

SANEDI's view on \$1-billion fund to kickstart SA's hydrogen economy

South Africa's plan to raise \$1 billion to kickstart the country's hydrogen economy in partnership with Denmark and the Netherlands bodes well for a new energy future, says Dr Titus Mathe, CEO of the South African National Energy Development Institute (SANEDI).

The announcement that Denmark and the Netherlands would join forces with South Africa to raise \$1 billion was made at the business forum on green energy transition and green hydrogen partnership impact that was held in Pretoria in the third week of June. The fact that Mark Rutte and Mette Frederiksen, the prime ministers of the Netherlands and Denmark respectively, attended the forum communicated the two countries' support for South Africa's energy-transition ambition.

This support is well placed when one considers the context South Africa has already created for a hydrogen economy. Apart from resource advantages – abundant renewable energy sources in the form of wind and solar, accessibility to sea water which could easily be desalinated to produce water for use in producing hydrogen using electrolyzers, and the cobalt, nickel, platinum and other minerals required to produce and use hydrogen fuel cells and batteries – South Africa also has technical and knowledge advantages. Chief among these is the country's well-developed expertise in the Fischer-Tropsch technology and the production of synthetic fuels, which can be easily transferrable to green-hydrogen technology. As an energy carrier, hydrogen is already used in a wide range of applications in South Africa (albeit currently produced from fossil fuels), and as such its safe storage and transport is well understood. The country also has an established manufacturing sector and a vast labour force that is "completely trainable", in the words of our Green Hydrogen Commercialisation Strategy. All of this means the country has the potential to decarbonise traditionally hard-to-abate sectors, such as heavy-duty transport, aviation and shipping, and industries such as steel, cement and ammonia/fertiliser manufacturing.

Acting on this potential, South Africa started investing in hydrogen research, development and innovation more than 12 years ago through a programme called Hydrogen South Africa (HySA). More than R500 million has since been invested in research and development activities, leading to South Africa developing intellectual property such as membrane electrode assemblies and the integration of systems in the various sectors of the hydrogen economy. During the Covid-19 pandemic, for instance, South Africa powered a field hospital using hydrogen fuel cells that combined national and international intellectual property.

Over the past few months, Infrastructure SA, a programme within the Ministry of Public Works, identified a pipeline of 19 green-hydrogen projects valued at more than R300 billion. The Industrial Development Corporation (IDC) also secured €23 million in grant funding from the German government to support the development of South Africa's green hydrogen economy and help accelerate the country's transition to renewable energy.

Internationally speaking, the Carbon Border Adjustment Mechanism (CBAM) states that any product manufactured outside the European Union using the so called "dirty energy" will be subject to significant carbon tax. Given that South Africa is a substantial exporter of products like steel, cement

and fertiliser, carbon neutrality and products produced using renewable energy and green-energy carriers will do much to secure and grow our export markets. The knock-on effect on these and other value chains will create considerable economic benefits, including job creation and mega-infrastructure development in underdeveloped areas.

From a domestic point of view, several policies are in place to support South Africa's participation in the hydrogen economy. These include the Department of Transport's Green Transport Strategy and the Department of Mineral Resources and Energy's Just Energy Transition (JET) Framework, which advances the production and use of hydrogen in the electricity sector, and the South African Renewable Energy Masterplan that encourages the use of green hydrogen.

In June 2021 the Minister of Trade, Industry and Competition established the Green Hydrogen (GH2) Commercialisation Panel, which is led by the IDC. The panel has private and public sector members and, drawing on the DSI's HySA programme and Hydrogen Society Road Map, developed South Africa's Green Hydrogen Commercialisation Strategy and Action Plan, which was approved by Cabinet in 2022.

Policy, research and development require implementation, which is where SANEDI comes to the fore. The announcement of Dutch and Danish support for the \$1-billion fundraising effort aligns perfectly with SANEDI's five-year strategic plan and the current financial year's performance plan. The conditions of this collaboration must however be well understood before South Africa commits to a long-term plan.

In terms of the five-year plan, SANEDI will champion and drive the demonstration and introduction of innovative renewable energy solutions in South Africa, including cleaner fossil fuels and cleaner mobility. SANEDI furthermore supports the DSI's Energy Secretariat in managing research and development projects, with a strong focus on the hydrogen economy, and is establishing a knowledge base in collaboration with the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ).

During the current financial year, SANEDI is working to complete several key deliverables:

- Cleaner Fossil Fuels Roadmap (Phase 3), main focus being Clean Coal and narrowing down list of technologies that are practical and can be implemented quickly in South Africa.
- Assess the feasibility of at least four renewable energy solutions.
- Train at least 120 individuals in renewable energy-related technologies.
- Produce a renewable energy industry status report.
- Maintain at least two renewable energy-related datasets/databases.
- Produce at least one policy support instrument to accelerate introduction of renewable energy and support tools for the renewable energy industry.
- Conduct a research study to enable JET policy developments.
- Train at least 50 key stakeholders on JET.
- Host at least four renewable energy-related knowledge sharing events.

While the green-hydrogen future is bright, it would be foolish to ignore the challenges that must be managed. Green hydrogen is three to four times more expensive than grey hydrogen, which poses significant funding stumbling blocks, a challenge that is exacerbated by the need to repurpose

resources and facilities that may be left stranded in the transition to a hydrogen economy. In addition, South Africa needs to establish standards and norms that directly address large-scale hydrogen storage and transportation (including hydrogen pipeline infrastructure), develop sufficient specialised skills and local manufacturing capacity and capabilities, provide certainty on intellectual property ownership and resolve electricity grid constraints.

These are not small matters to address and resolve. However, given the groundwork that has already been done, local advantages that already exist, the willingness of the international community to support the development of South Africa's hydrogen economy and the immense benefits it could deliver, it is an opportunity that must be pursued wholeheartedly.