

Hydrogen South Africa in the International Spotlight

South Africa's science and technology sector will be in the spotlight when international experts and decision makers in the field of Hydrogen and Fuel Cells gather in the country later this year. Renewable energy is becoming a vital component in the energy portfolio of many countries worldwide. With hydrogen being seen to be one of the best options to store renewable energy, South Africa has made significant strides in renewable energy development through its Hydrogen South Africa (HySA) flagship project.

Hydrogen is used as an energy carrier, which stores and delivers energy in a usable form. Using hydrogen as an energy carrier could reduce the country's dependence on coal technologies, imported oil and contribute to reducing greenhouse gas emission, which cause global warming. Fuel cells use hydrogen to generate electricity, producing water and heat as by-products. Through HySA, we have seen the development of various hydrogen-related innovations including novel catalysts and catalytic devices, liquid organic hydrogen carriers, high-pressure storage technology and a host of industry demonstrations.



State-of-the-art hydrogen fuel cell technology research facilities at HySA systems at the University of Western Cape



Prototype fuel cell forklift and hydrogen refuelling station at the Impala Platinum Refineries in Springs, Johannesburg (picture credit: Impala Platinum Ltd)



Onsite installation of a 2.5kW Fuel Cell System at Poelano High School in Ventersdorp, North West Province



First South African hydrogen fuel cell powered golf cart developed by HySA systems, University of Western Cape and Melex Electrovehicles

South Africa, through the Department of Science and Technology (DST), will host the 30th meeting of the International Partnership for Hydrogen and Fuel Cells in the Economy in December 2018.

The International Partnership for Hydrogen and Fuel Cells is an inter-governmental partnership consisting of nineteen partners which was established in 2003 with the main intention to facilitate and accelerate the transition to clean and efficient energy and mobility systems using hydrogen and fuel cell technologies. It is committed to advancing the commercialisation of hydrogen and fuel cell technologies with the goal to enhance the security and efficiency of their energy systems, to address environmental objectives and economic growth.

The partnership further provides an environment conducive for the sharing of information on policies and technology status, together with initiatives, codes, and standards to accelerate the cost-effective transition to use hydrogen and fuel cell technologies in the economy.

South Africa will utilise the opportunity, as host of the meeting and a strategic international partner, to collaborate with international experts and to enhance the country's energy capabilities. This partnership will go a long way to support the South African energy industry, sustainable economic growth, and contribute to the green economy.

In 2016, the International Partnership for Hydrogen and Fuel Cells indicated that the "global fuel cell industry reached \$2.2 billion in revenue in 2014, with nearly 30% annual growth in fuel cell shipments worldwide since 2010". This is in line with the DST's Ten-year Innovation Plan's prediction of this market reaching a multi-billion dollar international industry.

It is therefore important that South Africa's energy sector understands and appreciates the future contribution of hydrogen and fuel cells technologies into the energy mix, especially when integrated with other renewable technologies, such as solar cells and wind energy to provide safe, clean, affordable and reliable energy.

It was against the backdrop of the race to provide safe, clean, affordable and reliable energy supply for South Africa to meet its medium-term supply requirements that the DST identified hydrogen and fuel cell technologies as a long-term innovative energy solution. With approximately 75% of the world's known Platinum reserves, a key catalytic material of certain fuel cells, South Africa has a strong global competitive advantage and is best positioned to be a major player in the fuel cell industry market.

To exploit this competitive advantage, in May 2007, the Government approved the Hydrogen and Fuel Cell Technologies Research, Development, and Innovation strategy, branded Hydrogen South Africa, which was then officially launched in September 2008 by the DST. This was immediately followed by the establishment of the HySA Centres of Competencies – which are the HySA Infrastructure, HySA Catalysis, and HySA Systems – to promote proactive innovation and create human resources required to develop future industries in the hydrogen and fuel cell technologies field.

The HySA programme has delivered a number of demonstration pilot projects and innovations in collaboration with private sector partners. The development of the first hydrogen fuel cell golf cart in 2013 by HySA Systems and Melex Electrovehicles was one of the initial innovations produced through the HySA programme. In 2014, the DST, in partnership with Anglo American, Air Products and Clean Energy Investments, successfully installed fuel cells at three schools in Cofimvaba in the Eastern Cape. The project investigated how to best integrate science, technology and innovation in order to contribute to improving the delivery of basic education. In 2016, Impala Implats successfully launched the first fuel cell forklift in South Africa, which also has a hydrogen refuelling station. This was a collaborative effort between the DST, University of Western Cape and HySA Systems. Most recently in April 2018, the Minister of Science and Technology, Ms Mmamoloko Kubayi-Ngubane, launched a 2.5kW fuel cell system at Poelano High School in Ventersdorp, North West, which will enable the rural-based school to have access to low-cost, off-grid, primary clean energy for their ICT and lighting needs.

Public Awareness of Hydrogen and Fuel Cells in South Africa:

HySA Public Awareness, Demonstration and Education Platform (HySA PADEP) is an initiative funded by the Department of Science and Technology. Its main objective is to create public awareness, visibility and acceptance amongst the public, industries, entrepreneurs and key decision makers in South Africa about the challenges, benefits and safety of using hydrogen and fuel cell technologies in the alternative energy industry. Given the relative newness of this technology, it is HySA PADEP's intention to introduce this technology to South African society to stimulate future careers for the youth in this field, showcase cutting-edge research and present new business opportunities that this technology offers to industries and entrepreneurs. For more details and contact information, visit: www.hysa-padep.co.za and www.saasta.ac.za or follow us on Facebook: www.facebook.com/HySA-Public-Awareness and on Twitter: @HySA_Outreach.