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A Study on the Green Mobility Gap between Consumer Awareness and Adoption of Low Emission Vehicles in Indore City

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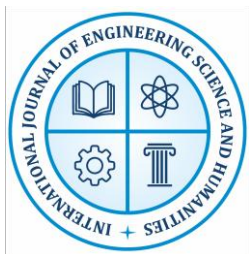
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ABSTRACT

The transition towards sustainable transportation has become increasingly important due to rising concerns about air pollution, climate change, fuel dependency, and urban traffic congestion. Low-emission vehicles, particularly electric vehicles (EVs), are considered an important solution for promoting cleaner and more sustainable urban mobility. India has witnessed significant growth in electric mobility, supported by government initiatives such as FAME-II and the PM Electric Drive Revolution in Innovative Vehicle Enhancement (PM E-DRIVE) Scheme. Recent government data indicate that EV adoption in India has increased substantially, while charging infrastructure has also expanded.

However, awareness does not necessarily translate into actual adoption. Consumers may be aware of the environmental benefits and government incentives associated with low-emission vehicles but may still hesitate to purchase them because of high initial costs, limited charging infrastructure, range anxiety, battery-related concerns, lack of information, resale-value uncertainty, and perceived maintenance issues. This difference between what consumers know and what they actually adopt is referred to in this study as the green mobility gap.

This study examines the gap between consumer awareness and actual adoption of low-emission vehicles (LEVs)—including electric two-wheelers, three-wheelers, and cars—in Indore, Madhya Pradesh. Using a structured survey of residents and descriptive plus inferential analysis, the research quantifies awareness levels, identifies key barriers to adoption, and models factors influencing purchase intention versus actual behaviour. Findings indicate high environmental awareness but moderate-to-low adoption, with infrastructure, cost, and range anxiety emerging as primary constraints. The paper concludes with policy and marketing recommendations to bridge the awareness–adoption gap and accelerate green mobility in Indore. The study recommends stronger consumer awareness campaigns, improved charging infrastructure, transparent information regarding vehicle costs and batteries, financial incentives, and greater availability of affordable low-emission vehicles.



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Keywords: Green Mobility, Consumer Awareness, Electric Vehicles, Low-Emission Vehicles, EV Adoption, Sustainable Transportation, Indore City, Green Mobility Gap.

1. Introduction

Urban transport is a major contributor to air pollution and greenhouse gas emissions in Indian cities. Indore, consistently ranked among India's cleanest cities, faces growing mobility demand alongside sustainability goals. Low-emission vehicles (LEVs)—especially electric vehicles (EVs)—are central to decarbonizing urban transport, yet adoption remains modest despite rising awareness conferences.

The concept of green mobility has emerged as an approach to making transportation more environmentally sustainable. Green mobility includes transportation solutions that reduce emissions and environmental damage, such as electric vehicles, public transportation, walking, cycling, shared mobility and other cleaner transportation alternatives.

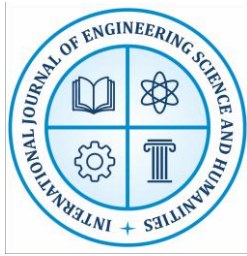
Among these alternatives, electric vehicles (EVs) have received considerable attention. India's electric mobility ecosystem has expanded rapidly. According to the India Electric Mobility Index 2024, EVs accounted for about 7.7% of new vehicle sales in 2024, with electric two-wheelers representing a major portion of the market.

Government policies have also played an important role. FAME-II supported electric two-wheelers, three-wheelers, four-wheelers, buses and charging infrastructure. It was followed by the PM E-DRIVE scheme, which provides demand incentives and supports the development of the electric mobility ecosystem.

The central research problem is therefore that consumers may be aware of the environmental and economic benefits of low-emission vehicles but may still hesitate to adopt them because of financial, infrastructural, technological, and psychological barriers.

Despite these developments, the adoption of low-emission vehicles is not determined by government policies alone. Consumer behaviour is equally important. A person may know that EVs are environmentally friendly but may still choose a petrol vehicle because of concerns about price, charging, driving range, battery life or resale value.

Therefore, the purpose of the present study is to examine the green mobility gap between consumer awareness and adoption of low-emission vehicles in Indore City. Specifically, the study seeks to assess consumer awareness, understand perceptions and purchase intentions, identify the major factors and barriers affecting adoption, and determine whether higher awareness is actually translating into the adoption



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Definition of Key Terms

Green mobility refers to transportation systems and practices that reduce environmental pollution, greenhouse-gas emissions, and dependence on fossil fuels while providing efficient and sustainable movement of people and goods.

