

# Awareness and Current Scenario of Electric Vehicles in Mumbai Metropolitan Region

Suma Poojary and Gayathri N.

Department of Zoology

MES's The D. G. Ruparel College of Arts, Science and Commerce, Mumbai, India

**Abstract:** *As the world is looking for various renewable sources of energy and as the fossil fuel resources are depleting, Electric Vehicles (EVs) pose a sustainable replacement to popular automobiles fuelled by fossil fuels. The Government of India has taken initiatives to promote the adoption of Electric Vehicles among the public. A sample survey was conducted among people of all age groups, to understand the current perspective regarding EVs among the public residing in Mumbai Metropolitan Region and to understand the direction of development of EV adoption. This survey was further comparatively analysed with the surveys conducted during 1900s, when EVs were promoted in countries abroad, to get a global context. It was comparable with the public opinion in India when Solar Panels and LED bulbs were introduced.*

**Keywords:** E-Amrit, Section 80 EEB, FAME, Clean Energy

## I. INTRODUCTION

We, as a population, are facing the scenario of depleting fossil fuels, and therefore looking into various renewable energy sources. The carbon emissions due to human activity has been alarming and thus Clean Energy Solutions, which have lesser carbon emission, are being popularly adopted. Vehicles which were fuelled by electricity were very popular among the masses back in the 19th century [1]. Due to the introduction of gasoline powered automobiles which were cheaper and had better capacity than EVs, the use of EVs saw a sharp decline. But due to current increased concern regarding Climate change, EVs are being seen as a replacement to gasoline consuming automobiles. The Government of Norway was the first to introduce incentives to impact the adoption of EVs, which was followed by countries around the world. India joined by introducing the Faster Adoption and Manufacturing of Electric Vehicles (FAME) scheme in 2015 under the National Electric Mobility Mission [2]. Since then, the Indian Government has taken various initiatives like e-Amrit Portal, Section 80EEB of Income tax Act, etc. to promote electric mobility in the country. Still the country has a long way to go to achieve its goals. It is becoming increasingly important to comprehend the elements driving the adoption of electric vehicles as the world moves toward sustainable transportation. This study is intended to understand important information about customer awareness, attitudes, inclinations and concerns about electric mobility.

## II. MATERIAL AND METHODS

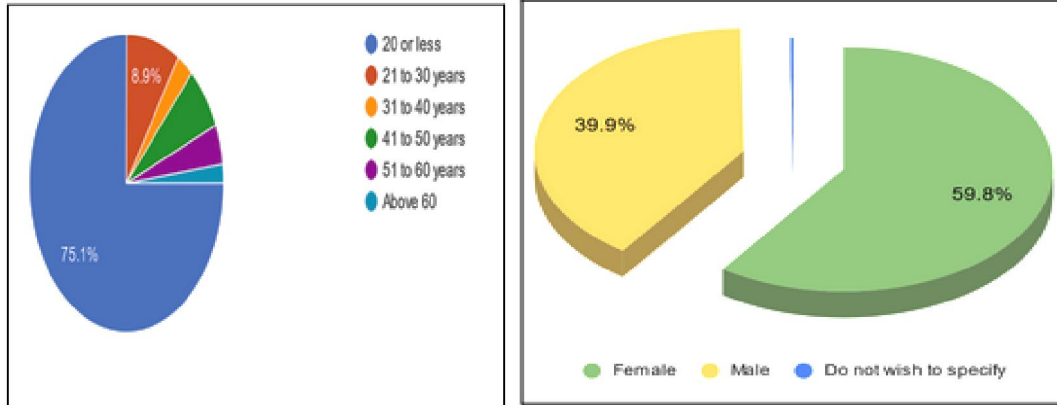
To understand the general perceptions of the public and to serve as an awareness medium regarding incentives rolled out by the Government such as National Subsidy, e-Amrit Web portal, Section 80 EEB of the income tax act, an online survey was conducted.[6][7]. Inclusively personal details were not asked to maintain the privacy of the respondents. The questions were opinion and awareness based. The questions focused on the economical and logistical challenges as may be perceived by the public. The age and gender of the respondents were recorded. The results of this survey were comparatively analysed with Global context to examine our development with respect to international development.

