

# **Review of AGL Gas Networks Capital and Operating Expenditure**

December 2003

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AGL Gas Networks

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## ABBREVIATIONS AND TERMS

<b>ABBREVIATION OR TERM</b>	<b>DEFINITION</b>
<i>Access Arrangement</i>	The final decision Access Arrangement for AGL Gas Networks Limited, Natural Gas System in NSW, July 2000.
<i>Agility</i>	The wholly owned subsidiary of AGL that provides asset management and field services to AGLGN and others.
<i>AGL</i>	The Australian Gas Light Company.
<i>AGLGN</i>	AGL Gas Networks Limited.
<i>Contract Customers</i>	An end use customer who is supplied with more than 10TJ of natural gas per year.
<i>DEA</i>	Data Envelope Analysis.
<i>DFT</i>	Department of Fair Trading.
<i>FRC</i>	Full Retail Contestability which commenced on 1 January 2002.
<i>FY</i>	Financial year.
<i>GJ</i>	Gigajoule ( $10^9$ Joules).
<i>IMS</i>	Incident Management Strategy.
<i>Incident</i>	Any situation involving gas company operations that could lead to a possible unacceptable increase in risk to people or property.
<i>IPART</i>	The Independent Pricing and Regulatory Tribunal of NSW.
<i>kPa</i>	Gauge pressure in kilopascals.
<i>MAOP</i>	Maximum Allowable Operating Pressure.
<i>MEU</i>	Ministry of Energy and Utilities.
<i>Metering Facilities</i>	The meter(s) and the associated filter(s), regulator(s), or other equipment, and pipe work, by which the gas delivered to the User is conditioned, controlled, and metered.
<i>Network</i>	The AGL system of pipes and associated facilities including meters and meter sets.
<i>PB</i>	Parsons Brinckerhoff.
<i>PJ</i>	Petajoule ( $10^{15}$ Joules).
<i>PRS</i>	Primary Regulator Station.
<i>SAOP</i>	Safety and Operating Plan.
<i>SCADA</i>	System Control And Data Acquisition.
<i>SRS</i>	Secondary Regulator Set.
<i>Tariff Customer</i>	Any person who is supplied with natural gas at a rate of < 10TJ per year by means of an authorised reticulator's distribution system.
<i>TJ</i>	Terajoule ( $10^{12}$ Joules).



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<b>ABBREVIATION OR TERM</b>	<b>DEFINITION</b>
<i>Trunk Mains</i>	That part of the Network being the pipe system that extends from Wilton to trunk receiving stations and is licensed under the <i>Pipelines Act 1967</i> .
<i>TRS</i>	Trunk Receiving Station.
<i>Type B Appliance</i>	An appliance, with gas consumption in excess of 10 MJ/h, for which a certification scheme does not exist.
<i>UAG</i>	Un-Accounted for Gas is gas lost due to leaking mains, metering errors, theft and operational losses.
<i>User</i>	A person to whom AGL provides a service under a Service Agreement.

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# 1. Introduction and Scope

## 1.1 Introduction and Purpose

Parsons Brinckerhoff (PB) has been engaged by the Australian Gas Light Company Gas Networks Limited (AGLGN) to provide consulting services for the review of capital and operating expenditure of the AGL gas networks in New South Wales.

The purpose of the study is to conduct an independent review of the operating expenditure, capital expenditure and asset management practices of AGLGN and prompt further improvements where possible. The review will assist AGLGN to prepare the next Access Arrangement submission to the Independent Pricing and Regulatory Tribunal.

## 1.2 Objectives and Scope of Work

The objectives of this engagement are to assess, using the defined security of supply and service standards, the AGLGN gas network in NSW for:

- the prudence of operating expenditure for the period 1999/2000 to 2003/2004;
- the prudence of capital expenditure for the period from 1999/2000 to 2003/2004;
- the efficiency of AGLGN capital planning practices and the reasonableness of estimates of capital expenditure for the period from 2004/2005 through to 2009/2010; and
- to benchmark the AGLGN gas distribution business against readily available key performance indices from other gas and electricity distribution businesses.

‘Prudent’, in its ordinary sense, means “discrete or cautious in managing one’s activities; practical and careful in providing for the future and exercising good judgement”.

For the purposes of this Total Cost Review, the prudence test is intended to determine whether the expenditure was reasonable given the information available at the time of the expenditure. That is, the review has been conducted on the basis that the investment decision was prudent at the time it was made – not with hindsight. PB has assessed prudence against identified drivers and whether service standards have been maintained. The consultant has also assessed the drivers of additional expenditure.

The assessment of prudence is based on the final outcomes, with consideration given to the quality of, and commitment to, the planning and evaluation procedures. The procedures have been benchmarked against industry practice for the planning, provision and utilisation of assets and service standards.

‘Efficient’, in the ordinary sense of the word is “functioning or producing effectively and with the least waste of effort”. For the purposes of this Total Cost Review, a test of

efficiency requires an assessment of operating and maintenance and capital expenditure from a least-cost perspective over the life-cycle of the assets.

Efficiency has been assessed on the basis that the projected expenditures will deliver the identified outcomes and service standards, and takes into consideration network and non-network options. Over time, efficient investments should minimise costs for the expected outputs and ensure that resources are allocated appropriately.

### **1.3 Approach and Methodology**

PB collected and reviewed all readily available relevant data including:

- AGLGN Access Arrangement for the period 1999/2000 to 2003/2004;
- access arrangements for Victorian gas networks; and
- current NSW Electricity pricing review including the Meritec Total Cost Review, Final Report, October 2003.

Additional information provided by AGLGN included:

- general information including annual reports, organisation charts, corporate plans and policies, asset management plans and policies, long-term network development plans, procurement and construction standards and specifications, network performance reports, network plans and maps;
- information on assets in service including age and condition;
- network performance data and statistics;
- demand forecasts; and
- actual and projected capital and operation expenditure.

A full list of reference material is provided in *Appendix A*.

AGLGN staff were interviewed to overcome data gaps and provide a thorough understanding of asset management systems, condition and performance of existing assets, growth forecasting procedures and long-term network development planning processes.

The evaluation of asset management systems and policies and development planning processes involved structured interviews with key personnel to review objectives and targets and determining the appropriateness and effectiveness of the systems in place. The interviews were used to challenge current AGLGN systems and processes with the aim of prompting further improvements where possible.

Capital and operating expenditure for the current access arrangement period and forecasts for the next submission to IPART were assessed on a global basis rather than in detail. The assessment focused on the appropriateness of processes and systems and the meeting of established performance indicators. Performance was benchmarked against readily available data on other utilities.





In undertaking the study PB has considered:

- the requirements of the National Gas Code;
- current and projected gas network capacity;
- appropriate asset utilisation levels benchmarked against best practice;
- current demand and likely future demand (as measured by customer number, energy sales and maximum demand);
- current condition of assets and renewal requirements;
- existing operational requirements;
- opportunities for demand management and non-network solutions to cope with growth;
- current safety and planning standards accepted by the industry;
- current and likely future customer service standards; and
- relevant industry standards.

## **2. Review of Operation Expenditure**

### **2.1 Introduction**

The regulated business of AGL Gas Networks (AGLGN) substantially comprises the NSW distribution assets and activities of the former AGL Gas Companies. The various Gas Companies were combined in 1994 to form the AGL Gas Companies (NSW) Ltd, which then separated into AGLGN and various retail companies in 1996. This separation involved the complete legal, accounting and management separation of the retail and network activities.

In July 2000 the Tribunal issued its revised Access Arrangements for AGLGN and these arrangements came into force on 1 October 2000 to apply until 30 June 2004.

AGLGN has provided its costs for previous years so that PB can determine the appropriateness of these expenditure levels. It is not a requirement of this review to determine operating efficiencies at a detailed level.

The Tribunal removed unaccounted for gas (UAG), along with government levies and charges from its determination of controllable non-capital costs. These costs are treated as direct pass through expenditures and have therefore not been subject to rigorous assessment by PB as part of this review.

#### **2.1.1 PB Comments on IPART Final Decision**

##### ***IPART Benchmarking Study***

Having reviewed the Data Envelope Analysis (DEA) model used by IPART and the subsequent public comments, there are considerable outstanding issues regarding the effectiveness of the model, the inputs and outputs used, the data integrity and the incorporation of environmental factors. Of particular concern is that the model asserts that length of mains is a controllable input that should be managed to improve operating efficiency. This would suggest that customers should not be provided access to gas distribution where they require more than benchmark lengths of pipe to supply, regardless of their willingness to pay. It is more generally accepted that gas pipeline operating costs are related to the lengths and types of lines.

Also of considerable contention is the use of gas deliveries as an output in the model, which would indicate that increasing consumption of gas is a distributor's performance objective. In a contestable energy market where distribution has been ring-fenced as a monopoly to allow retail supply competition, this would normally be difficult to accept. It is recognised, however, that improved utilisation of the gas distribution network can provide lower average prices for customers per unit volume of gas delivered. This is reflected in the cost projection formula provided by IPART to AGLGN that allows revenues to increase in proportion to customer number and sales volumes. While this is not strictly an operating cost efficiency measure of the distributor, it is an additional incentive to reduce average capital cost requirements per unit gas delivered. In this

instance marketing expenditures might be considered an exception and be assessed on the basis of cost per unit gas delivered, since increased sales volumes is normally one objective of those expenditures. Generally speaking, however, the majority of a gas distributor's operating and maintenance costs relate to the length/types of distribution mains and the number of customer connections.

In effect, if distribution costs were regarded as related to line lengths and customer numbers, they would be relatively fixed on a per customer basis. If pricing were based on this relationship customers would then have an incentive to increase consumption if the marginal cost of gas (retail energy costs) was low relative to alternative energy sources such as electricity. Making the assumption that distribution costs are energy related can influence customer consumption patterns in a potentially inefficient manner.

