

# “A Study on Future of Electric Vehicles in India ”

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## Abstract

In this paper, the topic of electric vehicles' future in India is covered. Electric mobility is advancing quickly around the world. Eight countries have committed to support the "EV 30@30" campaign under the Clean Energy Ministerial, a high-level conference to promote renewable energy policies and programmes. India is a member of the group of nations that are waging the campaign, which aims to have 30 percent of vehicles on the road be electric by 2030. Although electric mobility has many advantages, there are still a number of obstacles to overcome. To increase the penetration of EVs in the nation, a trustworthy charging infrastructure must be deployed. Also, a key factor in the growth of e-mobility will be effectively addressing the problems of range anxiety and charging time. Meeting client needs also heavily relies on easy and affordable access to charging infrastructure, including both conventional AC charging and quick DC charging. The grid's impact on EV charging requirements and other similar impacts must be evaluated and appropriately addressed.

## Introduction

The project's objective is to examine and analyse the potential for electric vehicles in India, with an emphasis on the variables influencing their uptake and the obstacles that must be overcome to ensure their widespread use.

Electric vehicles' potential is quickly developing. One of the top ten automobile markets in the world today, India has a rapidly growing middle class with strong purchasing power and consistent economic growth. 25 to 27 percent of the crude oil used in India is used for road transportation, and vehicular emissions are one of the main causes of urban pollution in India, according to the National Green Tribunal (NGT). Adoption of low-emission transportation options, such as electric automobiles, is so essential. Recent declarations by the government on phase-II of the Faster Adoption and Manufacture of (Hybrid &) Electric Vehicles Scheme (FAME II), which will be put into effect between 2019 and 2022, and a significant change will be made in the expanding electric vehicle (EV) market in India with the exemption from road tax and registration fees for hybrids and EVs. The development of EVs depends critically on the accessibility of EV charging infrastructure. The market adoption of electric vehicles will increase as battery technology advances and battery prices decline. Also, stricter emissions laws would encourage automakers to produce electric vehicles. Barriers to its widespread adoption include concerns for the environment, for consumers, for the nation's energy system, for national security, and for the economy.

## Literature Review

Electric vehicles have historically only proven successful in a small number of markets due to the close relationship between mobility and fossil fuels. Yet, compared to just a few thousand in 2010, nearly 2 million electric car sales were made in 2018, and the trend shows no signs of slowing down. It is anticipated that passenger EV sales will increase to 10 million in 2025, 28 million in 2030, and 56 million by 2040. By 2040, nearly 30% of the world's fleet of passenger vehicles will be electric, according to Electric Vehicle Outlook 2019, published by Bloomberg NEF. An opportunity for the mass market introduction of electric mobility was made possible by a number of factors, which include

## A. Climate change

The likelihood of a rapid rise in global temperatures has made it necessary to cut back on fossil fuel consumption and the pollutants that come with it.

## B. Developments in clean energy

Advances in wind and solar electricity production technologies over the past ten years have significantly lowered their cost and opened the door to the prospect of clean, low-cost systems.

## C. Intensive urbanisation

Urbanization is on the rise as rural inhabitants relocate to cities in pursuit of employment, especially in emerging economies. Urbanization plays a significant role in the process of economic development, but it also places a strain on the energy and transportation systems, which causes congestion and pollution. By lowering localised concentrations of pollution in cities, electric vehicles (EVs) help improve that scenario.

## D. chemistry of batteries

Higher energy densities, quicker charging, and less battery degradation from charging are all results of advances in battery technology. These advancements in battery chemistry have decreased costs and enhanced the performance and efficiency of electric vehicles when combined with the development of motors with higher rating and reliability.

## E. Energy safety

An internal combustion engine (ICE) based mobility system involves the use of gasoline, diesel, and compressed natural gas (CNG), which requires a large, expensive supply chain that is susceptible to disruption from the weather, geopolitical events, and other causes. Energy security concerns are lessened by electric mobility.

## Methodology

A combination of primary and secondary research will be used in the project. Surveys and interviews with customers, policymakers, and electric car industry stakeholders will be part of the core research. An detailed analysis of the literature and reports on electric vehicles in India and throughout the world will be part of the secondary study.

## Findings

The research findings will be presented in three sections: market analysis, policy analysis, and consumer analysis.

## Market Analysis

The market analysis will analysis at the present situation of the Indian market for electric vehicles, including its size, major players, and growth-promoting trends. Also, it will point out the problems that must be solved if the market is to realise its full potential.

## Policy Analysis

The policy study will analyse the effectiveness of current policies in boosting the adoption of electric vehicles in India as well as the country's present policy environment for such vehicles. It will also look into the possibility of future regulations hastening the transition to electric vehicles.

## Consumer Analysis

The consumer analysis will look at customers views and actions towards electric vehicles in India, including their knowledge of them, their readiness to buy them, and the factors that affect their choices.

## BENEFITS OF ELECTRIC VEHICLES

EVs have a positive impact on the environment, consumers, the country's energy grid, and national security.

### A. Environmental advantages

EVs can lessen the pollutants that cause smog and climate change, enhancing public health and minimising environmental harm. These pollutants are further reduced when EVs are charged using renewable energy sources like solar or wind.

