

HYDROGEN

FUTURE ENERGY

The world needs more energy, delivered in cleaner ways.



**Future energy,
here today.**

Hydrogen as a fuel is versatile and is becoming more commonplace around the world. It can be used to provide homes with heat and power and to power vehicles with zero emissions.

By 2030, Woodside expects to see hydrogen production at-scale around the world.

As Australia's largest oil and gas company, Woodside is leading this transition through active pursuit of hydrogen.

We are excited about delivering a lower-carbon energy future.

Did you know?

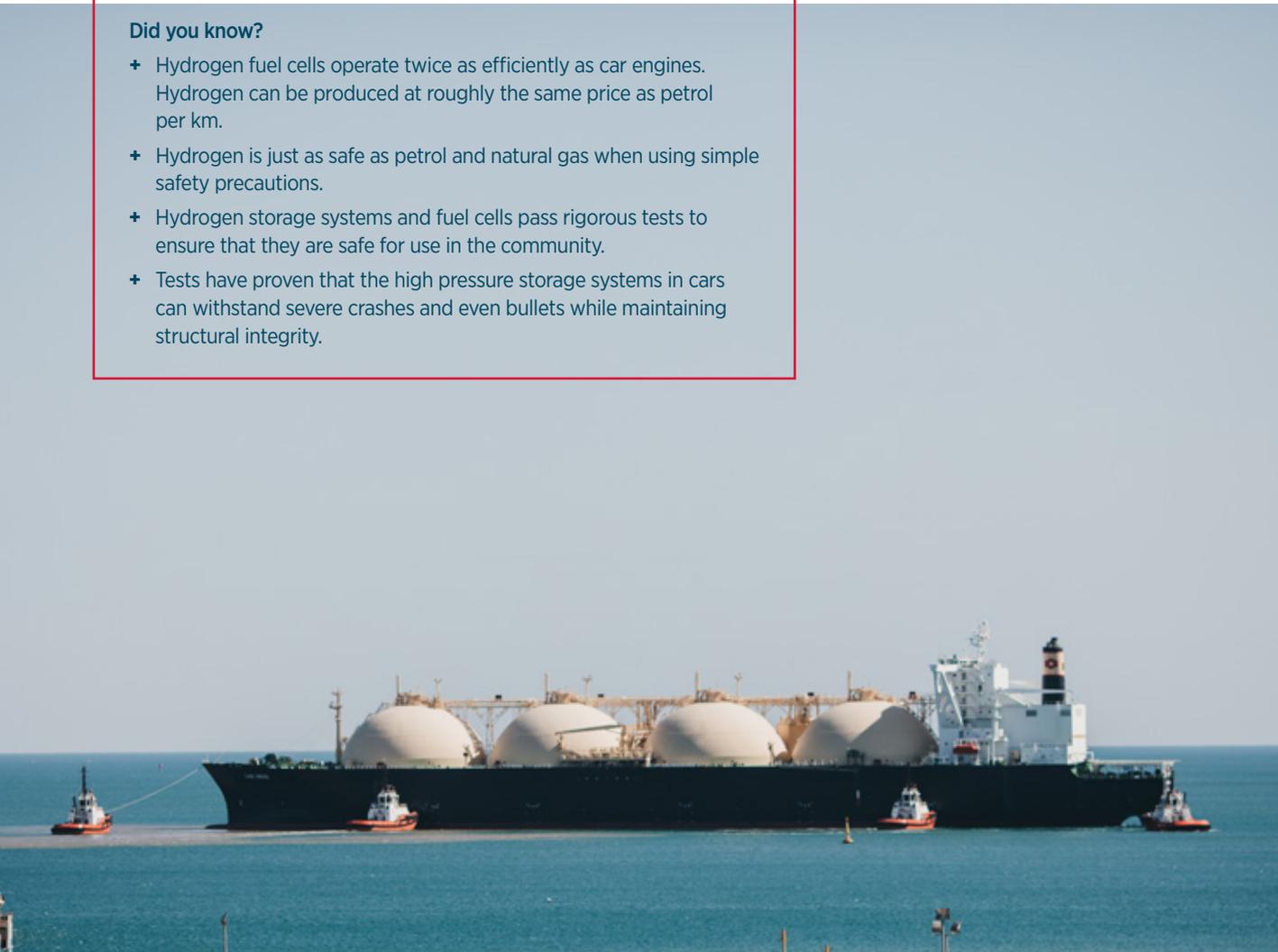
- + Hydrogen fuel cells operate twice as efficiently as car engines. Hydrogen can be produced at roughly the same price as petrol per km.
- + Hydrogen is just as safe as petrol and natural gas when using simple safety precautions.
- + Hydrogen storage systems and fuel cells pass rigorous tests to ensure that they are safe for use in the community.
- + Tests have proven that the high pressure storage systems in cars can withstand severe crashes and even bullets while maintaining structural integrity.

About hydrogen

Momentum is building around hydrogen. Governments and businesses are talking about it, and communities are being planned around it.

