

## The Inclinations of Consumers towards Electric Vehicles: A Case Study

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### Abstract:

Global warming, environmental degradation, and oil dependence may all be lessened with the widespread use of electric vehicles (EVs). Electric vehicles will emerge as the primary development trend in the automotive industry of the future due to the combined pressures of resource reduction and environmental reforms. To lessen the influence on the environment, it is crucial to build intelligent, energy-efficient, and low-carbon electric vehicles. (Tu & Yang, 2019) This paper investigates inclinations of consumers towards electric vehicles. Due to the brief duration of EV advertising, the majority of research relies on tests or questionnaires to determine the reactions and/or behaviours of customers. (Ma et al., 2019). This study's scope is restricted to Punjab, India, and it also used a questionnaire. Based on population, three major cities—Jalandhar, Amritsar, and Ludhiana—were chosen for data collecting. The sample strategy used was convenience sampling.

**Keywords:** environmental, degradation, inclinations, questionnaires.

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### Introduction

Global warming, environmental degradation, and oil dependence may all be lessened with the widespread use of electric vehicles (EVs). Electric vehicles will emerge as the primary development trend in the automotive industry of the future due to the combined pressures of resource reduction and environmental reforms. To lessen the influence on the environment, it is crucial to build intelligent, energy-efficient, and low-carbon electric vehicles. (Tu & Yang, 2019) One of the most alarming worldwide concerns of the twenty-first century has been environmental degradation. The globe is growing increasingly concerned about the escalation of environmental challenges since they impact a country's economy, society, and ecology. (Wen Hui Lee et al., 2024) Egoistic, social-altruistic, and biospheric value orientations, as well as views on the effects of environmental changes on valued objects, are all associated with environmental concern. (Stern & Dietz, 1994) Buildings worldwide account for over 40% of the world's yearly energy use. Lighting, heating, cooling, and air conditioning use the majority of this energy. Growing knowledge of the harm that CO<sub>2</sub>, NO<sub>x</sub>, and CFCs cause to the environment has rekindled interest in eco-friendly heating and cooling systems. Governments agreed in the 1997 Montreal Protocol to phase out refrigerant compounds that could harm stratospheric ozone. (Omer, 2008) A recent NASA analysis asserts that increased emissions from human activity into the atmosphere have caused the planet's average surface temperature to rise by around 1.62°F since the late 19th century. This planet is experiencing a reduction in pollution as a result of the recent

COVID-19 pandemic. India, home to some of the world's 30 most polluted cities, has seen a sharp decline in pollution, according to Wright, and Gohd reported that satellite track emissions have decreased over China during this coronavirus outbreak. (Khan et al., 2020)

## **Review of Literature**

The growing significance of electric vehicles (EVs) in the global shift to sustainable transportation is reflected in the substantial growth of the literature on consumer preferences for EVs in recent years. A summary of the main ideas, conclusions, and patterns found in the literature is provided below:

### **Environmental and Sustainability**

Environmental consciousness is one of the main factors influencing consumer demand for EVs. Research continuously demonstrates that buyers are more inclined to adopt EVs if they are worried about air pollution and climate change (Egbue & Long, 2012; Rezvani et al., 2015). However, worries about the sustainability of battery production and disposal are frequently balanced against the environmental advantages of EVs (Hawkins et al., 2013).

### **Cost Considerations**

Even though EVs have lower operational costs than internal combustion engine (ICE) vehicles, high upfront prices continue to be a major obstacle to their adoption (Hidrue et al., 2011). According to studies, buyers are more inclined to choose EVs if they are aware of the long-term fuel and maintenance savings (Lieven et al., 2011). The financial appeal of EVs is greatly increased by government incentives like tax credits and subsidies (Sierzchula et al., 2014).

### **Range Concern and Infrastructure for Charging**

One recurring worry among prospective EV customers is the possibility of running out of battery power before arriving at a charging station (Franke & Krems, 2013). The accessibility and availability of infrastructure for charging have a big impact on customer choices. EV adoption is higher among consumers in areas with established charging networks (Bailey et al., 2017).

### **Demographic Variations**

EV adoption is typically higher among consumers that are younger, better educated, and have higher incomes (Hidrue et al., 2011). Compared to rural customers, urban consumers prefer EVs because they have better access to charging infrastructure and are frequently subject to tighter emissions laws (Sierzchula et al., 2014).

