



The green revolution

Hydrogen is ubiquitous in the current energy debate, with Fortescue Chairman Andrew Forrest its biggest cheerleader in Australia. But how long will it take WA's biggest miners to incorporate the miracle molecule into their DNA? **Hugh Halloran** investigates

To paraphrase Gordon Gecko, "Green is good. Green is right." When companies the size and nature of Fortescue Metals, BHP and Rio Tinto get on the green wagon, it's a sure thing there are substantial bottom-line considerations behind their moves.

In the lead-up to and fallout from the Conference of Parties 26 (COP26) meeting in early November, Fortescue Metal's Fortescue Future Industries (FFI) subsidiary was releasing a statement almost every day selling the benefits of its plans for a future green hydrogen economy.

Between October 27 and November 5, FFI

put out seven media releases, while shortly before COP26 started, Fortescue chief Andrew Forrest appeared on Channel 7's *Flashpoint* and told viewers the biggest investment banks and analysts in the world believed the green hydrogen part of the next industrial revolution would be \$12 trillion.

That's trillion dollars with a T.

"When the world turned to fossil fuels it underwent an industrial revolution," Forrest said.

"When the world turns to renewable energy and renewable fuels that industrial revolution will be so much bigger.

"We're going to move on from the era of

polluting the world because we've got a much better way of producing all the energy we need, all the products we need, but with zero pollution.

"We could have green energy industries all over our beautiful country — not just in one state or another state, everywhere. It is the obvious and clear future to a higher standard of living at a lower cost."

Chief scientist backs hydrogen

Like Forrest, Australia's chief scientist from 2016 to 2020, Alan Finkel, is a big believer in the future of hydrogen.

In his lead industry address at the Australian Petroleum Production and Exploration Association (APPEA) 2021 conference and exhibition in Perth in June, Finkel said that initially hydrogen would be used for making ammonia and for oil refining, but eventually it would be used in huge quantities for steelmaking.

It would also be used in the heavy-duty, long-haul transport sectors.

Later, in October, Finkel told *The Australian*



newspaper that hydrogen presented “an extraordinary export opportunity” that was almost beyond imagining but that could rival our LNG exports.

“Imagine a world where Australia, 20 or 30 years in the future, is producing as much hydrogen in energy-equivalent terms as our 2020 LNG exports,” he said.

Not so fast, says BHP

BHP is taking a more circumspect approach, however, playing down the potential of hydrogen to change the world.

In a recent discussion at the Financial Times Mining Summit, BHP CEO Mike Henry said the company continued to believe that hydrogen would have its day, but current economics were not attractive for hydrogen-based steelmaking.

Developing green Direct Reduced Ironmaking (DRI) would take a massive quantum of capital, and existing blast furnaces still had another 20 or 30 years of useful life.

“We think the economics of taking all that sunk capital, throwing it away and developing hydrogen-based steelmaking rapidly are going to prove to be too challenging,” Henry said.

Asked how much he thought it would cost the industry to get into green DRI, Henry said it would

be many hundreds of billions of dollars.

“Even for a company like BHP, if at some point in the future BHP changed its mind and wanted to become a green DRI producer and we wanted to convert all of BHP’s iron ore with hydrogen, the amount of capital involved would be well in excess of BHP’s current market cap, so it would have quite a dilutive effect in terms of return on capital employed for BHP shareholders. We just do not believe that is the right way to go.”

Henry did, however, refer to BHP’s announcement in 2020 of a 30 per cent reduction in emissions by 2030 and its more recent ‘Say on Climate’, in which the company committed to a target of net-zero Scope 3 emissions for both shipping and supply into BHP.

“We’re going to move on from the era of polluting the world”

BHP was collaborating with others in the supply chain, notably the Baowu group and HBIS group in China, and with JFE Steel in Japan, to help them solve what for them were Scope 1 and Scope 2 emissions, and what for BHP were Scope 3.

“We are investing in the technologies that are going to enable decarbonisation, ultimately,” Henry said.

“We also have, through our ventures arm, some investments in even more bleeding-edge or cutting-edge technologies to enable steelmaking decarbonisation.”

“I want to ensure that anything we are specifically putting a target out there on is something that we have a high degree of confidence in our ability to achieve and that we have a real understanding of both the technologies and the costs required for doing so.”

Meanwhile, in November BHP announced it was divesting its 80 per cent interest in BHP Mitsui Coal (BMC), which operates a metallurgical coal joint venture in Queensland in a deal with Stanmore Resources worth up to \$1.8 billion.

“As the world decarbonises, BHP is sharpening its focus on producing higher quality metallurgical coal sought after by global steelmakers to help increase efficiency and lower emissions,” BHP’s President Minerals Australia Edgar Basto said in announcing the deal.

Rio seeks a third way

Australia’s other major miner, Rio Tinto, is taking a third approach: on the one hand it’s investigating how to decarbonise the production of steel and aluminium by using hydrogen, and on the other it’s investigating other means to reduce its carbon emissions.

One such investigatory project uses plant matter known as lignocellulosic biomass, instead

of coal, to be blended with iron ore and heated by a combination of gas released by the biomass and high efficiency microwaves that can be powered by renewable energy.

Lignocellulosic biomass includes sustainably produced agriculture by-products such as wheat straw, corn stover, barley straw and sugar cane bagasse along with and purpose-grown crops.

Importantly, the process does not use foods such as sugar or corn, and nor would Rio use biomass sources that included old-growth forests.

The use of raw biomass in Rio Tinto’s process could also avoid the inefficiencies and associated costs of other biomass-based technologies that first convert the biomass into charcoal or biogas.

Rio Tinto Iron Ore Chief Executive Simon Trott

said the company was encouraged by early testing results of this new process, which could provide a cost-efficient way to produce low-carbon steel from Pilbara iron ore.

“More than 70 per cent of Rio Tinto’s Scope 3 emissions are generated as customers process our iron ore into steel, which is critical for urbanisation and infrastructure development as the world’s economies decarbonise,” Trott said.

“So, while it’s still early days and there is a lot more research and other work to do, we are keen to explore further development of this technology.”

Green shoots

Finally, it’s worth noting the focus newer and smaller mining companies such as Bellevue Gold are placing on being green.

Bellevue, which proposes to develop one of WA’s highest-grade, lowest-cost gold mines over the next 18 months, is proudly proclaiming its commitment to sustainable mining practices and says it’s forecast to be the lowest greenhouse gas emitter per ounce on the Australian Stock Exchange.

The company plans to be one of the country’s best-in-class ‘green and gold’ miners with a forecast greenhouse gas intensity of 0.202 tonnes CO₂ equivalent per ounce thanks in part to its planned integration of renewable energy to complement its off-grid, baseload gas-fired power station.

It’s forecast to have the least total Scope 1 emissions of any major off-grid gold mine in Australia; to have one of the cleanest power supplies for any gold mine in Australia; and to be well insulated for any future carbon tax legislation.

Let’s hope that all the efforts outlined here mean that insulation won’t be needed. ●