



Africa hydrogen economy: untapped potential for green hydrogen supply

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Africa has all the raw materials necessary to produce green hydrogen. It is ready to play its role in the global transition towards green hydrogen energy. The region is not new to the hydrogen industry, as Egypt was once the world's largest hydrogen producer. Some African nations are already aware of the benefits the hydrogen economy presents, while others have yet to explore them. African countries want to develop both local and [export markets for green hydrogen](#).

The region has excellent platforms for collaborations in the form of regional economic associations. Currently, there are eight African Regional Economic Communities (RECs) which are: the Arab Maghreb Union (AMU/UMA), the Economic Community of West African States (ECOWAS), the East African Community (EAC) External, the Intergovernmental Authority on Development (IGAD), the Southern African Development Community (SADC), the Common Market for Eastern and Southern Africa (COMESA), the Economic Community of Central African States (ECCAS), and the Community of Sahel-Saharan States (CENSAD). These platforms can easily add hydrogen to their portfolio for potential developments.

Besides these economic associations, a dedicated hydrogen platform remained the inevitable need for the market. Back in 2014, Siggie Huegemann started promoting the African hydrogen potential on various online platforms to highlight the critical role hydrogen could play in Africa. He was later joined by Vincent Oldenbroek, and together they drove it through years of struggles to finally incorporating it as the African Hydrogen Partnership (AHP) in Mauritius in November 2020. One of the notable milestones was its first conference in Addis Ababa in February 2020 to promote the African hydrogen economy. The event saw attendees not just from Africa but also Europe and Asia. Indeed, establishing an organisation at such a level, from scratch, is an achievement; however, it has been just a start of a long journey to achieve the goals for which all the struggles have been started.

African green hydrogen industry can benefit both local and export markets.

All African countries can reap in one way or another the benefits from a green hydrogen economy. Almost all African countries are rich in at least one or more prevalent renewable energy sources—wind, solar, hydropower, geothermal and biomass.

Most African countries have a relatively low population density and non-arable land available. These factors can significantly help them achieve their green hydrogen economy goals and make them key players in the hydrogen supply-side equation.

Several African countries around the Northern and Southern Tropics have excellent solar and wind resources. When imagining the availability of extensive non-arable land and proximity to ports, it is hard to miss the North African countries as well as Namibia, South Africa, Angola, and Botswana.

These countries could produce hydrogen at such a low cost and in significant quantities, which can compete with current fossil fuel-based energy. Therefore, Africa can export hydrogen (either in liquid form, bounded to nitrogen as ammonia or liquid organic hydrogen carriers) to regions lacking large amounts of renewable energy sources or land availability, such as Europe, Japan and South Korea. It is also expected that the future global hydrogen energy system would be similar to the current oil and natural gas infrastructure.

Several other African countries have an abundance of mineral resources essential for producing solar panels, wind turbines, electric motors, batteries, electrolyzers and biological carbon (biomass).

Africa is lagging...

When looking at Africa, it has been lagging in the hydrogen economy race. There are numerous reasons for this. The so-called hydrogen economy itself is a multifaceted industry when it comes to applications. Africa is vast and is three times the size of Europe. As part of Africa, Morocco is very active and well-positioned to set up an export value chain of green hydrogen, ammonia, fertiliser and other related chemicals. Several other North African countries also started exploring the hydrogen market, including South Africa.

... but it is making inroads in the market.

Interestingly, Africa was once a dominant player in the global electrolysis market. Aswan [electrolysis plant in Egypt](#) was once the world largest hydrogen production plant, while the Kwekwe plant in Zimbabwe ranked 5th.

When looking at the number of registered hydrogen fuel cell electric passenger cars, buses and hydrogen refuelling stations, Africa is at a nascent stage. But it is on track. The first mining truck in South Africa is set to run on hydrogen. Similarly, other sectors such as off-grid power for telecom stations, mining operations, or the replacement of importing ammonia are also currently being examined by several companies.

