DISCUSSION DOCUMENT

# Green Hydrogen in India

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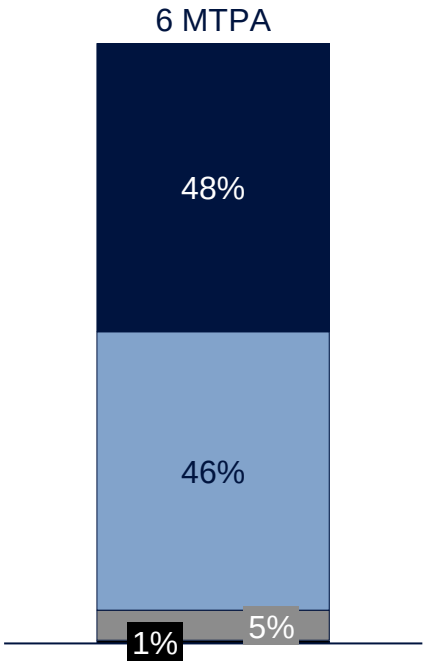
# India is among the largest consumers of hydrogen with 6 MTPA domestic production & consumption; majority consumption is in two sectors – 1. Fertilizers (48%) where hydrogen is used to produce ammonia/urea and 2. Refineries (46%) for hydro-desulfurization

**Hydrogen consumption in India by sectors**
MTPA




Hydrogen Consumption by sector for India (2020)

**Fertilizer (48%)**

- Hydrogen is used to produce ammonia through Haber Bosch process. ~90% of ammonia is used to manufacture fertilizers
- Fertilizer is a **regulated market** with subsidies provided to farmers. The low-cost domestic natural gas (~1.5-2 USD/ MMBTU) is provided to fertilizer industry hence the demand is expected to be price sensitives

**Refining (46%)**

- Hydrogen is used to process crude oil to obtain refined fuels e.g. gasoline, diesel. Sulphur impurities are removed via Hydro-desulfurization
- Refining is a de-regulated sector; however, it is dominated by govt. owned entities and a few private companies (Reliance). This sector primarily uses imported natural gas to produce hydrogen

**Steel (5%)**

- To produce virgin metallics (DRI or HBI) from lump iron ore (or pellets) requires approximately 650 $Nm^3$ of hydrogen (or 58 kg) per ton of DRI
- The Indian Direct Reduced Iron (DRI) sector accounts for about 39.3% of the total global production. The overall capacity utilization of the DRI plants stands low, at about 60%

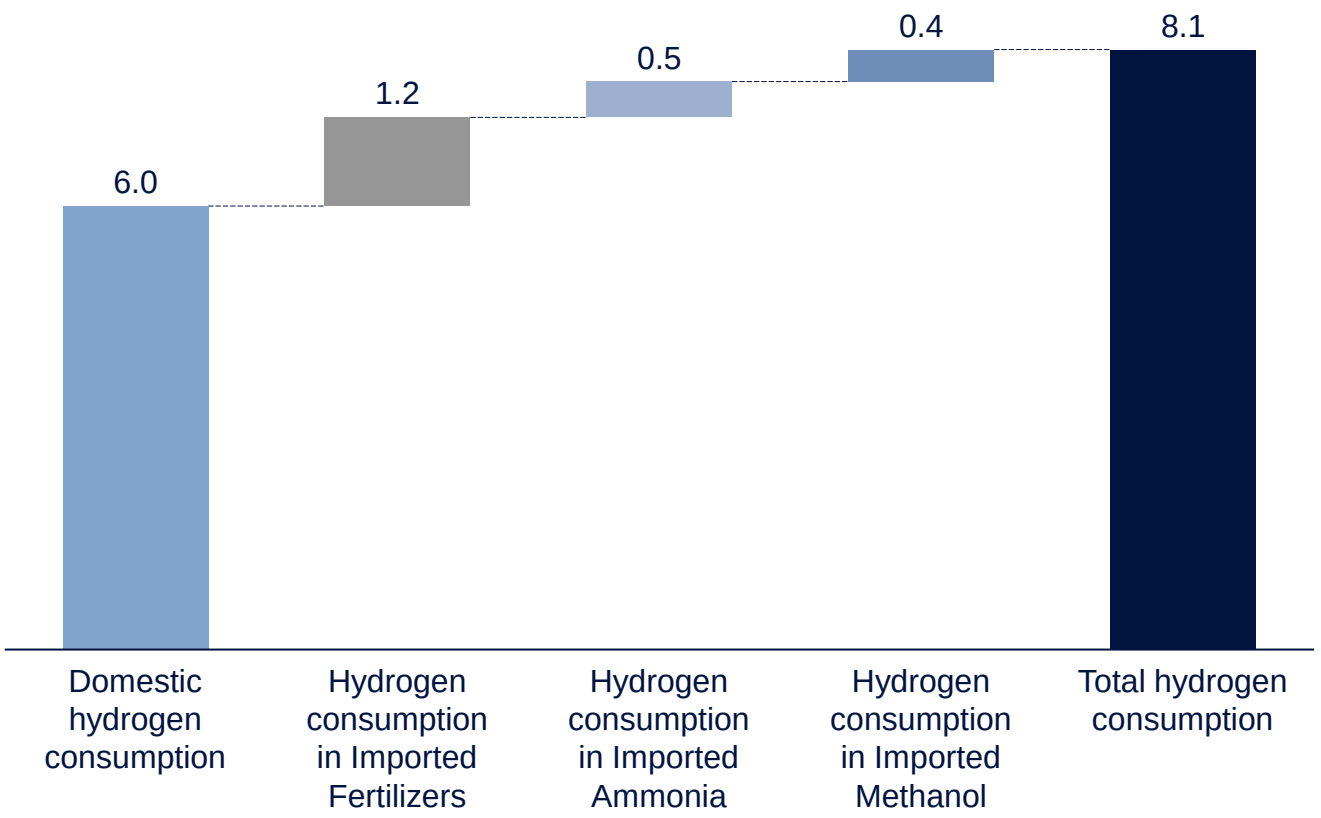
**Methanol (1%)**

- Hydrogen is used in production of methanol which is further used in production of acetic acid and formaldehyde
- ~80% methanol is imported because of high prices of Natural Gas in India. Methanol production capacity only has a 37% utilization in the country

Note: DRI – Direct Reduced Iron; HBI - Hot Briquetted Iron
Source: TERI; MNRE; NITI Aayog; World Steel Association; MEC+ analysis

# Import of hydrogen related compounds like fertilisers, ammonia and methanol lead to additional demand of 2.1 MTPA, increasing the total hydrogen consumption to ~8.1 MTPA

