

Reliable and clean gas for Australian homes

October 2017



70% of homes

connected to network or bottled gas

70%



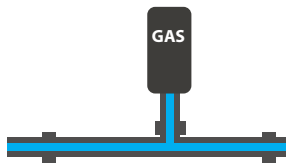
Over 11 million residential gas appliances used in cooking, hot water and heating



11 million ↑

5 millionth

gas network connection made in 2017



1/2 Cost

Gas supplied to the home at around half the cost of electricity



Gas Vision 2050

An attainable low or zero carbon future for gas across Australia's economy



Network connections growing by

100,000 per annum



The emission factor of gas is between 1/3rd and 1/6th of mainland grid electricity

1/3 to 1/6 CO₂

Residential gas consumption in winter is nearly triple the consumption in summer



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Reliable and clean gas for Australian homes

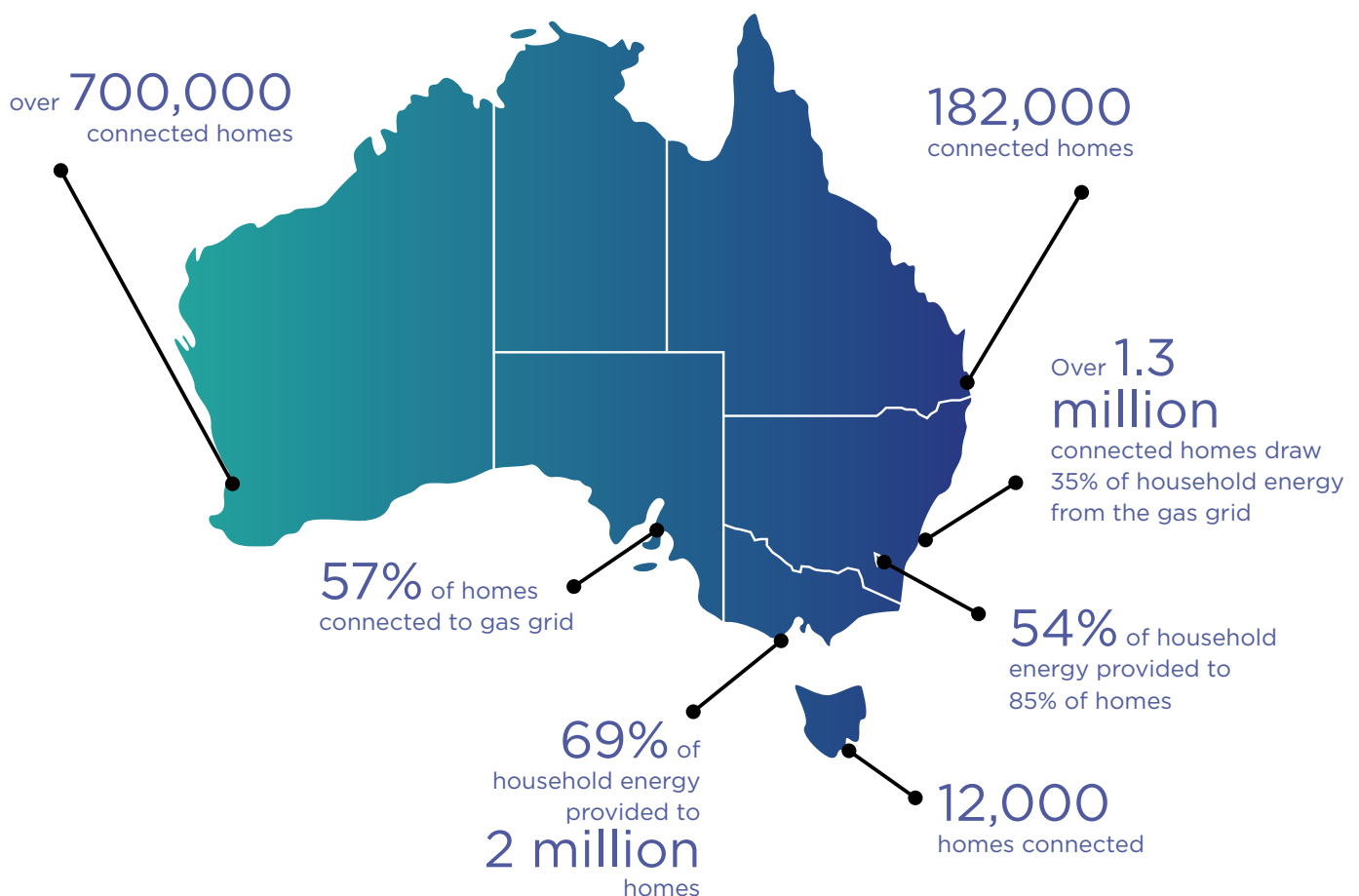
Gas is a major energy source to nearly 70 per cent of Australian homes through either a network connection providing natural gas or a bottled gas alternative.

