



Electrical Vehicle in India: Some Issues

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ABSTRACT:

The necessity for a move to electric vehicles of all types arose when people all over the world accepted the truth that conventional sources of fuel for motors are running out, and the destructive impacts they have on the environment aren't worth what they offer in terms of trade and commerce for people. The globe is rapidly moving toward electric mobility, and eight nations have committed to the 'EV 30@30' campaign, which is a high-level platform to promote sustainable energy laws and programs. The countries involved in the program, including India, aim to reach a 30 percent electric car adoption rate by 2030. There are definitely numerous advantages to electric vehicles, but there are several obstacles to overcome in order to advance electric mobility. A reliable charging infrastructure is critical to driving EV penetration in the country. Easy and economical access to charging infrastructure—both normal AC and quick DC charging—is also critical to addressing customer demands.

Key words: : Electric Vehicles, Battery Electric Vehicles, Fuel Cell Electric Vehicle, Electric Vehicle Charging Infrastructure

1. INTRODUCTION.

India is currently one of the top ten automobile markets in the world, with a rapidly growing middle class with purchasing power and stable economic growth. According to the National Green Tribunal (NGT), automobile emissions are one of the biggest drivers of India's urban pollution, accounting for 25 to 27 percent of the country's crude oil consumption. As a result, low-emission transportation alternatives such as electric automobiles are becoming increasingly popular. The government's recent announcements on phase-II of the Faster Adoption and Manufacturing of (Hybrid and Electric Vehicles scheme (FAME II), which will be implemented between 2019 and 2022, as well as road tax and registration charge exemption for hybrids and Electric Vehicles (EVs), will help India's EV market grow significantly. The availability of electric vehicle charging infrastructure is critical to the proliferation of electric vehicles. The market adoption of electric vehicles will expand as battery technology advances and battery prices fall. Furthermore, as emissions restrictions tighten, automobile manufacturers will be pushed to produce electric vehicles. Despite the benefits that electric vehicles bring for the environment, customers, the nation's energy system, and national security, they must overcome a number of technological, social, and economic challenges before they can be widely used. The benefits and drawbacks of using electric vehicles are listed below.

II. GLOBAL SCENARIO

According to Electric Vehicle Outlook 2019, BloombergNEF, passenger EV sales are expected to rise to 10 million in 2025, 28 million in 2030, and 56 million by 2040, up from just a few thousand in 2010. By 2040, 57 percent of all passenger vehicle sales and over 30 percent of the global passenger vehicle fleet will be electric.

The following circumstances have created an opportunity for electric mobility.

1. Changes in the climate The rapid rise in global temperatures has necessitated a reduction in the usage of fossil fuels and associated emissions.
2. Renewable energy advancements during the last decade have substantially decreased the cost of wind and solar electricity generation technologies, allowing for the creation of clean, low-carbon, and economical systems.
3. Rapid urbanization Economic progress, particularly in emerging nations, is causing a wave of urbanization as rural populations seek jobs in cities.
4. Advances in battery chemistry have resulted in higher energy densities, faster charging, and less battery degradation during charging.
5. Energy safety The supply chain for gasoline, diesel, and compressed natural gas (CNG) required to fuel an internal combustion engine (ICE) based mobility system is vast and costly, while Electric Mobility eliminates energy security concerns.

III. INDIAN SCENARIO

India is adopting EVs for the following reasons.

1. A relative abundance of renewable energy resources that can be exploited.
2. There is a lot of skilled labor and technology available.
3. A transformation in infrastructure and consumer behavior that allows for the application of technology to development.
4. A worldwide culture that accepts and encourages the global sharing of assets and resources.
5. India began its e-mobility adventure in 2011 when the National Mission for Electric Mobility was launched (NMEM).
6. In 2017, Energy Efficient Services Limited (EESL), a joint venture of national public-sector undertakings under the Ministry of Power, forayed into e-mobility by holding a tender for 10,000 e-cars for usage in government offices as a means of encouraging Indian e-vehicle manufacturers.

India's electric mobility is number seven. In terms of numbers, India will be one of the world's largest auto markets by 2030, with an estimated 400 million people in need of transportation.