Low-Emission Vehicles (LEVs)

Green Mobility

- Low-emission vehicles are vehicles that produce relatively low levels of harmful emissions compared with conventional petrol or diesel-powered vehicles. They include electric vehicles, hybrids, and other cleaner vehicle technologies.
- Electric vehicles are vehicles powered fully or partly by electricity, generally using an electric motor and a rechargeable battery instead of relying entirely on an internal-combustion engine.

Sustainable Transportation

Sustainable transportation refers to modes of transport that meet present mobility needs while minimizing negative environmental, economic, and social impacts for future generations.

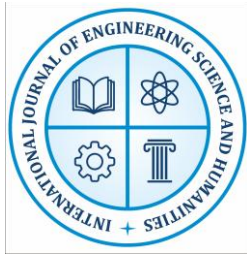
Research Objectives

1. To assess consumer awareness of low-emission vehicles.
2. To examine consumer perceptions towards low-emission vehicles.
3. To identify the key barriers preventing consumers from adopting low-emission vehicles.
4. To examine the gap between consumer awareness and adoption of low-emission vehicles.

Literature Review

adoption of low-emission vehicles, particularly electric vehicles (EVs), has received increasing attention because of concerns related to environmental pollution, fossil-fuel dependence and sustainable urban transportation. Previous studies have examined EV adoption from different perspectives, including consumer awareness, perceived benefits, perceived risks, environmental concerns, charging infrastructure, financial incentives, social influence and government policies.

- **Khurana, Kumar and Sidhpuria (2020)** examined the adoption of electric vehicles in India with particular emphasis on the **mediating role of consumer attitude**. Their study identified several factors affecting EV adoption, including environmental concerns, perceived usefulness, perceived ease of use and perceived cost.
- **Kumar and Alok (2020)** conducted an extensive literature review on EV adoption and analysed **239 research articles** published in Scopus-indexed journals. Their review identified several categories of factors influencing EV adoption, including consumer characteristics, psychological factors, technological factors, economic considerations, and environmental concern.



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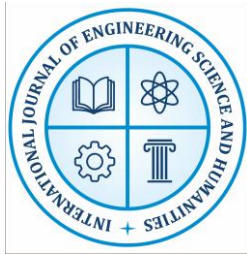
- **Tarei, Chand and Gupta (2021)** investigated the **barriers to EV adoption in India**. Their research examined technological, infrastructural, financial, behavioural and external barriers. The study used a two-stage decision-making approach to understand the relationships among different barriers. The findings indicated that EV adoption is influenced by several interconnected obstacles rather than by a single factor.
- **Goel, Sharma and Rathore (2021)** examined the barriers preventing the wider adoption of electric vehicles in India. Their research emphasised that the availability and accessibility of supporting infrastructure, economic considerations and consumer-related barriers can influence EV adoption.
- **Jaiswal, Kaushal, Kant and Singh (2021)** examined consumer adoption intention towards EVs in the context of Indian sustainable transportation. The researchers used an extended **Technology Acceptance Model (TAM)** incorporating perceived risk and financial incentives. Their findings showed that perceived usefulness, perceived ease of use and consumer attitude influence EV adoption intention. Financial incentives also play an important role in encouraging adoption.
- **Kaur & Reen (2026)**: Recent systematic evidence highlights charging infrastructure, upfront cost and environmental concern, while confirming an **intention–adoption gap**.
- **Patel et al. (2024)**: Charging infrastructure and cost concerns are major barriers to EV adoption in India.
- **Yadav & Yadav (2024)**: Environmental concerns and subsidies motivate adoption, while high cost, range anxiety, infrastructure and trust issues discourage consumers.

Research Gap:

Existing studies have largely focused on general EV adoption and its barriers in India, while limited attention has been given to the awareness–adoption gap among consumers in Indore City. There is a need to examine whether consumer awareness translates into actual adoption or purchase intention and to identify the key barriers—such as cost, charging infrastructure, range, battery concerns and perceived reliability—that may prevent consumers from adopting low-emission vehicles. This study attempts to address this gap by examining consumer awareness, perceptions and adoption-related factors specifically in Indore City.

