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## Electric Vehicles: The Future Transport

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This editorial is based on the article Is **India ready for a world where electric vehicles will dominate transportation?** which was published in The Indian Express on 30/10/2021. It talks about the challenges associated with the promotion of electric vehicles and ways to increase their penetration in the market.

India has the dubious distinction of having nine of the 10 most polluted cities in the world. These nine cities, all in north India, include Greater Noida, Noida, Lucknow, and Delhi. While many factors contribute to the polluted air, skies and human lungs of northern India, vehicular pollution bears substantial responsibility.

So, it is unsurprising that the Indian State is slowly but steadily encouraging electric vehicles. And with this, we may be coming a full circle in terms of our ability to commute. While in the 1900s, the **electric vehicle (EV)** lost out to fuel-based ones, that may not be the case anymore.

In 1886, Carl Benz, a German engineer applied for and was granted patent number 37435 for his “vehicle powered by a gas engine”. In a few months, the commercial production of the Benz motor car started. This is by most accounts the beginning of commercially-produced vehicles using gas engines.

Interestingly, in 1880, a few years prior to Benz’s patent, William Morrison, a chemist from Iowa, United States, helped bring to life, a six-seater electric vehicle. By 1900, electric cars accounted for over one-third of the vehicles sold in the US. The forward march of electric cars was stopped by the mass production of the very reasonably priced Ford automobile. A reasonably priced car along with the cheap prices of gasoline in the early 1900s meant that the world as we now live in came to be, with fossil fuel-dependent vehicles — cars and bikes — thronging our streets.

In this context, India must prepare itself with better charging infrastructure, battery-making factories and smart incentives for car companies and consumers to go electric

### Electric Vehicles (EVs)

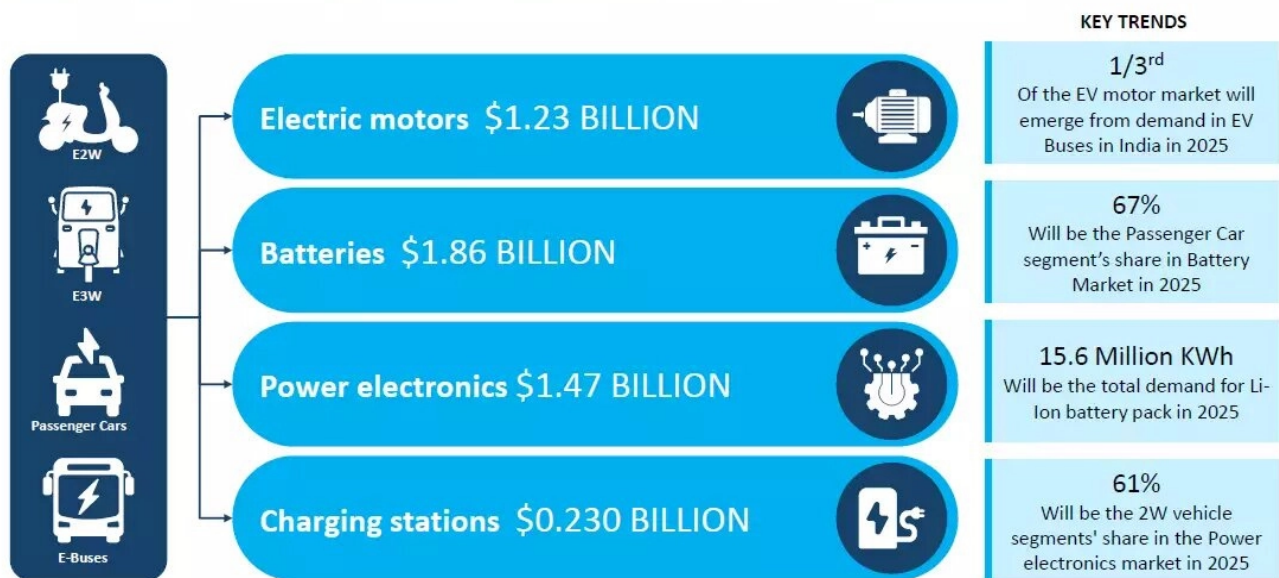
- An EV operates on an electric motor instead of an internal combustion engine and **has a battery instead of a fuel tank.**
- In general, EVs have low running costs as they have fewer moving parts and are also environmentally friendly.
- In India, the fuel cost for an EV is approximately **80 paisa per kilometre.** Contrast this with the cost of petrol which is today more than Rs 100 per litre in Indian cities, or **Rs 7-8 per kilometre to operate a petrol-based vehicle.**