## III. RESULTS AND DISCUSSION

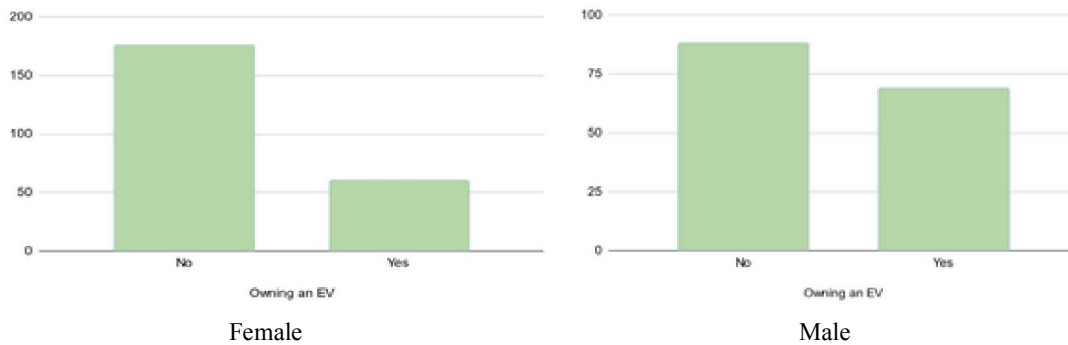
### Age and Gender

In this survey, the respondents were majorly young adults (age 20 or less) who were about 75.1%. The other age groups consisted of 8.9% (21 to 30 years), 2.8% (31 to 40 years), 6.9% (41 to 50 years), 4.3% (51 to 60 years) and 2% (above

60 years). The survey saw more percentage of female respondents (59.8%) than males (39.9%). One Individual did not wish to specify their gender.



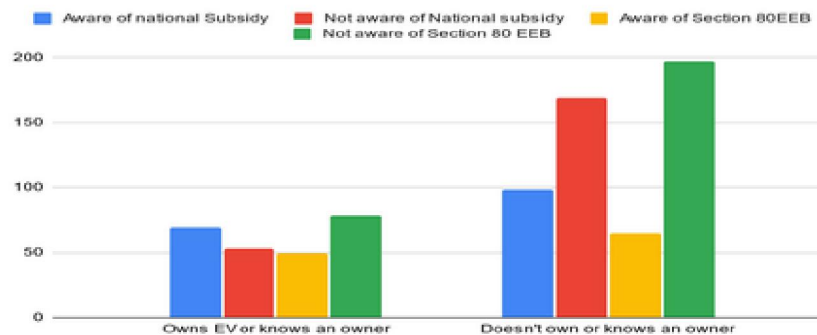
**Possession of an EV**



Of the total number of male respondents, 56.3 % owned an EV or know of someone who owns an EV. Among the female respondents, 25.2 % owned an EV or know of someone who owns an EV. The higher proportion of males owning EV is in line with the common global trend and general view that more males are likely to invest in a private vehicle.[3]

**Economic Aspects**

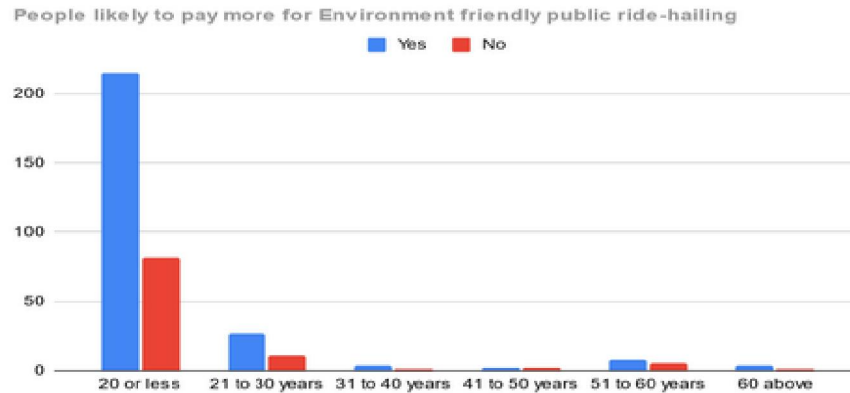
Awareness of National Subsidy for EV and Section 80 EEB of Income Tax Act