Need for the Study

The increasing concern over air pollution, fuel consumption and environmental sustainability has created a need to shift towards cleaner modes of transportation. Low-emission vehicles, particularly electric and hybrid vehicles, can contribute to more sustainable urban mobility. However, consumer awareness does not necessarily result in actual adoption.



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The study is needed to understand why consumer awareness of low-emission vehicles may not translate into actual adoption. It examines consumer perceptions and identifies key barriers such as cost, charging infrastructure, range, battery concerns and reliability. The study focuses on Indore City and aims to provide insights that can support informed consumer decisions and promote sustainable urban mobility.

Research Methodology

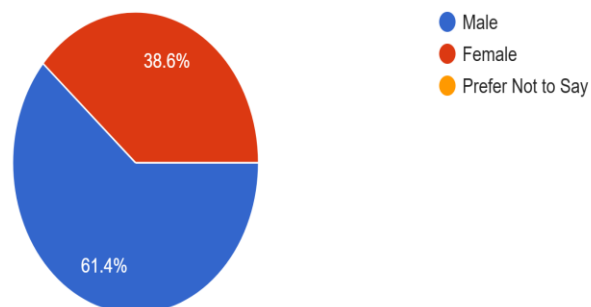
- **Research Design** The study follows a descriptive research design to examine consumer awareness, perceptions and adoption-related behaviour regarding low-emission vehicles.
- **Study Area** The study is conducted in Indore City, Madhya Pradesh, focusing on consumers and their awareness and perceptions regarding low-emission vehicles.
- **Data Sources**
Primary Data: Collected through a structured questionnaire using Google Forms.
Secondary Data: Collected from research papers, journals, reports, articles and other relevant sources related to green mobility and low-emission vehicles.
- **Sampling Method** The study uses convenience sampling, where respondents are selected based on their accessibility and willingness to participate.
- **Sample Size** The study uses responses collected from 70 respondents

Data Analysis

Gender Distribution

Gender

70 responses



Finding: Male respondents represent the majority of the sample (61.43%), while female respondents constitute 38.57%.

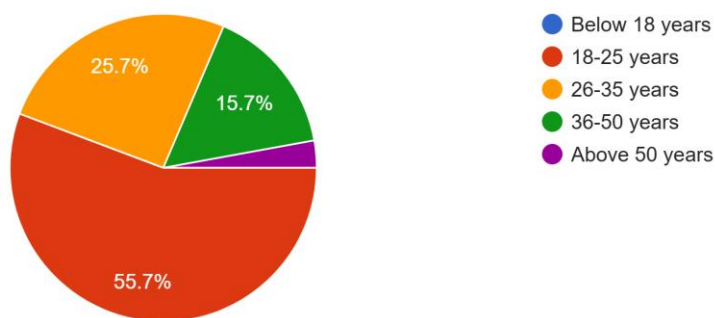


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Age Group

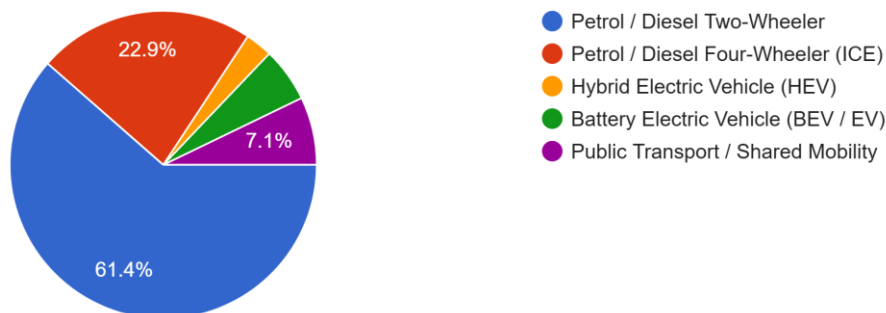
Age Group
70 responses



Finding: The sample is heavily weighted toward young adults and Gen Z consumers, with **81.42%** of respondents under the age of 35.

Current Primary Mode of Transportation

Current Primary Mode of Transportation:
70 responses



Finding: Traditional fossil-fuel vehicles account for **84.29%** of overall commuter mobility, with two-wheelers forming the largest target market for EV conversion (61.43%).

