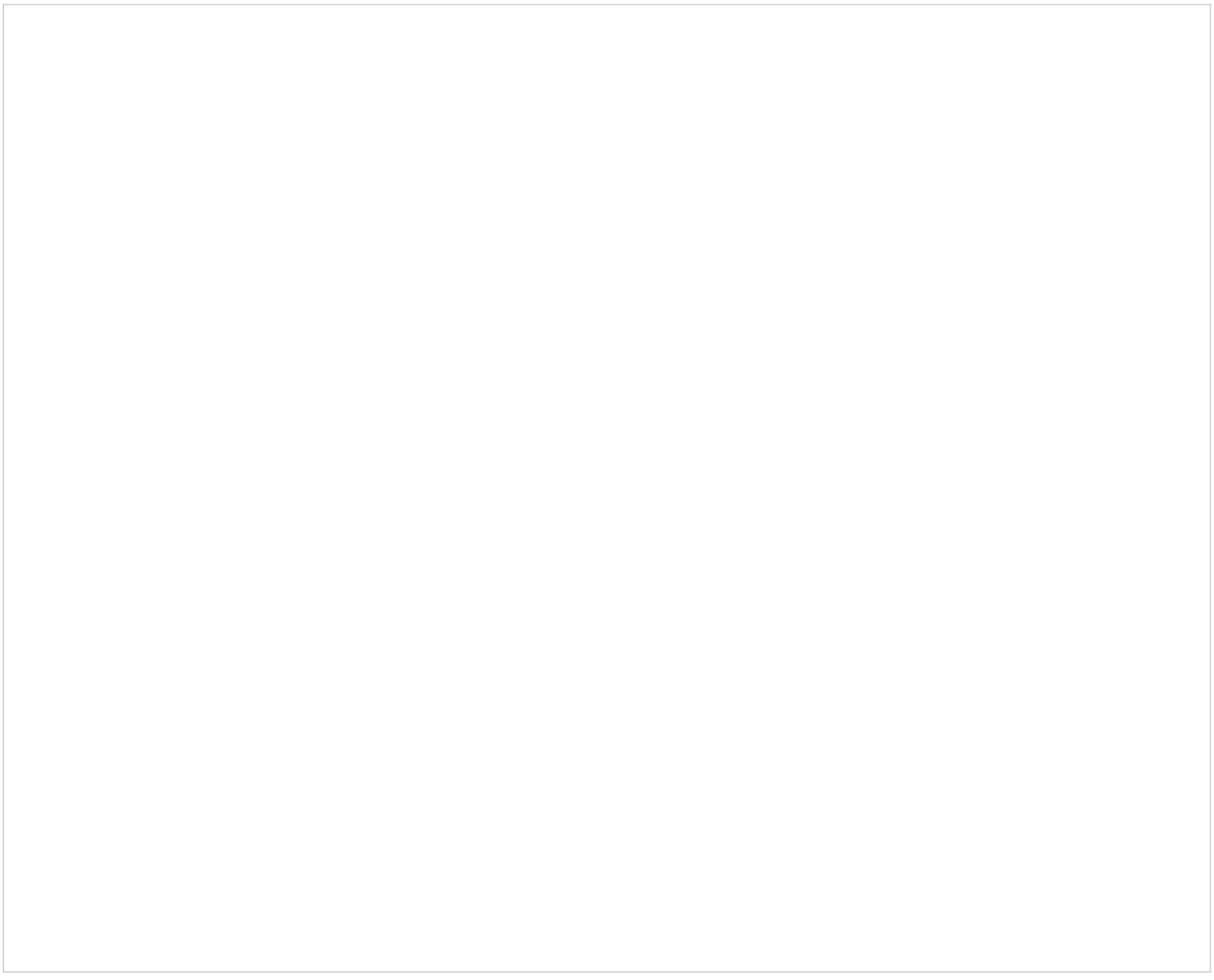
Challenges to Electric Vehicle Adoption in India

Electric Vehicles (EVs) as an element of transportation policy is being considered by most of the countries in the world. However, these countries' responses are affected by their stage of economic development, availability of energy resources, technological capabilities and political will to address climate change issues on a priority basis (higher the development, more the likelihood of adopting EVs).



The rapid growth in India's urbanization, population and wealth over the last few decades has had changed the mobility of its citizens. **India's transport demand has grown by almost 8 times since 1980 – more than any other Asian economy** (World Bank data, cited by NITI Aayog). While on the one hand, this has led to widespread development of the auto industry in the country, on the other hand, it has revealed the potential for irreversible damage on the environment.

