African Hydrogen Partnership: The time is now

gasworld
By Joanna Sampson, 13 March 2019

Establishing hydrogen economies and societies in Africa will provide tremendous social, economic and environmental benefits all at the same time.

That's the message from the African Hydrogen Partnership (AHP), a to be multi-stakeholder association that has recently unveiled an ambitious vision to transform Africa from a vast and largely underdeveloped continent, to a region at the forefront of clean technologies with a thriving hydrogen value chain.

The plans would see renewable hydrogen produced and consumed locally in Africa, meaning the continent would be able to reduce the import of fossil-based fuels and chemicals drastically. This would reduce dependency on the US dollar and help improve trade balances.

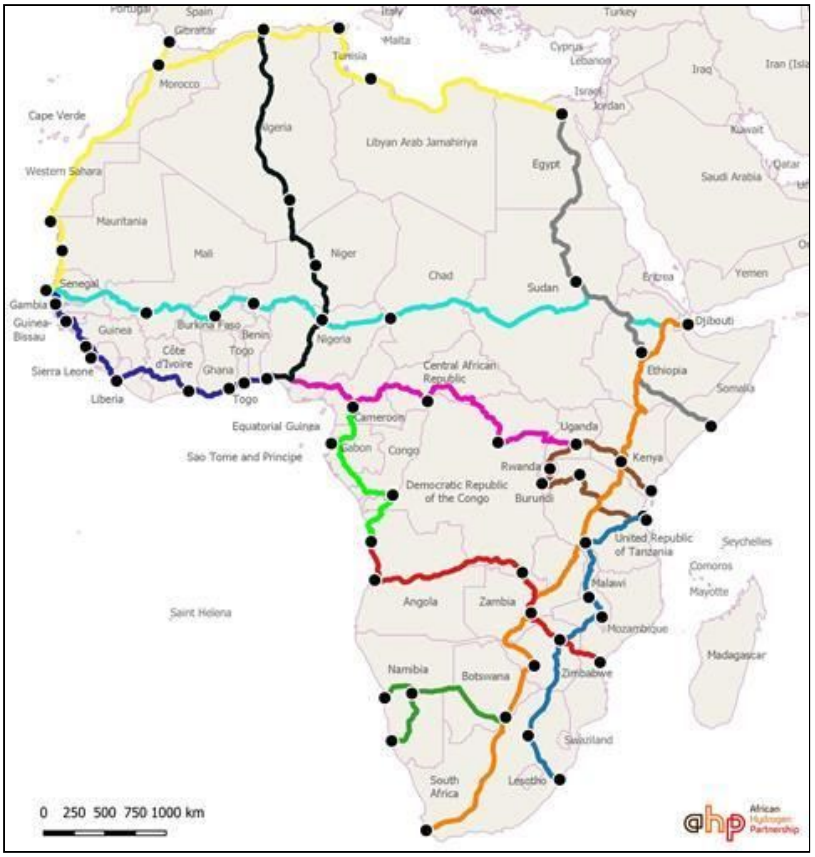
AHP proposes that the savings from this, and from reducing pollution, as well as socio-economic benefits, could be used to fund new hydrogen programmes.

Next to those savings, new financial instruments such as Green African Hydrogen Bond could be developed for providing efficient access to capital markets to raise funding for green hydrogen projects.

The first hydrogen economies would begin with the construction of large-scale power to gas (P2G) renewable energy facilities or hubs along important trans-African highways. These would also be built in ports, where hydrogen stations would provide fuel for long haul heavy goods vehicles (HGVs), buses and trains, all powered by hydrogen fuel cells.

The same P2G stations would also provide green hydrogen for industrial processes and green chemicals, such as ammonia (for fertiliser), green methanol (polymers), steel manufacturing (reducing agent), glass production (protective gas) and electronics (protective & carrier gas).

These trans-African hydrogen routes would connect major mining centres that use heavy-duty hydrogen vehicles (such as forklifts, tugs and bulldozers).



The routes would also connect harbours, trade centres, metropolitan areas overland and near-shore islands with hydrogen-powered ferries.

