10 GAS DISTRIBUTION NETWORKS

SPAusNet

Natural gas distribution networks transport gas from gas transmission pipelines and reticulate it into residential houses, offices, hospitals and businesses. Their main customers are energy retailers, who aggregate loads for on-sale to end users. For small gas users, distribution charges for metering and transport often represent the most significant component, up to 70 per cent, of delivered gas costs.

10 GAS DISTRIBUTION NETWORKS

This chapter considers:

- the role of the gas distribution networks
- the structure of the sector, including industry participants and ownership changes over time
- the economic regulation of distribution networks
- new investment in distribution networks
- quality of service.

10.1 Role of distribution networks

A distribution network typically consists of high, medium and low pressure pipelines. The high and medium pressure pipelines are used to service areas of high demand and to provide the 'backbone' of the network (for example, transporting gas between population concentrations within a distribution area). The low pressure pipes lead off the higher pressure mains to the end customer.

Gate stations (or city gates) link transmission pipelines with distribution networks. The stations measure the natural gas leaving a transmission system for billing and gas balancing purposes. They also reduce the pressure of the gas before it enters the distribution network.

Distributors can further reduce the pressure of the gas at regulating stations in the network to ensure that the delivered gas is at a suitable pressure for the operation of customer equipment and appliances.

Australian laws require odorant to be added to gas that enters a distribution system. This promotes safety by making leaks easier to detect. The odorant is usually added to the gas at the gate station.

10.2 Australia's distribution networks

Australia's distribution networks expanded from a total length of around 67 000 kilometres in 1997 to over 76 000 kilometres in 2006. The networks represent

an investment of more than $7 billion (measured in 2004 prices) and deliver over 300 petajoules of gas a year. Table 10.1 sets out summary details of the distribution networks operating in Australia.

Figure 10.1 shows the location of gas distribution networks in Australia. It illustrates the importance of population density in determining the location of gas reticulation services. In the past few years new distribution networks have been established in northern New South Wales and Tasmania following construction of transmission pipelines in these regions. This means that gas is now reticulated to most of Australia's capital cities, major regional areas and towns, although the Tasmanian and Central Ranges (northern New South Wales) distribution networks are still being rolled out.

