

Electric Vehicles (EV) - An Overview

Electric Vehicles can play a vital role in combating climate change across the globe by helping to cut down the emissions and reducing dependence on fossil fuels. This article throws light on the different types of electric vehicles, environmental advantages, various initiatives of Government and the future impact of electric vehicles on employment and economy.

Aspiring civil servants need to stay updated with the latest advancements in the field of science and technology and it is an important component of the [IAS Exam](#).

Electric Vehicle (EV) - Meaning

1. An electric vehicle (EV) is one that operates on an electric motor, instead of an internal-combustion engine that generates power by burning a mix of fuel and gases.
2. Electric Vehicles (EV's) include, road and rail vehicles, surface and underwater vessels, electric aircraft and electric spacecraft.
3. Though the concept of electric vehicles has been around for a long time, it has drawn a considerable amount of interest in the past decade amid a rising carbon footprint and other environmental impacts of fuel-based vehicles.
4. An electric vehicle may be powered through a collector system by electricity from off-vehicle sources, or may be self-contained with a battery, solar panels, fuel cells or an electric generator to convert fuel to electricity.

Electric Vehicles - 8 Different Types

Electric Vehicles can be broadly classified into 8 different types.

1. Plug-in Electric Vehicle
2. On- and Off-road Electric Vehicles
3. Space Rover Vehicles
4. Seaborne Electric Vehicles
5. Airborne Electric Vehicles
6. Electrically Powered Spacecraft
7. Range-extended electric vehicle
8. Railborne Electric Vehicles

Plug-in Electric Vehicle (PEV)

A plug-in electric vehicle (PEV) is any motor vehicle that can be recharged from any external source of electricity, such as wall sockets, and the electricity stored in the Rechargeable battery packs drives.

Plug-in Electric Vehicles can be further categorized into

1. Plug-in Hybrid Electric vehicles, (PHEVs)
2. Battery electric vehicles (BEVs)

Plug-in Hybrid Electric Vehicles (PHEV)

1. A plug-in hybrid electric vehicle (PHEV) is a hybrid electric vehicle whose battery can be recharged by plugging it into an external source of electric power, as well as by its on-board engine and generator.
2. Most PHEVs are passenger cars, but there are also PHEV versions of commercial vehicles and vans, military vehicles, utility trucks, trains, motorcycles, buses and mopeds.

Battery Electric Vehicles

1. A battery electric vehicle (BEV), pure electric vehicle, only-electric vehicle or all-electric vehicle is a type of electric vehicle (EV) that exclusively uses chemical energy stored in rechargeable battery packs, with no secondary source of propulsion.
2. Battery Electric Vehicles (BEV) thus have no internal combustion engine, fuel cell, or fuel tank.
3. Some of the broad categories of vehicles that come under this category are trucks, cars, buses, motorcycles, bicycles, forklift etc.

Advantages of Electric Vehicles

Electric Vehicles - Environmental Advantages

Electric cars (or electric vehicles, EVs) have several environmental benefits compared to conventional internal combustion engine cars.

1. Have the potential to reduce greenhouse gas emissions
2. Reduce dependence on petroleum
3. Reduce health effects from air pollution
4. Reduce dependence on petroleum
5. They produce little or no tailpipe emissions

Electrical Vehicles - Better Energy Efficiency

1. Internal Combustion engines will consume fuel even when the vehicle is stationary, whereas in electrical vehicles, the energy is not consumed when it is stationary.
2. Electrical Vehicles 'tank-to-wheels' efficiency is about a factor of 3 higher than internal combustion engine vehicles

Electric Vehicles - Mechanical Advantages

1. They can be finely controlled and provide high torque from rest, unlike internal combustion engines, and do not need multiple gears to match power curves. Hence it removes the requirement for gearboxes and torque converters.
2. Lesser vibration
3. Lesser noise
4. Electric motors are mechanically very simple and often achieve 90% energy conversion efficiency over the full range of speeds and power output and can be precisely controlled.

