

Understanding Green Hydrogen

Australian Industrial Power is proposing to develop the Port Kembla Power Station; Australia's largest hydrogen capable power station.

With an anticipated final nominal capacity of 635 megawatts (MW), the project will initially leverage natural gas from the new Port Kembla Energy Terminal and then aim to convert to using 100% green hydrogen by 2030 to deliver sustainable energy to NSW.

Depending on the rate at which coal-fired power exits the market, there may be a need for the power station to commence as a smaller scale (435MW) open-cycle unit to provide short-term dispatchable peaking capacity, before potentially moving to the final full 635 MW combined cycle design.

The project will also involve the construction of a short (approx. 16km) transmission line to connect the proposed power station to the broader electrical system.

Hydrogen as an energy source

Hydrogen is the most common element in the known universe and can be produced as a gas or liquid or found as part of other chemical compounds. Hydrogen has many uses such as fuel for transport or heating, a way to store electricity, or as a raw material in industrial processes.

When produced using renewable energy or processes, hydrogen becomes a way of storing renewable energy for use at a later date. This form of hydrogen is known as green hydrogen.

When stored as a gas, hydrogen energy can be delivered using infrastructure similar to that for natural gas. When converted into other forms such as liquid or other suitable materials, hydrogen can also be transported on trucks and in ships, meaning that it can be exported overseas and utilised as a tradable energy commodity.

As one of the world's largest exporters of coal and natural gas, much of the world is already powered using Australia's resources. With many countries seeking to switch to low carbon energy sources, the production and export of hydrogen from Australia could help to maintain our status as an energy export superpower.

Increasing the use of hydrogen in Australia will help us to reduce our emissions. Exporting hydrogen will also be key to helping a number of countries achieve their goal of net zero emissions by 2050.





It is also believed that hydrogen, specifically green hydrogen,

could potentially supply up to 25% of the world's energy needs by 2050. A 2018 CSIRO report has also estimated that demand for hydrogen imports in countries such as China, Japan, Singapore, and South Korea could reach \$9.5 billion by 2030.

What is green hydrogen?

Green hydrogen is pure hydrogen produced using renewable energy sources, such as wind, solar and hydro power.

Green hydrogen is one of several potential low-carbon fuels that could take the place of fossil fuels such as coal, oil, diesel or natural gas.

<p>Brown hydrogen</p> <p>Produced using coal where the emissions are released to the air.</p>	
<p>Grey hydrogen</p> <p>Produced from natural gas where the associated emissions are released to the air.</p>	
<p>Blue hydrogen</p> <p>Produced from natural gas, where the emissions are captured using carbon capture and storage.</p>	
<p>Green hydrogen</p> <p>Produced from electrolysis powered by renewable electricity.</p>	

Hydrogen production

Whilst hydrogen is the most abundant element in the universe, on Earth it cannot be found in its pure form in nature.

Hydrogen is most commonly found on Earth in the form of chemical compounds such as water and hydrocarbons, requiring energy to separate it into its pure form. One of the most common techniques used to extract hydrogen is the electrolysis of water.

In electrolysis an electrical current is passed through a larger substance to break it down into simpler substances. In the case of hydrogen production, water is electrolysed and broken into its two elements, oxygen and hydrogen.

If the electricity used during electrolysis comes from renewable sources and leads to no carbon emissions, then the hydrogen produced is called green hydrogen.

The benefits of using hydrogen to fuel the Port Kembla Power Station.

Green hydrogen is:



Sustainable

It does not emit polluting gases during its production.



Versatile

Green hydrogen can be used in electricity production as well as being used for domestic, commercial, industrial or mobility purposes.



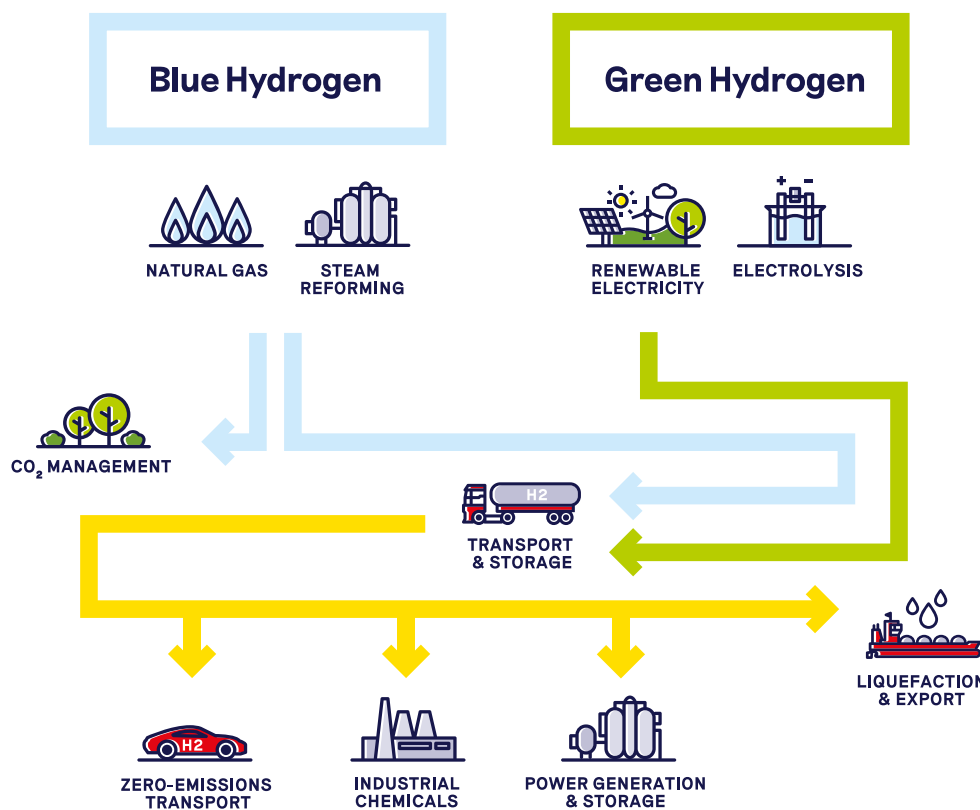
Easy to store

This allows it to be used for other purposes and at a later date other than simply when it is produced.



Transportable

Green hydrogen can be transported by vehicle, ship or pipeline to end users.



Ultimately using green hydrogen will help NSW work towards achieving the sustainability goal of net zero carbon emissions.