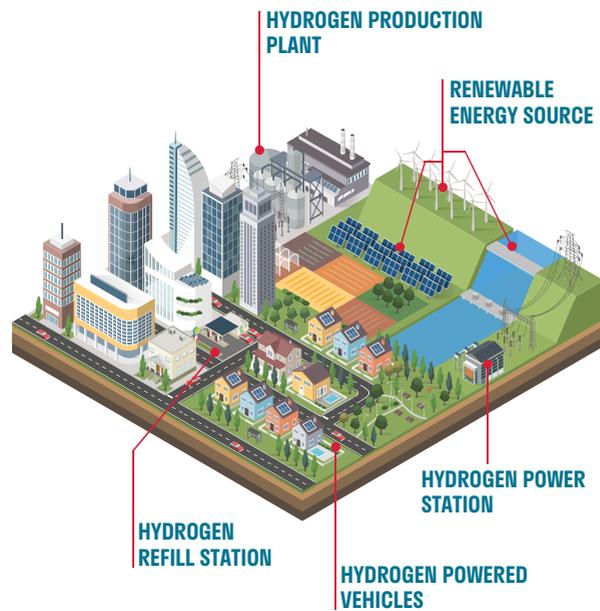
What is unique about hydrogen?

- + Hydrogen is the most abundant element in the universe.
- + It can be created from water with renewable energy.
- + It is a zero emission energy source.
- + Hydrogen can power everything that petrol or natural gas can, without emitting CO₂.



How can we use hydrogen?

- ✦ Hydrogen could power all your energy needs from washing machines to computers and fuel cell cars.
- ✦ Hydrogen can be converted into ammonia or liquid hydrogen for export. Australia has the capacity to export overseas to countries like Japan and South Korea.
- ✦ Excess renewable power can be used to generate hydrogen for transport through existing gas pipelines.



Hydrogen can be used in our homes, from cooking to heating.

