

Policy landscape of Green Hydrogen Economy

“Training program on “Techno-economic Considerations for the Design of Green Hydrogen Projects”

Feb 03, 2022 ; New Delhi

Deepak Rai, Skill Council For Green Jobs

About Skill Council for Green Jobs (SCGJ)

Set up in 2015 as a sector skill council by the Ministry of Skill Development and Entrepreneurship (MSDE) and the Confederation of Indian Industry (CII) to catalyse growth in green business through skilling and entrepreneurship development

Now recognised as an Awarding Body by the regulator- National Council for Vocational Education and Training (NCVET) and implements Skill India Mission



- Skilling interventions are aligned with leading schemes and missions of the Government of India while building partnership with stakeholders from industry, vocational institutions, academia and communities.
- Trained and certified over 526,000 trainees till date (mainly in waste management and renewables mainly solar energy, 10-15% female participation) and aims to further train and certify up to 3 Million trainees by 2030, (with at least 30% female candidates).
- **Delivering Skill solutions and the strategy is complemented by specific efforts to promote entrepreneurship as well**

India can potentially create about 3.4 million jobs (short and long term) by installing 238 GW solar and 101 GW new wind capacity to achieve the 500 GW non-fossil electricity generation capacity by 2030 goal.

India to create an estimated 30-35 million additional jobs across Green Business by 2047



Snapshot of Thematic NSQF aligned Job Roles

Sector-wise Job Roles	NSQC approved Job Levels						NSQC Approved
	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	
Solar Photovoltaic	1	2	8	6	1	2	20
Wind Energy	0	1	3	2	0	0	6
Bioenergy	0	1	3	1	1	1	7
Waste Management	0	2	1	0	1	0	4
Waste Water Treatment	0	1	3	0	0	0	4
Green Hydrogen	0	0	1	1	0	0	2
Others	0	3	6	1	0	0	10
Total	1	10	25	11	3	3	53

Project emerging skills needs and coordinate matching demand and supply of skilled workforce



**Hon'ble Prime Minister
Shri. Narendra Modi**
on 15th August 2021



*Make India energy independent
before the completion of 100 years
of independence (Year 2047).*

India is also emphasizing on Clean Energy Transition including on **Green Hydrogen** and **Circular Economy** creating new opportunities for **Green Growth** and **Green Jobs**

**India's pathway to combat
climate change
PANCHAMITRA at COP 26,
Glasgow**

India's five-point climate action plan, is set to give a firm push to its plans for an accelerated transition to a low carbon economy.

- Achieve the target of net-zero by 2070
- Non-fossil energy capacity to reach 500 GW by 2030
- 50% of energy requirements to be met through RE by 2030
- Emissions intensity of GDP to be reduced by 45% by 2030
- Reduce 1 Billion tonne of Carbon Emissions by 2030

And the launch of Mission LIFE in 2022

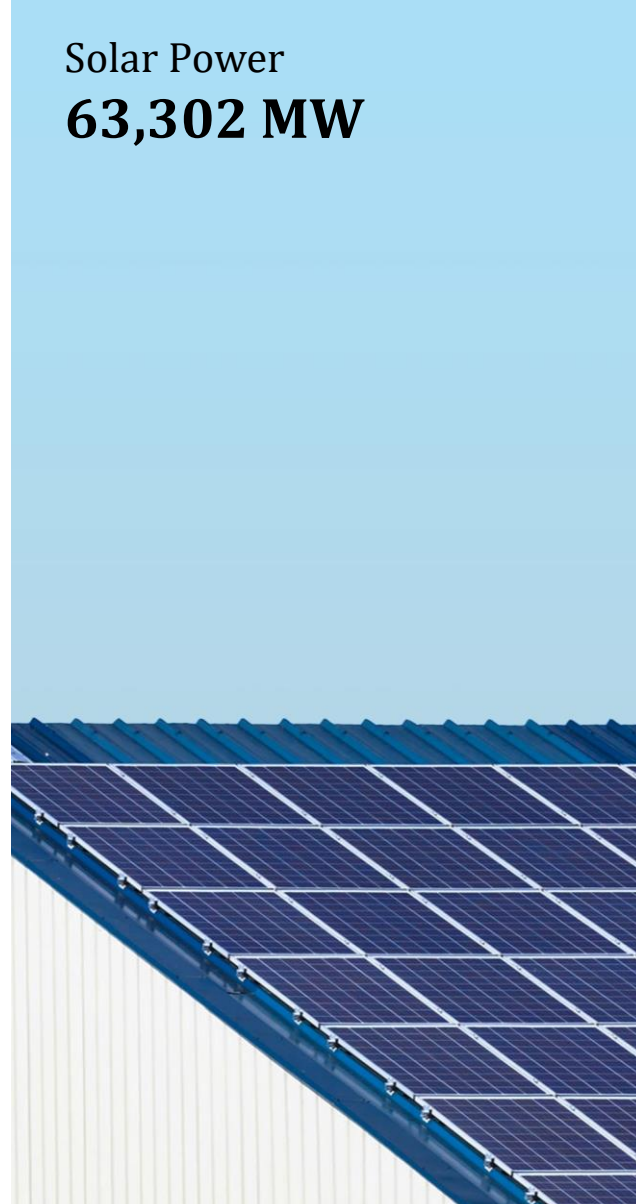
Hon'ble Prime Minister Shri. Narendra Modi at COP 26 (Nov 2021)