Table 10.1 Major Australian natural gas distribution networks, 2006

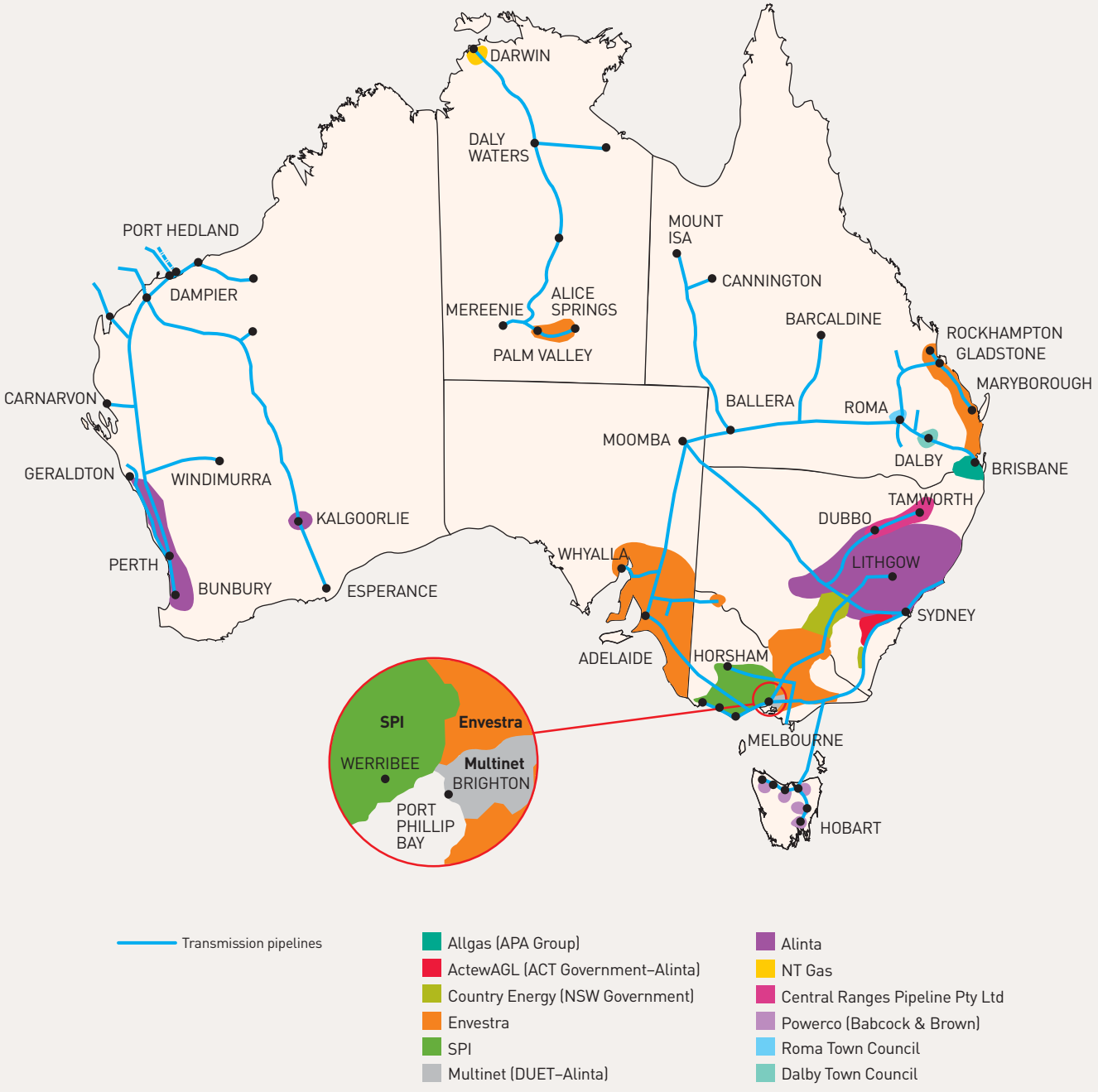
DISTRIBUTION NETWORK	LOCATION	LENGTH OF MAINS (KM)	THROUGHPUT (PJ A YEAR)	ASSET VALUE[1] ($M, 2004)	CURRENT OWNER[2]
NEW SOUTH WALES AND THE AUSTRALIAN CAPITAL TERRITORY					
NSW Gas Networks	Sydney, Newcastle/Central Coast, Wollongong	23 108	131.9	2116.4	Alinta
Central Ranges System	Dubbo to Tamworth region	na	na	na	Central Ranges Pipeline Pty Ltd[3]
Wagga Wagga distribution	Wagga Wagga & surrounding areas	622	1.4	51.3	Country Energy (NSW Govt)
Albury Distribution Network	Albury–Wodonga region	556	1.1	26.2	Envestra
ActewAGL Distribution (Canberra Gas Network)	ACT, Yarrowlumla and Queanbeyan	3769	7.2	264.6	ActewAGL Distribution (ACT Govt–Alinta)
VICTORIA					
Multinet Gas	Melbourne's eastern & south-eastern suburbs	9420	61.4	872.7	DUET (79.9%), Alinta (20.1%)
Envestra	Melbourne, north-east & central Victoria	9040	57.5	738.9	Envestra
SPI	Western Victoria	8960	71.3	862.5	Singapore Power
QUEENSLAND					
AllGas	South of the Brisbane River	2398	13.9	309.3	Australian Pipeline Trust
Envestra	Brisbane Region, Rockhampton & Gladstone	2408	5.3	232.5	Envestra
Roma Distribution Network	Roma	70	0.02	na	Roma Town Council
Dalby Distribution Network	Dalby	86	0.16	na	Dalby Town Council
SOUTH AUSTRALIA					
Envestra	Adelaide and surrounds	7492	29.1	783.0	Envestra
WESTERN AUSTRALIA					
Alinta Gas networks	Mid-west and south west regions	11 752	31	658.5	Alinta
TASMANIA					
Tasmanian Gas Network	Hobart, Launceston and other towns	120	na	100.0	Powerco (B&B)
NORTHERN TERRITORY					
Centre Gas Systems[4]	Alice Springs	35	na	na	Envestra
NT Gas Distribution	Darwin Trade Development Zone	19	na	na	NT Gas[5]

B&B: Babcock & Brown Infrastructure. DUET: Diversified Utilities and Energy Trusts. na not available. 1. Approximate value at the end of 2006 measured in 2004 prices. Based on the rolled forward regulatory asset base for covered pipelines. For Tasmania, the asset value is based on estimated construction costs. 2. As at 1 February 2007. 3. The shareholders of the company are Sun Super and three funds managed by Colonial Funds Management (a wholly-owned subsidiary of the Commonwealth Bank). 4. Also referred to as the Alice Springs Distribution System. 5. The Amadeus Pipeline Trust (96 per cent owned by APA Group) is the major shareholder of NT Gas.

Source: Access arrangements for covered pipelines; Productivity Commission, *Review of the gas access regime*, Report no. 31, 2004, Canberra; company websites.

Figure 10.1

Gas distribution networks in Australia



* Locations of the distribution systems are indicative only.

Source: The map is based on AGA submission to the Productivity Commission, *Review of the gas access regime*, August 2003, sub. 13, p. 102; supplemented with additional information.

10.3 Ownership of distribution networks

Ownership of distribution assets has tended to remain relatively stable. The changes that have occurred among private players largely reflect a restructuring of existing businesses rather than significant new entry. Major private sector providers of distribution services include Envestra, Diversified Utilities and Energy Trusts (DUET) and Alinta. Under a merger and demerger restructuring completed in late 2006, AGL's interests in distribution services were transferred to Alinta. The swap included AGL's New South Wales distribution network and its 50 per cent share in the Canberra energy networks.

In New South Wales, AGL (now Alinta), through the New South Wales distribution systems, has long been the principal supplier of natural gas distribution services. The system provides more than 90 per cent of the distribution services in the state. Gas services for the Wagga Wagga region were provided by the local council until April 1997. Since then services have been provided by the New South Wales Government corporation Great Southern Energy (now Country Energy).

AGL has provided gas distribution and retail services in the Canberra region since 1991. In 2000 AGL formed a joint venture partnership with the government-owned Actew Corporation to create a combined electricity and gas utility—ActewAGL. Alinta now owns AGL's half of the gas and electricity distribution networks. AGL has retained its 50 per cent share of the retail arm.

