India’s First Hydrogen Train

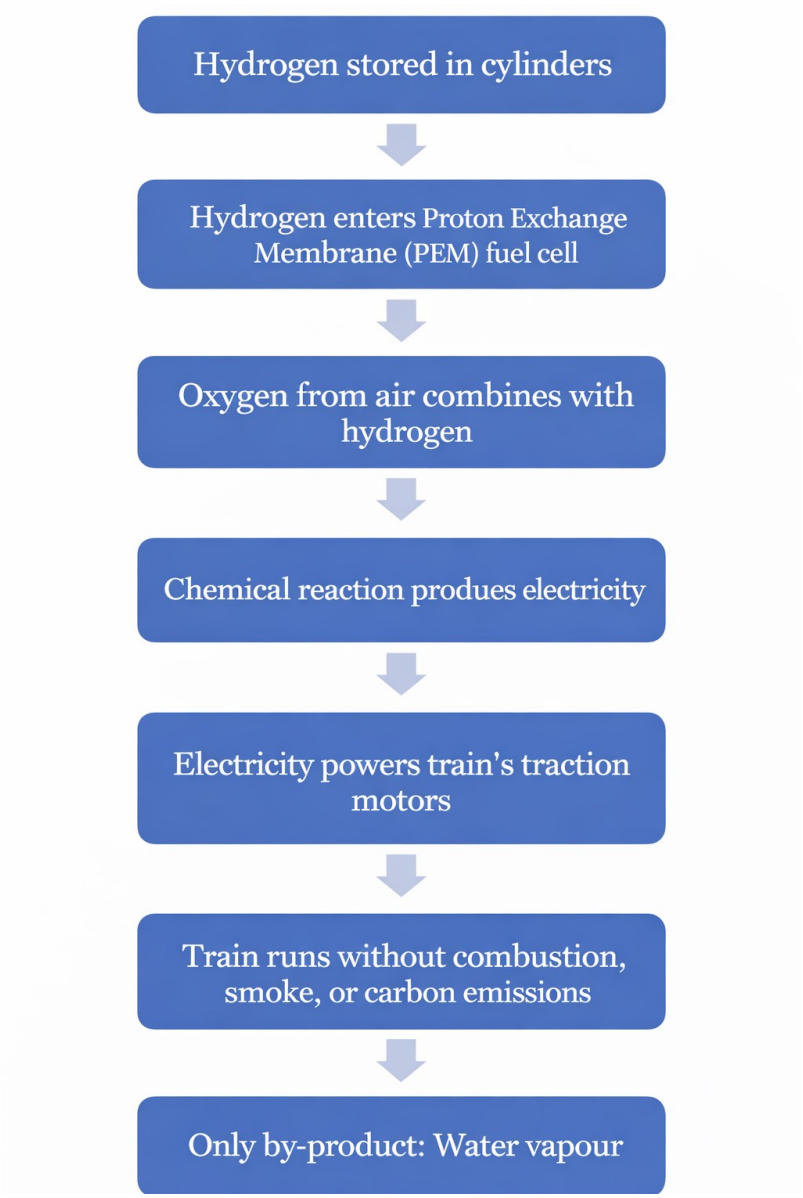
Prelims: *Current events of national and international importance | Science & Technology*

Why in News?

Recently, Prime Minister flagged off India’s 1st hydrogen-powered train between Jind and Sonipat (Haryana), marking India’s entry into the select group of countries operating hydrogen trains.

Key Highlights

- **Technology –** Powered by **hydrogen fuel cell technology**
- **Process**



- **Power System –** *Two hydrogen driving cars*, each producing 1,200 kW, *supported by lithium iron phosphate batteries and hydrogen storage cylinders*.
- **Refuelling –** India's 1st integrated hydrogen railway ecosystem at Jind.
- It includes facilities for *hydrogen production by electrolysis, plus storage, compression, and refuelling* at the same plant.
- **Train specs –** 10 coaches, capacity 2,600 passengers; operational speed 75 kmph (designed for 110 kmph).
- **Global context –** Germany pioneer; China operational; France, Italy rolling out; Japan, US, UK, South Korea at pilot stage.
- India's train is ***longest hydrogen train (10 coaches)*** and among the ***most powerful (3,200 HP)*** globally.

Challenges

- **High costs –** Green hydrogen production, storage, refuelling

infrastructure expensive.

- **Safety –** Hydrogen highly flammable; requires high-pressure storage, strict protocols.
- **Infrastructure needs –** Reliable supply chain, trained manpower, dedicated maintenance facilities.

Reference

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