8. The government's recent announcements on phase-II of the Faster Adoption and Manufacturing of (Hybrid and Electric Vehicles scheme (FAME II), which will run from 2019 to 2022, as well as road tax and registration charge exemptions for hybrids and EVs.

9. States have also been asked to outline their EV policies and provide extra fiscal and non-fiscal incentives to makers and buyers, according to the Centre.

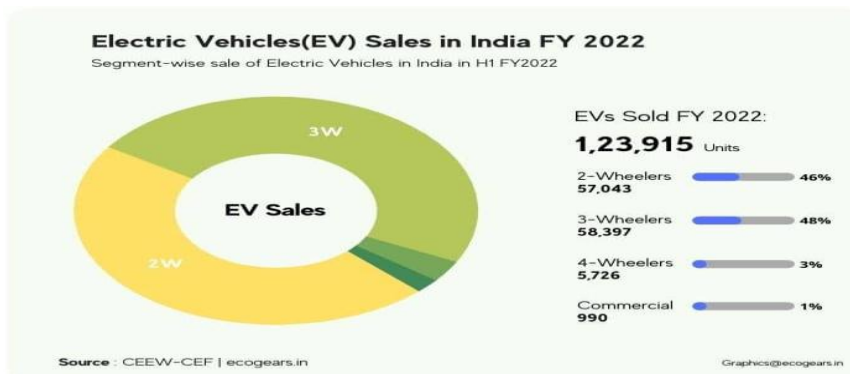
The following are the main goals of India's electric vehicle policy.

1. Reduce transportation's use of main oil.
2. Encourage customers to buy electric and alternative-fuel automobiles.
3. Encourage the adoption, research, and development of cutting-edge technology in India.
4. Improve public transit for both personal and commercial purposes.
5. Make cities less polluted.
6. Develop global-scale and competitive electric vehicle production capacity.
7. Encourage the growth of the EV sector's workforce. Almost every automobile manufacturer intends to enter the electric vehicle market. Tata and Mahindra already have electric vehicles in their portfolios, albeit in modest quantities.
8. Maruti Suzuki, Ford, Hyundai, Toyota, Kia, MG Motors, and other automakers are all testing and intending to release their own electric vehicles in the next years.

Electric Car Sales	H1 FY 2021/22	H1 FY 2020/21	Diff	% Growth	% Share
Tata Nexon	3,618	1,152	2,466	214.06	57.79
MG ZS EV	1,789	511	1,278	250.10	28.57
Tata Tigor	801	100	701	701.00	12.79
Hyundai Kona	51	101	-50	-49.50	0.81
Mahindra Verito	2	8	-6	-75.00	0.03
Total	6,261	1,872	4,389	234.46	100.00

Source:www.googelimege.com

Figure 1 depicts the sales of electric vehicles in the years 2020-21 and 2021-22. by several automobile manufacturers



Source:www.googelimege.com

Fig.2 Shows total Electrical Vehicle sold in India during the year 2021-22

IV. NEED OF THE STUDY

The third-largest road network in the world is found in India. In India, road travel appeared to be the main mode of transportation, with over 60% of the population commuting by personal or shared vehicles. Conventional vehicles contribute significantly to global warming and air pollution. Dust is produced by all sorts of cars due to brakes, tires, and road wear. The typical diesel vehicle has a negative impact on air quality, but the average gasoline vehicle has a positive impact. However, both gasoline and diesel vehicles harm the environment more than electric vehicles, necessitating the study.

V. OBJECTIVES OF THE STUDY

The present study is based on the following objectives.

1. To know the what is Electrical Vehicle
2. To know the challenges of producing Electrical Vehicle in Indian.
3. To give suitable suggestions to overcome challenges.
- 4.

