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Namibia's Green Hydrogen Opportunity - Briefing Note

Hydrogen is present in great quantities on Earth but mainly in combination with other elements such as in water (H₂O) or hydrocarbons (such as methane CH₄).

When hydrogen is combined with oxygen it releases energy to form H₂O. In principle, therefore, it can make a good fuel and can contribute towards reducing damaging Green House Gas emissions which lead to global warming and climate change. Furthermore, hydrogen gas H₂ is very energy dense – 2.6 times more per kilogram than natural gas and three times more than kerosene.

Despite these attractive properties, hydrogen has drawbacks. At room temperature hydrogen is a gas which must either be pressurised or liquefied if it is to be transported and used as a fuel. Transforming hydrogen into a liquid requires reducing the temperature to minus 253 degrees centigrade. Compression or liquefaction require energy as well as special storage tanks in which the hydrogen can be stored and transported.

Different ways of manufacturing hydrogen exist, each of which is denoted by a different colour depending on the extent to which the manufacturing process produces Green House Gas emissions. Green hydrogen is produced using electrolysis powered by renewable energy and is the most climate friendly process.

Currently, one of the key uses of hydrogen is in the production of industrial ammonia, the main ingredient of artificial fertilisers upon which much of global agriculture depends.

If Namibia can use its solar and wind resources and its proximity to seawater on the coast to generate green hydrogen, it can export it to a market that looks set to grow up to 2050 and beyond. This will involve using Namibia's abundant solar resources to drive seawater desalination plants to provide water which is then split in electrolyzers, also driven by electricity generated by renewables, into hydrogen and oxygen.

A significant drawback, however, is that Namibia is located far from the industrial markets where hydrogen is consumed. The hydrogen will need to be transported to major markets. Key questions relate to the cost of producing the green hydrogen and, perhaps most significantly, delivering it in a cost-competitive way to end customers.

Some of the Key Questions for Namibia

This potential project is so large that it will have important implications for Namibia's environment, macroeconomy, and public finances. The following questions require clear answers:

1. Can Namibia produce green hydrogen and/or green ammonia and deliver it to customers at competitive prices?
2. How will the green hydrogen and/or green ammonia be stored and transported to end users?
3. Who is going to finance the project and who will bear the risks associated with it?
4. What guarantees are there that the environment will be protected, in particular the Tsau//Khaeb National Park and the land where pilot schemes, such as the Daures Green Hydrogen Village?
5. Which new policies and laws will have to be introduced?
6. How many long-term, sustainable jobs will be created?
7. Will there be a systematic skills development programme to ensure that Namibians will be able to take up the jobs in the green hydrogen value chain?
8. How can Namibia avoid a scenario where the skills will be imported and Namibians will merely do menial and administrative jobs?
9. Will government take a stake in the project and if so how would this be paid for considering the already high level of public debt?
10. Will the project be properly governed with Extractive Industry Transparency Initiative (EITI) standards of transparency applied - meaning all contracts and licences must be published?
11. What will be done to ensure that green hydrogen will lead to energy self-sufficiency for Namibia?
12. How can we ensure that green hydrogen is not only an export commodity?
13. What will happen to the thousands of wind turbines and solar panels once they have ceased to function?
14. What happens if things go wrong or if the green hydrogen and ammonia markets do not develop as currently envisaged?

*Adapted from the IPPR Briefing Paper: "(Almost) everything you wanted to know about green hydrogen and Namibia (but were afraid to ask)"

<https://ippr.org.na/publication/almost-everything-you-wanted-to-know-about-green-hydrogen-namibia/>

For more information see the GH2 Country Portal - Namibia - <https://gh2.org/countries/namibia>

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