Wind Power
41,929 MW



Solar Power
63,302 MW



Small Hydro Power
4,935 MW



Bioenergy
10,725 MW



Renewable Energy Sector Indian Scenario



Wind Power
41929 MW

Waste to
Power
223.14 MW

Solar Power - Ground
Mounted
51425 MW

Waste to Energy(off-grid)
272 MW

Solar Power - Roof Top
8077 MW

Biomass (Bagasse)
Cogeneration
9433.56

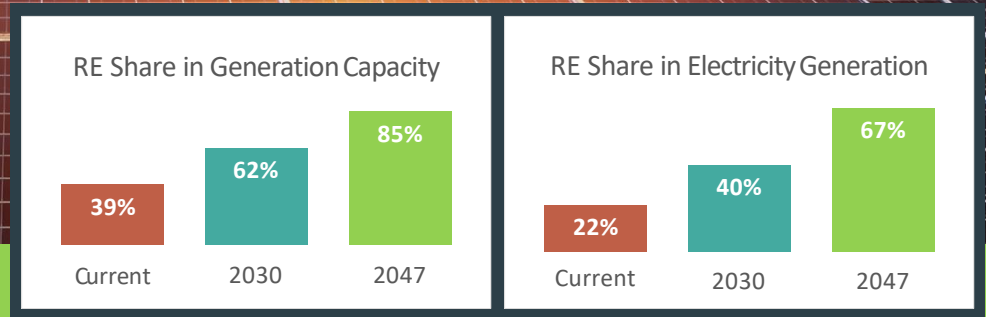
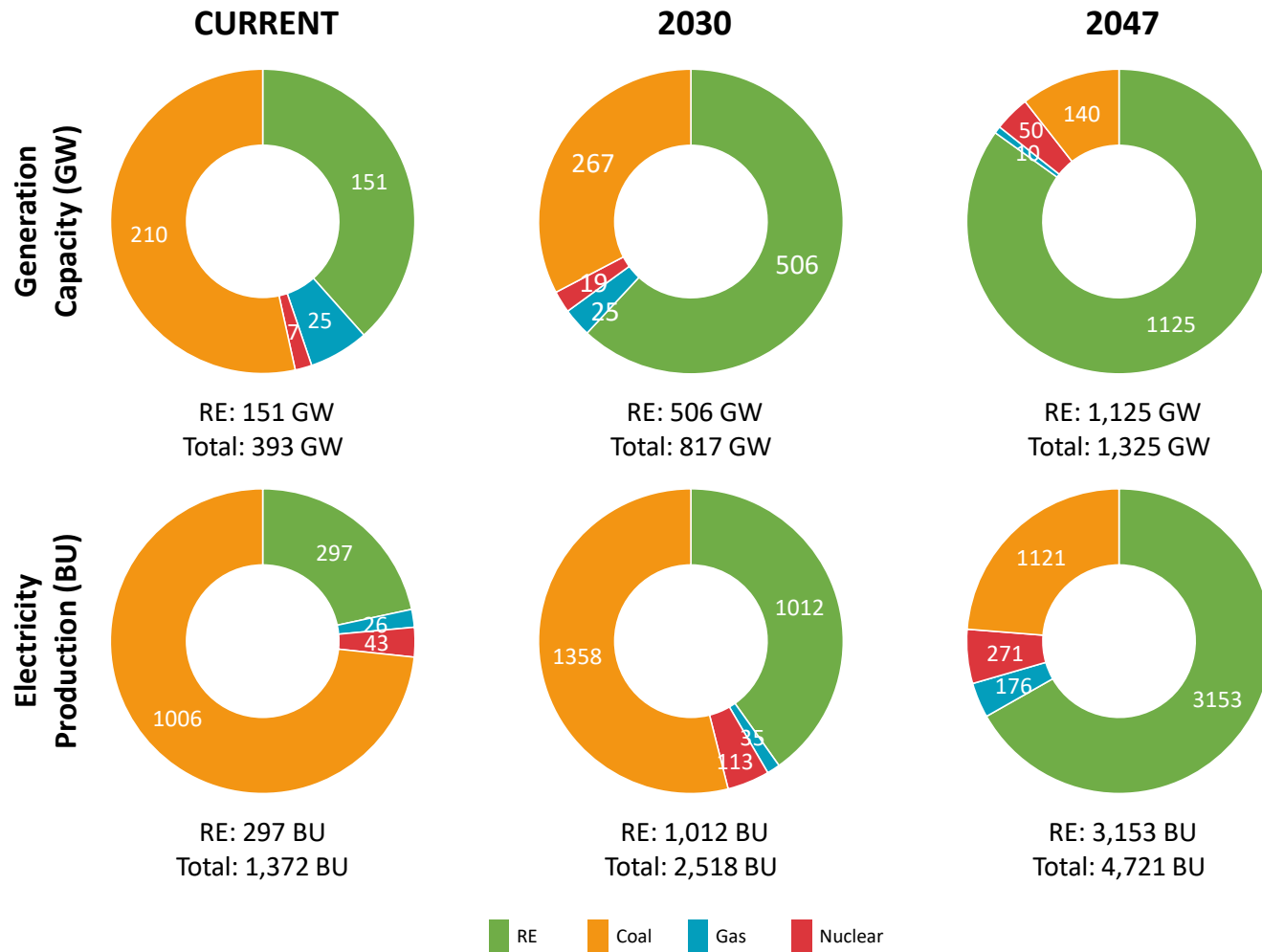
SPV Systems (Off-
grid)
2059 MW

Biomass (non-bagasse)
Cogeneration
772.05 MW

Small Hydro Power
4935 MW

Source: MNRE, Programme/Scheme wise Cumulative Physical Progress
as on Dec 2022 | <https://mnre.gov.in/the-ministry/physical-progress>

