

Green hydrogen stakes a strong claim as a solution

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Russia's aggressive cuts to natural gas exports and landmark US legislation have jointly boosted the global pursuit of carbon-free green hydrogen in recent months, firming a widespread resolve to find green hydrogen solutions to the climate change crisis.



A hillside of photovoltaic panels in Spain is set to power electricity utility company Iberdrola's new hydrogen plant. **Bloomberg**

The US Inflation Reduction Act, passed in August, authorises \$US369 billion in spending on energy security and climate change including a \$US3 a kilogram tax credit for green hydrogen. The subsidy is expected to lever a tectonic shift in the US green hydrogen market and experts believe it will draw in increasing numbers of private sector investors.

At the same time, the “weaponisation” of Russia’s natural gas exports in response to the sanctions that followed Russia’s invasion of Ukraine earlier this year has reshaped the global view of green hydrogen.

Fiona Simon [<https://www.afr.com/link/follow-20180101-p5ak9o>], CEO of industry body Hydrogen Council of Australia, says the world increasingly sees green hydrogen as both a solution for decarbonisation and a potentially crucial investment for national and food security.

“The situation in Ukraine with Russians weaponising energy is causing enormous concern,” she says. “People are now valuing diverse sources of

energy.” Green hydrogen production can’t be weaponised easily, simply because it can be made in multiple places and transported in many different ways, so there is no single point, route or pipeline that can be held to ransom.

Often seen as an environmentally friendly replacement for diesel, green hydrogen is produced by splitting water into hydrogen and oxygen via electrolysis, using renewable energy. The oxygen can be vented into the atmosphere and the hydrogen stored and transported and used to power ships, long-haul trucks and other applications less suited to battery power. It can also be used in industry, and potentially a replacement for household natural gas.



Australian Hydrogen Council chief executive Fiona Simon says hydrogen is both an investment and a decarbonisation solution.

Still in its infancy, the Australian green hydrogen industry is nevertheless forging ahead to set up trade deals with a flurry of MoUs. “We know the

movement, the progression will happen, but it's yet to be seen where that production will ultimately occur and in what volumes, and where that production will be used or sent," Simon says.

Mark Hutchinson, CEO of Fortescue Future Industries

[<https://www.afr.com/link/follow-20180101-p5bg8j>], the green arm of Fortescue Metals (which posted a \$9 billion profit this year), says he expects FFI to start producing green hydrogen at scale by 2024-25. Production will probably start first at an FFI facility in Queensland, and rapidly ramp up to 15 million tonnes by 2030.

FFI has signed an MoU with E.ON, the biggest power utility in Germany, to supply 5 million tonnes of green hydrogen annually by 2030. "They've contracted with us for almost 10 per cent of Germany's entire power, which is enormous," Hutchinson says. He expects the green hydrogen will be shipped to Germany in the form of liquid ammonia, which can be turned back into power. Alternatively green hydrogen can be transported in the form of synthetic LNG, depending on the buyer's requirements.

Hutchinson sees a green hydrogen market with nearly unlimited potential. "We're almost back into 1907, when BP and Shell were formed, and everyone said that's a silly idea, that's not going to work," he says. "The opportunity for green hydrogen is absolutely now."

On the supply side, FFI has more than 100 projects under way around the world, and in Queensland, Tasmania, South Australia and Western Australia. With abundant renewable energy, stable government and a massive open spaces for new facilities, Australia is well-placed to take a lead in the manufacture and trade of green hydrogen.



The opportunity for green hydrogen is absolutely now, says Mark Hutchinson of Fortescue Future Industries.

“Play this forward 20 years, Australia could be as big a player in green energy as Saudi Arabia is in the fossil fuel world,” Hutchinson says. FFI has had discussions with the new federal government and all the state governments, he adds.

“They’re extremely excited about what we’re doing, because we’re doing it at scale and we’re doing it quickly. There’s a green light from the government in Australia.”

Fortescue Metals plans to decarbonise by 2030, providing an example of how decarbonisation can be done both economically and at speed and FFI green hydrogen will play a large part in this transformation. “Boards are so slow, everyone has a 2050 plan,” Hutchinson says. “We want to say, ‘hey, we can do it by 2030, why can’t you?’”

FFI is also building a substantial global portfolio of renewable energy resources to power its green hydrogen production.

Aurecon managing director (energy) Paul Gleeson, says unlike FFI and Fortescue, other tier-one miners such as Rio Tinto and Anglo American are looking to green hydrogen as a product to buy for decarbonisation, rather than something they will produce. “They are very focused on it because it’s probably the only pathway to decarbonise certain things, particularly in aluminium and steel production,” he says.

Other large investors in the Australian green hydrogen market include players who are “taking a long view” and see it as part of their overall commodity mix for the decades ahead, Gleeson says, including large Japanese trading house Sumitomo and Korea Zinc, the world’s largest zinc, lead and silver producer, which via its Australian subsidiary, Ark Energy, has begun decarbonising its energy supply to become one of the first refineries in the world to produce green zinc. Ark has ordered fuel cell trucks from Hyzon motors, which will be fuelled by hydrogen produced by Ark Energy’s own green energy hub in Townsville beginning in early 2023.

Gleeson says government investment in upgraded transmission lines is a priority for green hydrogen production. Many gigawatts of Australian renewable energy will be required to decarbonise the nation’s own electricity markets, as well as to power green hydrogen facilities, but network capacity is currently constrained by ageing poles and wires.



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New transmission lines are needed to send power from wind and solar sites, such as the two renewable energy zones planned for western NSW, to cities, and potentially to green hydrogen facilities adjacent to deepwater ports. “Without state and federal participation in the enabling infrastructure, then we won’t get there very quickly,” he says.

Australia’s green hydrogen market is a field of green shoots with immense potential, but it’s likely some will wither if deals are delayed by infrastructure limitations. Hydrogen Council CEO Fiona Simon says the government should soon consider investing as much as \$20 billion in infrastructure for the green hydrogen market or sacrifice Australia’s edge as a trusted trading partner, a nation with substantial renewables capacity and lots of room for development.

“If other places get going faster because put they put more into it, then that starts to reduce Australia’s ability to benefit from this world desire to move to hydrogen,” she says, adding that without substantial government support for the necessary infrastructure and investment incentives, the Australian green hydrogen industry could fail to reach its potential over the next five or so years. “I struggle to think that we would be much advanced if there has been no further policy developments to encourage investment.”