**Cumulative hydrogen demand in India from domestic production and imports**
MTPA




- India imports ~14.64 MTPA of fertilizers and 2.41 MTPA of ammonia primarily from Saudi Arabia (0.72 MTPA), Qatar (0.46 MTPA) and Ukraine (0.25 MTPA) due to competitive costs (due to availability of low-cost natural gas/coal)
- Considering the push for indigenous production, additional demand for green hydrogen may emerge

Note: Hydrogen imported through urea and DAP are considered for hydrogen consumption in imported fertilizers, urea and DAP per kg contains ~0.57kg & ~0.2kg of ammonia and hydrogen/kg of ammonia ~(0.17-0.2)kg; hydrogen/kg of methanol ~ 0.19kg

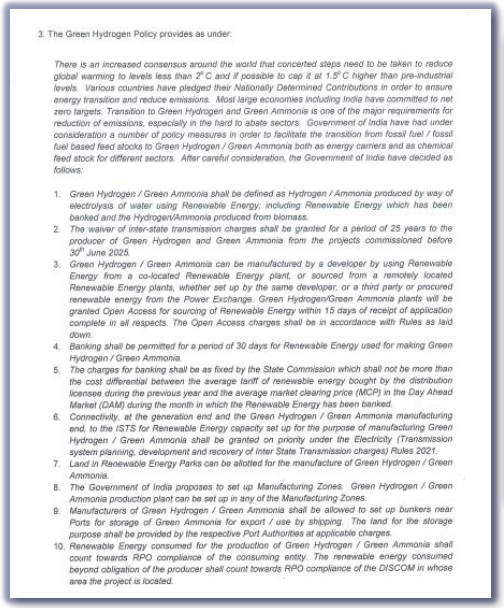
Source: PIB; TERI; MNRE; EXIM Data Bank (Govt. Of India); MEC+ analysis

Through National Hydrogen Mission, Govt. aims to replace the domestic hydrogen consumption with green hydrogen, while developing India into a global export hub for hydrogen technology, hydrogen and its derivatives

## Aim of the National Hydrogen Mission

- To lay down the vision, intent and direction for harnessing hydrogen energy
- To develop India as a global hub for manufacturing of hydrogen and fuel cells technology across the value chain
- To put forward specific strategy for the short term (four years), and broad strokes principles for long term (10 years and beyond)
- To facilitate demand creation in identified segments. Possible areas include suitable mandates for use of green hydrogen in industry such as fertilizer, steel, petrochemicals etc
- Major activities envisaged under the mission include:
  - Creating volumes and required infrastructure
  - Demonstrations in niche applications including transport and industry
  - Goal-oriented research & development
  - Facilitative policy support
  - Putting in place a robust framework for standards and regulations for hydrogen technologies.
- To aid the government in meeting its climate targets and making India a green hydrogen hub. This will help in meeting the target of production of five million tonnes of Green hydrogen by 2030

**MNRE and NITI Aayog have published policy inputs**



3. The Green Hydrogen Policy provides as under:

There is an increased consensus around the world that concerted steps need to be taken to reduce global warming to levels less than 2° C and if possible to cap it at 1.5° C higher than pre-industrial levels. Various countries have pledged their Nationally Determined Contributions in order to ensure energy transition and reduce emissions. Most large economies including India have committed to net zero targets. Transition to Green Hydrogen and Green Ammonia is one of the major requirements for reduction of emissions, especially in the hard to abate sectors. Government of India have had under consideration a number of policy measures in order to facilitate the transition from fossil fuel / fossil fuel based feed stocks to Green Hydrogen / Green Ammonia both as energy carriers and as chemical feed stock for different sectors. After careful consideration, the Government of India have decided as follows:

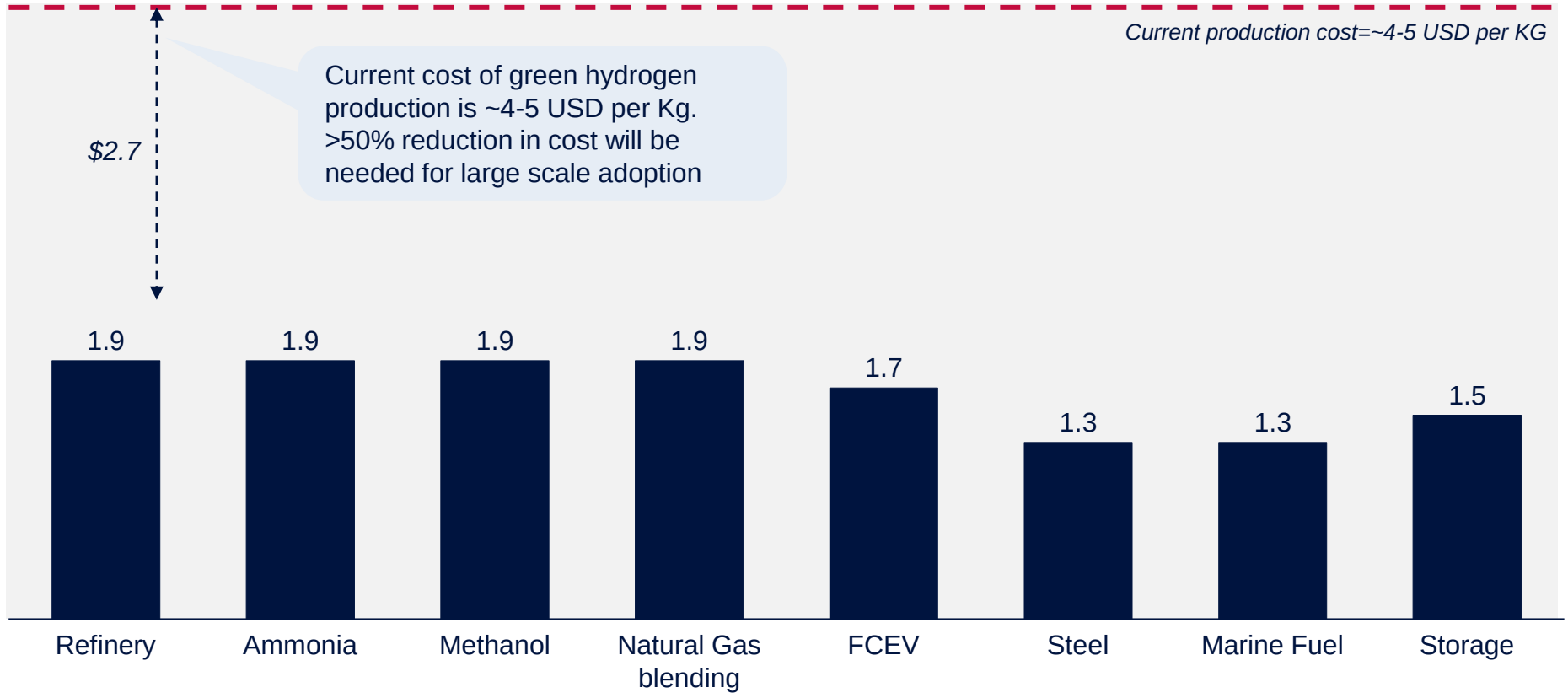
1. Green Hydrogen / Green Ammonia shall be defined as Hydrogen / Ammonia produced by way of electrolysis of water using Renewable Energy; including Renewable Energy which has been banked and the Hydrogen/Ammonia produced from biomass.
2. The waiver of inter-state transmission charges shall be granted for a period of 25 years to the producer of Green Hydrogen and Green Ammonia from the projects commissioned before 30th June 2025.
3. Green Hydrogen / Green Ammonia can be manufactured by a developer by using Renewable Energy from a co-located Renewable Energy plant, or sourced from a remotely located Renewable Energy plants, whether set up by the same developer, or a third party or procured renewable energy from the Power Exchange. Green Hydrogen/Green Ammonia plants will be granted Open Access for sourcing of Renewable Energy within 15 days of receipt of application complete in all respects. The Open Access charges shall be in accordance with Rules as laid down.
4. Banking shall be permitted for a period of 30 days for Renewable Energy used for making Green Hydrogen / Green Ammonia.
5. The charges for banking shall be as fixed by the State Commission which shall not be more than the cost differential between the average tariff of renewable energy bought by the distribution licensee during the previous year and the average market clearing price (MCP) in the Day Ahead Market (DAM) during the month in which the Renewable Energy has been banked.
6. Connectivity, at the generation end and the Green Hydrogen / Green Ammonia manufacturing end, to the ISTS for Renewable Energy capacity set up for the purpose of manufacturing Green Hydrogen / Green Ammonia shall be granted on priority under the Electricity (Transmission system planning, development and recovery of Inter State Transmission charges) Rules 2021.
7. Land in Renewable Energy Parks can be allotted for the manufacture of Green Hydrogen / Green Ammonia.
8. The Government of India proposes to set up Manufacturing Zones. Green Hydrogen / Green Ammonia production plant can be set up in any of the Manufacturing Zones.
9. Manufacturers of Green Hydrogen / Green Ammonia shall be allowed to set up bunkers near Ports for storage of Green Ammonia for export / use by shipping. The land for the storage purpose shall be provided by the respective Port Authorities at applicable charges.
10. Renewable Energy consumed for the production of Green Hydrogen / Green Ammonia shall count towards RPO compliance of the consuming entity. The renewable energy consumed beyond obligation of the producer shall count towards RPO compliance of the DISCOM in whose area the project is located.



