

Reliable and clean gas for Australian homes

July 2021



2/3

Australian homes
use gas connected to the
network or bottled gas



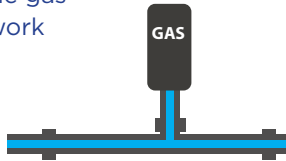
**Over
18 million**

residential gas
appliances used
across the
country



**Over
5 million**

homes are connected
to the gas
network



1/2 Cost

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



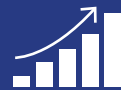
**Gas Vision
2050**

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



Network connections
growing by

**100,000
per annum**



1/4 CO₂

Gas is delivered to the
home at 1/4 the emissions
of grid electricity



Residential gas
consumption in winter
is over four times the
consumption in summer



X4

Reliable and clean gas for Australian homes

Gas is a major energy source to around 65 per cent of Australian homes through either a network connection or a bottled gas alternative

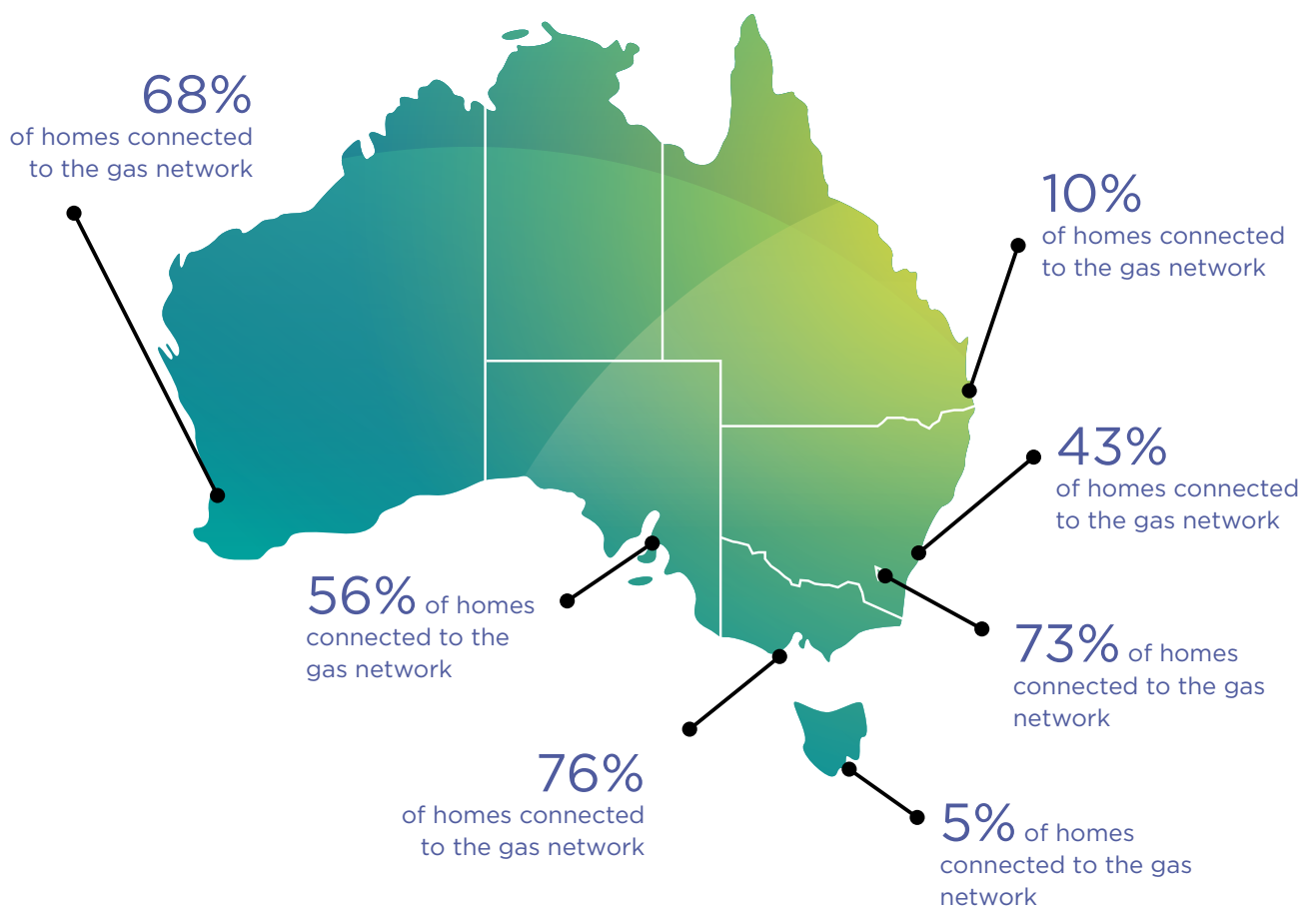
Almost 50% of homes are connected to the gas network

Network connections for convenience

Gas distribution networks connect over 5.1 million households to natural gas and supply 45 per cent of household energy across the country.

