GYANIKI – STUDY REPORT ON EV USER EXPERIENCE

GYANIKI TEAM

VROOMBLE SERVICES [PUNE]

What is INSIDE?

Introduction

Gyaniki - Study on EV user experience

Under Gyaniki platform, we have conducted a study to understand user experiences while using Electric Vehicle (EV).

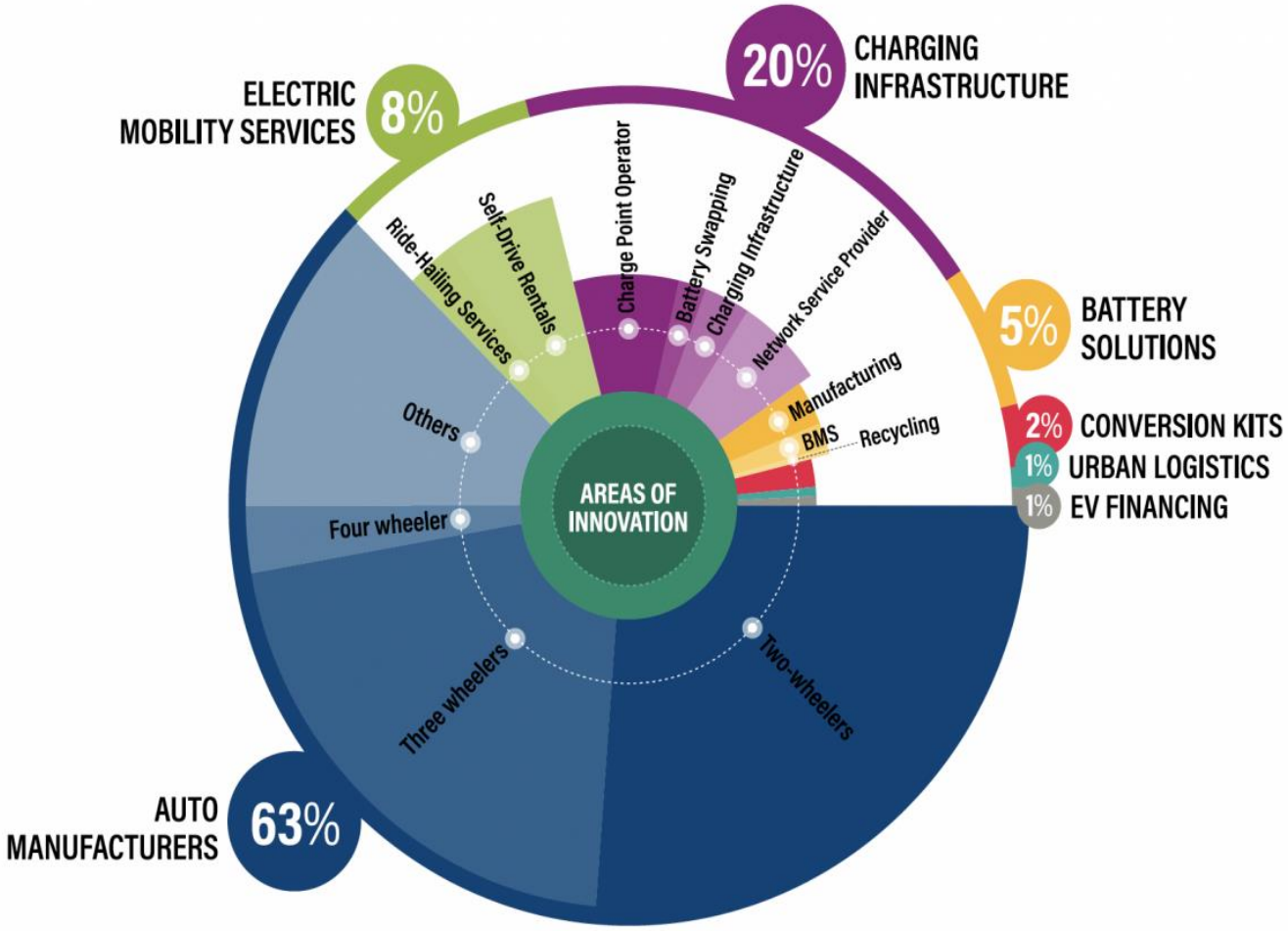
The transition to Electric Vehicles (EV) represents a significant shift in automotive landscape, particularly in India, where rapid urbanization and environmental concerns are driving the adoption of sustainable transportation solutions. This report represents the findings of a comprehensive survey study aimed at understanding the user experience of electric vehicle owners in India.

The study was conducted to gather insights into various aspects of EV ownership, including user satisfaction, charging Infrastructure, performance and the overall impact of electric vehicles on daily commuting. By analyzing the experiences and perceptions of current EV users, this report seeks to identify key factors that influence user satisfaction and to highlight areas for improvement in the EV ecosystem.

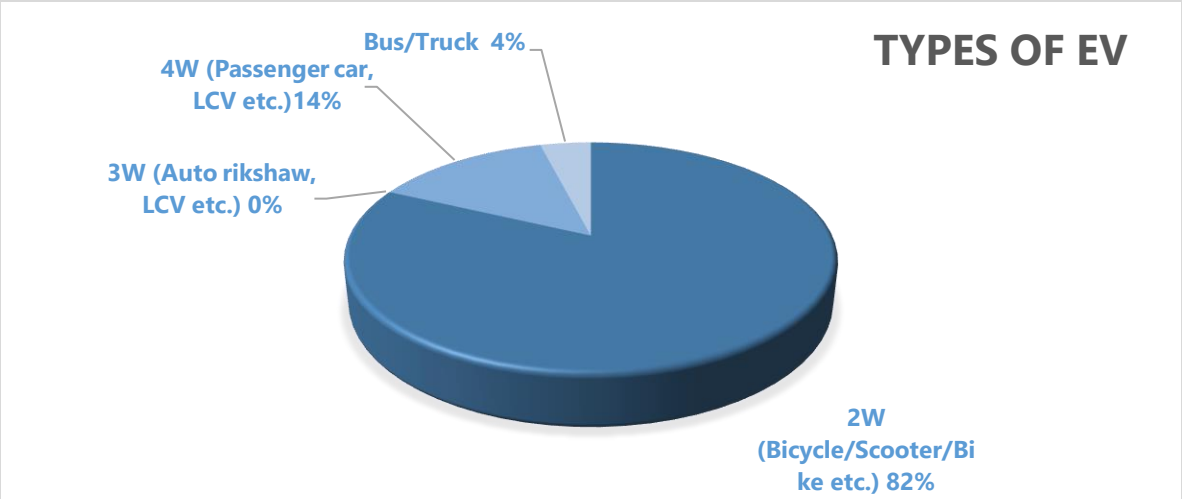
As India strives to meet its ambitious goals for reducing carbon emissions and promoting clean energy, understanding the user experience is crucial for manufacturers, policymakers and stack holders in automotive industry. This report aims to provide valuable data and recommendations that can inform future strategies for enhancing the electric vehicle market in India, ultimately contributing to a more sustainable and efficient transportation system.

The findings presented herein are based on a diverse sample of EV users across different demographics and geographic locations, ensuring a comprehensive understanding of the user experience landscape. We hope that this report will serve as a foundational resource of ongoing discussions and initiatives aimed at promoting electric mobility in India.

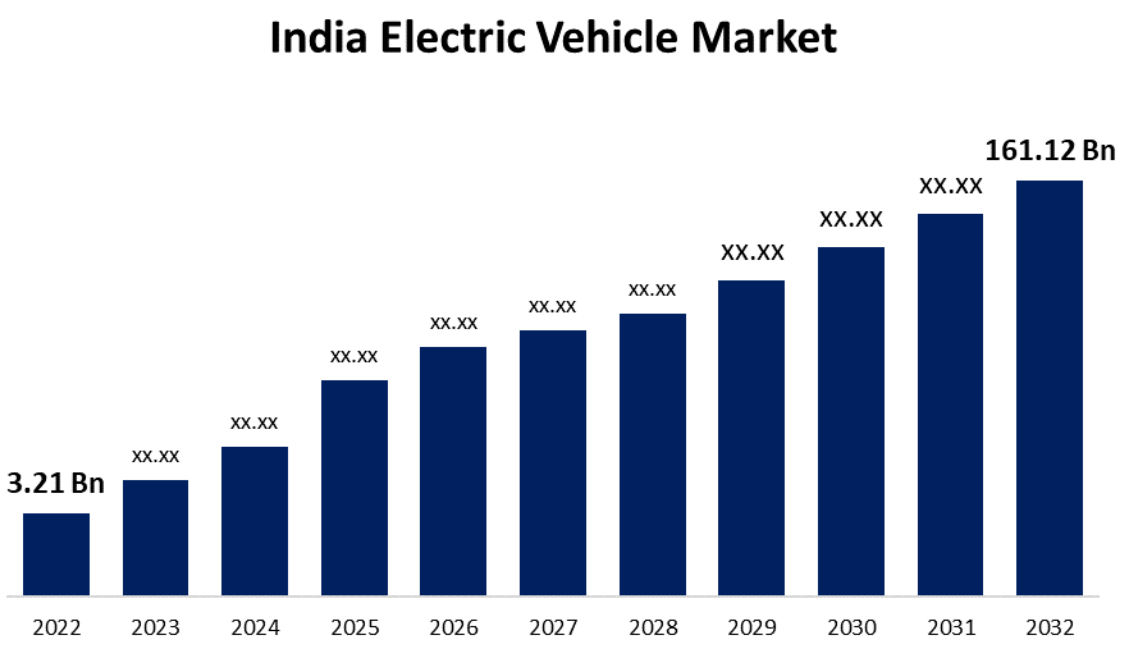
Tracking India's Evolving E-Mobility Startup Landscape



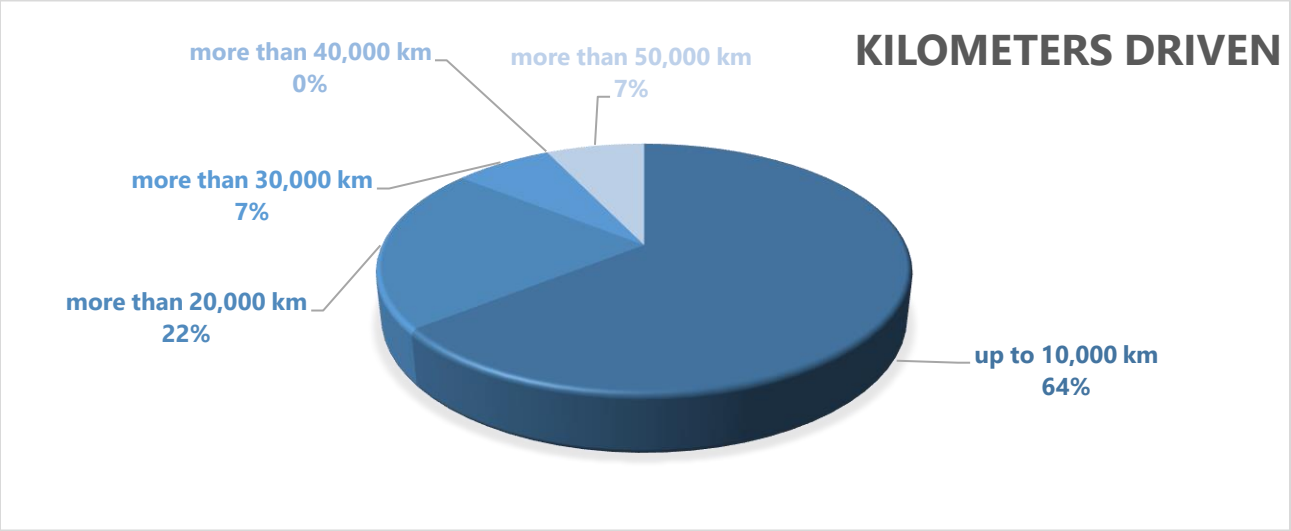
Q.1. which type of Electric Vehicle (EV) do you own.



- **2W (Bicycle/Scooter/Bike) – 82%**
- This category represents the largest share of electric vehicles, indicating a strong preference or market demand for two wheeled electric vehicles. This could be attributed to their affordability, ease of use in urban environments, and the growing trend of eco-friendly transportation options.
- **3W (LCV, Auto rickshaws) – 0%**
- The absence of electric three-wheelers in this data suggests that there may be limited availability or adoption of auto rickshaws and light commercial vehicles (LCVs) in the market. This could be due to various factors such as infrastructure challenges, cost or consumer preferences.
- **4W (Passenger car, LCV) – 14%**
- This category includes electric passenger cars and light commercial vehicles, which make up the smaller portion of the market compared to two-wheelers. The 14% indicates the growing interest in the electric cars, but it also highlights that there is still significant room for growth in this segment.
- **Bus/Truck – 4%**
- The percentage of buses and trucks is relatively low, indicating that electric options in the heavy-duty vehicle segment are still in the early stages of adoption. This could be due to higher costs, range limitations and the need for more robust charging infrastructure.
- Overall, the data reflects current trends in electric vehicle market, showing a strong indication towards two-wheeled electric vehicles while highlighting challenges in the adoption of three wheelers and larger vehicles. This information can be useful for stockholders looking to understand market dynamics and identify opportunities for growth in the electric vehicle sector.


