World Hydrogen Summit 2025

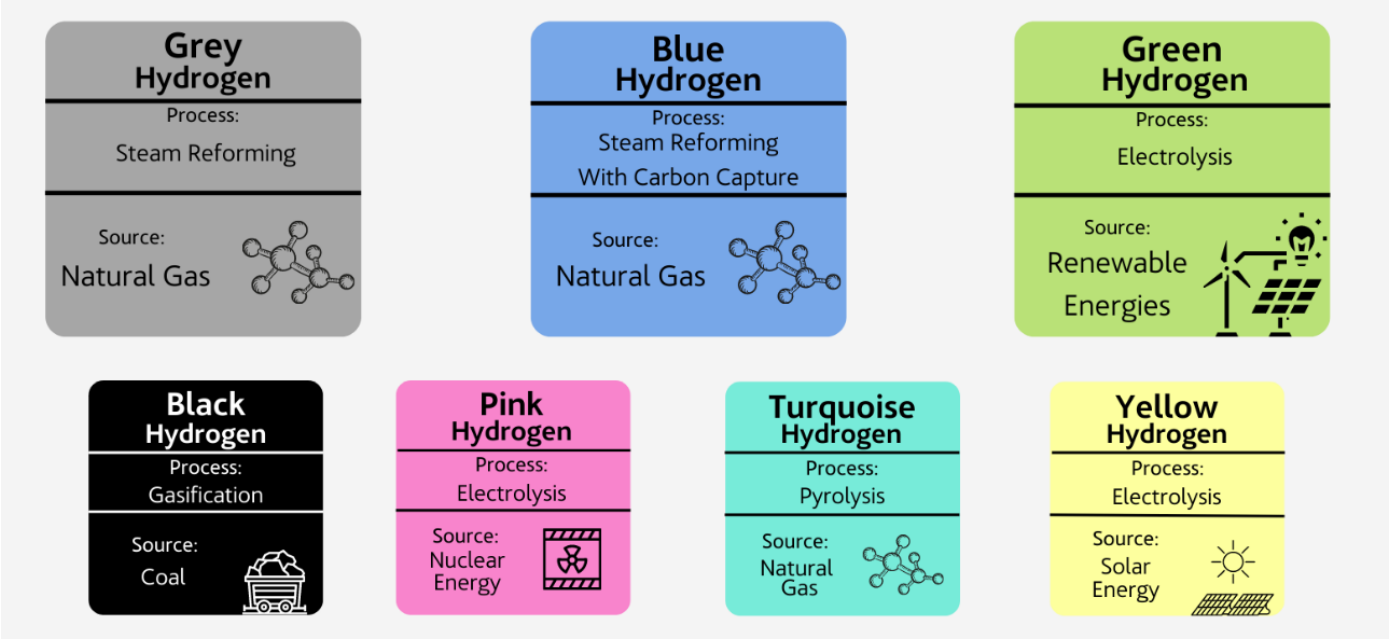
Source: PIB

Why in News?

At the **World Hydrogen Summit 2025** in **Rotterdam**, **Netherlands,** the Ministry of New & Renewable Energy outlined **India's initiatives** to emerge as a global hub for **green hydrogen production**.

What is Green Hydrogen (GH2)?

- **About: Green hydrogen** is produced by **splitting water** into **hydrogen (H_2) and oxygen (O_2)** through **electrolysis** powered by **renewable energy** sources like solar power, or via **biomass gasification.**
- **Applications:** Its **use** include **fuel cell electric vehicles (FCEVs)**, **industrial uses** such as fertilizers and refineries sector, and **transportation** sectors like **road** and **rail.**
- **Other Types of Hydrogen:**



What are India's Initiatives to Promote Green Hydrogen?

- **National Green Hydrogen Mission:** National Green Hydrogen Mission is India's flagship policy to scale up **green hydrogen**, with a target of establishing **5 million tonnes of annual green hydrogen** production capacity by 2030.
  - **Phase I** of the mission spans from **2022-23 to 2025-26**, followed by **Phase II** from **2026-27 to 2029-30**.
- **Green Hydrogen Certification Scheme (GHCI):** GHCI is an initiative to **certify green**

hydrogen production, ensuring transparency and market credibility while promoting India's green hydrogen market.
    - It will be verified by the **Bureau of Energy Efficiency (BEE)** **Accredited Carbon Verification (ACV) Agency** to ensure compliance.
- **Environmental Clearance Exemptions: Green Hydrogen and Green Ammonia plants** are **exempt** from mandatory **Environmental Clearance**, reducing delays and easing project implementation.
- **Green Hydrogen Hubs:** Ministry of Ports, Shipping and Waterways (MoPSW) has identified three major ports—**Kandla, Paradip, and Tuticorin**—to be developed as Green Hydrogen hubs.
- **International Collaboration:** India has partnerships with **Japan, Australia, and the UAE** for **technology transfer and investment** for green hydrogen production.