IPART recognised that the DEA modelling did not provide an adequate reflection of efficiency opportunities and made the following comment in its Final Decision.

“The Tribunal points out that the judgements and assumptions inherent in economic modelling were considered in interpreting results. No single model or analysis was relied upon in assessing AGLGN operating costs. Rather, a range of techniques was applied and considered.”

### **Marketing Expenditure**

IPART made the statement that AGLGN was seeking endorsement of total operating expenses and therefore cost comparisons should include marketing costs. This is partially supported by PB. While it is recognised that there may be significantly different drivers for marketing expenditures across distribution businesses, under the National Code only efficient costs can be recovered from customers. To the extent that marketing expenditures are aimed at increasing customer connections, and this was an important factor in IPART performance comparisons it is reasonable that these costs form part of the operating cost comparison.

However, to the extent that marketing costs are aimed at increasing consumption, its inclusion in broad distributor comparisons of operating costs is more contentious. Since most other operating costs incurred by distribution businesses relate to customer connections or the types and lengths of mains, to include expenditures relating to consumption introduces anomalies, as described above. Distributors at different stages of customer penetration and with significantly different environmental factors, in particular temperature, are likely to experience materially different consumption patterns.

To the extent possible PB has reviewed comparisons both with and without marketing costs. Our primary focus is to look at total controllable operating costs, but it is recognised that marketing needs to be viewed using different criteria – in particular the relationship between marketing expenditure and increased asset utilisation (sales volume growth relative to line lengths).

IPART recognised that increases in customer numbers and consumption would reduce average energy costs for customers and therefore its Final Decision provided incentives in the revenue formula to grow these figures. It was left to AGLGN to determine the most effective methods for achieving those goals. However, IPART also made the comment

that an important element of improving its network performance was to increase sales volumes. As previously stated, increases in sales volumes can reduce average prices for gas delivery which may improve the competitiveness of gas against other energies. However, this will not reduce the costs per customer for distribution services and is not an effective measure of operating cost efficiency. The inclusion of volume of gas delivered in the IPART formula for allowable operating costs on a 50 percent basis may have overstated this incentive for energy growth and may also deter AGLGN from extend lines for supply to smaller consumption customers. IPART made a similar comment in its 2000 Final Decision:

*“Given that the costs of providing gas transportation services are largely fixed, the number of forecast units from which those costs are recovered will affect the price for each service.”*

## **2.2 Industry Comparisons on Service Levels**

In reviewing relative efficiency of operating costs for AGLGN, consideration has been given to the appropriate cost drivers for the distribution business. As discussed in the previous section, distribution businesses in industries where retail operations have been made contestable and separated from monopoly distribution functions, typically offer transport systems for, in this case, energy conveyancing. Comparisons of performance are therefore related to the ability of the distributor to enable retailers and suppliers to access the network and meet delivery requirements. Key measures would therefore relate to:

- Service levels; and
- Reliability of supply.

These measures incorporate both the effectiveness of capital investments and the efficiency of business operations. PB is reviewing these aspects separately, although it is recognised that there are some interdependencies between them.

In terms of operating efficiency specifically, the responsibility of AGLGN is to manage, maintain and operate the distribution system at the lowest possible cost while achieving required service levels. PB has chosen to examine the Service Level Key Performance Indicators (KPI) used for the Victorian networks, as presented in the *Table 2.1*.

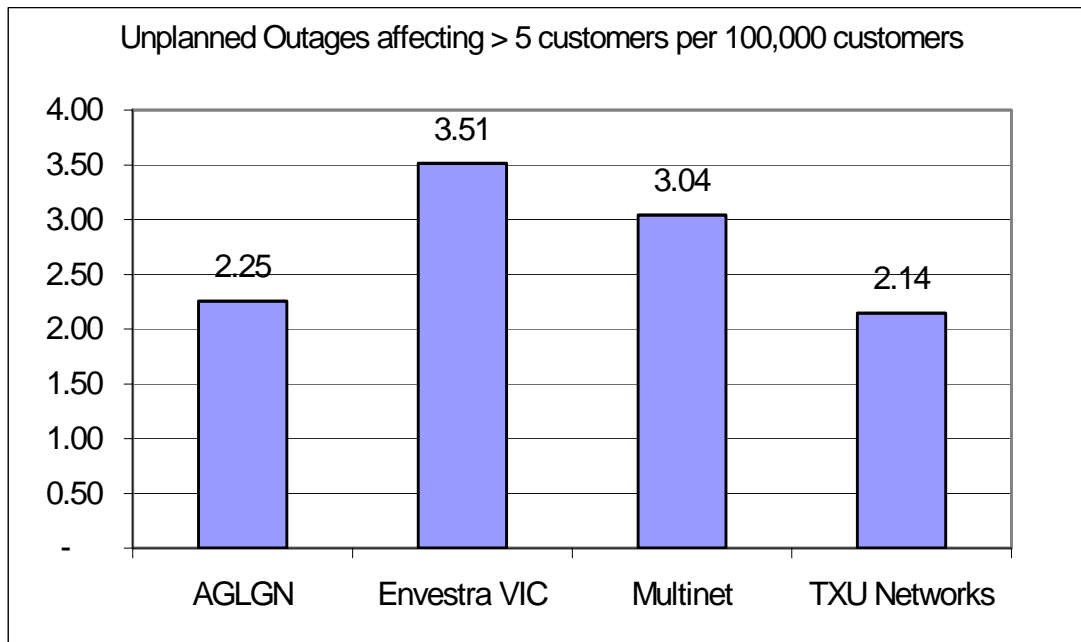
**Table 2.1: Summary of key service indicators.**

	2003 Actual <sup>1</sup>			
	AGLGN	Envestra VIC	Multinet	TXU Networks
Unplanned outages (total)				
affecting > 5 customers	20	16	19	10
affecting > 100 customers	6	0	1	2
affecting > 1,000 customers	1	0	0	0
Customer hours off supply (per 1,000 customers)	6.24	2.1	4.3	6.5
Reported gas leaks	10,692	10,980	10,680	7,370
Response to customer calls within 60 minutes (%) <sup>2</sup>	97%	94.40%	97.60%	99.10%
Number of customers	887,500	455,638	624,695	466,277

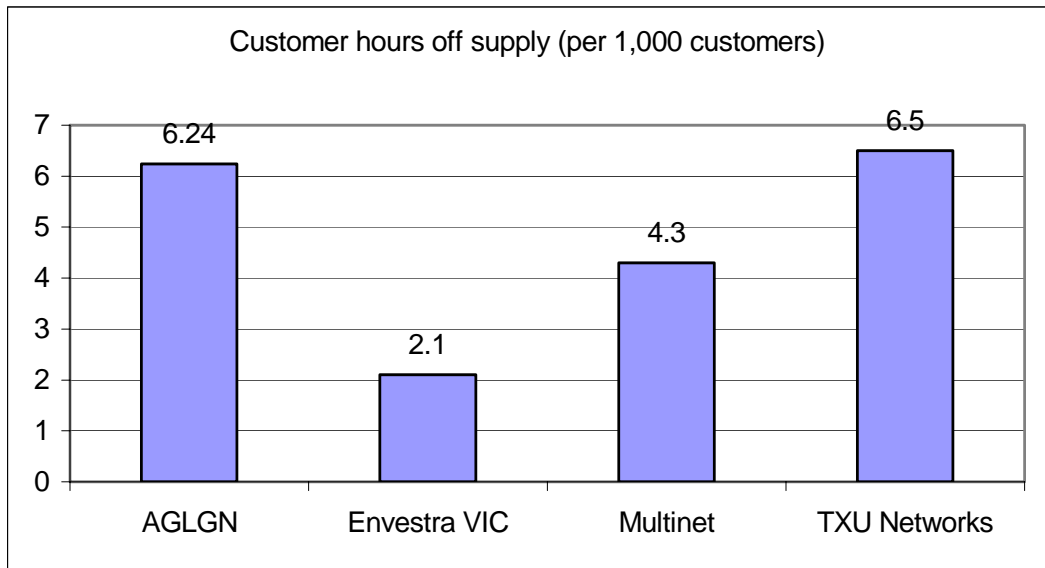
<sup>1</sup> AGLGN reporting period is 2002/03 financial year. Assumed Victorian reporting period is based on calendar year.

<sup>2</sup> Victorian data is for Metropolitan response during business hours.

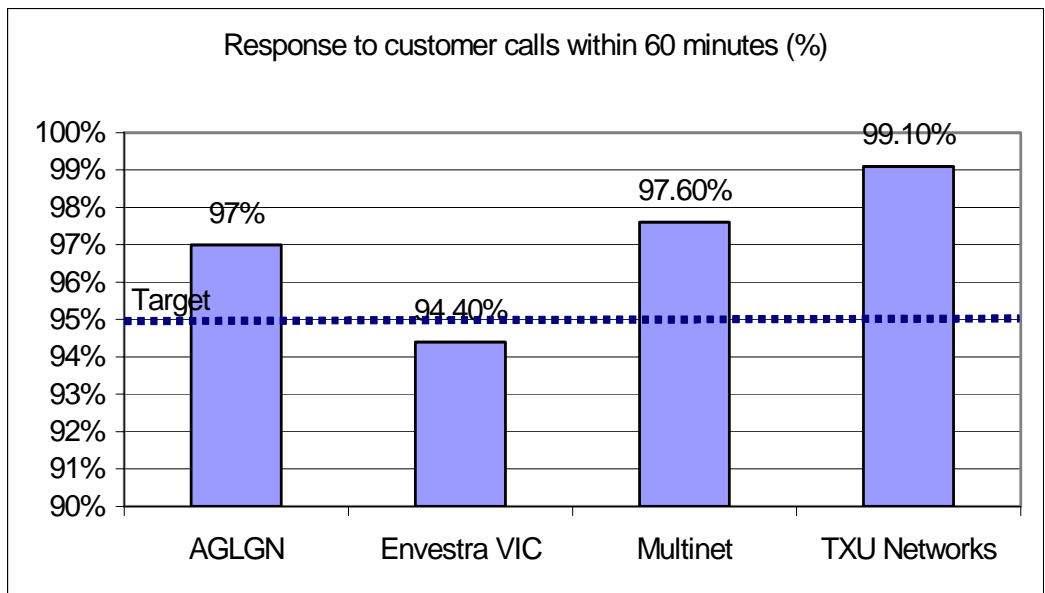
Data for key for service level indicators provided in *Table 2.1* is shown graphically in the *Figures 2.1, 2.2 and 2.3*.