### **Barriers to Adoption**

Concerns among consumers include battery longevity, replacement expenses, and the effects of battery disposal on the environment (Egbue & Long, 2012). Many buyers are misinformed about EVs, which results in misunderstandings regarding their cost, performance, and environmental advantages (Graham-Rowe et al., 2012).

The research emphasises how consumer choices for EVs are shaped by a complex interaction of environmental, economic, technological, and social variables. Even while obstacles like cost and range anxiety have been significantly reduced, more work must be done to support policies, build

infrastructure, and educate consumers in order to hasten the adoption of EVs. Future studies should concentrate on digitalisation, developing markets, and how changing technology affect consumer behaviour.

### Objective

The main objective of this paper is to find out the inclinations of consumers towards electric vehicles.

### Research Methodology

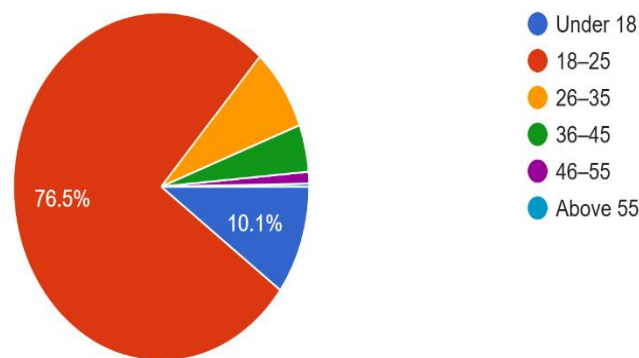
Non-probability convenience sampling was the method used for sampling. Punjab was the exclusive focus of this study, and Amritsar, Ludhiana, and Jalandhar were the three largest districts selected based on population size. The 2011 census showed that there were 81,82,985 people living there. 385 was the sample size. Using the following formula, the sample size was determined. *Necessary Sample Size = (Z-score)<sup>2</sup> X Std Dev\*(1-StdDev) / (margin of error)<sup>2</sup>* Twenty-two of the 385 respondents who received the questionnaires did not answer. Therefore, the study's analysis and interpretation were predicated on 363 respondents.

### Analysis and Interpretation

**Fig 1.1 Age Group of the respondents**

What is your age group?

366 responses



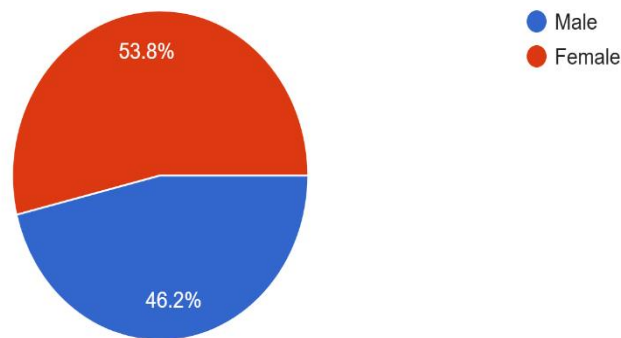
Source: Primary Data

Fig 1.1 depicts that 76.5 percent of respondents are between the ages of 18 and 25, while just 10.1% are under the age of 18. This shows that the tastes, attitudes, and views of younger people—especially those between the ages of 18 and 25—have a significant impact on the survey results. According to Rezvani et al. (2015), younger people are frequently more tech-savvy, environmentally sensitive, and receptive to embracing new technology like electric cars (EVs).

**Fig 1.2 Gender**

What is your gender?

366 responses



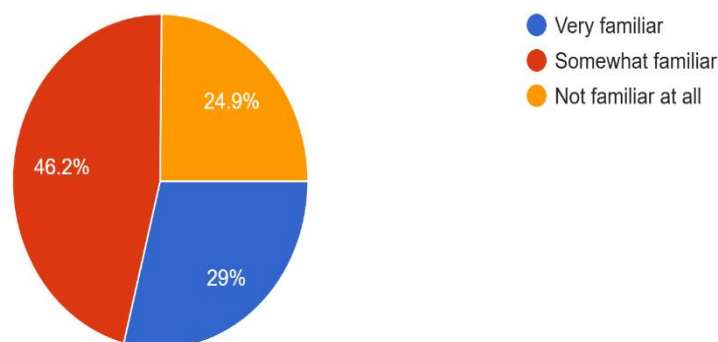
Source: Primary Data

Fig 1.2 represents that Women were slightly more represented in the survey, as evidenced by the respondents' gender distribution, which was 46.2% men and 56.8% women. This distribution is intriguing because it sheds light on the potential ways that gender may affect attitudes, preferences, and perceptions regarding electric cars (EVs). According to research, women typically give different weight to aspects including price, safety, and environmental impact when choosing a mode of transportation (Hjorthol, 2008). Their opinions towards EVs may be influenced by these priorities.

