

India's first truly indigenously developed Hydrogen Fuel Cell Bus

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In news—The Union Minister of State (Independent Charge) Science & Technology has recently launched India's first truly indigenously developed Hydrogen Fuel Cell Bus developed by KPIT-CSIR in Pune.

About Hydrogen Fuel Cell Bus-

- **The fuel cell utilizes Hydrogen and Air to generate electricity to power the bus and the only effluent from the bus is water**, therefore making it possibly the most environmentally friendly mode of transportation.
- For comparison, **a single diesel bus plying on long distance routes typically emits 100 tons of CO2 annually** and there are over a million such buses in India.
- **The high efficiency of fuel cell vehicles** and the high energy density of hydrogen ensures that the operational costs in rupees per kilometre for fuel cell trucks and buses are lower than diesel powered vehicles and this can bring freight revolution in India.
- Moreover, Fuel Cell vehicles also **give zero green-house gas emissions.**
- **About 12-14% CO2 emissions and particulate emissions come from diesel powered heavy commercial vehicles** and these are decentralised emissions and hence difficult to capture.
- Hydrogen fuelled vehicles provide an **excellent means to eliminate the on-road emissions from this sector.**

What is a Hydrogen Fuel Cell?

- **A hydrogen fuel cell uses the chemical energy of**

hydrogen to produce electricity. It is a **clean form of energy with electricity, heat and water being the only products and by-products.**

- Fuel cells offer a variety of applications, from transportation to emergency back-up power, and can power systems as large as a power plant or as small as a laptop.
- Fuel cells provide advantages over traditional combustion-based technologies, including greater efficiencies and lower emissions.
- Since hydrogen fuel cells only emit water, there are **no carbon dioxide emissions** or other pollutants released into the atmosphere.
- Fuel cells are also quiet during operation as they have fewer moving parts than combustion technologies.
- A fuel cell is an electrochemical cell that converts the chemical energy of a fuel and an oxidizing agent into electricity through a pair of redox reactions