**Figure 2.1: Service Indicators - Unplanned Outages**



**Figure 2.2: Service Indicators – Customer Hours off Supply**



**Figure 2.3: Service Indicators- Response to Customer Calls**

As can be seen by the Victorian Service KPI, AGLGN is performing at a comparable level while not necessarily best in all categories.

## 2.3 Industry Comparison of Operating Costs

Key measures of operating cost efficiency relate to costs of maintaining the distribution network, serving customers and managing the business. These costs are broadly driven by the length and types of mains, and the numbers of customers connected. As discussed previously, volumes of energy transported through the distribution network relate more to capital effectiveness and are therefore addressed in the capital cost review sections of this report. An exception to this relates to marketing costs of which a proportion may be justifiable on the basis of sales volume growth – i.e. increased asset

utilisation resulting from greater sales volumes, and therefore reviewed as a separate component of operating expenditure.

Within the key cost driver categories of customer numbers and kilometres of pipelines, there are many layers of variables. For customers, the load and location can influence costs, particularly as they relate to metering, connections, customer services and billing. Line length operating costs can vary depending on the type of mains, location, environment, geography and terrain.

In a detailed benchmarking exercise, each of these variables should be considered and their materiality assessed. However, this review by PB has been undertaken at a high level to determine the general reasonableness of expenditures. While the difference in cost impacts resulting from each of the detailed cost categories may be useful for accurate cost assessments, comparisons in this report are restricted to the key indicators used by IPART in setting its 2000 Access Arrangement.

Tables 2.2 and 2.3 show available data for various Australian gas distributors relating to operating costs, line lengths, customer numbers and sales volumes for 1998/99 and 2002/03.

**Table 2.2: Industry Operating Costs and Statistics – From IPART 2000**

Company State Year	AGLGN	AGL(ACT)	Envestra	Envestra	Multinet	Stratus	Westar
	NSW 1999	ACT 1999	SA 1999	Qld 1999	Vic 1999	Vic 1999	Vic 1999
<b>Statistics</b>							
Customer #s	751,613	64,912	329,412	74,790	587,179	416,327	410,976
Km of lines	21,589	3,410	6,892	2,046	8,601	7,314	7,195
Sales Volume (TJ)	101,469	5,115	46,178	10,639	87,730	57,053	62,594
Customers/km	35	19	48	37	68	57	57
Deliveries (TJ/km)	5	2	7	5	10	8	9
Utilisation (TJ/Customer)	0.14	0.08	0.14	0.14	0.15	0.14	0.15
<b>Operating Costs</b>							
Admin & Overhead	73.6	7.4	31.2	0.0	50.5	41.2	35.7
Marketing	31.0	5.0	6.5	0.0	0.9	4.6	2.1
Total O&M	104.5	12.5	37.7	10.0	51.4	45.8	37.8
<b>Opex Ratios</b>							
Operating/customer (\$)	139	192	114	133	87	110	92
Operating/km (\$)	4,842	3,651	5,468	4,879	5,973	6,257	5,254
Operating/delivery (\$/TJ)	1,030	2,434	816	938	586	802	604
Opex (excl. mktg) / customer (\$)	98	114	95	133	86	99	87
Opex (excl. mktg) / km (\$)	3,408	2,171	4,524	4,879	5,869	5,628	4,958
Opex (excl. mktg) / delivery (\$/TJ)	725	1,447	675	938	575	722	570

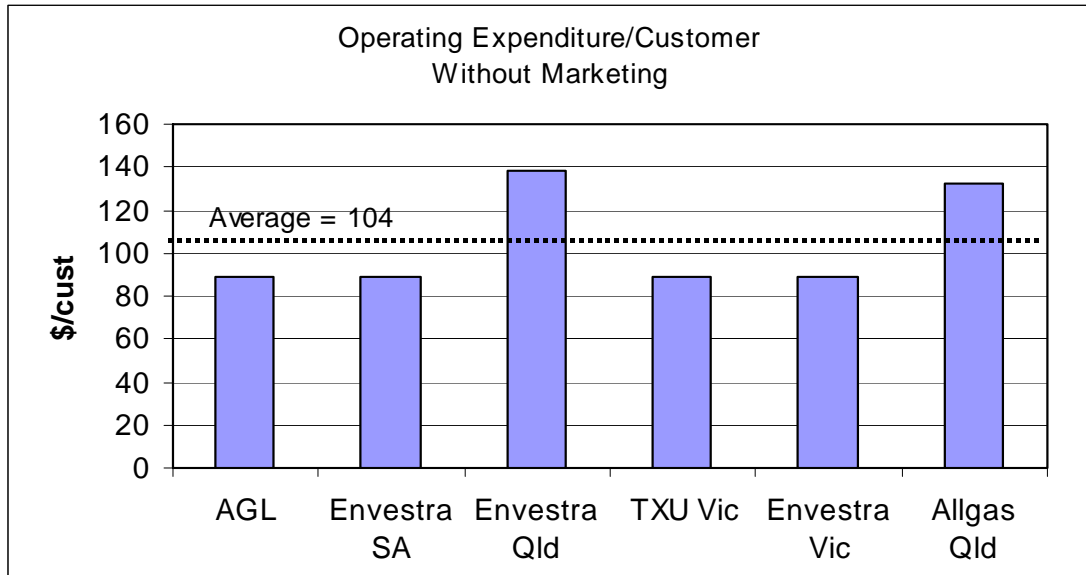
**Table 2.3: Industry Operating Costs and Statistics – Current Data**

<b>Company</b>	<b>AGLGN</b>	<b>ENVESTRA</b>	<b>ENVESTRA</b>	<b>MULTINET</b>	<b>TXU</b>	<b>ENVESTRA</b>	<b>ALLGAS</b>
<b>State</b>	<b>NSW</b>	<b>SA</b>	<b>QLD</b>	<b>VIC</b>	<b>VIC</b>	<b>VIC</b>	<b>QLD</b>
<b>Year</b>	<b>2003</b>	<b>2001/02</b>	<b>2002/03</b>	<b>2003</b>	<b>2003</b>	<b>2003</b>	<b>2002/03</b>
<b>Statistics</b>							
Customer numbers	892,920	350,488	73,736	631,637	466,277	459,555	58,979
Km of lines	22,880	6,897	2,026	9,100	8,000	7,943	1,843
Sales Volume (TJ)	97,127	41,800	13,300	60,653		53,600	9,992
Customers/km	39.03	50.82	36.39	69.41	58.28	57.86	32.00
Deliveries (TJ/km)	4.25	6.06	6.56	6.67	-	6.75	5.42
Utilisation (TJ/Customer)	0.11	0.12	0.18	0.10	-	0.12	0.17
<b>Operating Costs</b>							
O&M (\$mil)	62.0	24.7	8.7	51.1	41.6	25.8	6.4
Admin & Overhead	17.9	6.4	1.4			15.1	1.4
Marketing	13.1	6.2	0.5		3.0	2.7	0.4
UAG		4.7	1.1				1.4
Other operating costs (\$mil)			0.8		3.0	0.2	1.0
Total O&M (Excl tax and UAG)	93.0	37.3	10.6	51.1	44.6	43.6	8.2
<b>Operating Expenditure Ratios</b>							
Operating/customer (\$)	104	106	144	81	96	95	139
Operating/km (\$)	4,065	5,408	5,252	5,615	5,575	5,489	4,449
Operating/delivery (\$/TJ)	958	892	800	842		813	821
Operating expenditure (excl mktg) / customer (\$)	89	89	138	81	89	89	132
Operating expenditure (excl mktg) / km (\$)	3,492	4,509	5,005	5,615		5,149	
Operating expenditure (excl. mktg) / delivery (\$TJ)	823	744	762	842		763	781

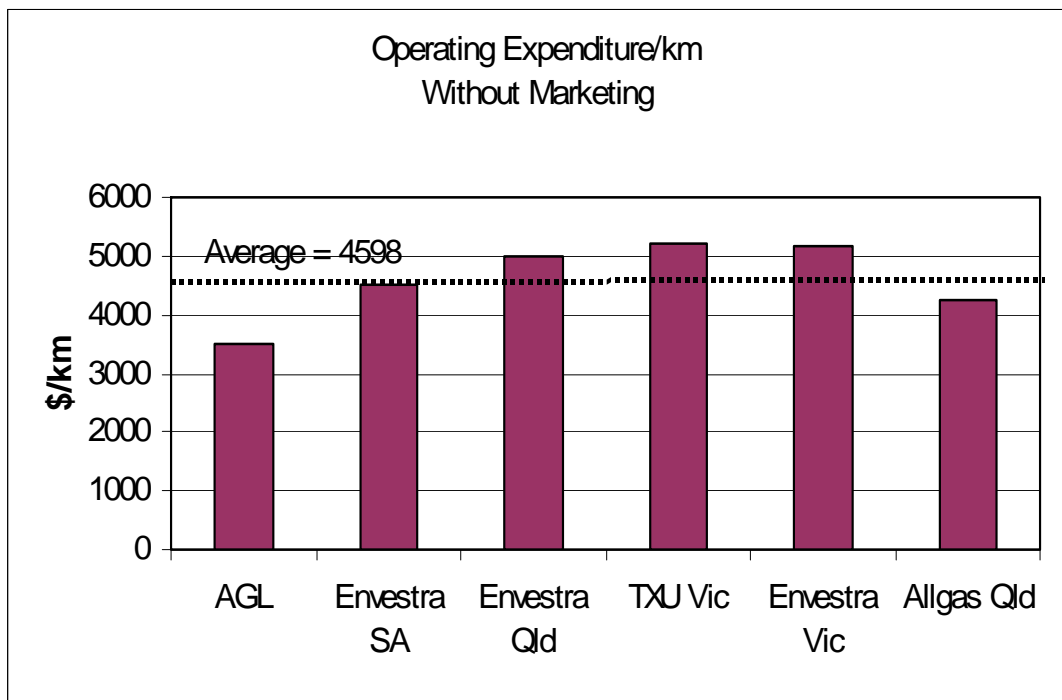
Data in the tables show that AGLGN controllable operating costs per customer including marketing were at the lower end of the range of the companies considered. The relatively low customer density influences the comparison based on customer numbers, yet AGLGN operating costs as calculated by length of mains were by far the lowest of all Australian gas distributors. The costs per volume of gas delivered for AGLGN generally compare unfavourably, however, as previously discussed, this should be viewed more as a measure of capital efficiency rather than operating efficiency, with the possible exception of some marketing costs.



