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THE GREEN HYDROGEN POLICY OF INDIA

Dr. Priti Prasad Mahajan

**Associate Professor and Head, Department of Geography, S.M.D.L, Arts Commerce & Science College, Kalamboli, Maharashtra.*

Abstract:

The world is in transformation, and energy is at the center of it. Since 2000, India has been responsible for over 10% of the rise in global energy demand. India's energy demand has nearly doubled during this time, with the country's share of world demand rising to 5.7 percent in 2013 from 4.4 percent at the turn of the century. India's primary energy demand has increased from approximately 441 Mtoe in 2000 to approximately 775 Mtoe in 2013. In 2030, this demand is predicted to rise to around 1250 million toe (according to the International Energy Agency) or 1500 million toe (according to the Integrated Energy Policy Report). India's energy consumption has nearly doubled since 2000, with significant room for continued rapid expansion. However, the rise in domestic energy generation is far insufficient to meet India's consumption requirements.

Imports will account for more than 40% of primary energy supply by 2040, up from 32% in 2013. It's also worth noting that no country has ever been able to achieve a Human Development Index of 0.9 or higher without having at least 4 toe of yearly energy supply per capita. As a result, there is a significant unmet demand for energy services that must be met in order for people to have adequate earnings and a decent standard of living. India can use green hydrogen to decarbonize its energy-intensive sectors including industry, transportation, and power.

Keywords: *Green Energy, Electrolysis*

Introduction:

Green hydrogen is hydrogen created by electrolysis dividing water. Only hydrogen and oxygen are produced. We can use hydrogen and release oxygen into the atmosphere without harming the environment. We need electricity and power to achieve electrolysis.

Green hydrogen is the colour of hydrogen that is created without releasing damaging greenhouse gases into the atmosphere. Green hydrogen is created by electrolyzing water with clean electricity generated from surplus renewable energy sources such as solar or wind power. Electrolysers divide water into hydrogen and oxygen via an electrochemical reaction, producing no carbon dioxide in the process.

Green hydrogen can help decarbonize businesses like shipping and transportation, where it can be used as a fuel, as well as industrial industries like steel and chemicals, where it can be utilised as a raw material and a fuel.

Fertilizers and refineries use hydrogen as a vital ingredient, therefore green hydrogen could help these businesses reduce overall emissions. It might also be used to minimise emissions in steel production by replacing coal as an energy source and a reducing agent.

Objectives:

1. To study concept of Green hydrogen.
2. To understand the government's policy regarding Green hydrogen.

Methodology:

For this study secondary data is gathered through the internet, newspapers, government reports, and books.

The Green Hydrogen Policy of India:

The National Hydrogen Mission aims to reduce carbon emissions and enhance renewable energy use while aligning India's efforts with worldwide best practises in technology, policy, and legislation. The Indian government has set out Rs 25 crore in the Union Budget for 2021–22 for hydrogen energy research and development, with the goal of producing three-quarters of its hydrogen from renewable sources by 2050. Concerns about climate change and a growing emphasis on zero-carbon renewable energy sources have made hydrogen-based energy sources more significant than ever. Stricter carbon-reduction rules have also encouraged hydrogen producers to switch from traditional fossil fuels to renewable energy sources such as wind, solar, biomass, hydropower, and so on. In this global setting, India must gain a competitive advantage in the fight to develop new and emerging green technologies and become self-sufficient. Given hydrogen's cross-sectoral sustainability, being an early adopter of hydrogen energy technology will pay off in the long run.

On 15 August 2021, Prime Minister Narendra Modi announced the launch of National Hydrogen Mission (NHM) while commemorating the 75 years of independence with an aim to cut down carbon emissions and increase the use of renewable sources of energy. The broad objective of the mission is to scale up Green Hydrogen production and utilization and to align India's efforts with global best practices in technology, policy and regulation. Accordingly, the Government of India has allotted Rs 25 crore in the Union Budget 2021–22 for the research and development in hydrogen energy.

Ministry of new and renewable has been sponsoring a broad-based Hydrogen Energy and Fuel Research, Development, and Demonstration (R&D) programme. Projects in commercial, academic, and research institutions are being financed to address issues in hydrogen production from renewable energy sources, its safe and efficient storage, and its use for energy and transportation applications via combustion or fuel cells. In terms of transportation, Banaras Hindu University, IIT Delhi, and Mahindra & Mahindra have all received significant funding. As a result, internal combustion engines, two-wheelers, three-wheelers, and minibuses that run on hydrogen fuel have been developed and demonstrated. There are now two hydrogen refuelling stations (one each at Indian Oil R&D Centre, Faridabad and National Institute of Solar Energy, Gurugram).