Source: National Hydrogen Policy; NITI Ayog; News Articles; MEC+ analysis

# The biggest barrier for large scale green hydrogen adoption is the cost of production

**Required cost of hydrogen production for breakeven against conventional technologies in India**
USD/kg





Source: Mckinsey & Company; MEC+ analysis

# To overcome the barrier, Govt. released first phase of India's Green Hydrogen Policy in Feb 2022, providing framework and incentives to inputs of green hydrogen covering RE power, land and grid

## Vision and Ambition

- Policy considers $H_2$ and Ammonia as an essential part of the decarbonization plans, especially for the hard to abate sectors
- Target of production of 5 million tonnes of Green hydrogen by 2030

## Policy mandates and timeline

*No clear mandates and timelines have been identified in the policy*

To achieve competitive prices, MNRE will aggregate demand from different sectors & have consolidated bids

## Governance

- MNRE is planning to establish a single portal for all statutory clearances and permissions required across the hydrogen value chain
- The authorities/ agencies to provide clearances in a time-bound manner, preferably within 30 days of application

## Incentives and Funding

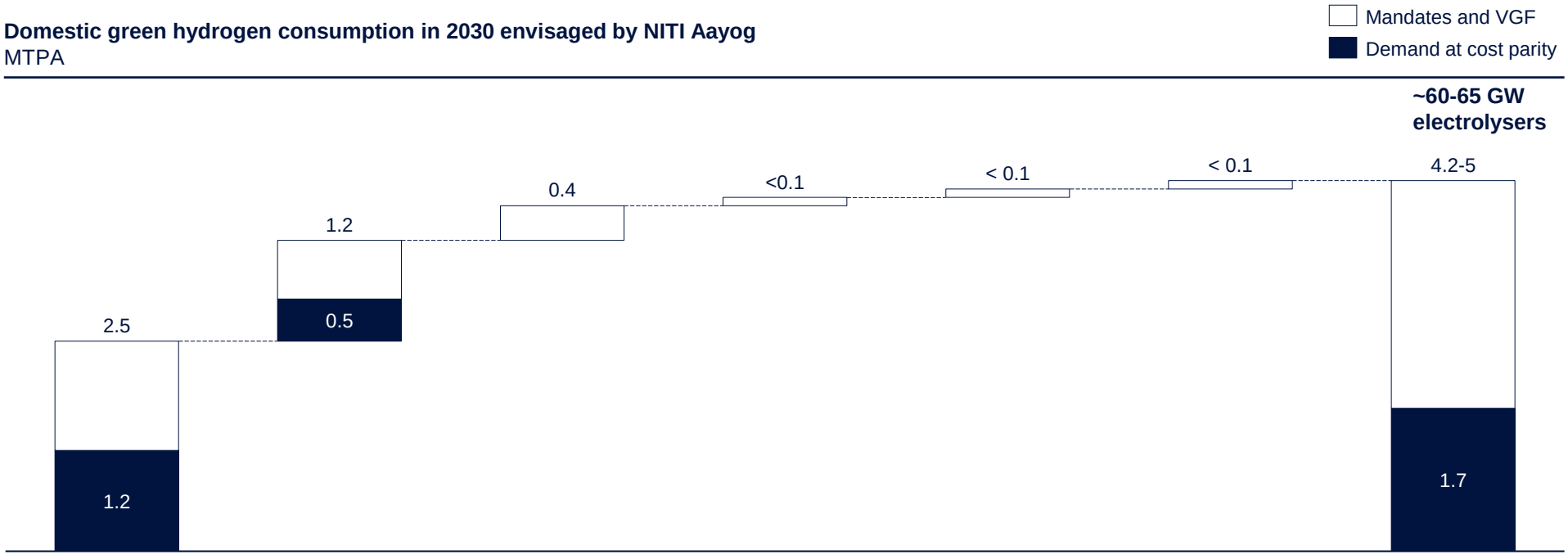
| Renewable power production | Power supply | Green hydrogen production | Storage and Distribution | Consumption |
|---|---|---|---|---|
| • Green Hydrogen/ Ammonia projects commissioned before June 2025 to be waived off ISTS charges for 25 years<br>• Banking of power permitted for up to 30 days for making Green hydrogen<br>• Land in RE parks can be allotted for production of Green Hydrogen/ Ammonia<br>• Grid connectivity to ISTS to be granted on priority | • DISCOMs are allowed to procure and supply power to Green hydrogen plants and are obligated to charge cost of procurement, wheeling charges and small margin to be determined by State commission; no ASS/CSS applied<br>• Electricity supplied will count towards the RPO of the DISCOM | Proposal to set-up manufacturing zones for Green Hydrogen/Green Ammonia<br>*No incentive announced yet; expected in phase 2 of policy* | Green Hydrogen/ Ammonia producers allowed to setup storage facility near ports for exports<br>*No incentive announced yet; expected in phase 2 of policy* | *No incentive or mandates announced yet; expected in phase 2 of policy* |

