

Electric Two-Wheelers Leading Clean Mobility Race in Delhi: Success Factors

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Authors

Jyoti Parikh, Probal Ghosh, Vinay Saini, Anurag Dey and Jasleen Bhatti



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Abbreviations

e2W	electric Two-Wheeler
2W	Two-Wheeler
CAGR	Compound Annual Growth Rate
EV	Electric Vehicle
FY	Financial Year
GDP	Gross Domestic Product
GHG	Greenhouse Gas
ICCT	International Council on Clean Transportation
MoEFCC	Ministry of Environment, Forest and Climate Change
MoP	Ministry of Power
NDC	Nationally Determined Contribution
YoY	Year on Year
UNFCCC	UN Framework Convention on Climate Change

1. Introduction

With an average yearly growth rate of 6-7 percent, India has been one of the world's fastest-growing economies. The movement of passengers and goods across the country is the key to economic growth. As the country's economy expands, so will the mobility sector's contribution to gross domestic product (GDP). Road transport dominates the Indian transport sector in terms of freight, passenger traffic, and overall gross value added. The primary reason behind the popularity of road transport is the ease of access, flexibility, door-to-door operations, and dependability.

As the number of on road vehicles increases, so has the reliance on fossil fuel-based energy sources, resulting in a major increase in greenhouse gas (GHG) emissions that have adversely impacted the environment and can lead to climate change.

2. Background

Transport sector plays a vital role in the development of an economy but is also a major contributor in India's total GHG emissions with 9.6% share (Source: MoEFCC). Within the transport sector, passenger transport plays a significant role in urban air pollution. According to ICCT, 2015 study titled "Global Transportation Energy and Climate ROADMAP" India's 2Ws (Motorcycles & Mopeds) ownership increased from 62 per 1000 persons in 2010 to 92 in 2015 and 122 in 2020 which is much higher than many developed and developing countries. The ownership of 2Ws in Delhi also has also increased from 122 per 1000 in 2010 to 159 in 2015 and 169 in 2020. According to IRADe's calculations Delhi's ownership of 2Ws is higher due to higher economic growth. The impact of 2W ownership on emissions and pollution is particularly high in cities like Delhi. IRADe's Analysis has shown that 2Ws contributed to 64% of emissions of CO, 69% of emissions of HC+NO_x and 23% of CO₂ emissions from passenger transportation in 2019-20.

On February 7, 2021, Delhi Transport Minister Mr. Kailash Gahlot inaugurated the first phase of the "Switch Delhi" campaign, which intends to encourage individuals to adopt Electrical Vehicles (EVs) such as e-bikes and e-scooters, and to position the city as India's EV Capital. The policy provides a variety of financial and non-financial incentives for purchasing 2Ws. The registered owner will receive a purchase incentive of Rs. 5,000 per kWh of battery capacity, up to a maximum of Rs. 30,000 per vehicle. e2Ws qualifying for purchasing incentives would also be eligible for a scrapping incentive of up to Rs. 5,000 for destroying and de-registering old ICE 2Ws registered in Delhi. During the policy's duration, all e2Ws will be exempted from paying road tax and registration fees.

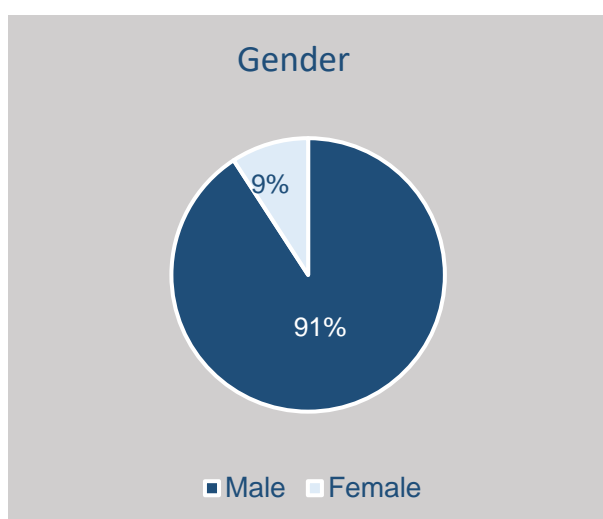
The Delhi EV policy serves as an example for other state governments whose policies are more concerned with attracting manufacturers rather than increasing the demand. Despite the plethora

of incentives made available through this EV Policy, widespread public acceptance of e2Ws remains the most pressing issue.