Indian Energy Sector 2022- 2047



Source: MNRE Vision 2047 (CEA Optimal Energy Mix Report (Jan. 2020), NITI Aayog - India Energy Outlook, 2021)

Reliance's \$75 billion plan aims to make India a hydrogen hub

Analysts say Reliance is likely to opt for hydrogen in a bid to avoid India's wholesale electricity market, which is dominated by financially stressed utilities

Topics

Reliance Industries | hydrogen

Rajesh Kumar Singh & Debjit Chakraborty | Bloomberg
Last Updated at January 30, 2022 10:08 IST

Ohmium, Shell announce collaboration on green hydrogen solutions

Under this both firms have intent to launch joint working groups to assess opportunities from the technical, commercial, and safety perspectives

ETEnergyWorld • August 24, 2022, 12:04 IST

Adani, TotalEnergies join hands to invest \$50 billion in green hydrogen

Gautam Adani, chairman, Adani Group said, he is confident the company will produce the world's least expensive green hydrogen

Topics

Adani Enterprise Ltd | Total | clean energy

Shreya Jai | New Delhi
Last Updated at June 15, 2022 00:34 IST

Green Hydrogen | Joint Venture – ReNew Power, IOCL and L&T



ReNew Power (NASDAQ: RNW), India's leading renewable energy company, along with IOCL and L&T have announced signing of binding term sheet for the formation of a Joint Venture (JV) company to develop the nascent green hydrogen sector in India. The planned JVs aim to enable India's transition from a grey hydrogen economy to a greener economy that increasingly manufactures hydrogen via electrolysis powered by renewable energy. Continue to browse this section to learn more about this news.

Source: Multiple Media reports



Ministry of New and Renewable Energy

Cabinet approves National Green Hydrogen Mission

Mission aims to make India a Global Hub for production, utilization and export of Green Hydrogen and its derivatives

Mission will help in India becoming energy independent and in Decarbonisation of major sectors of the economy

Posted On: 04 JAN 2023 4:14PM by PIB Delhi

Jakson Green to invest Rs 22,400 cr in green hydrogen project in Rajasthan

Jakson Green has inked a pact to invest Rs 22,400 crore to set up a green hydrogen and green ammonia project, in phases, in Rajasthan

Topics

Jakson group | rajasthan

Press Trust of India | New Delhi
Last Updated at October 25, 2022 17:38 IST

Indian Oil targets green hydrogen meeting 10% of requirements by 2030

Indian Oil Corporation (IOC) is targeting to replace at least a tenth of its current fossil-fuel-based hydrogen at its refineries with carbon-free green hydrogen as part of a decarbonization drive