Note: DISCOM- Distribution Company; ISTS – Inter State Transmission Charges; RPO – Renewable Power Obligation; PLI – Production Linked Incentives; MNRE – Ministry of New & Renewable Energy

Source: Ministry of Power; India Green Hydrogen Policy; MEC+ analysis

# The phase 2 is still awaited, however multiple documents have since been published; NITI Aayog envisages three main strategies– Mandates, Clusters, Corridors– for domestic demand creation of 4.2 to 5 MTPA

**Domestic green hydrogen consumption in 2030 envisaged by NITI Aayog**
MTPA

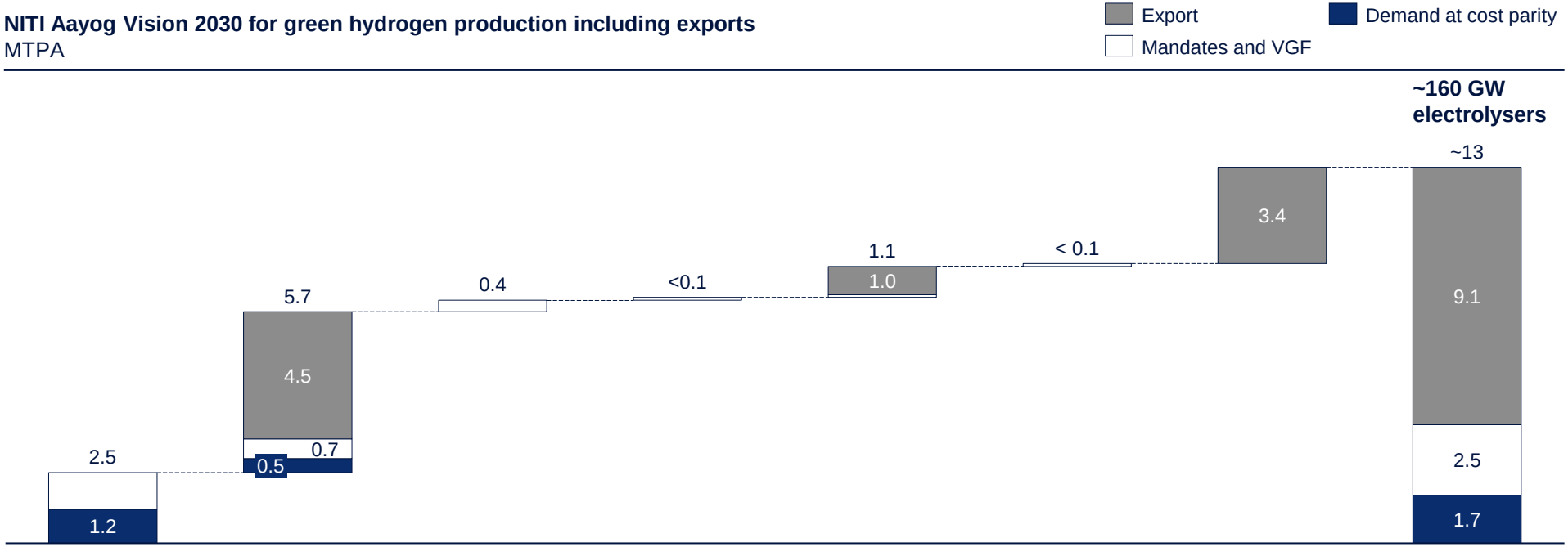



| Refinery | Fertilizer | Gas Blending | HDV | Steel | Methanol | Total |
|---|---|---|---|---|---|---|
| • **Corporate level mandate** of 50% green H2 by 2030 and 100% by 2035<br>• Higher mandate considering H2 contribution to end cost is 2%–4% | • **Mandate** on **import substitution** targeting 100% by 2030; domestic target by 2040<br>• Lower mandate considering H2 contribution to end cost is 80%–90% | • **Pilot for** H2 blending with natural in city gas distribution with subsequent scale up<br>• 10% blending by 2025 and 20% by 2030 can be considered | • **Pilot on** specific routes<br>• 1,000 trucks, 50 boats, and 10 aircrafts piloted by 2030 with three hydrogen corridors | • **Existing plants-** fleet level carbon intensity reduction<br>• New plants with >20 MTPA green steel capacity primarily for exports (not represented in graph) | • Import substitution can be considered | |

Note: 1 million tonnes of green hydrogen corresponds to around 11-13 GW of electrolyser capacity (NITI Aayog)
Source: NITI Aayog and RMI Report; MEC+ analysis