In Victoria - the state with the most gas connections - gas networks provide 71 per cent of household energy, and 76 per cent of household energy to properties with an electricity and gas connection.

You don't have to worry about running out of gas with a network connection, and network gas is also cheaper than a cylinder alternative. This convenience is securely provided using over 97,000 km of distribution network, enough to circle the globe two and a half times.



Over 12 million household appliances used for cooking, heating and hot water are connected to the gas network

Gas is an integral part of modern lifestyles

Gas is mostly used for space heating, hot water and cooking with over 12 million gas network-connected appliances and over an estimated 6 million additional bottle gas appliances in use across the country.

Gas is essential in our homes and to our modern lifestyles. It heats our living spaces, reliably warms our showers and cooks delicious meals.

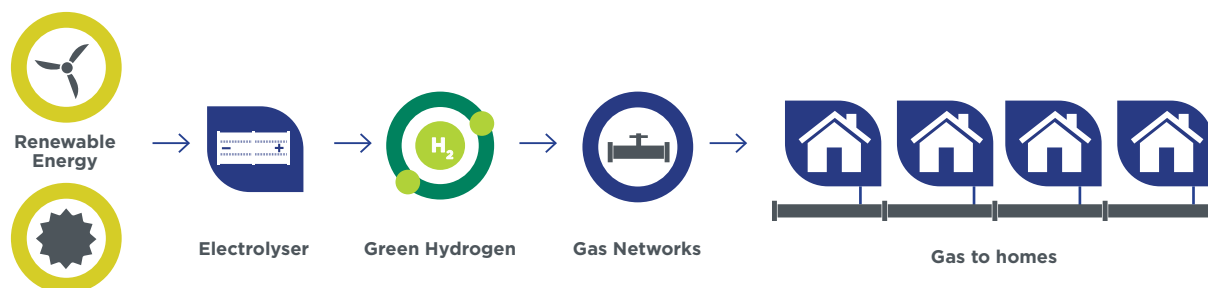
ENA research shows that 66 per cent of households with a gas connection have gas cooking, while 40 per cent have a barbecue and around 30 per cent have hot water systems. Over 40 per cent of Victorians have gas central heating, and 33 per cent of Tasmanians have an indoor gas fireplace.

Gas is changing - for good

The gas industry has a vision for the future - [Gas Vision 2050](#), reflecting the ambition of the Australian gas sector to decarbonise. Gas Network businesses that supply over two-thirds of Australian residential customers have committed to net zero by 2050.

Using the transformational technologies of renewable hydrogen and biogas, gas will continue to be an essential part of our lives, supporting other clean energy technologies such as electric renewables and battery storage. Households can be sure that the exceptionally reliable energy delivery mechanism of the gas network will continue to deliver for Australians through to 2050 and beyond.

Renewable hydrogen pathway



National statistics by region

| | Australia | ACT | NSW | QLD | SA | TAS | VIC | WA |
|---|-----------|-------|--------|-------|-------|-----|--------|--------|
| Homes connected to gas ('000) | 5,163 | 153 | 1,491 | 211 | 450 | 13 | 2,089 | 757 |
| Percentage of homes connected to gas | 48% | 73% | 43% | 10% | 56% | 5% | 76% | 68% |
| Average household gas consumption (GJ pa) | 32 | 33 | 20 | 9 | 17 | 30 | 54 | 13 |
| Percentage of total jurisdictional household energy from gas | 45% | 54% | 30% | 4% | 36% | 5% | 71% | 35% |
| Percentage of energy from gas for average electricity and gas connected household | 63% | 62% | 50% | 31% | 51% | 49% | 76% | 44% |
| Length of distribution gas mains (km) | 97,646 | 4,933 | 27,566 | 7,123 | 8,420 | 839 | 34,203 | 14,362 |
| Estimated residential gas network-connected appliances* ('000) | 12,169 | 286 | 3,302 | 643 | 1,003 | 33 | 5,233 | 1,669 |

Source: Deloitte Access Economics - Analysis for Gas Vision 2050 Update (2019), DNSP data, AER Regulatory Information Notices

Half of Australian households are connected to gas

Customers want gas

In the last decade, almost one million new households have been connected to the gas network. National network connections have grown from 4.8 million in 2015 to nearly 5.2 million in 2020. Connections are still growing in most states today, at an average of nearly 100,000 new connections per year.