Key statistics from Tables 2.2 and 2.3 are shown graphically in Figures 2.4, 2.5 and 2.6.

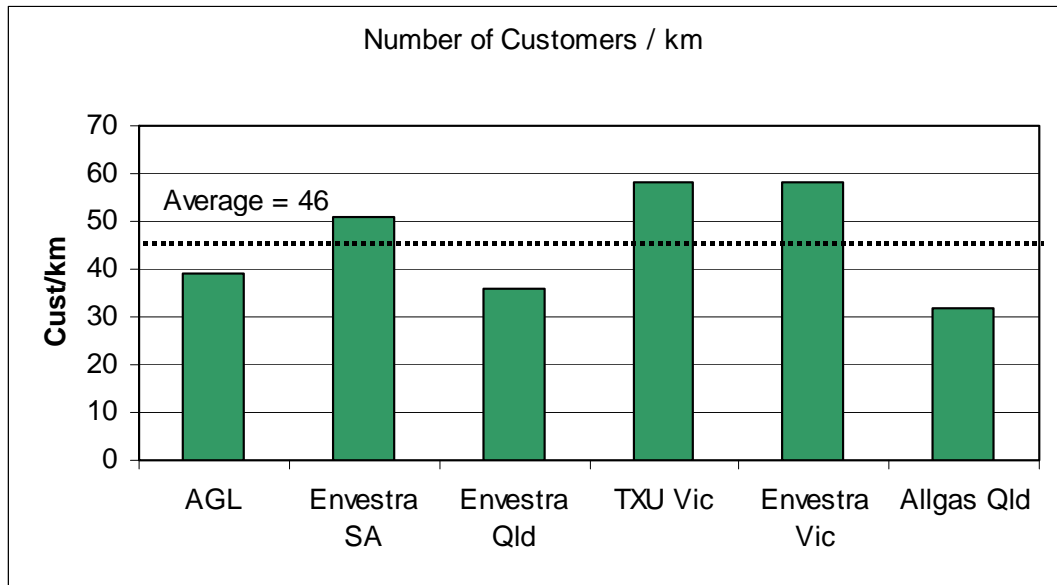


**Figure 2.4: Operating Expenditure per Customer (\$2003)**



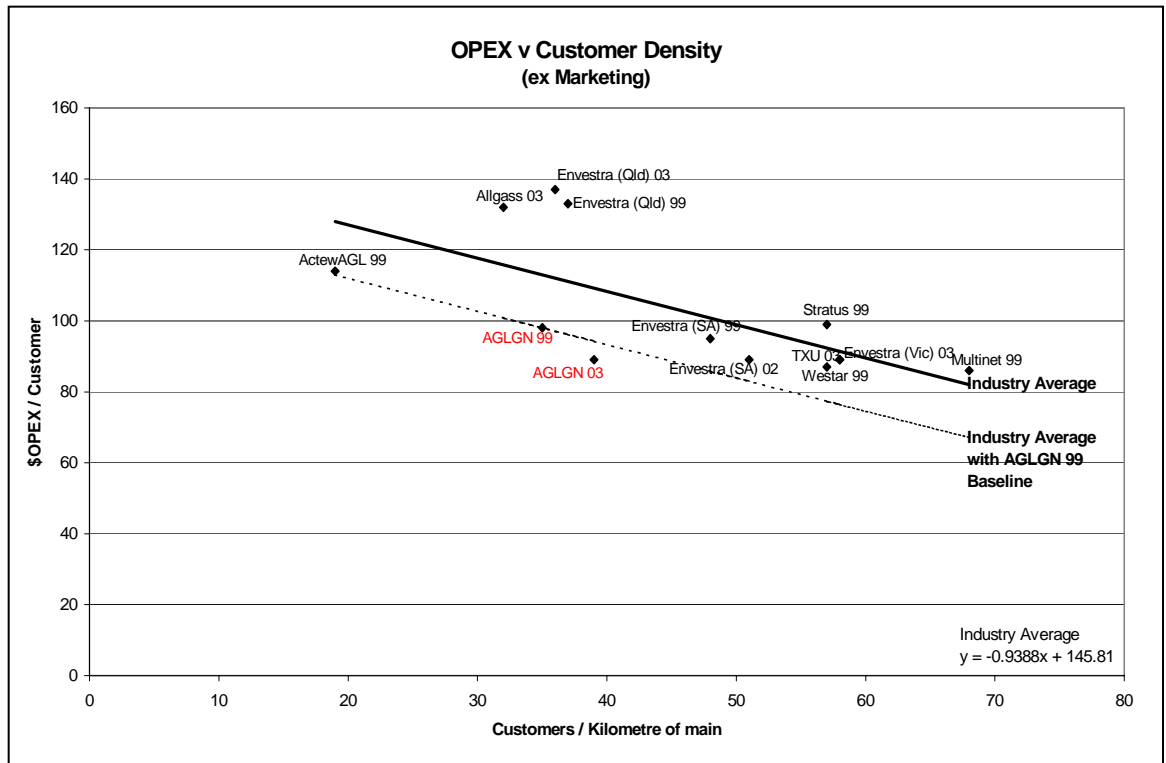
**Figure 2.5: Operating Expenditure / km of Main (\$2003)**

**Figure 2.6: Number of Customers / km of Mains**



A comparison of AGLGN performance over the period shows that it has improved its relative performance on most measures. In particular, total operating cost per customer has reduced by 15% over the 4-year period in nominal dollars (24% in real terms). The exception would appear to be in terms of costs per unit volume of gas delivered which have increased due to declining total sales volumes (as a result of the loss of a major contract customer which again highlights the anomaly of including volumes as a measure of operating efficiency for a distribution business).

A useful way of presenting these results is to graph costs per customer against customer density (customers per kilometre of line). This is shown in *Figure 2.7* which demonstrates the high correlation between these statistics across Australian distributors.



**Figure 2.7: Customer Density Versus Operating Costs (\$2003)**

A comparison between Operational Expenditure and Customer density demonstrates relative performance both across distributors, as well as time periods. The above chart comprises data from reporting periods in both 1999 and 2003.

In the case of AGLGN, it can be seen that both productivity and efficiency have improved over time. Here, productivity is demonstrated by an increase in customers per kilometre of main. Efficiency is represented by \$OPERATING EXPENDITURE per customer.

A linear trendline was applied to the raw data, the result being representative of the average standard of performance across the stated distributors. It is clearly shown that during the 1999 reporting period, AGLGN performed 13% better than the industry average trend line.

Further, using AGLGN 1999 performance as a baseline and transposing the industry standard accordingly, it can be seen that there has been a marked improvement in AGLGN performance up to 2003.

## 2.4 Operating expenditure in FY 2000-2004

PB undertook a high level review of operating expenditure in the period FY 2000 – 2004 to establish an opinion on how AGLGN met its IPART allowed costs, and on this basis to assess the reasonableness of future operating expenditure.

Table 2.4 shows expenditure levels allowed in the final decision by IPART for AGLGN over the period of the Access Arrangement.

**Table 2.4: IPART 2000 Determination – Operating Costs (2000\$)**

IPART 2000 Determination (2000 \$)							
Year	1999	2000	2001	2002	2003	2004	Cumulative %
<b>Unit cost reductions</b>							
Operation and maintenance		-3%	-3%	-3%	-3%	-3%	-14.10%
Corporate overheads		-3%	-3%	-3%	-3%	-3%	-14.10%
Marketing		-19%	-19%	-19%	-19%	-19%	-64.50%
<b>Real controllable opex before growth</b>	<b>101.9</b>	<b>94.5</b>	<b>88.1</b>	<b>82.6</b>	<b>77.8</b>	<b>73.5</b>	<b>-27.80%</b>
<b>Final decision – opex after growth</b>							
Operation and maintenance	59.2	58.9	57.2	55.1	54.9	54.5	-7.90%
Corporate overheads	15	14.9	14.5	13.9	13.9	13.8	-7.90%
Marketing	27.7	23.6	20	16.9	14.3	12	-56.60%
<b>Real controllable opex after growth (\$m)</b>	<b>101.9</b>	<b>97.3</b>	<b>91.6</b>	<b>85.9</b>	<b>83</b>	<b>80.3</b>	<b>-21.20%</b>
<b>Other costs</b>							
Government levies	8.8	6.5	6.5	6.5	6.5	6.5	
<b>Contestability adjustment mechanism to allow for such costs</b>							
Unaccounted for gas	8.6	8.5	8.6	8.7	8.7	8.8	
<b>Real other opex (\$m)</b>	<b>17.4</b>	<b>15</b>	<b>15.1</b>	<b>15.2</b>	<b>15.2</b>	<b>15.3</b>	
<b>Allowed opex (\$m)</b>	<b>119.3</b>	<b>112.3</b>	<b>106.8</b>	<b>101.1</b>	<b>98.2</b>	<b>95.6</b>	<b>-19.90%</b>

In arriving at the controllable costs for operation, maintenance and corporate overheads, IPART made provisions for operating expenditure adjustment through:

- reductions of unit costs of 3% each year, based on assumed efficiency savings; and
- incremental operating expenditure costs for additional growth to be calculated on an equal weighting of 50 percent each applied to volume load growth and customer growth.

