

India's Clean Energy Leadership in Green Hydrogen

Ishita Srivastava, Research Associate
Ambassador Manjeev Singh Puri, Distinguished Fellow
THE ENERGY AND RESOURCES INSTITUTE (TERI)

India has become a global leader in making progress on clean energy: by the end of December 2025, non-fossil fuel sources accounted for 51.93 per cent of India's installed power capacity, crossing the 50 per cent mark set by India's second Nationally Determined Contribution. According to IRENA's Renewable Energy Statistics 2025, India ranks fourth globally in total installed renewable energy capacity.

India's energy transition must be understood in relation to its development needs. The country has not yet reached peak energy demand, and energy access, affordability and security remain central to its development pathway. Its development strategy therefore combines renewable energy growth, energy efficiency, nuclear power, green hydrogen, carbon sinks and carbon markets with industrial competitiveness and job creation.

Green hydrogen has emerged within this as an important facet because it can support decarbonisation in sectors where direct electrification may not be sufficient. Green hydrogen is both a fuel and an industrial feedstock and its production using renewable energy can replace fossil fuel-derived inputs in petroleum refining, fertiliser production, steel manufacturing, and other hard to abate sectors, while also supporting the decarbonisation of long-haul automobiles, railways and marine vessels. The Indian Railways has recently demonstrated the capacity to run hydrogen fuelled trains.

The National Green Hydrogen Mission provides the central policy framework for scaling this opportunity linking energy transition with industrial policy and external economic opportunity. It targets a production of 5 million metric tonnes of green hydrogen annually by 2030. Production capacity of 862,000 tonnes per year has already been allocated to 18 companies, while 15 firms have been awarded 3,000 MW of annual electrolyser manufacturing capacity. Three green hydrogen hubs have also been identified at Deendayal Port Authority in Gujarat, V.O. Chidambaranar Port Authority in Tamil Nadu and Paradip Port Authority in Odisha.

A sectoral focus is connecting green hydrogen with concrete industrial use cases. In fertilisers, data indicates an aggregate procurement capacity of 7.24 lakh metric tonnes per annum of green ammonia at ₹55.75 per kg. In petroleum refining, green hydrogen is being used to reduce the carbon footprint of the industry, while in steel, five pilot projects with public and private producers are testing green hydrogen for iron reduction and other process applications under Indian operating conditions.

India's green hydrogen strategy also has a clear international dimension with India looking to use voluntary cooperation under Article 6 of the Paris Agreement on Climate Change. This international orientation is consequential because green hydrogen is expected to become part of future clean energy trade. Thus India's green hydrogen effort not only responds to domestic decarbonisation needs, but also positions the country to contribute to the rules, markets and supply chains of a future low-carbon economy in the world.

India is also positioning itself in emerging international hydrogen platforms and partnerships. It entered the international hydrogen community at the World Hydrogen Summit in Rotterdam in 2024 with its first India Pavilion. Cooperation is expanding under the EU-India Trade and Technology Council, where more than 30 joint proposals have been received on hydrogen production from waste. India and the United Kingdom have engaged on hydrogen standardisation, and work is being undertaken with the Germans on market-based mechanisms and joint tender designs for exports. Moreover, Indian companies have secured long-term offtake agreements with Japanese companies for green ammonia and green methanol.

India has been in the forefront of pushing solar energy in the global south not only through its promotion but by the demonstrative effect of its domestic action. Its pro-active actions on green hydrogen would have a similar hugely positive effect in the global south.

Ambassador Manjeev Singh Puri is a former Indian diplomat who has served as Ambassador to the European Union (EU), Nepal, Belgium and Luxembourg. He has been India's Ambassador & Deputy Permanent Representative to the UN.