

First hydrogen-powered rail coach

Prelims - Current events of national and international importance | Science and Technology

Why in news?

Union Railway Minister announced that the Indian Railways has successfully tested the country's First hydrogen-powered coach at the Integral Coach Factory (ICF) in Chennai.

- **Proposed route** - The train scheduled to carrying passengers between **Jind and Sonipat** on an 89-km route in Haryana.
- **Design & Approval** - The design, validation and testing are done by Indian Railways' **Research Design & Standards Organisation (RDSO)**.
- **Components** -
 - The conversion of two **conventional 1600 Horse Power (HP)** diesel power cars into hydrogen fuel cell-powered traction system.
 - Setting up hydrogen storage and fuelling facility at Jind in Haryana.
- **Principle** - In a hydrogen fuel cell, oxygen and hydrogen undergo electrochemical reactions to produce electricity, water, and heat.
- **Hydrogen Fuelling facility** - The hydrogen storage and fuelling facility at Jind will have a storage capacity of 3,000 kg of Hydrogen.
 - Operated and maintained in accordance with the standards and specification of Petroleum Explosives Safety Organisation (PESO).
- **Regenerative braking** - The train uses regenerative braking to capture kinetic energy during deceleration and convert it back into electricity to recharge the onboard batteries.
- **Safety features** - That includes pressure relief valves, leak detection, flame detection sensors, temperature detection systems, and scientifically designed ventilation.
- **Independent audit** - An independent third-party safety auditor - 'Technischer Überwachungsverein Sud' (TUV-SUD) of Germany has been roped in for ensuring the safety standards.
- **Future expansion** - Indian Railways plans to run hydrogen trains on

several heritage and hill routes.

- **Significance** – Increased use of hydrogen, which is a **cleaner fuel**, will further reduce dependence on fossil fuels.

Hydrogen is the colourless, odourless, tasteless, lightest and highly flammable.

- **Only a few countries** – The hydrogen fuel in the railways have tried by a few countries in the world that includes Germany, France, Sweden, and China.

Quick Facts

Hydrogen for Heritage

- It is an initiative by Indian Railways to deploy 35 hydrogen-powered trains on heritage and hill routes to reduce emissions and diesel dependency.

National Green Hydrogen Mission

- This initiative was launched on January 4, 2022 to make India a global hub for Green Hydrogen production, usage, and export by 2030.
- Its goals include achieving 5 MMT (Million Metric Tonnes) of Green Hydrogen by 2030, reducing dependence on fossil fuel imports, fostering indigenous manufacturing of electrolyzers and other technologies, and creating significant employment opportunities.

References

1. [The Hindu | Indian Railways first hydrogen powered coach](#)
2. [Indian Express | Indian Railways tests first hydrogen-powered coach](#)