Table 2.5 brings the Final Decision for controllable costs of operating expenditure to nominal dollars, but still on the basis of the volume and customer growth numbers as projected at the time of the Determination.

**Table 2.5: IPART 2000 Determination – Operating Costs (Nominal \$)**

Year	2000	2001	2002	2003	2004	Total 2000-04
CPI conversion of \$2000 to nominal:	1	1.0289	1.0583	1.091	1.121	
<b>Unit cost reductions</b>						
Operation and Maintenance	-3%	-3%	-3%	-3%	-3%	
Corporate overheads	-3%	-3%	-3%	-3%	-3%	
Marketing	-19%	-19%	-19%	-19%	-19%	
<b>Real controllable operating expenditure before growth</b>	<b>94.5</b>	<b>90.6</b>	<b>87.4</b>	<b>84.9</b>	<b>82.4</b>	<b>439.83</b>

**Final decision - operating**



<b>Year</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>Total 2000-04</b>
<b>expenditure after growth</b>						
Operation and maintenance	58.9	58.9	58.3	59.9	61.1	297.06
Corporate overheads	14.9	14.9	14.7	15.2	15.5	75.16
Marketing	23.6	20.6	17.9	15.6	13.5	91.12
Real controllable operating expenditure after growth (\$m)	97.3	94.2	90.9	90.6	90.0	463.02
<b>Other costs</b>						
Government levies	6.5	6.7	6.9	7.1	7.3	34.44
Contestability adjustment mechanism to allow for such costs			5.7	5.8	4.7	16.15
Unaccounted for gas	8.5	8.8	9.2	9.5	9.9	45.91
Real other operating expenditure (\$m)	15.0	15.5	21.7	22.4	21.9	96.51
<b>Allowed operating expenditure (\$m)</b>	<b>112.3</b>	<b>109.8</b>	<b>112.6</b>	<b>112.9</b>	<b>111.9</b>	<b>559.53</b>

PB has reviewed the information on actual customer growth and actual volumes of gas sold and compared these with the assumptions used in 2000 IPART Decision when predicting controllable costs adjustments as shown in *Table 2.6*.

**Table 2.6: Growth Predictions & AGLGN Actuals**

<b>Year</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>Total 2000-04</b>
<b>Number of New Customers (total number of gas sites)</b>							
Predictions used in AA (annual growth)		36,383	30,274	29,204	28,380	25,923	150,164
Actual sites connected		36,360	38,870	33,373	32,382	30,096	171,081
Variation on growth		-23	8,596	4,169	4,002	4,173	20,917
% variation		-0.06%	28.39%	14.28%	14.10%	16.10%	13.93%
<b>Volume of Gas (Total billings)</b>							
Predictions used in AA (growth in PJ pa)		101,584	98,127	94,308	96,307	98,123	488,449
Actual volume growth (PJ pa)	101,477	104,733	100,382	96,733	97,127	98,101	497,076
Variation on volume		3,149	2,255	2,425	820	-22	8,627
% variation		3.10%	2.30%	2.57%	0.85%	-0.02%	1.77%

As the actual growth figures are different to those projected by IPART in its Final Decision, the allowance for operating costs needs to be adjusted as per IPART

provisions. The adjusted allowable expenditure for controllable operating costs after actual growth is shown in *Table 2.7*.

**Table 2.7: Allowable Operating Costs (Nominal \$) after consideration of actual growth**

<b>Year</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>Total 2000-04</b>
<b>Final decision - operating expenditure after growth</b>						
Operation and maintenance	59.8	59.9	59.6	60.8	61.9	301.99
Corporate overheads	15.1	15.2	15.0	15.4	15.7	76.41
Marketing	23.6	20.6	17.9	15.6	13.5	91.12
Real controllable operating expenditure after growth (\$m)	98.5	95.6	92.5	91.8	91.1	469.52
<b>Other costs</b>						
Government levies	6.5	6.7	6.9	7.1	7.3	34.44
Contestability adjustment mechanism	0.0	0.0	5.7	5.8	4.7	16.15
Unaccounted for gas	8.5	8.8	9.2	9.5	9.9	45.91
Real other operating expenditure (\$m)	15.0	15.5	21.7	22.4	21.9	96.51
Allowed operating expenditure (\$m)	113.5	111.2	114.2	114.2	112.9	566.03

The final reconciliation of adjusted IPART allowed costs to AGLGN actual costs (in nominal dollars) is presented in a *Table 2.8* for the period of the current Access Arrangement (2000 – 2004).

**Table 2.8: AGLGN Actual Operating Costs 2000 – 2004 (Nominal \$)**

<b>Year</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004 Forecast</b>	<b>Total 2000-04</b>
Final decision - operating expenditure after growth						
Operation and maintenance	54.1	57.3	61.4	60.7	65.2	298.7
Corporate overheads *	17.0	18.4	17.8	17.9	18.2	89.30
Marketing	23.3	17.1	12.4	13.1	13.1	79.00
Real controllable operating expenditure after growth (\$m)	94.4	92.8	91.6	91.7	96.5	467.00
Other costs						
Government levies	6.4	5.3	4.4	3.8	3.8	23.68
Contestability adjustment mechanism	0.0	0.0	4.5	4.7	4.7	13.97
Unaccounted for gas	10.2	8.1	6.8	7.7	8.3	41.11
Real other operating expenditure (\$m)	16.6	13.4	15.7	16.3	16.8	78.77
Actual operating expenditure (\$m)	111.0	106.2	107.3	108.0	113.3	545.77

The variation between adjusted allowable operating costs and actual operating costs is shown in *Table 2.9*

**Table 2.9: Variation between Adjusted Allowable Operating Costs and Actual Costs (\$m, nominal)**

Year	2000	2001	2002	2003	2004 Forecast	Total 2000-04
<b>IPART 2000 Determination (\$m, nominal)</b>						
Allowed operating expenditure with predicted growth	112.3	109.8	112.6	112.9	111.9	559.5
Allowed operating expenditure with adjustment for actual growth	113.5	111.2	114.2	114.2	112.9	566.0
<b>AGLGN Actual (\$m, nominal)</b>						
Actual operating expenditure	111.0	106.2	107.3	108.0	113.3	545.8
<b>Variation (\$m, nominal)</b>						
Actual – Final Decision	1.3	3.6	5.3	4.9	-1.4	13.77
Actual – Final Decision adjusted for actual growth	2.5	5.0	6.9	6.2	-0.3	20.26

This analysis illustrates that AGLGN expenditure was generally less than the IPART allowed operating expenditure. AGLGN has delivered a real \$13.8M reduction in the total operating costs for the period 2000 – 2004 over the allowances set by IPART in the 2000 Final Decision. In addition to this, when the allowance set by IPART for incremental operating expenditure costs due to growth is recalculated for actual growth, AGLGN has delivered savings of \$20.3M in its overall operating costs.

The results show that AGLGN controllable operating cost for the period was generally less than the IPART allowed with the exception of the final year where the forecast is some \$1.4M above the IPART figure in 2003/04. The primary explanation provided by AGLGN for this variance is that market management expenditures that relate to facilitation of a number of activities in NSW is provided by AGLGN but was not removed from IPART comparisons with Victorian distributors in the 2000 Access Decision. In Victoria, VENCORP and the Office of Gas Safety provide many functions for operation and coordination of the gas market. VENCORP's role and gas functions are described in their documentation extract below.

*“Roles*

*VENCORP is funded by energy industry participants, and has major operational, planning and development roles for both gas and electricity. Our key roles are:*

- *Independent system operator for the Victorian gas transmission network;*
- *Manager and developer of the Victorian wholesale Gas Market; and*
- *System Planner providing planning services for the gas and electricity industries.*

*In addition, VENCORP has operational and communications responsibilities during gas and electricity emergencies.*

## *Statutory Functions*

### *GAS*

*Statutory roles include the operation of the gas transmission system and the competitive wholesale gas market. These activities must be undertaken by VENCORP as directed by the Gas Industry Act 2001, the Third Party Access Code for Natural Gas Pipeline Systems, and the Market System Operations Rules (MSOR). The Statutory Gas functions are funded by charging fees to market participants. The Australian Competition and Consumer Commission (ACCC) regulates these fees."*

AGLGN has argued that its market management and operation costs of \$4.2 million (2002/03) were omitted by IPART in its 2000 Decision and should be added to IPART base figures when comparing expenditures. The following activities are included:

- gas balancing;
- emergency load shedding;
- gas quality management;
- energy contract administration;
- transportation contracts;
- SCADA, communications; and
- Type B appliance approvals.

AGLGN has not as yet raised this issue with IPART and therefore resolution of the issue is not possible in this report. It does appear that some functions performed by AGLGN are provided by VENCORP in the Victorian market which would indicate that at least some of these expenditures should have been added to allowable operating costs in the IPART 2000 review. However it is difficult in this exercise to gain a comprehensive understanding of the extent of overlap functions. The ACCC revenue allocation to VENCORP as recovered from gas market participants was some \$15 million in 2001/02. While there is clearly a lack of congruence between these functions, it does indicate that market operation costs are likely to be substantial and are relevant to this review.

