by existing customers grows at 1.25% pa. Using a slightly different methodology, MMA has assessed approximately the same growth rate. The difference is considered immaterial. This is the underlying growth rate assuming a constant weather trend. We understand this to also be the methodology used by AGLGN. The impacts of the weather trend are added.

This is the underlying existing usage increase that is factored into growth by all customers including connected customers in the year after their connection.

In the latest AGLGN analysis a separate assessment has been made for “Replacement Hot Water Services”. These are considered to be part of the changes to the existing customer average usage and should not be considered separately.

2.11.4 Average consumption by new connections

We understand AGLGN to now use the following information about average usage by customers in the year following first connection and then for 2003/04.

⁶ Billing HDDs have been used by AGLGN to reflect that customers are billed quarterly, meaning that some quantities billed in a financial year are from the previous financial year.

Table 8: Historical and forecast average usage by customer sub-sector, GJ pa

Average Consumption in first year of new connection	2000	2001	2002	Assumed 2003	Assumed 2004
New houses	27.5	27	24	24	18.4
Medium density	27.5	27	24	24	18.4
Central Hot Water	19.1	19.1	19.1	20.5	14.7
E to G	21.1	19.2	17.3	17.3	17.3
Blue Mountains	40.8	40.8	40.8	40.8	#
Central West	33.8	33.8	33.8	33.8	#
Disconnections	22.8	22.8	22.8	22.8	22.8

Note #: The Blue Mountains and Central West are no longer treated by AGLGN as project areas, and the concerted marketing formerly carried out in these areas has ceased. For the Regulatory Period new connections in these have been included at the weighted average of the relevant categories across NSW. Most forecast connections have the assumed E to G rate of 17.3 GJ in the first year, which is the current weighted average consumption of new E to G customers connected throughout NSW (including the Blue Mountains and the Central West).

AGLGN seems to have used the average usage in the last year of the period for the purpose of forecasting forward. However, this, and the previous year, were warmer than normal. MMA believes that the average usage for new connections in 2003/04 should be based on the average of the three years for which history has been collected, with some compensation made for a shift in HWS from storage to instantaneous. The three year average can be weather normalised if AGLGN considers this appropriate.

Recommendation 12: AGLGN should use, as the starting point for the new houses, new medium density, new CHW and new E to G the average of the three years measured usage but take into account the impact of the annual shift from storage to instantaneous HWS (expected to be some 0.1 - 0.2 GJ pa).

We understand that AGLGN has used an average for project areas going forward of 17.3 GJ despite using an average of 40.8 and 33.8 in its reconciliations. This appears inconsistent despite the project areas being treated in future as E to G areas. It also appears inconsistent with the forecast average usage of 17 GJ pa in the Singleton new project area.

Recommendation 13: AGLGN should use the same average usage numbers going forward in the Blue Mountains and Central West as it has in its historical reconciliation.

The Basix program will not be in place until, at the earliest, 1/7/04. This means that the averages in 2003/04 should largely reflect those in 2002/03.

Similarly, the program applies in the first year only to new homes in Sydney. This means it applies to only some 75% to 80% of new dwelling connections in that first year 2004/05, with the remainder being applied in 2005/06.

Recommendation 14: AGLGN should use the 2002/03 averages for 2003/04 as there will be no impact of the Basix program until 2004/05 at the earliest.

Recommendation 15: AGLGN should include only the changes applicable to new dwellings in Sydney in 2004/05 (estimated at some 75% to 80% of the total) and the remainder only from 2005/06.

Recommendation 16: AGLGN should review the expected impact of Basix in light of the comments made in Section 2.10.2.

Average usage in the new project area of Singleton is projected by AGLGN to be 17 GJ pa for residential customers. This seems very low given the significantly higher values stated by AGLGN to apply to the Blue Mountains and the Central West. Further documentary evidence needs to be provided for this assumption or a value similar to that for the Central West should be used.

Recommendation 17: AGLGN should either provide further evidence of the low expected average usage in Singleton or adopt the value used in the Central West.