**Fig 1.3 Familiarity with Electric Vehicles.**

How familiar are you with electric vehicles (EVs)?

366 responses



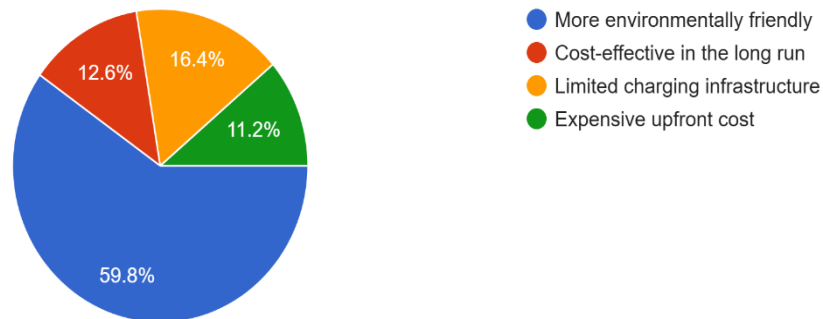
Source: Primary Data

Fig 1.3 explains that among the respondents, 29% were familiar with electric vehicles, 46.2% were somewhat familiar, and the remaining 24.9% were not aware of them at all.

**Fig 1.4 General opinion of EVs compared to traditional fuel vehicles**

What is your general opinion of EVs compared to traditional fuel vehicles?

366 responses



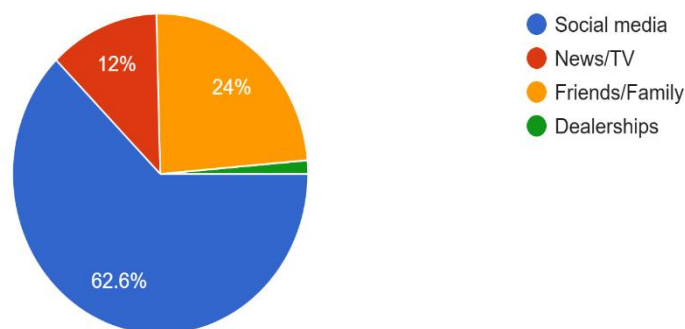
Source: Primary Data

Fig 1.4 represents that 59.8% of people think EVs are better for the environment, which emphasises how appealing they are for sustainability and lowering emissions. In the long run, 12.6% believe they are cost-effective; this is probably due to decreased operating costs, like cheaper fuel and maintenance expenditures. 16.4% of respondents express dissatisfaction with the charging infrastructure's lack of accessibility and convenience. The belief that EVs are more expensive to buy initially than conventional cars is reflected in the 11.2% who believe that the high upfront cost is a barrier. According to this breakdown, people's opinions on EVs are still influenced by infrastructure and cost concerns, even though the majority acknowledge the environmental advantages.

**Fig 1.5 Source of Information**

Where did you first hear about EVs?

366 responses



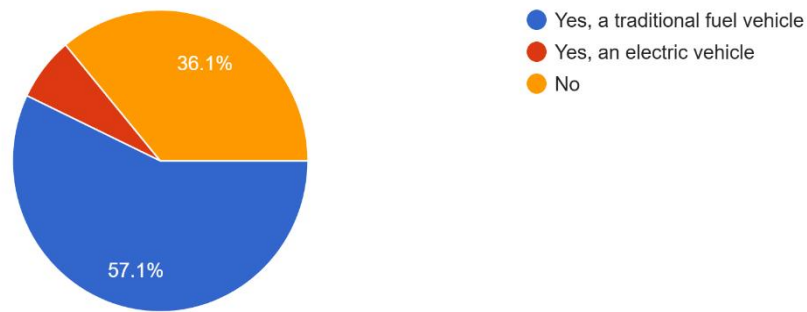
Source: Primary Data

Fig 1.5 highlighted that Social media was the source of 62.6% of EV knowledge, Friends and family accounted for 24%, 12% came from news sites, 1.4% comes from dealers. Social media has emerged as the most influential source of information, significantly surpassing traditional sources like news or

dealerships. This trend indicates the importance of leveraging social media for effective communication and awareness campaigns related to EVs.