Among the respondents, 67.5% did not own an EV or know someone who owns it. The Indian government has put in place policies to encourage the purchase of electric cars. To further lower the cost of electric vehicles for consumers,

the Goods and Services Tax (GST) rates have been lowered. The lower GST rates are intended to encourage people to adopt more environmentally friendly solutions by reducing the price difference between conventional and electric automobiles. The Income Tax Act's Section 80EEB allows for a deduction of up to ₹1.5 lakh for interest paid on loans taken out to buy electric cars.[4] Individual taxpayers are allowed to claim this deduction. 70.7% were unaware of the various economic incentives by the government.

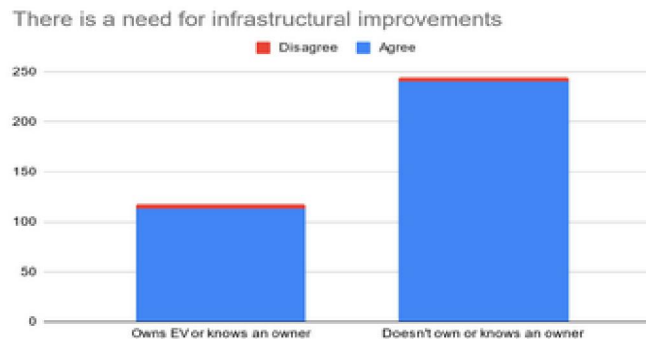
**Expenses vs Environment friendly decisions**



Among all age groups, people were more inclined towards eco-friendly ride hailing, even if it means they have to pay higher, indicating that the public is becoming more and more environmentally conscious in their actions. The adoption of eco-friendly projects has significantly increased in India in the past few years, indicating a growing understanding of environmental sustainability. People and companies alike are actively working to lessen their carbon footprint, from embracing renewable energy sources like solar power to a notable rise in the use of electric vehicles. This is a commendable aspect.

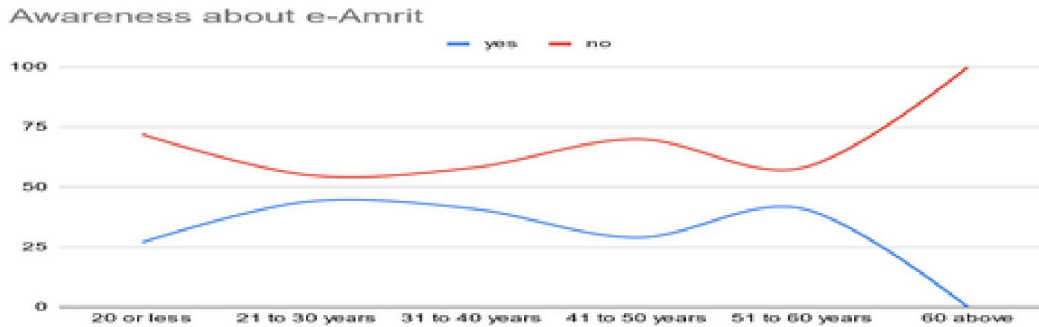
**Logistical Aspects**

**Charging Centers for EVs and turnaround time**



Almost all people, irrespective of their personal exposure to an EV such as Car or Scooter, believe that there needs to be significant improvements in the availability of charging centres and battery lifespan. Enhancing battery longevity and addressing the availability of charging infrastructure are essential for the long-term viability and mass market acceptance of EVs. Encouraging more people to convert to electric vehicles requires a strong network of charging stations. Increasing battery life is essential to increasing the sustainability and economic viability of electric cars. Enhancing battery technologies, investigating materials that can increase battery life, and creating effective cooling systems should be the main goals of research and development. The life of EV batteries can also be extended by teaching users on appropriate battery management techniques, such as the best cycles for charging and discharging.

