

Dawn of 'green steel' and the revival of Australian manufacturing

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NSW Environment Minister Matt Kean has declared hydrogen the "breakthrough that changes the world", comparing its impact on climate change to what a vaccine will do to COVID-19.

His speech to a sustainability summit, hosted by The Sydney Morning Herald, follows reports that NSW would pursue large scale hydrogen production as part of its response to the economic crisis caused by the pandemic, and that the federal government would call for expressions of interest in the creation of a "regional hydrogen export hub".

Mr Kean said he believed Newcastle and Port Kembla, with their existing infrastructure and heavy manufacturing economies, would be ideal candidates for hydrogen production.

Scientists and engineers around the world have increasingly focused on hydrogen as a replacement for fossil fuels because it can be created from water via a process called electrolysis and then burnt in individual engines, used to create energy in power plants or exported in gas or liquid form.

There is ongoing debate about whether public investment in the resource should be put into electrolysis plants powered by fossil fuels, such as coal or gas, and linked to carbon capture and storage technology (a process that creates what is known "blue hydrogen"); or whether the focus should be on hydrogen created with renewable energy alone to create "green hydrogen".

A leaked draft of the federal government's Technology Roadmap, seen by the *Herald*, suggests the government favours blue hydrogen as the cheapest and fastest option to help foster a hydrogen industry.

Australian National University's Centre for Climate Economics and Policy director Professor Frank Jotzo said he believed public funds should be directed towards green hydrogen, not only because of the benefits to emissions reductions but because potential customers of export hydrogen, such as Germany, are already stating a preference for it.

Grattan Institute energy program director Tony Wood said he believed governments should not only embrace hydrogen production at a location, like those mentioned by Mr Kean or in the Latrobe Valley in Victoria, but that they should commit to funding a green steel project powered and fed by hydrogen.

The world's first test green steel plant was opened in Sweden last week by Prime Minister Stefan Lofven, who said in a speech on Monday that "steel is jobs".

"Steel has built Sweden, and steel has built our welfare system. But steel – or rather the manufacture of steel – also threatens our way of life," he said,

In the green steel process being tested and refined in Sweden, by a government-private enterprise consortium called Hybrit, hydrogen is not only used to heat the blast furnaces, but replaces metallurgical steel inside them, providing the carbon that reduces and binds with the iron ore to create steel with no carbon emissions.

"Today, you are laying the foundations that will enable the Swedish steel industry to be entirely fossil – and carbon dioxide – free in 20 years," said Lofven.

Mr Wood said such a project in Australia would not only solve the engineering problems of how to maintain heavy industry in a carbon-free environment, but the political deadlock that has crippled Australian climate policy.

Rather than choosing between addressing climate change and supporting the nation's industrial heartlands, it allows for both, he said.

In May the Grattan Institute published a paper arguing that Australia should be at the forefront of the green steel revolution.

"A range of clean energy industries could plausibly provide hundreds, or even thousands, of new jobs in Australia," the report says. "But very few can plausibly provide tens of thousands of jobs, comparable to the number in [Australia's] key coal mining regions.

"Green steel is the exception."

In November the British billionaire Sanjeev Gupta announced that his company GFG Alliance would create a green steel facility at the Whyalla steelworks in South Australia it bought in 2017. Work has already started on replacing the ageing blast furnace with a \$1 billion-plus electric arc furnace capable of the process. At first the facility will use gas before making a shift to hydrogen, Mr Gupta told the Herald last week.

He said that rather than focusing on the export of hydrogen — a difficult and potentially dangerous product to ship — Australia should be focusing on using hydrogen onshore and exporting green steel instead.

Australia, with its wealth in iron ore and space for the creation of renewable energy, has significant advantages over Sweden, said Mr Gupta. He also argued that a new industry, such as this, had significant "first-mover advantages" in research and development, skills creation and the build-up of the necessary scale.

Mr Gupta said he expects green steel to be more expensive than the traditional product and would expect government support until it reaches scale. "There has been a lot of interest," he says of his dealings with government agencies so far.

If it doesn't happen he fears Australia will be left behind in what he sees now as an inevitable industry.

Already, he says, European market forces are stirring as governments and consumers seek to eliminate greenhouse gas emissions not only from the cars they drive but from the materials used to build them.

Last November the federal government announced a national hydrogen strategy, with energy and emissions reduction minister Angus Taylor saying an export hydrogen industry could create regional jobs and billions of dollars in economic growth by 2050.

The government has already provided a \$300 million fund to support hydrogen projects as well as \$70 million via the Australian Renewable Energy Agency. Announcing the fund earlier this year Mr Taylor said the government's goal was to drive the cost of hydrogen down to \$2 a kilogram, at which point it would become competitive with alternative energy sources in large-scale deployment in Australia.