Victoria privatised its state-owned gas distribution businesses as part of industry reforms between 1997 and 1999. This saw the entry of:

- Envestra (part-owned by Origin Energy[1] and Cheung Kong Infrastructure), which acquired the Stratus network
- TXU, which acquired the Westar network. Since the end of April 2004 Singapore Power (SPI) has owned and operated the network
- Utilicorp and an AMP consortium, which acquired the Multinet network. The consortium restructured in 2003 to form DUET. As part of the restructuring deal Alinta also acquired a 20 per cent stake in the network.

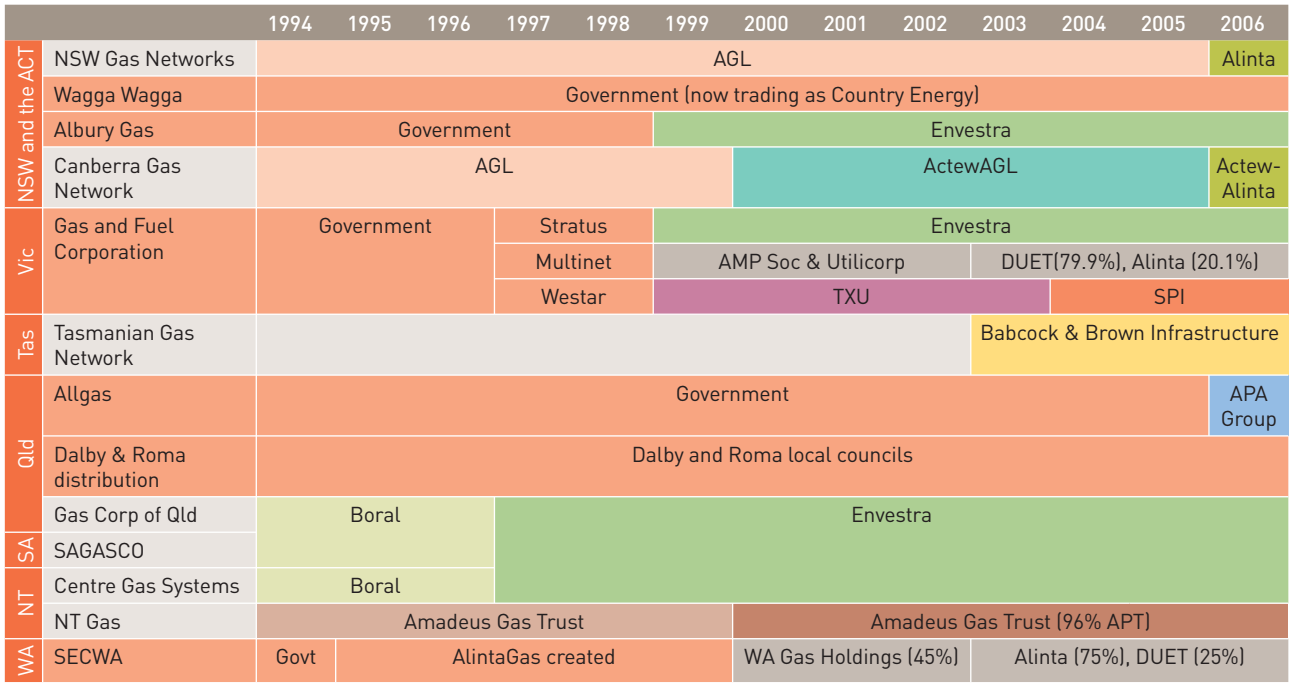
In 1995 the Government of Western Australia formed AlintaGas (now Alinta)[2] from the restructuring of the State Energy Commission of Western Australia (SECWA). The government privatised AlintaGas in 2000. WA Gas Holdings Pty Ltd was the cornerstone investor in the process with a 45 per cent holding. The government floated the remaining equity in the business on the stock exchange. As part of a restructuring deal between the AMP consortium and WA Gas Holdings Pty Ltd in 2003, Alinta gained an increased share of the mid-west and south-west distribution systems in Western Australia and a share of the Multinet system in Victoria with the remaining holdings transferred to DUET.

In South Australia in 1993 Boral acquired the bundled distribution utilities the South Australian Gas Company and the Gas Corporation of Queensland. It combined the bundled distribution utilities with the assets of Centre Gas Systems (in the Northern Territory) to form Envestra in August 1997. In 1999 Envestra expanded its operations through the acquisition of the Albury Gas Company and the Victorian Stratus network.

1 Origin Energy completed the sale of its network businesses, including its interest in Envestra, to APA Group in July 2007.

2 On 8 May 2003 AlintaGas changed its name to Alinta to reflect its move into electricity.

Figure 10.2
Distribution network ownership changes[1]



APT: Australian Pipeline Trust (which is part of the APA Group). DUET: Diversified Utilities and Energy Trusts. SECWA: State Energy Commission of Western Australia. SPI: Singapore Power. 1. The figure represents changes in ownership in the year it occurred.

In 2006 the Queensland Government sold its state-owned distributor Allgas to the Australian Pipeline Trust (which is part of the APA Group). Allgas operates in south-east Queensland and parts of northern New South Wales. The small distribution networks in Dalby and Roma are owned and operated by the local town councils.