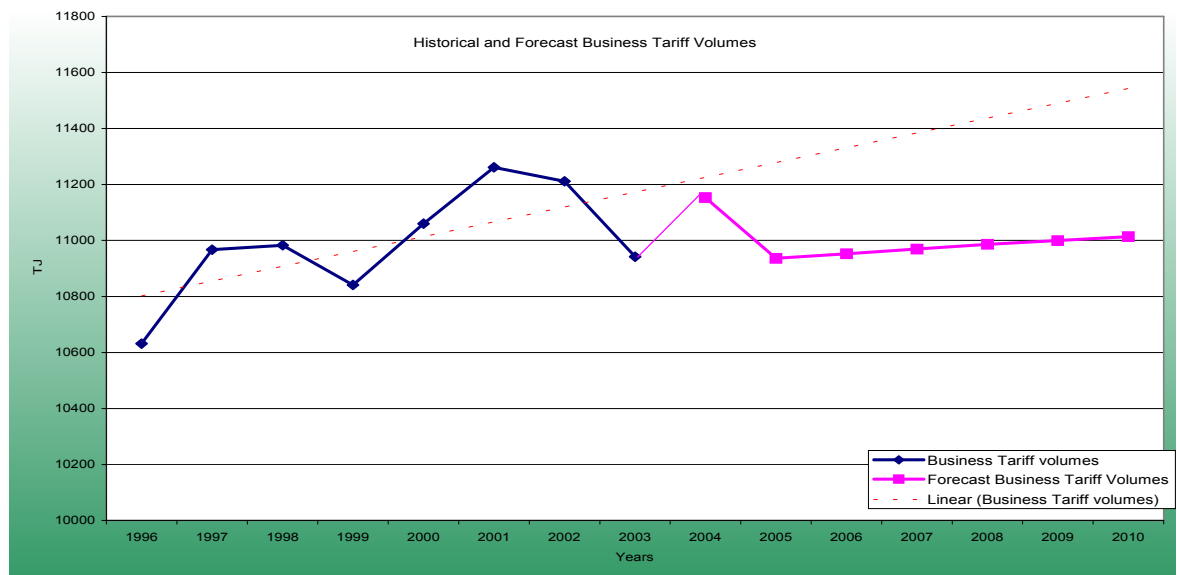
While we accept that the advent of Basix will reduce the growth in average usage per customer, we expect that if the recommendations are followed the reduction in growth will be less severe than forecast by AGLGN.

2.12 SMALL BUSINESS CUSTOMERS

2.12.1 Historical and forecast consumption

Growth in consumption by the small business (tariff) customers over the period 1996 to 2003 and forecast by AGLGN to 2010 is illustrated in Figure 5.

Figure 5: Historical and forecast small business volumes



Note: The forecast reduction in 2004/05 is due largely to the expected transfer of over 200 TJ from the tariff to the contract market in that year.

Growth has been relatively slow, about 0.3% pa using a trend line of the past four years growth based on actuals⁷. However, each of these past four years has been warmer than the preceding year. Estimated billing HDDs for the business customers, assuming that 40% are billed quarterly and 60% monthly, have dropped from 576 HDDs in 1999 to 477 in 2003.

If the actual sales are weather normalised it results in an average trend growth for the business tariff market as a whole over the period 1999 to 2003 of about 0.9% pa if no warming trend is included. As AGLGN considers the warming trend separately, this is the appropriate comparison.

2.12.2 Forecast growth

AGLGN has forecast growth in the tariff business segment to grow by 1.9% in 2003/04, to reduce by 2% in 2004/05 and then to grow at about 0.15% pa thereafter.

A significant part of the increase in the first year of the forecast period, of the order of 1.5%, is due to the expectation of more normal weather in 2003/04. For the year 2004/05 the main driver is a net 221 TJ Tariff to Contract customer transfer is forecast to occur in that year. Thereafter the market is forecast to grow slowly.

As we have seen previously, the growth in the business tariff market is understood to have been some 0.9% pa. According to AGLGN, much of the growth over the period has been related to the project areas in the Blue Mountains and Central West. In the absence of these areas, AGLGN initially estimated underlying growth of business usage of less than 0.1% pa, since amended to 0.41% pa. AGLGN proposes to remove the Blue Mountains and Central West from consideration as project areas and, therefore, use only the underlying growth factor plus estimated growth in the new Singleton project area.

While we consider much of this to be reasonable, we expect there will continue to be business customer growth in the Blue Mountains and Central West project areas greater than that in the remainder of the network. Although the extent is uncertain, it may be approximated as in proportion to the new connections expected in these project areas.