VI. REVIEW OF LITERATURE.

In their analysis, Praveen Kumar and Kalyan Dash concluded that rather than making a large-scale adjustment, India could invest in small-scale reinforcements to address load difficulties locally. Before establishing the large scale charging infrastructure, proper planning of site, population, traffic density, and safety should be taken into account. It is critical to integrate efforts in the energy and transportation industries. Drivers of electric cars are offered a financial consumer incentive, such as tax credits, purchase subsidies, discounted tolls, free parking, and access to restricted highway lanes, which will assist the market grow. In their study, Philippe Lebeau, Cedric De Cauwer, Joeri Van Mierlo, and Cathy Macharis believe that freight transportation has a significant impact on urban migration. The possibility of integrating electric vehicles into urban logistical operations was investigated by researchers. A fleet with a variety of technologies has the potential to lower last-mile expenses. A fleet size and mix vehicle routing problem with time windows for EVs was provided by the researcher. The authors' key contribution was to take into account the unpredictability of the EV range. EVs are often the most competitive technology in the small van segment. In the segment of large vans, diesel has proven to be the most cost-effective alternative, as electric cars would need to travel a greater distance to be cost-competitive. Hybrid vehicles are preferred in the truck category because their operating and fixed costs are cheaper than diesel trucks. Adoption of electric vehicles, according to Fanchao Liao, Eric Molin, and Bert van Wee of Widespread, may help to reduce problems such as pollution, global warming, and oil reliance. EV penetration, on the other hand, is comparatively low, despite governments' aggressive promotion measures. They offered a comprehensive assessment of studies on consumer preferences for electric vehicles in order to inform policymakers and guide future research. They compared consumer preference for electric vehicles from an economic and psychological standpoint. Financial and technical characteristics of electric vehicles, such as their purchase and running costs, driving range, charging duration, vehicle performance, and brand variety on the market, are all proven to have a substantial impact on their usefulness. The number of charging stations available has a favorable impact on the utility and promotion of electric vehicles. The influence of incentive measures, such as tax cuts, is fairly significant. According to Mohamed M, G Tamil Arasan, and G Shivkumar, replacing ICE engines with electric engines will reduce pollution significantly and be cost-effective for consumers. Many countries have adopted this technology and are benefiting the environment as a result. The study observed the advantages and disadvantages of EV implementation in India. Government initiatives, batteries, industries, and the environment have all been taken into account. Cost of electric vehicles, efficiency of electric vehicles in India, and demand for electric vehicles were all taken into account. In India, the usage of electric vehicles is largely intended to reduce greenhouse gas emissions and oil costs. The government should make the most of the opportunities offered and identify appropriate solutions to the issues. Developing an aggressive plan for the adoption of electric vehicles in India and assuring a well-executed implementation, according to Janardan Prasad Kesari, Yash Sharma, and ChahatGoel, is a challenge but critical for the government. India's geography and diversity will bring challenges that would necessitate smart answers. With the acquisition of four-wheeled cars for government offices, three-wheeled vehicles, and buses for public transportation, public procurement is likely to be a major driver of EV growth. The initial expansion of two- and four-wheeled electric cars is likely to be boosted by investments from fleet operators such as Ola and Uber, as well as operators of food distribution services. However, it may take 5-6 years for private EVs to attain popularity and acceptance. Users of scooters who only need to travel short distances may consider an EV, but those who need to travel longer distances and currently possess bikes like the Hero Splendor may find it difficult to switch to an e 2W, according to Yogesh Aggarwal, VivekGedda, and Kushan Parikh. It is relatively straightforward to enhance the range of an automobile by increasing the battery size. However, with electric 2Ws, every increase in kWh may provide an additional 30km of range, but the increase in weight is around 10kg, or about 10% of the overall weight of the bike. In smaller motorcycles, the weight issue is even more pronounced (less than 150cc).