Africa can use its resources but have to provide the right investment environment.

Like other natural resources, Africa is also rich in the raw materials required for hydrogen, particularly renewable resources. However, to utilise these resources, it is vital to understand both the opportunity with sufficient regulatory freedom.

A few years ago, hydrogen was a relatively new topic for politicians in Europe than counterparts, for example, in Japan. But last year, the whole hydrogen landscape changed in Europe and hydrogen as an energy vector has now been fully embraced by the EU, demonstrated through various strategies and roadmaps. The EU now has set its direction and has been providing enough support to the hydrogen market.

This shows that once there is sufficient awareness and the right balance between freedom and regulations; then investments would follow. In Africa, several governments are fully aware of this

opportunity and understand how to develop a value chain around hydrogen energy; other governments are just getting to know this.

Investors are not shy of Africa...

The scale of new hydrogen projects is getting interesting for foreign investors. But it is not yet at the scale of investment like LNG export projects in Africa, where a single energy project can be in a multibillion range. On the other hand, the technologies for wind, solar, batteries, LNG are proven, and the off-take of power and gas is already in place.

One takeaway from non-hydrogen business investment in Africa is that foreign investors are not afraid of investing in African energy projects. The scale of solar and wind projects all over Africa is increasing, which is a good sign for the region and improving investor confidence. The first utility-scale batteries projects are coming up with hydrogen, likely to be next in line.

The [European Parliament has stressed](#) that the EU should work with the rest of the world, particularly Africa, to develop the hydrogen energy market. It is a good strategy that shows their willingness to support investments in the private sector. Such investment would help build up local knowledge and underpin the long term off-take agreements of hydrogen and other related chemicals. However, this should not be done in just 1-2 countries but should be carried out in several countries in Africa simultaneously.

...but it is the hydrogen industry itself that is holding back investment.

The problem with hydrogen investment is currently with the industry itself rather than Africa. The entire hydrogen equipment manufacturing industry is presently scaling up. Companies are installing their first larger-scale electrolysers in various parts of the world. Once a few of these projects completed, the pace would start picking up, and the fear of investing in hydrogen will fade away.

There is rising interest, mainly from Europe, in renewable rich African countries for developing export-oriented hydrogen projects. Even the stock prices of hydrogen companies are also on an upward trajectory, so investors are becoming aware of the sector, and now, projects need to follow.

Local expertise can be a critical factor, too and needs to be addressed. Several countries in Northern and Southern Africa have well-recognised institutions educating the new generation.

There are several hydrogen projects in the pipeline.

The most concrete project is the mining truck project of Anglo American in South Africa, a fuel cell application in a hospital, and several pilot projects from Hydrogen South Africa (HySA). In Morocco and other North African countries, there are several planned projects or feasibility studies being conducted. Once operating a 100 MW electrolyser, Zimbabwe is also now looking into getting a new one for their ammonia production.

Startup companies in the African hydrogen market are on the rise...

New startups are emerging in the African green energy sector, especially with a focus on hydrogen. For instance, Cape Stack, which is based in Cape Town, is building fuel cells technology. Hydrox Holdings, a Johannesburg based startup, has developed a novel electrolyser, which is close to achieving commercial-ready status. Hyena Energy, which is based in Cape Town, is working on a

fuel cell power generator based on LPG fuel. The Bambili Group is another name to mention which deployed fuel cells technology in a South African military hospital. Similarly, Hydrogetics from Johannesburg uses a Liquid Organic Hydrogen Carrier (LOHC) for powering an underground mining vehicle.

...and funds are also available.

South African government is offering funding through organisations such as the Industrial Development Corporation. Several commercial companies have expressed strong interest in providing financial support for hydrogen-based green energy projects.

Both commercial and development banks are also interested in promoting the African hydrogen industry and have indicated a keen interest in working on various opportunities.

This article is based on conversations with Vincent Oldenbroek, Secretary-General African hydrogen Partnership.