Recommendation 18: AGLGN should use a growth rate for the business market which continues to assess the Central West and Blue Mountains as project areas. The business tariff growth rate can be estimated in ratio to the proportion of new homes projected in these areas every year compared to recent history. Singleton business tariff growth should be additional to this.

⁷ Part of the reason for this may be the impact of Full Retail Contestability (FRC) on the recording of customer numbers. AGLGN has explained that since the advent of FRC some retailers have not provided details as to whether customers are residential or tariff. This may mean a mis-classification of customers. AGLGN considers that while this may shift apparent consumption between classes it should, overall, have relatively little impact.

2.12.3 Base Year

AGLGN does not escalate the weather normalisation by the assumed percentage annual increase in average consumption between years 2002/3 and 2003/4.

Recommendation 19: In its tariff volume summary, the weather normalisation should be applied to the 2002/03 year and this should then be multiplied by the calculated increase to provide the starting 2003/04 usage by existing business customers.

2.12.4 Contract to Tariff and Tariff to Contract movements

Movements of customers between the tariff and contract markets take place quite frequently. For example, as a company supplied under a tariff expands it may exceed the 10 TJ threshold required to become a contract customer and elect to do so. Generally, but not always, such companies would find it in their best interests to do so. Conversely, if companies contract and reduce usage, or approach closure, they may elect, or be required, to become tariff customers.

Trying to unwind and forecast contract to tariff and tariff to contract movements is extremely complicated and, unless this distorts trends, probably unnecessary. It is generally considered reasonable, for a company with a charging schedule in equilibrium, to assume no net movements.

The AGLGN charging schedule has been in place for several years now. However, AGLGN is forecasting that, in the first year of the new access arrangement, some 281 TJ will transfer from tariff to contract with a compensating 60 TJ transfer from contract to tariff.

According to AGLGN, the customers identified as switching from tariff to contract (T to C) are all liable to be contract users but have not yet switched from the tariff structure. The C to T customers are all consuming less than 10 TJ each and presumably AGLGN can require that they be changed. AGLGN has assumed all the T to C customers will switch sometime during 2003/04 and has factored in the switching from 2004/05.

While it is generally in the interests of customers to be charged according to a contract structure, this is not always the case. The move to a contract structure may require company investment in metering or other equipment. As we understand it, some customers have been liable to become contract customers for a number of years but have elected not to do so.

We consider it inappropriate to assume that all customers who can do so will switch to contract status despite evidence to suggest that this is not always the case. AGLGN has stated⁸ that 11/17 of the customers representing 190/281 of the load had transferred from

⁸ Email from D Pringle dated 24 March 2004.

tariff to contract by end February 2004 or asked for an offer to do so and that it considers it is reasonable to assume that the remainder will be on contract for the vast majority (if not all) of the regulatory period.

We do not accept that all the T to C customers will switch in the first year. Indeed, some may not switch over the entire regulatory period.

We consider it reasonable to assume that all those who have confirmed to AGLGN that they will switch will actually do so by 2004/05, and that a further proportion, say 50%, of the remainder will transfer over the remaining years of the access arrangement.

Recommendation 20: Only the volumes which have actually transferred or asked for offers be included as T to C (and C to T) for 2004/05. A further 50% of the remainder should be assumed to transfer over the remaining period of the AA.

2.13 BUSINESS CUSTOMER NUMBERS

Business customer numbers are a relatively minor contributor to AGLGN revenues and hence, not considered a major concern in the review of forecasts.

AGLGN has provided total business customer numbers, by region, from 1998 to 2003. These show a decline of business customer numbers over the past few years. AGLGN has forecast that business customer numbers will decline at about 250 customers per annum.

As stated in Section 2.3, the decline is likely to be due at least in part to the introduction of FRC and consequent inability in some cases for AGLGN to distinguish between business and residential customers. AGLGN has stated that it treats such customers as residential. It is unclear where these would register in the residential business numbers however, it would tend to exaggerate residential numbers and, in compensation, underestimate the number of business customers.

The rate of incremental “churn” is expected to slow in coming years, and some business customers are expected to return to AGL, presumably allowing them to again be counted as business customers. We consider it appropriate; in that case, to assume that customer numbers will remain flat from 2003/04.