Households in Victoria and NSW make up over 75 per cent of new connections nationally, with 42,000 and 35,000 respective new connections per year.

Roy Morgan Research¹ showed that almost two-thirds of all Australian households own a barbecue. This represents 5.8 million additional gas appliances, most of which run on cylinder gas.

Ground-breaking gas blending projects

Hydrogen Park SA and the Clean Energy Innovation Hub are already delivering blended renewable gas to a selection of Australian households, with other Australian projects like the Western Sydney Green Gas Project soon to follow.

These landmark projects are demonstrations of the potential of renewable gas, developing the required skills and processes necessary for a decarbonised future.

Most gas distribution network pipelines are made of plastic and are already capable of safely transporting renewable gas.

Gas demand is growing

The total demand for gas in households generally increases with the number of connections. Total household demand for gas has risen from 133 PJ in 2005 to 166 PJ in 2020, growing over 25 per cent since 2005.



Residential gas consumption in winter is over four times the consumption in summer.

Gas networks securing winter heat demand

Demand for gas in winter is more than quadruple the demand in summer. Heating is the main use of gas in households and much more gas is used in colder states than in warmer states.

In the ACT, over eight times more gas is used in winter than in summer. Victorians consume more gas on average than Canberrans, consuming 7.9 GJ of gas in winter compared to 1.5 GJ in summer.

ACIL Allen research has shown that households with gas heating typically use 65 per cent of their gas for heating².

Even in warmer states like WA and QLD, more gas is used in winter than in summer to take the cold bite out of the air on extra chilly days.

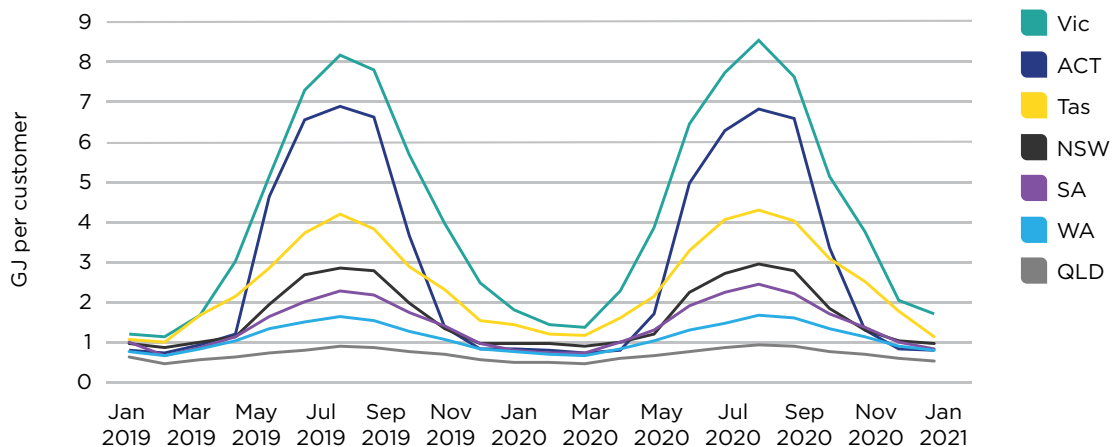
The energy demand of electric appliances like refrigerators, televisions, computers and lighting are minimal, and much lower than the energy demand for providing warmth. While electricity can be used to provide warmth, the majority of energy used for heating is provided by gas.

Gas network storage capability is unmatched

Gas networks are able to provide large amounts of gas supply in winter months.

Gas network infrastructure can store up to 275 PJ of natural gas, enough to meet the needs of residential customers for over 19 months if you exclude industrial customers and gas-powered generation.

