

Green hydrogen: Looming large for Anglo American

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Anglo American Platinum’s commitment to decarbonising its operations was reaffirmed by the company’s CEO, NATASCHA VILJOEN, at a recent Business Day ‘Dialogues’ webinar titled ‘Mining in a time of transition: Why hydrogen excites Anglo American’.

Viljoen said that Anglo American Platinum’s target was to be carbon neutral on Scope 1 and 2 emissions by 2040 and made it clear that green hydrogen would play a key role in allowing this objective to be achieved, writes **ARTHUR TASSEL**.

Green hydrogen – which is hydrogen produced when renewable energy is used to split water into hydrogen and oxygen – is currently the focus of intense development work by Anglo American Platinum (Amplats).

At its huge Mogalakwena open-pit mine near Mokopane in Limpopo Province, it is piloting the conversion of a Komatsu 930E-4 ultra-class haul truck to allow it to run on hydrogen, which will involve the machine’s original diesel engine being replaced by a hybrid



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The project is part of Anglo American's innovation-led approach to sustainable mining, FutureSmart Mining, which applies innovative thinking and technological advances to address mining's sustainability challenges.

Amplats forms part of the wider Anglo-American group. Hydrogen fuel cells work by combining hydrogen and oxygen in an electromechanical process that generates electricity. The only by product is water, so harmful emissions are almost eliminated. While fuel cell technology is well established, applying it to an ultra-class mining truck is a major challenge.

To achieve its goal, Amplats is working with a range of industry partners including global energy and services company ENGIE, responsible for providing the green hydrogen solutions the project requires; UK-based Williams Advanced Engineering; and Seattle-based First Mode.

Amplat's plan is to retrofit 40 trucks starting in 2024, with all fuel being generated by a local solar plant, and eventually roll out the system to several hundred more vehicles in the global Anglo-American fleet, in the process sharply reducing the group's carbon footprint.

Commenting on the Mogalakwena hydrogen fuel cell truck project, Viljoen told the webinar audience that the haul trucks used at the mine were huge. "They can carry up to 300 t of ore and the truck itself is 250 t, so you're talking about more than 500 t of metal and ore that you have to move," she said.

She pointed out that to be successful hydrogen trucks needed to be able to operate 24/7 and be quickly refuelled. Apart from reduced emissions, the benefits of hydrogen trucks will include lower maintenance costs on the powertrain and power savings because of regenerative braking.

A key component of the green hydrogen initiative at Mogalakwena is plentiful solar power and this will be provided by a 100 MW solar plant. Amplats recently selected the Pele Green Energy/EDF Renewables South Africa consortium as the preferred supplier of the facility, which is expected to go into construction later this year and to be operational

Anglo American's commitment to green hydrogen extends well beyond the mine site, a point that was emphasised by another of the webinar panellists, Fahmida Smith, market development principal at Anglo American. Smith, who leads Anglo American's work on the wider hydrogen economy development, said that the establishment of South Africa's first 'hydrogen valley', stretching from the Mogalakwena mine to Durban, would provide a tremendous boost to South Africa's economy.

She said it had the potential to add at least US\$4 billion to GDP while also contributing a minimum of 14 000 jobs per year by 2050. It would also generate \$900 million in tax revenues. She also noted that it would create increased demand for PGMs, with platinum being at the core of hydrogen technologies. She described the hydrogen valley proposal as a "huge opportunity" for the country.

Smith, in essence, was summarising the results of the recently completed Hydrogen Valley Feasibility Report. This was an initiative of the Department of Science and Innovation (DSI) and was completed by the DSI in partnership with Anglo American Platinum, the South African National Energy Development Institute (SANEDI), clean energy solutions provider Bambili Energy and ENGIE.

According to the report, the proposed hydrogen valley will serve as an industrial cluster, bringing various hydrogen applications together to form an integrated hydrogen ecosystem. The feasibility study identifies nine hydrogen-related projects across the mobility (mining, trucks, and buses), industrial (ammonia/chemicals) and construction sectors that could be used as a springboard for the establishment of the hydrogen valley.

The third panellist participating in the webinar, Jonathan Debasc, ENGIE Green Hydrogen MD Thermal Supply and Hydrogen Africa, posed the question of whether renewables could get the world to 'net zero'. He expressed doubt that this would be possible and said the problem was the unpredictability of renewables, solar and wind, which meant that supply could be interrupted.

"This is where hydrogen comes in – it fills the gap," he said, referring to hydrogen's ability to act as a store of energy. Debasc argued that in pursuing the goal of 'net zero', it would make no sense to use hydrogen not produced with green power. He was enthusiastic about South Africa's green hydrogen potential, saying the country could ultimately become an export hub for the product. The key to this would be having enough renewable energy to produce sufficient green hydrogen to meet cross-border demand.

Fortunately, he said, South Africa had solar and wind resources which were among the best in the world. From the perspective of the mining industry, Amplats' Viljoen stressed that renewables made sense on strictly economic grounds, with the cost of renewables coming in at less than 50% of what Amplats currently paid for power. She said this represented a significant saving, given that energy accounted for between 20 and 25% of the company's total costs.

She said that, in any event, a transition to renewables and green hydrogen was essential

Finally, and regarding timescale, it is worth pointing out Anglo American has committed to a full green hydrogen fleet by 2030, by which time it is expected that hydrogen trucks will have reached parity with diesel trucks in terms of total cost of ownership. If this target is realised, it will reportedly be equivalent to taking half a million diesel cars off the road and very likely position the group as the world leader in the adoption of green hydrogen technologies in mining.