



VIVA-TECH INTERNATIONAL JOURNAL FOR RESEARCH AND INNOVATION

ANNUAL RESEARCH JOURNAL

ISSN(ONLINE): 2581-7280

Perception of Indian Consumers Towards An Electric Vehicle for Private Transportation

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Abstract : Due to the limited availability and rising prices of fossil fuels, it is needed to find some alternative option of energy for running the vehicle. Electricity seems to be an effective upcoming solution for the same. In a country like India with a 1.38 billion population, the electric vehicle (EV) industry can provide a sustainable alternative for transportation. However, the current market share of EVs is significantly less. This paper will focus on the scope of EV in India and study consumer perception towards electric mobility.

Keywords - Electric vehicles, Consumer perception, Electric mobility, Charging station, Conventional vehicle, Government electricity policies

I. INTRODUCTION

The third-largest road network in the world is found in India. Hence road travel is naturally a preferred choice. Approximately 60% or more of the population uses personal or shared vehicles to commute [12]. Currently, vehicles that are operated on fossil fuel are a major cause of global warming and environmental pollution. These all vehicles are responsible for producing dust particles and harmful gases due to the burning of fossil fuel. The conventional diesel vehicle pollutes more than a gasoline vehicle, but still, both vehicles are responsible for environmental damage. A sustainable solution for this problem is to take steps toward electric mobility[13].

The government has taken a step forward to solve this problem by announcing incentive schemes for promoting electric vehicles (EV). The first thing that has been done is they have imposed green tax on re-restraining the vehicle after 15 years[6]. This will motivate people to scrap their old vehicle and go for new less polluting options. The second step has been taken by increasing taxes on conventional fuel like petrol and diesel. This has increased the per kilometer travel cost of a conventional vehicle. High taxes on conventional fuel will also force consumers to opt for lighter, smaller, more fuel-efficient cars. Or they may choose to drive as minimum as possible. This will also force the consumer to use 2 wheelers instead of 4 wheelers wherever possible.

The government aims to prompt maximization of EV sales by launching the FAME India scheme[8]. They have announced the minimum road taxation on EV. Several state governments are providing additional benefits to EV owners on a first come first serve basis. Incentives have also been provided to increase the fast charging infrastructures on highways. It is expected that with an increasing amount of benefits given over use of EVs, people will positively move towards electric transportation for personal and public use.

II. CURRENT SITUATION

An automobile market in a developing country like India is the largest growing market. In the world, It contributes approximately around 15% to the country's GDP. This fastest-growing industry is expected to reach around 25% in the next three years. In order to fight the issue of global climate change, India is targeting to achieve more than 40% sales of overall vehicles to EVs by 2030[6]. "Faster adoption and manufacturing of Hybrid and Electric vehicles" [FAME] scheme has already been announced by the government for the same. They have announced the minimum road taxation on EV. Several state governments are providing additional benefits to EV owners on a first come first serve basis. Favorable conditions have also been provided to increase

the fast charging infrastructures on highways. Post-implementation of this scheme it is expected that the EV market will grow rapidly in India.

In order to solve these various problems, authorities are announcing incentive schemes for promoting electric vehicles (EV). the first thing that has been done is they have imposed a green tax on re-restring the vehicle after 15 years. This will motivate people to scrap their old vehicle and go for new less pouting options. The second step has been taken by increasing taxes on conventional fuel like petrol and diesel. This has increased the per kilometer travel cost of a conventional vehicle. High taxes on conventional fule will also force consumers to opt for lighter, smaller, more fuel-efficient cars. Or they may choose to drive as minimum as possible. This will also force the consumer to use 2 wheelers instead of 4 wheelers wherever possible.

Presently a total of 0.1% share of EVs in India is disappointing as compared to other developed countries. It is expected that with an increasing amount of benefits given for use of EVs, people will positively move towards eclectic transportation for personal and public use.

III. FACTORS THAT AFFECT EV ADOPTION: HEADINGS

3.1 The high initial cost of Ev:

The initial high cost is due to the existing high cost of the battery. The cost of an EV is almost 1.96 times its equivalent petrol model. This is a significantly large initial investment to be handled by the customer. And payback period depends on a daily commute in kilometers by the user. So in the case of less kilometers are to be traveled per day, it is financially viable to opt for a fossil fuel car.

3.2 Replacement of battery after its life cycle is over:

The consumer will have to replace the battery after its defined numbers of charging cycles are over. It will be 600 to 1200 charging cycles or 6 to 8 years. This will put an additional financial burden on consumers. Currently, companies are not in a position to declare the cost of new batteries. This creates confusion over his mind about whether to opt for EV or not.

3.3 A number of charging stations available:

Currently, the government is building the charging infrastructure across highways. But for a big country like India, it will take a few more years to develop a sufficient number of charging stations to fulfill its needs. Due to this factor, people are worried about where to chare the vehicle in case of long journeys. For a small distance (less than 200 Kms.) it may not be a big problem in case of 4 wheelers.

3.4 Time and cost required for charging:

The amount of time required for charging the EV depends on the type of charger used. In the case of a slow charging station, it will take 8 to 14 hours of charging time. This can be easily done at home during nighttime. Cost per unit of this is as per normal rates of the electricity distribution board. But for long journeys, it is required to go for a fast charging method. These fast chargers will also take around 40 to 90 minutes for charging the Ev. this is significantly high as compared to fuel refilling. The electricity charges for fast charging are 15 to 25 rupees per unit. This increases the travel cost per kilometer. Also due to the limited number of charging stations available, waiting time is also high.

IV. RECOMMENDATIONS:

Along with incentives provided by the government it is also required to improve the existing battery technology. Progress of the EV industry will largely depend on developments in battery technology. It is required to develop a low-cost and safe chargeable battery. Battery swapping stations for 2 wheelers can also help in the case of two-wheelers. This swapping technology will require a standardization of batteries specification in all the vehicles. This will also make it possible for customers to rent a battery instead of buying it. Wich will lead to internal competition amongst service providers for offering a better price.

Another parameter is charging infrastructure, which plays a vital role in the adoption of EVs. More availability of charging stations will help in reducing range anxiety in people's minds. Home charging stations can be encouraged by proper administrative planning, this can help to increase the number of charging stations which is possible. It will also provide a passive income for people in that area. In the case of apartments, separate arrangements for EV changing should be made compulsory, so that people can be benefited from this facility.

Installation of EV charges should be made mandatory for corporate offices with parking facilities. Public places like shopping malls and cinema halls should have separate parking facilities for EVs along with fast chargers. More fast-charging stations should be permitted at private business outlets having ample parking space. For private residential houses with rooftops, solar EV charging stations can be recommended. Government can provide subsidies for such charging infrastructure.

Low-interest loans for EVs can be offered by private financial institutions. This will motivate the consumer toward the adoption of EV. Based on this data related to EV loans, the government can offer income tax rebates to the consumer. This will also lead to improving EV sales.

V. CONCLUSION

With the increasing cost of fossil fuels, it is necessary to find the other alternative. EV seems to be the best possible option for this. It has significantly less running cost compared to an IC engine. But currently high initial cost and limited charging infrastructure seem to be demotivating factors to opt for EV as an option. In order to improve these situations, the author has suggested a few recommendations. It is most likely to see that in the future people will have to go for this EV transportation technology, but the government has to play it effectively.

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