



Green Hydrogen Fuel Cell Electric Vehicle

For Prelims: Green Hydrogen, renewable energy, fossil fuels, Paris Agreement, FAME II scheme, PLI scheme, [\[email protected\]](#) campaign.

For Mains: challenges associated and ways to increase the electric vehicles penetration in the Indian market.

Why in News?

Recently, the Union Minister for Road Transport and Highways launched the **world's most advanced technology**, [Green Hydrogen](#) Fuel Cell Electric Vehicle (FCEV) Toyota Mirai.

What is the Significance of this Achievement?

- **Create Awareness about Green Hydrogen and FCEV Technology:**
 - This is a **first of its kind project in India** which aims to create a **Green Hydrogen based ecosystem in the country** by creating awareness about the unique utility of [Green Hydrogen](#) and **FCEV technology**.
 - An MoU was also signed by Toyota Kirloskar Motor Pvt Ltd and the [International Centre for Automotive Technology \(ICAT\)](#) for a pilot project to evaluate the vehicle's performance on Indian roads and climatic conditions.
 - ICAT is a **leading world class automotive testing, certification and R&D service provider** under the aegis of NATRiP (National Automotive Testing and R&d Infrastructure Project), Government of India.
- **Help India becoming Self-reliant' by 2047:**
 - It will **promote clean energy and environmental protection** by reducing dependence on [fossil fuels](#) and thereby make **India 'Energy Self-reliant' by 2047**.
- **Best Zero Emission Solutions:**
 - **Fuel Cell Electric Vehicle (FCEV)**, powered by Hydrogen is one of the **best Zero Emission solutions**. It is completely **environment friendly with no tailpipe** emissions other than water.
 - **Tailpipe emissions:** Emission of something such as gas or radiation into the atmosphere.
 - **Green Hydrogen** can be generated from [renewable energy](#) and abundantly available [biomass](#).
 - **Introduction and adoption of technology** to tap into the Green hydrogen's potential will play a key role in securing a **clean and affordable energy future for India**.

What is the State of Electric Vehicles in India?

- **About:**
 - The **push for Electric Vehicles (EVs)** is driven by the **global climate agenda** established under the [Paris Agreement](#) to reduce carbon emissions in order to limit

global warming.

- The global electric mobility revolution is today defined by the **rapid growth in EVs uptake**.
- Falling battery costs and rising performance efficiencies are also fueling the demand for EVs globally.

▪ **Need for Electric Vehicles:** India is in need of a transportation revolution.

- The current trajectory of adding ever more cars running on expensive imported fuel and cluttering up already overcrowded cities suffering from infrastructure bottlenecks and **intense air pollution** is unfeasible.
- The transition to electric mobility is a **promising global strategy for decarbonising the transport sector**.
- EVs currently account for **less than 3% of all vehicles sold in India**. This is despite EV registrations crossing 50,000 units for the first time in December 2021, the highest ever monthly sale recorded.
- Although **80% of the volume of EVs** sold is occupied by low-cost and low-speed three-wheelers, **overall EV sales have picked up pace** due to the rise of next-gen two-wheeler companies.
- As per the **Accelerated e-Mobility Revolution for India's Transportation (e-AMRIT) portal in India**, only 7,96,000 EVs have been registered till December 2021, and just 1,800 public **EV charging stations** have been installed.
- While there has been a **growth of 133% in the sales of EV from FY 2015 to FY 2020**, when compared to sales of conventional ICE vehicles, the numbers seem insignificant. In FY 2021-22, **only 1.32% of the total vehicles sold in the country were electric**.

▪ **Associated Challenges:**

- **Consumer Related Issues:** Lack of appropriate charging stations is a cause of concern, which is quite less than the neighbouring counterparts who already had over 5 million charging stations.
 - Lack of charging stations makes it **unsuitable for the consumers in covering long range**.
- **Policy Challenges:** EV production is a capital intensive sector requiring long term planning to break even and profit realisation, uncertainty in government policies related to EV production discourages investment in the industry.
- **Lack of Technology and Skilled Labour:** India is **technologically deficient in the production of electronics** that form the backbone of the EV industry, such as batteries, **semiconductors**, controllers, etc.
- **Unavailability of Materials for Domestic Production:** Battery is the single most important component of EVs.
 - India does **not have any known reserves of lithium and cobalt** which are required for battery production.
 - Dependence on other countries for the import of **lithium-ion batteries is an obstacle** in becoming completely self-reliant in the battery manufacturing sector.

▪ **Related Initiatives:**

- The remodelled **Faster Adoption and Manufacturing of Electric Vehicles (FAME II) scheme**.
- **Production-Linked Incentive (PLI) scheme for Advanced Chemistry Cell (ACC)** for the supplier side.
- **PLI scheme for Auto and Automotive Components** for manufacturers of electric vehicles.
- **"Charging Infrastructure for Electric Vehicles—Guidelines and Standards,"** describing the roles and responsibilities of various stakeholders at the Central and State level for expeditious deployment of public EV charging infrastructure across the country, has been issued recently.
- India is among a handful of countries that support the global ** campaign**, which aims for at least 30% new vehicle sales to be electric by 2030.
 - India's advocacy of five elements for climate change — "Panchamrit" — at the **COP26 in Glasgow** is a commitment to the same.
 - Various ideas were espoused by India at the Glasgow summit, such as, renewable energy catering to 50% of India's energy needs, reducing carbon emission by 1 billion tonnes by 2030 and achieving **net zero by 2070**.

Way Forward

- The Indian market **needs encouragement for indigenous technologies** that are suited for India from both strategic and economic standpoint.
- Breaking away the **old norms and establishing a new consumer behaviour is always a challenge**. Thus, a **lot of sensitisation and education is needed**, in order to bust several myths and promote EVs within the Indian market.
- **Subsidising manufacturing for an electric supplychain** will certainly improve EV development in India.

Source: PIB

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