



INTERNATIONAL PARTNERSHIP FOR HYDROGEN AND FUEL CELLS IN THE ECONOMY

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INDIA

Name	Radhey Shyam Meena
Contact Information	rshyam.mnre@gov.in , rshyammnre@gmail.com , +91 9929205059
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1. New Initiatives, Programs, and Policies on Hydrogen and Fuel Cells

- India continued to advance the National Green Hydrogen Mission (NGHM) at a rapid pace, with major progress across policy, regulatory, and infrastructure pillars.
- A key milestone during this period was the operationalisation of the Green Hydrogen Certification Scheme of India (GHCI), enabling credible verification of Green Hydrogen, Green Ammonia, and Green Methanol. India also notified its Green Ammonia Standard (≤ 0.38 kg CO_{2e}/kg NH₃) and Green Methanol Standard (≤ 0.44 kg CO_{2e}/kg CH₃OH), strengthening the country's MRV and sustainability framework.
- India's signing of 7.24 lakh tonnes per annum (TPA) of Green Ammonia Purchase and Supply Agreements (GAPA/GASA) represents one of the largest green ammonia contracting exercises globally, firmly positioning India as a frontrunner in the global hydrogen economy. Of the total 724,000 TPA awarded, agreements for 670,000 TPA have already been formally signed across 13 fertiliser units. The discovered price range of ₹49.75–₹64.74 per kg (equivalent to USD 0.60–0.78 per kg, or USD 600–780 per tonne) is 40–45% lower than prevailing international benchmarks of ~USD 1,000 per tonne, demonstrating India's ability to achieve global cost leadership at scale. This procurement round will help in replacement of grey ammonia imports, generating USD 2.5 billion in foreign exchange savings over 10 years and catalysing multi-billion-dollar investments in renewable energy and hydrogen production assets. With 10-year assured offtake contracts—modelled on India's successful renewable PPAs—this initiative creates one of the world's first bankable, long-term commercial markets for green ammonia, establishing India as a global reference point for industrial-scale green hydrogen deployment.
- India has further expanded its hydrogen derivatives market with SECI issuing a tender for the supply of 500,000 tonnes per annum of Green Methanol under the SIGHT Scheme. This marks one of the largest green methanol procurement calls globally, aimed at accelerating adoption in shipping, chemicals, and industrial applications. The tender structure includes long-term offtake commitments to



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ensure bankability and is expected to mobilise multi-billion-rupee investments in renewable energy and hydrogen-to-methanol production assets.

- Implementation of the SIGHT Scheme continued at scale, supporting electrolyser manufacturing and large-volume Green Hydrogen and Green Ammonia production. Competitive tenders resulted in the award of 862,000 TPA of Green Hydrogen and 724,000 TPA of Green Ammonia, while 30,000 TPA of Green Hydrogen was contracted for refinery use at discovered prices ranging from ₹279 to ₹397 per kg.
- India also approved the second phase of pilots, R&D projects, startup funding, and national testing infrastructure, further strengthening the innovation pipeline under the Mission. This phase includes new allocations for advanced hydrogen production pilots, safety R&D, multi-sectoral testing facilities, and grants for high-potential startups across electrolyzers, fuel cells, and novel hydrogen applications.
- Parallely, India expanded its regulatory ecosystem with over 122 hydrogen-related standards published or under development by BIS, OISD, MoRTH, PESO, and PNGRB.
- Several states—including Tamil Nadu, Andhra Pradesh, Rajasthan, Uttarakhand, Bihar, Maharashtra, and Gujarat—introduced or updated hydrogen policies offering land, water access, fiscal incentives, and streamlined single-window clearances.
- Infrastructure development accelerated with four Hydrogen Valley Innovation Clusters progressing in Jodhpur, Pune, Odisha, and Kerala, and four major ports—Kandla, Tuticorin, Paradip, and Vizag—designated as Green Hydrogen Hubs.
- A major international milestone during this period was the signing of the first-ever MoU globally between two hydrogen regulators — PNGRB (India) and DVGW (Germany). This pioneering regulator-to-regulator partnership establishes a formal framework for cooperation on hydrogen safety, pipeline standards, blending protocols, and regulatory harmonisation, positioning India as a leader in shaping global hydrogen governance and technical norms.
- India also deepened international cooperation through active engagement in BRICS, the EU–India Trade and Technology Council, and IPHE, including the award of two joint EU–India TTC R&D projects.

Together, these developments reflect India's strong policy momentum and its transition from planning to large-scale implementation of a globally competitive green hydrogen ecosystem.

2. Hydrogen and Fuel Cell R&D Update

- India's R&D efforts during this period continued to prioritise electrolyser efficiency, cost reduction, safety, and indigenous technology development under the National Green Hydrogen Mission.
- Significant progress was achieved across multiple fronts. Indigenous electrolyser manufacturing capacity is being rapidly expanded, with India targeting 3 GW per year by 2027–28, supported by strong industry participation and mission-backed innovation.