In Tasmania, Powerco provides distribution services. Powerco is owned by Babcock & Brown Infrastructure, a specialist infrastructure entity operating across the energy transmission and distribution, transport infrastructure and power generation sectors in Australia and overseas.

Figure 10.2 summarises ownership changes in the gas distribution sector since 1994.

10.4 Regulated distribution networks

When it began in 1997 the National Third Party Access Code for Natural Gas Pipeline Systems (the Gas Code) covered 14 distribution networks. Subsequent coverage of pipelines occurred through extensions to existing covered networks, application to the National Competition Council (NCC) or through a competitive tendering process. Conversely, through application to the NCC coverage has been revoked (in whole or in part) for five relatively small distribution networks.

Twelve distribution networks are currently covered (table 10.2). The covered networks operate in the states (except Tasmania) and the Australian Capital Territory.

Table 10.2 **Coverage status of distribution networks that have been or are covered**

PIPELINE	STATUS AT 1 JULY 2007
COVERED AT GAS CODE INCEPTION	
NEW SOUTH WALES AND THE AUSTRALIAN CAPITAL TERRITORY	
NSW Gas Networks (incl Central West)[1]	Covered (except the South West Slopes and Temora extensions)[1]
Great Southern (Wagga Wagga) (Country Energy)	Covered
Albury Gas Company	Covered
Canberra System	Covered
VICTORIA	
Multinet Gas Systems	Covered
Envestra Networks Systems	Covered
SPI	Covered
QUEENSLAND	
Allgas Energy System	Covered
Dalby System	Coverage revoked November 2000
Gas Corporation of Queensland (Envestra System)	Covered
Roma System	Coverage revoked May 2002
SOUTH AUSTRALIA	
Envestra South Australia Distribution Systems	Covered
WESTERN AUSTRALIA[2]	
Alinta Gas Distribution Systems	Covered
NORTHERN TERRITORY	
Alice Springs Distribution System (also known as Centre Gas Systems)	Coverage revoked July 2000
COVERAGE SINCE IMPLEMENTATION OF THE GAS CODE	
South West Slopes (NSW)[1]	Coverage revoked October 2003
Temora (NSW)[1]	Coverage revoked October 2003
Central Ranges System (NSW) (under construction)	Covered by competitive tender May 2004
Mildura Distribution System (Vic)	Coverage revoked December 2002

1. The South West Slopes and Temora distribution networks were constructed as extensions of the NSW network and became automatically covered. 2. The Gas Pipelines Access (Western Australia) Law and Regulations apply to pipelines for the reticulation of natural gas and certain other pipelines transporting liquefied propane, propene, butanes and/or butenes. Only natural gas pipelines are currently covered.

Source: Information provided by the National Competition Council.

Regulation of covered pipelines

The regulation of distribution networks is the responsibility of state and territory regulators, except in the Northern Territory where the Australian Competition and Consumer Commission (ACCC) fulfils this role. Responsibility for regulating transmission and distribution pipelines, except in Western Australia, is scheduled to transfer to the Australian Energy Regulator from the end of 2007.

The providers of covered pipeline services must submit access arrangements to the nominated regulator for approval, and comply with other Gas Code provisions, such as ring fencing.

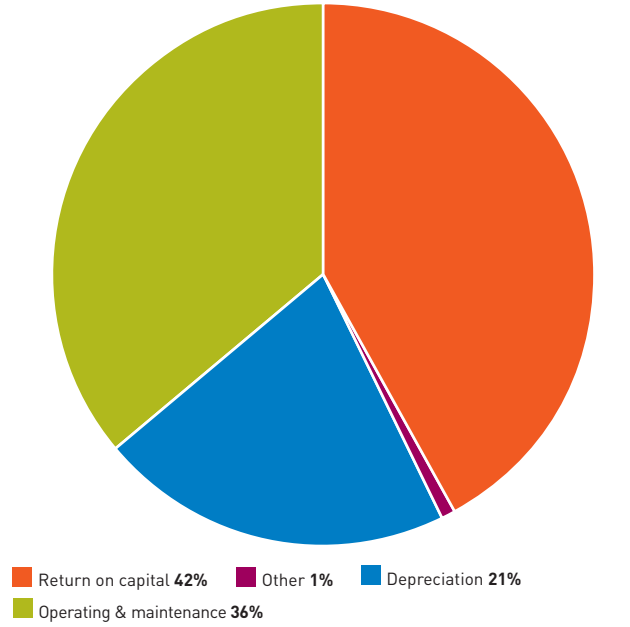
Access arrangements specify reference services that the pipeline operator must offer and reference tariffs, which form a benchmark as the basis for negotiating services.[3] Reference tariffs may apply to one or more of the pipeline services offered. For distribution services, reference tariffs often apply to a broad range of services such as capacity reservation, volume, peak, off-peak and metering services.

As with transmission most service providers have adopted a building block approach to determining reference tariffs with a CPI-X price path. Pipeline operators can retain any cost savings achieved, but also bear the cost of under-performance. This provides an incentive to improve the efficiency of pipeline operations.

Figure 10.3 shows the components of the revenue cap for the Alinta gas networks in New South Wales (formerly owned by AGL). This illustrates the relative importance of the building block components in a revenue determination used for setting reference tariffs. Capital and depreciation account for over 60 per cent of the revenue determination, while operating and maintenance costs account for most of the rest.