**Fig 1.6 Ownership of a vehicle**

Do you currently own a vehicle?  
366 responses

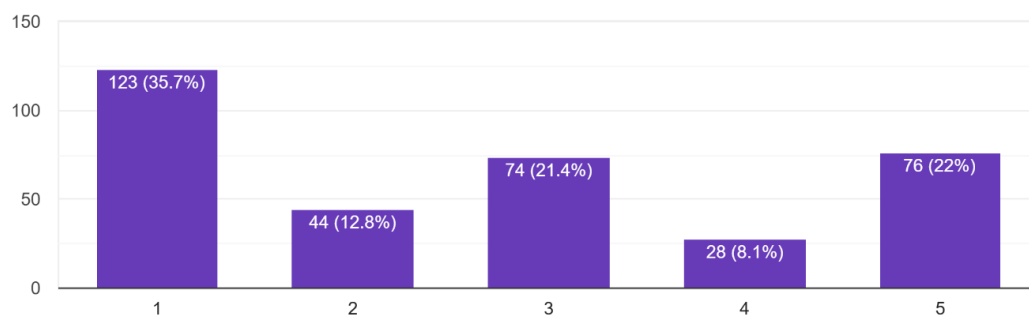


Source: Primary Data

Fig 1.6 explains that 57.1% of the respondents have a traditional fuel vehicle and only 6.8% have electric vehicle. This means that preference for EVs still not very encouraging. The remaining 36.1% most likely don't own a car at all or drive other kinds (such as hybrids or public transportation). Due to variables like cost, infrastructure, range anxiety, or ignorance, the low percentage of EV owners indicates that customer preference for EVs is still low. Even if people are becoming increasingly aware of EVs (for example, through social media), more needs to be done to make them an attractive option.

**Fig 1.7 Plan to Purchase EV in the next 5 Years.**

If not already owning an EV, how likely are you to purchase one in the next 5 years?  
345 responses

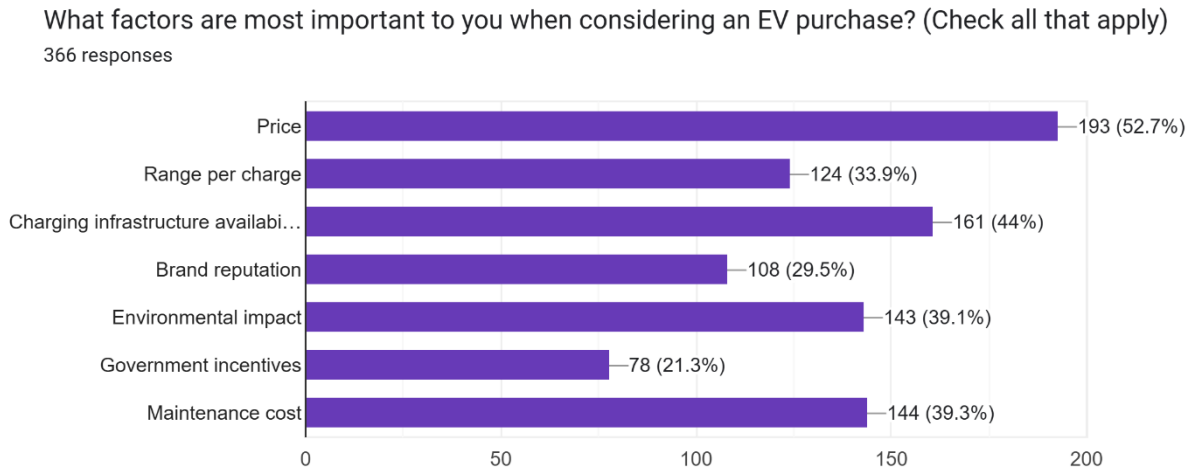


Source: Primary Data

Fig 1.7 briefed that 35.7% of the respondents are very likely to purchase EVs in the next 5 years, 12.8% are likely to buy , 21.5% of the respondents are neutral regarding the purchase and almost 30.1%

respondents are not ready to purchase EVs in the next 5 years. In the next five years, 58.6% of respondents are inclined to adopt electric vehicles (EVs), either very likely or likely. This illustrates how consumers are becoming more conscious of sustainability and carbon footprint reduction. The 30.1% who are unwilling to buy, however, emphasises the need to address issues including price, charging infrastructure, and confidence in EV technology.