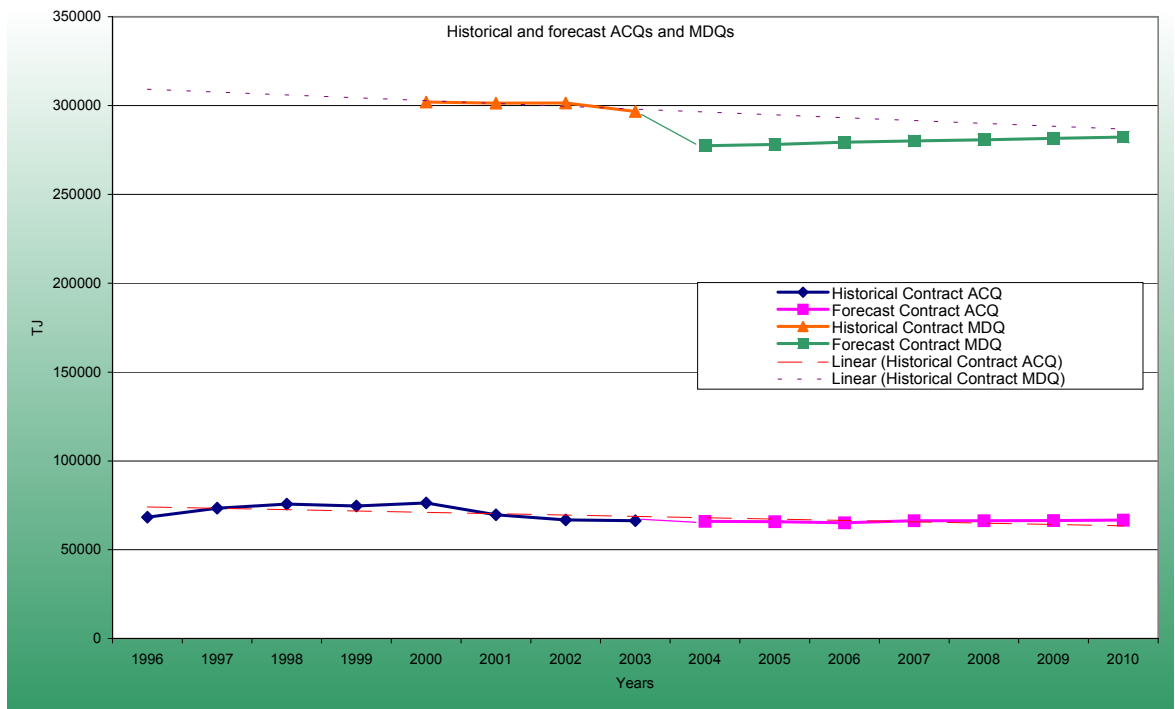
Recommendation 21: AGLGN should assume that business customer numbers over the coming period remain constant at 2003/04 levels.

3 CONTRACT MARKET

3.1 HISTORICAL CONTRACT MARKET VOLUMES

The recent history of the contract market over the period 1996 to 2003 is illustrated in Figure 6 together with AGLGN’s forecasts over the coming period to 2009/10. The Figure provides both annual quantities distributed to contract customers (ACQ) and also the contracted or booked MDQs.

Figure 6: Contract market, recent history and AGLGN forecasts



The figure shows that contract market volumes have fluctuated between 66 and 76 PJ over the past seven years. However, much of the fluctuation can be attributed to one off-taker, the Visy cogeneration plant at Smithfield. This plant, which is understood by MMA to use about 66 PJ of gas pa came on-stream in about 1996 off-taking from the AGLGN distribution system. This increased the distribution network load by about 66 PJ. However with the connection of the Eastern Gas Pipeline in September 2000 the plant bypassed the network, removing 66 PJ from the network.

If usage at Smithfield is subtracted from the total load, remaining network contract volumes have remained reasonably constant over the past five years at about 66 PJ pa. This has meant that increased and new loads have largely balanced the well-publicised losses of loads such as the BHP steel plant at Newcastle.

AGLGN is forecasting that the loads will reduce slightly over the next few years before again increasing to about 2003 levels. However AGLGN is forecasting that the charging parameter, MDQ, will drop substantially in 2004 and not reach the 2003 levels by the end of the AA period.