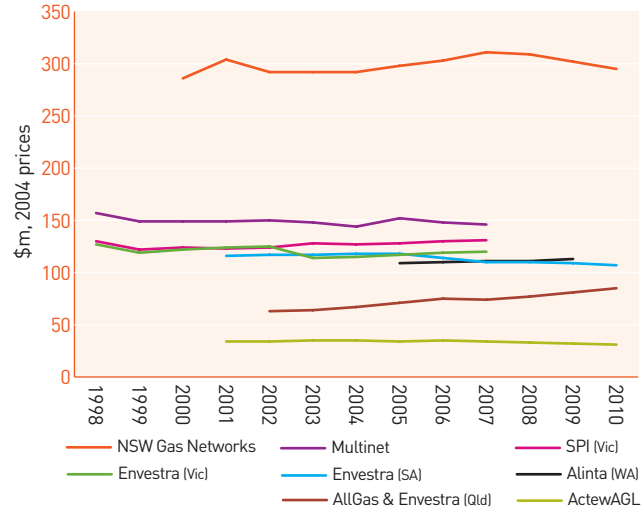
Figure 10.4 shows forecast revenue for selected covered distribution pipelines for 1998–2010. Differences in revenue across pipelines largely reflect the relative size of the networks. Reflecting the incremental nature of investment in the sector, revenue allocations are largely expected to mirror changes in demand.

Figure 10.3
Revenue building block components for the NSW gas networks, 2005–06 to 2009–10



Source: IPART, *Revised access arrangement for AGL gas networks*, Final decision, Sydney, 2005.

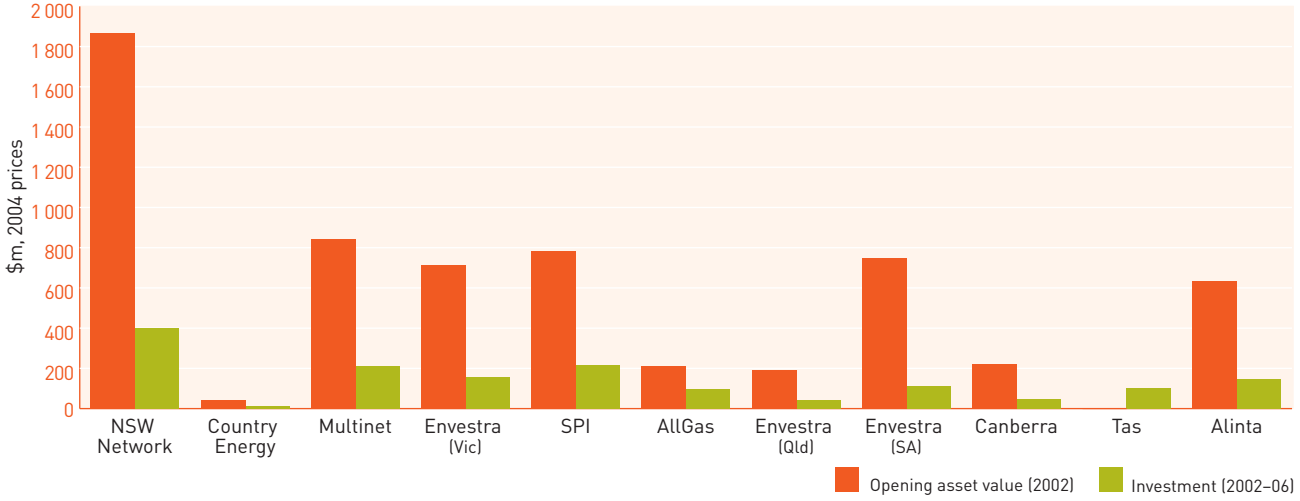
Figure 10.4
Total revenue allowance for selected distribution pipelines 1998–2010



Source: Approved access arrangement information for each pipeline.

3 For the Central Ranges distribution network in New South Wales reference tariffs for the first access period were determined using a regulator-approved competitive tender process.

Figure 10.5
Distribution network assets (2002)[1] and investment (2002–06)[2, 3]



1. The asset values are determined on a depreciated optimised replacement cost basis and derived from the regulatory asset base for 2002, as published in access arrangements. 2. Investment data represents forecast capital expenditure for covered pipelines for 2002–06 (or closest approximation) supplemented with published data on the construction and extension costs for other pipelines. 3. Represents actual investment data for Allgas and Envestra (Qld) as published in the revised access arrangements for the covered networks.

Source: Access arrangement information for each covered pipeline, ABARE, *Minerals and energy, major development projects,* 2006 and earlier issues.

10.5 Investment

Investment in the distribution sector includes upgrading and extending existing networks, expanding into new regional centres and towns and constructing new networks. The cost of gas distribution infrastructure varies largely with:

- the distance between access points on a gas transmission line or gas distribution main
- the density of housing and the presence of other industrial and commercial users in the area.

Figure 10.5 shows the value of assets and investment for selected distribution networks. It depicts forecast asset values at the start of the 2002 fiscal year along with forecast capital expenditure for 2002–06. For covered networks the investment data are based on the estimated regulatory asset base (opening value)[4] and forecast capital expenditure published in access arrangements.[5] The value of investment in the Tasmanian Gas Distribution Network is based on projected construction costs as published by the Australian Bureau of Agricultural and Resource Economics (ABARE).