**Fig 1.8 Factors responsible for purchase an EV**



Source: Primary Data

### Factors Influencing EV Purchase Decisions

Price: 52.7%

For more than half of the respondents, the price of an electric car is the most important consideration.

Availability of Charging Infrastructure: 44%

One important factor is having access to a trustworthy charging network.

Cost of Maintenance: 39.3%

The expense of EV maintenance is a significant consideration for over 40% of purchasers.

Impact on the Environment: 39.1%

Many people base their purchasing decisions on their concern about lowering their carbon footprint.

33.9% is the range per charge.

For almost one-third of respondents, a car's driving range on a single charge is an important consideration.

29.5% is the brand's reputation.

The legitimacy and reputation of the EV manufacturer are valued by about 30% of respondents.

21.3% in government incentives

Although they are less important, government financial incentives and subsidies still have an impact on more than 20% of respondents.

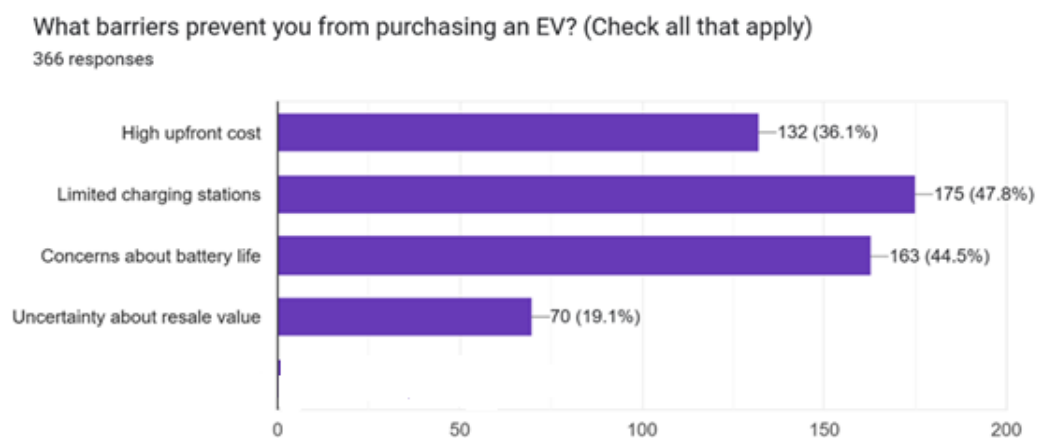
### Major Highlights

Cost and Infrastructure for Charging Availability is the most important element.

Government incentives are the least effective, yet they still make a big difference.

Environmental effect and maintenance costs are two examples of factors that demonstrate purchasers' increasing understanding and practical considerations.

**Fig 1.9 Factors that demotivate consumer to buy EV**



Source: Primary Data

47.8% of charging stations are limited.

The main issue is that almost half of the respondents say that the absence of easily available charging infrastructure deters them.

Issues with Battery Life: 44.5%

Many consumers have serious concerns about the longevity and dependability of EV batteries.

High Initial Expense: 36.1%

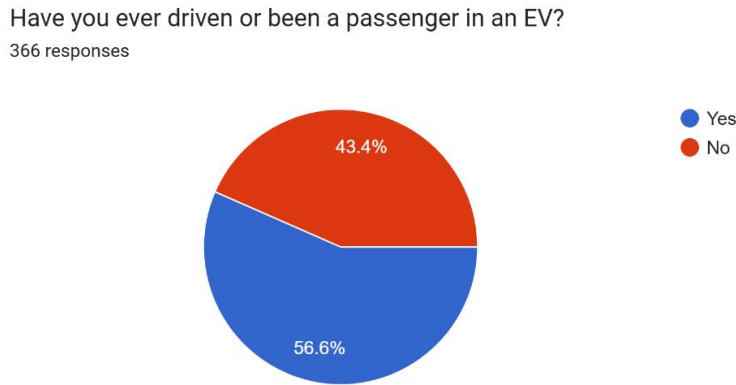
More than one-third of respondents are put off by the upfront cost of buying an EV.

Resale Value Uncertainty: 19%

Almost one in five purchasers are impacted by worries about the EV resale market and its declining value.

