Australian Gas Infrastructure Group

Hydrogen Gas
An Important Future Fuel

agig.com.au
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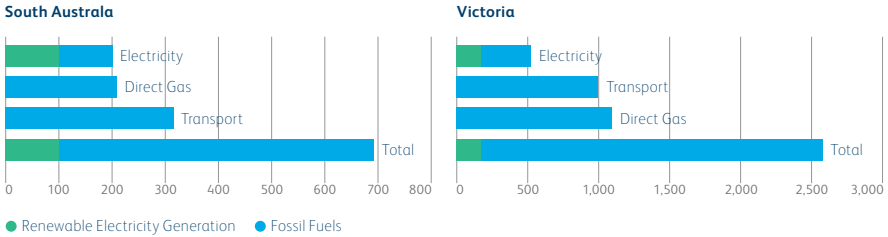
Gas in Australia Today

Natural gas is an important part of our energy mix. We use it in homes and businesses to heat our buildings, heat water and to cook. It is also used by many large industries and to generate electricity. Because gas is so reliable, we often don't realise the important role it plays in our energy mix.

Australia has committed to reducing carbon dioxide emissions to between 26% and 28% below 2005 levels by 2030. To meet these carbon reduction targets, we must decarbonise the gas, electricity and transport sectors - a massive challenge which requires more options than just electrification.

2016/17 Peak Daily Energy & Transport Consumption (TJ per day)



Gas in Australia Tomorrow

Compared to other energy sources, natural gas is already low-carbon – providing 44% of Australian household energy but only 13% of household greenhouse gas emissions.[1] But we can do more.

Blending or even substituting natural gas with renewable gases such as hydrogen or biomethane can decarbonise the gas sector and will also help achieve carbon reductions for the lowest cost, using the same reliable infrastructure we use today – the gas networks. It also means customers retain the choice of energy supply, and those industries relying on gas as an input can continue to access it.

[1]ENA Gas Vision 2050.

About Hydrogen

The most **abundant** element in the universe

Colourless, odourless, non toxic and an **excellent carrier of energy**

Produced cleanly: from water or from fossil fuels (with carbon capture)

A **clean burning** fuel

Like natural gas, hydrogen can be used to heat buildings and power vehicles

Can be **safely added to existing network** up to at least 10% without modification

100% network conversion is achievable, and likely cheaper than electrification[2]

Enables further decarbonisation of **transport and electricity**

Can be **stored** and **transported**

Can provide **energy system resilience** – accessing Australia's largest 'battery' the gas networks

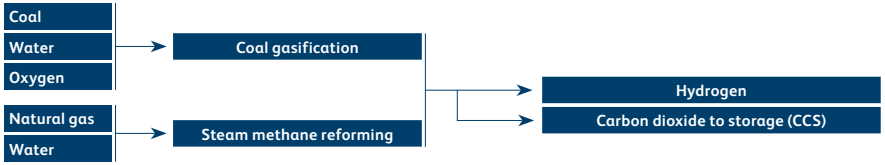
Enables new **export** markets – to Japan, Korea

Economic benefits to Australia through revenue, new industries and jobs

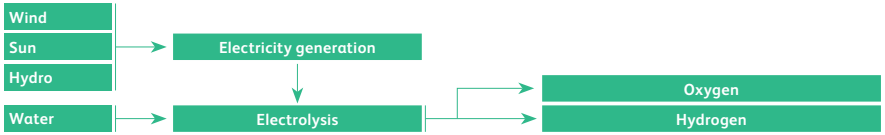
Producing Hydrogen

Hydrogen is the most abundant element in the universe, but it is often attached to other elements. In order to use it, we must separate it. There are multiple ways we can achieve this. The two existing pathways for clean hydrogen production are using fossil fuels and carbon capture and storage, or using renewable electricity and water. The costs of these technology are falling and the time is right to consider their use in our energy system.

CCS Hydrogen



Renewable Hydrogen



Australia's gas sector is on the pathway to a cleaner energy future. We can achieve this by using renewable or carbon neutral gas, such as hydrogen and biomethane.