India Electric Vehicle Market
3.21 Bn
xx.xx
xx.xx
xx.xx
xx.xx
xx.xx
xx.xx
xx.xx
xx.xx
161.12 Bn
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032

Q.2. How many kilometers you have driven until now.



- **A significantly majority of EV users (64%) have driven up to 10,000 km:**

- This suggest that many users are relatively new to EVs or use them for short-distance travel.

- **More than 20,000 Km - (22%):**

Smaller portions of users (22%) have driven more than 20,000 kilometers. This indicates that some users are utilizing their EV's more extensively, possibly for longer commutes or travel.

- **More than 30,000 Km - (7%):**

Only 7% of users have driven more than 30,000 Km, suggesting that long-term usage of EVs is less common among the surveyed population.

- **More than 40,000 Km – (0%):**

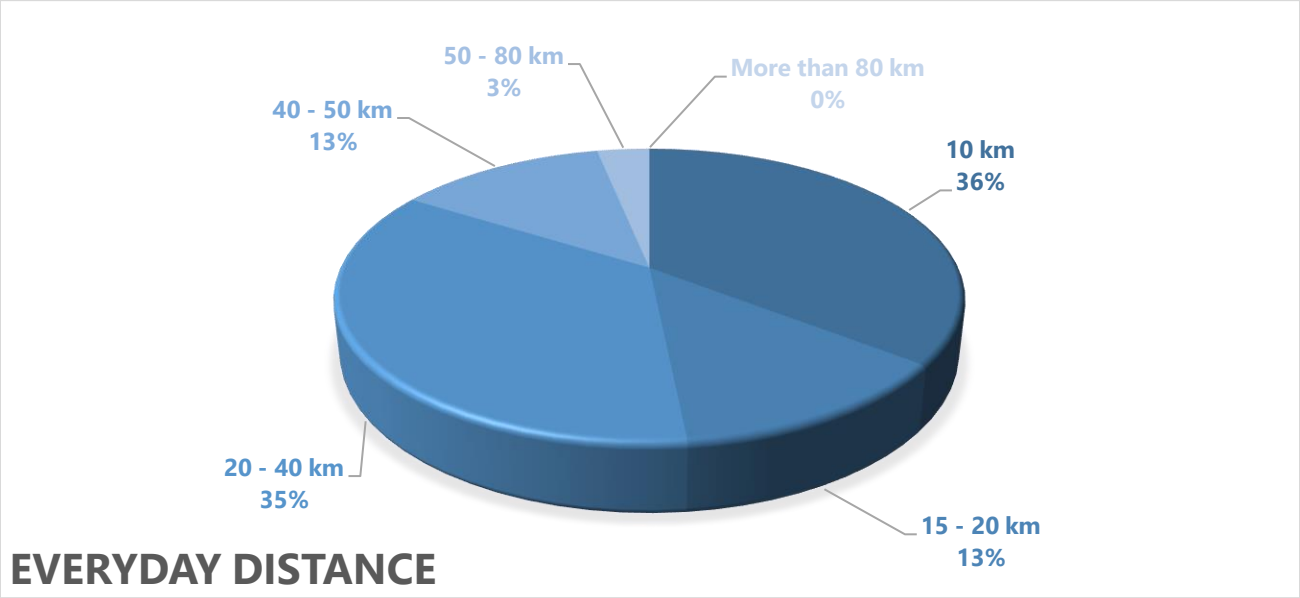
No user reported in this category.

- **More than 50,000 Km – (7%):**

This indicate a small group of dedicated EV users who rely heavily on their vehicles.

Overall, the data suggests that while a large percentage of users are driving relatively short distances, there is smaller segment that is using their EVs for longer journeys.
This information is useful for understanding user behavior and the potential for growth in EV adoption and usage.

Q.3. How many kilometers do you travel every day?



- **Up to 10 Km - (36%):**

A significant portion of users (36%) travel distances up to 10 km. This suggests that many users primarily use their EVs for short trips, which is common in urban settings.

- **Up to 15 – 20 Km – (13%):**

This indicates a moderate level of usage for slightly longer commutes or errands.

- **Up to 20 – 40 Km – (35%):**

A substantial 35% of users fall into this category, indicating that a significant number of EV users are engaging in longer trips, possibly for work or leisure.

- **Up to 40 – 50 Km – (13%):**

Some EV users are making longer journeys but still within a manageable range for EVs.

- **Up to 50 – 80 Km – (3%):**

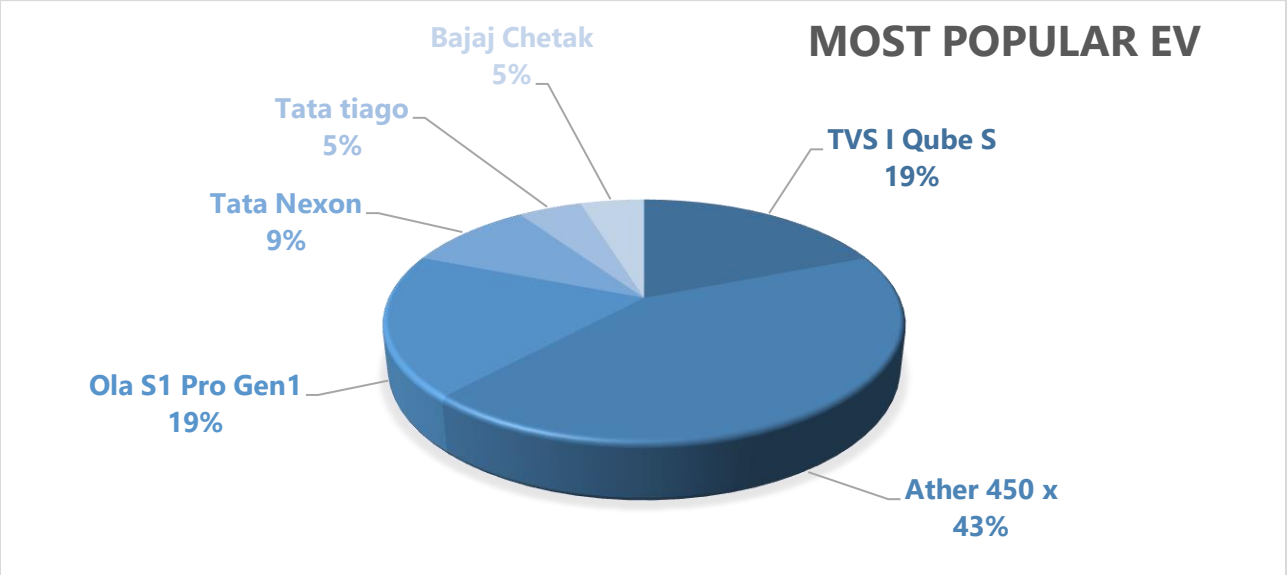
It indicates that long distance travel using EV is less popular.

- **More than 80 Km – (0%):**

No user reported travelling more than 80 Km using EV.

Overall, the data indicates that majority of EV users are engage in short to moderate distance travel for notable preference for distance under 40 Km. This information is valuable for understanding user behavior and the potential for EVs in Urban commuting scenarios.

Q.4.which is the most popular EV in the users.



The above data indicates the popularity of various Electric Vehicles (EVs) among users, represented as the percentage of the total.

- **Ather 450x – 43%**

The Ather 450x is the most popular EV model with the 43% users selecting it. It is well received in the market likely due to its features, performance, and design and brand reputation. Ather energy is well known for its technology and innovation, which may contribute to its appeal.

- **TVS I Qube S – 19%**

This is a second most popular model with the solid market presence. It is a well-established brand in two-wheeler segment and its entry into EV segment seems to gain traction.

- **Ola S1 pro Gen 1 – 19%**

Ola electrical has positioned itself as a string competitor in the EV space and its marketing strategy and features may be resonating well with the consumers.

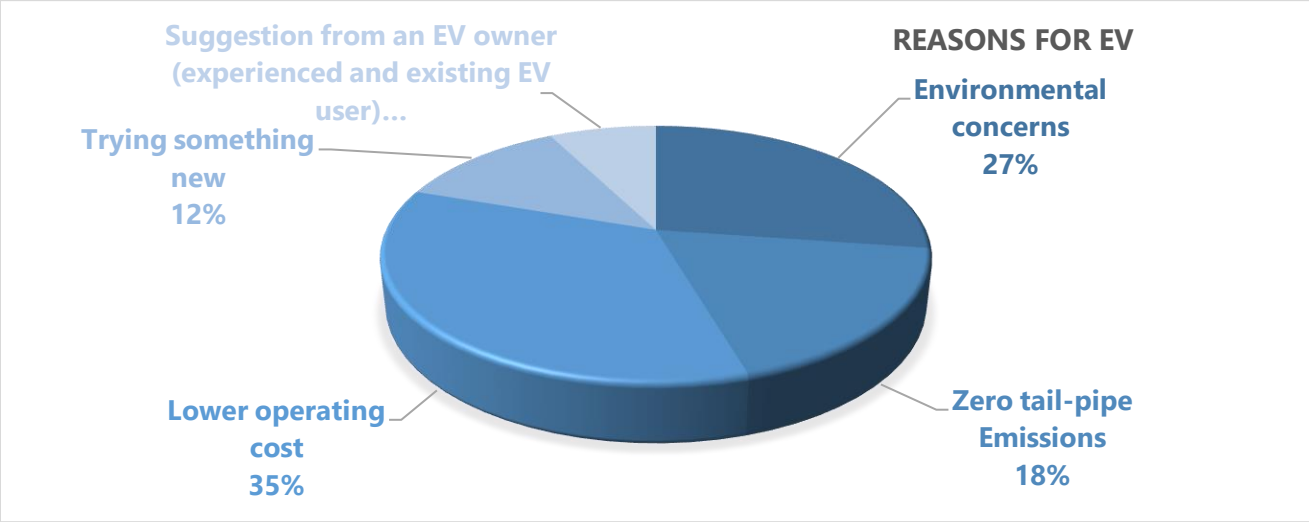
- **TATA Nexon and TATA Tiago**

  These are the options in the electric car segment available. Electric 4-wheelers are less favored than Electric 2-wheelers may be because of less consumer awareness, market positioning and consumer preferences.

- **Bajaj Chetak – 5%**

It is a well-known brand in 2-wheeler market. However, it is less popular than Ather and Ola.
Overall, the data indicates that a strong preference for Ather 450 x among users, highlighting its popularity in the electric vehicle market. Higher percentage of 2-wheelers suggests a trend towards electric scooters and bikes likely due to their practicality in urban commuting and lower price points than electric cars.

Q.5. why did you choose to purchase an EV?



Above data outlines, the reasons why users choose to purchase EVs.

- **Lower operating cost – 35%**

The most significant reason by users for purchasing EV is lower operating cost. EVs generally have cheaper operating costs and fuel costs than ICE engine vehicles because electricity is often cheaper than traditional vehicles. EVs generally requires less maintenance cost due to less moving parts which can leads to long term savings for owners.

- **Environmental concerns – 27%**

Many consumers are concern about environmental change & fossil fuel consumption on climate change and air quality. By choosing EV, these individuals aim to reduce their carbon footprint and contribute to a more sustainable future.

- **Zero tail pipe emission - 18%**

EVs do not emit harmful pollutants while driving, contributing to cleaner air in urban areas and reducing overall greenhouse gas emissions.

- **Trying something new – 12%**

This reflects a growing interest in innovative technologies and a willingness to explore alternative modes of transportation. Many consumers are curious about latest advancements in automotive technologies and novelty of owing an EV. Many consumers also purchased EV after taking advice from experienced and existing EV users. So positive feedback from the existing EV users can alleviate concerns and encourage new buyers to make the switch.

Overall, the data indicates that the primary motivation for purchasing an EV are financial savings or environmental considerations. The lower operating cost stand out as the most compelling reason, while a desire to contribute to a cleaner environment and the appeal of innovative technology also play important role. The Influence of existing EV owners highlight the importance of community and shared experiences in the decision making process for potential buyers.

BENEFITS OF SWITCHING TO EVS

1. Cut the Emissions
2. Low Maintenance
3. Saving Fuel Cost
4. Government Subsidies for EV Buyers
5. Better Driving Experience

IMPORTANT THINGS TO KNOW WHEN CHOOSING AN EV

Total Cost of Ownership

01

Includes the purchase price, maintenance costs, and the electric scooter price over its lifespan, offering significant savings compared to traditional vehicles.