## Prospects in India

- The private sector has appreciated the inevitability of the dominance of the EV.
- Companies like Amazon, Swiggy, Zomato and Ikea are deploying EVs for deliveries.
- Car manufacturers like Mahindra are partnering with consumers like Ola, while Tata Motors is partnering with Blu Smart Mobility in moves that will ensure more EV delivery and ride-hailing services.

## PERSPECTIVE: MARKET SIZE OF EV COMPONENT INDUSTRY IN 2025

ELECTRIC VEHICLE VALUE CHAIN IN INDIA IS EXPECTED TO REACH \$4.8 BILLION IN 2025



## Associated Challenges

- **Lack of Charging Infrastructure:** The real challenge for the consumer is the lack of charging infrastructure in India.  
EVs are typically powered by **lithium-based batteries.** These batteries need to be charged usually every 200-250 kilometres or so for a car. So, there is a need for a dense proliferation of charging points.

- **Issue of Slow Charging:** It takes up to 12 hours for a full charge of a vehicle at the owner's home using a private light-duty slow charger. To compound this technological problem of slow charging at home, there are a few charging stations around the country.

This is woefully inadequate in a country as large and densely populated as ours.

- **Lack of a Stable Policy For EV Production:** EV production is a capital intensive sector requiring long term planning to break even and profit realization, uncertainty in government policies related to EV production discourages investment in the industry.
- **Technological Challenges:** India is technologically deficient in the production of electronics that form the backbone of the EV industry, such as batteries, semiconductors, controllers, etc.
- **Lack of Associated Infrastructural Support:** The lack of clarity over AC versus DC charging stations, grid stability and range anxiety (fear that batteries will soon run out of power) are other factors that hinder the growth of the EV industry.
- **Lack of Availability of Materials For Domestic Production:** Battery is single most important component of EVs. India does not have any known reserves of lithium and cobalt which are required for battery production. India is dependent on countries like Japan and China for the import of lithium-ion batteries.
- **Lack of skilled workers:** EVs have higher servicing costs and higher levels of skills is needed for servicing. India lacks dedicated training courses for such skill development.

## Way Forward

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- **Increasing R&D in EVs:** The Indian market needs encouragement for indigenous technologies that are suited for India from both strategic and economic standpoint.
  - Since investment in local research and development is necessary to bring prices down, it makes sense to leverage local universities and existing industrial hubs.
  - India should work with countries like the UK and synergise EV development.
- **Sensitising Public:** 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.
- **Viable Electricity Pricing:** Given current electricity prices, home charging may also be an issue if the generation is from thermal power plants run on coal.
  - Thus, a shift in the electricity generation landscape as a whole is what is required to facilitate the growth of electric cars.
  - In this context, India is on track to become one of the largest solar and energy storage markets by 2025.
  - A combination of solar-powered grid solutions that are organised with a general improvement in grid resilience will ensure adequate charging infrastructure for EV's being a green option.

- **Creating the Closed-Loop Mobility Ecosystem:** Subsidizing manufacturing for an electric supplychain will certainly improve EV development in India.
  - Along with charging infrastructure, the establishment of a robust supply chain will also be needed.
  - Further, recycling stations for batteries will need to recover the metals from batteries used in electrification to create the closed-loop required for the shift to electric cars to be an environmentally-sound decision.
- The largest suppliers of lithium-based EV batteries are reported to be the Chinese and the South Korean companies. If this is so, then a new global order is emerging to replace the **Organisation of the Petroleum Exporting Countries (OPEC)**.
  - India must plan for its place in this order — with better-charging infrastructure, battery-making factories and smart incentives for car companies and consumers to go electric.

### ***Drishti Mains Question***

‘Electric vehicles are the future of transportation.’ Discuss in the light of the statement the challenges associated and ways to increase the electric vehicles penetration in the Indian market.

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