Did you know...

The Towns Gas we used to rely upon, before converting to natural gas, was manufactured from coal and consisted of 50-60% hydrogen.

Some places such as Hong Kong and Singapore still rely on Towns Gas.

We moved away from Towns Gas upon the discovery of natural gas because it was considered more economically viable.

Today we know hydrogen is an important part of our decarbonisation journey and that the costs of producing hydrogen are decreasing.

Research shows that converting the Victorian gas distribution network to renewable hydrogen from electrolysis is around 40% less than the additional cost of full electrification[2].

[2] Decarbonising Victorian Gas Consumption: https://www.energynetworks.com.au/sites/default/files/08232018_decarbonising_victorian_gas_consumption_-_final.pdf

Using Hydrogen

Hydrogen uses are extensive and varied

In homes and businesses to provide heat (hot water, cooking, space heating)
Blended with natural gas or 100% hydrogen using existing gas networks

In Industry
Hydrogen can be used for high-temperature industrial processes, such as making alumina or as a chemical feedstock for existing and new industries

Power Generation
Generating electricity from fuel cells or hydrogen turbines

Refuelling Transport Vehicles
Fuel cell vehicles are essentially electric vehicles, but with a longer range and quicker refuelling time – well suited to heavy vehicles in particular

Export Overseas
Its ability to decarbonise energy systems means many countries are looking to develop hydrogen energy value chains and import hydrogen

Energy System Resilience
Electrolysers can respond quickly to variations in the electricity market consuming excess renewable power generation – and the gas networks are giant batteries to store this hydrogen

A Great Opportunity

Australia has great potential to harness the benefits of a hydrogen economy. Our natural renewable electricity resources and our expertise in energy export and infrastructure position us well to decarbonise our own systems as well as global markets. Importantly a new hydrogen economy will translate to new jobs and growth.

Our Hydrogen Projects

Hydrogen uses are extensive and varied

Hydrogen Park South Australia (HyP SA) – Under Development

An Australian-first project to produce renewable hydrogen using a process known as electrolysis and blend it with natural gas for supply to more than 700 customers on the existing network.

The Australian Hydrogen Centre – Proposed

We are proposing to establish a virtual Australian Hydrogen Centre with industry partners to externalise learnings from HyP SA and complete feasibility studies for the blending of 10% hydrogen and 100% hydrogen conversion of towns and cities across Australia.

Hydrogen Blending – Proposed

Our vision is to deliver 100% renewable gas to all customers on our networks. We are actively pursuing additional hydrogen projects with a view to blending more hydrogen into our Australian networks and to building the infrastructure – such as transmission pipelines – required to achieve this.

We are also actively participating in the Future Fuels Cooperative Research Centre and in the development of the National Hydrogen Strategy with a view to progressing the hydrogen industry.

Artist's impression of Hydrogen Park South Australia

Momentum is Building

Whilst HyP SA will be a first of its kind in Australia, there is plenty of other work going on in this space, including other hydrogen production projects around Australia. Similar work is also going on around the world, where hydrogen is being blended with natural gas at volumes of up to 20%.

There is also policy and Government support. Australia's Chief Scientist is working on a National Hydrogen Strategy, whilst the states have their own roadmaps and funding programs. Australia has also established a Future Fuels Cooperative Research Centre to enable research and development to transition energy infrastructure to a low-carbon economy using fuels such as hydrogen and biogas.

About Australian Gas Infrastructure Group (AGIG)

We own and operate infrastructure that delivers gas to more than two million Australian homes and businesses. We also deliver gas that supports the Australian economy – for power generators, mines and manufacturers.

Our portfolio of companies delivers for customers across Australia. The combined distribution, transmission and storage assets make AGIG one of the largest gas infrastructure businesses in Australia.

AGIG comprises three companies: Dampier to Bunbury pipeline Group (DBP), Multinet Gas Networks (MGN) and Australian Gas Networks (AGN).