Even more significant than the high initial cost are issues with battery life and charging infrastructure. Although less of a problem, resale value is nevertheless important since it shows how dubious the market is about EVs' long-term value.

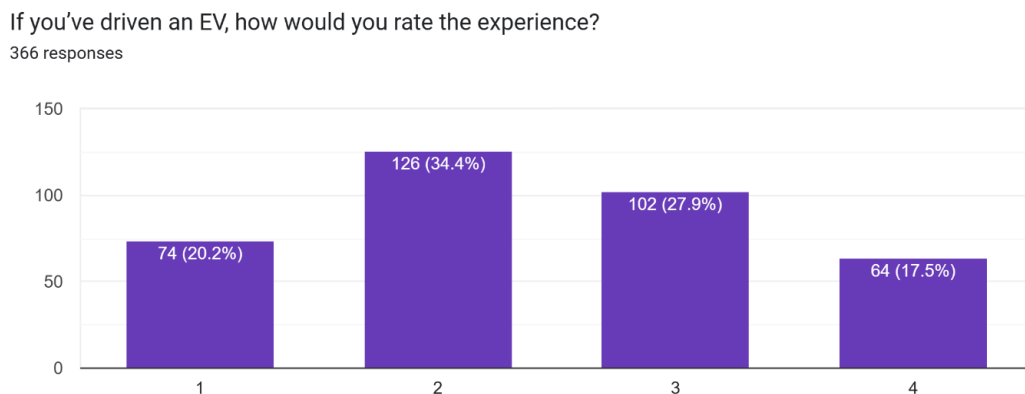
**Fig 1.10 Experience of driving or been a passenger of an EV.**



Source: Primary Data

56.6% of respondents had prior EV experience. More than 50% of the participants have operated an EV as a driver or as a passenger. 43.4% of respondents had no prior EV experience. Nearly 43% of respondents, a sizable majority, have never driven an electric vehicle. The vast majority of respondents (56.6%) are somewhat familiar with EVs, which may have a favourable impact on their opinions and level of willingness to use EV technology. However, in order to increase visibility, the 43.4% of people who have never driven an EV constitute a substantial audience for awareness campaigns or test drive initiatives.

**Fig 1.11 Satisfaction after driven an EV**

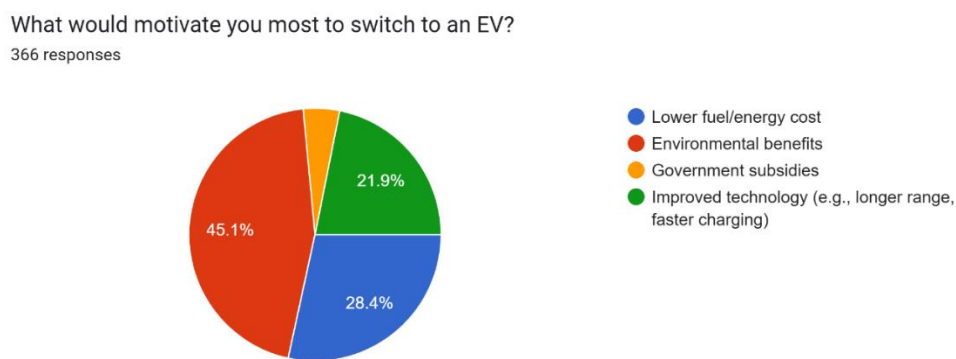


Source: Primary Data

54.6% of respondents reported having a good experience when driving an EV, indicating that most participants were satisfied or had a positive experience with their time spent driving an EV. This group

probably valued features like smooth driving, environmental benefits, fuel savings, or the novelty of the technology. However, 45.4% of the participants did not think their experience was positive. This sizable user base might have encountered difficulties including short battery life, a dearth of infrastructure for charging, expensive starting prices, or a lack of knowledge with EV technology. The information reveals a disparity in user happiness, indicating that although many people gain from EVs, a sizeable portion are still apprehensive or unhappy. This gap could be closed and EV comfort could be raised by addressing these issues through test drives or demonstrations, more educational initiatives, and infrastructural upgrades.