Convenient network connections

Gas distribution networks connect around 5 million households to natural gas. Across the year and averaged across the country, this provides 44% of the total household energy. In Victoria - the state with the most gas connections - gas networks provides 69% of household energy per year.

The convenience of a network connection is that you don't have to worry about running out of gas and it is also cheaper than a cylinder alternative. This convenience is provided through secure gas supplies using over 90,000 km of distribution network.

70% of homes connected to gas



Over 11 million residential gas appliances used in cooking, hot water and heating

Gas can decarbonise further in the future

This fact sheet demonstrates how gas is essential in our homes and to our modern lifestyles.

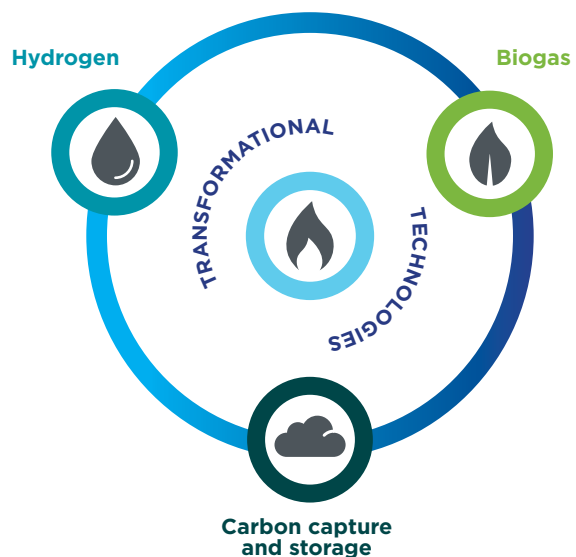
Gas is already a clean energy source. In the future, Australia will make a transformation to a cleaner energy future.

Gas - using the transformational technologies of hydrogen, biogas and carbon capture and storage - will continue to be an essential part along with other clean energy technologies such as renewables and battery storage.

Ensuring the massive and exceptionally reliable energy delivery mechanism of the gas networks delivers for Australians through 2050 to 2100 and beyond.

The gas industry has recently produced a vision for the future - Gas Vision 2050, which reflects the ambitions of key organisations that represent Australia's gas sector. It describes an aspirational and attainable future for gas Across Australia's economy.

Integration of low emission transformational technologies with gas



National statistics by region

	Australia	ACT	NSW	QLD	SA	TAS	VIC	WA
Homes connected to gas (000)	5,000 (est)	139	1,332	182	427	12	1,958	710
% homes connected to gas	49	85	42	10	57	5	80	75
Average household energy consumption (GJ pa)	33	35	20	8	17	34	49	15
% household energy from gas	44	54	35	3	35	6	69	35
Gas mains distribution (km)	90,459	4,620	26,290	5,760	7,950	710	31,090	14,000
Residential gas appliances (000)	>11,000	245	2822	561	945	31	4874	1526

Source: Deloitte Access Economics (2016) - Analysis for Gas Vision 2050.

5 millionth gas network connection made in 2017

Gas provides warmth and comfort

Gas is mostly used for space heating, hot water and cooking with over 11 million of these gas appliances in use across the country.

Separate to this, Roy Morgan Research¹ showed that almost two thirds of all Australian households own a barbecue – representing 5.8 million additional gas appliances – mainly running on cylinder gas.

Electricity is used for household appliances such as refrigerators, televisions, computers and lighting. The energy demand of these appliances is generally less than the energy demand for providing warmth. Electricity can also be used for space heating but the majority of people use gas.

Growing uses of gas include hydronic heating, spa and or pool heating, outdoor heating and open fireplaces – once again confirming that warmth and comfort are important to customers.

Customers want gas

Nearly an additional million households have been connected to network gas in the last decade.