Topics

Indian Oil Corporation | Fossil fuel

Press Trust of India | New Delhi
Last Updated at August 2, 2022 16:49 IST

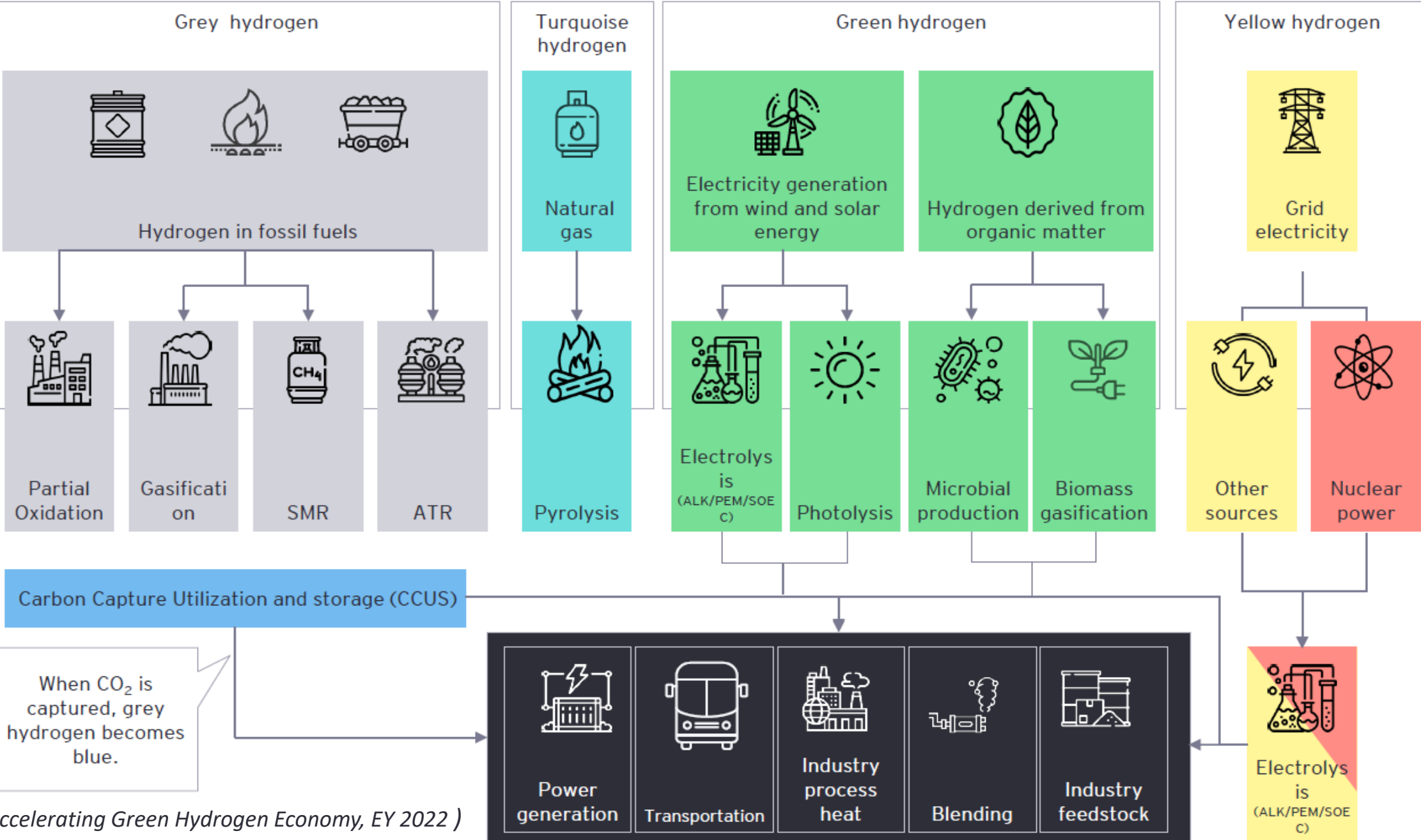
Home > News > ENVIRONMENT

NTPC starts India's first green hydrogen blending project

The project is a joint effort of NTPC and Gujarat Gas Ltd (GGL).

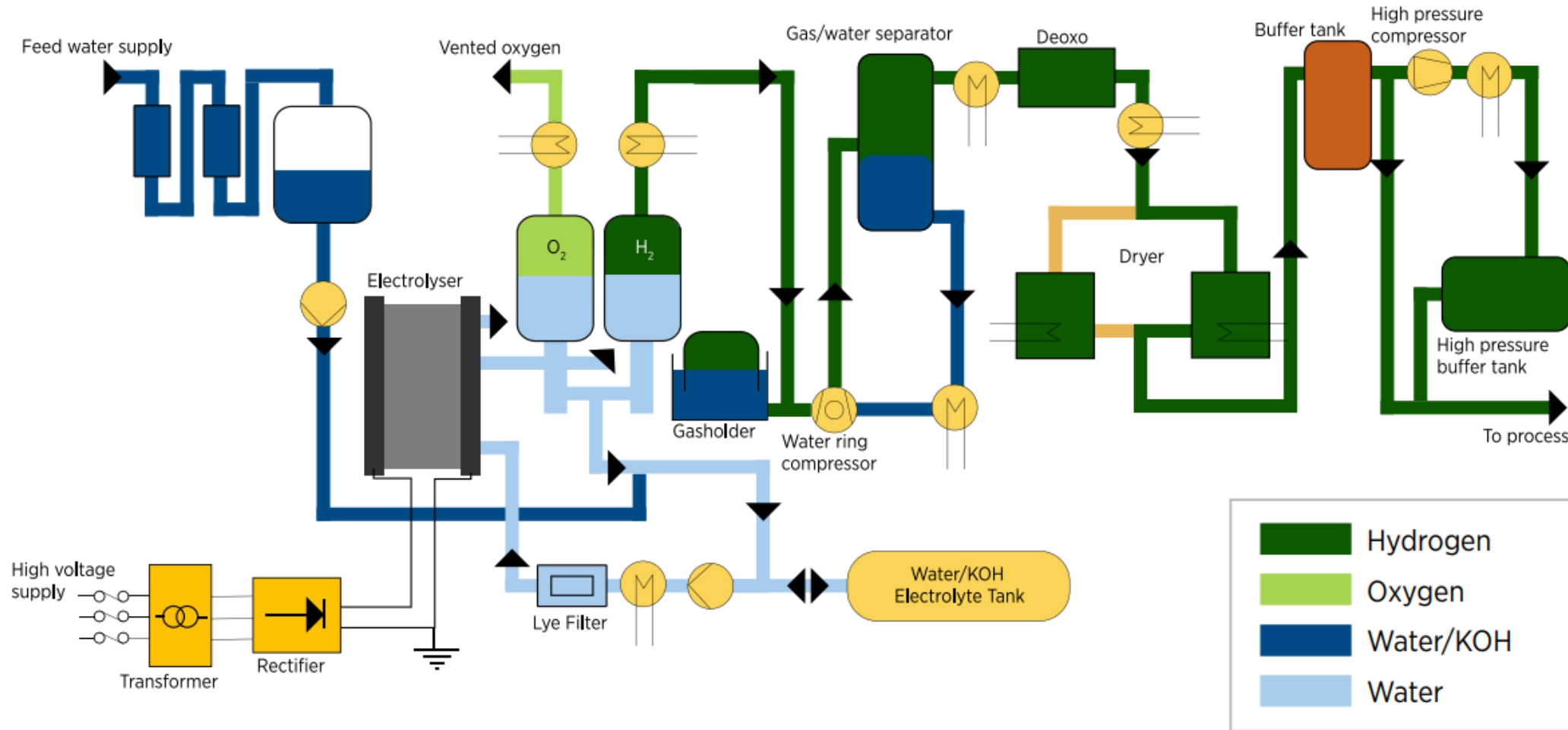
MONEYCONTROL NEWS | JANUARY 03, 2023 / 06:04 PM IST

Green Hydrogen production routes and nomenclature



(Source: Accelerating Green Hydrogen Economy, EY 2022)

Typical system design and balance of plant for an alkaline electrolyser



Source: IRENA, 2020

Green Hydrogen Policy



Panchamrit India's climate actions : 2030 Targets [COP26 Glasgow]

500 GW of non-fossil energy capacity by 2030	50% of electrical energy capacity	one billion tonnes reduction	Reduce 45% carbon intensity of economy	Net-zero emissions by 2070
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Its pivotal role is also reflected in India's Long Term Low Emissions Development Strategy (LT-LEDS).

