



## Electrified Flex Fuel Vehicle

**For Prelims:** Electrified Flex fuel vehicle, [Bharat Stage-6\(BS 6\) Stage-II](#), Bharat Stage Emission Standards, [Ethanol Blending](#)

**For Mains:** Flex Fuel Vehicles: Significance and its usage, Green model of development.

[Source: PIB](#)

### Why in News?

Recently, the Prototype of **the world's 1<sup>st</sup> Bharat Stage-6 (BS6) Stage-II, Electrified Flex fuel vehicle**, developed by Toyota Kirloskar Motor was unveiled.

- This vehicle is capable of **running on up to 85% ethanol blended petrol** and features an **electric powertrain**.
- The Ministry of Petroleum & Natural Gas has also highlighted flex-fuel vehicles' potential to substitute petrol with higher [ethanol blends beyond 20%](#).

### Note:

- [Flex-fuel vehicles \(FFV\)](#): They have engines that can run on flexible fuel - **a combination of Petrol/Diesel/Electric and ethanol, which can include up to 100% ethanol**.

### What are the Electrified Flex Fuel Vehicles?

- **About:**
  - Electrified Flex Fuel Vehicle integrates both a **Flex Fuel engine** and an **electric powertrain**, offering the dual benefit of **higher ethanol use and improved fuel efficiency**.
  - Flex Fuel Strong Hybrid Electric Vehicles (FFV-SHEV): When FFV is integrated along with **strong hybrid electric technology, it is referred as FFV-SHEVs**.
    - Strong hybrid is another term for full hybrid vehicles, which have the capability to **run solely on either electric or petrol modes**.
    - In contrast, **mild hybrids cannot run purely on one of these modes and use the secondary mode merely as a supplement** to the main mode of propulsion.
- **Significance:**
  - The integration of an electric powertrain **reduces reliance on conventional fuels**, contributing towards [sustainable transportation](#) and India's '[Aatmnirbhar Bharat](#)' **initiative** as production of [ethanol](#) increases.
  - Similar to **SHEVs**, this vehicle can achieve significantly **higher fuel efficiency, optimizing the use of ethanol and electricity**.

- By promoting the use of FFVs, India can capitalize on its abundant **ethanol potential, reducing petrol consumption.**
- The vehicle represents a significant stride towards **decarbonization and greener mobility, aligning with global efforts to combat climate change.**

## What are BS6 (Stage II) Norms?

- **BS6 Norms:** The Bharat Stage (BS) norms are emission standards instituted by the Government of India to regulate the output of air pollutants from motor vehicles.
  - The BS regulations are **based on the European emission standards** and the [Central Pollution Control Board](#) implements these standards.
  - Presently, every newly sold and registered vehicle in India is required to adhere to the [BS-VI version of emission regulations.](#)
- **BS6 Stage II:** BS6(Stage II) has even **stricter emission limits compared to the initial BS6 norms.**
  - BS6 (Stage II) incorporates **Real Driving Emissions (RDE)** and [Corporate Average Fuel Economy \(CAFE 2\)](#) and On-Board Diagnostics.
  - The new RDE test figures will provide a more realistic estimation of the amount of emissions likely to be produced by vehicles in real traffic conditions with frequent changes in speed, acceleration, and deceleration.
  - Onboard diagnostic (OBD) systems monitor and report the status and performance of various vehicle subsystems and sensors.

## Ethanol Blending:

- **About:**
  - **Ethanol**, a key **biofuel** produced through fermentation of sugars by yeasts or petrochemical methods.
  - The **Ethanol Blending Programme (EBP)** in India aims to decrease oil imports, curb emissions, achieve energy self-sufficiency, and [doubling farmers' income](#), transitioning them to ['urjadata' while remaining 'annadata'](#), and contributing to environmental improvement.
  - The Government of India has advanced the **target for 20% ethanol blending in petrol (also called E20) to 2025 from 2030.**
    - India has been increasing its ethanol blending in petrol from 1.53% in 2013-14 to **11.8% in August, 2023.**
- **Other Initiatives to Promote Ethanol Blending in India:**
  - [National Policy on Biofuels 2018](#)
  - [E100 Pilot project](#)
  - [Pradhan Mantri JI-VAN Yojana 2019](#)
  - [Repurpose Used Cooking Oil \(RUCO\)](#)

## UPSC Civil Services Examination, Previous Year Questions (PYQ)

**Q. According to India's National Policy on Biofuels, which of the following can be used as raw materials for the production of biofuels? (2020)**

1. Cassava
2. Damaged wheat grains
3. Groundnut seeds
4. Horse gram
5. Rotten potatoes
6. Sugar beet

Select the correct answer using the code given below:

- (a) 1, 2, 5 and 6 only
- (b) 1, 3, 4 and 6 only
- (c) 2, 3, 4 and 5 only
- (d) 1, 2, 3, 4, 5 and 6

Ans: (a)

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