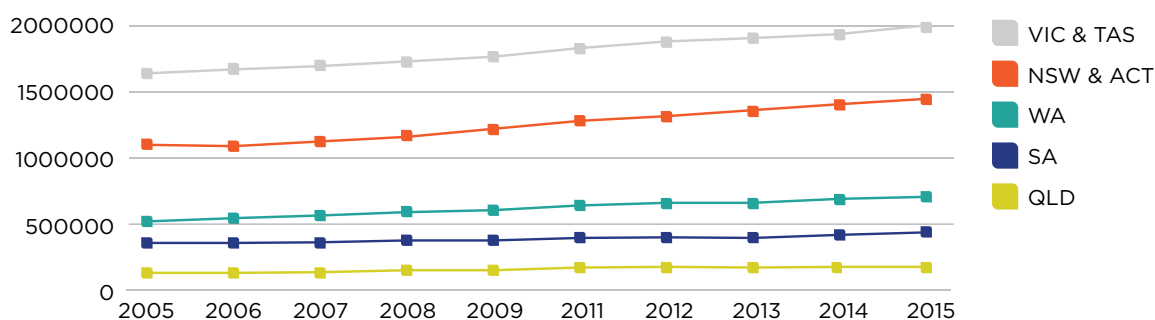
National network connections have grown from 3.8 million in 2005 to 4.8 million in 2015. Connections are growing in every state. That is growing at an average of nearly 100,000 new connections per year. At this rate, the 5 millionth customer will be connected later in 2017.

Network gas provides customers with an opportunity to choose which energy source to use in their home and allows them to make decisions based on lifestyle, convenience, costs and emissions.

Gas demand is growing

The total demand for gas in households has also increased as a result of additional connections. The 2015 demand of 162 PJ pa represents a growth over the 10 year period from 2005 of 22%.

Connections by regions



National network connections

	2005	2007	2009	2011	2013	2015	2017
National network connections (000)	3,767	3,914	4,145	4,348	4,548	4,765	5,000 (est)

Source: Electricity Gas Australia (2006 to 2016)

¹ Roy Morgan Research (2016), Is Australia the barbecue hotspot of the world?, accessed from: www.roymorgan.com/findings/6752-is-australia-barbecue-hotspot-of-the-eorld-201604072313

Residential gas consumption in winter is nearly triple the consumption in summer

Gas networks securing winter heat demand

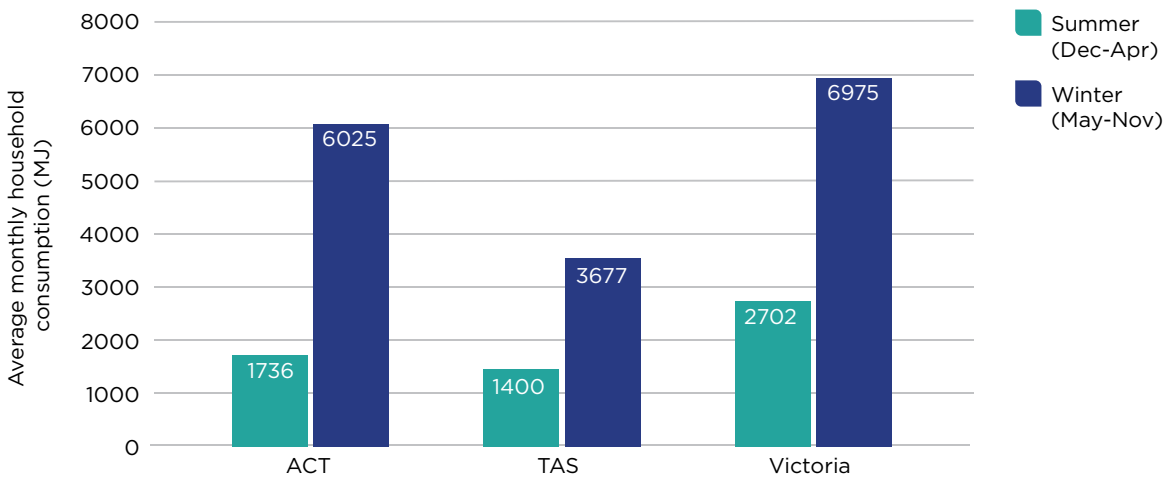
Customers research has shown that customers value natural gas. They see it as the superior choice for cooking, hot water and heating in their homes. In south-eastern Australia, demand for gas in winter is approximately triple the gas demand during summer months. Gas networks are able to meet the high demand in winter months. During the coldest month of July in Canberra, seven times as much gas is consumed compared to the hottest month of January.

Meeting this demand is enabled by the inherent storage capacity available in the gas networks and supporting infrastructure.

This infrastructure can store up to 221 PJ of natural gas, enough to meet the need of residential customers for 16 months, although this storage infrastructure is also used to provide gas for industrial customers and for power generation.

In the future, this infrastructure can continue to securely supply decarbonised gas.