# NITI Aayog Vision is to have ~13 MTPA green hydrogen production in India by 2030 for domestic and export markets

**NITI Aayog Vision 2030 for green hydrogen production including exports**
MTPA

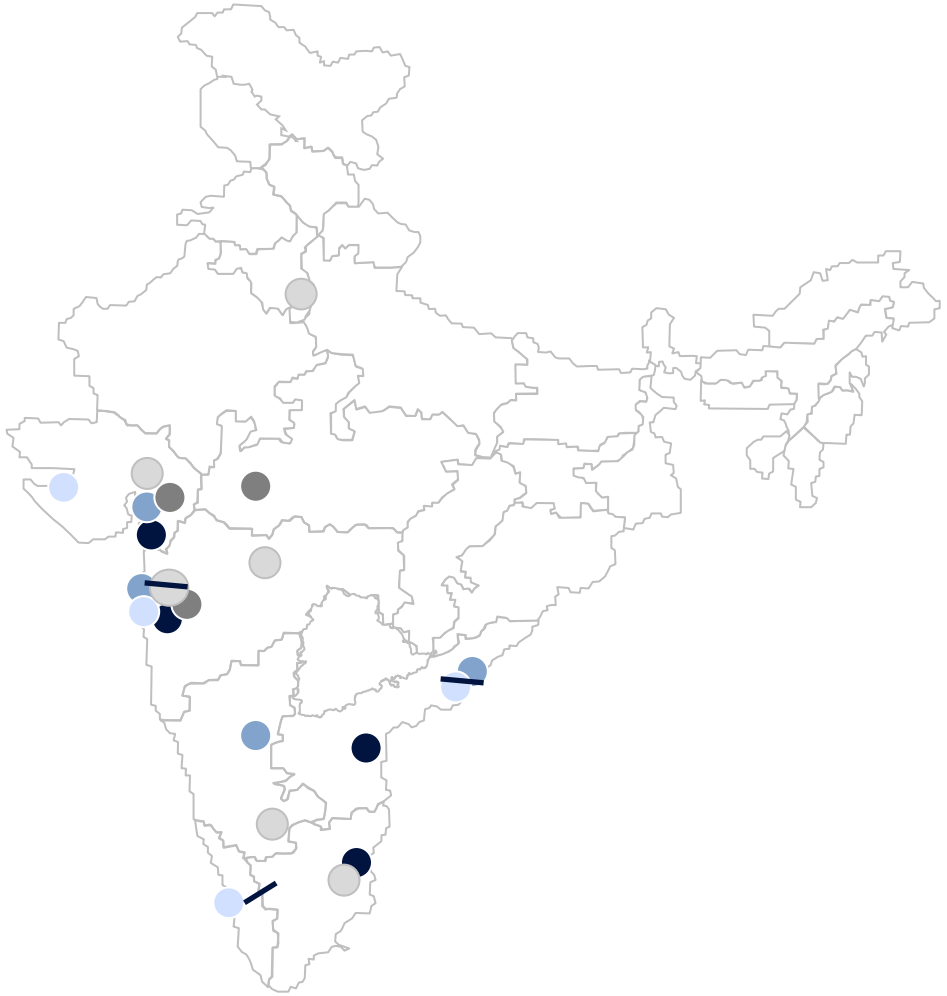



- **25 million tonnes ammonia exports to** countries such as Japan, Korea, and the European Union
- New plants with **>20 MTPA green steel** capacity primarily for exports towards EU and other markets
- Methanol exports could increase in the long term as global demand from marine fuel increases
- Green H2 in form of new carriers; if new carriers are not realized, Ammonia is likely to fulfil this portion of demand (41 GW)

Note: 1 million tonnes of green hydrogen corresponds to around 11-13 GW of electrolyser capacity (NITI Aayog)
Source: NITI Aayog and RMI Report; MEC+ analysis

# Maharashtra and Gujarat proposed to have the greatest number of consumption hubs as per IH2A's proposed 25/25 Development Plan for National Green H2 Projects, Hubs

**Proposed hydrogen clusters by Indian Hydrogen Alliance**



**Type of clusters, details and legend**

| | |
|---|---|
| Green H2, NH3/Fertilizer Hubs | • Ankleshwar-Bharuch-Dahej/Gujarat*<br>• Pune-Nhava Sheva/ Maharashtra<br>• Nellore OR Vizag/ Andhra Pradesh<br>• Chennai/ Tamil Nadu |
| Green H2 Steel Plants | • Bellary/Karnataka*<br>• Hazira/ Gujarat<br>• Dolvi/ Maharashtra<br>• Vizag/ Andhra Pradesh |
| Green H2 Refineries | • Jamnagar or Vadodara/Gujarat<br>• Mumbai/Maharashtra<br>• Kochi/Kerala<br>• Vizag/ Andhra Pradesh |
| Heavy-Duty Transport | • MAH2 Mumbai-Pune/Maharashtra*<br>• KochiH2-Coimbatore/Kerala-Tamil Nadu<br>• Vizag/ Andhra Pradesh |
| H2-CGD Networks | • Indore CGD/ Madhya Pradesh*<br>• Pune CGD OR Nagpur CGD/ Maharashtra<br>• Vadodara CGD/ Gujarat |
| Waste to H2 cities | Seven Municipal projects<br>• Pune*, Nagpur, Mumbai, Delhi, Bangalore, Chennai, Ahmedabad |

Note: *Indicative project SPV structures; H2 – hydrogen; Fert. Hubs – Fertilizer Hubs; CGD- City Gas Distribution; NH3 – Ammonia
Source: Indian Hydrogen Alliance; MEC+ analysis



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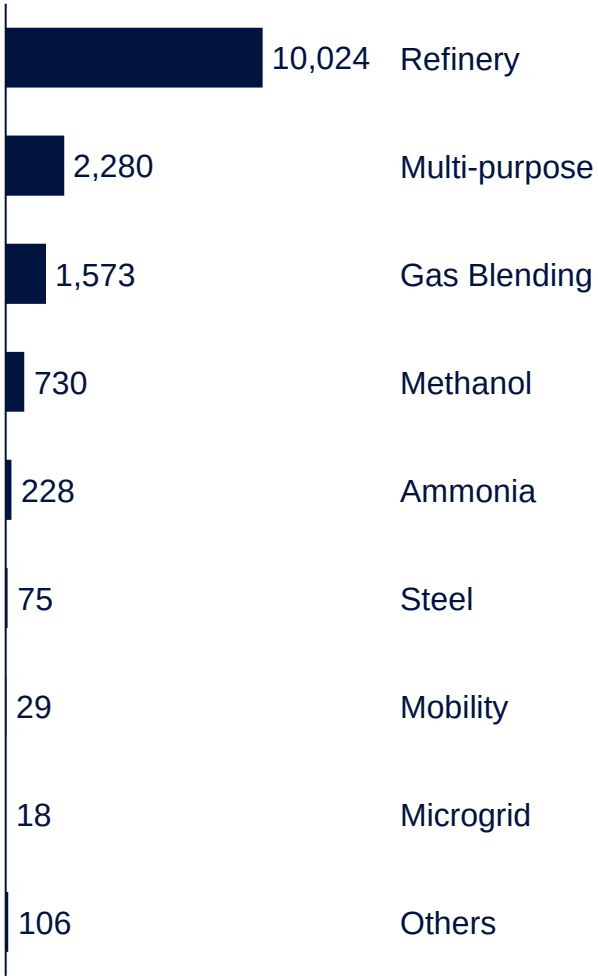
# 38 projects have been announced, 22 of them have moved beyond initial stages; ~67% of the total volume is within refineries driven by possible mandates followed by blending and other pilot projects