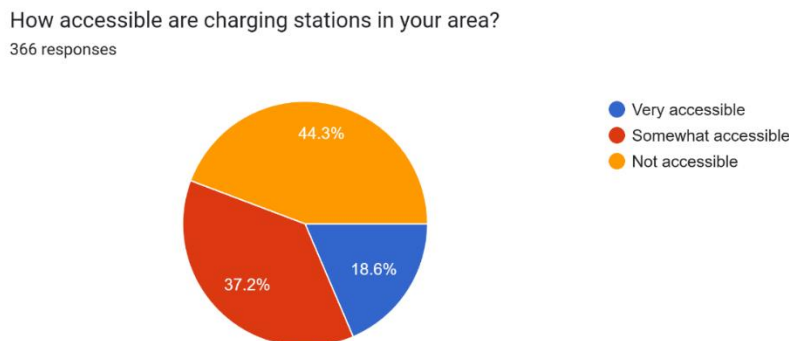
**Fig 1.12 The motivation behind switching to an EV**



Source: Primary Data

According to the survey's findings, 45.1% of participants said that the main reason they were moving to electric cars (EVs) was the advantages to the environment, followed by lower fuel and energy expenses (28.0%) and better technology (21.9%). Research continuously demonstrates that environmental concerns, especially among consumers who care about the environment, are a significant factor in the adoption of EVs (Rezvani et al., 2015; Egbue & Long, 2012).

**Fig1.13 Accessibility of charging stations in area.**

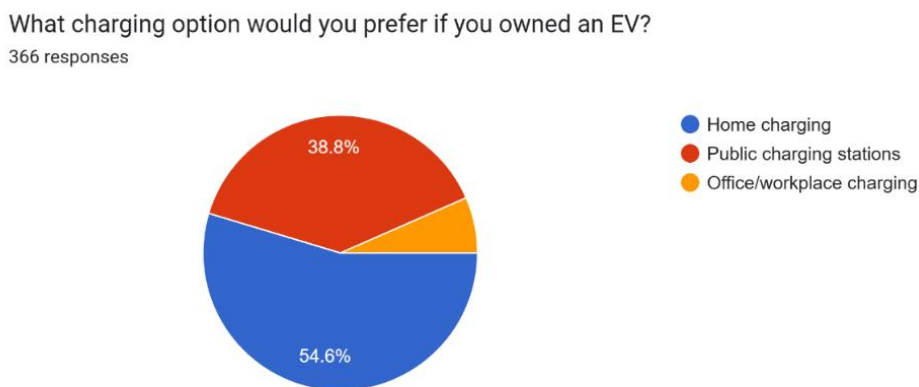


Source: Primary Data

According to the study results, only 18.6% of participants think charging stations are very accessible, 37.2% think accessibility is limited, and 44.3% think there is no accessibility in their area. One of the

biggest obstacles to EV adoption is the absence of charging infrastructure, especially in rural or impoverished locations (Bailey et al., 2015; Egbue & Long, 2012). One psychological obstacle that prevents people from adopting EVs is "range anxiety," which is exacerbated by limited access to charging stations (Franke & Krems, 2013). Due to consumers' increased confidence in the availability of charging choices, EV adoption rates are typically greater in areas with well-established charging networks (Sierzchula et al., 2014).

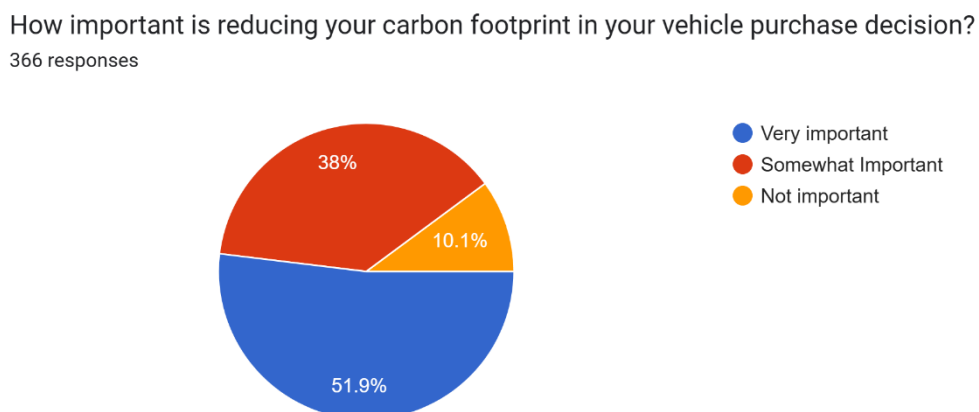
**Fig 1.14 Charging Option**



Source: Primary Data

According to the research, home charging is clearly preferred (54.6%), followed by public charging stations (38.8%), with office charging receiving a lower percentage (6.6%). By offering incentives, subsidies, or joint ventures with utility companies, promote the installation of home charging stations. Boost the quantity of public charging stations in busy places like malls, roads, and urban centres.