Monthly Household Income

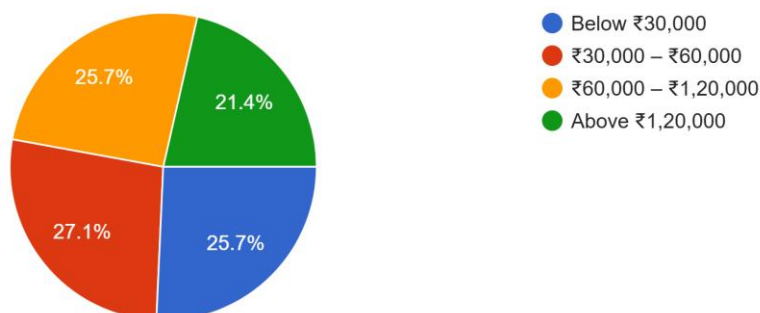


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Monthly Household Income (INR / Equivalent):

70 responses



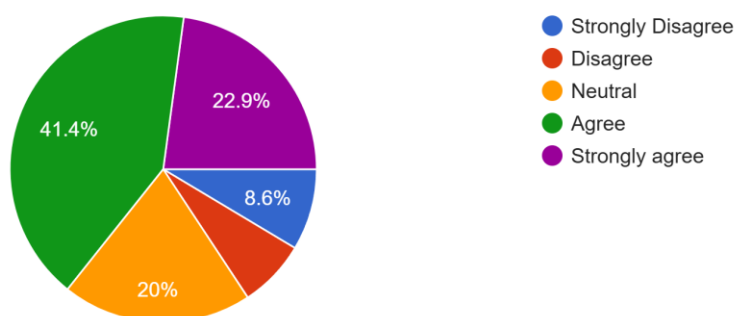
Finding: The respondent group displays a balanced economic spread across low-, middle-, and high-income brackets.

Technical Literacy & Awareness

Understanding the Difference Between HEV, PHEV, and BEV

I clearly understand the difference between Hybrid (HEV), Plug-in Hybrid (PHEV), and Battery Electric Vehicles (BEV).

70 responses



Finding: 61.43% (\$n = 45\$) of respondents demonstrate positive technical awareness regarding vehicle powertrains.

Awareness of Government Subsidies, Tax Benefits, and Schemes

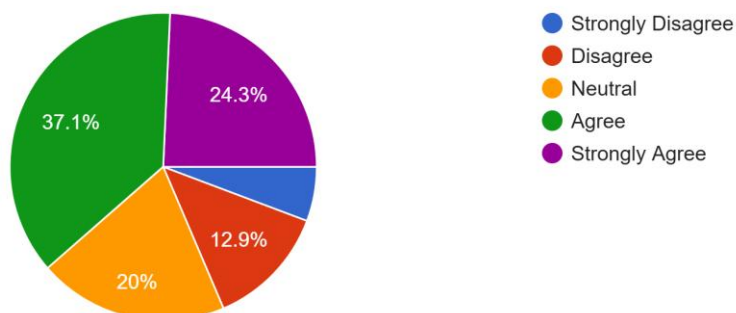


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I am well-informed about government tax benefits, subsidies, and EV purchase schemes.

70 responses

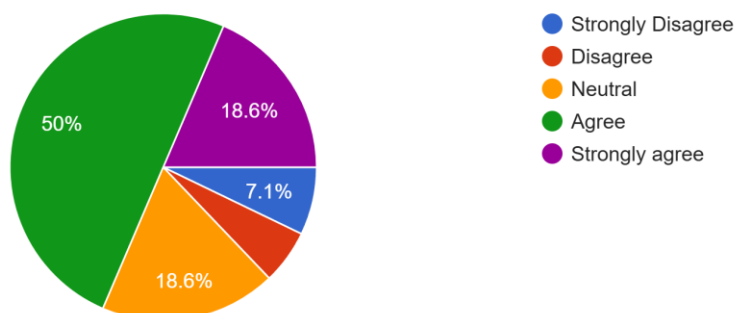


Finding: 57.14% ($n = 43$) state they are well-informed regarding EV policy incentives, while 18.57% indicate a lack of awareness.

Understanding Long-Term Total Cost of Ownership (TCO)

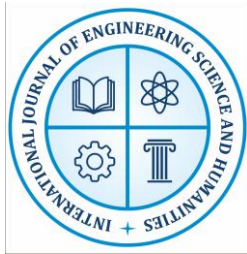
I understand the long-term Total Cost of Ownership (TCO) comparisons between regular petrol/diesel vehicles and electric vehicles.

70 responses



Finding: A high majority (68.57%, $n = 48$) express clear comprehension of long-term operational cost differences between ICE and electric vehicles.