Range and Charging Time

02

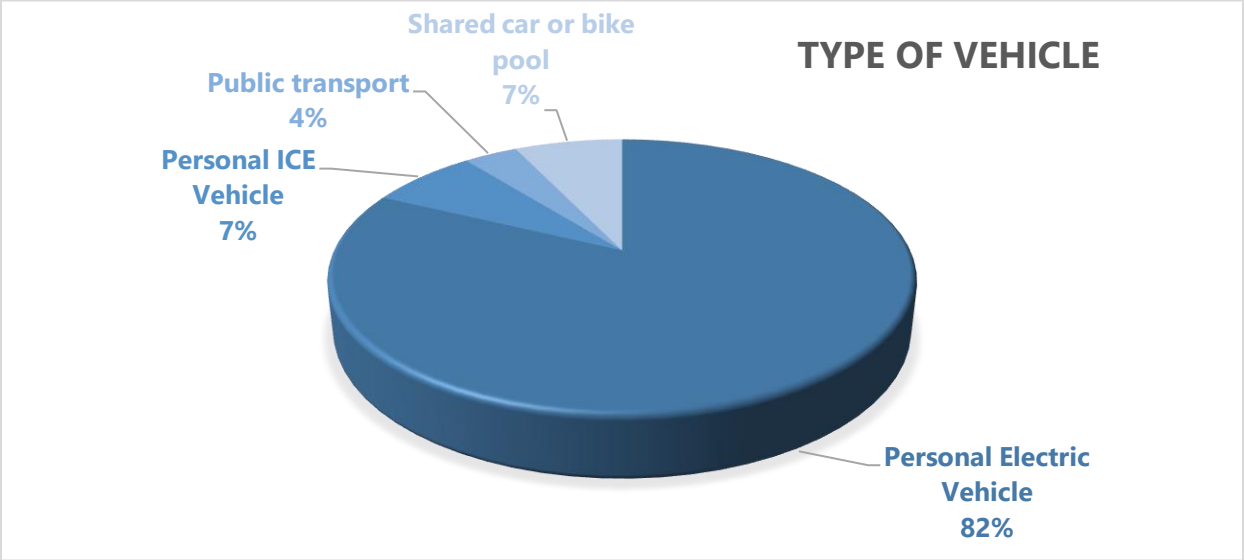
Key considerations determining an EV's suitability for daily needs. Advances in battery technology continue to improve these metrics.

Incentives and Subsidies

03

Many governments offer incentives to promote the adoption of EVs, making them an economically attractive option for consumers.

Q.6.Which transportation method you find easy and comfortable for everyday use.



- **Majority of respondents (82%) use Electric vehicles.**

  This high percentage indicates strong preference for adopting electric mobility for personal use. Factors contributing to this are:

  1. Lower operating costs
  2. Environmental concerns
  3. Ease of use, and
  4. Advancement in EV technology.

  There is growing acceptance and reliance on EV as primary mode of transportation.

- **Relatively low percentage of ICE vehicle users (7%)** suggests that declining interest in conventional vehicles likely due to awareness of Environmental issues and the benefits of electric vehicles. Government policies promoting EV adoption and the availability of incentives for electric vehicle purchase.
- A small portion of people depends on public transport (4%). It is not a primary mode of transport for majority of users. Factors such as accessibility, convenience and personal preference influence this. Growing trend of personal vehicle ownership, particularly in urban areas where EVs are more popular.
- Rest of the users use shared car or bike pool (7%). This appeal for the users who do not prefer to own a vehicle or who wants to reduce their carbon footprint. This indicates a shift towards more flexible transportation solution.

Data indicates strong preference for personal electric vehicles among users; this is a significant mode of transportation for majority. This shows trend towards sustainability and individual ownership of electric vehicle.

This shift may be driven by:

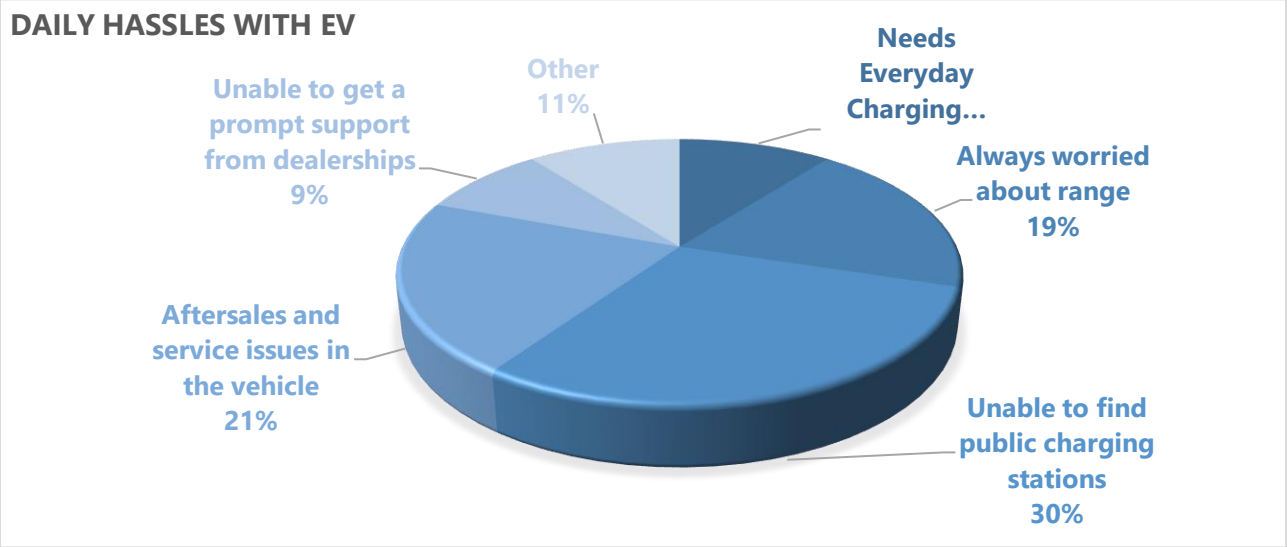
1. Environmental awareness
2. Economic factors and
3. Advancement in EV technology

4. Reflecting changing attitudes towards transportation in current landscape.

Whichever form of e-transportation you are considering, the main features to keep in mind are:

- Range, battery storage capacity, and charge time
- Speed, not just top speed but whether it will keep up with traffic
- Cost
- Available accessories (baskets, seats, etc.)
- Serviceability (is there someone in town who can fix it)
- Manual pedaling/pushing vs. electrical pedal assist and throttle control
- Drivetrain options, such as dual motors, manual pedaling pushing, electric pedal assist, throttle control, and regenerative braking
- Weight and size (pack-ability, portability, and storage needs)

Q.7. what type of hassles you face with your EV?

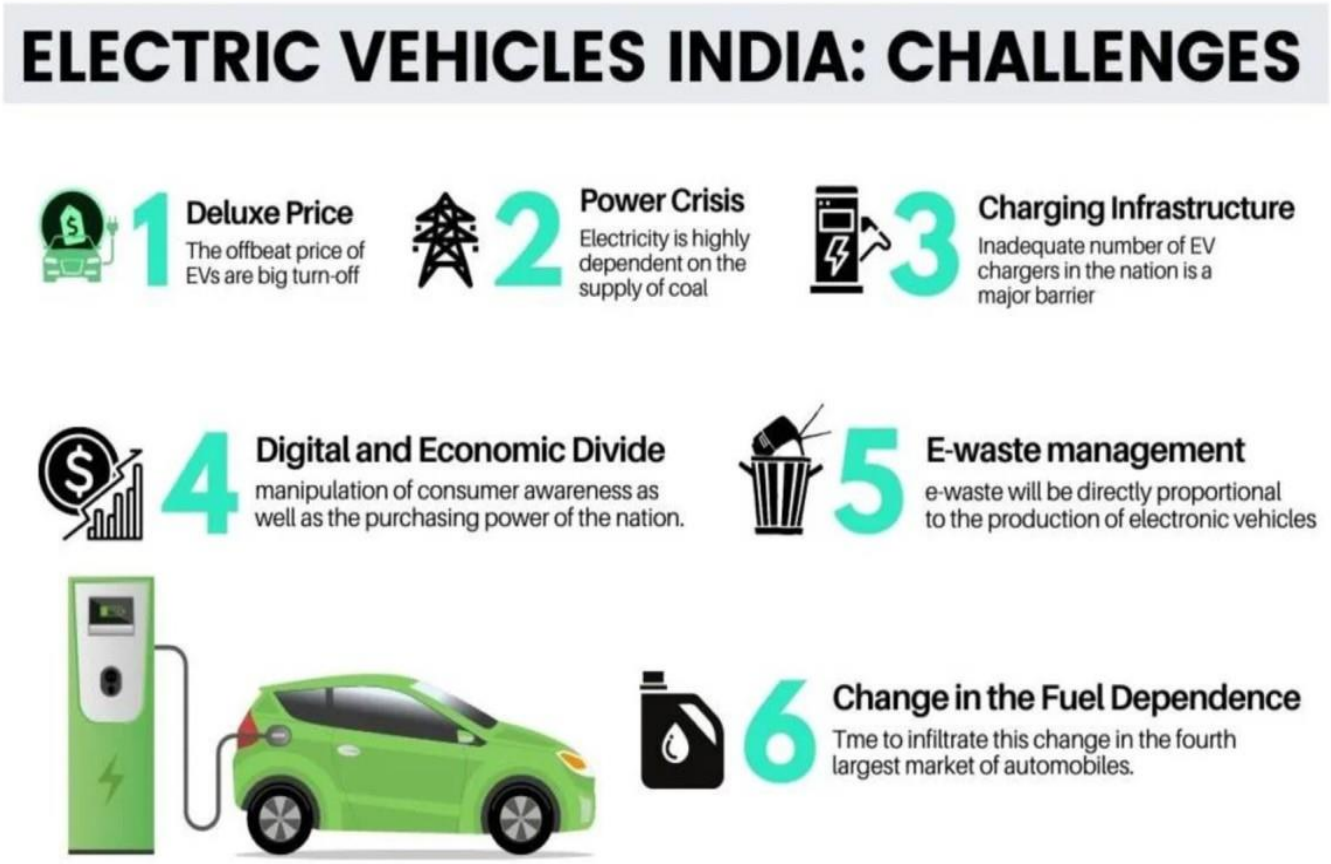


The data provided outlines various daily hassles provided by EV owners and identified each issue.

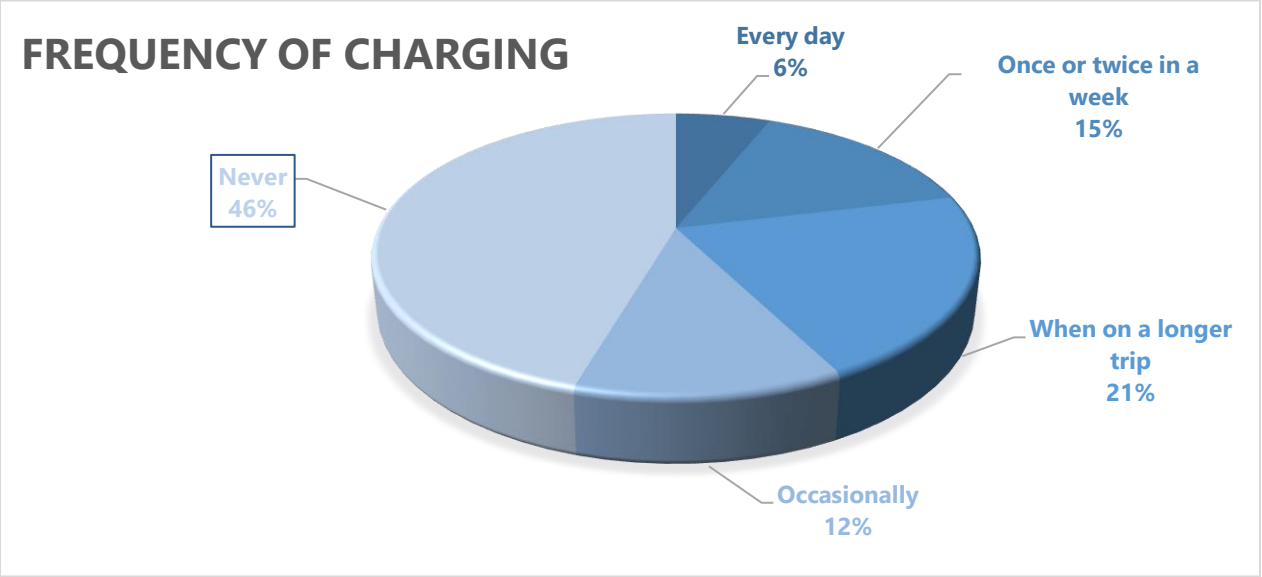
- **Unable to find public charging stations (30%):** This is the most significant concern among EV users. The reliance on public charging station is critical and it can create anxiety about running out of battery, which is a common concern among EV users.
- **Always worried about range (19%):** Range anxiety is well-documented phenomenon among EV drivers. This worry stems from the fear of depleting the vehicles battery, before reaching a charging station especially on longer trips or in areas with limiting charging options. This concern is closely related to the availability of charging infrastructure.
- **After sales and service issues in the vehicle (21%):** This indicates that once the vehicle is purchased, owner may face challenges related to maintenance & service. This issue can affect the overall ownership experience and may deter potential buyers from considering EVs.
- **Needs everyday charging (10%):** This reflects the necessity for regular charging, which can be a hassle for those who may not have convenient access to charging facilities. Daily charging can be seen as a burden, especially for individuals with busy schedules.
- **Unable to get prompt support from dealerships (9%):** This suggests that consumer service and support from dealership may not meet the expectations of EV owners. Timely assistance is crucial for resolving issues and maintaining customer satisfaction.