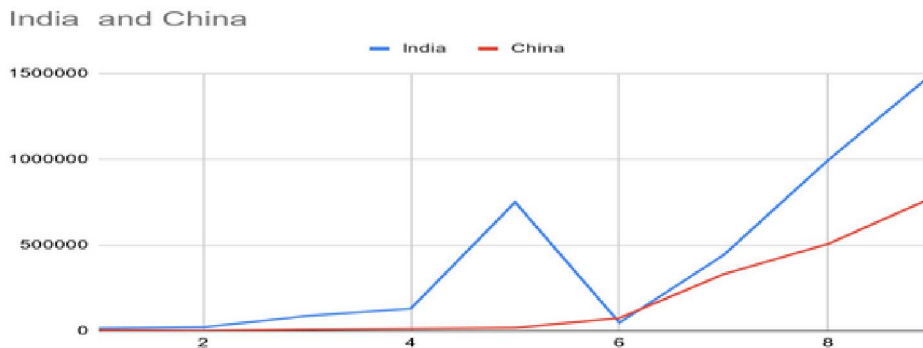
**e-Amrit Web Portal**



Majority of people in all age groups are unaware of the e-Amrit web portal, there is no significant difference about lack of this knowledge in people who own EV or not. This may be since this web-portal was released very recently compared to other government initiatives for EVs.

**Acceptance of Sustainable Energy Solutions**

The First Major Incentive announced by the Indian Government to promote the adoption of personal Electric Vehicles was the FAME Scheme I in 2015. Since then, there has been a significant increase in EV sales. Another such Country, which improved its EV sales by various initiatives, was People’s Republic of China, which started rolling out subsidies. The country has stood out as an EV hub now. The following is a comparative analysis of the sales of personal electric vehicles among the public of both the countries in the first 9 years (China 2009-2018, India 2015-2023) after the Government took initiatives to improvise its EV scenario. [5]



India has been performing positively compared to China, with just a sharp dip in its 6th year, which was 2020, which can be explained by the pandemic. Overall, the future for EV market looks encouraging.

**IV. CONCLUSION**

The introduction of electric vehicles, or EVs, is a big step in the direction of a future that is more ecologically conscious and sustainable. Making the switch to EVs is a crucial way to lessen greenhouse gas emissions, lessen reliance on fossil fuels, and reduce air pollution in metropolitan areas as the globe struggles with the effects of climate change. The possible advantages are not limited to environmental aspects; they also include enhanced energy security, technological innovation, and economic rewards. Increasing public knowledge of EV incentives is essential to promoting their use and aiding in the shift to environmentally friendly transportation. The perspective of the public must be constantly evaluated to understand the influence of such incentives. This information is useful to understand the public opinions to further take into consideration while implementing policies. By effectively communicating these benefits and incentives, individuals can make more informed decisions about transitioning to electric vehicles, contributing to a cleaner and greener future.

**REFERENCES**

- [1]. M. Guarnieri, Looking Back to Electric Cars, 2-35122, Department of Industrial Engineering – University of Padua, 2024.
- [2]. Ministry of Information and Broadcasting, Government of India. Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles in India, 2022.
- [3]. Ministry of Health and Family Welfare, Government of India. National Family Health Survey-Phase II, 2023.
- [4]. Ministry of Finance, Government of India. Deduction of Tax at Source-Income-Tax Deduction from Salaries Under Section 92 of the Income Tax Act, 1961. 2022.
- [5] Hao H., Ou. X., Wang H. Ouyang M., China's Electric Vehicle Subsidy Scheme- Rationale and Impacts, Volume 73, Energy Policy, pp. 722-732, 2014.
- [6] Consumers Union, Union of Concerned Scientists. Electric Vehicle Survey Methodology and Assumptions: American Driving Habits, Vehicle Needs and Attitudes towards Electric Vehicles, 2013.
- [7] P. Kumar, Accessibility of Electric Vehicle in Indian Market, 2021.