

How viable is hydrogen as a power supply and how could it be financed?

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As load shedding continues to plague South Africa, costing the economy billions of rands a day, the net has been cast far and wide for potential solutions to the country's energy crisis. One possible solution that's receiving a growing amount of attention is hydrogen.



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In the past couple of years, you may have seen headlines about South Africa's potential as a green hydrogen hub. You may also have heard about the potential boost an active hydrogen sector could give to the South African economy. A paper from McKinsey, for instance, suggests that green hydrogen in particular could boost the economies of six African countries (including South Africa) by \$126bn by 2050. It should hardly be surprising then that the government has set a target for the country to claim 4% of global market share by that time.

But how viable is hydrogen as an energy source really? Does it really have the potential to alleviate South Africa's energy woes? And if it is viable, how should hydrogen projects be financed, what should developers do to create investable or financeable projects, and how should the government get involved?

An energy source not without pitfalls

Of course, South Africa isn't the only country excited about the energy potential for the universe's most abundant element, with analysts predicting that the global market for hydrogen production will be worth around \$225.73bn by 2030. On the face of it, the shift to hydrogen makes sense.

As a fuel source, it has several advantages, including its relative abundance; efficiency; versatility; and the fact that when it is burned as a fuel, it produces only water vapour, making it a clean source of energy. But even those advantages come with caveats.

For example, almost all hydrogen produced today is grey or blue hydrogen, both of which come from a steam methane process where methane extracted from natural gas is combined with steam (produced by burning fossil fuels), allowing it to break down into hydrogen and carbon dioxide. Unfortunately, methane leaks during production and transportation can make this kind of hydrogen worse than simply burning natural gas.

In theory, this is where South Africa should have an advantage. Thanks to its abundance of sunlight, particularly in areas such as the Northern Cape, it should be able to produce abundant amounts of green hydrogen. Unlike other forms of hydrogen production, green hydrogen doesn't make use of methane at all. Instead, it makes use of electrolysis to split water into hydrogen and oxygen.

But even green hydrogen can be difficult and costly to transport and store. That means that for hydrogen to be truly viable, production hubs need to be close to markets. That's to say nothing of the risks involved in producing, storing, and transporting a highly flammable agent. And given the current state of electricity in South Africa, as well as the large amounts of power required to produce hydrogen in the first place, the country may even struggle to produce hydrogen for purposes outside the production of electricity.

Assuming those pitfalls are overcome, as industry optimists say they will be, what is the bankable scenario for hydrogen in South Africa?



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Using blended finance

One possible place to start is by using blended finance. In this model, organisations such as development finance institutions (DFIs) would make the initial investments in green hydrogen projects. Less risk-averse than other financiers, such institutions would be able to absorb defaults on any failed projects they've financed through loans. Once those projects are weeded out and successful ones start to emerge, then senior lenders (including banks) can come in, particularly if there are additional security measures, such as insurance, in place.

While extensive due diligence would need to be put in place, the fact that green hydrogen is a relatively nascent concept needn't be an obstacle as it is for some other emerging innovations. After all, the process of producing hydrogen is well established, as is renewable energy. The only really new thing is bringing the two together.

Even so, a number of conditions would have to be in place to attract the kind of funding green hydrogen needs to be viable. Players in the sector would, for example, need to secure commitments from green finance programmes to attract further investment.

For its part, the government will also have to incentivise investment in the green hydrogen sector through attractive tax breaks, grants, and the creation of hydrogen-specific special economic zones (SEZs) that help bring down the cost of

producing, transporting, and exporting hydrogen.



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Long-term potential, but no silver bullet

Ultimately then, it should be clear that hydrogen is no silver bullet for South Africa's energy crisis. In fact, overcoming that particular crisis will be critical if the country is to have any hope of meeting the hydrogen potential that many think it has. As we've seen, however, that's just one of many obstacles that will have to be overcome for South Africa to have a viable hydrogen industry.

Getting to that point will take time and many technological advances, especially when it comes to storage and transportation. That is when will we see widespread interest from financiers such as commercial banks.

That's not to say that South Africa can't benefit from a healthy green hydrogen sector, but it's not going to start reaping rewards anytime soon.

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