3.2 OUTLINE OF FORECASTING METHODOLOGY

AGLGN's charging parameters for the contract market are contracted maximum daily quantity (MDQ) and location or zone. Consequently AGLGN has had to forecast at this level. To a certain extent this has influenced the methodology selected by AGLGN.

AGLGN has initially forecast ACQ and, through load factor or other considerations MDQ. The MDQs have then been allocated to location in line with current location patterns after taking into account known or expected closures and new plants.

3.3 SEGMENTATION INTO MAJORS AND NON-MAJORS

AGLGN has initially segmented its contract into 17 "majors", each consuming more than 800 TJ of gas pa or over 35 PJ in total, and about 450 "non-majors" who each consume less than 800 TJ and about 29 PJ in total.

3.4 ANNUAL CONTRACT QUANTITY (ACQ) FORECASTS

3.4.1 ACQ for the majors

AGLGN has held discussions with each of the majors to ascertain plans and expectations for changes in either quantity of gas consumed (annual contract quantity or ACQ) and contracted MDQ.

Overall for this group AGLGN has estimated that ACQ will reduce slightly in the first year of the AA period due largely to the closure of one major plant (Port Kembla Copper). After this usage is expected to increase marginally over the period.

MMA has held brief discussions with personnel at, or representing, over half of the majors. During these discussions it became clear that, in terms of ACQ the AGLGN forecasts were overall reasonable. There was no expectation of significant growth or contraction by any of the customers. Most expected usage to remain reasonably constant over the period.

3.4.2 ACQ for the non-majors

AGLGN has separated the non-majors into 16 categories each describing a particular type of end-user, for example accommodation or food & beverages. AGLGN has then used linear trend analysis based on data from 1995 to 2003 to forecast growth rates for each of

these categories. Some categories exhibited positive growth rates (eg food & beverage) and some negative (eg masonry and ceramics).

AGLGN has examined the errors that would have been introduced over the historic period if this procedure had been used. Although errors in individual years were as high as 3.5% of load in that year, there were both positive and negative errors. Overall the error summed to 0.3%. AGLGN thus considered that this linear regression methodology could be used. Using a linear trend for each component is, of course, the same as using a linear trend for the non-majors as a whole.

While the method used may result in relatively low errors overall, the r^2 is only 0.36. Thus only some 36% of the observations are explained by the relationship. It is quite possible that the trends observed may be better explained by drivers other than linear time growth.

AGLGN was asked whether it had experimented with other potential drivers, for example GSP or sectoral output or logarithmic trends. AGLGN responded that to its knowledge there is no published macro output driver which equates satisfactorily to the sector as a whole or to individual industry groups as designated by AGLGN. It further referred to ACIL Consulting's assessment for the 1999 review that there was no relationship between manufacturing end use and State final demand (SFD) and said that ACIL had agreed with AGLGN's judgement not to attempt to model contract customer use against macroeconomic indicators such as SFD.

Given that some of the linear relationships examined had very low r^2 , MMA undertook its own analysis of relationships which could best describe historical usage. Because sectoral economic output was considered to be a likely indicator of usage, MMA analysed gas usage by contract market categories against output history for the sector.

MMA used the BIS Shrapnel history provided in the State Industry Prospects publication⁹ for its analysis because this provided both historical and forecast data suitable for use in many of the categories.

The results of the analysis are provided in Table 9.

⁹ BIS Shrapnel, "State Industry Prospects 2003 to 2018", August 2003

Table 9: Regression analysis results, r^2 , of contract usage by categories against time and sectoral output

