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Green Ammonia for fertilizer manufacturers.
South Asia Regional Energy Partnership (SAREP)
GREEN
HYDROGEN
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National Green Hydrogen Mission

National Green Hydrogen mission

Mission outline

- India's objective is to become the global energy hub for production, usage and export of green hydrogen and its derivatives
- The mission will lead to economy-wide benefits through decarbonization of industrial, mobility and energy sectors
- Four key components (SIGHT, Pilot, R&D, Operations) should be considered and addressed with further steps to succeed
- The implementation will consist of two main phases: competence development (till FY25) and ecosystem expansion (FY 2026 onwards)

Targets of National Green Hydrogen Mission

Target 2030

India's green hydrogen production capacity

5 MMT p.a.

- Green hydrogen will be used as a replacement of fossil fuels and fossil fuels-based feedstocks
- It includes ammonia production , petroleum refining, blending green hydrogen in city gas distribution systems, production of steel, and use of green hydrogen-driven synthetic fuels in various sectors including mobility, shipping, and aviation
- Green Ammonia, Shipping, Transport and Green Steel are of focus

Renewable energy capacity addition

~125 GW

- Increasing renewable energy capacities are essential to upscale green hydrogen production
- India has substantial experience in renewable energy deployment, contract mechanisms and policy frameworks
- India has achieved some of the long term levelized costs for solar and wind power generation, which trend is expected to continue

Total investments

INR 8 Lakh Crores

- Financing the Mission would require both public and private investments
- Government supports will de-risk private investment, which investments would primarily target developing new projects and assets for hydrogen production

Full time jobs

over 600 k

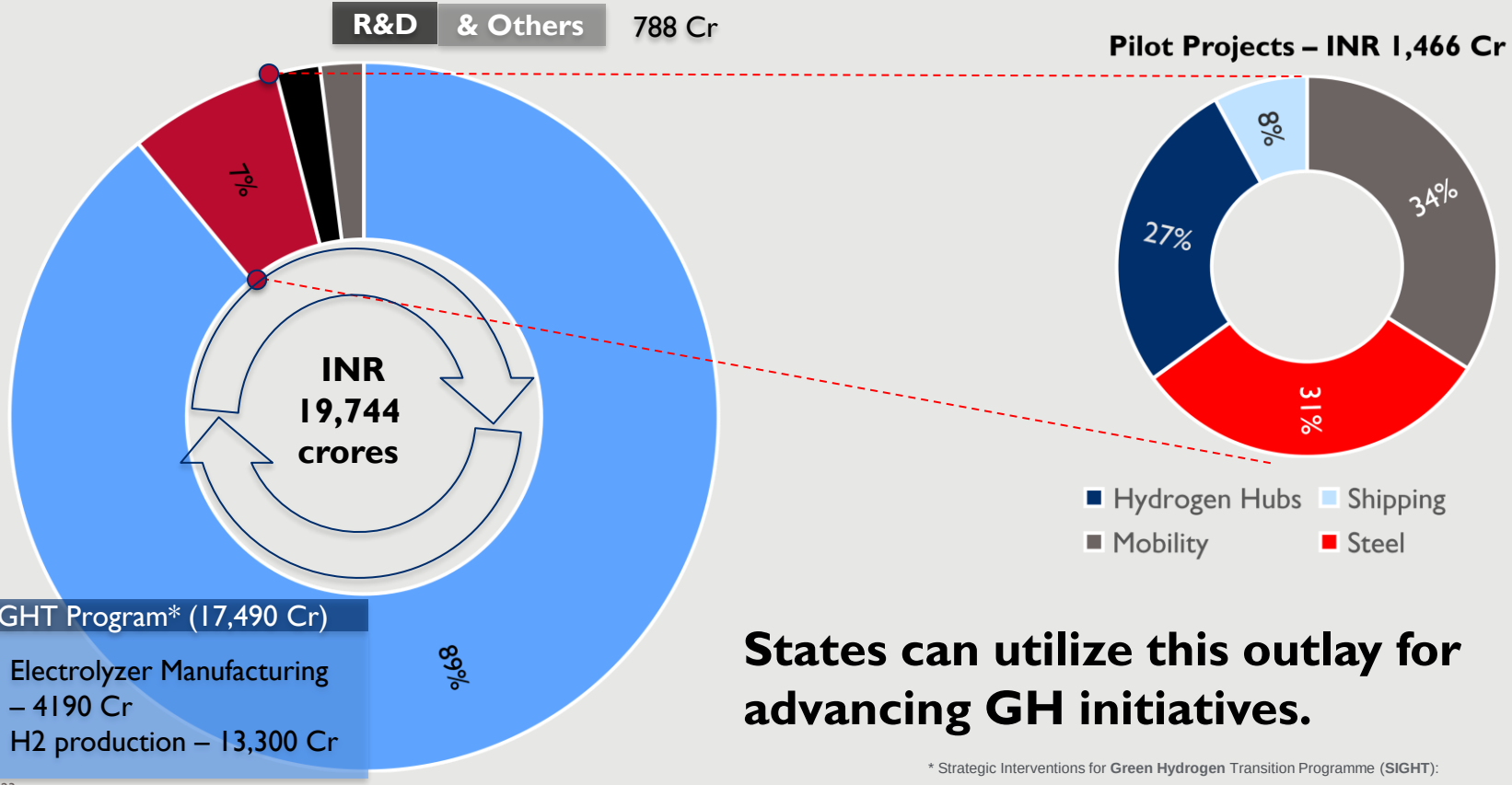
- The mission will create employment opportunities across the whole value chain