### B. Consumer Advantages

Electric vehicles (EVs) are less expensive to operate than gasoline-powered vehicles, principally because energy is less expensive on an equivalent cost basis and because maintenance is less expensive.

### C. Energy Grid Advantages

EVs and controlled charging make the energy grid more effectively used, which lowers the average cost.

### D. Advantages to National Security

When EVs plug in, a domestic combination of energy sources, such as natural gas, coal, nuclear power, hydropower, wind, and solar, powers them entirely. In sharp contrast, gasoline-powered automobiles are totally dependent on imported oil.

## BARRIERS TO ADOPTION OF ELECTRIC VEHICLES

Electric vehicles are marketed as a practical near-term vehicle technology to lessen reliance on fossil fuels and the subsequent greenhouse gas emissions produced by conventional automobiles. Despite the fact that EVs have a number of advantages, potential socio-technical and financial obstacles may prevent widespread consumer adoption.

### A. Technology-Related Issues

Technology-related drawbacks continue to be a key obstacle to the adoption of EVs. The main cause for concern is batteries because of how much weight they add to the vehicle. Among the technological obstacles are:

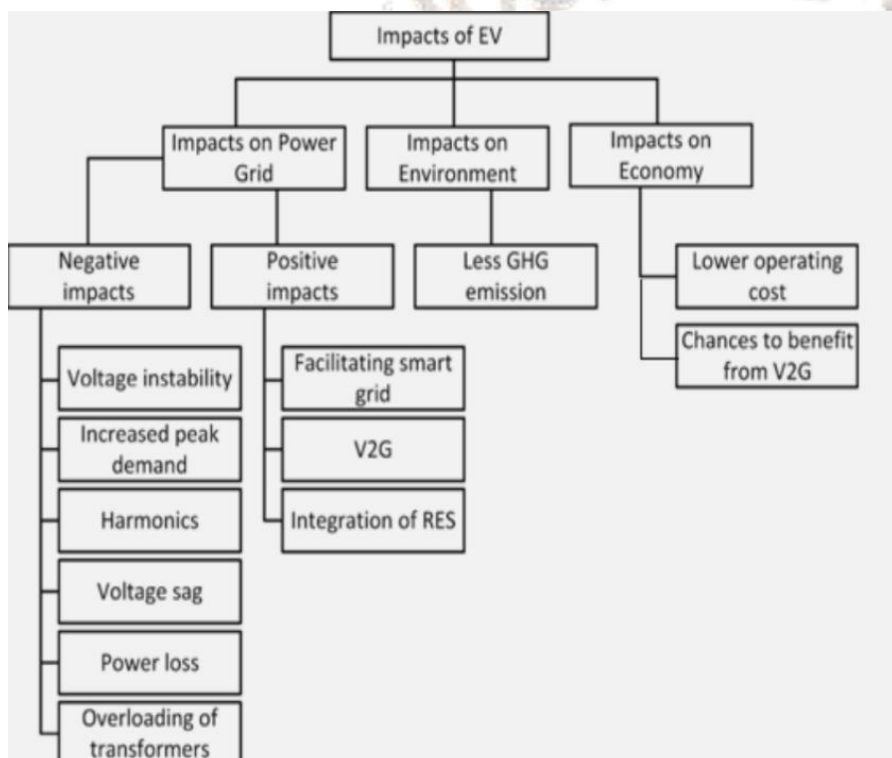
1. Limited Range
2. Long Charging Time and Battery Charging Rate
3. Safety Concerns

B. Problems With Society

1. Social Acceptance
2. Insufficient Charging Stations:

B. Economic Problems

**Impact of Electric vehicle**



**Conclusion**

By switching as soon as possible from ICE to EV vehicles, India stands to gain significantly. The main benefits include a decrease in pollution to the environment, a decrease in oil imports, an increase in national security, a stronger economy, and better use of renewable resources. About two thirds of the air pollution in cities is caused by emissions from ICE-powered vehicles. The current ban on older fuel-powered vehicles in some Indian cities already has a positive impact on the quality of the air, and this situation will only get better with the widespread adoption of EVs. ICE three-wheelers are now the main mode of transportation for villages, carrying citizens to bus stops along highways or train stations. They can be simply converted to electric, offering villages with clean transportation. Opportunities for durable and lightweight thermoplastics, increased need for electricity, storage, and many other industries will be brought about by EVs. Also, the charging and changing of EV batteries would generate a significant amount of jobs nationwide. The Indian government is committed to fostering an environment that is conducive to electric mobility, and as part of the 2019 Union Budget, the government recently made some significant announcements to advance electric mobility in India. To encourage the sale of EVs throughout the nation, it has been suggested that the GST rate on electric vehicles be decreased from the current 12 percent to 5 percent. In addition, the interest paid on loans acquired to buy electric vehicles will be eligible for a 1.5 lakh rupee income tax exemption. The transition to electric mobility will be orderly and painless because to improvements in EV technology, stricter

environmental legislation, and time-bound efforts from the government and the automotive industry. The initiative will offer suggestions for governments, business leaders, and consumers to speed up the adoption of electric vehicles in India based on the research's findings. These suggestions will include both immediate and long-term steps to address the issues the electric vehicle industry is currently facing and foster its expansion.

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