**Project pipeline based on end use case**
Hydrogen (Tonnes per Annum)




**Green hydrogen project pipeline**

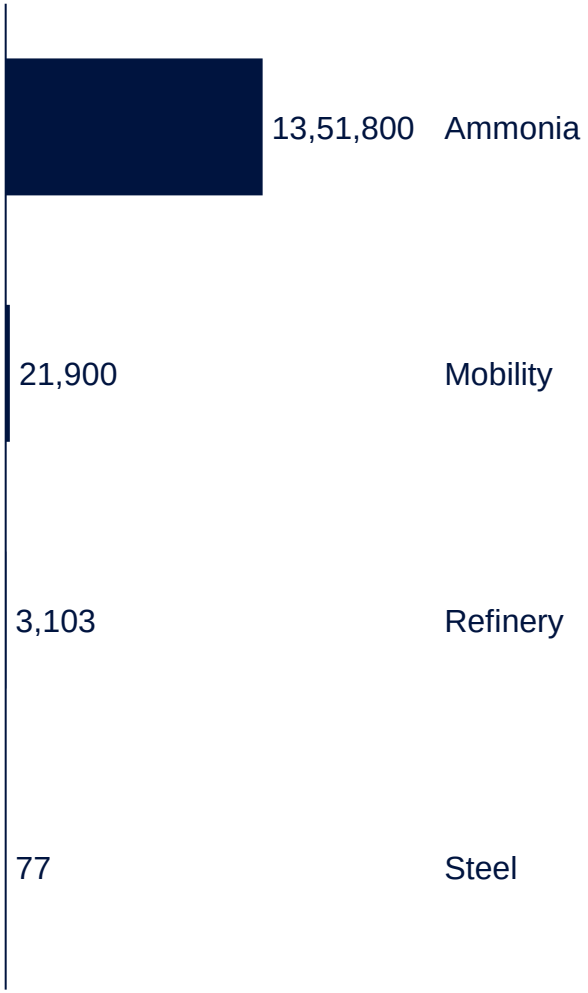
| Project name | Project status | Location | End use case | Electrolyser capacity(MW) | Project Capacity (H2 TPA) |
|---|---|---|---|---|---|
| OIL | Commissioned | Assam | Gas Blending | 0.1 | 3.7 |
| ACME | Commissioned | Rajasthan | Ammonia | 1.5 | 228** |
| L&T* | Commissioned | Gujarat | Manufacturing | 0.8 | 16.4 |
| ACME | Commissioned | Rajasthan | Pilot | NA | NA |
| Hygenco | Commissioned | Madhya Pradesh | Pilot | NA | NA |
| NTPC | Under Construction | Gujarat | Gas Blending | 0.0065 | NA |
| NTPC | Under Construction | Andhra Pradesh | Microgrid | 0.24 | 18.3 |
| HPCL | Under Construction | Andhra Pradesh | Refinery | 2.5 | 370.0 |
| NTPC | Under Construction | Madhya Pradesh | Methanol | 5 | 730.0 |
| GAIL | Under Construction | Madhya Pradesh | Gas Blending | 10 | 1569.5 |
| Hygenco (Jindal) | Under Construction | Madhya Pradesh | Steel | 0.5 | 75** |
| NTPC | Under Construction | Leh | Mobility | NA | 29.2 |
| NTPC - Netra | Under Construction | Uttar Pradesh | R&D | NA | 52.0 |
| MAHAPREIT | EOI/NIT | Maharashtra | Refinery | 1 | 146.0 |
| BPCL | EOI/NIT | Maharashtra | Gas Blending | 5 | NA |
| Chennai Petroleum (IOCL) | EOI/NIT | Tamil nadu | Refinery | NA | 1000-5000 |
| GIPCL | EOI/NIT | Gujarat | Multi-purpose | 5 & 10 | 2280** |
| IOCL - Mathura | EOI/NIT | Uttar Pradesh | Refinery | 40 | 5000.5 |
| IOCL - Panipat | EOI/NIT | Haryana | Refinery | 16 | 2007.5 |
| NTPC * | EOI/NIT | NTPC Power Plant | Co-firing | NA | 5.5 |
| MAHAGENCO | EOI/NIT | Maharashtra | Turbine cooling | NA | 15.8 |
| SJVN Ltd | EOI/NIT | Himachal Pradesh | Feedstock – HVOF coating | NA | 15.8 |

Note: *L&T commissioned capacity at 0.38 MW; **1 MW electrolyzer to produce ~150 TPA hydrogen; IOCL- Indian Oil Corporation Ltd; NTPC- National Thermal Power Corporation Ltd; BPCL: Bharat Petroleum Corporation Ltd; GAIL- Gas Authority of India; L&T- Larsen and Toubro; MAHAPREIT-Mahatma Phule Renewable Energy and Infrastructure Technology; CPCL-Chennai Petroleum Corporation Limited; HPCL-Hindustan Petroleum Corporation Ltd; GIPCL- Gujarat Industries Power Company Ltd; OIL- Oil India Limited; SECI- Solar Energy Corporation of India; EOI/NIT – Expression of Interest/Notice Inviting Tender