Monthly residential gas consumption by state



National gas network statistics

| | ACT | NSW | QLD | SA | TAS | VIC | WA |
|--|-----|-----|-----|-----|-----|-----|-----|
| Residential monthly winter gas consumption | 6.6 | 2.8 | 0.9 | 2.2 | 4.0 | 7.9 | 1.6 |
| Residential monthly summer gas consumption | 0.8 | 0.9 | 0.5 | 0.8 | 1.2 | 1.5 | 0.7 |
| Ratio of winter to summer consumption | 8.4 | 3.0 | 1.7 | 2.8 | 3.4 | 5.4 | 2.1 |

Source: Distribution Network Service Provider data

² ACIL Allen, Energy Consumption Benchmarks, Electricity and Gas for Residential Customers (2017), p. 23. [Available here](#)

Gas is supplied to homes at below half the cost of electricity

Gas provides more affordable energy to the home

In Australia, the average cost to supply gas to homes is less than half of what it costs to provide the same amount of energy when using electricity³.

The largest difference is in Victoria, where the average cost of gas supply is 65 per cent lower than the cost of electricity supply. Gas is substantially cheaper in all Australian jurisdictions except for Queensland where gas is slightly more expensive.

The final cost of customer energy bills depends on the cost of energy delivered to homes, but also several other factors such as the types of appliances, how they are used, the number of residents, energy retailer costs and the overall energy efficiency of the home.

Global renewable gas funding is substantial

Renewable gases are currently more expensive to produce than natural gas but will become cheaper in the future as global research and development produces innovative technologies to reduce cost.

\$300 billion in total investment has been proposed globally through to 2030, including \$70 billion in public funding pledged by 30 countries³ and \$300m pledged by Australia's Clean Energy Finance Corporation.

There are 66 large-scale, demonstration and pilot hydrogen projects under development across Australian industry, including six that are already operational.

Learnings from these projects will contribute to ensuring renewable gas is a cheap, clean and reliable source of energy that can play its part in decarbonisation.

Electricity and gas cost delivered to the home



National gas network statistics

| | National | ACT | NSW | QLD | SA | TAS | VIC | WA |
|-----------------------------|----------|------|------|------|------|------|------|------|
| Cost of electricity (c/kWh) | 28.7 | 27.5 | 27.6 | 26.1 | 34.9 | 26.1 | 30.4 | 28.8 |
| Cost of gas (c/kWh eq) | 12.7 | 11.7 | 13.4 | 24.8 | 17.5 | 15.4 | 9.2 | 15.2 |
| % gas: electricity | 44% | 43% | 49% | 95% | 50% | 59% | 30% | 53% |

Source: AER State of the Energy Market 2020 - Figure 6.2, Composition of a residential electricity bill; The Government of Western Australia - Household electricity pricing, available here; AER State of the Energy Market 2020 - Figure 6.3, Composition of a residential gas bill; Note: Conversion rate from \$/MJ to c/kWh is 360. Does not take into account appliance efficiency. [Available here](#)

³ Excludes fixed supply charge

The emission factor of gas is around 75% lower than average national grid electricity

Gas provides cleaner energy to the home

Natural gas distributed through pipelines has a constant emission factor of 0.185 kilograms of carbon dioxide per kilowatt hour of energy delivered to the home. Natural gas provides energy to homes with on average 75 per cent fewer greenhouse gas emissions than grid electricity in Australia.

Victoria has a large amount of brown coal power generation, leading to an electricity emission factor that is over five times higher than direct use of gas in the home.

South Australia's higher proportion of renewable generation and gas-powered generation leads to an emission factor three times higher than natural gas.

Peak gas usage occurs during the mornings and evenings, typically when renewable generation output is lower and electricity emission factors are typically higher.

Tasmania is the only state where gas delivered to the home produces more emissions than electricity with its vast hydro power generation. Natural gas is still a competitive source of household energy because it's cheaper and heats homes faster than grid electricity.

Comparison of electricity and gas emission factors



Emission factors of electricity and gas

| | NEM (ex WA) | WA (SWIS) | NSW & ACT | QLD | SA | TAS | VIC |
|-----------------------------------|-------------|-----------|-----------|-------|-------|-------|-------|
| Emission intensity of electricity | 0.79 | 0.68 | 0.81 | 0.81 | 0.43 | 0.17 | 0.98 |
| Emission intensity of natural gas | 0.185 | 0.185 | 0.185 | 0.185 | 0.185 | 0.185 | 0.185 |
| Ratio of electricity to gas | 23% | 27% | 23% | 23% | 43% | 109% | 19% |

Source: Department of the Environment and Energy (2020), National Greenhouse Accounts Factors, Table 2 & Table 5