Typically investment in the distribution sector is around $250 million a year. Much of this relates to incremental expansion of the existing networks. For example:

- The Victorian Government began a $70 million natural gas extension project in 2003. The project extends the Victorian distribution network to country and regional areas including Bairnsdale, Paynesville, Mornington Peninsula, Macedon Ranges, Creswick, Barwon Heads, Maiden Gully, Port Fairy, Camperdown and the Yarra Ranges.[6]
- ENERGEX began a $3.7 million project in 2005 to upgrade and extend its distribution network in Queensland.

4 The regulatory asset base represents the estimated depreciated optimised replacement cost value of the asset.

5 Investment spending can vary significantly from that determined in access arrangements. For example, the 2001 Allgas access arrangement determined capital expenditure of $59 million for 2002-06. Actual expenditure over that period was $95 million, a variance from the forecast of 60.5 per cent.

6 Business Victoria, Natural Gas Extension Program (NGEP), viewed: 31 August 2006, http://www.business.vic.gov.au/BUSVIC/STANDARD/1001/PC_60302.html.

Construction of new transmission pipelines also provides opportunities to develop new distribution networks. For example:

- The Central Ranges Gas Network (owned by the Central Ranges Pipeline Pty Ltd) is being constructed in New South Wales. It currently provides distribution services in Tamworth and will be incrementally expanded to offer services in Coolah, Coonabarabran, Dunedoo, Gilgandra, Gulgong, Gunnedah, Mudgee, Quirindi and Werris Creek.
- The Tasmanian Natural Gas Distribution Network (owned by Babcock & Brown Infrastructure trading as Powerco) is being rolled out in major cities and towns throughout Tasmania following the construction of the Tasmanian Gas Pipeline.

10.6 Quality of service

Quality of service monitoring for gas distribution services is generally in relation to:

- reliability of gas supply (the ability of the service provider to maintain continuous gas supply to customers)
- customer service/customer relations (efficiency and responsiveness of service providers in handling issues such as complaints and reported gas leaks)
- network integrity (gas leaks; operational and maintenance activities).

Some state and territory governments impose quality of service standards and reporting requirements on gas distributors. However, monitoring and reporting of service quality is less comprehensive for the gas industry than for electricity. Gas distribution services are typically more reliable than electricity because gas is transported underground. Even when mains are damaged gas will usually continue to flow so that most customers are unaffected. In addition, gas outages frequently go undetected or have little effect, particularly in the residential sector. By contrast even transient faults in an electrical system can disrupt household, commercial and industrial activities because electricity is used to power continuous equipment operations. For instance lights and fridges stop working and clocks and other equipment may need to be reset once electricity supplies are restored.

Gas distributors also face strong incentives to minimise interruptions. Even when carrying out maintenance work distributors maintain supply to avoid the time and cost associated with lowering pressure and purging air from the pipelines.

Reliability of supply

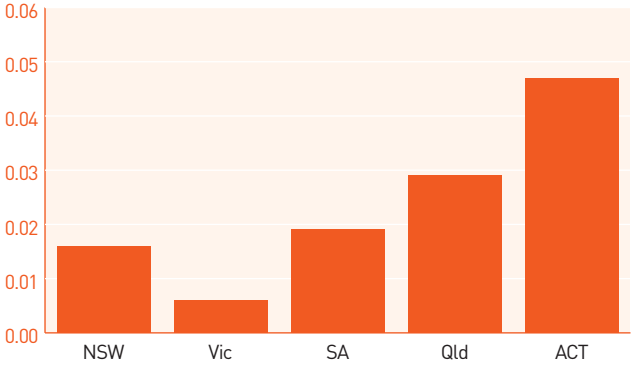
The reliability of gas supply refers to the ability of the service provider to maintain a continuous gas supply for customers. Most states and territories impose reliability requirements on gas distributors and monitor their performance. Typically gas distributors are required to:

- use their best endeavours to minimise unplanned disruptions to the gas supply
- provide a 24-hour service so customers and retailers can obtain information on unplanned interruptions to supply and for notification of emergencies and faults
- provide minimum notification of planned interruptions to the gas supply.

Figure 10.6 shows unplanned interruption events per 1000 customers in the eastern states and territories. The figure indicates that gas distribution services are reliable. For example, the Australian Capital Territory experienced 88 unplanned interruptions in 2003–04. Only four (0.047 per 1000 customers) of those events affected more that five customers at a time.

In 2004 there were about 19 300 service interruptions in Victoria. In almost all cases fewer than five customers were affected by the outage. In 2005 there were 10 significant events that affected more than 20 people. This equates to 0.006 events per 1000 customers. The Essential Services Commission (ESC) reports that the average customer may expect to lose supply approximately once every 44 years.

Figure 10.6
Unplanned interruption events per 1000 customers



1. NSW data for 2001–02. Vic data for 2005. SA data for 2004–05. Qld and ACT data for 2003–04. 2. For Victoria data reflects the incidence of significant interruptions affecting 20 or more customers. 3. For the ACT data reflects the incidence of interruptions affecting five or more customers.