NATIONAL GREEN HYDROGEN MISSION

NODAL MINISTRY

- Ministry of New and Renewable Energy

OBJECTIVE

- Decarbonise energy/industrial/mobility sector
- Develop indigenous manufacturing capacities
- Create export opportunities for GH_2 and its derivative

COMPONENTS OF NGHM

- Strategic Interventions for Green Hydrogen Transition Programme (SIGHT)
- Strategic Hydrogen Innovation Partnership (SHIP) (PPP for R&D)

GH_2 is not commercially viable at present; current cost in India is around ₹350-400/kg. The National Hydrogen Energy Mission aims to bring it down under ₹100/kg.

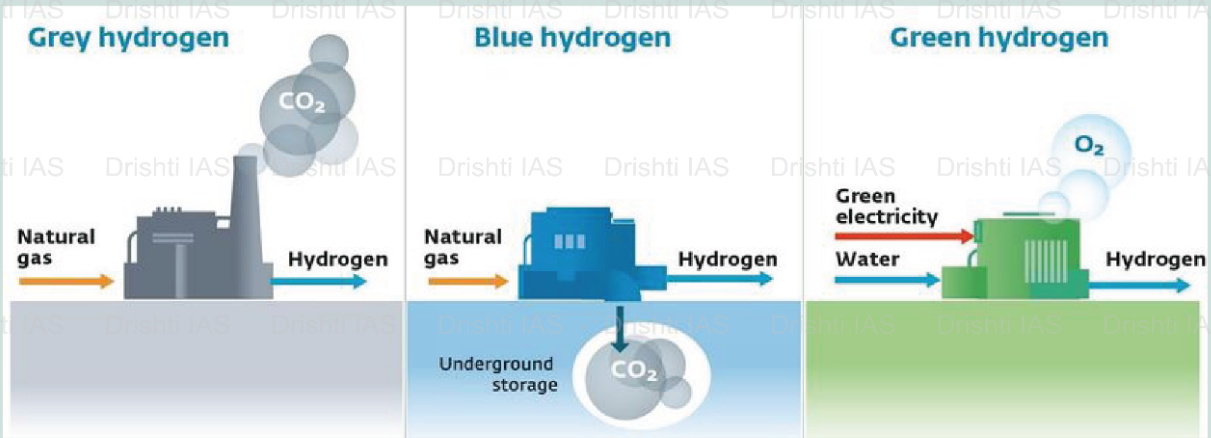
Expected Outcomes by 2030

- Atleast 5MMT GH_2 annual production
- Rs 1 lakh crore fossil fuel import savings
- 6 lakh jobs
- 50MMT CO_2 annual emissions averted
- ₹ 8 lakh crore investment

HYDROGEN AND GREEN HYDROGEN

Hydrogen is the most common element in nature but exists only in combination with other elements. It has to be extracted from naturally occurring compounds (like water).

Green Hydrogen (GH_2) is made by splitting water through an electrical process called electrolysis, using an electrolyser powered by renewable energy (RE).



Hydrogen

- **Hydrogen** is the lightest and most abundant element in the universe. It is a **colorless, odorless, and highly flammable gas** at room temperature.
- **Need of Hydrogen-based Fuel:** They are crucial for **India's energy independence** (reduces reliance on **fossil fuel imports**), offering a **stable, local energy source** from **renewables**.
    - Production from **waste biomass** also creates **additional income** for **farmers** and **local communities.**

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims

Q. Which of the following is the exhaust pipe emission from Fuel Cell Electric Vehicles, powered by hydrogen? (2024)

(a) Hydrogen peroxide

(b) Hydronium

(c) Oxygen

(d) Water vapour

Ans: (d)

Q. Hydrogen fuel cell vehicles produce one of the following as "exhaust" (2010)

(a) NH_3

(b) CH_4

(c) H_2O

(d) H_2O_2

Ans: (c)