



A fresh push for green hydrogen

India will soon join 15 other countries in the hydrogen club as it prepares to launch the National Hydrogen Energy Mission (NHEM). The global target is to produce 1.45 million tonnes of green hydrogen by 2023. Currently, India consumes around 5.5 million tonnes of hydrogen, primarily produced from imported fossil fuels.

Highlights:

In 2030, according to an analysis by the Council on Energy, Environment and Water (CEEW), green hydrogen demand could be up to 1 million tonnes in India across the application in sectors such as ammonia, steel, methanol, transport and energy storage. However, several challenges in scaling up to commercial-scale operations persist. We propose five recommendations.

Key steps

1. First, decentralised hydrogen production must be promoted through open access of renewable power to an electrolyser (which splits water to form H₂ and O₂ using electricity).
2. Currently, most renewable energy resources that can produce low-cost electricity are situated far from potential demand centres. If hydrogen were to be shipped, it would significantly erode the economics of it.
3. Second, we need mechanisms to ensure access to round-the-clock renewable power for decentralised hydrogen production. To minimise intermittency associated with renewable energy, for a given level of hydrogen production capacity, a green hydrogen facility will typically oversize the electrolyser, and store hydrogen to ensure continuous hydrogen supply.
4. Third, we must take steps to blend green hydrogen in existing processes, especially in the industrial sector. Improving the reliability of hydrogen supply by augmenting green hydrogen with conventionally produced hydrogen will significantly improve the economics of the fuel. This will also help build a technical understanding of the processes involved in handling hydrogen on a large scale.
5. Fourth, policymakers must facilitate investments in early-stage piloting and the research and development needed to advance the technology for use in India. The growing interest in hydrogen is triggered by the anticipated steep



decline in electrolysis costs. India should not be a mere witness to this. Public funding will have to lead the way, but the private sector, too, has significant gains to be made by securing its energy future.

6. Finally, India must learn from the experience of the National Solar Mission and focus on domestic manufacturing. Establishing an end-to-end electrolyser manufacturing facility would require measures extending beyond the existing performance-linked incentive programme.
7. India needs to secure supplies of raw materials that are needed for this technology. Further, major institutions like the DRDO, BARC and CSIR laboratories have been developing electrolyser and fuel-cell technologies.
8. There is a need for a manufacturing strategy that can leverage the existing strengths and mitigate threats by integrating with the global value chain.

Even before it has reached any scale, green hydrogen has been anointed the flag-bearer of India's low-carbon transition. Hydrogen may be lighter than air, but it will take some heavy lifting to get the ecosystem in place.