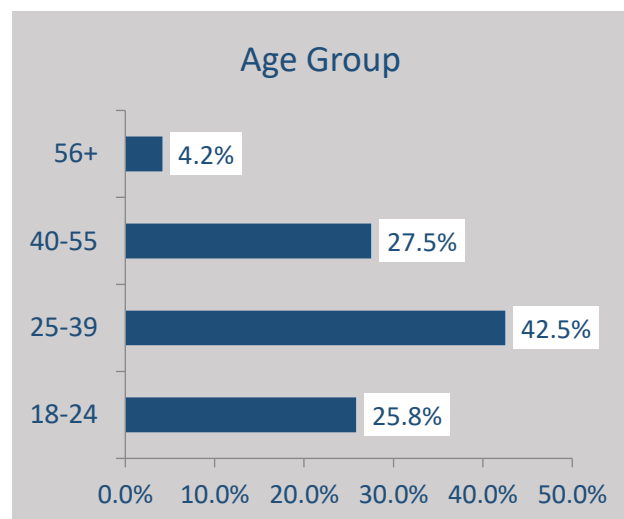
3. Survey

IRADe commissioned a survey of electric vehicle users in Delhi. The survey was organised in various segments. A survey of e2W owners in Delhi was undertaken through random sampling to explore user concerns such as use and travel patterns, charging patterns, and customer preferences of existing e2W owners. The survey was implemented by Nielsen India and was organised under a project funded by SSEF. The analysis of the survey results provided interesting and policy relevant findings.

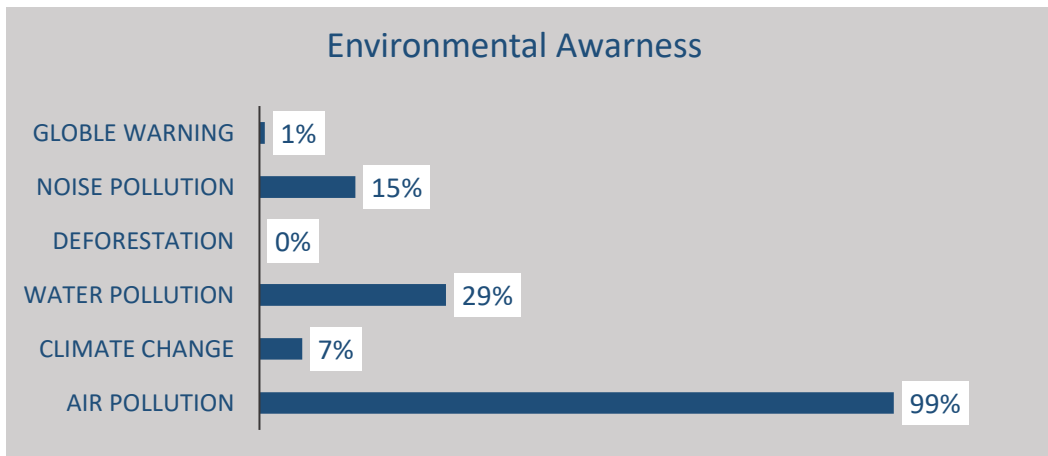
As shown in Figure 1, 91 percent of the respondents were male and 42.5 percent of the respondents were between 25-39 years (millennials). 30 percent of respondents were business owners, while 43.3 percent worked as salaried workers in private companies. Most of the respondents were graduates with a share of 39.2 percent followed by senior secondary educated with a share of 26.7 percent. While 12.5 percent of the respondents are secondary level educated, 10.8 percent are pre-secondary educated and the rest are categorised in post-graduate and undergraduate education level. In terms of environmental awareness, nearly all respondents were aware of air pollution as an environmental issue, 29 percent were aware of water pollution, 15% were aware of noise pollution, and only 7 percent were aware of climate change. Respondents were aware of the environmental benefits, battery-based technology, noise-free operation, and cheap operating costs of EVs.