There are other unique challenges faced by EV owners that may not be as prevalent but still affect their experiences.

In summary, primary concerns for EV, owners revolve around charging infrastructure and support services. Addressing these issues essential for improving the overall experience of EV owners and encouraging higher adoption of EV vehicles.



Q.8. How often do you charge your EV in Fast Public charging station?

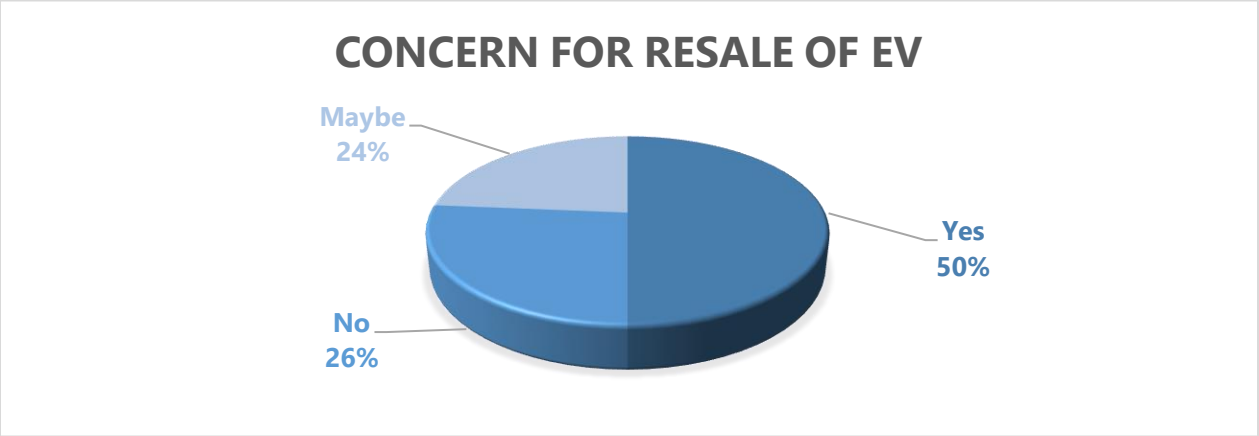


The data regarding the frequency of charging electric vehicles (EVs) at fast public charging stations reveals distinct patterns in user behavior. Here is a breakdown of the findings:

- **Every Day (6%):** A small percentage of users (6%) charge their EVs at fast public charging stations daily. This may indicate that these individuals rely on public charging infrastructure due to lack of home charging options or have high quality mileage that necessitates frequent charging.
- **Once or twice a week (15%):** A slightly larger group charges at public stations once or twice a week. These users have a combination of home charging and public charging, using fast stations to supplement their charging needs, especially if they have longer commutes or travel for work.
- **When on a longer trip (21%):** The most significant group charges their EV on public charging station especially when on longer trips. This behavior is logical, as fast charging stations are often strategically located along highways and travel routes making them convenient for recharging during extended journeys where home charging is not an option.
- **Occasionally (12%):** This may reflect users who have access to home charging but utilize public stations when they are away from home for extended periods.
- **Never (46%):** This largest segment may have access to home charging, they may not drive their EVs frequently enough and also for long distance driving or they may prefer slower charging options that are more cost effective.

Above data illustrates that a range of charging behaviors influenced by factors such as access to home charging, driving patterns and the necessity of using public infrastructure.

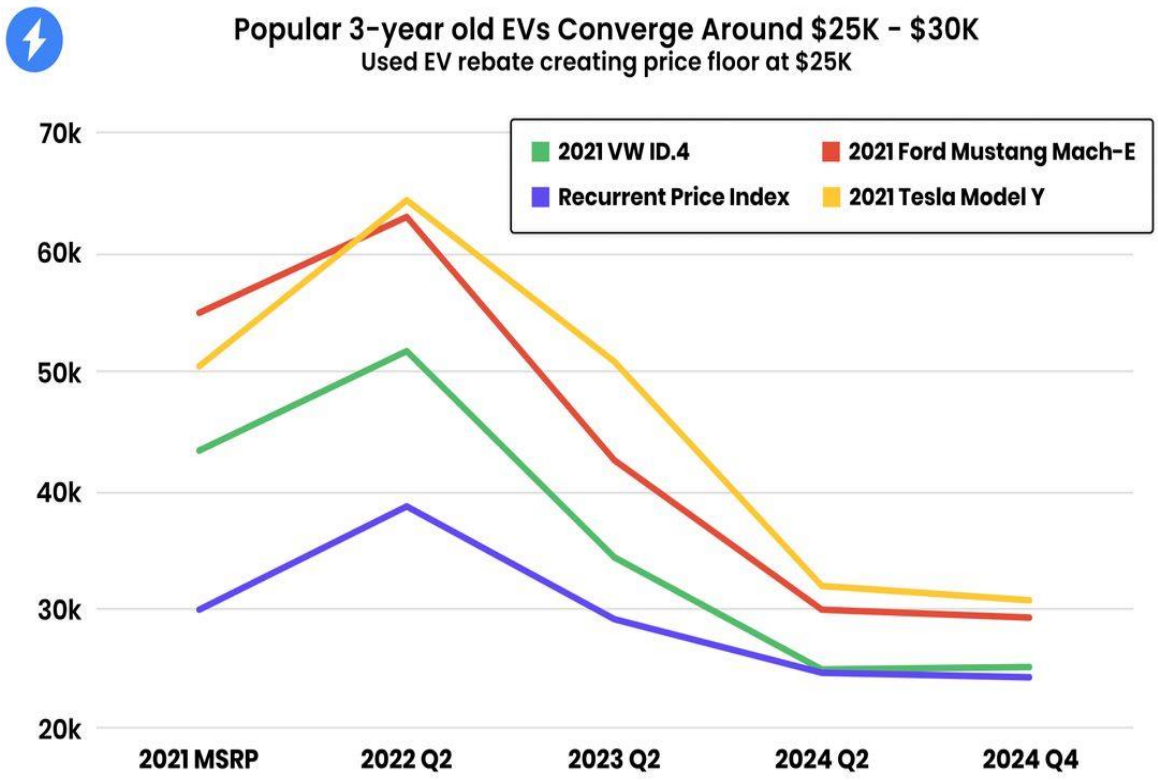
Q.9. Are you concerned about the resale value of your EV?



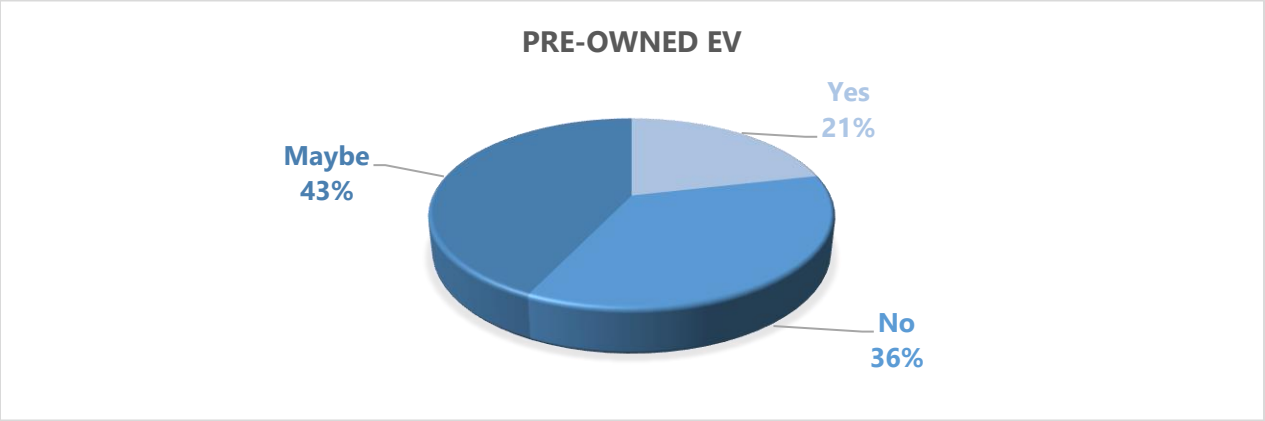
The concern about the resale value of (EV) can vary among individuals. If you considering this aspect, it may be beneficial to evaluate factors such as market trends, battery life and the overall demands for EVs in the particular area.

Several factors can influence the resale value of an electric vehicle (EV):

- **Market Demand:** As the popularity of EV continues to grow, demand in the used car market may increase, potentially increasing resale value.
- **Battery Life and Condition:** The health of the battery is crucial. EVs with longer battery life and better performance tend to retain higher resale values. Regular maintenance and proper care can help maintain battery condition.
- **Brand reputation:** Some manufacturers have stronger reputation for reliability and performance, which can positively influence resale value. Brands known for their EV technology may see better resale prices.
- **Government Incentives:** Changes in government policies or incentives for EV can affect resale value. For instance, if incentives for new EV purchases are reduced, it may increase demand for used EVs.
- **Technological Advancements:** Rapid advancements in EV technology can lead to older models depreciating faster. Buyers may prefer newer models with better range and features.
- **Mileage and condition:** Like traditional vehicles, the overall condition and mileage of the EV will significantly affect its resale value. Lower mileage and well maintained vehicles typically command higher prices.


Popular 3-year old EVs Converge Around $25K - $30K
Used EV rebate creating price floor at $25K
70k
60k
50k
40k
30k
20k
2021 VW ID.4
2021 Ford Mustang Mach-E
Recurrent Price Index
2021 Tesla Model Y
2021 MSRP
2022 Q2
2023 Q2
2024 Q2
2024 Q4

Q.10. Would you like to buy pre-owned EV.

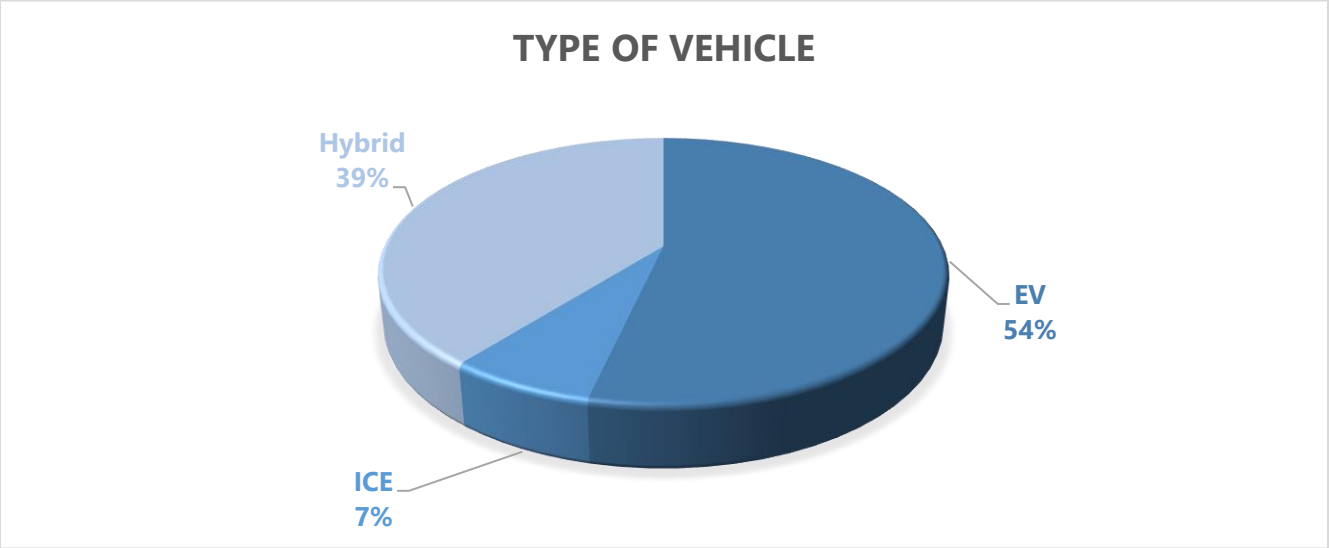


Potential market for pre-owned EVs are influenced by various factors such as price, availability and consumer education about electric vehicle.