Proximity Awareness of Public Charging Infrastructure

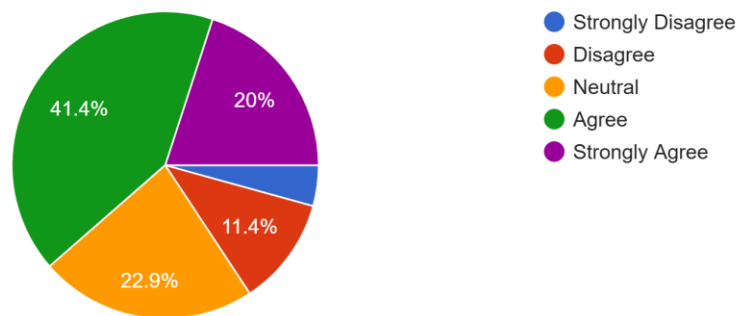


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I know where public charging stations are located near my home, workplace, or regular travel routes.

70 responses

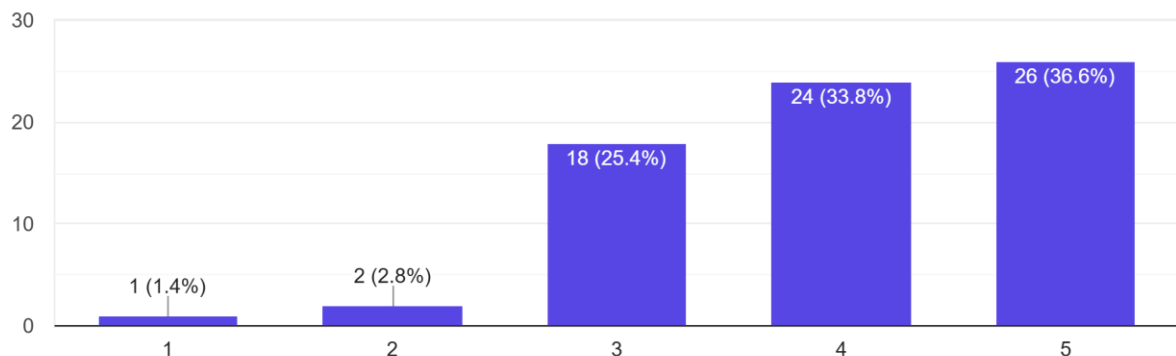


Finding: 64.29% (n = 43) know where local charging points are located along their routine routes.

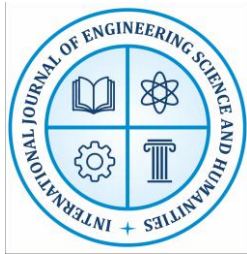
Perceptions and Functional Attitudes Environmental Contribution and Social Identity

Driving a low-emission vehicle significantly enhances one's environmental contribution and social identity.

71 responses



Finding: 70.42% (n = 50) perceive green mobility as a positive enhancer of environmental sustainability and personal social standing.



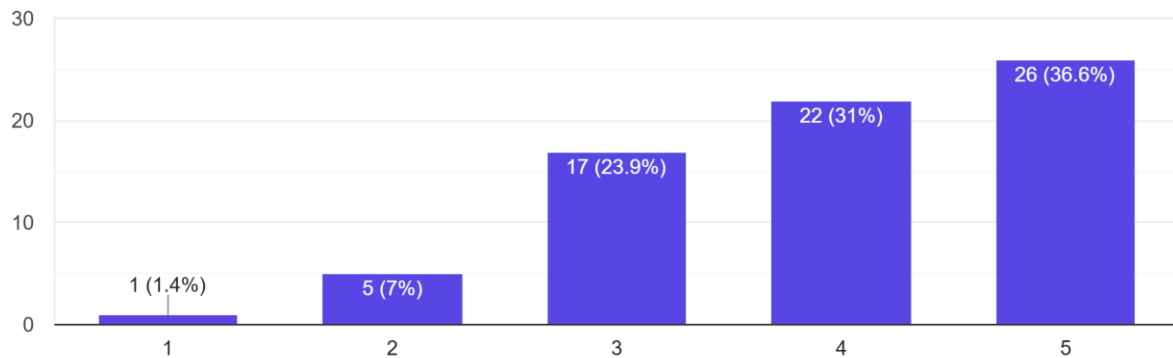
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Perceived Risk of Rapid Technology Obsolescence

I feel that EV technology is changing too fast, making current models obsolete too quickly.