In metropolitan areas where there's severe pollution, lightweight and convertible hydrogen fuel cell business vehicles could provide sufficient reliable energy to run a small business during the day and to supply electricity to the owner's home at night. These vehicles would make clean transport and power available and affordable for everyone.

In AHP's vision for a hydrogen economy, the consumer transports green energy from large scale, independent renewable energy production facilities and from local mini-grids to wherever they need to consume the energy.

This is a new, revolutionary concept for Africa put forward by AHP's co-founders Vincent Oldenbroek and Siegfried Huegemann that would remove Africa's current dependency on the electricity grid for energy.

It's clear, years of planning have gone into this vision and Oldenbroek and Huegemann are determined to see it come to fruition. They are currently in discussion with the three main stakeholders needed to make it happen – the industry, African governments and financial institutions – as well as in the process of establishing AHP as an organisation.

The three main stakeholders are part of the African Green Hydrogen Deal, where governments provide favourable rules and regulations for hydrogen and fuel cell applications, the industry provides those applications and the financial institutions provide access to long term low cost capital.

"Hydrogen technology has accomplished tremendous achievements over the last four years. Costs have come down, products have been scaled up and at the same time all the developments like renewable electricity have become really cheap. These developments together made us decide the timing is right and 2019 was the year to start this," explains Oldenbroek (left) in an exclusive interview with gasworld.

"However, with climate change happening all over the world, for example the extreme warm winters in Europe, you could say maybe we are already too late. With all these environmental challenges we are facing, there's no better time than today," adds Huegemann.

Social, economic and environmental benefits

Relieve, raise and revolutionise are the three main goals of AHP's plans. The co-founders want to:

- Alleviate the financial exploitation caused by US dollar dependency, external damage caused by foreign companies and unfair international wealth distribution
- Elevate national African economies by creating a high value industry and jobs, making them leading forces in the rapidly developing new hydrogen technology market
- Make African nations initiators and leaders of the next industrial revolution in green hydrogen – simultaneously revolutionising the economy, society and environment

"First and foremost, green hydrogen fuel cell technology produced using renewable energy is not associated with any carbon dioxide emissions. The technology is absolutely clean meaning there are no negative side effects," says Huegemann (left), who has been working on these plans for half a decade.

"To understand the benefits, we must first talk about the challenges we face in Africa. I don't believe that many people really understand that global warming has already caused a massive type of mass migration of people in Africa. A good example of this is Lake Chad. Once one of the largest lakes in Africa, it has lost more than 90% of its surface."

"It's a collaboration, it's a cooperation, it's not about confrontation. If we keep on fighting each other, how can we solve the problems of this world?"

"Water scarcity, intensified by climate change, is just one challenge we face in Africa. Something else people don't understand is the terror organisation Boko Haram could evolve only on the back of climate change."

"In northern parts of Nigeria, herdsmen - for whom cattle is the basis of existence - have migrated south to escape the dire impact of climate change. Thousands of people have already been killed in extremely violent conflicts with subsistence farmers in recent years."

"Currently, it is estimated tens of millions of people will be on the move in Africa within the next five to ten years. We have tried to come up with a social, economic programme that tackles environmental challenges, at the same time as seeking cooperation with Africans and bringing the north and south together."