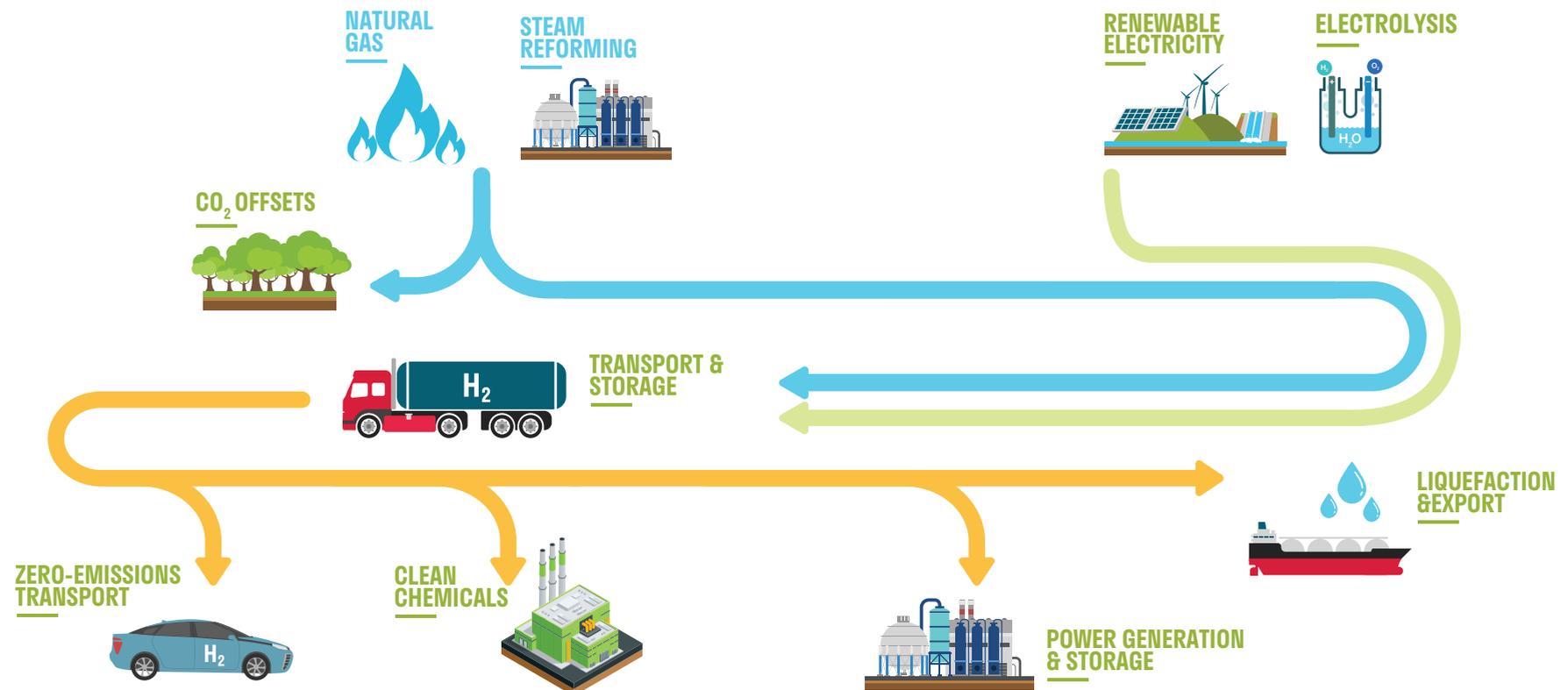
Woodside's focus

Blue hydrogen

- + Blue hydrogen is carbon-neutral hydrogen created from natural gas.
- + Blue hydrogen is produced by reacting natural gas with high temperature steam to produce hydrogen and a small amount of carbon dioxide.
- + In order to create blue hydrogen, the carbon emission needs to be offset with projects like tree planting. These projects support employment and help improve biodiversity.

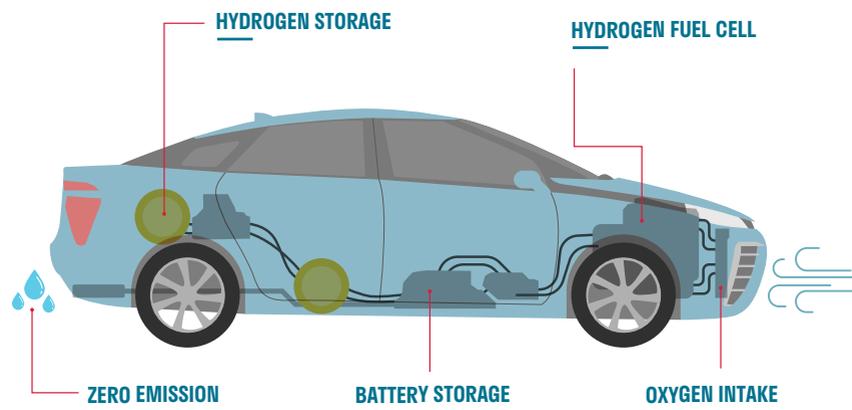
Green hydrogen

- + Renewable energy can be used to create green hydrogen. Wind, solar, geothermal and even hydro power generate electricity for use in electrolysis.
- + Electrolysers produce hydrogen by splitting the hydrogen and oxygen atoms from water to create pure hydrogen.
- + Hydrogen from renewables is the cleanest form of power because no carbon is created during the process.



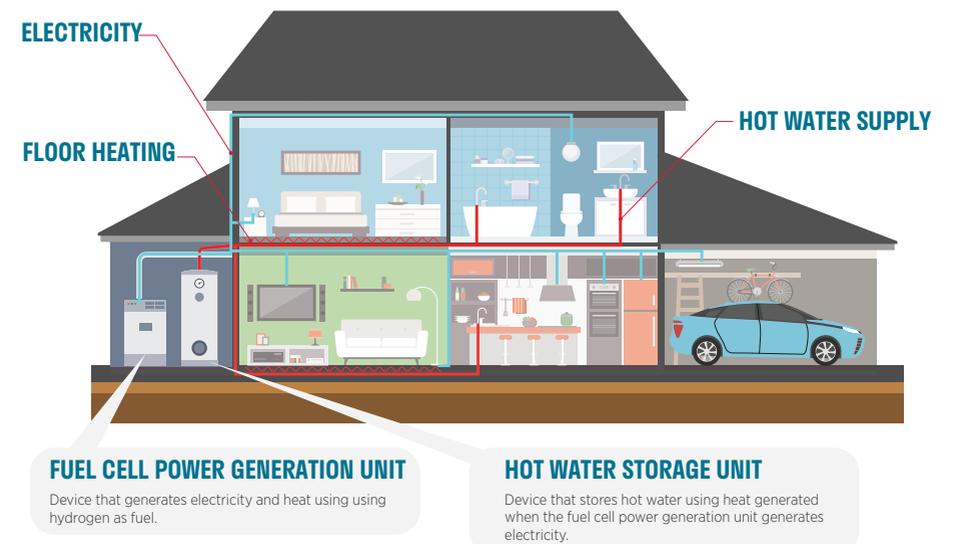
Hydrogen for transport

- ✦ Hydrogen fuel cells provide power for transport, from road trains, buses and cars right down to scooters.
- ✦ A fuel cell combines hydrogen with oxygen to make electricity and water. It operates similar to a battery.
- ✦ The electricity generated is used to power an electric motor that drives the vehicle. Electricity is also stored in a battery for use.
- ✦ The water forms as steam and leaves through the vehicle exhaust. Instead of emitting CO₂, the vehicle emits pure natural water.



Hydrogen for the home

- ✦ Hydrogen could be used to power every household appliance that relies on electricity.
- ✦ A fuel cell could be installed at your property. Just like in a vehicle fuel cell, the chemical reaction of hydrogen and oxygen from the air creates electricity. The only by-product is water.
- ✦ The heat from a fuel cell can be used to heat water or air. This fuel cell power generation unit is very energy efficient.
- ✦ Homes could one day be powered with fuel cells, making use of the emitted pure water.





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