

# India's Green Hydrogen Push

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## Executive Summary

- A. India's push towards green hydrogen is a game-changing initiative that aligns with its sustainability goals and net zero emissions target. The government formulated a roadmap towards this revolutionary shift, highlighting the urgency of adopting this sustainable energy source.
- B. While challenges hinder the process, a collaborative approach including policy reforms helps unlock the potential of green energy sources and reduces the burden of fossil fuels.
- C. With its abundant renewable energy resources and a strong commitment to sustainability, India has the opportunity to become a global hub for green hydrogen production and innovation, driving economic growth while paving the way for a cleaner and greener future.

## I. Why India Needs Shift towards Green Hydrogen

In the era when every nation is taking the central stage towards sustainable development, India has a competitive edge in development by decarbonizing and harnessing the power of green hydrogen. India's ambitious plan to become a global hub for the production of green hydrogen is urgent.

- A. India aims to achieve net zero emissions by 2070. Its energy mix strategies include a significant shift toward clean energy alternatives.
- B. To achieve this, the government has also released the **roadmap for the Green Hydrogen Ecosystem, which induces the use of zero-emission fuels instead of fossil fuels.**
- C. By transitioning to green hydrogen, India can avoid future carbon emissions, directly contributing to its net-zero pathway.
- D. Reducing **Dependency on Fossil Fuels Imports** and **Increasing Domestic Energy Resources.** By producing green hydrogen domestically using renewable energy, India can lower its dependence on imported fuels, ensuring a more self-sufficient and resilient energy ecosystem.

## II. Approaches to Facilitate the Use of Green Hydrogen

- A. **Provision of Subsidies and Incentives:** The government should start incentivizing green hydrogen and providing fiscal concessions for industries and firms that shift the use of fossil fuels to green hydrogen production.
- B. **Government Fleet Initiatives:** The Indian government should focus on launching pilot projects that integrate hydrogen fuel cell vehicles into government fleets, i.e. buses, trucks and other municipal vehicles. These projects help to promote the public and private sector's interest in adopting green hydrogen vehicles.
- C. **Agricultural Sector: Green Ammonia for Fertilizer Production:** Ammonia production is essential for fertilizers which particularly relies on natural gas. Green Hydrogen can be used to produce green fertilizers and can also reduce the carbon footprint of agriculture significantly. Furthermore, Offering subsidies for green ammonia-based fertilizers can make them more affordable and accessible to farmers, encouraging adoption.

- D. **Clear Regulatory Frameworks and Standards:** Enforcing safety standards and technical guidelines for the use of green hydrogen production, storage, transportation and usage is critical to promoting it to an industrial level. Implementing penalties on carbon emissions can make the use of fossil fuels expensive, which will incentivize the use of green hydrogen in industries.
- E. **Spreading Awareness and Upskilling for the Hydrogen Economy:** Introducing campaigns to make people aware of the benefits of making a hydrogen-based economy. Developing specialized training programs on hydrogen technologies and safety for engineers, technicians, and managers is critical to building a skilled workforce for India's hydrogen economy.

### III. Challenges Faced While Adopting Green Hydrogen in India

- A. **High Production Costs:** Green hydrogen production costs are currently high due to the price of electrolyzers and renewable energy. India must focus on reducing production costs to compete with conventional fuels, and to scale up production capacity.
- B. **Infrastructure Requirements:** There is a need for extensive infrastructure development, including hydrogen storage, pipelines, and refuelling stations. It is well known that hydrogen is volatile and requires specialized storage and transportation systems, which could drive up initial investment costs.
- C. **Limited Skilled Workforce and R&D:** India requires a skilled workforce trained in green hydrogen technology and increased funding in R&D for electrolyzer technology and hydrogen production to achieve cost-effective scaling.
- D. **Water Availability Concerns:** Producing hydrogen through electrolysis requires significant amounts of water, which could be challenging for water-scarce regions. This could raise concerns about water resource management in hydrogen production hubs.

### IV. Conclusion

India's green hydrogen push marks the remarkable step aiming at reducing carbon and greenhouse emissions and becoming a Net Zero Emission hub by 2070.

- A. India's ability to **decarbonize** hard-to-abate sectors like steel, cement, and transportation, coupled with its potential to balance renewable energy intermittency, makes it central to India's clean energy transition.
- B. Government initiatives like **the Hydrogen mission** and fulfilling the pledge taken under the **Paris Agreement to reduce carbon emissions** mark the importance of India's green hydrogen in the energy sector.
- C. However, to fully realize its potential, India must address challenges such as **high production costs, infrastructure development, and the need for skilled labour**. A **sustained focus on research, policy support, and international collaboration** will be required for **efficient use of this new upcoming strategy**.