Electric Vehicles in India - Government Schemes and Initiatives for Promotion of Electric Vehicles

1. In February 2019, the Union Cabinet cleared a Rs 10,000-crore programme under the FAME-II scheme. This scheme came into force from April 1, 2019. The main objective of the scheme is to encourage faster adoption of electric and hybrid vehicles by offering upfront incentives on the purchase of electric vehicles and also by establishing necessary charging infrastructure for EVs.
2. In 2017, Transport Minister Nitin Gadkari made a statement showing India's intent to move to 100 percent electric cars by 2030. However, the automobile industry raised concerns over the execution of such a plan. The government subsequently diluted the plan from 100 percent to 30 percent.
3. In 2013, India unveiled the 'National Electric Mobility Mission Plan (NEMMP) 2020' to make a major shift to electric vehicles and to address the issues of national energy security, vehicular pollution, and growth of domestic manufacturing capabilities. The scheme was to offer subsidies and create supporting infrastructure for e-vehicles.

Impact of Electric Vehicles on Employment and Economic Growth

1. The battery manufacturing industry in India can become bigger than the total amount spent on import of crude oil. This would provide a huge boost to the Indian economy.
2. There needs to be a careful plan to hand-hold mini and micro auto component industries, which employs large numbers of people. Many of these companies won't survive as Electric Vehicles replaces petrol/diesel vehicles. Hence it is imperative to help them during the transition phase to EV components manufacturing.
3. European Climate Foundation has estimated that through reducing oil demand by more efficient electric cars, employment will increase by 5,00,000 to 8,50,000 by 2030.
4. As per one of the studies, net private and social benefits are estimated between \$300 and \$400 per Electric vehicle.
5. The revenue loss for governments from the taxes on the oil sector is expected to be replaced by higher tax revenues in other economic sectors.
6. EVs will create opportunities in durable and lightweight thermoplastics, higher demand for electricity, storage, and many others.

Electric Vehicle Policy (EV) 2020

The Delhi Government has announced the Electric Vehicle Policy 2020 where the emphasis will be given on replacement of two-wheelers, public transport and shared vehicles and goods-carriers instead of private four-wheelers, with Electric Vehicles (EVs).

Given below are the features of the Electric Vehicle (EV) Policy 2020:

- As per this policy, the focus will be shifted to e-mobility, including e-autos, e-buses, etc. The Government will also offer low-interest rate loans to buy electric vehicles
- A state EV fund will be introduced to cover up the expenditure of the EV Policy
- The main objective of the Electric Vehicle Policy is to reduce air pollution and curb the health emergency issues in the state of Delhi
- These e-vehicles will also reduce the expense of buying motor vehicles

Frequently Asked Questions on Electric Vehicle (EV)

Q 1. What are Electric Vehicles?

Ans. A vehicle that works on an electric motor instead of an internal combustion engine is called an Electric Vehicle.

Q 2. What is the need for Electric Vehicles?

Ans. Electric Vehicles are useful as they reduce the harmful emission released by the engine-based vehicle. They can be very helpful in reducing air pollution in the atmosphere.

Q 3. What are the different types of Electric Vehicles?

Ans. There are eight types of Electric Vehicles:

- Plug-in Electric Vehicle
- On- and Off-road Electric Vehicles
- Space Rover Vehicles
- Seaborne Electric Vehicles
- Airborne Electric Vehicles
- Electrically Powered Spacecraft
- Range-extended electric vehicle
- Railborne Electric Vehicles

Q 4. What are the advantages of Electric Vehicles?

Ans. Given below are the advantages of Electric Vehicles:

- Reduce Greenhouse Gas Emissions
- Reduce Air Pollution and health issues caused by it
- Reduce dependence on petroleum
- Reduced Noise Pollution
- Electric Vehicles do not consume energy when stationary