Why Australia's hydrogen industry should be renewables only

Michael Mazengarb Renew Economy 28 September 2020

Leading environmental group WWF Australia has published a new 'position paper' on hydrogen, which outlines why the technology presents such an enormous economic opportunity for Australia, but also why it needs to be based around renewables rather than fossil fuels.

Virtually all hydrogen production at present is undertaken using fossil fuels such as gas and coal as an input, and is generally supplied to the chemical industry. Such production is not emissions free, with carbon dioxide left as a by-product of fossil fuel derived hydrogen production.

Just over half of the world's hydrogen production is used for the production of ammonia, a key input for fertiliser production, with hydrogen also used in the oil refining, and explosives industries.

However, the focus on hydrogen now is the role it can play in the decarbonisation of industries like transport, thermal heat and the power generation sector, and renewable hydrogen – produced by splitting water using electricity generated from wind and solar – carries no associated greenhouse gas emissions.

WWF Australia's position statement says a renewable hydrogen industry must be paired with a sufficiently robust 'guarantee of origin' scheme, and that this growth must be undertaken concurrently with wider efforts to shift energy use on to zero emissions sources.

It cited analysis produced by Bloomberg New Energy Finance that suggests the market for green hydrogen has the potential to grow to become $700 billion a year industry, and Australia is well placed to seize this economic opportunity as a supplier to key Asian markets including Japan, South Korea and Singapore.

"Australia has a huge opportunity to be a global leader in renewable hydrogen, but only if we act now," WWF Australia's Energy Transition Manager Nicky Ison said.

"Hydrogen is already an established industry and currently used globally to manufacture fertiliser, explosives and other chemicals and commodities and accounts for 1% of global carbon pollution.

"WWF has been advocating for the acceleration of renewable hydrogen as part of our Renewable Recovery campaign, including the development of Hydrogen Hubs, one of which was announced by the Federal Government last week."

WWF Australia is concerned by proposals being pushed by the Morrison government, and Australia's chief scientist Dr Alan Finkel, that Australia pair fossil fuel derived hydrogen with carbon capture and storage technologies, as a way to make early progress in boosting production and establishing supply chains.

The Morrison government has recently announced a range of funding measures to support the development of carbon capture and storage technologies, which it says could be used to effectively remove emissions from the production of fossil fuel hydrogen, but would rely on a technology that is widely considered to be unproven.

WWF pointed to an analysis prepared by the International Renewable Energy Agency that said it was likely that funding and resourced being directed to fossil fuel hydrogen was diverting funding that could be better directed to accelerating the development of renewable hydrogen.

"Supporting the expansion of hydrogen from coal and gas is synonymous with supporting the expansion of the fossil fuel industry, which is incompatible with a safe climate and the need to decarbonise our economy," the WWF report says.

"If CCS is required for global decarbonisation, for example, for industrial emissions capture, it should be limited to sectors where there are no renewable alternatives. This is not the case in the hydrogen sector."

The WWF report says while a future hydrogen industry would only add a small amount of demand for Australia's freshwater resources, the industry needs to explore the use of recycled and wastewater supplies.

"To grow the scale needed to bring renewable hydrogen down the cost curve, we should start with decarbonising the existing hydrogen industry. In doing so, Australia has the opportunity to take a significant share of what is projected to be a $700 billion per year global industry," Ison added.

Germany names hydrogen the hero of its post-coal future

Bevan Shields Sydney Morning Herald September 27, 2020

London: Australian wind and solar farms could help Germany phase out its use of coal under a major export deal which also promises to create thousands of new jobs.

Europe's largest economy has identified Australia as a potential supplier of the vast quantities of hydrogen needed to decarbonise its heavy industry in order to adhere to the Paris climate accord and to achieve Chancellor Angela Merkel's goal of net zero emissions by 2050.

Research Minister Anja Karliczek said a "historic opportunity" had emerged for Germany to buy hydrogen produced in Australia via renewable energy and ship it to the northern hemisphere using a reconfigured fleet of environmentally friendly tankers.
"Australia is extremely well positioned to produce very large quantities of hydrogen at very low cost by global standards," Karliczek told *The Sydney Morning Herald* and *The Age.*

"It will be impossible to cover the capacities required in Europe within Europe itself."
Hydrogen can be produced with no greenhouse gas emissions if the process is powered by renewable energy, or by fossil fuels when the resulting carbon is captured and stored. According to Australia's Clean Energy Finance Corporation, hydrogen can enable the "deep decarbonisation of notoriously difficult-to-abate sectors" – particularly manufacturing.
Germany's plan to phase out fossil fuels requires so much hydrogen to fill the gap that any partnership with Canberra could feasibly eclipse the volumes Australia expects to send to Japan by the end of the decade.
Nearly €10 billion ($16.4 billion) of Germany's coronavirus stimulus package has been earmarked for the development of a domestic hydrogen industry and building international supply chains with countries like Australia.
Both countries have signed an agreement for a joint feasibility study to examine how big the partnership could be.
Karliczek said Germany had identified a hydrogen demand of about 1000 TWh per year by 2030, which is equivalent to about 3 million tonnes.

"Of this amount, 15 per cent is expected to be generated domestically, while the remaining amount will need to be imported," she said.
Some will come from other European countries – particularly those bordering the North and Baltic seas – but the rest will have to be sourced from elsewhere.

"Let's assume [the feasibility study produces] evidence for a stable and cost-efficient supply chain for green hydrogen between Australia and Germany. This would give Australian exports the opportunity to cover a significant percentage of our demand," Karliczek said.
"The costs will ultimately be a decisive factor – especially the costs of the renewable electricity needed. I am therefore convinced that countries which, like Australia, have excellent conditions for the cost-effective production of green hydrogen will continue to play an important role as partners for Germany in the long term."
Analysis by the International Energy Agency last year found Australian hydrogen imports into Japan could be cheaper than domestic production by 2030, even when substantial transport costs are included.

Hydrogen has been listed as a priority in the Morrison government's "technology investment road map".
The plan not only includes "green" hydrogen produced from renewables but also "blue" hydrogen produced from gas and using carbon capture to bury the emissions.
The German government's national hydrogen strategy states that only green hydrogen is considered sustainable in the long term.
Overall, coal represented nearly 30 per cent of Germany's energy generation last year. Karliczek said Germany's chemical and steel industries would be among the "first customers" as soon as Australian hydrogen production chains were established.
She also predicted a deal with Australia would spur the development of a fleet of cargo tankers that have their traditional polluting engines replaced with a hydrogen fuel cell and an electric motor.
"Another technological option would be to replace diesel from fossil sources with climate-neutral, synthetic fuels," she said.
"The bottom line is that this is a challenge we must meet. However, I am confident that research and innovation will allow us to find solutions to this challenge."
Trade and Investment Minister Simon Birmingham said Australia could be a global supplier of green hydrogen if the price of production was competitive.
"With Germany expected to be one of the largest users of hydrogen in the world, we're positioning ourselves through early co-operation to get ahead of the pack," he said.
"Our Technology Investment Roadmap identifies hydrogen as a priority and this deal we've signed with Germany will help get the ball rolling on joint initiatives that could ultimately lead to billions of export earnings for Australia and support thousands of jobs."