Brief discussions with VENCORP have not allowed a detailed reconciliation of market operation functions. For this review, therefore, the analysis has acknowledged these costs in the comparisons with other distributors. It is noted that AGLGN has not indicated any concerns regarding relativities with distributors of other states on this issue.

Based on a preliminary analysis, market management costs would appear to be a legitimate addition to the allowed IPART operating costs. The appropriate value to be added would require more detailed assessment of the extent of duplicated functions with those of VenCorp, however, the figure provided by AGLGN would appear to be reasonable. Figures for other interstate comparators would need to be adjusted to enable congruence. Based on this position, AGLGN would appear to have achieved or bettered IPART non-capital controllable cost targets.



However, PB notes that AGLGN actual direct maintenance and operations costs, including the related administrative and overheads costs, are higher for the 2000 – 2004 period by approximately \$15.8M when compared to IPART controllable costs with growth as predicted for the same period. These costs are higher by approximately \$9.6M if compared with the IPART allowance after the adjustment for AGLGN actual growth.

We have identified possible reasons for these higher costs:

- A capital expenditure/operating expenditure trade-off, as the capital expenditure allowed for asset replacement programs in the Access Arrangement was not actually spent, therefore increasing maintenance and operating costs.
- Cost savings expected to eventuate from improvements in IT systems as expected at the time of the Final Decision did not materialise, as these projects did not occur.
- Increase in operating costs arising from the introduction of Full Contestability and general market management expenditures that relate to facilitation of FRC in NSW.

In summary, PB is of the opinion that:

- AGLGN 2000 – 2004 actual operating expenditure is prudent and reasonable.
- The direct operation and maintenance and related administrative and overheads costs projected for 2004 of \$83.4M, excluding marketing costs (\$2004), represent a cost per customer in the order of \$90/customer, which PB regards as prudent.
- The cumulative 3% pa savings in operating costs arising from productivity improvements over the period of the Access Arrangement, as imposed by IPART on AGLGN, are not technically sustainable into the next Access Arrangement period. Continued reductions of this magnitude cannot be justified on the basis of inefficiencies relative to other distributors.

## 3. Review of Capital Expenditure

### 3.1 Efficiency of Capital Expenditure Process in AGLGN

Documentation relating to the procedures used by AGLGN to identify capital works were reviewed and discussed with key AGLGN personnel. The documents included:

- technical policy on Gas Network Design Criteria and Performance Validation for Supply, Reliability and Growth, TPC.PROC.4.99.28;
- Capital Budget Management Procedure;
- Asset Management Plan Procedure; and
- Integrity Management Procedure.

The application of these procedures was then used for an initial assessment of the capital expenditure estimates, which were also compared with customer connection and Stay-in-Business activity forecasts provided by AGLGN.

Key AGLGN personnel were interviewed in order to review specific items and/or activities in the capital expenditure forecasts in greater detail.

#### ***Planning Process***

AGLGN has in place, a gas network design criteria and performance validation policy to identify the nature and extent of capital works required on the AGLGN network. It also has in place, several procedures to maintain the integrity of the network; to ensure that pipelines and facilities are regularly maintained and replaced where required, and that all capital expenditure is prepared and approved following an appropriate approval structure.

The gas network design criteria prescribes that, where a request for design work is identified, the network should be designed with provision for projected loads for 5-years growth, and that the design must be verified by computer models based on the most recent system data. Long-term strategic plans must also be developed for the gradual implementation of design to meet market demands for periods up to 20-years.

Once the design have been approved and implemented, the design must be validated against monitored field data. Field data is collected annually over a period of one week for each network during the winter, when demand for gas is highest, to test system performance. The validation policy requires that a revision of the network model be conducted annually to determine the timing and extent of any system reinforcement and capacity augmentation works.

The integrity management procedure requires that integrity issues associated with AGLGN network be identified and proposed rectification actions be documented and reviewed. A review of the network is conducted annually, timed to coincide with the

compilation of annual lifecycle plans and budgets. This procedure ensures that the gas network maintains its integrity and that any risks identified are sufficiently addressed.

The asset management plan procedure is designed to ensure that all assets managed by AGLGN are maintained and operated according to regulatory and technical requirements while being efficient with capital and operation expenditure. The Asset Management Plan is a rolling five year plan that is reviewed annually and includes capital works to be carried out from projects identified through integrity and capacity management reviews. The current plan covers the period from 1 July 2002 to 30 June 2007 and aims to maintain existing reliability, performance and risk levels while staying within the established regulatory pricing structure.

The design criteria and validation policy, and the integrity and asset management procedures document the process of capital works identification. The Capital Budget Management Procedure however, specifies the stages involved in the preparation of the capital budget as well as the required approval process. The preliminary budget is reviewed and a proposal developed for management approval prior to the commencement of any work associated with the capital works project.

It is the opinion of PB that the planning process used by AGLGN is effective and efficient and provides an excellent balance between the competing requirements of risk exposure, operational efficiency, capital investment, revenue and regulatory compliance.

### 3.2 Capital Expenditure in FY 1999/2000 to 2003/2004

PB undertook a high level review of actual capital expenditure for the period FY 1999/2000 to 20003/2004 to compare with IPART allowed costs and to establish an opinion on the prudence of AGLGN expenditure. This review was also used as a basis to assess the efficiency of future capital expenditure forecasts.

In its 2000 to 2004 Final Decision for AGLGN Access Arrangement, IPART allowed the capital costs shown in *Table 3.1*. The review of non system asset expenditure was not included in PB scope but forecast and actual expenditure figures for this are included in *Table 3.1* and following tables for completeness.

**Table 3.1: IPART 2000 Determination – Capital Costs 1999/2000 to 2003/2004**

Real 2000 \$m	1999/2000	2000/01	2001/02	2002/03	2003/04	Total
<b>Renewal / Replacement</b>						
High pressure						
M/L pressure tariff	9.4	9.2	8.9	8.7	8.5	44.7
Meters / regulators / filters	0.5	16.1	1.1	8.5	5.8	32
Non System Assets	10.1	6	12	12	12	52.1
Subtotal	20	31.3	22	29.2	26.3	128.8
<b>Growth Related</b>						
M/L pressure tariff	52.4	37.4	36.8	35.9	34	196.5

<b>Real 2000 \$m</b>	<b>1999/2000</b>	<b>2000/01</b>	<b>2001/02</b>	<b>2002/03</b>	<b>2003/04</b>	<b>Total</b>
<b>System Reinforcement</b>						
High Pressure (Sydney)	4.6	16.1	16.9	3	6.3	6.3
<b>TOTAL Real 2000 \$m</b>	<b>77</b>	<b>84.8</b>	<b>75.7</b>	<b>68.1</b>	<b>66.6</b>	<b>331.6</b>

Note: Figures may not add up to sub-total and total due to rounding

PB adjusted these costs for price movement based on CPI to compare against the actual capital invested by AGLGN. This is shown in Tables 3.2 and 3.3.

**Table 3.2: IPART 2000 Determination – Capital expenditure 1999/2000-2003/2004 in Nominal dollars**

<b>Nominal \$m</b>	<b>1999/2000</b>	<b>2000/01</b>	<b>2001/02</b>	<b>2002/03</b>	<b>2003/04</b>	<b>Total</b>
CPI conversion of \$2000 to nominal:	1	1.0289	1.0583	1.091	1.121	
<b>Renewal / Replacement</b>						
High pressure	0	0	0	0	0	
M/L pressure tariff	9.4	9.5	9.4	9.5	9.5	47.3
Meters / regulators / filters	0.5	16.6	1.2	9.3	6.5	34.0
Non System Assets	10.1	6.2	12.7	13.1	13.5	55.5
Subtotal	20.0	32.2	23.3	31.9	29.5	136.8
<b>Growth Related</b>						
M/L pressure tariff	52.4	38.5	38.9	39.2	38.1	207.1
<b>System Reinforcement (Security of Supply)</b>						
High Pressure (Sydney)	4.6	16.6	17.9	3.3	7.1	49.4
<b>TOTAL Nominal \$m</b>	<b>77.0</b>	<b>87.3</b>	<b>80.1</b>	<b>74.3</b>	<b>74.7</b>	<b>393.3</b>

**Table 3.3: Actual Capital Expenditure 1999/2000 to 2003/2004 (as provided by AGLGN)**

<b>Nominal \$m</b>	<b>1999/2000</b>	<b>2000/01</b>	<b>2001/02</b>	<b>2002/03</b>	<b>2003/04</b>	<b>Total</b>
<b>Renewal / Replacement</b>						
High pressure	0.2	0.0	-	-	4.6	4.8
M/L pressure tariff	10.7	9.2	2.4	0.7	1.1	24.0
Meters / regulators / filters	3.9	3.7	0.7	2.2	6.4	16.9
Non System Assets	5.3	2.2	5.8	2.7	5.2	21.3
Subtotal	20.1	15.1	9.0	5.5	17.3	67.0
<b>Growth Related</b>						
M/L pressure tariff	56.0	55.0	46.3	48.1	47.5	252.8
<b>System Reinforcement (Security of Supply)</b>						
High Pressure (Sydney)	2.4	0.5	2.5	6.7	5.5	17.6
<b>TOTAL Nominal \$m</b>	<b>78.5</b>	<b>70.5</b>	<b>57.7</b>	<b>60.4</b>	<b>70.3</b>	<b>337.4</b>

Note: 1. Figures may not add up to sub-total and total due to rounding

The total projected capital expenditure over the period 2000-2004 was compared against AGLGN total actual capital expenditure, as shown in *Table 3.4*.

