

# Significance of Hydrogen Powered Ferry

# Why in news?

India recently launched its first indigenously developed hydrogen fuel cell ferry.

## What are the special features of hydrogen fuel cell ferry?

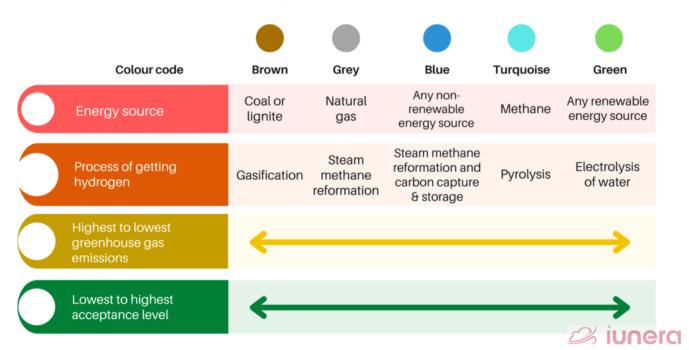
- 'Harit Nauka' initiative- The ferry is a part of this initiative which was launched in 2024 to reduce greenhouse gas emissions as per the <u>Maritime Amrit Kaal Vision</u> 2047.
- Manufactured- By Cochin Shipyard Limited.
- Deployed in service- At Varanasi in Uttar Pradesh.
- **Features** The ferry can carry 50 people, in its air-conditioned passenger area, the boat has five hydrogen cylinders that can carry 40kg of hydrogen and support 8 hours of operations. The vessel is also fitted with a 3-kW solar panel.
- **Fuel cell** It utilises utilizes a 50-kW Proton-Exchange Membrane (PEM) fuel cell which is a type of hydrogen fuel cell with Lithium-Ion Phosphate batteries.
- **Hydrogen fuel cell system** It was developed by KPIT Technologies, Pune in collaboration with CSIR labs.

### What is the significance of hydrogen fuel cell ferry?

- **Environment friendly-**The hydrogen fuel cell-powered vessel has zero emission, zero noise and is energy-efficient.
- **Zero emission-** Fuel cell technology allows for efficient conversion of chemical energy in hydrogen into electricity, with water being the only byproduct.
- **Quick refuelling-** The hydrogen fuel cells do not require recharging, for the continuous operation it must be provided with uninterrupted supply of fuel and oxygen.
- **Zero noise-** The hydrogen fuel cell-powered vessel produces zero emissions and operates silently, making it environmentally friendly and suitable for urban areas.
- **Durability-** The passenger area is constructed with high-quality fiberglass reinforced plastic, similar to metro train coaches it enhances durability while keeping the vessel lightweight.
- **Sustainability-** The ferry features a 3-kW solar panel, contributing to the vessel's energy needs and enhancing its sustainability.
- **Flexibility-** The advantage of using a PEM fuel cell with a Lithium-Ion Phosphate battery is that the system can adjust the power output according to the power demand.
  - $\circ\,$  When the vessel needs to accelerate, the battery can provide extra power.
  - $\circ\,$  When the vessel needs to slow down, the battery can store the excess power generated by the fuel cell.
- Benefits of PEM cell- PEM fuel cells are popular in automotive applications because

they operate at a lower temperature, and are lighter and more compact.

- **Cost effective** There are no moving parts, hence the ferry requires less maintenance than combustion vessels.
- The ferry is a milestone for the field of nuclear fusion and green energy, as it represents the necessary heat and stability required for viable fusion reactors.
- **Emerging green fuel** The ferry has given India an early mover advantage to tap the potential of hydrogen as an emerging green fuel in the marine sector.
- **Boost National Green Hydrogen Mission** It aims to make India the global hub for production, usage, and export of green hydrogen and its derivatives, such as green ammonia and green methanol.



# Hydrogen colour palette

# **Quick facts**

### National Green Hydrogen Mission

• Launch year- 2021

• **Objective-** To make India the Global Hub for production, usage and export of Green Hydrogen and its derivative.

- Strategic Interventions for Green Hydrogen Transition (SIGHT)-
  - Incentive for manufacturing of electrolysers
  - Incentive for production of green hydrogen.

• **Green hydrogen hubs**- It will identify and develop regions capable of supporting large scale production and/or utilization of Hydrogen as Green Hydrogen Hubs.

### Harit Nauka Initiative

• It is the 'Guidelines for Green Transition of Inland Vessels'.

• Launch- By Ministry of Ports, Shipping, and Waterways.

• **Aim**- To embark on a journey towards a sustainable and eco-friendly future for our inland waterway

• All states have to make efforts to use green fuels for 50 per cent of inland waterwaysbased passenger fleets in the next one decade, and 100% by 2045.

• This is to reduce greenhouse gas emissions as per the Maritime Amrit Kaal Vision 2047.

### Reference

- 1. Indian Express- Significance of hydrogen powered ferry service
- 2. MNRE- National Green Hydrogen Mission