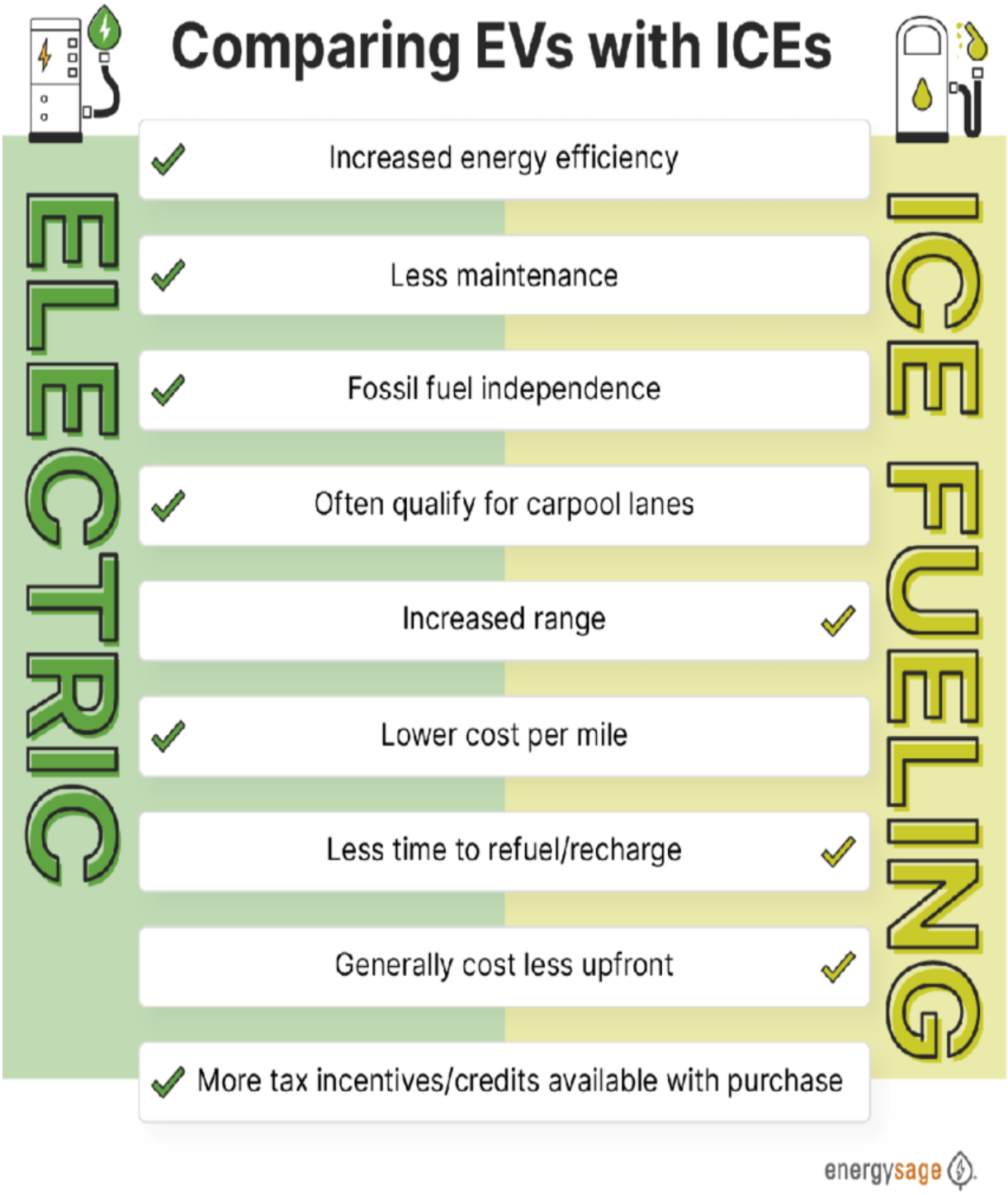
The results indicate a mixed sentiment towards purchasing pre-owned EV.

- **Interest Level:** With 43% of respondents, indicating 'Maybe' there is a significant portion of the population that is open to the idea of buying a pre-owned EV. This suggest potential for market growth, as these individuals may require further information or incentives to make a further decision.
- **Skepticism:** The 36% who responded 'No' may reflect concerns about reliability, maintenance costs or performance of pre-owned EVs. This skepticism could be a barrier to market expansion and may require targeted marketing strategies to address the concerns.
- **Affirmative interest:** The "21%" who answered 'yes' indicates a smaller yet committed segment of the market that is ready to purchase pre-owned EVs. This group could be leveraged for testimonials or case studies to encourage others.
- **Market Strategy:** The data suggests that manufacturers and dealers should focus on educating potential buyers about the benefits of pre-owned EVs, such as cost savings, environmental impact, and advancements in technology that may alleviate concerns.
- **Future Trends:** The high percentage of 'May be' responses could indicate a growing interest in EVs overall which may lead to increased acceptance and demand in the future as more consumers become familiar with the technology and its benefits.
- **Benefits of pre-owned EV:** Cost savings, Depreciation can give you great deal, Environmental Impact, can get incentives, and can be equipped with advance technology and features.
- **Considerations:** Battery health, warranty, Charging infrastructure, Model availability, Software updates.
  In summary while there is notable interest in pre-owned EVs, addressing the concern of skeptics and converting the 'May be' responses into 'Yes' will be crucial for market growth.

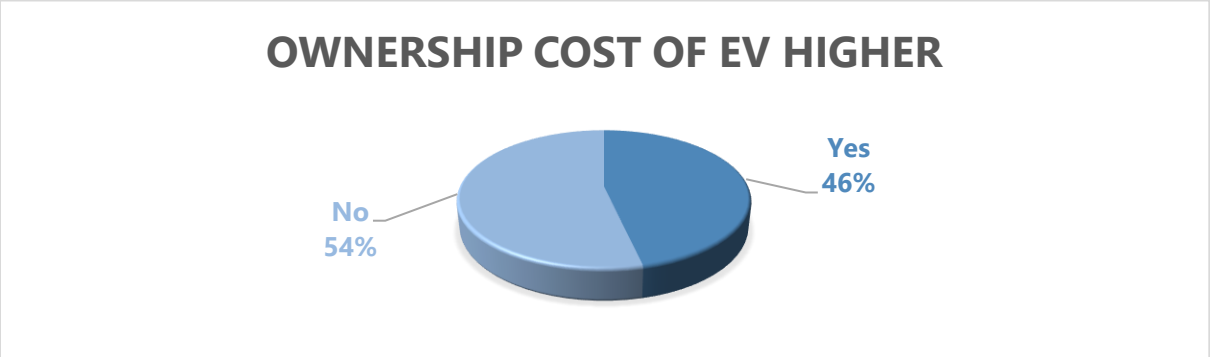
Q.11. which vehicle would you like to buy as your next vehicle?



- **Environmental concerns:** The significant preference for EVs (54%) likely reflects growing awareness and concern about environmental issues. Electric vehicles produce zero tailpipe emission, which contributes to reduce pollution, and a smaller carbon footprint compared to ICE vehicles. This aligns with global efforts to combat climate change and promote sustainability.
- **Cost of ownership:** EVs often have lower operating costs compared to ICE vehicles. They typically require less maintenance (fewer moving parts, fewer oil changes) and benefit from lower fuel costs, especially as electricity prices can be more stable than gasoline prices. This financial aspect may influence the higher preference for EV.
- **Government Incentives:** Many governments offer incentives to purchasing EVs, such as tax credits, rebates and grants. These incentives can make EVs more financially attractive, further contributing to more preference.
- **Technological Advancements:** The more advancements in EV technology including improvements in battery life, charging infrastructure and overall performance have made them more appealing. Consumers may feel more confident in convenience and reliability of EVs now than in the past.
- **Hybrid Vehicles:** The 39% preferences for hybrid vehicles indicates that many consumers are still interested in traditional option that combines both electric and gasoline both. Hybrids can offer better fuel efficiency than traditional ICE Vehicles while still providing the convenience of gasoline engine for longer trips. This option is open to those who are not fully ready to commit to Electric Vehicle.
- **ICE Vehicles (7%):** A lower preference to ICE Vehicles suggest a declining interest in traditional gasoline-powered cars. This could be due to their awareness about environmental impact, rising fuel costs and a shift in consumer attitudes towards more sustainable consumer vehicles.


Comparing EVs with ICEs
ELECTRIC
ICE FUELING
Increased energy efficiency
Less maintenance
Fossil fuel independence
Often qualify for carpool lanes
Increased range
Lower cost per mile
Less time to refuel/recharge
Generally cost less upfront
More tax incentives/credits available with purchase
energysage

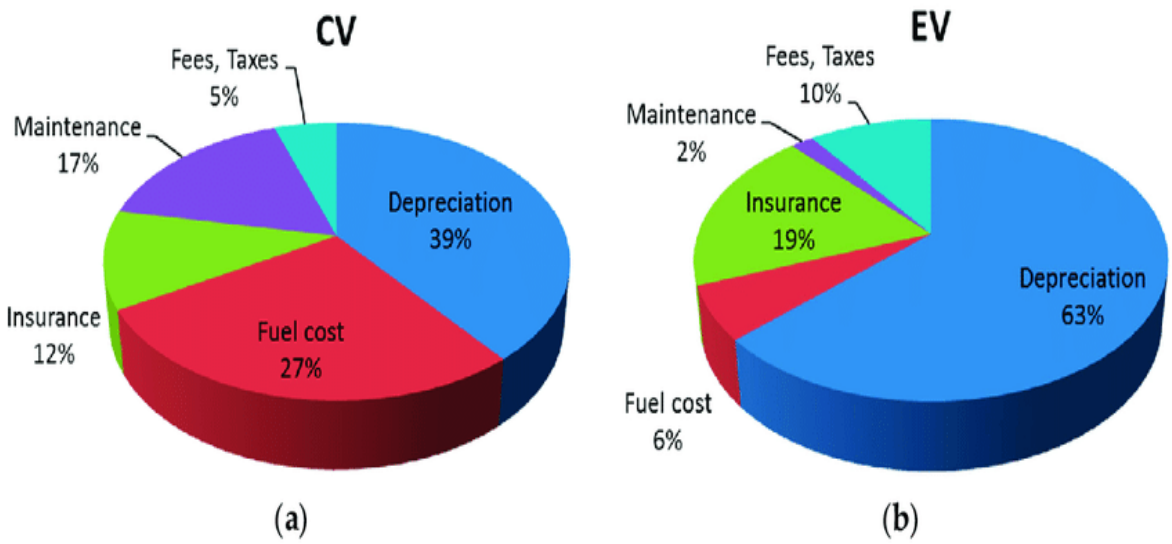
Q.12. Do you think ownership cost of an EV is higher than ICE.



- **Initial purchase price**: Generally, EVs tend to have a higher upfront cost as compared to ICE vehicles. This is primarily due to the cost of the battery technology. However, prices for EVs have been decreasing over time and various incentives and tax credit can offset these costs.
- **Fuel costs**: EVs typically have lower fuel costs compared to ICE vehicles. Electricity is often cheaper than gasoline or diesel on a per mile basis, leading to significant savings, over time especially for those who charge at home.
- **Maintenance Costs:** EVs generally have lower maintenance costs because they have fewer moving parts and do not require oil changes, fuel filters, and spark plugs or exhaust systems. This can lead to long-term savings as compared to ICE vehicles, which require more maintenance that is frequent.
- **Depreciation:** The resale values of EV can be a concern, as they may depreciate faster than ICE vehicles due to rapid advancements in technology and changing consumer preferences. This can affect the overall ownership costs.
- **Insurance Cost:** Insurance premiums for EVs can be higher due to their higher replacement costs and the expense of specialized repairs. This factor can influence the total cost of ownership.
- **Charging Infrastructure:** The availability and cost of charging infrastructure can also affect ownership costs. Home charging setups may require an initial investment. While public charging can vary in cost.

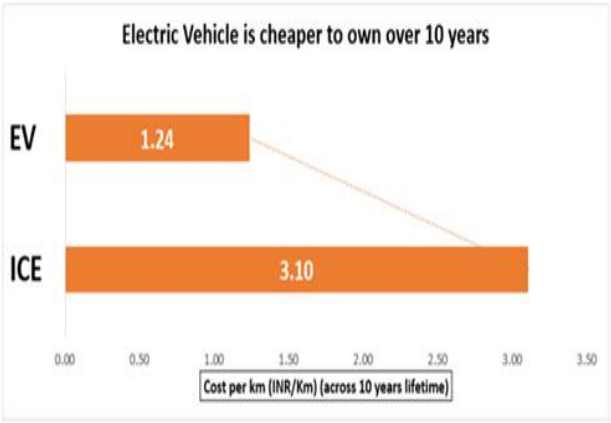
  In summary, from the data we can find that while the initial purchase cost of EVs may be higher, their lower fuel and maintenance costs can lead to overall savings on long run. The perception that EV ownership costs are higher may stem from the initial investment and concerns about depreciation and insurance. Ultimately, decisions may vary from individual circumstances, driving habits and local market conditions.