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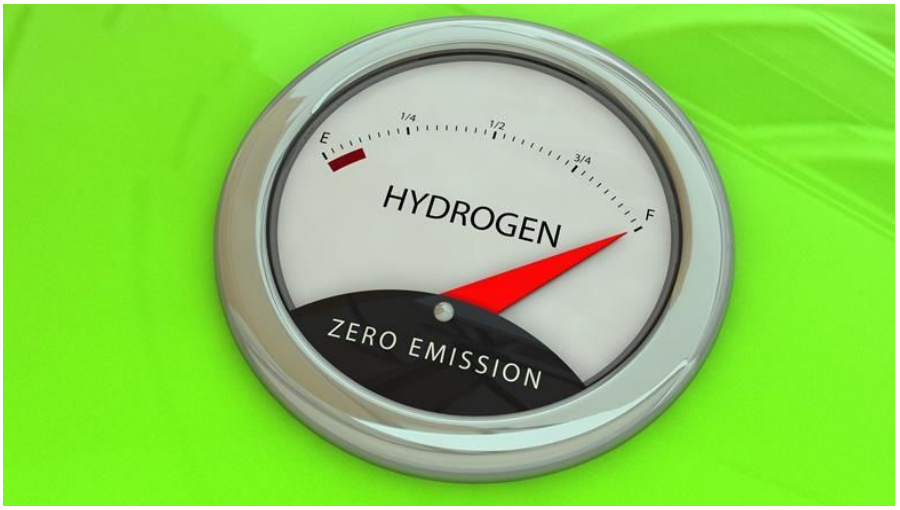
Electrification of rural and urban regions; creation of state-of-the-art, cutting edge business sectors and jobs; reduced dependency on the US dollar, meaning stronger national currencies and financial budgets; and an increase in tax revenues are just some of the economic and social benefits outlined in AHP's plans.

Environmental benefits include cleaner, air, soil and water; less deforestation; mitigating the risks of terror, slavery and exploitation that can be associated with climate change related migration; and cutting-edge technology that is scalable to meet the challenge of rapid population growth.

“Think about the tremendous value creation chain associated with the production of oil. There are hundreds of thousands of jobs associated between when oil is found in the ground and when oil is consumed by the consumers. That value creation chain we will move to Africa effectively and transform,” explains Huegemann.

Oldenbroek continues, “That would be installing solar or wind turbines, creating jobs and knowledge in the African countries, and then connecting that electricity to electrolysers, building hydrogen production facilities etc. The whole value chain will be in the African countries which will create jobs and knowledge in those countries.”



Next steps

When formally established as an organisation, AHP will function as an umbrella organisation for national hydrogen associations.

“These will be established as legally independent branches, with AHP holding the majority of the votes,” explain the co-founders. “This will create efficiencies across national borders, delivering accountability and transparency. It will provide full visibility of operations and decision-making, mitigating the risk of bribery and corruption.”

AHP together with the national branches will form the following functional groups:

- Renewable energy
- P2G hydrogen generation
- Storage, transportation and refuelling
- Land, air and water transport
- Stationary applications
- Capital markets
- Science and regulation

Oldenbroek and Huegemann anticipate AHP will be set up in a year or less, as long as they can establish close collaboration with founding members in an interim organisation. Providing all goes well, they say AHP should start activities from late 2019 or early 2020.

“Together with the future partners, we want to make this happen. Siegfried and I are just the kick starters of this vision,” Oldenbroek says. “As for now, we have attracted a lot of interest and we hope we can turn this interest into real concrete projects, which are really contributing to these social, economic and environmental benefits.”

Huegemann adds, “The common reaction to our plans is ‘they’re very ambitious’ but people have been really positive. People can really see the benefits and the big advantage of Africa is that it’s green field. There’s not much yet in place so you can really build things up from scratch and that’s what people are really excited about.”

“What people have found amazing is the way of thinking. The hydrogen fuel cell technology is now really getting rolled out – it’s ready and available. People talk about the US, Japan and South Korea, the leading industrial regions in the world, but not a broader sort of public has ever considered ‘hey, why don’t we do it Africa’ and we have. We want to address the tremendous challenges and turn them into great opportunities.”

About the co-founders

Siegfried Huegemann laid the foundations of the African Hydrogen Partnership Association with the African Hydrogen Power initiative.

He holds a Masters degree in Finance and Quantitative Analysis from the University of Otago in New Zealand, and currently works as Manager of Derivatives Technology for one of the largest global fund management companies.

Vincent Oldenbroek lives and works in Africa. He graduated from Delft University of Technology as a Mechanical Engineer, specialising in energy technology. Oldenbroek worked as a project and sales engineer before returning to the University of Technology.

His PhD studies researched integrated transport and energy systems based on renewable hydrogen, specialising in microgrids with vehicle-to-grid and hydrogen fuel cell electric vehicles.

This study sparked his passion for the unlimited potential of renewables, including battery and hydrogen fuel cell technology. Living in Africa, he has a clear understanding of the large potential of the African continent.