

# An Empirical Study on Attitude of Consumer Towards Purchase of Zero Emission Vehicle in India

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**Abstract---** The gap between domestic crude oil production and consumption is widening. This, coupled with hardening of the crude prices, is leading to increase in the trade deficit. This poses a serious challenge to environment. Keeping this in mind a research is designed to study the perception of consumers towards buying of zero-emission vehicles in India. The study also considers the barriers to buying decision of consumers towards zero-emission vehicles. The study found that, the major barriers are lack of proper infrastructure, high prices, battery problems and limited range of variety in the products.

**Keywords---** Consumer perception, buying behavior, automobile industry, electric vehicle

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## I. INTRODUCTION

The Indian automobile manufacturing sector is one of the largest employers because of its profound backward and forward chain integration with other industries. According to the report of the society of Indian automobile manufacture Indian automobile production has now taken 4<sup>th</sup> place globally reaching 26 million units in 2020 of which 4.7 million are exported by India this makes India the 7th biggest producer of commercial automobiles. A major impetus was provided by the liberalization of the Indian vehicle manufacturing in the year 1991, since then there has been the significant increase in the manufacturing facilities in terms of the number of players and size.

### 1.1 Need for Zero-emission vehicles:

Globally, automotive industry is passing through a paradigm shift. The past century has been the era of internal combustion engine (ICE) primarily [1] on account of the ease of use, availability and low-cost of fossil fuels. The shift to electric mobility has become necessary on account of fast depletion of fossil fuels, rapid increase in energy costs, impact of transportation on the environment and concerns over climate change.

For emerging economies like India, the urgency to find viable alternatives for sustainable mobility is also accentuated by rapid economic development which is accelerating the demand for transportation. As a result of sustained high GDP growth, primary energy consumption is expected to increase by 70% in the next ten years.

The gap between domestic crude oil production and consumption is widening. This, coupled with hardening of the crude prices, is leading to increase in the trade deficit. This poses a serious challenge to environment. Therefore, all measures need to be taken to lessening the dependence on fossil fuels for energy requirements and the projected production and consumption of crude oil for India up to 2020.

## II. LITERATURE REVIEW

Campbell et al. (2012) used survey data from Birmingham in 2001 to discover prospective EV owners in a metropolitan area. They working ranked cluster study – a technique by which to cluster a set of substances in such a way that elements in the same group (called cluster) are further like each other (in some sense or another) than those in other groups (clusters) – to categorize geo-demographic [2] groups that fit the profile of a predicted extra fuel vehicle driver. Contemporary environmental concerns are thrusting the manufacturing and sales.

According to Bhalla iPretty et. al. (2018) combination of Indian skilled and semiskilled technological base, a platform of large customer base, and relatively cheaper production and labor cost, has fascinated almost all global electric vehicle manufacturers and component suppliers, to start operations from India – iBosch, iAVL and iCummins. To study iCommercial success and ipurchase intention of ielectric ivehicle by iIndians, there is a need to istudy the ifactors influencing the iconsumer iacceptance of these ivehicles. iVarious ifactors that influence the ipurchase idecision of icar ibuyers are

individual perception on dimensions like environmental issues, cost, trust, technology advancement, infrastructure, and society acceptance. The results show that environmental concerns and consumer trust on technology [3] are antecedent factor for perception about Electric vehicle purchase and the factors which give adoption blow back are cost, infrastructure, social acceptance. Thus, to promote sales of electric vehicle government has to play a leading role by creating environmental policy, infrastructure and subsidized cost of vehicle or lower the bank rate of interest rate.

According to Bigerna S. et. al. (2018) Sustainable mobility has received increasing attention in recent years. The transport sector contributes to almost a quarter of Europe's greenhouse gas emissions. The development of electric vehicles (EVs) may help the shift toward sustainable [4] mobility, reducing oil vulnerability and greenhouse gas emissions in road transport. Poor penetration of EVs might be explained, moreover, by consumer resistance to EVs. The aim of our paper is to determine consumers' attitude and preferences for EVs, investigating which conditions influence consumer decision-making to purchase an EV. Using a fuzzy set qualitative comparative analysis of 421 highly-educated individuals, involving students [5] and faculty members, we identify several configurations of conditions of the variables which lead to the outcomes, supporting their equifinality and asymmetric nature. Our findings indicate attitudes related to EVs differ across age and groups. Our paper offers public decision makers new useful insights for understanding the importance of specific determinants, and for designing effective strategies for EVs' development worldwide.

### III. RESEARCH METHODOLOGY

#### 3.1 Research Objectives:

1. To examine the need for zero-emission vehicles in India
2. To understand the perception of consumers towards zero emission vehicles
3. To identify and analyze the factors considered by consumer in preferring zero emission vehicles in India.

#### 3.2 Research Design:

For the purpose of this research, descriptive research design has been used to describe the factors considered by consumers in preferring zero emission vehicles in India.

#### 3.3 Data Collection:

For the purpose of this research, primary data has been collected from two-wheeler and four-wheeler vehicle consumers through semi structured questionnaire. The

secondary data has been collected from the websites, magazines and journals.

#### 3.4 Sample design and sampling technique:

For the purpose of the research, simple random sampling technique has been used to gather the primary data from 100 two-wheeler and four-wheeler vehicle consumers.