CO2 emissions are expected to be averted

50 MMT p.a.

- The Mission will significantly decarbonize the identified industrial sectors and prepare a foundation for similar transition in other emerging sectors like steel, shipping, energy storage and long-haul mobility

Hydrogen mission intends to invest INR 19,744 Cr. to promote Green Hydrogen



SIGHT Program* (17,490 Cr)

- Electrolyzer Manufacturing – 4190 Cr
- H2 production – 13,300 Cr

States can utilize this outlay for advancing GH initiatives.

* Strategic Interventions for **Green Hydrogen** Transition Programme (**SIGHT**):

Fertilizers have special mention in the Green Hydrogen mission

7.5 DOMESTIC MANUFACTURE OF FERTILIZERS USING GREEN AMMONIA

a. In the year 2020-21, India imported about 10 MMT of Urea, 5 MMT Di-ammonium Phosphate (DAP) and 3 MMT of Ammonia. This translates into an annual import value of over USD 6 billion. With the expected reduction in the price of Green Hydrogen, there will be an economic rationale for producing these fertilizers domestically, using Green Hydrogen/Green Ammonia to substitute imports. Accordingly, it is proposed that the Government of India may call for competitive bids for establishing fertilizer plants based on Green Hydrogen/Green Ammonia.

b. As part of the Mission, MNRE will formulate model bidding guidelines for procurement of Green Hydrogen based fertilizers, in consultation with the Department of Fertilizers. Two plants each for production of Green Hydrogen based Urea and Green Hydrogen based DAP are targeted to be set up through competitive bidding route.By 2034-35, it is targeted to substitute all Ammonia based fertilizer imports with domestic Green Ammonia based fertilizers.

Fertilizer Manufacturers are encouraged in the National Hydrogen Policy to set up Pilot Projects

Support and Incentives to promote production of Green Hydrogen

Support from National Green Hydrogen Mission

Policy enabling low cost H2 production

- Green Hydrogen / Ammonia manufacturer may purchase RE power from **exchange or set up RE capacity themselves or** through any developer.
- Manufacturer can **bank its** unconsumed RE power, up to 30 days with DISCOM and take it back when required.
- **Distribution licensees** can procure and supply RE to manufacturers at concession (procurement cost + wheeling charges + small margin as per State Commission).
- **Inter-state transmission charges** are waived for 25 years for projects commissioned before 30th June 2025.
- **Renewable energy** consumed shall count towards Renewable Purchase Obligation (RPO) compliance

Policy enabling "ease of doing business"

- **Open access for electricity** will be granted within 15 days of receipt of application.
- Priority will be given for connectivity, at generation end and the Green Hydrogen / Ammonia manufacturing end, to the **ISTS for RE capacity** used to produce Green Hydrogen / Ammonia.
- Ministry of New and Renewable Energy (MNRE) will set up a **single portal for granting statutory clearances** in a time-bound manner
- MNRE may **aggregate demand from** different consumers and have consolidated bids for the procurement of GH/GA. This could help create competitive prices for GH.
- **Land in RE parks** can be allocated towards green hydrogen/green ammonia plants

States Specific support (1/3)

Key Sections	Uttar Pradesh	Andhra Pradesh	Rajasthan
Tax Breaks	100% SGST breaks for SGST exemption for gH2 prod.	Reimbursement of **S-GST revenue** from sale of Green Hydrogen / Green Ammonia within the state for 5 years	SGST reimbursement 75% of the State Tax due and deposited for a period of 7 years.
Investment Subsidy	Additional subsidy INR 3500 **per ton urea** over 10% blend of green urea.	NA	20% **Capital Subsidy** for plant and machinery (max 50cr)

States Specific support (2/3)

Key Sections	Uttar Pradesh	Andhra Pradesh	Rajasthan
Incentives for Electricity Capacity addition	100% exempt from wheeling , ISTS , cross subsidy and distribution charges 100% exempt from land tax , land use conversion , stamp duty , industrial water consumption for producing green hydrogen	• 100% exemption of electricity duty for power consumed for production of Green Hydrogen / Green Ammonia for 5 years from COD • 25% Intra State transmission reimbursed to the developer for 5 years from COD subject to INR 10 lakh / MW / year of installer electrolyzer capacity • Reimbursement of **Cross – Subsidy charge** for RE Power located in state for period of 5 years.	• Land & Tax conversion charges exempt 100% of land tax for 7 years to promote large scale solar. • Mandi Fee 100% exemption for 7 years. • 100% Stamp Duty benefit