Definition of 'Green hydrogen / ammonia'

Waiver of ISTS charges

Grant of Open Access

RPO compliance

Grant of ISTS connectivity

Banking of renewable energy for 30 days

Manufacturing Zones

Land in RE Parks

Single window

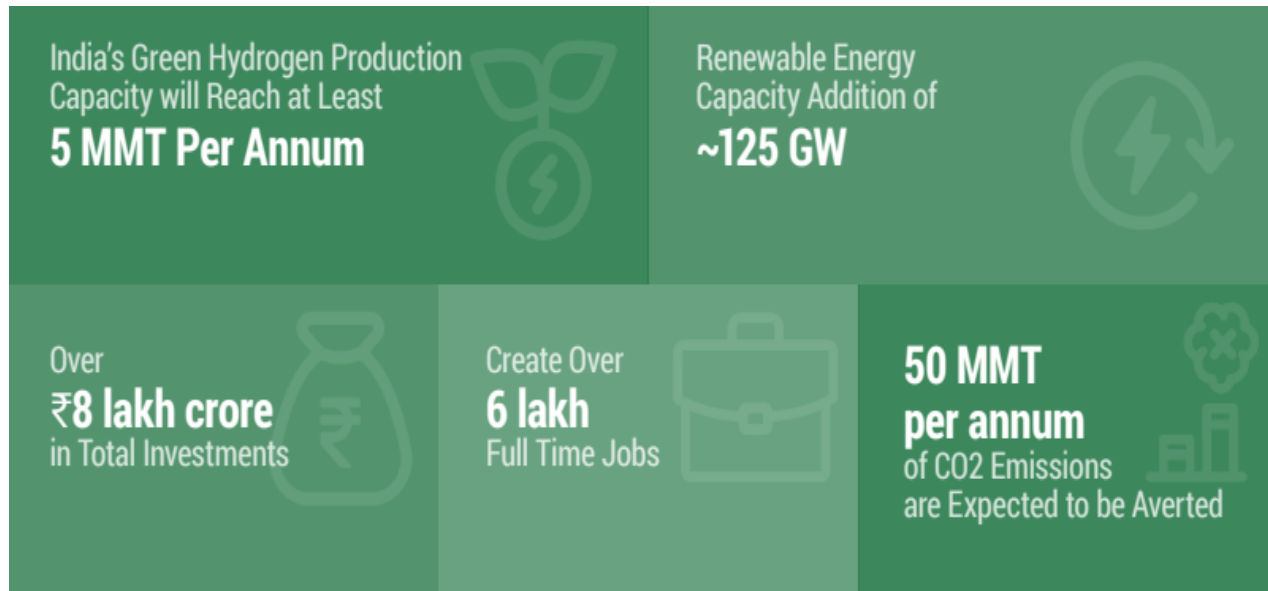
Bunkering and storage

Demand Aggregation and consolidated bids

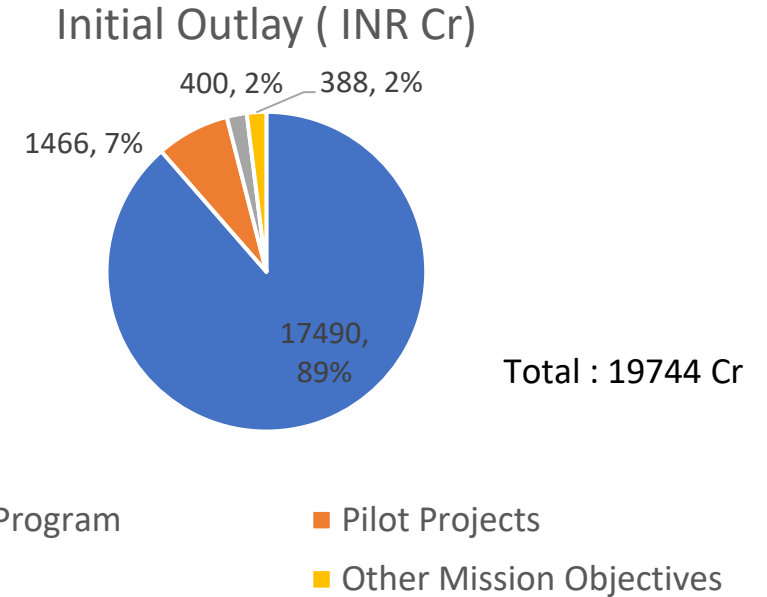
National Green Hydrogen Mission

Overarching objective: To make India the Global Hub for production, usage and export of Green Hydrogen and its derivatives.

- India to become Aatmanirbhar
- Significant decarbonization of the economy, reduced dependence on fossil fuel imports, and enable India to assume technology and market leadership in Green Hydrogen.