Comparison of summer and winter residential consumption



Sources: Sustainability Victoria (2015), Victorian Households Energy Report - Page 2; ACT Government (2015), Electricity and natural gas consumption trends in the Australian Capital Territory 2009-2013; Tasmanian residential gas consumption (2010-2016).

Gas supplied to the home at around half the cost of electricity

Gas provides cheap energy to the home

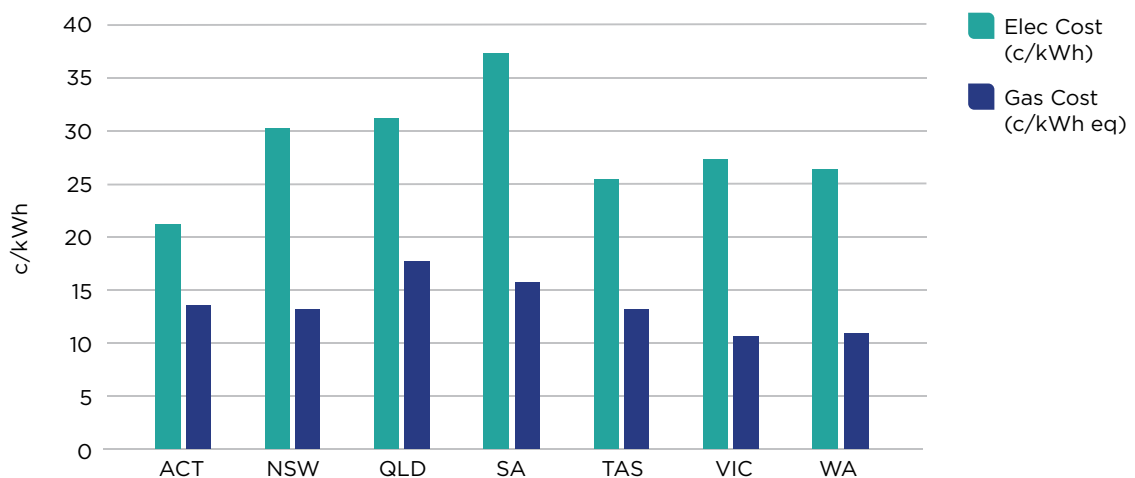
The average cost of gas supplied to homes is around half the cost of electricity supplied. In Victoria, the average cost of gas supply is 39% of the cost of electricity supply.

While energy prices are rising overall, the difference between electricity and gas retail prices is widening meaning that gas will continue to provide cheaper energy for

households into the future.

The total cost of energy bills relates to cost of energy delivered to the home but also the types and number of appliances used, the number of residents and their behaviour in the home and the overall energy efficiency of the home.

Electricity or gas cost delivered to the home



National gas network statistics

	ACT	NSW	QLD	SA	TAS	VIC	WA
Cost of electricity (c/kWh)	21	30	31	38	26	27	26
Cost of gas (c/kWh eq)	14	13	18	16	13	11	11
% gas: electricity	63%	43%	56%	42%	52%	39%	42%

Source: AER State of the Nation 2017 - Average Market Offers, Table 4.4, May 2017; Office of the Tasmanian Economic Regulator - Comparison of Australian Standing Offer Energy Prices, August 2017; Western Australian residential retail pricing for gas and electricity obtained from Kleenheat and Synergy.

The emission factor of gas is between 1/3rd and 1/6th of mainland grid electricity

Gas provides clean energy to the home

Natural gas distributed through pipelines provides energy to homes with fewer greenhouse gas emissions than electricity in mainland Australia. The emission factor for electricity is 3 to 6 times higher than that of gas, depending on the electricity mix within the state.

For example, within Victoria, which has a large amount of brown coal power generation, the emission factor of electricity is 6 times that of the emission factor of direct use of gas in the home. This reduces to 3 in South Australia due to its higher proportion of renewables and gas powered generation.

Tasmania is the exception as it is powered predominantly by hydro power with some gas generation and electricity imports from Victoria. Even there, the cost of natural gas is approximately half of the electric cost making it a competitive source of household energy.