**Fig 1.15 Importance of purchasing decision for reducing carbon footprint**

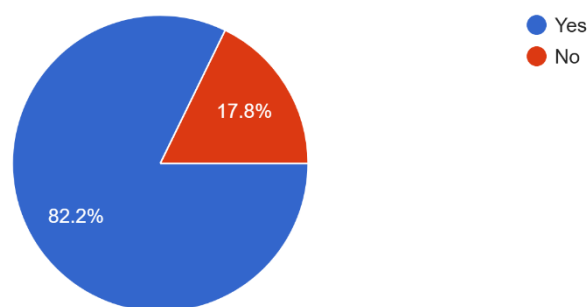


Source: Primary Data

More than 50% of those surveyed acknowledge that purchase decisions have a big impact on lowering carbon footprints. This suggests a keen understanding of the ways in which consumer decisions—such as purchasing eco-friendly goods or endorsing sustainable brands—can help environmental sustainability. Although a significant percentage of respondents (38%) agree that purchase decisions are important, they might not give them as much priority. More information or incentives to promote sustainable buying practices would be helpful for this group. Just 10.1% of respondents do not believe that decisions about what to buy have an impact on lowering carbon emissions. It could be necessary to run focused awareness programs for this demographic to emphasise how consumer decisions affect the environment.

**Fig 1.16 EVs are Significant for Combating Climate Change**

Do you believe EVs are a significant step toward combating climate change?  
366 responses



Source: Primary Data

**EV Support Is Strong (82.2%):** Most people are aware of how EVs help the environment by lowering greenhouse gas emissions, reducing reliance on fossil fuels, and improving air quality. This indicates that people are becoming more conscious of how important environmentally friendly transit is to reducing global warming. This shows that most respondents are aware of how EVs help the environment by lowering greenhouse gas emissions and reducing reliance on fossil fuels. It's worthwhile to investigate the causes of the 17.8%'s disagreement, though, as their viewpoints may raise issues like the effects of battery production on the environment, the constraints of the charging infrastructure, or other obstacles to the adoption of EVs. Resolving these issues could increase public acceptance of EVs and their contribution to reducing climate change.

### Conclusion and Recommendations

The results of the questionnaire demonstrate the rising interest and awareness of electric vehicles (EVs), especially among younger respondents (18–25 years old), who are more receptive to embracing new technology. Even though the environmental advantages are widely acknowledged, major obstacles like expensive starting expenses, a lack of adequate charging infrastructure, and worries about battery life still prevent widespread adoption. Social media is an important venue for awareness campaigns since it has a significant impact on public perception. Even though over half of the respondents had driven an EV, a sizable percentage (43.4%) have not, highlighting the necessity of test drives and

practical experience to boost comfort and trust in EV technology. The research also shows that price is still the most important consideration when making a purchase, closely followed by the availability of charging infrastructure and upkeep costs. Even though they have less of an effect, government incentives nevertheless encourage adoption. Overall, even if EV adoption is increasing, the transition will not be accelerated unless infrastructural and cost issues are resolved. More customers may choose electric mobility if these issues are addressed with a well-thought-out strategy that includes improved incentives, wider charging networks, and advancements in technology.

### Recommendations

**Costs of Battery Replacement and Maintenance:** Although battery technology is advancing, replacements are still expensive. To lower long-term costs, manufacturers should concentrate on producing long-lasting, reasonably priced batteries with warranties.

**Economical Pricing:** In order to make EVs more accessible to a wider audience, their prices need to be competitive. Tax breaks and government subsidies may contribute to the increased accessibility of EVs.

**Charging Infrastructure:** For broad adoption, a carefully thought-out network of fast-charging stations is necessary. To get rid of range anxiety, charging stations must be present in both urban and rural locations.

**Planning & Implementation:** To develop a plan for EV integration that includes incentives, regulations, and infrastructure investment, the public and private sectors must collaborate. Environmental Impact: EVs, particularly those that run on renewable energy, drastically cut carbon emissions. Making the switch to electric vehicles can help cut pollution and fight climate change.

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