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 Uberwachungsverein 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 electrolysers 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

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