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E-Vehicle: Opportunities and Challenges

Sachin Kumar Kansara[1], Parwati Kumawat[2]*

[1]Research Scholar, Department of Commence and Management, Madhav University, Aburoad (Rajasthan)
[2]*Assistant Professor, Department of Commence and Management, Madhav University, Aburoad (Rajasthan)

***Correspondence Author:** Dr. Parwati Kumawat
*Department of Commence and Management, Madhav University, Aburoad (Rajasthan)-307026, Email: dr.princekumawat@gmail.com, Mobile No: -9672815448

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ABSTRACT

A number of factors, including price reductions and increased awareness of environmental issues and climate change, are contributing to the growing popularity of electric vehicles, or EVs. This paper reviews the challenges and opportunities of e vehicle in India. This research study is descriptive in nature. Main sources of data is secondary source. The main objective of the study is to know the challenges and opportunities of EVs.

Keywords: EVs, India, Opportunities, Challenges.

Introduction

Environmental pollution has increased significantly as a result of the use of polluting and non-renewable energy sources. We must immediately limit carbon emissions and cease using non-renewable resources due to the growing effects of global warming. Since the industrial age, the atmospheric carbon content is rising. The average passenger vehicle emits 4.7 metric tons of carbon dioxide annually. Fossil fuel burning is the main human source of carbon emissions. Internal combustion engines have been replaced with electrical engines in automobiles, opening the door for electric cars (EVs). Since their introduction, EVs have been embraced by numerous nations, improving the environment. The implementation of electric vehicles in India will now present both opportunities and challenges.

Objectives

- To understand the scenario of electric vehicles
- To know the challenges of electric vehicles
- To know the opportunities of electric vehicle

Research Methodology

The research paper is based on secondary data. Various papers, books and websites have been used as a source of data.

Environmental Opportunities for India

The shift towards electric vehicles in India will have a big influence on the environment. Currently, the transportation sector in India is a major contributor to pollution. Consider New Delhi, the nation's capital, where 50% of the surface PM 2.5 levels are caused by two- and three-wheelers. Approximately one-fifth of India's overall energy consumption is also attributed to the transportation industry. Given these figures, EVs have the potential to significantly affect India's environment in the following ways.

1. Reducing Air Pollution

Vehicle traffic is responsible for 1.2 million deaths per year and 27% of all air pollution in India alone. Therefore, India's adoption of EVs will greatly lessen the detrimental effects that Internal Combustion Engine (ICE) vehicles have on the environment worldwide.

2. Reducing Noise Pollution

Though vehicles are not the only source cited in the report, EVs are likely to reduce noise levels because they lack the mechanical valves, gears, and fans common to ICE vehicles. Rapid urbanization has increased the need for vehicles, making noise pollution a significant problem in India as well. Five Indian cities are listed among the noisiest in the world in the 2022 UNEP report.

3. Improving Operational Efficiency

From the perspective of fuel efficiency, EVs can convert 60% of electrical energy from the grid, whereas gasoline or diesel cars only convert 17 to 21%. It is obvious that this move to electric vehicles in India can increase fuel production and optimization efficiency and lower end-user operating costs, which will increase demand for EVs. In addition to the aforementioned environmental effects, the country will benefit economically from the widespread adoption of EVs.

Economic Opportunities for India

In addition to being a major step in the direction of a cleaner and greener future, India's complete electrification will have positive local effects on consumers, businesses, and investors. We have highlighted some of the most attractive opportunities below.

1. Fleet Operators

By converting to electric vehicles, fleet operators such as Amazon, Door Dash, and Big Basket can lower their operational expenses. Weforum.org states that the Total Cost of Ownership (TCO) for a gasoline-powered two-wheeler in New Delhi is Rs 2/km. When EVs are used, this cost drops to Rs 0.52/km. Without a doubt, fleet operators experience a more than 50% reduction in operating expenses. Maintenance expenditures will decrease down as well. However, moving to EVs is happening at a considerably slower pace when compared to Brazil or the US. Due to their high initial costs, unknown reseller value, and lack of confidence in the new technology, electric vehicles are still not popular in India. In response to these worries, the government is offering tax breaks to lower initial expenditures, and early adopters are offering dependable and strong charging options that will increase trust in this new technology.

2. OEMs

The Indian government is pushing for supply chain indigenization under the Atma Nirbhar plan to support OEMs in developing the EV ecosystem because the EV industry offers them a lot of opportunities to build cost-competitive auto products for India and the rest of the world. According to research, OEMs can produce a 5.7% higher value addition to every EV by 2030. Furthermore, initiatives from firms in India are underway to help OEMs construct a charging app using SDK development tools, and provide access to features like navigation, car diagnostics, and keyless management. All these approaches help OEMs offer on-the-go charging for their drivers and expedite the migration to EVs.