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- Under the EU–India Trade and Technology Council (TTC), two joint research projects were formally awarded in the area of biomass-derived hydrogen, focusing on agricultural residue gasification and MSW-to-hydrogen pathways, while three additional innovative bio-hydrogen pilot projects have been recommended for award.
- India is also advancing a network of Centres of Excellence, with five CoEs under evaluation across production, storage, transportation, utilisation, and cross-cutting applications, and two CoEs—Tata IIS Ahmedabad and CSIR-IMMT Bhubaneswar—finalised for skilling and applied research.
- In parallel, five R&D projects focused on hydrogen safety—covering production, storage, and transportation—have been recommended for support, complementing ongoing standards development by BIS, OISD, MoRTH, and PNGRB.
- To strengthen the national testing ecosystem, seven major testing and regulatory infrastructure projects progressed during this period, including facilities for electrolyser testing, fuel cell validation, hydrogen purity assessment, and storage system evaluation.
- Innovation-led growth was further supported through the recommendation of nine startups for grants under NGHM, spanning fuel cells, electrolysers, hydrogen production technologies, and novel pilot applications.

Collectively, these initiatives reflect India's strong push toward a globally competitive, innovation-driven hydrogen R&D ecosystem.

3. Demonstration, Deployments, and Workforce Developments Update

- India made substantial progress in hydrogen deployment across key sectors, reflecting the transition of the National Green Hydrogen Mission from planning to large-scale implementation. In the fertiliser sector, 724,000 MTPA of Green Ammonia has been contracted by SECI for 13 units, with agreements already signed for most of the allocated capacity.
- For the refinery sector, 30,000 MTPA of Green Hydrogen has been contracted to IOCL, BPCL, HPCL, and NRL at a discovered price of ₹279/kg, marking one of the world's largest early-stage industrial offtake programmes.
- The steel sector advanced with the sanctioning of four hydrogen-based DRI pilot projects, supporting India's decarbonisation pathway and CBAM preparedness. In mobility, five FCEV pilot projects—covering buses and heavy-duty trucks—are under implementation along with associated Hydrogen Refuelling Stations (HRS) across multiple routes.
- Maritime and port infrastructure also progressed, with a hydrogen/ammonia bunkering facility sanctioned at V.O. Chidambaranar Port and feasibility studies underway at Paradip, JNPT, Kandla, and Vizag.
- The Mission's regional innovation ecosystem strengthened through the advancement of four Hydrogen Valley Innovation Clusters in Jodhpur, Odisha, Pune, and Kerala, each integrating production, storage, and end-use applications.
- Workforce development also accelerated, with over 1,200 candidates trained across the hydrogen value chain and two Centres of Excellence for skilling



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finalised for award. Together, these deployments demonstrate India's rapid progress toward building a robust, end-to-end green hydrogen ecosystem.

4. Events and Solicitations

- India remained actively engaged in international and national hydrogen initiatives during this period. India is participating in the 45th IPHE Steering Committee Meeting in Berlin (11–15 May 2026), contributing to discussions on permitting, certification, skills, and environmental impact analysis.
- Domestically, preparations are underway for major upcoming events, including ICGH 2026 and RE-INVEST 2026, which will showcase India's progress under the National Green Hydrogen Mission.
- On the implementation front, MNRE and SECI are preparing new tenders for Green Hydrogen production through innovative pathways, complementing ongoing SIGHT allocations.
- Additional mobility pilot projects—covering heavy-duty vehicles and hydrogen refuelling infrastructure—are currently in the tendering stage. India is also advancing collaboration opportunities in port-based hydrogen logistics, with the development of hydrogen hubs progressing at multiple major ports.
- In parallel, regular Expressions of Interest (EOIs) continue to be issued for pilot projects in the steel sector, supporting early adoption of hydrogen-based DRI and low-carbon steelmaking technologies.

5. Investments: Government and Collaborative Hydrogen and Fuel Cell Funding

- India continued strong government–industry co-investment under the National Green Hydrogen Mission. Major funding flowed through SIGHT incentives for Green Hydrogen and Green Ammonia, alongside capital support for steel pilots, mobility demonstrations, and four Hydrogen Valley Innovation Clusters.
- India also strengthened its global footprint in green hydrogen derivatives through multiple long-term export offtake agreements secured by leading Indian developers. Reliance, L&T Energy GreenTech, AM Green (Greenko Group), and Juno Joule collectively signed export contracts exceeding 300,000 TPA of Green Hydrogen/Green Ammonia equivalents with major international buyers such as Uniper (Germany), Itochu (Japan), Sembcorp, and other European and Asian utilities. These agreements—among the largest green hydrogen export deals globally—demonstrate India's emerging cost leadership and bankability in global markets.
- Several states extended land, water, and infrastructure incentives to accelerate project development.
- Parallel investments strengthened national capabilities in testing facilities and standards development, supporting electrolyser, fuel-cell, storage, and safety validation.
- In addition, targeted grants were provided for Centres of Excellence, R&D projects, testing infrastructure, and startup innovation, ensuring comprehensive support across production, storage, transport, and end-use deployment.



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6. Regulations, Codes & Standards, and Safety Update

- India continued to strengthen its regulatory and standards ecosystem for hydrogen during this period. More than 122 hydrogen-related standards have now been published or are under development across BIS, OISD, MoRTH, PESO, and PNGRB, covering production, storage, transport, and end-use applications.
- The PNGRB advanced regulatory work on hydrogen blending in CGD networks, including safety envelopes and test protocols.
- The Green Hydrogen Certification Scheme of India (GHCI) became fully operational, enabling certification of Green Hydrogen and its derivatives through accredited carbon verifiers.
- Safety frameworks were further reinforced through updated codes for hydrogen refuelling stations, storage systems, and transport, ensuring alignment with emerging global best practices.