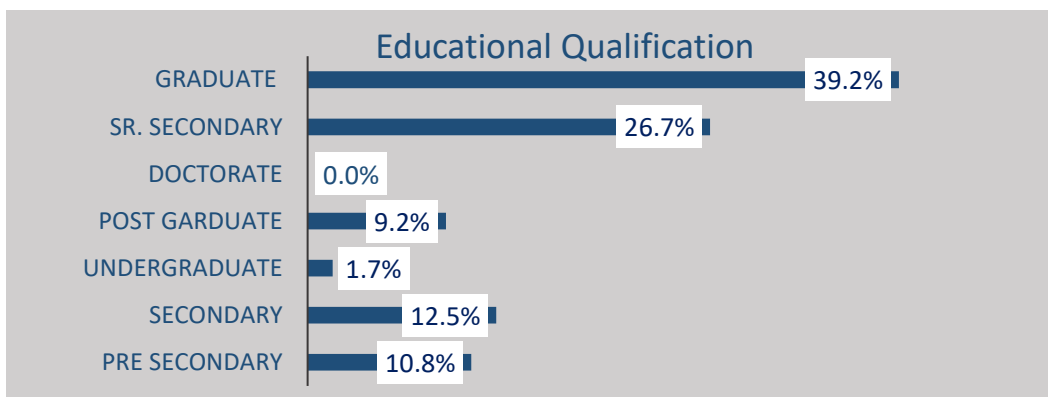
a) Share of Respondents by Gender



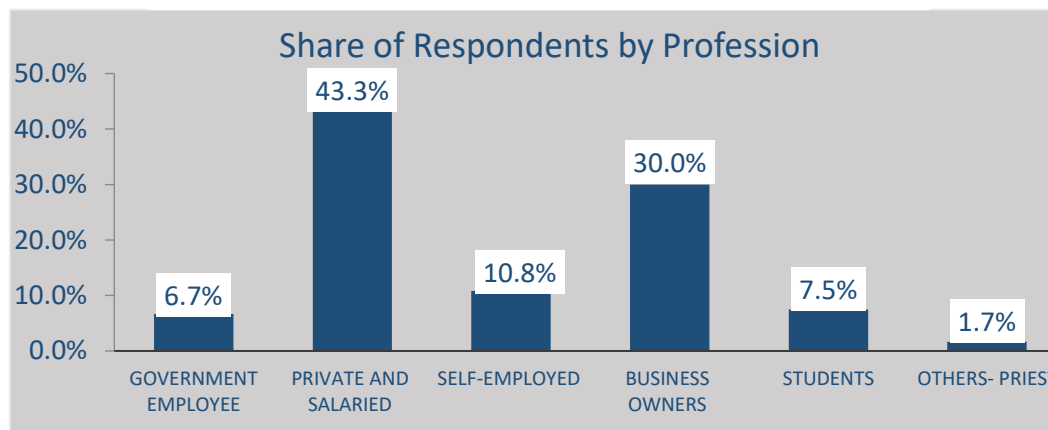
b) Share of Respondents by Age



c) Share of Respondents by Environmental



d) Share of Respondents by Educational Qualification



e) Share of Respondents by Profession

Figure 1: Survey results based on the demographic profile of e-2W owners

As shown in Figure 2 below the average expenditure of the respondents owning an e2W is Rs.18,506. The expenditure ranges from Rs.7,000 to Rs.40,000. 39 percent of respondents earn between Rs.10,000 and Rs.15,000, and 27 percent earn between Rs.15,000 and Rs.20,000.

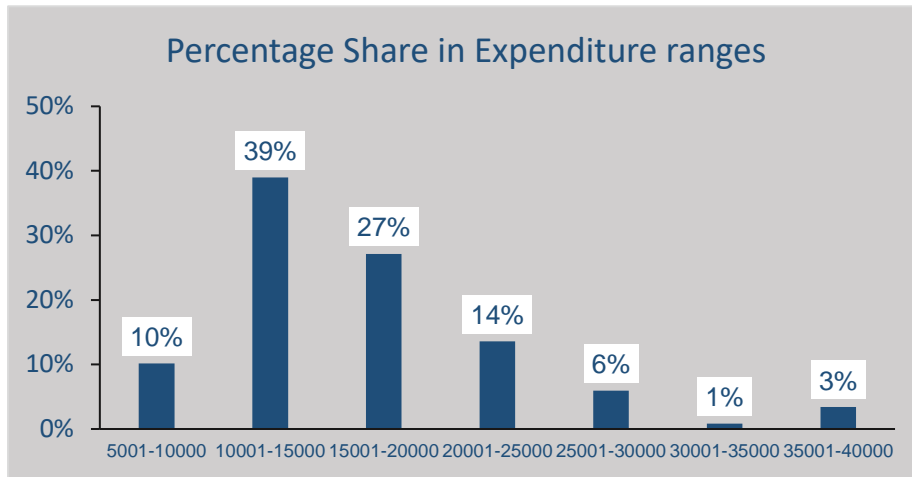


Figure 2: Percentage Share in Expenditure ranges

Figure 3 given below shows the vehicle ownership by type i.e., the percentage of respondents owning only 2W vehicle and owning both 2W and 4W. It can be seen that 91 percent of the respondents own only 2W and 9 percent of the respondents own both 2W and 4W vehicles.