VII. CHALLENGES OF ELECTRICAL VEHICLE PRODUCTION.

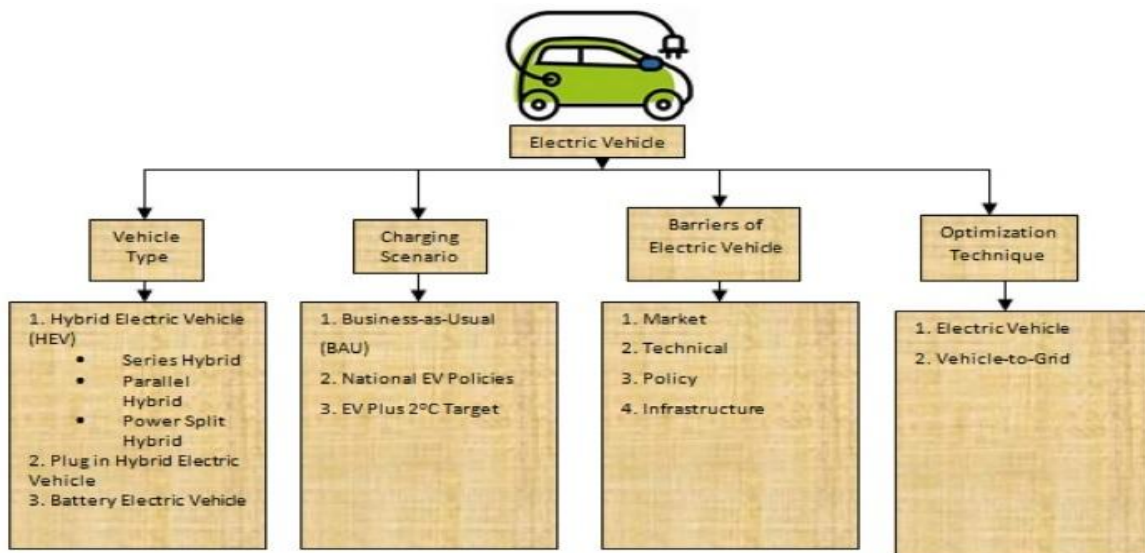


Source:www.googelimege.com

Electric Vehicle Overview

The car is powered by an electric motor that utilises 90–95 percent of the input energy, making it a very efficient vehicle. The battery, charging port, charger, DC/DC converter, power electronics controller, regenerative braking, and drive system are the main components of an electric car. The electric motor's role is to power the electric vehicle by utilizing the electrical energy stored in batteries. When electric vehicles are recharged with low-emission power sources, they become more environmentally beneficial. The electric grid is used to charge the cells. The main purpose of the battery is to provide power to the electric automobile in order for it to run. The drive system's job is to get things moving by delivering mechanical energy to the traction wheel. The electric car has many internal configurations based on the components used and does not require a traditional transmission.

The overview of the electric vehicle can be understood with the help of following Fig.3

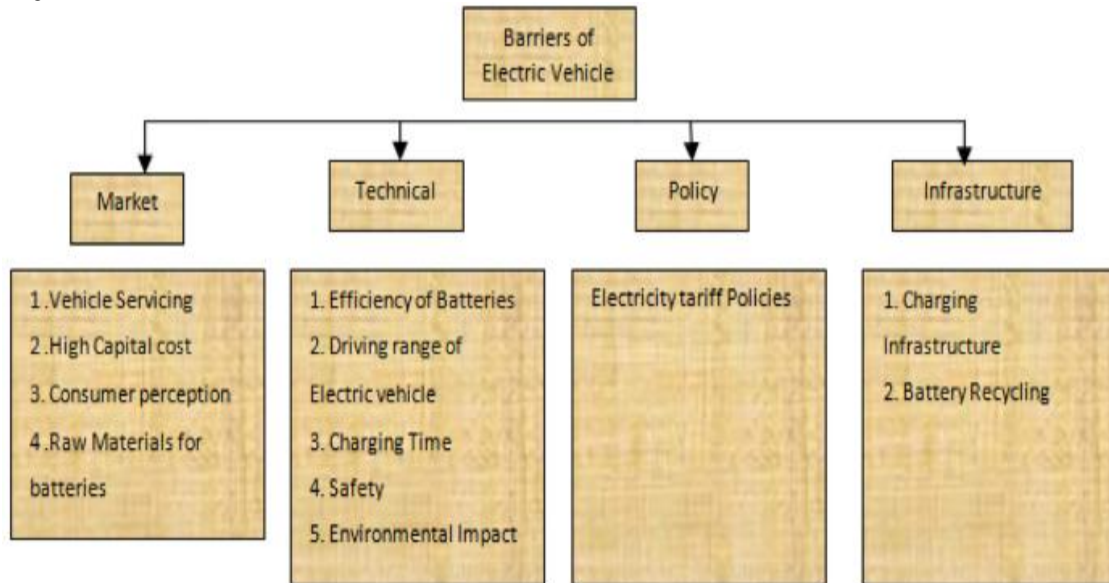


Source:www.googelimege.com

Fig.3 The overview of the electric vehicle

Challenges for Evs in the Indian Market

Challenges for EVs in the Indian market can be addressed from various prospective such as Technical, policy and lack of infrastructure. These are shown in Fig.4