States Specific support (3/3)

Key Sections	Uttar Pradesh	Andhra Pradesh	Rajasthan
Equipment Manufacturing facilities	**Electrolyser only** reducing subsidy for > 50MW based on commissioning date from 2023-2028	Promote setting up Green Hydrogen and its related **equipment manufacturing facilities in the state**	• Capital Subsidy based on eligible investment to be disbursed in annual installments over 10 years • **Turnover linked Incentive of 1.2%-2% of Net Sales Turnover disbursed annually for 10 years**
Hydrogen Hubs & Pilots **SEZs**	**One time grant of 30% of cost , max 5 Cr for pilots**	**Hydrogen Hub** with NTPC	Freight subsidy for green Hydrogen
Job creation	Skill Development with no specific target / incentives.	600 jobs or 12,000 jobs per MTPA production of green hydrogen / green ammonia	Skilling support in the form of a training subsidy of INR 4000 per worker per month for training delivered in Rajasthan.

Economic Assessment

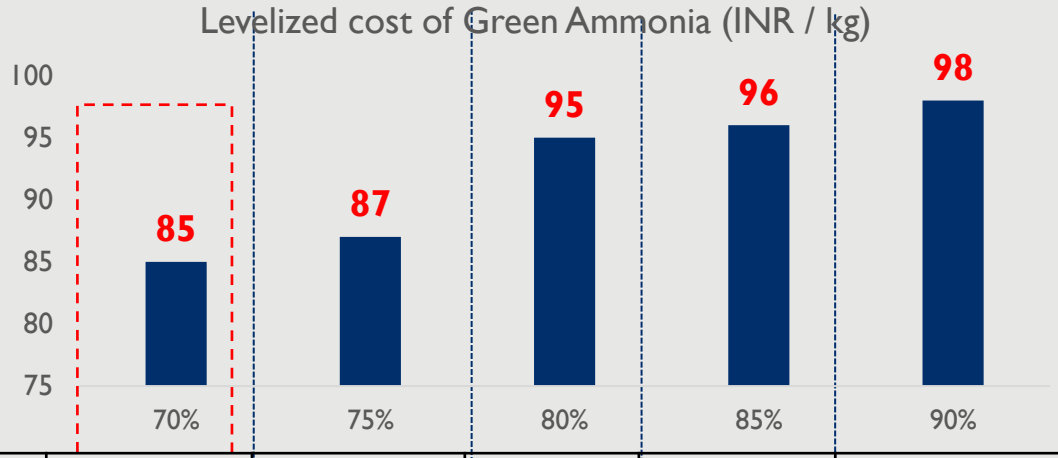
Existing Supply Chain : Fertilizers & Ammonia

Fertilizer In India (Qty in Mn Ton)			
Fertilizer	**Production**	**Import**	**Sales**
Urea	28.5	7.6	36.4
DAP	4.3	7.1	10.7
MOP	0	1.4	1.6
NPK	9.3	2.8	10.7
Total	**42.1**	18.8	59.4

- Fertilizer **domestic demand is ~60MMT** per year.
- India imported ammonia **3 MMT.**
- Import of Fertilizer and Ammonia is **US $6Bn.**

Ammonia substitution for "Imports" and "Conversion to Green Ammonia"

INR 80-85/kg is price expected of Green Ammonia



Contract Power	90MW	82MW	74MW	66MW	60MW
Price / Kwhr	3.75	4.30	4.82	5.29	5.72
Electrolyzer	79MW	71MW	68MW	59MW	55MW
Storage	3.75 ton	3.26 ton	2.89 ton	2.09 ton	1.38 ton
Capex	878 Cr	809 Cr	782 Cr	703 Cr	666 Cr
Opex	3639 Cr	4015 Cr	4547 Cr	4946 Cr	5310 Cr

Source: SAREP Analysis

Key Assumptions – Respective Min Contract Power is compared between each RTC Profile to calculate LCOG. ALK considered with 200bar storage tank

Project life (after CoD)** = 25 year ; Electricity cost*-RTC tariff Open access surcharge ; Debt: Equity ratio* = 70:30 ; Cost of Debt* = 8.42%

Way Forward

A. To encourage fertilizer manufacturers to use Green Ammonia and support GOI in implementation of Green Hydrogen mission objectives.

B. Fertilizer Manufacturers to avail incentives & subsidies and set up pilot project or aggregate requirements to be met by Green Ammonia Developer.

C. Suggestions from this workshop to promote use to Green Ammonia in Fertilizer manufacturing.

Green hydrogen SAREPs coverage

Technology 01

Pilots and Demonstrations – Green Fertilizers

Techno-Economic Study – Findings and Learnings

Investment 02

Green Hydrogen Investment Landscape in India

Knowledge product

Skill 03

Skill and Capacity Building requirement

Meeting GH mission targets - ongoing activity update

Policies 04

Enabling National Policies and Regulations

MNRE and states

Thank You

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