3. The Real Estate Sector

Because the real estate business necessitates the building of EV manufacturing facilities, industrial areas, and charging stations, EVs present a number of opportunities for real estate investors, realtors, and property developers. Given that it typically takes 15 to 20 minutes to charge an EV, the construction of retail infrastructure surrounding EV charging stations is another crucial component. By 2030, the EV industry would need 1,300 acres to establish 110 GWh of battery manufacturing capacity, according to a Colliers report. By 2025, the nation will also require 13.5 million square feet for charging stations. These figures demonstrate how many opportunities there are for all participants in the real estate market.

4. Consumers

India's young and dynamic people is eager to adopt new technology as the nation's upward mobility trend continues to increase. Individuals are in a better position to buy EVs when their socioeconomic level improves with increasing wealth. Efforts to expand EV charging networks with additional charging stations are being led by the government and other forward-thinking EV companies in India in order to satisfy the increasing demand. This involves providing software solutions that enable daily charging. Additionally, a number of players are collaborating with companies and governmental organizations to develop creative solutions that benefit the EV sector by utilizing India's skilled labour pool. The EV sector is expected to generate five crore new jobs, and India's youthful talent pool is well-positioned to benefit from this employment expansion, according to Union Minister of Road Transport and Highways Nitin Gadkari. Even with all of these advantages, the nation still faces numerous challenges to overcome before fully embracing electric vehicles.

The Challenges for India

There are challenges in the way of India's EV potential being realized. India is taking a long time and facing many obstacles on its path to broad EV adoption. We look at the main obstacles to EV adoption in India in the sections that follow. We also look at potential ways to assist the nation get beyond these challenges so that EV adoption may happen more quickly and effectively across the board.

1. Lack of Clean Energy

India uses coal to generate a large portion of its electricity. However, using coal to power all of the EVs would negate the goal of using EV adoption to cut carbon emissions. As stated in Nitin Gadkari's speech at the 7th edition of the ETAuto EV Conclave, India is investigating alternative energy generation sources such as solar, wind, and nuclear energy. In order to power EV manufacturing facilities, the government is also aggressively pursuing biofuel research and development. The Indian government's actions foster confidence and give private companies the chance to use creativity and technology to produce EVs more quickly and cheaply. As a result, end users will pay less up front, which will encourage more Indians to buy electric vehicles.

2. Underdeveloped Charging Infrastructure

India's goal of achieving complete EV adoption is hampered by infrastructure problems. Because EVs' engines and other components differ from those of conventional ICE vehicles, they require different infrastructure for charging and maintenance. However, India's present infrastructure for EV charging might not be sufficient to meet the country's growing demand. There are 934 charging stations in India as of the time this article was written, the majority of which are found in cities. By contrast, as of 2022, there were 1.8 million EV charging stations in China. Purchasing high-speed, commercial-grade chargers will be necessary to build larger batteries and fast-charging stations. However, this calls for a large outlay of funds. To increase the number of charging stations, the government is collaborating with private companies. Numerous financial and non-financial incentives are being offered by the Ministry of Power to encourage the construction of EV charging stations. For instance, the government is establishing reasonable fees for operators and customers and implementing a revenue-sharing mechanism for land usage. Additionally, private sector organizations are assisting in the installation of EV stations and charging stations by collaborating with national, state, and local institutions. In order to keep an eye on these stations' activities and streamline the charging procedure overall, they are also working with operators to develop a Charger Management System (CMS).

3. Suboptimal Battery Technology

Due to their short driving range, EVs make it challenging for drivers to go far between charges. In addition to a lack of charging stations, the issue is exacerbated by vehicle weight, battery capacity, and aerodynamic drag. This is due to the fact that present batteries are insufficient to boost EV propulsion and enable greater range because they are tiny and have low voltage capabilities. Private companies need to come up with new ways to solve this issue by producing batteries that are lighter, have a higher energy density, and charge using renewable resources. Through tax credits, the government is giving the required boost. Through the National Mission for Transformative Mobility and Battery Storage, 2019, the national government is also encouraging battery production in India. Additionally, it is giving businesses the business climate and technological know-how they need to advance EV battery technology.

4. Persistent Resistance to Change

Despite the long-term economic and environmental advantages of electric vehicles, Indian consumers continue to oppose their adoption. This results from a general hesitancy to adopt new technology, particularly in rural regions, and a lack of knowledge about EVs.To address the concerns of customers, however, Indian market participants need to unite. In order to encourage the broad adoption of EVs in India, they should also provide a favorable environment. This can be accomplished by making EVs more reasonably priced, building out the infrastructure for charging them, and developing awareness and education campaigns to inform people of the advantages of making the switch to EVs.

Conclusion

The main goals of EV adoption in India are to lower oil costs and greenhouse gas emissions. The Indian government's 2030 goal is a challenging and ambitious undertaking. The government should take use of all the potential and figure out appropriate solutions to the problems that may arise from the use of EVs. India is in a position to execute Vision 2030 as a result of its commitment to numerous environmentally beneficial agreements.

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