Green Hydrogen Superpower

Why in news?

Green hydrogen is a critical industrial fuel of the 21st century and India is well-positioned to show leadership.

What is green hydrogen?

- It is a type of hydrogen produced by splitting water through electrolysis, using electrolyser powered entirely by renewable power sources.
- **Advantages –** It could replace fossil fuels and decarbonize a range of sectors such as petroleum refining, fertiliser production, steel production, chemicals, transport, etc.
- **Disadvantages –** It is not commercially viable at present and is expensive to be manufactured.

	Terminology	Technology	Feedstock/ Electricity source	GHG footprint*
PRODUCTION VIA ELECTRICITY	Green Hydrogen	Electrolysis	Wind | Solar | Hydro Geothermal | Tidal	Minimal
	Purple/Pink Hydrogen		Nuclear	
	Yellow Hydrogen		Mixed-origin grid energy	Medium
PRODUCTION VIA FOSSIL FUELS	Blue Hydrogen	Natural gas reforming + CCUS Gasification + CCUS	Natural gas | coal	Low
	Turquoise Hydrogen	Pyrolysis	Natural gas	Solid carbon (by-product)
	Grey Hydrogen	Natural gas reforming		Medium
	Brown Hydrogen	Gasification	Brown coal (lignite)	High
	Black Hydrogen		Black coal	

*GHG footprint given as a general guide but it is accepted that each category can be higher in some cases.

All about Green Hydrogen.

What is the National Green Hydrogen Mission?

- The National Green Hydrogen Mission was first announced by the Prime Minister in his Independence Day speech in 2021.
- **Objectives –** The mission is aimed at making India a global hub for the production of green hydrogen.
- The mission also aims to:

1. Creation of export opportunities for green hydrogen.
2. Decarbonisation of the energy sector.
3. Development of indigenous manufacturing capacities.

All about National Green Hydrogen Mission.

What are India's commitments?

- **Electricity –** India has committed to 50% electricity capacity from non-fossil sources by 2030.
- Most industrial greenhouse gas emissions in India come from steel, cement, fertilizers and petrochemicals.
- **Green hydrogen –** India is targeting at least 5 million tonnes of production of green hydrogen by 2030, which is larger than that of any single economy.

How can the targets be achieved?

- **Domestic demand –** If we are not a big player domestically, we cannot be a major player in the international market.
- **SIGHT –** The mission introduces a Strategic Interventions for Green Hydrogen Transition (SIGHT) fund for five years, with ₹13,000 crore as direct support to consume green hydrogen.
- This will encourage heavy industries to increase demand, offering economies of scale by which suppliers can reduce prices.
- **Government procurement –** A share of government procurement of steel could be nudged towards green steel, which could help India to later position itself as a green steel exporter.
- **Investments –** India can be an attractive destination for domestic and foreign investment.
- A *mission secretariat* can ensure project clearance is streamlined and reduce financial risks.
- **Electrolyser manufacturing –** The SIGHT fund offers ₹4,500 crore to support electrolyser manufacturing under the performance-linked incentive scheme.
- Not targeting value addition would result in electrolyser technologies and production again getting concentrated.
- China could end up controlling 38% of electrolyser capacity by 2030.
- **Bilateral partnerships –** India must cooperate with like-minded countries on trade, value chains, research and development, and standards.
- **Trade in local currency –** Using yen or euro for trade, could reduce the cost of capital and help us become export competitive.
- **Rules for green hydrogen economy –** India must coordinate with major economies to develop rules for a global green hydrogen economy.
- Attempts for rules and standards are being driven by private corporations rather than structured intergovernmental processes.

What is the way forward?

- **G20 –** India's G20 presidency is an opportunity to craft rules for a global green hydrogen economy.
- These rules must address operational threats, industrial competitiveness and strategic threats.
- **Global network –** India should promote a global network on green hydrogen via

which companies could collaborate.

- **India's geography –** With abundant sunshine and significant wind energy resources, India is geographically blessed to become one of the lowest-cost producers of green hydrogen.
- India is well-positioned to show leadership, in our collective interest and that of the planet.

Reference

1. The Hindu | How to become a green hydrogen superpower