Category	Output indicator from BIS Shrapnel	Time Linear	Time Exponential	Time period logarithmic*	Output Linear	Output Exponential	Output Logarithmic
Accommodation	Accommodation, cafes, restaurants	46%	47%	54%	49%	49%	51%
Chemicals, Oil Products	Petroleum, coal, chemicals	66%	65%	69%	19%	18%	19%
Food & Beverages	Food, beverage, tobacco	91%	91%	92%	93%	92%	92%
Health & Education	Education + Health & Community Services	54%	54%	72%	55%	54%	57%
Laundries	Not Applicable	91%	92%	72%			
Machinery & Equipment	Machinery & Equipment	93%	88%	79%	73%	73%	71%
Masonry & Ceramics	Non-metallic mineral products	47%	48%	65%	3%	3%	3%
Metals & Metal Products	Metal Products	8%	8%	9%	30%	31%	29%
Other Commercial	Not Applicable	33%	36%	44%			
Other Industrial	Not Applicable	7%	6%	26%			
Paper & Printing	Printing, Publishing Recorded Media	68%	70%	78%	34%	34%	33%
Recreation & Leisure	Not Applicable	84%	82%	90%			
Road Surfacing	Not Applicable	14%	15%	10%			
Textiles & Clothing	Textiles, Clothing, Footwear	82%	80%	57%	93%	93%	96%
Transport	Transport & Storage	75%	76%	54%	85%	86%	83%
Wood Products	Wood & Paper Products	61%	61%	53%	36%	37%	36%

* Using 1995 as year 1 of the period.

While the linear time trend would appear to be the best or a good relationship to use in several cases (for example, chemicals, food etc) in other cases other relationships appear significantly better (for example some relationship with output in the metal products and textile areas and logarithmic period in accommodation and health),

Unless there is good reason MMA considers that the best possible driver should be used for the analysis and for forecasting. Unless there is good reason not to, MMA believes that the relationship with the best fit should be used for each category.

Recommendation 22: AGLGN should try using other drivers (eg NSW sectoral output) and exponential and logarithmic relationships as well as time-linear relationships in forecasting growth by contract category. The best relationship should be used unless there are compelling reasons not to.

3.4.3 Baseline correction for the non-majors by category

The baseline correction used by AGLGN has several components:

- The year 2002/03 value for each category is initially adjusted to take into account known closures and additions. This, for example, the announced closure of the CUB brewery in Broadway in 2005 is an adjustment made to the baseline. This has subtracted a net 857 TJ due mainly to the closures or expected closures of CUB, Pasminco Cockle Creek and Austral bricks in Eastwood.
- Additionally any C to T or T to C adjustments are made to the baseline. Thus the net 221 TJ of T to C transfers discussed in Section 2.12.4 are expected are factored into the baseline. The 221 TJ net transfer needs to be reconciled with the net 207 TJ stated in Table 4.7 by AGLGN.
- Further major to non-major categorisation changes are estimated to add 451 TJ to the baseline.

3.4.4 Forecasting ACQ from the baseline

The amended baseline ACQ is then escalated or de-escalated annually by the trend values for the category. The first such step in 2003/04 also returns each category to “trend line values. This return to trend line values adds about 270 TJ to the 2003/04 year. This may, in part, be due to a weather correction as the contract market does have some weather sensitivity and the year 2002/03 was particularly warm. The use of the trend value means that weather normalisation is probably not required.

3.4.5 MMA concerns

MMA has some concerns in the areas of baseline correction.

One concern is the timing of the baseline change. All closures and additions are adjusted for in 2002/03 even though this will in several cases not actually be the case. This means that the adjustments are escalated as well.

A further concern is that the adjustments in the baseline do not actually match those in the contract market report. According to Table 4.7 of the contract market report there should be a net loss in the baseline of 199 TJ. Yet, as we understand it, the adjusted baseline number is 28,692 TJ, some 324 TJ less than the actual non-major usage in 2002/03. While

AGLGN has provided some explanation for this discrepancy in the report, it is not sufficiently detailed to allow a reconciliation by MMA.

However, the most significant concern is that there is an element of double-counting in applying both trend analysis and expectations about closures and additions. For example, if a trendline estimate suggests that a category of usage is expected to lose 200 TJ pa, presumably through either reduced usage by existing users or the closure of a plant, and it is known that a plant which uses 200 TJ intends to close next year, is it reasonable to count both the trend reduction and the reduced usage by the user who is exiting?

This is an issue of some concern because, according to AGLGN, the level of losses due to announced closures is much greater than usual.

One possible solution may be to extend the trend analysis for one or two years to include the timing and impact of the intended closure. For example, if consumption for a sector is expected to be 500 TJ in 2003/04 but there is an announced closure of 100 TJ in 2003/04, perhaps the impact of the closure could be factored in and the trendline analysed from 1995 to the assumed 2003/04.

AGLGN has argued that this would not give adequate weight to the known closure, however it would certainly provide some added weight. Perhaps a compromise is for all closures in 2003/04 to be factored into the baseline, while other known closures and additions are only factored into the trend analysis.

