

# This is HydroGeneration X

With the National Green Hydrogen Mission, India is poised to lead the world in energy transition

- **Amitabh Kant**

landmark National Green Hydrogen Mission approved by the Union Cabinet on 4<sup>th</sup> of January 2023 will transform India into an innovative global hub for the production and export of green hydrogen, a strategic alternative fuel of the 21<sup>st</sup> century. The launch of this mission marks a watershed moment for India's climate economy and has the potential to catapult India to a global exporter of clean energy.

The allocation of resources by the Indian government will position India as a global leader for hydrogen technologies across the value chain, including production to utilisation of green hydrogen across hard to abate industries. The government has allocated ₹17,490 crore for the Strategic Interventions for Green Hydrogen Transition Programme (SIGHT) programme, ₹1,466 crore for deployment of pilot and projects, ₹400 crore for research development and innovation, and ₹388 crore towards other associated mission components. The mission aims to develop 5 million metric tonnes (MMT) of green hydrogen production capabilities by 2030 supported by 125 GW of renewable capacity. This will reduce 50 MMT of greenhouse gases (GHG) emissions and further generate savings worth ₹1 lakh crore due to avoided import of fossil fuels.

Adoption of green hydrogen will enable cross-sectoral decarbonisation and reduce dependence on imported fossil fuels and feedstock. The mission will also support development of domestic electrolyser manufacturing capabilities, which will directly and indirectly lead to the creation of skilled and semi-skilled jobs. The mission envisages unlocking substantial investments by 2030. Currently, India spends over \$160 billion of foreign exchange every year for energy imports. This is expected to substantially increase in the coming decade, given India's rapid urbanisation and industrialisation ambitions. Adoption of green hydrogen across hard to abate sectors will lead to reduction of energy imports and enable energy security in events of global geopolitical energy crises. At COP 26 in Glasgow, Prime Minister Narendra Modi put forth India's "Panchamrit" vision to achieve net zero by 2070, in addition to achieving aggressive near-term emission reduction and renewable energy targets. Along with aggressive solar electrification of the economy, the implementation of National Green Hydrogen Mission of India will be pivotal in supporting India's NDC commitments.

Three critical factors are driving India's hydrogen story and will position India well to convert its green hydrogen ambition into reality.

## **1. Private sector as driver of green hydrogen momentum.**

Indian industry has drawn up ambitious plans and is forging critical global partnerships in green hydrogen. Even before the roll-out of the Green Hydrogen Mission in January 2023, leading industrial houses such as RIL, L&T, Adani and NTPC had announced multibillion dollar investment plans in green hydrogen. All renewable energy players such as Greenko, Renew and Acme have announced giga-scale green hydrogen

production targets. The launch of this mission will further solidify confidence in India's clean energy sector.

## **2. Size and scale driving low costs**

India's green hydrogen policy unambiguously focuses on reducing the cost of green hydrogen by addressing the delivered cost of green power and creating giga-scale demand via existing hydrogen consuming industrial sectors. The existing applications offer low cost and high ease of adoption for green hydrogen compared to new applications such as mobility and city gas blending, making this mission one of the most pragmatic national hydrogen mission of all.

## **3. India as a global hydrogen production and export hub.**

India's abundant wind, solar and pumped storage result in some of the least costs for clean electricity. Electrolyser manufacturing aligns with India's competitive strengths in precision metal fabrication and assembly; and will be supported under Mission's robust R&D and domestic electrolyser manufacturing (SIGHT) component. Though some technologies employ high-tech production processes, these can be quickly indigenised with channelised and specific R&D funding. The mission under its ambit should also aim to focus on R&D across the niche aspects of value chain including storage, transportation and distribution of green hydrogen and derivatives.

The versatility of green hydrogen as an energy vector and critical green chemical positions it as one of the key pathways for transporting green energy across distance and time. Green hydrogen, being a light molecule poses significant logistical difficulty in transportation as a gas and it has to be stored in cryogenic conditions for transport. However, different solutions are already being proposed to solve this conundrum. Hydrogen can be carried in the form of ammonia, due to its mature technology levels, existing transportation carriers and well understood regulatory regime. However, converting green hydrogen into green ammonia and cracking hydrogen again from green ammonia is an energy intensive process. Innovative new solutions such as LOHC (Liquid Organic Hydrogen Carriers) are being trialled to overcome this. India is blessed with complementary renewable resources, three times cheaper construction costs than competing regions and an innovative clean energy sector and can lead the production, storage and transportation of ammonia and to Europe and Japan.

India's unique green hydrogen ecosystem is poised for great things. The Indian hydrogen industry must now leverage the exceptional opportunities emerging from the comprehensive National Green Hydrogen Mission. Industry in collaboration with the central and state governments should aim to set-up large-scale green hydrogen production and electrolyser manufacturing units and transform India into a net energy exporting country in the decade to follow. As Prime Minister Modi visualised - green hydrogen is the future of the world, a fuel which will not only help India to make new progress in the field of energy self-reliance but will also become a new inspiration for Clean Energy Transition all over the world.