

Hydrogen explained

What is hydrogen?

Hydrogen is a clean energy carrier that can be used in transport, power generation and a range of industrial processes. It's already a key input for a range of industries that provide vital products for our mining and agricultural sectors.

How is hydrogen made?

The two most common methods of producing hydrogen are steam reforming and electrolysis.

- **Steam reforming/Gasification** is used in industries to separate hydrogen atoms from carbon atoms in methane (natural gas) or from coal. These processes result in carbon dioxide emissions.
- **Electrolysis** is a process that uses an electrical current to split water and create hydrogen, with oxygen the only by-product. This process enables manufacturers to recover oxygen or heat.

Types of hydrogen

Hydrogen can be produced from a wide variety of energy sources.

- **Green hydrogen** is produced from water electrolysis and renewable energy and is carbon neutral.
- **Blue hydrogen** incorporates carbon capture and storage into the steam methane reformation processes, reducing carbon emissions.
- **Brown hydrogen** is produced from fossil fuels and accounts for around 95 per cent of global production.

Hydrogen uses

Hydrogen is a very flexible energy carrier that can be used as a:

- **grid stabiliser** – hydrogen electrolyzers can ramp up and down their load to match the variable output of renewable energy like wind and solar, helping to stabilise the grid
- **natural gas replacement** – hydrogen can be added to natural gas to supplement domestic gas supply
- **transport fuel** – hydrogen fuel cells offer an alternative to batteries for powering electric motors. Hydrogen is especially suited to heavier transport like trucks and trains
- **power generation** – hydrogen can be fed through a gas turbine or fuel cell to generate electricity
- **industrial feedstock** – hydrogen is used to produce industrial products such as ammonia, which is important for farming and mining.

Hydrogen's role in our low carbon future

Hydrogen is set to play an important role in our low carbon future, both globally and in Australia.

Countries like Japan and Korea want to use hydrogen to help decarbonise their economies, and Australia is well placed to become a major hydrogen exporter.

State, federal and international governments are implementing strategies to support hydrogen's development and increased use.