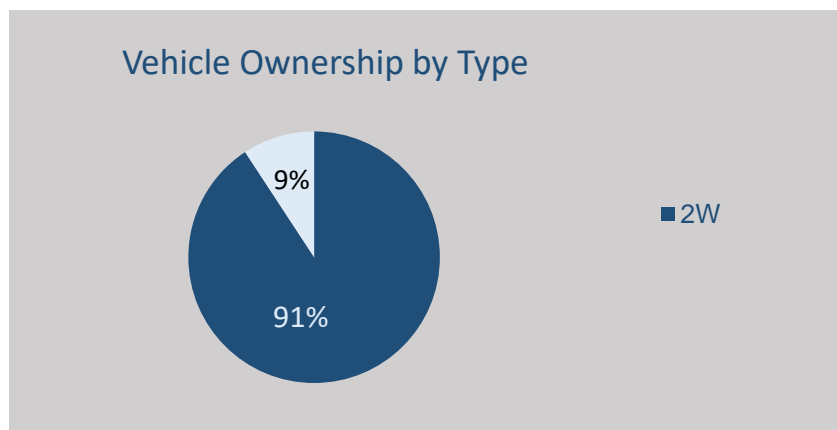


Figure 3: Vehicle Ownership by Type

3.1 Survey Findings

Capital cost, range, operating and maintenance costs, government policies, high petrol prices, and emission/environmental factors are all regarded as very important by at least 90 percent of respondents. The criteria deemed less important include – availability of variants, availability of public charging, the performance of EV versus conventional, and high resale prices, implying that all of these considerations are not given priority when purchasing an EV.

The factors which are considered to be very important by at least 90 percent of the respondents are – capital cost, range, operating and maintenance cost, government policies, high petrol price, and emission/environment factors.

According to the survey responses, respondents are less satisfied with the existing range, charging time, availability of charging infrastructure, and waiting time at public charging stations when compared to other factors, and thus there is room for improvement in these areas to increase e2W usage. Overall, 88 percent of e2W users are satisfied with the vehicle's performance, with only a small and limited number of buyers dissatisfied.

4. Way Forward

With a large population in Delhi accustomed to using 2Ws for daily travel, it makes sense to focus more on the promotion of e2Ws. The following steps can be undertaken in this regard:

1. For both working and non-working days, the average cost of charging e2Ws for office is Rs. 5/charge. Home charging costs Rs.16 and Rs.14 per charge on working and non-working days, respectively, and store charging costs Rs.15 per charge on working days. However, because no respondents were found to be using public charging, the survey does not estimate its cost.

Because the **majority of respondents favoured home charging of e2Ws, DISCOMs can offer subsidised charging tariffs to stimulate e2W adoption.**

2. **Safety concerns**, primarily about batteries overheating and catching fire, have to be addressed.
3. The requirement for technological advancement to enable an **improvement in e2W range (km/charge).**
4. The average cost per service for e2W is Rs. 751. The majority of survey respondents wanted free vehicle servicing on a regular basis. Replacement services are not available in the market, despite the fact that battery repair services are.

The **e2W owners desire battery replacement services, which will result in lower servicing costs over time. They are also willing to opt for periodic safety checks.**

5. The **idle land beneath flyovers can now be freed up for the installation of small battery swapping stations.**
6. Despite the Delhi government's maximum subsidy of Rs. 30,000 per EV, the price of e2W variants is more than that of ICE 2Ws. In any economy, EV proliferation is incomplete unless the middle- and lower-income segment, which make up a sizable portion, embrace it. Because the high cost of e2Ws is caused by the use of Lithium-ion batteries. The **government should invest in improving domestic Lithium-ion battery manufacture while decreasing exports.**

7. The Delhi government could **mandate all last-mile delivery companies, such as food delivery and e-commerce logistics firms, to utilise electric 2Ws.**
8. **Mobile charging stations should be installed on national highways** so that persons travelling from Delhi to other states by e2Ws can readily access them.
9. **Develop and implement inductive/wireless charging,** which will be **useful in locations with limited home parking space.**
10. **Students** completing their secondary school exams may **be eligible for special discounts on e2W purchases.**
11. Encourage the **creation of smartphone apps that will allow e2W users to share their home charging stations** with people who live nearby.
12. The **government might devise a national scrappage programme to ensure that scrapped ICE vehicles from Delhi are not utilised in any other state** throughout the country.
13. To **raise awareness among college students,** particularly those in their first year, the government can organise **campaigns, roadshows, hackathons, and debates at college fests.**
14. In Delhi, not all urban neighbourhoods have dedicated home parking spaces. **On-street charging stations should be strategically located near streetlights and municipal parking lots.** The government can establish these as a **potential source of billing for e2Ws.**