Source: www.googleimage.com

1. Vehicle maintenance A trained technician should be accessible to repair, maintain, and troubleshoot the electric vehicle in order to take adequate care of it. They must be able to apply their expertise as rapidly as possible to solve the problem.
2. Charging time Charging time is inextricably linked to the question of driving range. Using a 7 kW charging station and a sluggish charger, the EV can take up to 8 hours to fully charge from empty. The length of time it takes to charge a battery is mostly determined by its size. The longer it takes to recharge an automobile battery from empty to full, the larger the battery is.
3. Electric vehicle safety requirements The electric vehicle must meet the state or municipal regulation's safety requirements. Overcharge, temperature, short circuit, fire impact, vibration, humidity, and water immersion are only some of the circumstances that the batteries must withstand.
4. The impact on the environment Electric vehicles do not pollute the environment in general, but the components of the batteries are mined or harvested from brine in the desert. Mining has a low environmental impact with this extraction.
5. In order to accelerate the Indian electric vehicle revolution, the Indian government intends to finance EV charging infrastructure. The Ministry of Power has confirmed that EV charging stations in India do not require a license to operate, which could help to expand the country's EV charging station infrastructure.
6. The chemical ingredients of batteries, such as Lithium, Nickel, Cobalt, Manganese, and Titanium, not only enhance the supply chain's cost-effectiveness, but also pose an environmental risk when scrapping.

VIII. SUGGESTIONS AND RECOMMENDATIONS.

The following are some suggestions and recommendations are made to overcome above challenges.

The following are some suggestions and advice for overcoming the issues mentioned above.

1. A rise in middle-class wealth and a young population will result in a rapid expansion of the electric vehicle market, thus the government should introduce a scheme to encourage young people to acquire electric vehicles.
2. India should offer a tax exemption to all electric vehicle manufacturers for the next ten years, or till 2030.
3. Electric vehicles should only be purchased by the government for official purposes.
4. Focus on the transition to electric vehicles, which may raise the cost of registration for non-EV vehicles.
5. The government should either refuse to grant license to non-EV manufacturing enterprises or make the process of obtaining production permission extremely onerous.
6. The government should encourage foreign direct investment in EV manufacturing businesses and provide a special subsidy to enterprises that are involved in EV R&D.
7. Universities and colleges should be provided special money to do creative research in the field of EV manufacturing.
8. EVs are currently a hot commodity, selling out in a matter of days, but they require cost-cutting, so attempt to lower the cost of EV production.
9. Encourage and implement a policy of voluntary scrapping of old and inefficient cars.
10. The government and the automobile industry must implement the Automobile Mission Plan 2016-2026 correctly and on time.
11. The initial GST on EVs was decreased from 12% to 5%, but I propose that it be dropped to 0% to encourage purchasers and sellers.

12. The income tax deduction for interest paid on electric vehicles is 1.5 lakh, which has been increased to 2 lakh, and the principal amount owed on a car loan is also eligible for the 80C deduction.

13. MPs, MLAs, and all government employees have been given authorization to purchase electric vehicles for both official and personal use.

IX. CONCLUSION.

The present prohibition on older gasoline cars in some Indian cities has already had a favorable impact on air quality, and this will only improve with the widespread use of electric vehicles. Today, the principal mode of transportation for settlements, transporting residents to highway bus stops or train stations. It is possible to convert them to electric quickly, providing villages with clean transportation. The Indian government is committed to providing a conducive environment for electric mobility, and as part of the Union Budget 2019, the government made many key announcements aimed at promoting electric mobility in India. In order to encourage the sale of electric vehicles in the country, it has been suggested that the GST rate on them be reduced from 12 percent to 5%. In addition, the interest paid on loans obtained to acquire electric vehicles will be eligible for a tax deduction of up to 1.5 lakh. The improvement of electric vehicle technology, tougher environmental rules, and time-bound initiatives from both the government and the automobile industry will all contribute to a steady and easy transition to electric mobility

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