

Study on Adoption of Electric Vehicles in India and Challenges

Abstract— Over the years, the extensive increase in contribution of automobiles towards the environment pollution created the need for replacement for petroleum-based vehicles. Electric vehicles are one of the emerging technologies as well as green and viable. Many countries around the globe have implemented and adopted this technology up to a large extent. This paper is analyzing the position of India with other major countries and challenges faced over adoption of this new technology based on a study.

Keywords—electric vehicle, slow progress, adoption, initiative

I. INTRODUCTION

Hybrid and electric vehicles have gained significant popularity over the past few years as they have come out to be a 'greener' replacement of their gasoline peers as it is well known that vehicle emissions are the major contributor of air pollution. Exponential hike in the conventional vehicle fuel prices over the past few decades is yet another reason for popularity of electric engine vehicles.

II. ADVANTAGES OF ELECTRIC VEHICLES

Few of the advantages of an EV are as enumerated below.

A. Environment Friendly

As they have zero exhaust emissions hence reduces the greenhouse gas emission.

B. Less Maintainance

BEVs have less moving parts than those had by conventional combustion engine vehicles maintenance is comparatively easier and cheaper.

C. High Fuel Economy

EVs are cheaper to operate since they have high efficiencies and fuel economies thereby reduce cost for the owner. The electricity to charge an EV is about one third as much per kilometer to purchase fuel for vehicle.

III. INDIA'S RANK IN ADOPTION OF EVS

India is one of the major automobile consumer markets in the world today. According to a World Economic Forum report, it is poised to become the world's third-largest consumer market by 2030. Yet, Indian cities are far from being counted among the EV capitals around the globe today.

According to the data of Statista.com which ranked countries with the highest share of electric vehicles in new passenger car sales in 2018, Norway is racing ahead followed by Iceland, while Sweden was third. Netherlands was fourth followed by Finland and China, whereas India failed to position itself even in top 10 countries.

IV. STUDY ANALYSIS

To home down to the key reasons behind India's slow progress in this field inspite of being one of the major consumer base for automobile vehicle industry, a study with primarily focusing on the age group of 25 years to 40 years who is the main consumer of automobile vehicles in India was conducted in which a group of 828 participants were questioned for their prime reason for not adopting the electric

vehicles over conventional petroleum engine vehicles. The following are the highlights of the study.

- Around 21 percent of participants were unaware about the pros and cons of an EV.
- Only around 6 percent of participants were either in procession or planning to buy any electric vehicle in near future.

On asking about the main reasons for not going for the electric vehicle over conventional vehicle the followings came out to be the basic reasons behind the slow growth in the field of adoption of the EVs.

- 46 percent participants were considering limited availability of recharging station as their main reason for avoiding electric vehicle.
- 22 percent participants were avoiding EV due to limited per charging range.
- 12 percent participants did not like EV due to unreliability of electric components.
- 10 percent participants did not like the available models of EV.
- 7 percent participants think that EV is relatively costly and remaining 3 percent of them had other reasons for disliking for EV.

On being asked about expecting time for EVs to be a norm in Indian society, following facts have come out.

- 6 percent participants believed that it will take 5 more years.
- 47 percent participants decided on 10 years.
- 43 percent participants went for 15 years.
- Remaining 4 percent participants told that India will take more than 15 years to fully adopt the EV technology.

V. GOVERNMENT INITIATIVES

The Department of Heavy Industry formulated the FAME India Scheme (Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles in India) in 2015 for the initial period of two years, with the first phase starting in April to push the adoption of electric vehicles.

The Phase-I of the theme was further extended to March 2019. During this season, about 280,000 hybrid and electric vehicles were supported by way of a demand incentive amounting to about IN 359 cores (about US \$50.5 million). Phase-I saw the development of about 500 charging stations across the country. Also, Energy Efficiency Services Limited (EESL) under the Ministry of Power has deployed 65 public charging stations for electric vehicles in the country.

The second phase which was started in April 2019 was planned to support about 100,000 electric-2 wheelers, 500,000 electric-3 wheelers, 55,000 e-4 wheeler passenger cars, and 7,000 e-buses through demand incentives for a period of three years. Additionally, a budget provision of IN 1000 Crores (about US\$ 140 Million) has been created for the setting up of a charging infrastructure under the scheme. The Department of Heavy Industry had issued an Expression of Interest (EoI) inviting proposals for the establishment of 1,000 charging stations under this phase.

The following initiatives have been launched by the government for electric vehicle industry promotion in India.

- Under the new GST regime, GST on EVS is reduced from the existing 12% rate to 5%.
- The Ministry of Power has allowed the sale of electricity as a 'service' for the charging of electric vehicles. This may attract investments into the charging infrastructure.
- The government has granted an exemption to battery-operated transport vehicles and transport vehicles that run on ethanol and methanol fuels from the requirements of the permit.
- The government has planned the exemption of registration fees for battery-operated/electric vehicles to promote the employment of eco-friendly vehicles with in the country.
- The Ministry of Road Transport and Highways has allowed the people of 16-18 years of age to get driving licenses to drive e-scooters.

VI. CONCLUSION

The implementation of EVs in India aims primarily to reduce greenhouse gas emissions and cut oil expenses. As indicated by the above mentioned study limited availability of recharging stations which is further augmented by poor per charging range of EV is the prime reason for non-adoption of the EVs. There is also a necessity of a massive scale

campaign to unfold awareness concerning the advantages of EV as around 21 percent of participants were not even fully aware about the facts. Also, reduction in the cost and availability of more lucrative models will make EVs more attractive for the people. However, as highlighted in previous paragraphs government has already taken numerous initiatives to address the various challenges but results on grass root are relatively sluggish. Hence, if government really wants to achieve its target of complete adoption of EV technology by 203, there is a necessity of reassessment of the challenges and prioritization of the efforts based on various environmental studies and the surveys. The Government should make the most out of the opportunities available and find suitable ways to tackle the challenges impeding over the implementation of EVs.

REFERENCES

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