Source: ESC, *Gas Distribution Businesses—Comparative performance report 2005*, 2006, Melbourne; ESCOSA, *2004/05 Annual performance report, performance of South Australian Energy Distributors*, 2005, Adelaide; ICRC, *Licensed electricity, gas and water and sewerage utilities, performance report for 2003–04*, 2005.

By contrast, Powerco in Tasmania reported that its customers could expect to lose gas services for an average of about 32.8 minutes a year. Nevertheless, Powerco met its target of the gas being off for less than 0.5 per cent of the time in each network it operates. Powerco is still in the process of rolling out the network and has only a few customers. The Office of the Tasmanian Energy Regulator reports that some volatility in reliability could be expected for the next few years.[7]

Customer service

The level of customer service achieved by a distributor can be measured in terms of responses to customer calls, promptness of connections, meeting appointments with customers on time and the number and nature of complaints made about service providers.

Victoria and South Australia report on customer complaints. In 2005 there were about 1.7 complaints per 1000 customers in Victoria, an improvement in performance of about 2 per cent over the previous year.[8]

In South Australia Envestra received 26 complaints in 2004–05 and 21 complaints in 2005–06.[9] The South Australian Energy Industry Ombudsman received 19 complaints about Envestra in 2004–05 and 15 complaints in 2005–06. These figures represent fewer than one complaint per 1000 customers.

Victoria also reports on a range of customer service indicators. It sets customer call response targets for distributors. The targets require distributors to respond to:

- 95 per cent of customer calls in metropolitan areas (during 7 am to 7 pm weekdays) within 60 minutes
- 90 per cent of customer calls in metropolitan areas (after hours) and country areas (all hours) within 60 minutes.

All Victorian distributors met these targets in 2004 and 2005.

Victoria applies guaranteed service levels to distributors. Payment penalties apply for not meeting guaranteed service levels (table 10.3).

Figure 10.7 shows the number of payments made by each distributor for failure to meet target service levels in 2004 and 2005. The ESC reports that in 2004, distributors made a total of 382 payments worth more than $27 000.[10] Around 208 payments made to residential customers were for lengthy interruptions to the gas supply where interruptions were not restored within 12 hours. Envestra made 95 payments for lengthy interruptions, while the other distributors each made around 60 payments. A total of 143 payments were made for repeat interruptions resulting from a residential customer experiencing more than six unplanned interruptions in a 12-month period. Multinet made 63 of these payments, while Envestra made 49 payments and SPI made 31 payments. Distributors were required to make a total of 31 payments for failure to connect a residential customer within two days of the agreed date. Envestra accounted for 22 payments, SPI 8 payments and Mulitnet one payment for delayed connection times.

7 Office of the Tasmanian Energy Regulator, *Tasmanian energy supply industry performance report 2004–05*, 2005, Hobart.
8 Essential Services Commission, Victoria, *Gas distribution businesses–comparative performance report 2005*, August 2006, Melbourne, p. 27.
9 ESCOSA, *SA energy network businesses 05/06*, 2005/06 Annual performance report, November 2006, p. 95.
10 Essential Services Commission, Victoria, *Gas distribution businesses–comparative performance report 2004*, 2005, Melbourne, p. 19.

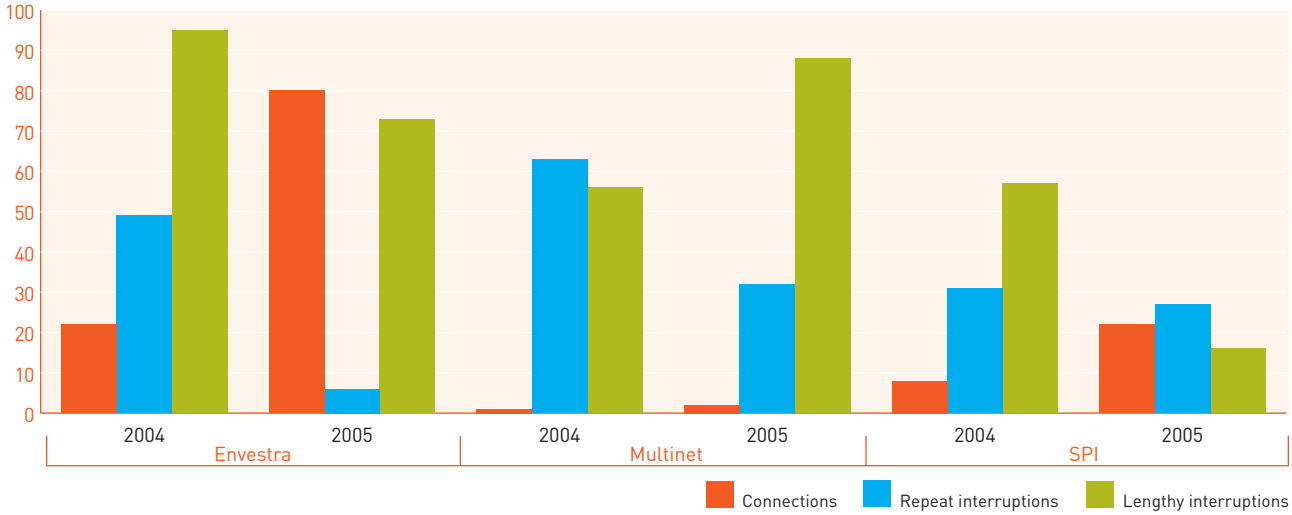
Table 10.3 Guaranteed service levels (GSL) payment threshold items—Victoria