**Table 3.4: Projected versus Actual Capital Expenditure**

<b>Nominal \$m</b>	<b>Projected</b>	<b>Actual</b>	<b>Variance</b>
Renewal/Replacement System Assets	81.3	45.8	35.54
Renewal/Replacement Non System Asset	55.5	21.3	34.25
Growth Related	207.1	252.8	-45.7
System Reinforcement (Security of Supply)	49.4	17.6	31.8
<b>Total</b>	<b>393.32</b>	<b>337.42</b>	<b>55.90</b>
<b>% Difference</b>			<b>14.21%</b>

The total AGLGN actual expenditure over the Access Arrangement period was \$55.9 million less than forecast as expressed in nominal dollars.

The major differences between actual and forecast expenditure identified by PB are detailed in the following sections.

***Items where actual expenditure was below forecast***

- Renewal / Replacement – Medium and low pressure mains and services renewals.

In 2000, AGLGN received IPART endorsement for continuation of its program of replacement of the distribution networks (mains and customer services) that had reached their economic life. The total program was estimated to be \$47.3m, but as reported by AGLGN, this program was greatly reduced for the period 2000-2004 with AGLGN spending only \$23.7m.

AGLGN has explained to PB that this was due to reallocation of the available capital to the growth segments of the capital expenditure program to cope with higher than expected growth related to the housing boom in Sydney.

- Renewal/Replacement – Meter/filter replacement.

PB has identified that AGLGN has reduced capital programs for meter aged replacement, mainly for tariff customers. The reduction of this item is in the order of \$17m.

AGLGN has explained that this reduction is mainly due to the transitional arrangements with the Department of Fair Trading (DFT) based on the ongoing testing of existing meter accuracy that allows extension of the service life for selective groups of meters.

- System Reinforcement (Security of Supply).

The decrease in expenditure in system reinforcement was due mainly to deferral of the next major section of the Sydney primary loop main. The supply of much of the Sydney metropolitan area is currently provided by a single feeder main that transports gas from the pipelines in western Sydney to the eastern parts of Sydney. AGLGN has an ongoing construction project to establish a security loop for this single feeder main called the “Primary Loop”. IPART has made provision for some \$32m in the final decision to complete construction of this project.

AGLGN has explained to PB that the project is being deferred, mainly due to a change in the route of the M5 motorway along which the pipeline was to be built. The new route is unsuitable for the pipeline and alternative routes are being assessed.

- Non System Assets.

While it was outside PB scope to assess the expenditure on non-system assets, for completeness of the analysis, AGLGN has underspent by \$34.2M of the non-system assets allowance by the 2000 Final Decision, a large proportion of which was to be on information technology systems.

AGLGN has explained to PB that there had been delays in finalising details of the proposed information technology systems and that the program had been deferred until the next Access Arrangement period.

### **Items where actual expenditure was above forecast**

- Growth Related – Medium and Low pressure mains and customer services.

The increased growth related expenditure of \$45.7 million is very largely due a greater than forecast increases in the number of residential tariff customers. The actual growth over the Access Arrangement period was 171,081, an increase of 14% over the original forecast of 150,164.

### **Reasonableness of Unit Costs for Growth**

Capital expenditure for residential customer market growth (that includes mains/service/meter) represents approximately 75% of total capital expenditure. PB has analysed AGLGN actual unit costs of mains/service/meter for residential customers for the period 2000-2004 and has benchmarked the unit costs against other Australian gas companies.

Table 3.5 details the AGLGN actual unit rate costs achieved during the period in real 2005 dollars.

**Table 3.5: Unit costs of mains/service/meter for residential customers**

<b>Real 2005 \$'000</b>	<b>1999/2000</b>	<b>2000/01</b>	<b>2001/02</b>	<b>2002/03</b>	<b>2003/04</b>
<i>Gross Residential Customer Connections</i>	40482	39248	35439	36234	33047
Total Tariff Capital expenditure (residential and Industrial/commercial) (\$'000)	64.5	61.5	50.3	50.8	47.5
Less Industrial & Commercial (\$'000)	3.76	3.92	2.13	4.90	4.06
Residential Capital expenditure (including mains, services, meters) (\$'000)	60.7	57.6	48.2	45.9	43.45
Cost of mains/service/meter per residential customer (\$)	1,500	1,468	1,360	1,267	1,315
<i>Average 2000-2004 (\$)</i>			<i>1,387</i>		

Comparable rates (in 2005 dollars) used by others are:

Envestra	\$1,296
Multinet	\$1,358
TXU	\$1,505

(source Victorian Essential Services Commission (ESC) Final Decision Oct 02)

The rates achieved by AGLGN compare very favourably with those of others. In the opinion of PB the actual unit rates that AGLGN has achieved are cost efficient and reasonable.

### ***Reasonableness of Costs of Capital Projects***

PB reviewed the process that AGLGN applied in the delivery of the capital projects.

AGLGN, for majority of capital projects, seeks at least 3 independent companies to tender for the projects. The labour and material components of the projects tendered comprise approximately 80% of the project direct costs.

PB considers that AGLGN has applied good industry practices to deliver cost effective capital implementation.

### ***Overall Comment on Capital Expenditure in FY 1999/2000 to 2003/2004***

It is the opinion of PB that the planning process used by AGLGN for capital works is effective and efficient and provides an excellent balance between the competing requirements of risk exposure, operational efficiency, capital investment, revenue and regulatory compliance.

In the opinion of PB the capital expenditure during the period has been managed in a prudent manner. Capital was reallocated from renewal replacement works to meet the greater need of coping with higher than forecast growth. However this has possibly contributed to increased maintenance and operating costs. Major expenditure on system reinforcement has had to be deferred by matters outside of the control of AGLGN. PB cannot comment on the reduced expenditure on non system assets for information technology works as it is outside the scope of this review.

PB considers that during the period considered, the capital projects have been delivered in an efficient and cost effective manner.

## **3.3 Future Capital Expenditure FY 2004/05 to 2009/10**

AGLGN has requested PB to provide a high level assessment of reasonableness of the network related elements of future capital expenditure.

### **3.3.1 Growth Related Expenditure**

#### ***Growth related – Medium Low pressure tariff, Residential***

Market expansion historically constitutes some 75% of the total AGLGN capital expenditure directly related to the network. The components of market expansion are: new mains, customer services and customer meters.

AGLGN has provided PB with forecasts of projected customer growth in the residential and Industrial/Commercial customer market groups. Using these together with the historical average unit cost of connections for each new residential customer with a

reduction applied that would be derived from productivity improvements; PB has prepared a forecast of capital expenditure for residential customer growth. PB is of the opinion that while the historical average unit cost of connection for each new residential customer of \$1387 is reasonable (refer *Section 3.2, Table 3.5*) that a 1% per annum efficiency reduction to unit costs could be derived from productivity improvements. *Table 3.6* summarises the AGLGN residential customer growth forecast and PB forecasts of associated capital expenditure.

**Table 3.6: Forecast Capital Expenditure for Customer Growth**

<b>Real \$2005</b>	<b>2004/ 2005</b>	<b>2005/ 06</b>	<b>2006/ 07</b>	<b>2007/ 08</b>	<b>2008/ 09</b>	<b>2009/ 10</b>
Gross Residential Customer Connection	34,775	35,538	34,917	34,909	34,863	34,876
Residential Capital expenditure including mains, services, and meters \$m	48.2	48.8	47.5	47.0	46.4	46.0
Cost of mains/ service/meter per residential customer	1,387	1,373	1,359	1,346	1,332	1,319

***Growth related – Medium Low pressure tariff, Industrial and Commercial***

PB is of the opinion that the historical unit cost of \$6,500 per connection is reasonable for the forecasting of capital costs for connection of Industrial and Commercial tariff customers.

***Growth related – Capacity Development***

Capacity development projects are feeder mains and related facilities that reinforce the existing networks with enhanced capacity for ongoing market expansion, or introduce gas to new development areas. These mains provide gas to the local distribution networks.

PB selected three representative capacity development projects to review in order to assess the AGLGN processes and procedures of project planning in general as well as the reasonableness of these particular proposals. The projects ranged from high pressure steel mains to medium pressure extensions and are among the larger capacity development projects being considered for the next Access Arrangement period.

*North Ryde to Turramurra Primary Mains Project*

Following network reviews indicating that the North Ryde to Willoughby secondary network will be at full capacity by winter 2006 due to on-going growth on the network, AGLGN has proposed that the primary main at North Ryde be extended to Turramurra in 2005/2006. A PRS will be constructed at Turramurra which would another supply point to the secondary network. This network augmentation would provide the long term capacity and security of supply for predominantly residential growth demands in the Warringah, Pittwater and Hornsby areas.



PB has reviewed the proposal and is of the opinion that the need for the project has been clearly demonstrated. Assessments of alternative supply routes or capacity augmentation methods have shown that this is the most efficient capacity development solution.

#### *Castle Hill to Dural Gas Distribution Network Upgrading*

A network validation of the Castle Hill/Thornleigh/Dural system has shown that the system is nearing capacity at sections of the network. Apart from medium density growth in the network, there are also new estate developments which require network capacity augmentation to support the growth demands. Secondary mains and regulator installation are planned to be staged over time. In 2004/05, it is proposed that 1850m of 150mm steel pipe be laid along Showground and Gilbert Roads, Castle Hill, connecting with the existing 75NY main at Showground and the existing 110NY main at Gilbert Road. The first stage would provide interim capacity until the second stage is required in 2006/07.

The second stage requires that 5700m of 150mm steel pipe be laid from the end of an existing 150mm secondary main at Victoria Avenue to the 150mm steel main at Showground Road and that another be laid from the 150mm steel main at Gilbert Road to the proposed SRS location at Old Northern Road, Dural.

PB is of the view that the planned works will provide efficient long term capacity development of the network.

#### *Campbelltown Gas Distribution Network Upgrading*

A review and performance evaluation for the next 5 years of the 210 kPa pressure system has shown that the network has sufficient capacity to meet the current demands in the Campbelltown area. However, residential developments at Macquarie Fields, Raby and Campbelltown will mean that network capacity augmentation would be required in the near future.

