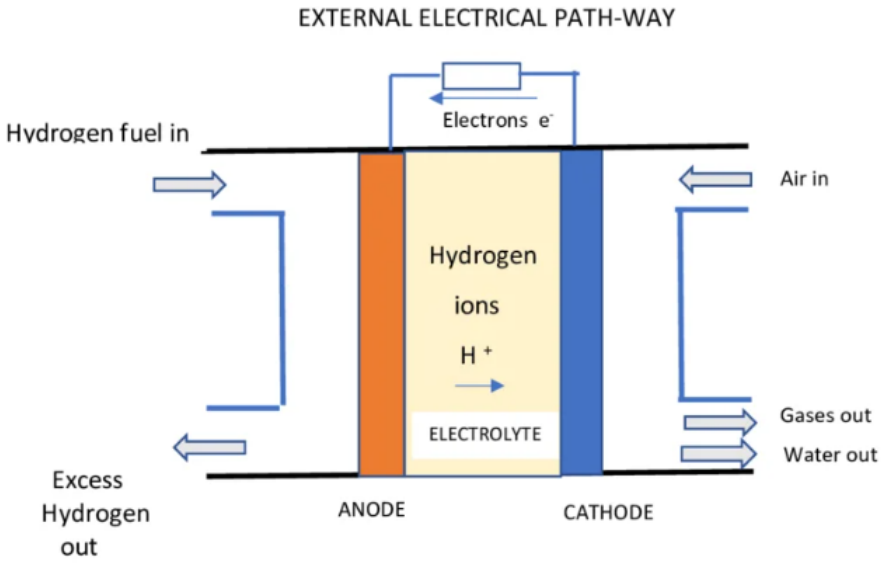
India’s First Indigenous Hydrogen Train

Prelims: *Current events of national and international importance| Science and technology*

Why in News?

Recently, the Indian Railways has approved the introduction of a 10-car Hydrogen Fuel Cell-based trainset.

- **Route** – The country’s first hydrogen-powered train will run *between Jind and Sonipat in Haryana*.
- **Developed by** – Chennai-based Integral Coach Factory (ICF).
- **Hydrogen fuel cell technology** – It generates electricity through a chemical reaction using hydrogen, with *water vapour as the only emission.*



- **Alternative to fossil fuel** – Hydrogen fuel cell technology, making it a clean alternative to conventional fossil fuel-based traction systems.
- Decarbonisation of the railways is a significant step towards attaining the net-zero goal by 2070.
- **Hydrogen for Heritage** – Indian Railways under *“Hydrogen for Heritage”* envisages deploying 35 hydrogen-powered trains on heritage and hill routes across the country.

Features of India’s hydrogen train system

- **Capacity** – 10-Car Train with 1200 KW Engine.
- **Maximum speed** – It will operate at a Maximum Speed of 75 kmph.
- **Hydrogen storage** – An *indigenous hydrogen storage* and refuelling facility has been set up at Jind for the train set.
- **License for hydrogen** – The Petroleum and Explosives Safety Organisation (PESO) has granted the required licence for storage and dispensing of compressed hydrogen gas at the site.
- **Hydrogen compression system** – It has been provided for refuelling operations, along with necessary technical support and critical spares to ensure reliable and fail-safe functioning.
- Provision of a standby compressor unit is also being ensured.
- **Safety protocols** – Necessary safety provisions, regular audits and standard operating procedures are being ensured for the proposed maintenance facility at Shakurbasti.
- Comprehensive safety and operational protocols, including
    - 24x7 monitoring of the hydrogen refuelling system,
    - Deployment of trained and certified personnel for critical operations, and
    - Regular inspection and maintenance schedules.
    - Various safety sensors, including hydrogen leak detectors and flame detectors, are installed at the hydrogen production.
- Operation and maintenance manuals for the hydrogen train-set and hydrogen plant, duly approved by RDSO (Research Designs and Standards Organisation), are also being made available.

Reference

PIB| Hydrogen Fuel Cell Train

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