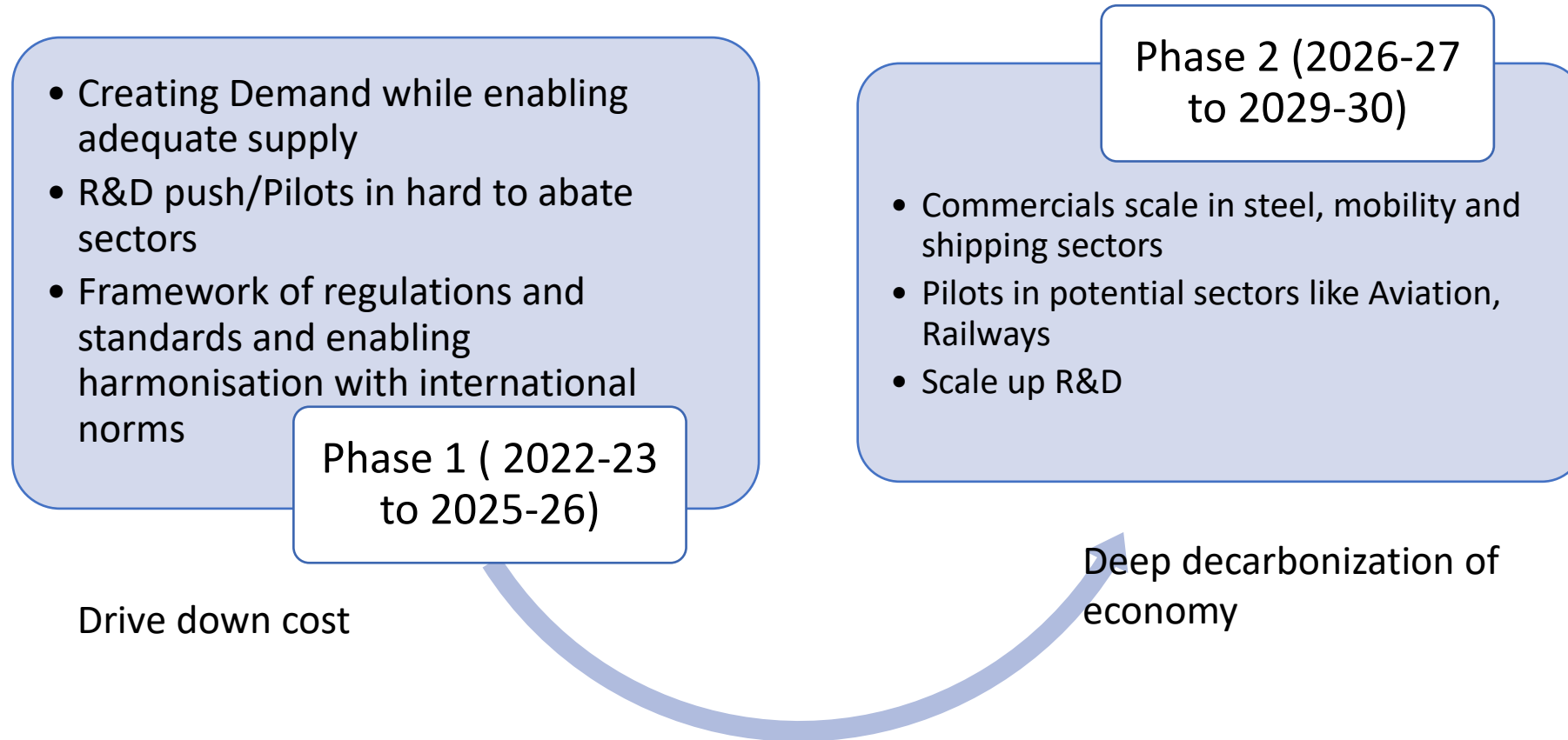
(Source: MNRE, 2023)