In order to meet the future growth in demand, 1040m of 110mm PE pipe will need to be laid from the existing 75mm NY main in Georges River Road along College Road to interconnect with the 100mm ST main in Waminda Avenue, Campbelltown. In addition, the existing 110mm PE main in St Andrew Road will need to be extended by 830m, crossing the Hume Highway (M5) and laid into the Kooringa Reserve Park, St Andrew to interconnect with the existing 110mm PE main in the east side of the street. Both network interconnections will provide capacity to support anticipated growth demands.

PB is of the opinion that the need for the project has been clearly demonstrated and that the proposed works will be effective and efficient.

#### *Planning Practices and Procedures*

PB is of the opinion that planning practices and procedures used to develop this group of projects are efficient and conform to accepted industry planning practices. Cost estimates for the three projects were reviewed and are considered to be reasonable. Costs are based on historical unit rates from similar AGLGN projects with special consideration given to any unique features.

### **Summary of Growth related Capital Expenditure Projections**

The growth related capital expenditure projections for FY2004 – 2010 are summarised in the *Table 3.7*:

**Table 3.7: Growth related Capital Expenditure projections for FY2004 – 2010**

<b>Real 2005 \$m</b>	<b>2004/05</b>	<b>2005/06</b>	<b>2006/07</b>	<b>2007/08</b>	<b>2008/09</b>	<b>2009/10</b>
<i>Growth Related</i>						
M/L pressure tariff, Res *	48.2	48.8	47.5	47.0	46.4	46.0
M/L pressure tariff, I & C	3.8	3.6	3.4	3.2	3.0	2.9
Capacity Development	4.0	17.0	9.1	5.4	4.5	8.9
<i>Subtotal</i>	56.0	69.4	60.0	55.6	53.9	57.8

\* Refer to Table 3.6

### **3.3.2 Stay-in-Business Expenditure**

Stay-in-Business projects are required to ensure the ongoing integrity of the existing gas infrastructure. PB has reviewed in detail a number of projects within this group in order to assess the reasonableness of this category.

#### *Security of Supply Upgrade; Sydney Primary Loop*

The primary loop was to be constructed during the previous Access Arrangement period but has been deferred, as discussed earlier, because of the original route not being feasible due to changes to the M5 Motorway project. Alternative routes are being assessed, and construction of the loop is planned to commence within the next two years. However, the estimated construction cost is expected to be much higher than the original estimates. Total capital expenditure is now forecast to be \$50m (Real \$2005).

#### *Medium Low pressure mains and services renewal*

Provisions have been made for the programmed renewal of networks reaching their economic lives. Renewal of the older cast irons mains and steel mains by insertion with new plastic mains will enables the upgrade of the low pressure networks to higher operating pressures. Total capital expenditure for programmed renewal is forecast to be \$39m (Real \$2005).

While PB has not performed detailed cost analyses on these projects, it is our opinion that based on the historical level of cost, they appear to be reasonable.

#### *Facilities Renewal and Upgrade*

Provision has been made for replacement and upgrade of existing facilities to maintain current levels of safety and reliability.

While major replacement of these facilities is not forecast over the Access Arrangement period, AGLGN is forecasting that a number of facilities will require upgrade and

refurbishment to maintain the integrity of the network. Total capital expenditure for facilities renewal and upgrade is forecast to be \$15m (Real \$2005), and appears to be reasonable.

#### *Meter Renewal and Upgrade*

Provisions have been made for the replacement of industrial, commercial and residential meters and regulators that reach the end of their maximum regulatory, technical or economic service life. Total capital expenditure for meter renewal and upgrade is forecast by AGLGN to be \$56m, \$33m of which is for residential aged meter and regulator replacement (Real \$2005).

Previous regulatory requirements specified that residential meters must have an accuracy of +2% to -3% and be replaced every fifteen years. At the end of the current Access Arrangement period there will be almost 900,000 residential meters in the AGLGN network and in order to abide with these requirements, more than 50,000 meters would need to be replaced annually.

Provisions for a residential gas meter statistical sampling program have been made to determine if the service life of the meters can be extended while maintaining the same degree of accuracy. The newer meter models are better designed and are predominantly exposed to better quality and drier gas, reducing the likelihood of corrosion and other damage to the meter and associated components. Initial tests have shown that approximately 50% of the meter population can be extended, but AGLGN expects that this proportion will increase annually. The statistical meter-testing program is expected to show that the service life of residential meters can be extended.

However, the new meter standards, currently being prepared, may require a greater degree of accuracy from the meters, which will increase the frequency of residential meter replacement and associated capital expenditure.

In summary, AGLGN has made the assumption that only 50% of meters due for replacement under the old 15 year regulatory replacement requirements will be necessary. PB is of the opinion that the AGLGN approach and estimates are reasonable, but should this assumption prove incorrect, there could additional capital expenditure incurred of up to \$33 million.

#### *Site Security Upgrade*

Due to changing threats in the security environment following September 11, site security measures have been investigated by AGLGN, and upgrades recommended at a number of sites to improve the level of security to the infrastructure. Total capital expenditure for site security upgrades is estimated to be \$2.5m (Real \$2005)

Based on an assessment of the above projects, PB is of the opinion that the AGLGN proposals are prudent and necessary for the integrity of the gas networks.

### **Summary of forecast Stay-in-Business capital expenditure**

AGLGN has advised PB that the Stay-in-Business projects will be of the order of \$198m over the six year period, which is an average of approximately 1% per year of total

optimised replacement cost of the AGLGN infrastructure (approximately \$3b). Considering that the weighted economic life of the network elements is of the order of 50 years, any long term replacement level below 2% will lead to gradual degradation of quality of infrastructure. This may be acceptable in the short term. However should a lower level be maintained in the longer term there will be an overall increase in the risk factors, reduced safety and security of supply.

PB has observed that in the years of 2000-2004, AGLGN priority in capital expenditure was directed towards growth (revenue related projects) at the expense of renewals and upgrades. A further example is the deferral of the completion of the Primary Main Loop in Sydney.

PB is of the opinion that such an approach is not sustainable and may induce a disproportionately large impact on future capital requirements for the gas networks in order to provide secure and reliable gas infrastructure. A progressive move towards a sustainable long term annual replacement expenditure level of 2% of the total asset value is recommended.

The Stay-in-Business capital expenditure forecast provided by AGLGN is summarised in the *Table 3.8*:

**Table 3.8: Stay-in-Business Capital Expenditure Forecast**

<b>Real 2005 \$m</b>	<b>2004/05</b>	<b>2005/06</b>	<b>2006/07</b>	<b>2007/08</b>	<b>2008/09</b>	<b>2009/10</b>
<i>Stay-in-Business</i>						
Trunk system upgrade	8.3	4.4	0.4	0.8	0.9	0.2
Security of Supply upgrade	1.1	14.0	14.0	17.8	3.2	0
M/L pressure renewal	3.4	11.6	8.6	9.7	7.2	5.7
Meters/regulators/filters	8.4	7.8	11.0	8.2	10.9	9.5
Facilities renewal and upgrade	3.4	2.1	1.5	1.9	1.9	1.9
Site Security upgrade	1.1	1.1	0.4	0	0	0
Government Authority	1.6	5.3	2.1	2.1	2.1	2.1
<b>TOTAL SIB Real 2005 \$m</b>	<b>27.3</b>	<b>46.3</b>	<b>38</b>	<b>40.5</b>	<b>26.2</b>	<b>19.4</b>

### 3.3.3 Total Forecast Capital Expenditure

Total Forecast Capital Expenditure is summarised in *Table 3.9*.

**Table 3.9: Total Forecast Capital Expenditure**

<b>Real 2005 \$m</b>	<b>2004/05</b>	<b>2005/06</b>	<b>2006/07</b>	<b>2007/08</b>	<b>2008/09</b>	<b>2009/10</b>
<i>Growth Related</i>	56.0	69.4	60.0	55.6	53.9	57.8
<i>Stay-in-Business</i>	27.3	46.3	38	40.5	26.2	19.4
<b>TOTAL Real 2005 \$m</b>	<b>83.3</b>	<b>115.7</b>	<b>98</b>	<b>96.1</b>	<b>80.1</b>	<b>77.2</b>



PB is of the opinion that AGLGN forecast growth related capital expenditure is reasonable and has been developed on the basis of efficient planning practices. However PB believes that the current and proposed levels of expenditure on replacement and renewals and security of supply are not sustainable in the long term and may induce a disproportionately large impact on future capital requirements. The current low level may be acceptable in the short term but a progressive move towards a sustainable long term annual replacement expenditure level of 2% of the total asset value is recommended in order to provide secure and reliable gas infrastructure.

# **Appendix A**

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Data Sources, References

## Sources of Information and References

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**Table A1 AGL Technical Policies**

<b>Section 4.2</b>		<b>Administration</b>	
TPC.PROC.4.2.1	Technical Policy Manual Contents List	Rev. 19	June 1999
TPC.PROC.4.2.3	Technical Policy Review Committee Operating Charter	Rev. 2	August 1998
<b>Section 4.5</b>		<b>Document Control</b>	
TPC.PROC.4.5.1	Technical Policy Documentation Requirements	Rev. 2	March 1999
<b>Section 4.99</b>		<b>General Policies</b>	
TPC.PROC.4.99.7	Metering Equipment Maintenance and Service Life	Rev. 1	October 1998
TPC.PROC.4.99.21	Network Component Failure Investigation Policy	Rev. 0	November 1997
TPC.PROC.4.99.22	Distribution Safety, Quality and Environmental Audit Procedure	Rev. 0	April 1998
TPC.PROC.4.99.28	Gas Network Design Criteria and Performance Validation for Supply Reliability and Growth	Rev. 0	March 1999
TPC.PROC.4.99.31	Emergency Response Policy	Rev 0	May 1999
TPC.PROC.4.99.32	Security of Gas Supply Infrastructure	Rev. 1	December 1999