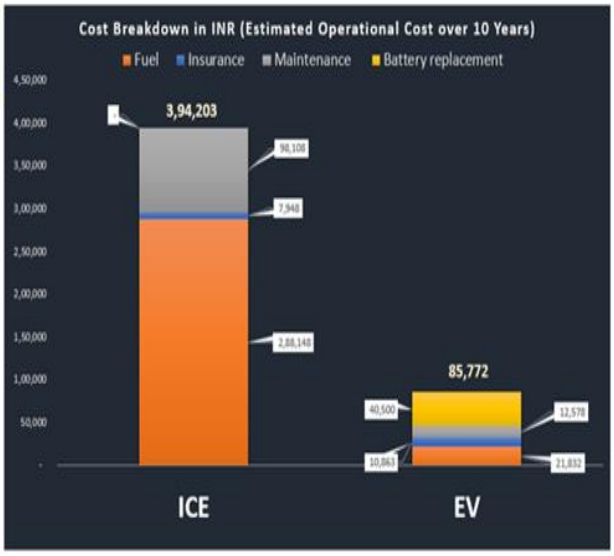
Below image shows the detailed breakdown cost of elements of conventional vehicles (CV) and electric vehicles (EV).



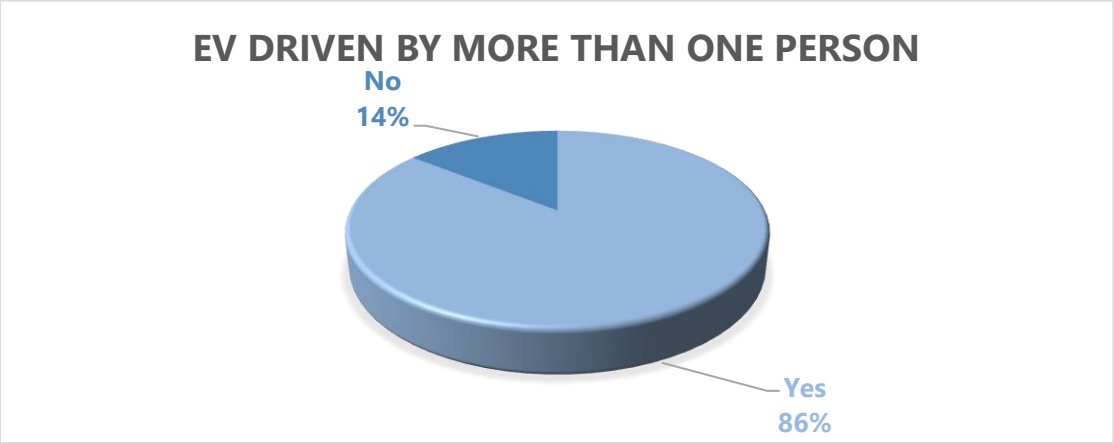
Comparison between Honda Activa 6G (ICE) and Ather +450 (EV)

	ICE	EV
Cost per km (across 10 years lifetime)	3.10	1.24





Q.13. Is your vehicle driven by more than one person.

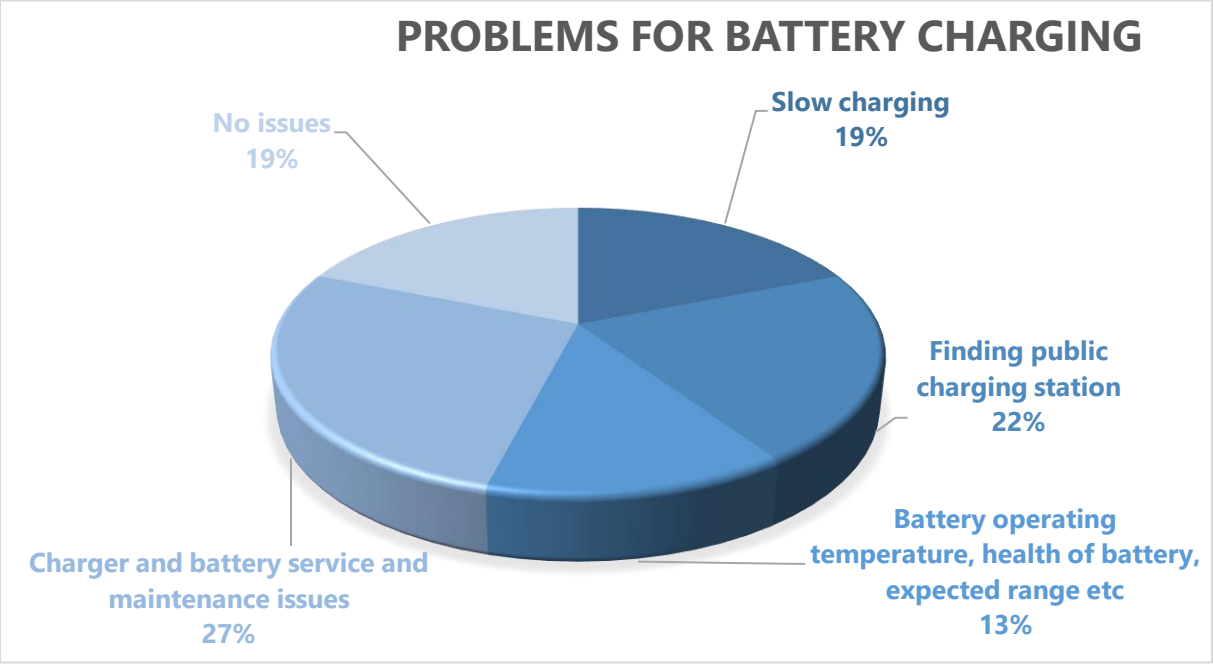


Based on the data provided, where 86% of respondents indicated that more than one person drives their vehicle and 14% stated that it is not, we can draw several insights:

- **Shared Driving Trends:** The high percentage of vehicles driven by more than one person suggests a trend towards shared driving arrangements. This could be indicative of family usage, carpooling or shared ownership models, which are becoming increasingly common.
- **Implications for vehicle design and features:** Manufacturers may consider this data while designing vehicles, designing features that accommodate multiple drivers, such as customizable seat settings, multiple key fobs, and shared systems.
- **Insurance and Liability Considerations:** For insurance companies, understanding that multiple individuals drive a majority of vehicles could influence policy offerings and pricing. Policies may need to account for the increased risk associated with multiple drivers.
- **Urban Mobility and Sustainability:** The trend toward shared driving could also reflect broader societal shifts towards sustainability and urban mobility solutions, where individuals are more inclined to share resources rather than own vehicles outright.
- **Potential for ride-sharing services:** The data may also indicate an opportunity for ride-sharing services as a significant portion of the population is accustomed to shared driving experience.

  In summary, data suggests a strong inclination towards shared vehicle usage, which has implications for various sectors, including automotive design, insurance and urban planning.

Q.14. what kind of problems do you face for your vehicle (battery) charging?



Users regarding vehicle battery charging face several challenges.

- **Slow Charging (19%):**
  Reasoning: Slow charging can be attributed to various factors, including the type of charger used e.g. (Level 1, Level 2) the vehicles battery capacity and the state of the battery.
  Solution: Users can invest in faster charging solutions such as Level 2 chargers or utilize fast-charging stations when available. Additionally, optimizing charging schedules to take advantage of off-peak electricity rates can help.
- **Finding public charging stations (22%):**
  Reasoning: The availability of public charging stations can be limited especially in rural areas or regions with less infrastructure for electric vehicles.
  Solution: Utilizing mobile apps or navigating systems that provide real time information on charging station locations can help. Advocacy for increased infrastructure development by local governments and private companies can also address this issue.
- **Battery Operating Temperature, Health of Battery, Expected Range (13%):**
  Reasoning: Battery performance can be significantly affected by temperature extremes, which can lead to reduced efficiency and range. Additionally the overall health of the Battery influences its longevity and performance.
  Solution: Users should monitor battery health through their vehicles diagnostic tools and ensure that they are charging in optimal temperature conditions. Regular maintenance and following manufacturer guidelines can help maintain battery health.
- **Charger and Battery service maintenance issues (27%):**
  Reasoning: Issues related to the charger and battery can arise from wear and tear, compatibility problems or lack of maintenance.

Solution: Regular maintenance check and using compatible charges can mitigate these issues. Users must do service at intervals and battery care.
Many users are satisfied with their charging experience possibly due to adequate infrastructure or effective vehicle technology.
Understand the underlying reasons and implement the practical solutions.

Electric Vehicle Charging Infrastructure

Level 1 and Level 2
Residential Charging

Electric vehicles are charged via an AC power supply at a normal (Level1) or semi fast charging rate:
Voltage
120V 1-Phase AC
Amps
12-16 Amps
Charging Loads
1.4 to 1.9 KW
Charging Time
3-5 Miles of range per hour
Price per Mile
2c-6c mile

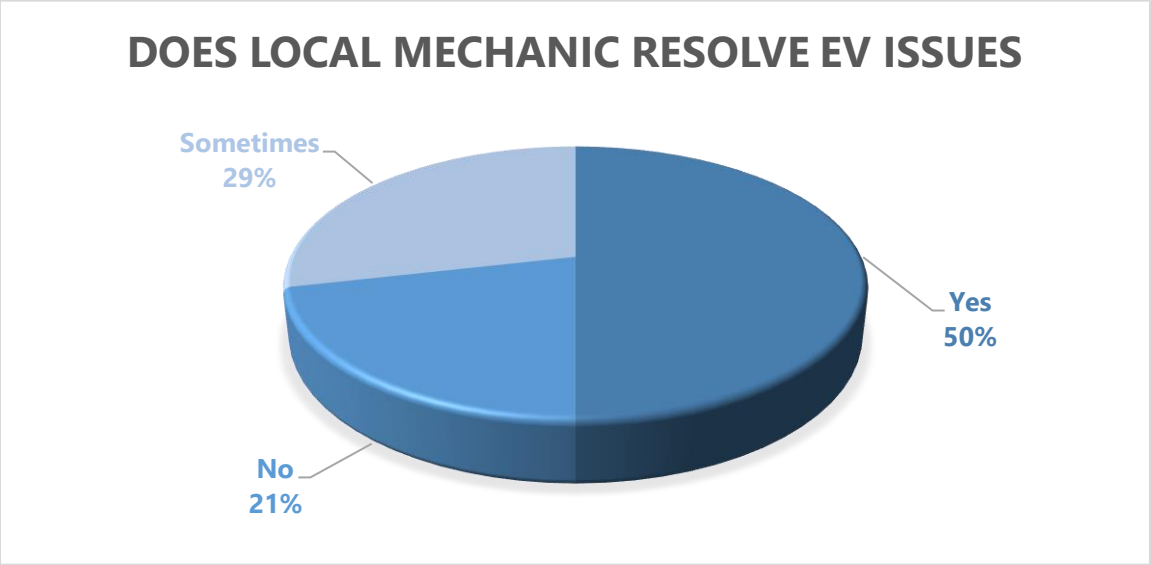
Level 2
Work and Public place Charging

Electric vehicles are charged via an AC power supply at semi fast (Level2) charging rate:
Voltage
208V or 240V 1-Phase AC
Amps
12-80 Amps (Typ 32 Amps)
Charging Loads
2.5 to 19.2KW (Type 7KW)
Charging Time
10-20 Miles of range per hour
Price per Mile
2c-6c mile

Level 3
DC Fast Charging

Electric vehicles are charged via an DC power supply at a fast (Level3) charging rate:
Voltage
208V or 480V 3-Phase AC
Amps
<125 Amps (Typ 60 Amps)
Charging Loads
<90KW (Type 50KW)
Charging Time
80% Charge in 20-32 minutes
Price per Mile
12c-25c per mile

Q.15. Does your local garage mechanic find it difficult to identify and resolve minor issues of your EV.



The survey results indicate that 50% respondents believe that their local garage mechanic finds it difficult to identify and resolve minor issues with EVs. In contrast, 21% feels that mechanics do not face such difficulties while 29% believes that it varies depending on the situation.

- **Specialized Knowledge and training:** EV operate differently from traditional ICE vehicle. Mechanics may lack the specialized training required to diagnose and repair EV-specific issues, leading to difficulties in resolving even minor issues.
- **Diagnostic tools:** The technologies used in EVs often requires advanced diagnostic tools that may not be available at all local garages. This can hinder mechanics ability to accurately identify issue.
- **Complexity of Systems:** EVs have complex electrical systems and software that can complicate troubleshooting. Mechanics accustomed to traditional vehicles may find it challenging to adopt to these new systems.
- **Limited Experience:** As EVs are relatively newer in the automotive market, so mechanics have very limited hands-on experience with them, which can contribute to uncertainty while diagnosing issues.