Need for EVs in India

- **Rapid urbanization** has increased the demand for energy and transport infrastructure.
- India's **commitment to address the issue of climate change** (Intended Nationally Determined Contribution goal to reduce the emissions intensity of its GDP by 33 to 35% by 2030 from 2005 level and to achieve about 40% cumulative electric power installed capacity from non-fossil fuel based energy resources by 2030) necessitates the adoption of alternative fuels for environmental sustainability.
- The **shift towards renewable energy sources** has led to cost reduction from better electricity generating technologies. This has introduced the possibility of clean, low-carbon and inexpensive grids.
- **Advances in battery technology** have led to higher energy densities, faster charging and reduced battery degradation from charging. Combined with the development of motors with higher rating and reliability, these improvements in **battery chemistry** have reduced costs and improved the performance and efficiency of electric vehicles.
- High expenses on oil import in the changing geopolitical conditions require India **to ensure its energy security** by moving towards alternative energy sources.
- The existing mode of transport for last mile connectivity like autorickshaw and feeder buses suffer from capacity constraint. These vehicles need better management and should be considered as the first area of transformation to e-vehicles.

The demand for EVs has emerged from the contention of addressing the rising demand for automobiles while keeping a check on the environmental pollution. Despite the Government's willingness to transform the mobility services in the country, the growth of EV industry has not been upto the mark. The Indian EV industry has the lowest level of penetration rates in the world. There are several reasons behind this.

Factors that can facilitate Electric Vehicle production in India

1. A relative abundance of exploitable renewable energy resources like wind and solar.
2. High availability of skilled manpower and technology in manufacturing and IT sector to handle the technical issues related to this industry.
3. The consumer base in the country is changing and is becoming more receptive to the new technological changes in the automobile industry.

4. A universal culture that accepts and promotes the sharing of assets and resources for the overall common good.

Factors that hinder the development of EV industry in India

1. **Lack of a stable policy for EV production:** Profit determination becomes uncertain considering the high capital costs and the uncertainty in policies related to EV production. This discourages investment in the industry.
    For eg, the launch of Faster Adoption and Manufacturing of (Hybrid) and Electric Vehicles (FAME) framework has been extended repeatedly.
2. **Lack of associated infrastructural support:** Policy uncertainty is affecting the development of associated infrastructural support for the industry, for example, the charging infrastructure. The lack of clarity over AC versus DC charging stations, grid stability and range anxiety (fear that battery will soon run out of power) are other factors that hinder the growth of EV industry. This comes in the backdrop of already debilitated existing infrastructure like roads, bridges etc.
3. **Domestic factors affecting EV production:** India does not have any known reserve of lithium and cobalt, it is dependent on countries like Japan and China for the import of lithium-ion batteries. Rupee depreciation has also negatively affected such imports.
4. **Lack of skilled workers:** EVs have higher servicing costs and higher levels of skills is needed for servicing. India lacks the dedicated training courses for such skill development.

Way Forward

- Two-wheelers account for 76% of the vehicles in the country. Customizing India's EV Policy to suit the current demands of its auto-industry i.e. focussing more on the production of electric-two wheelers can be beneficial.
- The promotion of Electric Vehicle as one of the solutions to environmental pollution should consider all other factors like the source used for electricity generation. Electricity is majorly produced from the thermal sources (bituminous coal which has low calorific value and high ash content) in India which negatively impact the environment. Hence, an integrated approach should be followed by combining the renewable industry and the EV industry.
- India needs to encourage private investment in battery manufacturing plants along with an emphasis on the development of low-cost production technology.
- The education system in the country has to be synchronized with the industrial transformation. Skill development plans should be upgraded to handle the servicing related concerns.

- Stabilizing policy environment by working on tax incentives, non-fiscal incentives can address the uncertainty of demand which can, in turn, help the industry to achieve economies of scale (maximum utilization of resources on the conditions of maximum efficiency which will reduce the per unit cost).
- **India currently ranks as one of the top energy consumers in the world. It is the world's third largest producer and third largest consumer of electricity.** With India’s population and GDP expected to grow in the future, energy demand will see a significant rise and with that associated greenhouse gas (GHG) emissions as well. In keeping with these developments, policy measures need to focus on increasing access to clean energy while keeping the emissions in check.