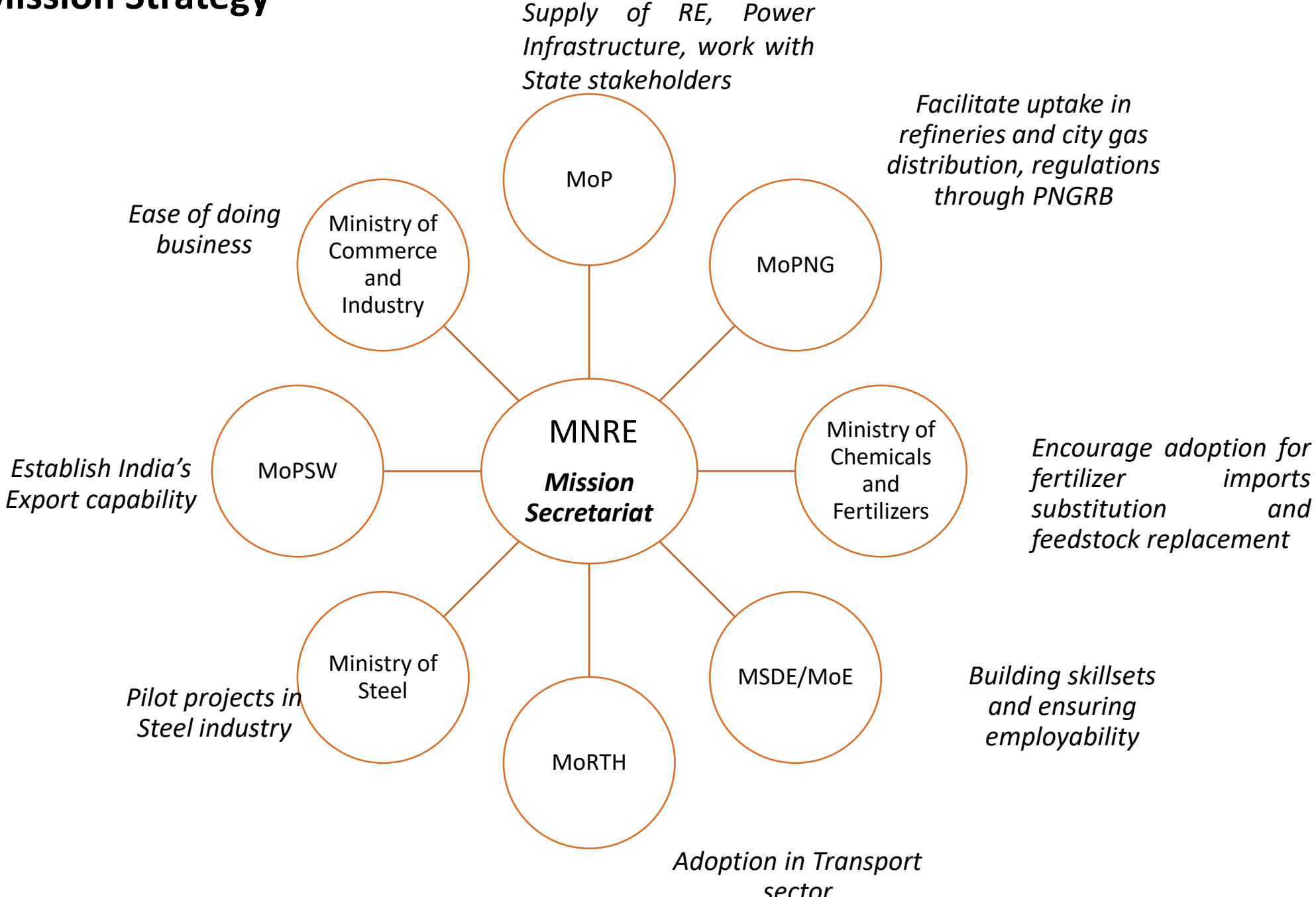
Mission will build capabilities to

- Produce at least 5 Million Metric Tonne (MMT) of Green Hydrogen per annum by 2030, with potential to reach 10 MMT per annum with growth of export markets
- Support replacement of fossil fuels and fossil fuel based feedstocks with renewable fuels and feedstocks