Source: News Articles & Press Releases; Company websites; MEC+ analysis

# Remaining 16 projects are in planning stage, majority of which focus on ammonia exports

**Project pipeline based on end use case**
Hydrogen (Tonnes per Annum)



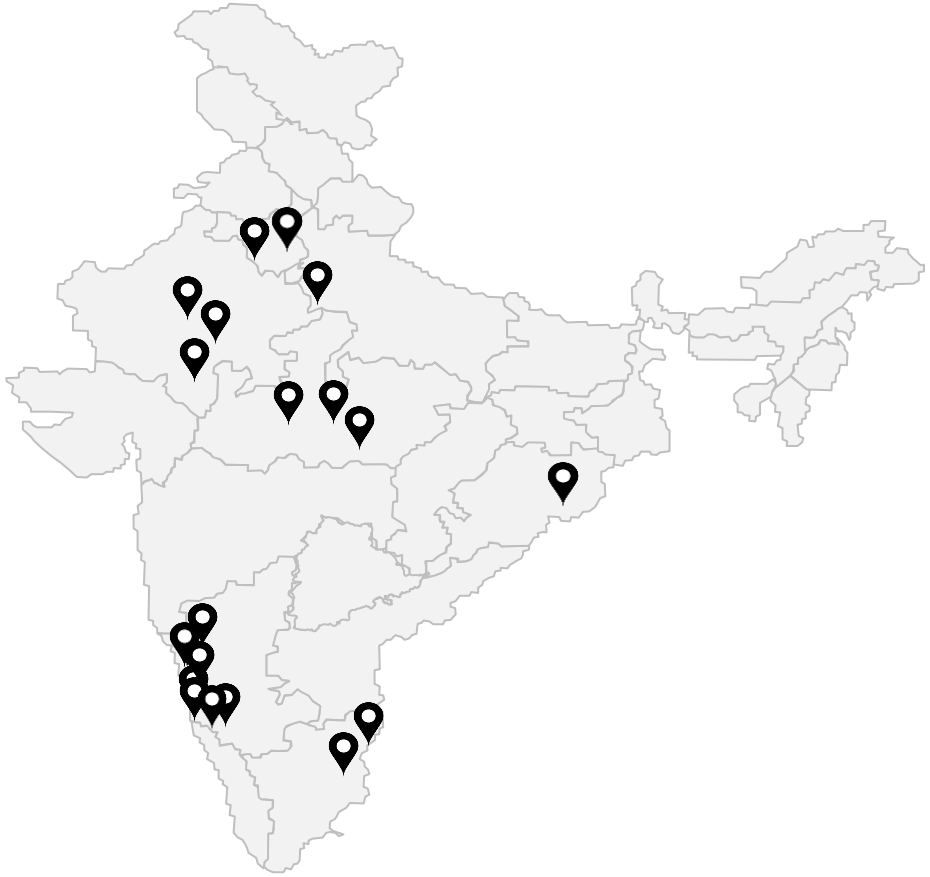

**Green hydrogen project pipeline**
(Projects in the initial stages)

| Project name | Project status | Location | End use-case | Specification |
|---|---|---|---|---|
| ACME Group | Proposal Cleared | Karnataka | Ammonia | 1.2 MTPA NH3 |
| ReNew Power | Proposal Cleared | Karnataka | Ammonia | 1 MTPA NH3 |
| Avaada | Proposal Cleared | Karnataka | Ammonia | 1 MTPA NH3 |
| JSW (Green Hydrogen) | Proposal Cleared | Karnataka | Ammonia | *Not Available* |
| Renew Power | Proposal Cleared | Odisha | Ammonia | 0.1 MTPA NH3 |
| ACME Group | MoU | Tamil Nadu | Ammonia | 1.1 MTPA NH3 |
| Avaada | MoU | Rajasthan | Ammonia | 1 MTPA NH3 |
| Jakson | MoU | Rajasthan | Ammonia | 0.365 MTPA NH3 |
| ABC Cleantech | MoU | Karnataka | Ammonia | 1 MTPA NH3 |
| Petronas | MoU | Karnataka | Ammonia | 0.5 MTPA NH3 |
| Greenko – Keppel | MoU | India | Ammonia | 0.25 MTPA NH3 |
| Avada group | Planning | Madhya Pradesh | Ammonia | *Not Available* |
| O2 Power | Planning | Karnataka | Ammonia | *Not Available* |
| BORL (BPCL) | Planning | Madhya Pradesh | Refinery | 3102.5 TPA H2 |
| Hygenco | Planning | Haryana | Steel | 75 TPA H2 |
| Gov of Kerala - IH2A | Planning | Kerala | Mobility | *21,900 TPA H2* |

Note: 1 Kg of ammonia requires 0.18kg of hydrogen; MTPA – Million Tonnes Per Annum
Source: News Articles; Company Websites; MEC+ analysis

# The projects are emerging across India varying by the end-use application

## Project Locations targeting large-scale applications



**Large-scale application-based projects in refining, ammonia & steel manufacturing are in clusters**

## Project Locations targeting small-scale applications

**Applications within mobility, gas blending, methanol production & pilot projects are distributed across the country**

Note: *Ammonia can be used for fertilizers and as hydrogen carrier for exports
Source: News Articles; Company Websites; MEC+ analysis



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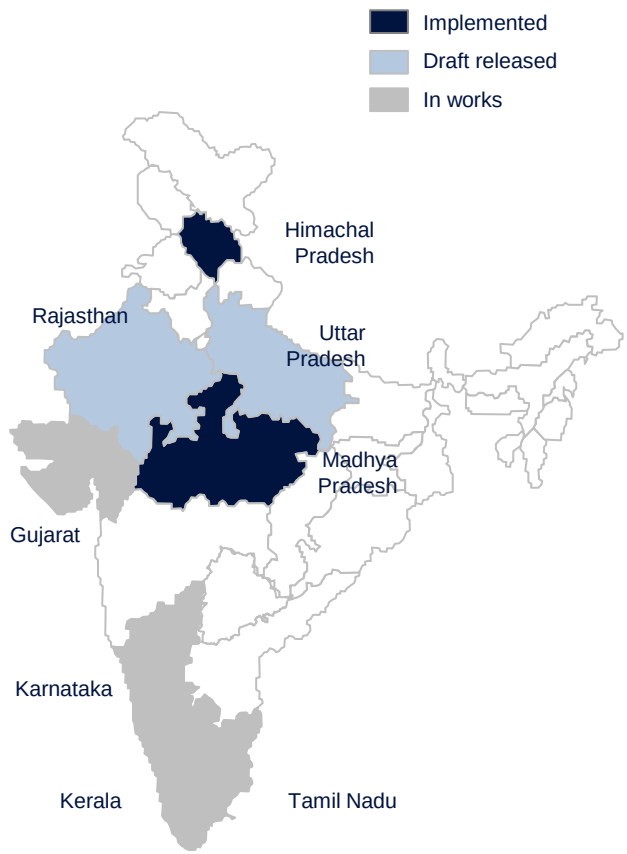
# States have been working on their own policy to participate in the transition; Rajasthan and Uttar Pradesh have recently released a draft of dedicated green hydrogen policy

| State | Policy Status | Policy Details |
|---|---|---|
| **Himachal Pradesh** | Implemented as part of Energy Policy | • Approved in Jan 2022, Himachal's new energy policy provides provisions & incentives for Green Hydrogen producers<br>○ Green H2 plants to get same incentives as industries, provision of surplus power from the nearby hydro plants and exemption of electricity duty, registration & stamp duty for establishment of Hydrogen plants |
| **Madhya Pradesh** | Implemented as part of RE policy | • RE policy 2022 for the MP government has a section dedicated to green hydrogen production and electrolyser manufacturing<br>• The incentives extended are similar to ones extended to RE Equipment manufacturing covering concessional lease rent for government land, subsidies, rebate/exemption on duties etc. |
| **Rajasthan** | Hydrogen Policy Draft Released | • Aims to make Rajasthan the most preferred investment destination for green hydrogen production in India.<br>• Govt. to provide land near RE projects at competitive rates, promote establishment of H2 consumption units near production sites and give fiscal incentives for adoption of hydrogen instead of fossil fuels<br>• Govt to offer incentives comprising of investment support on SGST, employment subsidy, electricity duty exemption, electricity charges subsidy, rebate in power tariff, stamp duty exemption, mandi fee exemption, rebate in land conversion charges, and support for water conservation / green measures<br>• 5% interest subsidy for term loans for investing in plant and machinery (for 5 years up to INR 10 cr per year) or capital subsidy equal to 20% of the investments made up to INR 50 cr<br>• One-time 50% reimbursement of the cost incurred for acquiring technology from premier national institutes in India (up to INR 2 cr) |

