

India's Green Hydrogen Mission: Hype or reality?

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The Green Hydrogen Mission, launched in 2021, forms part of India's strategic push toward sustainable energy. | Credits: Getty Images

India's Green Hydrogen Mission is one of the most ambitious and forward-thinking projects the government has embarked upon, aiming to transform the country into a global leader in green energy. As part of its vision, India plans to produce 5 million tonnes of green hydrogen annually by 2030, which is in line with its broader climate goals of achieving net-zero emissions by 2070. But while the intent is clear and commendable, the road to achieving these ambitious targets is fraught with significant challenges. This article explores the objectives, hurdles, and the ways forward to ensure the mission's success.

The Intent Behind the Green Hydrogen Mission

The Green Hydrogen Mission, launched in 2021, forms part of India's strategic push toward sustainable energy. Hydrogen, particularly green hydrogen, which is produced through electrolysis powered by renewable energy, is seen as a clean fuel that can decarbonize sectors that are otherwise difficult to electrify, such as heavy industry, shipping, and transportation.

Key goals of the Green Hydrogen Mission include:

1. **Decarbonizing Industries:** Hydrogen offers a viable alternative to fossil fuels in sectors like steel, cement, and chemicals, where electrification is not feasible.
2. **Energy Independence:** By reducing reliance on imported fossil fuels, India aims to secure its energy future while fostering self-reliance.
3. **Global Leadership:** The mission is also seen as a step toward establishing India as a global leader in green hydrogen technology and export.
4. **Job Creation & Economic Growth:** The green hydrogen economy is expected to generate thousands of jobs, stimulate new industries, and boost the domestic manufacturing sector.

Challenges in Realizing the Targets

While the government's intentions are clear, the journey to realizing these goals is marred by several obstacles. Here are some of the primary challenges:

1. **High Production Costs:** Green hydrogen is still significantly more expensive to produce than grey hydrogen (produced from natural gas). The cost of electrolyzers, renewable electricity, and the infrastructure needed for production are key drivers of the high costs. In India, where the demand for energy is growing rapidly and costs of renewable energy generation are volatile, reducing the cost of green hydrogen will be critical to making it a viable option.
2. **Scaling Up Infrastructure:** India currently lacks the necessary infrastructure for hydrogen production, storage, and distribution. Developing hydrogen pipelines, refuelling stations, and ensuring a stable supply chain are massive undertakings that require substantial investment and time.
3. **Access to Affordable Renewable Energy:** The success of green hydrogen depends on cheap and abundant renewable energy. While India has made significant progress in solar and wind energy generation, the intermittency of these energy sources and regional imbalances in production could impact the steady supply needed for hydrogen production.
4. **Technological Barriers:** The electrolyzers used to produce green hydrogen are expensive and not yet efficient enough at scale. India lacks a domestic manufacturing ecosystem for these critical components, making the country reliant on imports. Furthermore, advances in storage and transportation technology are needed to ensure hydrogen can be safely and efficiently distributed.
5. **Policy and Regulatory Hurdles:** Despite the Green Hydrogen Mission's launch, there is a lack of clear and consistent policies surrounding the production, distribution, and use of hydrogen. Additionally, the regulatory frameworks around safety standards, carbon pricing, and incentives for private investment remain undefined, leading to uncertainty in the market.