AGLGN has also argued that its treatment of closures and additions is most appropriate because it allows more accurate allocation of MDQ to location in the forecasts and locational MDQs are very important in determining locational pricing. While this is a reasonable argument, it is considered that locational considerations could be added as a post-adjustment.

Recommendation 23: AGLGN should provide reconciliation between its baseline adjustments in the spreadsheet and those in Table 4.7 of the contracts report and also between the net T to C transfer of 221 TJ in the market report against 207 TJ in Table 4.7.

Recommendation 24: AGLGN should adjust the 2002/03 baseline only for “return to trend” values. All other adjustments should be made in the year they will actually take place.

Recommendation 25: AGLGN should only adjust for known additions and closures which have happened or will happen in 2003/04. Other additions and closures can be adjusted for only through a trend analysis carried forward to the year of addition or closure.

3.5 ADDITIONAL MAJOR LOADS

The only major new loads considered capable of adding significant load (> 800 TJ pa) to the network over the next few years are generation and cogeneration. Although some generation and cogeneration projects might start up in that time period, it is considered equally likely that none will or that, if they do, they will either offtake from transmission rather than distribution mains or not significantly increase contracted MDQ.

At this stage we consider it unlikely that any significant new cogeneration or generation project will offtake from the distribution mains over the coming AA period. AGLGN has confirmed that it is not aware of any such projects as well. While there may be additional smaller cogeneration loads, such as for example at hospitals, this will be relatively minor and is covered in the non-majors analysis.

Similarly, although major new projects (such as steel or aluminium) are often mentioned, none is considered likely to eventuate over the next few years. We consider it appropriate for AGLGN to have not included any major new energy user in its forecasts.

Other new loads such as, for example, use of natural gas for vehicles, in transport are also likely to be relatively small and are again covered by the analysis in the non-major section.

3.6 BYPASS

As mentioned previously, AGLGN has experienced bypass by the cogeneration plant at Smithfield. AGLGN has not expressed concern about bypass by any other contract user and has not included any such bypass in its forecasting.

3.7 CONTRACTED MAXIMUM DAILY QUANTITIES

3.7.1 Majors

While AGLGN has assumed little change in MDQ for many of the majors, for a few it has foreshadowed major MDQ reductions. The rationale for this assumption is that some customers have too much MDQ and are likely to relinquish some or would relinquish some if they were acting rationally.

In total, AGLGN has assumed that the majors will in total book of the order of 20 TJ less MDQ capacity in 2004 than in 2003. This is an expected reduction by about 12%.

However discussions by MMA with the majors of most concern have suggested that they currently have no intention of reducing the amount of MDQ they have contracted. In some cases the customers are paying very little for the MDQ and have said they are willing to pay this for the increased flexibility it offers. In other cases the customers are not exposed to MDQ pricing. AGLGN has expressed the belief that some decrement

customers who are currently not paying fully for MDQ may no longer be decrement after the next AA period and would then have significant incentive to reduce their MDQs.

MMA does not consider it appropriate for AGLGN to assume MDQ behaviour based on its understanding of rational behaviour when the evidence suggests that customers do not have the intention to behave this way. However, if there is evidence that some customers will have increased incentive to change their MDQ contracting in future years then this would tend to favour an assumption about MDQ reduction.

Recommendation 26: AGLGN should assume that contracted MDQ levels for the majors stay at 2002/03 levels unless it provides evidence from customers that they intend to change their ordering behaviour or provides evidence that the incentive to some customers for reducing MDQ contracted will become greater over the new AA period.

3.7.2 Non-majors

AGLGN has applied industry group load factors based on the average load factor over the past four years. A historical review by AGLGN of this methodology has suggested that this results in relatively little error over the medium term.

The industry group load factors were applied to produce preliminary MDQ forecasts by industry group. These were then allocated to location taking into account specific site load profiles resulting in final MDQ by location.

Despite AGLGN stating that the final allocations maintained or increased the MDQ for each industry group apart from wood products, the preliminary MDQs are higher than the final MDQs in all forecast years. However this is considered relatively immaterial in the overall context.

The AGLGN methodology for assessing MDQ for the non-majors thus appears appropriate. We have not reviewed in any detail the allocation of MDQ by location.