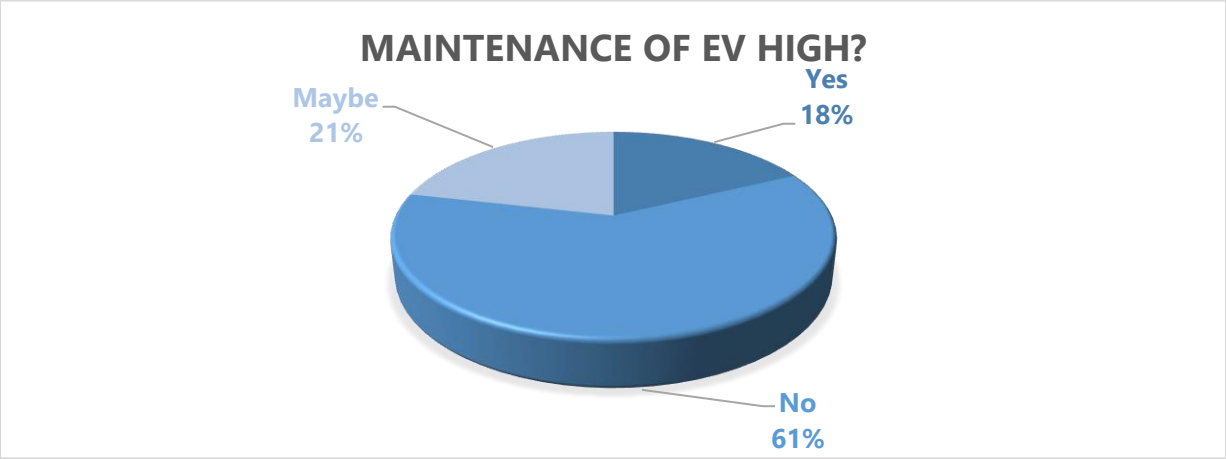
Solutions:

- **Training Programs:** Encouraging local garages to invest in training programs focused on EV technology can enhance mechanics skills and confidence in handling EV repairs.
- **Investment in Tools:** Garages should consider in investing in specialized diagnostic tools designed for EVs to improve their ability to identify and resolve issues effectively.
- **Collaboration with EV manufacturers:** Establishing partnership with EV manufacturers can provides mechanics with access to resources, training and support, enabling them to stay updated on the latest technologies and repair technics.

- **Public Awareness:** Educating EV owners about the importance of seeking out specialized EV service centers can help ensure that their vehicles are serviced by mechanics with the appropriate expertise.

  By addressing these challenges through targeted training and resource allocation, local garage mechanics can improve their ability to diagnose and resolve minor issues with electric vehicles, ultimately enhancing service quality for EV owners.

Q.16. Did you experience maintenance of EV is high as compared to ICE.



Based on data, it appears that a majority of respondents (61%) believe that maintenance of EV is not higher as compared to ICE vehicles. A small portion 18% feels that EV maintenance is indeed higher, while 21% are uncertain.

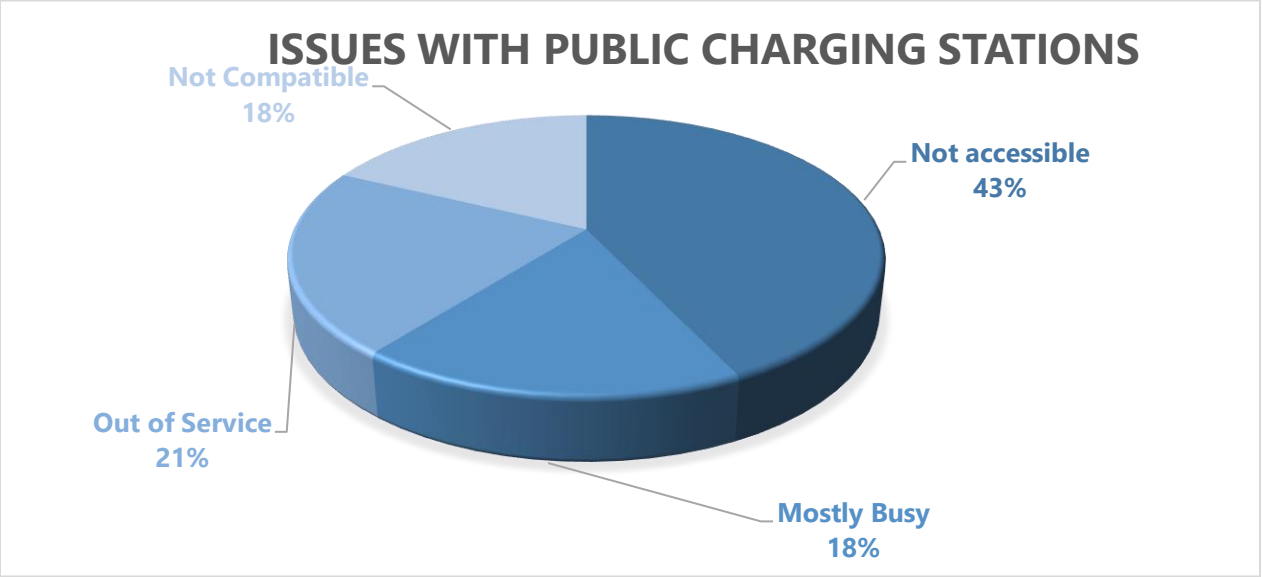
- **Complexity of systems in ICE:** ICE vehicle has many moving parts and complex systems like (engine, transmission and exhaust systems) that require regular maintenance like oil changes, filter replacement etc. In contrast EV has less moving parts and do not require oil changes, which can lead to lower maintenance cost over time.
- **Battery maintenance:** One of the significant maintenance for EVs is battery maintenance. While EV batteries are designed to last for many years, they can be expensive to replace if they degrade significantly. However, advancements in battery technology and warranties often mitigate these concerns.
- **Breaking Systems:** EV utilize regenerative breaking, which can reduce wear on break component compared to traditional ICE vehicle. This can lead to lower maintenance cost in EVs.
- **Overall costs:** while some may argue that the initial cost of maintenance for EVs can be high due to battery replacement, the overall maintenance cost over vehicles lifespan tends to be lower as compared to routine maintenance for ICE vehicles.

To address concerns for EV maintenance, manufacturers can focus on improving battery technology and providing comprehensive warranties. Educate consumers about long-term benefits and lower maintenance needs of EVs compared to ICE.

In conclusion, EV requires less maintenance as compared to ICE vehicles leading to lower costs and less frequent service needs over time.


ELECTRIC VEHICLE MAINTENANCE GUIDE
Key Tips for Longevity & Performance
6 TIPS FOR YOU:
1
PRIORITIZE REGULAR MAINTENANCE
• Regular upkeep is vital for electric vehicle (EV) longevity and efficiency.
• Focusing on battery maintenance extends its lifespan and optimizes overall performance.
FOCUS ON CORE COMPONENTS
• Maintain EV battery for longevity and performance.
• Regenerative brake upkeep for efficiency.
• Proper tire care for safety and efficiency.
2
3
BATTERY CARE FOR LONGEVITY
• Shorter, frequent sessions with Level 1 charger.
• Protect battery from extreme temperatures and use preconditioning.
• Update software regularly.
BENEFIT FROM MAINTENANCE INCLUSION
• Hassle-free ownership with full maintenance coverage including battery, brakes, and tires.
• Premium EV and expert maintenance, ensuring a seamless driving experience.
4
5
SUBSCRIPTION VS. LEASING
• Subscription offers shorter terms, all-inclusive fees, and more vehicle options.
• Enhanced flexibility and convenience compared to traditional leasing.
EMBRACE A GREENER FUTURE
• EV maintenance for a greener future and better driving experience.
assistance.
6

Q.17. what is the major issue you find with the public charging stations?



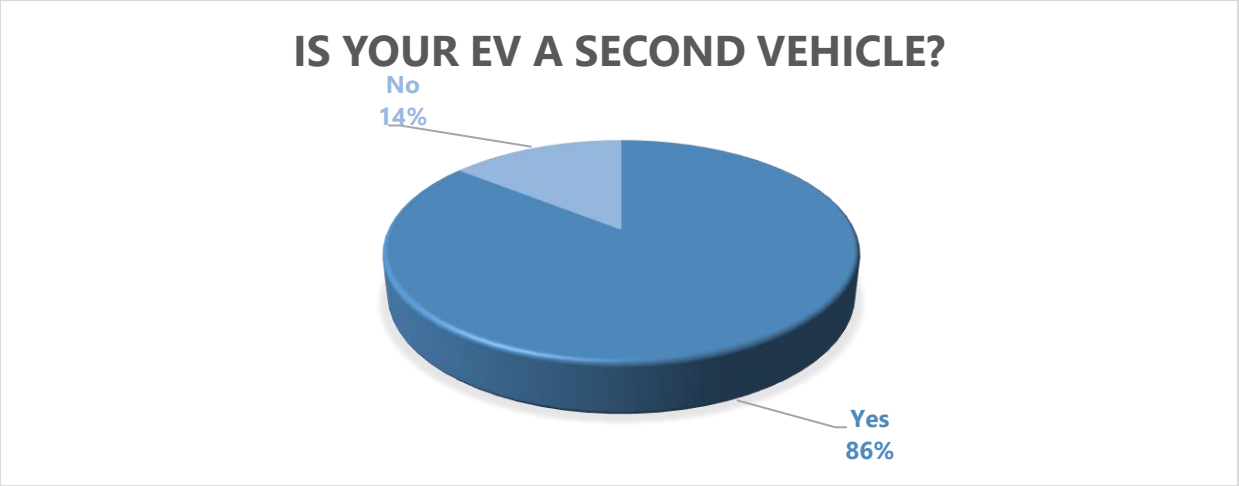
The major issue identified with public charging stations is that they are 'Not accessible', which accounts for the 43% of the responses. This suggests that a significant portion of users face challenges in facing or utilizing these charging facilities.

- **Physical Accessibility:** Many charging stations are located at the areas, which are difficult to access for certain users. This can limit the usability of the charging infrastructure.
- **Geographic distribution:** Charging stations may not be evenly distributed across urban and rural areas leading to situations where users in less populated regions have limited access to charging options.
- **Infrastructure Limitations:** Some charging stations may be situated in the locations that not conductive to easy access, such as busy parking lots or areas with limited parking space, making it difficult for users to park and charge their vehicles.

  Solutions:
  - **Improved location planning:** Urban planners and charging station providers should conduct thorough assessments to identify high traffic areas and locations that are easily accessible to all users, including those with disabilities.
  - **Increased number of Stations:** Expanding the network of charging stations particularly in underserved areas, can help alleviate accessibility issues.
  - **User-Friendly Design:** Charging stations should be designed with accessibility in mind, so that they are easy to use for all individuals.
  - **Public Awareness Campaigns:** About locations and availability about charging stations can help users to plan, their charging needs better.

    By addressing these issues through thoughtful planning and design, the accessibility of public charging stations can be significantly improved, ultimately enhancing the user experience of Electric vehicle owner.

Q.18. Do you consider EV to act as a second vehicle for city or shorter driving distance.

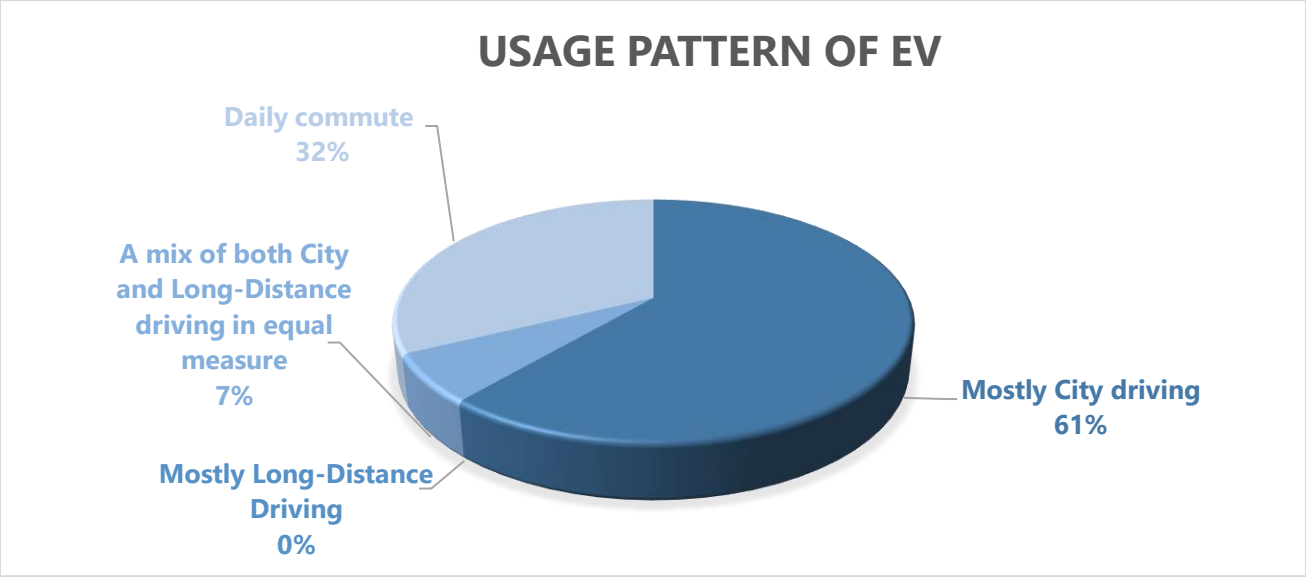


Based on the data provided, 86% of respondent consider EVs suitable as a second vehicle for city or shorter driving distances.