### IV. PERCEPTION OF CONSUMER

The preference towards transportation mode is very much affected by its accessibility. The observation from the data highlighted that general vehicle users preferred of private vehicle for different mode of transportation. The reason for preference of private vehicle in long distance travel can be due to the convenience, more secure and privacy, improved highways and recently built high speed and secure expressways.

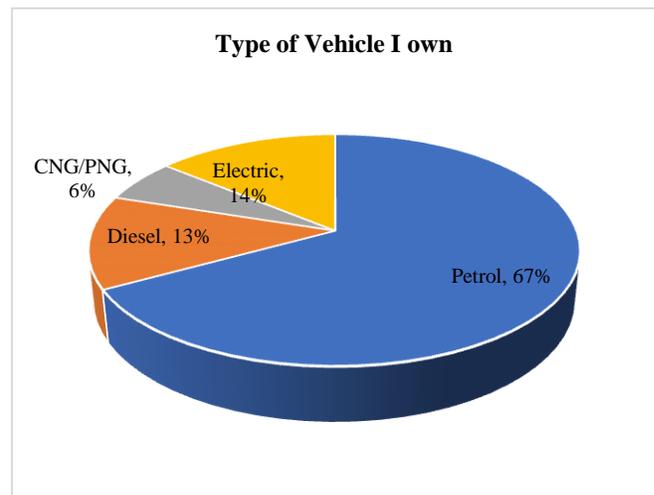
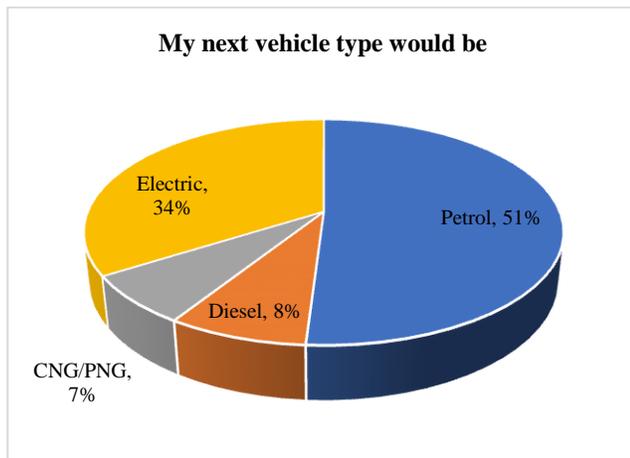


Fig. 1 Type of Vehicle I Own

Based on the data collected through questionnaire, figure 1 represents the present ownership of vehicle by the consumers, it is found that 67% of consumers use petrol vehicles, this includes two-wheeler consumers also, 13% consumers use Diesel vehicle, only 6% use CNG/PNG vehicles and remaining 14% consumers use electric/zero emission vehicles.

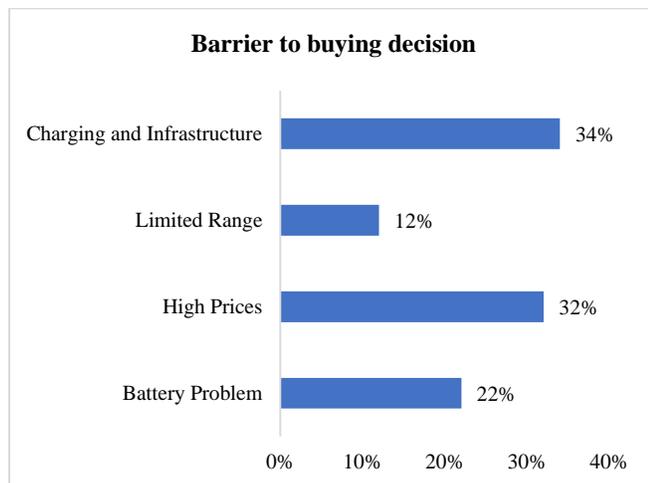


**Figure 2** Next Vehicle type

When asked about the next type of vehicle to be purchased by consumer, majority i.e. 51% preferred petrol vehicle, 8% preferred diesel vehicle, 7% preferred CNG/PNG and the number of customers preferring electric/zero emission vehicle increases to 34%. This shows that, consumer behavior is getting diverted towards zero emission vehicles.

**Challenges ahead of Zero emission vehicle:**

There have been major challenges that electric vehicle developers have had to face through the years. Hence, an attempt is made to study the challenges that needs to solved before consumers make the buying decision.



**Fig. 3** Barrier to buying decision

Figure 3 represents the barriers faced by consumers towards buying a zero-emission vehicle/electric vehicle. Majority of the consumers i.e. 34% are worried about the charging points and inadequacy of proper infrastructure for

the electric/zero-emission vehicle. 32% of consumers are concerned about the high prices charged by manufacturers. The cost of battery installed in electric vehicle is very high and due to this the cost of vehicle also rises, this created one of the barriers for 32% of consumers.[6] Another concern for low turnover of such type of vehicle is slow charging of batteries and short lifecycle of battery is fear that restrains consumers from buying such vehicles and at last 12% of the consumers do not buy such type of vehicle because of limited variety available in it.

**V. CONCLUSION**

The study found that, the major barriers are lack of proper infrastructure, high prices, battery problems and limited range of variety in the products. Even though the industry is facing lots of barriers there is still lot of hope present for the success and growth of zero emission vehicles because the acceptability and liking towards this category of vehicle is found to be increasing day by day.

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