Comparison of electricity and gas emission factors



Emission factors of electricity and gas

	NSW & ACT	QLD	SA	TAS	VIC	WA (SWIS)
Emission intensity of electricity	0.83	0.79	0.49	0.14	1.08	0.7
Emission intensity of natural gas	0.185	0.185	0.185	0.185	0.185	0.185
Ratio electricity:gas	4.49	4.27	2.65	0.76	5.84	3.78

Source: Department of the Environment and Energy (2017), National Greenhouse Accounts Factors, Table 2 & Table 5

Gas fired electricity has doubled in a decade

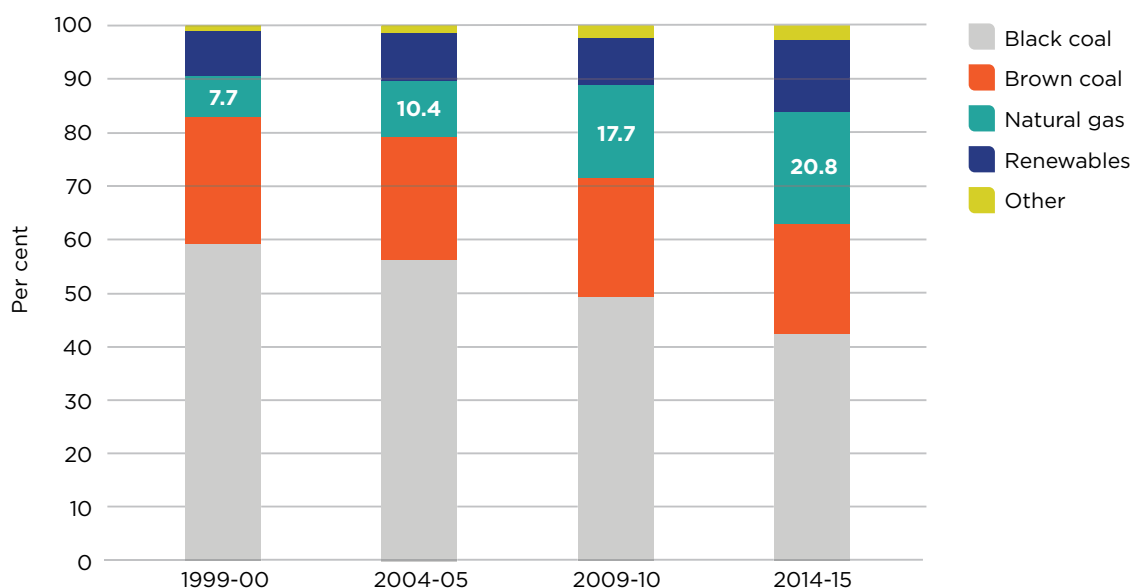
Generating electricity from gas closes the loop

Gas is used to generate electricity. Gas fired electricity has grown from 7.7% in 1999/2000 to nearly 21% in 2014/15 or 52,000 GWh of generation in that year. Gas provides complementarity electricity to intermittent renewable generation as it is responsive and hence provides security to the electricity grid.

Efficient combined-cycle gas powered electricity generation produces less than half of the emissions of coal. Biogas - in the form of landfill gas- produces very low emissions due to the renewable nature of the organics material in landfill that produces the biogas. This results in near zero emissions from the use of biogas for power generation.

So even those homes without a dedicated gas connection still rely on gas for securing the reliability of the electricity system and reducing emissions from coal fired generation.

Growth of gas fired electricity generation



Source: Office of the Chief Economist (2016), Australian Energy Statistics - Figure 4.4: Australian electricity generation fuel mix

Emission intensity of power generation

Fuel used	Brown Coal	Black Coal	Gas - Open Cycle	Gas - cogeneration	Gas - Combined Cycle	Landfill gas
Emission intensity (t CO ₂ /MWh)	1.09 to 1.31	0.82 to 1.19	0.49 to 1.20	0.48 to 0.63	0.36 to 0.46	0.05 to 0.07

Source: ACIL Allen (2106), AEMO Emission factors 20160511

Do you want to know more?

Do you want to get your home connected to gas? The first step is to contact these businesses to find out whether the gas network is in your area.

Region	Gas business	Contact details
Australian Capital Territory	ActewAGL	http://www.actewagl.com.au/
New South Wales	Jemena	http://jemena.com.au/
(Wagga Wagga & Albury)	Australian Gas Networks	http://www.australiangasnetworks.com.au/
Queensland	Australian Gas Networks	http://www.australiangasnetworks.com.au/
South Australia	Australian Gas Networks	http://www.australiangasnetworks.com.au/
Tasmania	TasGas Networks	http://tasgasnetworks.com.au/
Victoria	Australian Gas Networks	http://www.australiangasnetworks.com.au/
	AusNet Services	https://www.ausnetservices.com.au/
	Multinet Gas	https://www.multinetgas.com.au/
Western Australia	ATCO Gas Australia	http://www.atcogas.com.au/

Further information

To learn more about the future of gas please visit www.energynetworks.com.au or contact us at info@energynetworks.com.au.



Goto

www.energynetworks.com.au/gas-vision-2050