- **Cost Efficiency:** EVs typically have lower operating costs compared to traditional gasoline vehicle. For short trips, the savings on fuel can be significant, making them an economical choice for a second vehicle.
- **Environmental Impact:** EVs produce zero tailpipe emission, which contributes to improved air quality in urban areas. Using an EV for city driving helps reduce the overall carbon footprint, aligning with sustainability goals.
- **Convenience for Short Trips:** An EV is used for short trips and is well suited for these type of journeys, as they can be charged overnight and are efficient for short distances.
- **Incentives and Rebates:** Many governments offer incentives for purchasing EVs, which can make them more affordable as a second vehicle. These financial benefits can encourage consumers to consider EVs for city driving.
- **Parking and Space Efficiency:** EVs are often smaller and easier to park in congested urban environment. Their compact size is advantageous for cities where parking space is a challenge.
- **Technological Advancements:** The rapid advancement in EV technology, including improved battery life and charging infrastructure, make them practically useful in city life.
- Reduced maintenance cost due to very few moving parts in the Electric vehicle (EV).

In conclusion, the majority views those EVs can effectively serve as the second vehicle for city or shorter driving distances is supported by economic, environmental and practical considerations.

Q.19. what can best describe your usage pattern for your EV.



Based on the above data for EV usage patterns, we can analyze the preferences and behaviors of users as follows:

- **Mostly city driving (61%):** The majority of users (61%) primarily use their EVs for city driving. This suggests that the urban environment is more suitable for EV adoption likely due to charging infrastructure, lower emission regulations and the suitability of EVs for shorter trips. City driving typically involves frequent stops and starts which can be advantageous for EVs.
- **Daily Commute (32%):** This indicates that many individuals are integrating EVs in their daily routine, which may be influenced by factors such as cost savings on fuel, environmental concerns and the desire for a reliable mode of transportation.
- **A mix of both city and Long-Distance driving (7%):** The smaller segment of people use EV for long-distance driving too especially if they are comfortable for range limitations of their EVs for longer journeys, possibly using public charging stations along their routes.
  Notably there is no user who uses their EV for long-distance driving. It may also indicate that users are more inclined to use traditional vehicles for, such trips where range and refueling times are less of a concern.

  Solutions and Recommendations:
- **Enhancing charging infrastructure:** Availability of fast-charging stations on major driving routes could encourage more EV adaptation for longer-trips.
- **Educating on Range management:** Providing information on how effectively manage range and plan trips can help users for planning longer trips.
- **Incentives for mixed usage:** This can promote a more versatile use of EV, potentially increasing their appeal.
  In conclusion, data indicates strong preference for city driving among EV users, with daily commuting also being a significant factor.

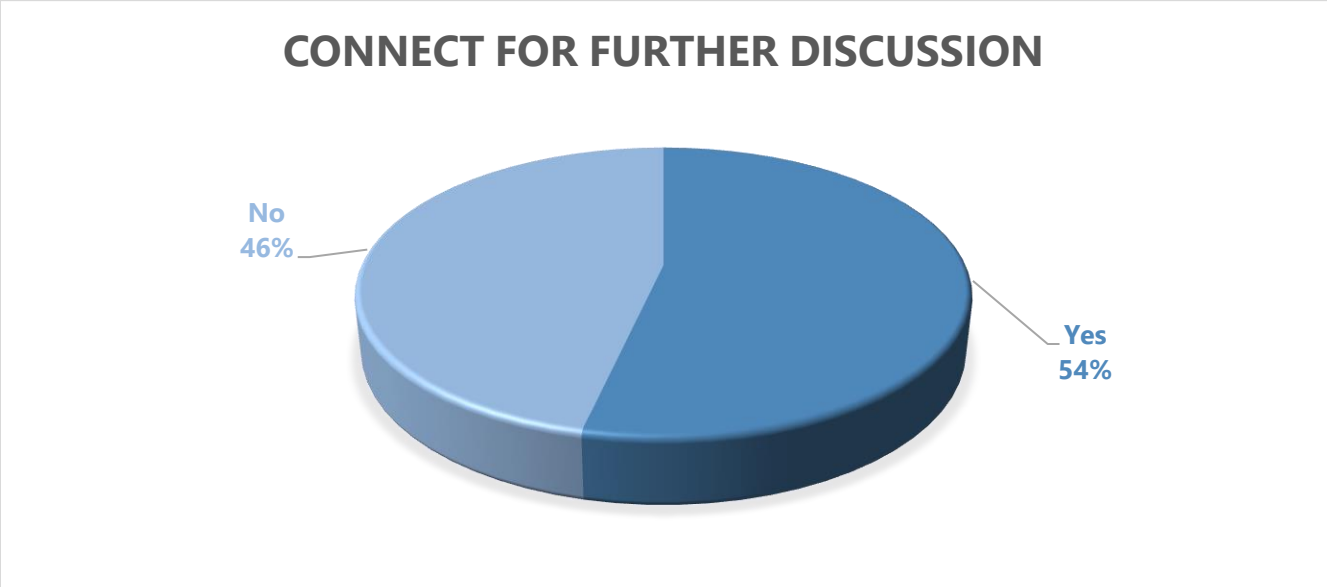
Q.20. Would you like to take awareness training on electric vehicle and future mobility.

Based on the above data regarding interest in the awareness training on electric vehicle (EV) and future mobility we can analyze responses as follows: Interest in training:

- **Yes (43%):** A significant portion of respondents expressed a clear interest in participating in awareness training. This indicates a recognition of the importance of understanding electric vehicles and future mobility trends, likely driven by the growing relevant of sustainability and technological advancement in transportation.
  There is a strong potential for engaging in training programs. This reflects a growing societal trend towards sustainability and innovation in transportation.
- **May be (32%):** A substantial number of respondents are undecided. This group may require more information or motivation to commit to training. There uncertainty could stem from a lack of awareness about the benefits of EVs or relevance of future mobility concepts. This highlights an opportunity for further outreach and education. By addressing the concerns or gaps in knowledge for this group, organizations can potentially convert them into participants.
- **No (25%):** A smaller segment indicated they do not wish to participate in the training; this may be due to lack of knowledge, other priorities and belief that they already possess sufficient knowledge.
- Information sessions and webinars or workshops can be hosted that outline the benefits of EVs and future mobility addressing common misconceptions and highlight the real world applications.
- Cater training material, which can cater to different levels of existing knowledge ensuring that both new and people with some knowledge and background can find some value in that.
- Incentives can be offered on EV related product and services. Feedback can be gathered related to No or Maybe response.

In conclusion, the data indicates a strong interest in awareness training on EVs and future mobility with opportunities to enhance engagement through targeted strategies.

Q.21. Would you like our team to connect with you for further detailed discussion.



Based on the provided data, 54% of respondents express a desire to connect for further detailed discussions, while 46% indicated they would prefer not to engage further.

Majority Interests: The fact that 54% of respondent are open to further discussions suggests a majority interest in exploring topic or issues in greater depth. This could indicate that they find value in the conversation & believe that it is essential & beneficial.

Engaging them further could lead to deeper insights, foster relationships and potentially enhance satisfaction with services or products.

Minority Concerns: Those who opted not to engage further may have various reasons for their decision. These could include:

No need for further information, time constraint or a preference for written communication over verbal discussion. Can conduct follow up survey or feedback sessions to understand their reasons.

Practical Day-to-Day Experiences and Observations of EV users

1. Worst service experience with Ola Customer service. His vehicle was off-road for more than a month's period. Customer has already purchased after sales service from the company still after sales service is worst.
2. Future of EV is very bright and EV is here to stay.
3. We need more infrastructure development in India especially for charging stations and those should be easily available and accessible to everyone.
4. In EV, 4-wheeler segment range anxiety should be reduced and range per kilometer covered should be more for 4-wheelers.
5. Most of the 2-wheeler EV users do not face any issues with their EVs. There is a huge improvement in EV infrastructure. Now range anxiety also not happens with many EV users.
6. SIM Card for maps supposed to upgrade to 4G.
7. EV vehicle is not as strong as ICE engine vehicle.
8. Many are loving their EV experiences and saying it is good and want to continue using it.
9. Some users have completed just a year with EV and drive only 3000 km. so until date they have not faced any issue for such a short distance. EV 2-wheelers are good for office going persons and short distance commuters on daily basis.
   However, we cannot rely on EV for long distance travel considering the range issues.
10. Few have completed 2 years with their EV 2-wheeler they own Ather 425X. After sales service is very bad and maintenance cost is very high. They have spent Rs. 4000 on one part only in 2 years. High maintenance cost, frequently come under maintenance and dealer services are very bad.
11. One user is with Ola S1 Pro. He has completed 2 years with his EV. Until date, he has not faced any issues with his EV. However, he says that there is no feel of ICE engine vehicle. His daily commute is of 55 Km but after 30 km he gets tired.
    Therefore, sturdiness of EV is not as good as that of ICE Vehicle.
12. Some EV users also installed solar panels so that their EV rides are completely eco-friendly and free of cost. They have clear conscious that they do not pollute the air. Because they have understood, that EV is the future.

Conclusion

Electric vehicles (EV) play an important role in steering the world away from fossil fuels towards cleaner, renewable energy sources. To contribute to a sustainable transportation solution, buying an electric vehicle is highly preferable.

Running costs of EV are lower than regular ICE vehicle as electricity is cheaper than petrol or diesel.

EV can be charged at home so do not need to go to gas station. EVs can accelerate quickly because electric motors produce instant torque.

EVs are quieter and smoother than conventional vehicles because electric motors generate less vibration and noise.

There are some challenges with EV:

Upfront cost of EV is high than ICE vehicle. There is a fear of running out of battery charge while driving, especially for long-distance travel and especially for 4-wheelers. EV batteries degrade over time, which can reduce the range.so range anxiety is a serious problem with EV 4-wheelers especially in long distance drive.

EV infrastructure development especially charging infrastructure is still under progress in India and not yet fully developed and running. So using EV for long distance travel is still not recommended.

After sales service in EV is very big challenge in front of OEM's. Customers and EV users are not very happy with after sales service of EV vehicles.

Resale value of EV is still a big concern for many users as the battery replacement cost is very high.

Even though EV s are the best solutions to tackle the issues of climate change and energy stability. There is lot of work need to be done to make it a sustainable solution over the conventional vehicles in the world. Surely, EV has the bright future with sustainable energy sources and pollution free transportation over the globe.

References

1. Tracking India's Evolving E-Mobility Startup Landscape. https://www.wricitiesindia.org/content/electric-mobility
2. India Electric Vehicle Market. https://www.sphericalinsights.com/reports/india-electric-vehicle-market
3. Benefits of switching to EVS. https://komaki.in/blog/choosing-an-electric-vehicle-for-your-daily-commute/
4. Important things to know while choosing an EV. https://komaki.in/blog/choosing-an-electric-vehicle-for-your-daily-commute/
5. Electric Vehicle India Challenges. https://blog.geetauniversity.edu.in/the-future-of-electric-vehicles-in-india-opportunities-and-challenges/
6. Popular 3-year old EVs Converge. https://www.recurrentauto.com/research/used-electric-vehicle-buying-report
7. Comparing EVs with ICEs. https://www.researchgate.net/figure/The-advantages-of-EVs-over-ICEs-Based-on-the-image-buying-an-EV-has-more-benefits_fig1_374550125
8. Detailed breakdown cost of elements of conventional vehicles (CV) and electric vehicles (EV). https://www.researchgate.net/figure/Detailed-break-down-cost-elements-of-a-CV-conventional-vehicle-and-b-EV-electric_fig3_322668224
9. Electric Vehicle Charging Infrastructure. https://www.sciencedirect.com/science/article/pii/S2352484722017346
10. Electric Vehicle Maintenance Guide. https://steerev.com/electric-vehicles-evs/comprehensive-guide-to-electric-vehicle-maintenance/