

Green hydrogen described as a game changer in the country's decarbonisation outlook

The November 2022 report on the Green Hydrogen Commercialisation Strategy (GHCS) for South Africa positions green hydrogen (GH) as a key contributor to future global energy demand, as well as decarbonising hard-to-abate industries.

These factors are driving the growth of a new global energy market for Green Hydrogen.

GH is a term that is used to describe hydrogen that is produced with zero carbon emissions. Hydrogen produced by means of splitting water into hydrogen and oxygen using renewable energy such as solar, wind, etc. is seen as holding the most significant promise for decarbonisation.

The GHCS report was the result of the Green Hydrogen Commercialisation Panel established in June 2021 by the Minister of Trade, Industry and Competition (DTIC), comprising private and public sector champions in the green hydrogen value chain and was co-ordinated by the Industrial Development Corporation of South Africa (IDC).

During the second Renewable Hydrogen and Green Powerfuels Webinar on 13 April 2021, Minister for the DTIC, Ebrahim Patel, described the Hydrogen Economy as a potential "game changer" not just for South Africa, but for the world at large. He went on to say that South Africa is well positioned to capitalise on the rapidly developing global hydrogen economy, to reindustrialise the country and to become an exporter of cost-effective green hydrogen to the world.

South Africa's initial exploration of a hydrogen economy dates to 2008 when Hydrogen South Africa (HySA) was officially launched by the Department of Science and Innovation (DSI) to investigate the use of local resources and existing knowledge in the development of high-value commercial activities in hydrogen and fuel cell technologies.

HySA was initially established for a period of 15 years, but having recognised HySA's critical role in the future of South Africa's hydrogen economy, prompted Cabinet in 2021 to approve support for the programme for an additional 10 years. The HySA programme has been instrumental in conducting cutting-edge research and development hydrogen technologies earmarked to support GH commercialisation.

The production of hydrogen by splitting water using electrical energy, also known as water electrolysis, has been known for many years, but currently most of the hydrogen is still produced from fossil fuels. The three main challenges associated with water electrolysis technology to produce hydrogen are the cost of the hydrogen that is directly related to the cost of renewable electricity, costs of hydrogen storage and its safe transportation to the point of use. HySA Infrastructure is mandated to deal with these challenges.

The GHCS report builds on the



State-of-the-art hydrogen fuel cell research facilities at the DSI-HySA Infrastructure at North West University.

strong foundational work undertaken by the DSI with respect to its HySA programme and the recent development and publication of the Hydrogen Society Road Map (HSRM).

As the lead agency for the DTIC in developing the GHCS, Industry Strategist and Planner at the IDC, Mr Mahandra Rooplall is confident that the GHCS will contribute extensively to South Africa's success as a producer and supplier of green hydrogen. "We need to recognise that we are embarking on a mammoth mission, from a size and complexity perspective and therefore, we should be aligned to and understand the reasons for developing the GHCS," said Mr Mahandra Rooplall from the IDC.

GH, he says, presents new opportunities in different key industries including energy security, economic growth, skills development, as well as employment creation.

The GHCS outlines four key opportunities for South Africa. The first of these is the global opportunity presented, as hydrogen will play a significant role in the transition to a net-zero energy system and will establish SA as a future energy market global trader, securing foreign direct investment, earning foreign income and creating economic growth and development.

Secondly, from a competitiveness perspective, South Africa's natural endowments of land, wind, solar, oceans, green minerals and existing petrochemical base, together with innovations in the hydrogen sector and a robust financial system bode well for the future of GH commercialisation. In addition, the country's proprietary Fischer Tropsch technology and abundance of platinum group metals (PGM) have been identified as clear differentiators. PGMs are used in the electrolyzers needed to produce green hydrogen and as a fuel in hydrogen fuel-cell electric vehicles and South Africa is home to more than 80% of the world's platinum reserves.

A third opportunity is realised in that a GH economy offers skills development and employment opportunities as part of a just energy transition. The transitioning away from fossil fuels will require the training and re-skilling of communities reliant on the fossil fuel industry and in doing this will offer numerous opportunities.

Finally, in a global Net Zero environment, 'dirty' economies will increasingly be financially penalised. Whereas Renewable Energy will make a substantial contribution to South Africa's decarbonising targets, GH is poised to be the global clean fuel of the future and critical to the country's green energy production goals.

During his April 2021 webinar mentioned previously, Minister Patel said: "The way we power the world is changing. Through the centuries, and as our technologies have developed, we have turned to wood, to coal, to oil, to water, to nuclear fission and to the sun and wind to power our communities and our industrial endeavours. Today we stand on the brink of a new development in our efforts to bring cheaper, more accessible energy solution to the world, in the form of hydrogen. If the 20th Century became known as the century of crude oil (and nuclear energy), the 21st Century may become known as the century of renewables and hydrogen."

The GHCS presents a compelling argument for the viability of a GH₂ future in South Africa. Read the full report. <http://www.thedtic.gov.za/green-hydrogen-commercialisation-strategy/>

A well established and sustainable green hydrogen industry for South Africa offers numerous benefits to the country. Government has demonstrated its commitment to working with the private sector and civil society by creating an enabling environment in which the objectives as set out in the GHCS can be realised.



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