INDIA'S POLICY ON GREEN HYDROGEN

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Introduction

Carbon-free hydrogen, as a fuel, transport, and energy store, is at the top of the global green agenda. It is a replacement for today's transition fuel (natural gas), which, while cleaner than coal, diesel, or heavy fuel oil, is incapable of achieving the drastic reductions in carbon intensity required to stop global warming.[1] The demand for hydrogen in India is estimated to be 9.1 million tonnes in 2022, rising to 11 million tonnes by 2030.[2] To demonstrate its commitment to achieving net zero emissions, India launched the National Green Hydrogen Mission, which incentivizes the generation of green hydrogen. The mission will turn India into a cutting-edge worldwide centre for the production and export of green hydrogen, a strategic alternative fuel of the 21st century.

National Green Hydrogen Mission

Green hydrogen has been defined as the result of water electrolysis (the use of electricity to divide water into its essential components of hydrogen and oxygen) using renewable energy or hydrogen created from biomass.[3] India agreed to a net-zero emissions target by 2070 at the 26th Conference of Parties (COP26) in Glasgow, as well as the goal of making renewable, cheap, low-carbon hydrogen widely available by 2030. India announced the commencement of the 'National Hydrogen Mission' in August 2021, with the goal of scaling up green hydrogen production and aligning India's energy transition efforts with global practises in technology, policy, and legislation.[4] The goal is to support the development of green hydrogen production capacity of at least 5 MMT (Million Metric Tonnes) per year in the country by 2030, with an accompanying renewable energy capacity addition of around 125 GW.[5] This would cut

[1] Ahluwalia S, "India's Green Hydrogen Policy: Tentative Beginnings" (ORF March 2, 2022) <https://www.orfonline.org/expert-speak/indias-green-hydrogen-policy> accessed January 19, 2023.
[2] "Centre Clears ₹19,744-Crore Green Hydrogen Mission" The Hindu (January 4, 2023).
[3] Ahluwalia (n 1)
[4] Kant A, "This Is HydroGeneration X".
[5] "Ministry of Power Notifies Green Hydrogen/ Green Ammonia Policy" (Press Information Bureau) <https://pib.gov.in/PressReleasePage.aspx?PRID=1799067> accessed January 19, 2023.

greenhouse gas emissions by 50 MMT and produce savings of Rs 1 lakh crore owing to reduced imports of fossil fuels.

The policy seeks to promote green hydrogen production in India by easing the process with time-bound single-window clearances, allowing power banking of excess unconsumed renewable power, providing access to power markets and interstate grids, as well as long-term interstate power transmission charge waivers, and easing port storage setups for hydrogen export and use by the shipping sector.[6] The first phase of the hydrogen strategy is largely concerned with the acquisition of renewable energy, hydrogen generation, storage, and distribution. The strategy would jump-start India's energy transition efforts, notably in high-emission industrial sectors such as oil refineries, fertilisers, metals, chemicals, and cement, where green hydrogen may be utilised as a substitute.[7] It plans to spend over Rs. 8 lakh crore and create over 6 lakh jobs by 2030. The mission's overall organisation and implementation will be the responsibility of the Ministry of New and Renewable Energy (MNRE).

The mission will provide numerous benefits, including the creation of export opportunities for green hydrogen and its derivatives, the decarbonisation of the industrial, mobility, and energy sectors, the reduction of reliance on imported fossil fuels and feedstock, the development of indigenous manufacturing capabilities, the creation of job opportunities, and the growth of cutting-edge technologies.[8] Given the greater emissions intensities associated with coal, the use of renewable hydrogen in the steel sector would have the greatest impact.

What Lies Ahead?

The abundance of wind, solar, and pumped storage in India results in among of the lowest costs for renewable power. Manufacturing of electrolyzers matches with India's competitive capabilities in precision metal fabrication and assembly, and will be encouraged throughout this mission.[9] The mission will also help to strengthen domestic electrolyzer manufacturing capabilities, which will contribute to the creation of skilled and semi-skilled employment both directly and indirectly. To make 1 kilogramme of hydrogen, the most efficient alkaline electrolyzers nowadays use 50 kWh of power and 10 litres of fresh water. As a result, if all 5 million tonnes of green hydrogen production targets by 2030 are met using alkaline electrolysis, India would need 50 billion litres of fresh water and 250 billion kWh of power

[6] "India's Green Hydrogen Policy: Unprecedented Growth Needed to Achieve 2030 Targets" The Economic Times.
[7] Kumar S, "Accelerating Green Hydrogen Economy" [2022] EY.
[8] ibid
[9] Kant (n 4)

from renewable sources, primarily wind and solar.[10] This equates to 115 GW of installed renewable energy capacity. The green hydrogen market in India is still in its early phases of development and to be competitive until 2030, the green hydrogen supply chain must achieve adequate economies of scale and innovation. India could become a regional hub for exporting green hydrogen at competitive costs by leveraging low-cost local renewable power produced at scale, commanding a respectable part of the global hydrogen demand of 200 million tonnes by 2030.[11]

Conclusion

The true potential of Green Hydrogen resides in its capacity to assist the nation in becoming 'Atmanirbhar' in its expanding energy requirements, as well as providing a cheaper and less volatile supply of hydrogen for sectors that now rely on natural gas. Despite the fact that renewable power costs significantly less in India than it does elsewhere, it is still not economically feasible to manufacture green hydrogen on a big scale due to the high cost of electrolyzers.[12] The Indian government has worked to cut manufacturing costs by giving quick permissions and tax exemptions; nevertheless, much will depend on additional incentives from state governments.

[10] Kumar (n 7)
[11] Status Quo Mapping of Hydrogen Production and Consumption in India, Indo-German Energy Forum, 2021.
[12] India's (n 6)