Gas fired electricity keeps the lights on

Generating electricity from gas closes the loop

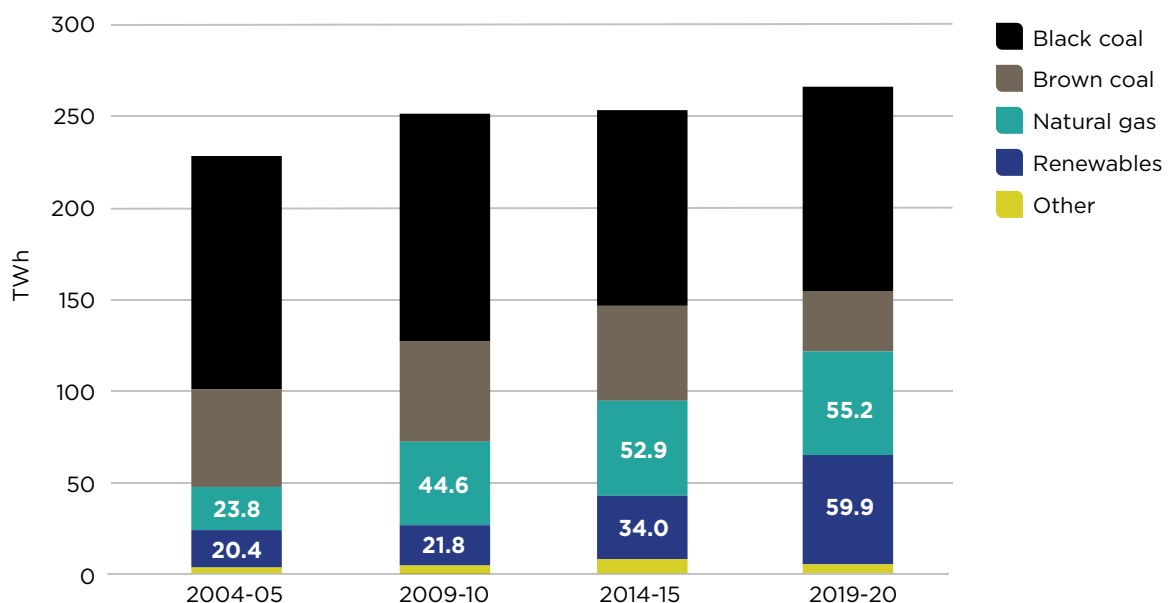
Gas is used to produce electricity in gas-powered electricity generation plants. Gas fired electricity generation produced 55,200 GWh of electricity across Australia in 2019-20 and made up 21 per cent of total electricity production across Australia.

Homes that don't have a dedicated gas connection still rely on gas when it is used to generate electricity. Gas powered generation can come online in mere minutes and provides security to the electricity grid, making sure the lights stay on.

Gas powered generation complements intermittent renewable electricity generation and fills in the gaps when the wind isn't blowing or the sun isn't shining. Efficient combined-cycle gas powered electricity generation produces less than half of the emissions of coal, while gas-powered generation is increasingly being used to support growing intermittent renewable generation.

Biogas produced from organic matter in landfill produces renewable electricity when used in gas powered engines. Biogas powered generation produces 0.5 per cent of total electricity generation across Australia.

Gas fired generation supporting renewable generation across Australia



Source: Department of Industry, Science, Energy and Resources, Australian Energy Statistics, Table O Electricity generation by fuel type 2019-20 and 2020 (2021). [Available here](#)

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, AEMO Emission Factors 20160511, 2016

| Region | Gas business | Contact details |
|------------------------------|-------------------------|--|
| Australian Capital Territory | Evoenergy | www.evoenergy.com.au |
| New South Wales | Jemena | www.jemena.com.au |
| (Wagga Wagga & Albury) | Australian Gas Networks | www.australiangasnetworks.com.au |
| Queensland | Australian Gas Networks | www.australiangasnetworks.com.au |
| South Australia | Australian Gas Networks | www.australiangasnetworks.com.au |
| Tasmania | TasGas Networks | www.tasgasnetworks.com.au |
| Victoria | Australian Gas Networks | www.australiangasnetworks.com.au |
| | AusNet Services | www.ausnetservices.com.au |
| | Multinet Gas | www.multinetgas.com.au |
| Western Australia | ATCO | www.atco.com/en-au/for-business/natural-gas/wa-gas-network.html |

Further information

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





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