AREA OF SERVICE	LEVEL OF SERVICE TO INCUR GSL PAYMENT	LEVEL OF GSL PAYMENT
Appointments	More than 15 minutes late for appointment with a residential customer[1]	$50 per event
Connections	Failure to connect a residential customer within two days of agreed date	$80 per day (subject to a maximum of $240)
Repeat interruptions	More than six unplanned interruptions to a residential customer in a 12-month period resulting from faults in the distribution system[2]	$50 for each subsequent event in that calendar year
Lengthy interruptions	Gas supply interruption to a residential customer not restored within 12 hours[2]	$80 per event

1. Appointments rescheduled by the gas businesses are counted as missed appointments. Appointments rescheduled by the customer are excluded from payments.
2. Excluding force majeure, faults in gas installations, transmission faults, third party events and upstream events.

Source: Essential Services Commission, Victoria, *Gas distribution businesses—comparative performance report 2004*, 2005, Melbourne, p. 18.

Figure 10.7
Number of guaranteed service level payments made in 2004 and 2005 by Victorian distributors



Source: Essential Services Commission (ESC), Victoria, *Gas distribution businesses—comparative performance report 2004*, 2005, Melbourne, p. 18; ESC, Victoria, *Gas distribution businesses—comparative performance report 2005*, August 2006, Melbourne, p. 27.

In 2005, distributors made a total of 347 payments worth about $32 000. Around 177 payments made to residential customers were for lengthy interruptions. Envestra made 73 payments for this, while Multinet made 88 payments and SPI made 16 payments. There were 65 events in 2005 requiring payments for repeat interruptions. Envestra made six payments for this, while the other distributors made about 30 payments each. Distributors were required to make a total of 104 payments for delayed connection times. Envestra accounted for 80 payments, Mulitnet 2 payments and SPI 22 payments.

In 2006 Alinta began a GSL scheme similar to that operated in Victoria. Compensation payments range between $25 for late appointments up to $100 for repeat interruption events.

Network integrity

Some state regulators report on network integrity issues, including gas leaks, condition of the pipelines and operational and maintenance activities. However, there is little consistency in reporting on gas leaks and unaccounted-for gas. (Unaccounted-for gas is the difference between the quantity of gas delivered into the network and that withdrawn from a network in a given period. This can result from gas leaks, meter error and theft.)

Victoria (reports on gas leaks per kilometre of pipe)

In 2005 Multinet recorded the highest gas leaks per kilometre at 1.22, followed by SPI (1.15) and Envestra (0.99). The ESC reports that the difference between distributors is not significant and shows fewer leaks than in 2004, but over the three-year period from 2003–05 leaks increased by about 4 per cent. Between 2003–05 Victorian distributors replaced 534 km of low pressure gas mains. This represents about half of the mains targeted for replacement over the five-year period 2003–07.[12]

Queensland (unaccounted-for gas)

The level of unaccounted-for gas for the Allgas network during 2003–04 was 383 terajoules or about 4 per cent of total throughput. By comparison the level of unaccounted-for gas for the Envestra network during the reporting period was 329 terajoules or about 2 per cent of total throughput.[13]

South Australian (unaccounted-for gas)

In 2005–06 the proportion of unaccounted-for gas was about 4.2 per cent of delivered gas (1630 terajoules), an increase of almost 60 per cent from 2002–03. ESCOSA reports that the amount of unaccounted gas is linked closely to the amount of cast iron pipelines within the system because such pipelines are susceptible to ground movement and to joint failures. Over 20 per cent of Envestra's network was made up of cast iron pipelines in 2004. This is somewhat higher than Multinet and Envestra (Queensland). By comparison around 13 per cent of the Allgas network was made up of cast iron pipes in 2004. Envestra has a program in place to replace cast iron mains. In 2005–06 it replaced 86 kilometres of mains. Its current access arrangement allows for capital expenditure to replace 100 kilometres of pipe a year.[14]

The Australian Capital Territory (unaccounted-for gas)

In 2004–05 there were 61 terajoules of gas unaccounted for from ActewAGL's distribution network (including the Queanbeyan portion).

Western Australian (unaccounted-for gas)

Western Australia collects data from distributors on unaccounted-for gas and reliability, but does not make the information public. In its most recent access arrangement Alinta reports that between 2000 and 2002 unaccounted-for gas fluctuated between 2.6 per cent and 2.7 per cent. Alinta notes that roughly half of its unaccounted-for gas results from measurement error. It forecasts that unaccounted-for gas would be 2.5 per cent a year for the 2005–09 access arrangement period.[15]

12 ESC, *Gas distribution businesses comparative performance report for the calendar year 2005*, August 2006.
13 QCA, *Gas distribution service quality performance: 1 July 2003 to 30 June 2004*, http://www.qca.org.au/files/ServiceQualityReport200304_QCASummary.pdf.
14 ESCOSA, *SA energy network businesses 05/06*, 2005/06 Annual performance report, November 2006.
15 Alinta, *AlintaGas networks access arrangement information for the mid-west and south-west gas distribution systems*, Amended AAI dated 29 July 2005.