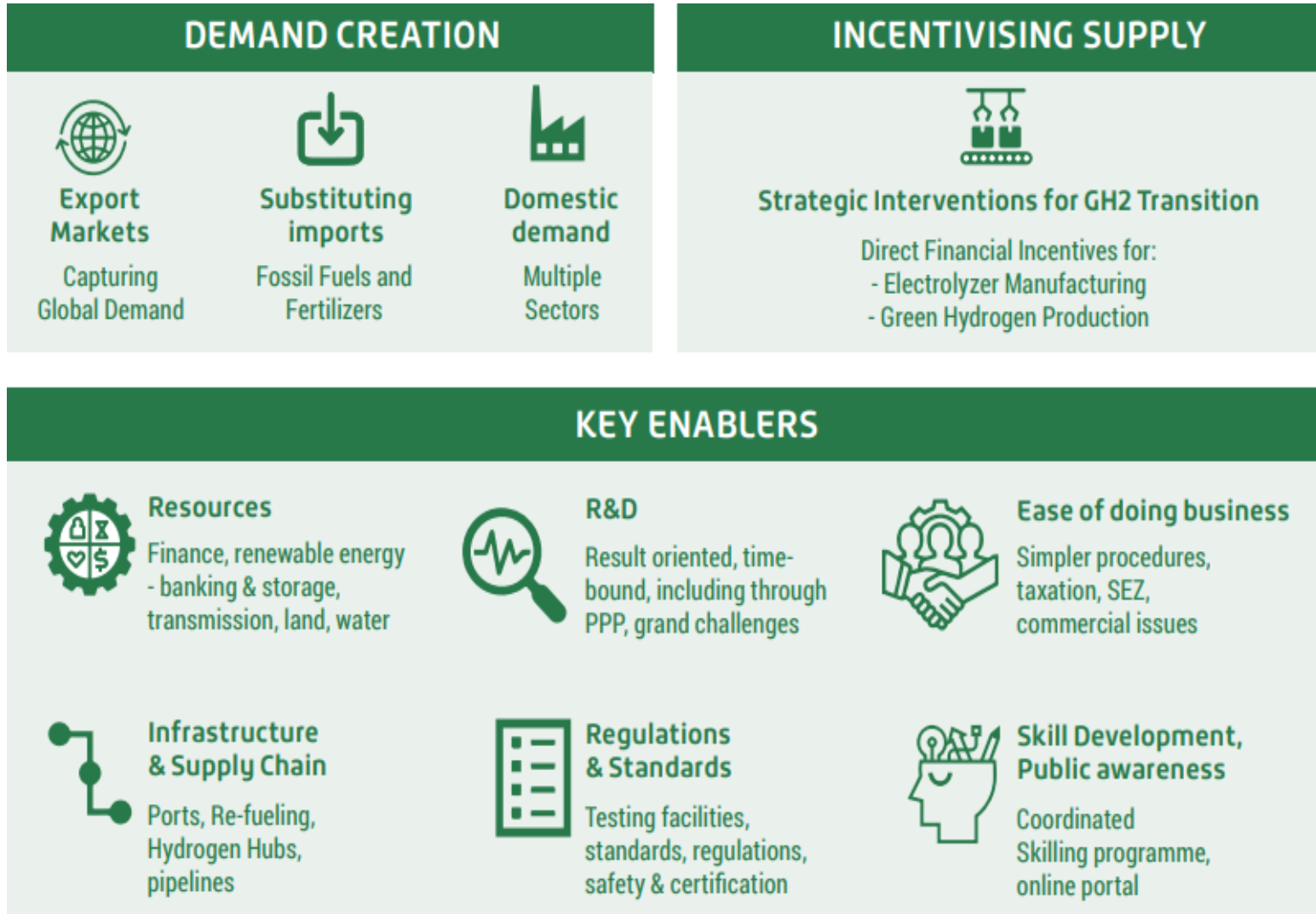
Phased approach



Integrated Mission Strategy



Mission Components

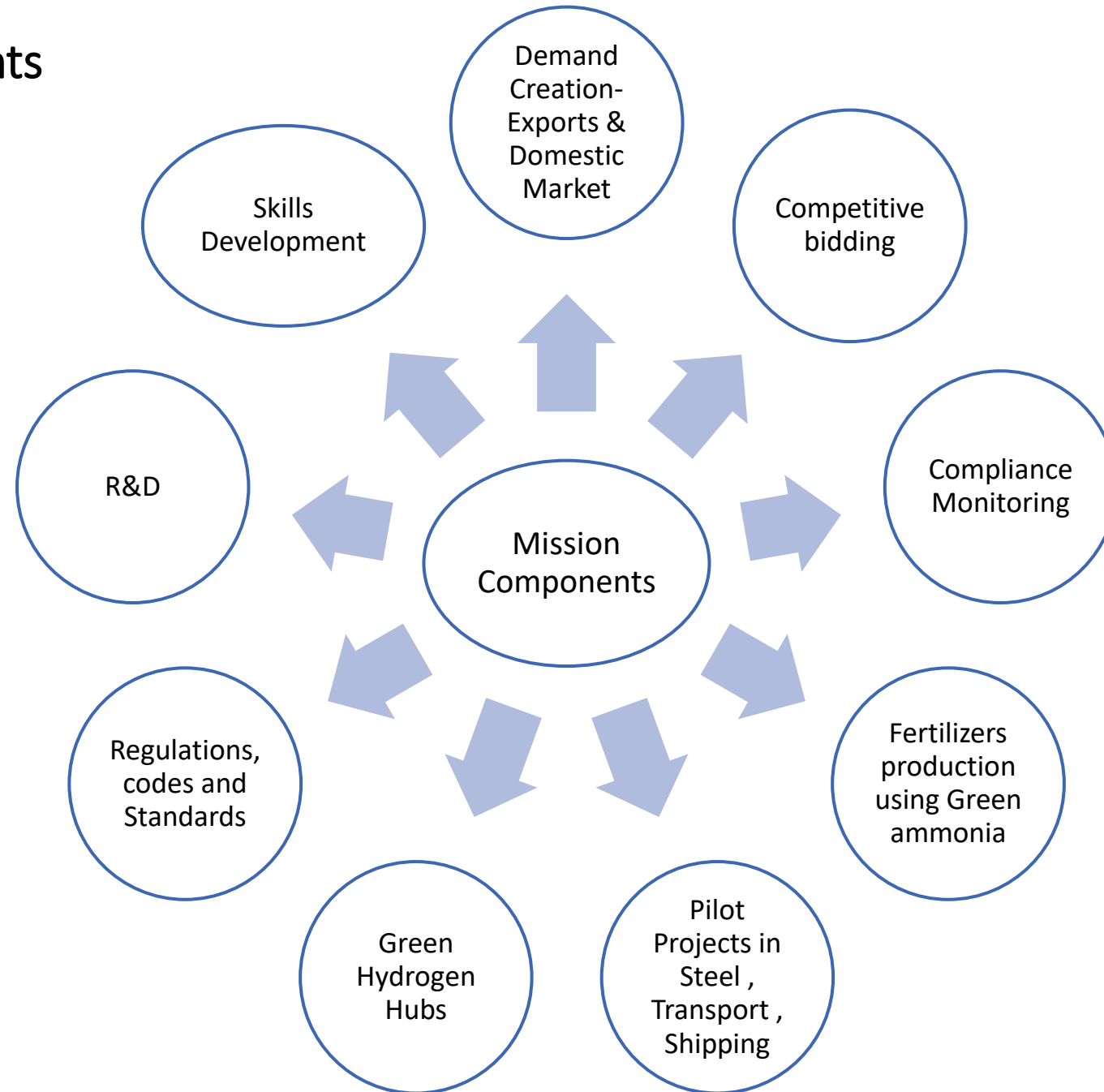


STRATEGIC INTERVENTIONS FOR GREEN HYDROGEN TRANSITION (SIGHT)

- Financial Incentives for domestic manufacturing of electrolysers, and production of green hydrogen
- Financial + Non Financial Measures proposed to produce low cost Green Hydrogen

(Source: MNRE, 2023)

Mission components



Mission Governance Framework and implementation timeline

Empowered Group

- ✧ Chaired by Cabinet Secretary
- ✧ Members: Principal Scientific Adviser to the Government of India, CEO, NITI Aayog, and Secretaries of Ministries of New and Renewable Energy, Petroleum and Natural Gas, Power, Road Transport and Highways, Steel, Heavy Industries, Ports, Shipping and Waterways, Skill Development and Entrepreneurship; and Departments of Fertilizers, Science and Technology, Scientific and Industrial Research, Promotion of Industry and Internal Trade; and experts from the industry.

Advisory Group

- ✧ Chaired by the Principal Scientific Advisor to the Government of India
- ✧ Members: Experts from academic and research institutions, industry, and civil society.

Mission Secretariat

- ✧ Headquartered in MNRE
- ✧ Headed by Mission Director
- ✧ Comprise subject matter experts and professionals

(Source: MNRE, 2023)

	Facilitate	Green Fertilizers	SIGHT	Pilots & Hubs	Regulations & Standards	R&D
YEAR						
2022-23			Consultation and Market Review	Roadmap for key sectors	Procedure for regulatory approval of pilot projects	Formulation of R&D Roadmap
2023-24	Notification of targets as may be decided by EG	Notification of Bids Award of Capacity	Notification of Incentive Schemes	Call for Proposals Phase I Implementation	Adoption of relevant international standards	Call for Proposals Phase I Implementation
2024-25	Preparatory steps for implementation	Construction				
2025-26	Implementation	Green Fertilizer production	Implementation of incentives	Call for proposals	Continuous Review and Monitoring	Call for proposals
2026-27						
2027-28						
2028-29				Phase II Implementation		Phase II Implementation
2029-30						

New Skills and Jobs Opportunities in Green Hydrogen Value chain