**States with Hydrogen Policy**




Note: H2 – Hydrogen; PPP – Public Private Partnership



Source: State Governments; News Articles; MEC+ analysis

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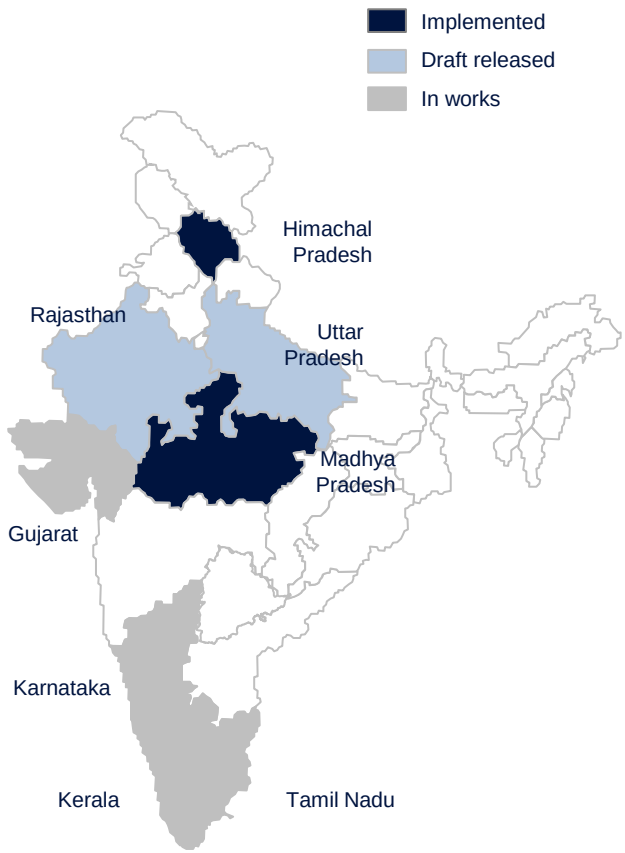
| State | Policy Status | Policy Details |
|---|---|---|
| **Uttar Pradesh** | Hydrogen Policy Draft Released | • Aims to be a leading green H2/ammonia producer and a 100% green hydrogen/ammonia consuming state by 2035<br>• 4 key pillars to build the H2 ecosystem: boost manufacturing, lead R&D and innovations, provide incentives for promoting Green H2 adoption and establish the state's green hydrogen task force.<br>• Exemptions offered on land taxes, charges and duties, water consumption and to provide employment subsidy; 100% reimbursement on SGST, some exemption on electricity charges<br>• An additional subsidy of INR 3500/tonne of urea will be applicable for every tonne of green urea produced in the state beyond the 10% blending share in total production<br>• CAPEX subsidy for electrolyzer deployment (starting at 60% and decreased to 20%) from 2023 to 2027 |
| **Karnataka** | In works | • Karnataka government intends to develop Green H2 policy in line with the national policy and develop pilot projects in PPP model<br>• Mangalore is proposed to be the first green hydrogen cluster in the state with total investments of approximately INR 1.5 lakh crores |
| **Kerala** | In works | • Released strategy road-map for deployment of hydrogen fuel cell electric public transport buses<br>• Kerala Govt and IH2A to build Kochi Green Hydrogen hub, plans to produce 60 TPD green hydrogen to be used initially for mobility |
| **Gujarat** | In works | • Gujarat government is working on the hydrogen policy with plans to offer financial subsidies to subsidize the high costs of green H2<br>• Gujrat government has reserved 6000 sq. km of land for hydrogen fuel projects |
| **Tamil Nadu** | In works | • Tamil Nadu government announced in the assembly that a Green Hydrogen Policy would be unveiled to encourage investments in (blue and green) hydrogen production<br>• Thoothukudi to form a green hydrogen cluster within the state with total investments of approximately INR 83,000 Crores |

**States with Hydrogen Policy**




Note: H2 – Hydrogen; PPP – Public Private Partnership

Source: State Governments; News Articles; MEC+ analysis



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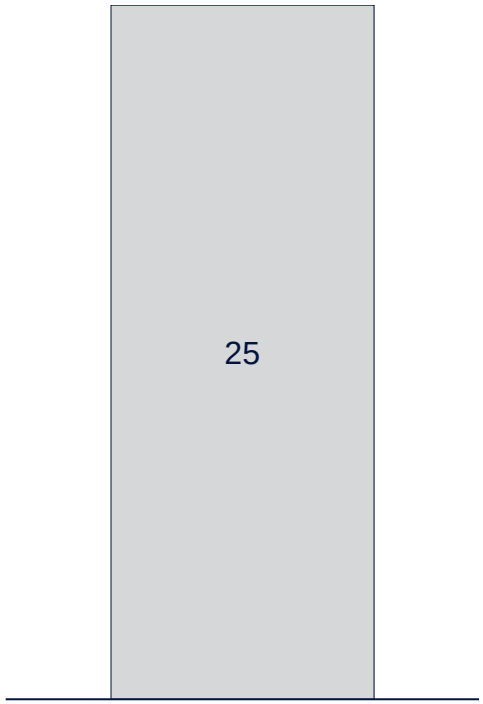
# Electrolyser manufacturing tie-ups have started; limited clarity on export potential

**2030 Electrolyser manufacturing capacity Vision by NITI Aayog in India in GW**




| Player Type | Player | Electrolyser OEM | Technology |
|---|---|---|---|
| RE developers | Reliance Industries Limited | Stiesdal; Looking for partner | Alkaline |
| | Greenko | John Cockerill | Alkaline |
| | adani | Looking for partners | TBD |
| Oil and Gas | Oil India Limited | homiHydrogen | TBD* |
| | Bharat Petroleum | BARC | Alkaline |
| | GAIL | Looking for partners | TBD |
| Project EPC | Larsen & Toubro; IndianOil | Hydrogen pro | Alkaline |
| | BHEL | Looking for partners | TBD |
| Electrolyser OEMs | ohmium | | PEM |
| | h2e POWER GOODENERGYSOLUTIONS | | SOEC AEM |
| | Greenzo Energy Pvt. Ltd. | | TBD |

**Partnership details**

- Reliance has already partnered up with Stiesdal and is now in talks with another electrolyzer OEM to set up their gigafactory
- Greenko and John Cockerill enters a JV to manufacturer electrolysers for green hydrogen and ammonia plants
- Adani group will build a 5 GW electrolyser factory; that will produce 3 MTPA of hydrogen by 2030
- OIL & homiHydrogen aims for partnership which could include manufacturing and packaging of electrolysers in India
- BPCL will work with Bhabha Atomic Research Centre (BARC) to scale up Alkaline Electrolyser technology
- GAIL released an expression of interest for partner selection for electrolyser manufacturing
- L&T and Hydrogen pro signed an MoU for setting up gigawatt-scale manufacturing of alkaline water electrolysers
- BHEL floated a request for partnership (technology partnership) for electrolyser systems to produce hydrogen
- Current production capacity of ~0.5 GW per year targeting US exports (PEM tech); Planned expansion to 2 GW per year
- Plans to establish 1GW manufacturing capacity of SOEC electrolyser in Maharashtra
- Plans to establish 250MW manufacturing capacity at an investment of Rs.400 crores.

Note: *HomiHydrogen is developing capabilities for Alkaline, PEM, AEM & SOEC
GAIL - Gas Authority of India Limited; BHEL- Bharat Heavy Electrical Limited; L&T and IOCL have signed a binding term sheet to manufacture electrolyzer;
Source: NITI Aayog; Company websites; News Articles & Press Releases; MEC+ analysis.