There is a growing consensus around the world that coordinated action is needed to keep global warming to less than 20 °C, and if possible, to less than 1.50 ° C. above pre-industrial levels. Several countries have pledged their Nationally Determined Contributions to ensure an energy transition and cut emissions. The majority of major economies, including India, have committed to net-zero goals. Transitioning to green hydrogen is one of the measures required to reduce emissions, particularly in hard-to-abate industries. The Indian government is considering a variety of green hydrogen and green ammonia as energy carriers and chemical feedstock's for various industries. The Government of India has made the following decision after careful consideration:

1. Green Hydrogen or Green ammonia shall be defined as Hydrogen or Ammonia produced by way of electrolysis of water using Renewable energy; including Renewable Energy which has been banked and the Hydrogen or Ammonia produced from biomass.
2. The waver of Inter-state transmission charges shall be granted for a period of 25 years to the producer of Green Hydrogen and green Ammonia from the projects commissioned before 30th June 2025.
3. Green Hydrogen can be manufactured by a developer by using Renewable Energy from a co-located Renewable

4. Energy Plant, or sourced form a remotely located Renewable Energy Plants, weather set up by the same developer, or a third party of procured renewable Energy Power Exchange. Green Hydrogen Plants will be granted Open Access for sourcing of Renewable Energy within 15 days of receipt of application complete in all respects. The open access Charges shall be in accordance with Rules as laid down.
5. Banking shall be permitted for a period of 30 days for Renewable Energy used for making Green Hydrogen.
6. The charges for banking shall be as fixed by the State Commission which shall not be more than the cost differential between the average tariff of renewable energy bought by the distribution licensee during the previous year and the average market clearing price in the day Ahead Market during the month in which the renewable Energy has been banked.
7. Connectivity, at the generation end and the Green Hydrogen manufacturing end, to the ISTS for renewable Energy capacity set up for the purpose of manufacturing Green Hydrogen shall be granted on priority under the Electricity Rules 2021.
8. Land in Renewable Energy can be allotted for the manufacture of Green Hydrogen.
   The Government of India Proposes to set up Manufacturing Zones. Green hydrogen production plant can be set up in any of the manufacturing zones.
9. Renewable energy consumed for the production of Green Hydrogen shall count towards RPO (Recruitment Process Outsourcing) compliance of the consuming entity. The renewable energy consumed beyond obligations of the producer shall count towards RPO (Recruitment Process Outsourcing**)** compliance of the of the distribution company in whose area the project is located.
10. Distribution licensees may also procure and supply Renewable Energy to the manufacture of Green Hydrogen in their states. In such cases, the distribution licenses shall only charge the cost of procurement as well as the wheeling charges and a small margin as determined by the state commission.
11. Ministry of New and Renewable Energy will established a single portal for all statutory clearances and permissions required for manufacture, transportation, storage and distribution of Green Hydrogen. The concerned agencies will be requested to provide the clearances and permissions in a time- bond manner, preferably within a period of application date.

Challenges:

The most difficult part of the shift to green hydrogen is making it economically and commercially feasible. According to a CEEW analysis from 2021, steel created with green hydrogen costs 50-127 percent more than steel made using conventional coal.

According to a September 2021 CEEW research, green hydrogen deployment is still in the pilot stage, and while many nations, like India, have declared national hydrogen programmes, they have not yet determined how it will be commercialised on a wide scale. The research proposes forming a multi-country alliance to support and develop green hydrogen technologies on a financial and technological level. According to a report published by the TERI in 2021, businesses and the government should work together to transition to green steel. Companies such as Reliance Industries and JSW Steel, as well as specialists from think tanks in India, have joined the India Hydrogen Alliance to plan the country's green hydrogen roadmap.

India also requires greater research on the usage of green hydrogen in green steel. Kumar suggested that India leverage its recent US-India Climate and Energy Agenda 2030 Partnership to advocate for collaboration on such research. Currently, the focus is solely on green steel deployment, not on research to identify innovative ways to use green hydrogen.

Conclusion:

Green hydrogen currently accounts for a small percentage of total hydrogen due to the high cost of generation. Green

hydrogen will become more affordable as it becomes more widely available, just as wind energy has. NTPC Renewable Energy Ltd, the company's subsidiary, held a domestic tender in July 2021 to build India's first green hydrogen fueling station in Leh, Ladakh. The company intends to manufacture green hydrogen on a commercial scale using the power supplied by its planned renewable energy projects.

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