71 responses

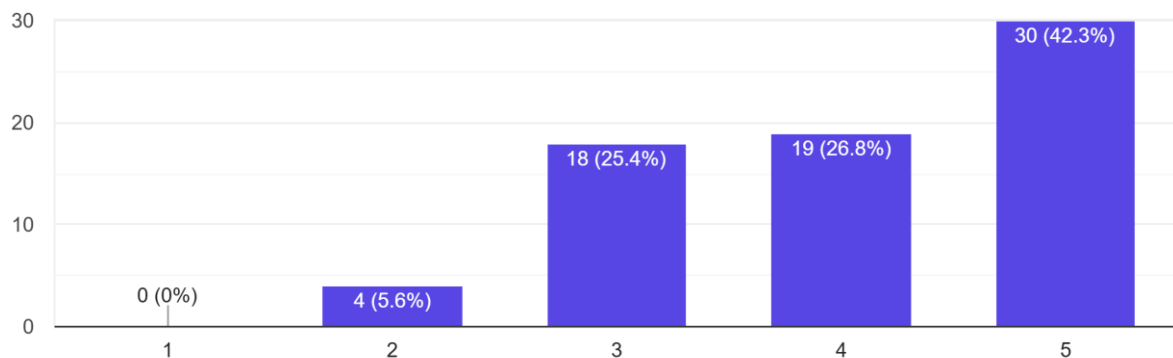


Finding: 67.61% (n = 48) harbor concerns that fast-moving technological iteration will render current EV purchases outdated quickly.

Concerns Regarding Battery Degradation and Extreme Weather Safety

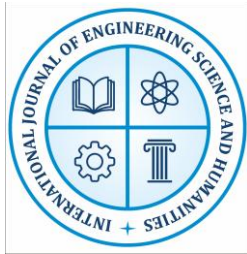
I am concerned about battery degradation, replacement costs, and safety in extreme weather.

71 responses



Finding: 69.01% (n = 49) report high anxiety regarding battery life degradation, high replacement overheads, and weather safety.

Vehicle Safety and Performance Parity vs. ICE Vehicles

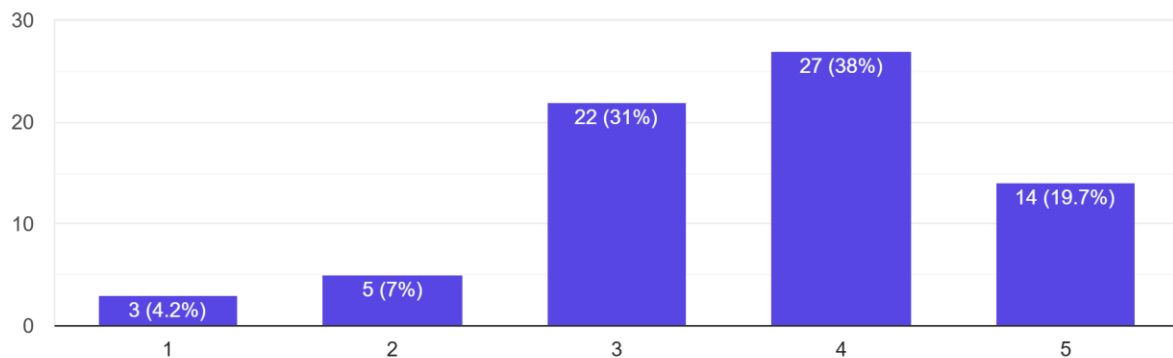


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Low-emission vehicles offer safety and performance equal to or superior to conventional ICE vehicles.

71 responses



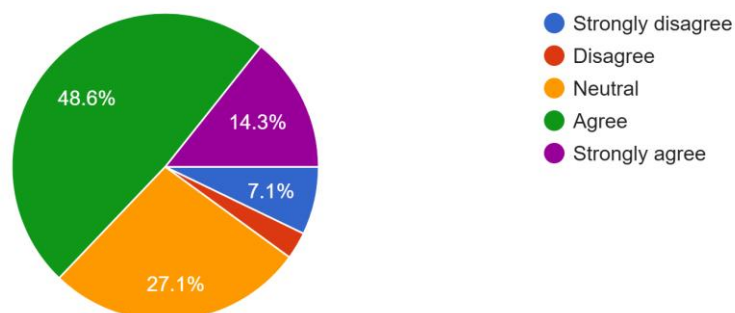
Finding: 57.75% (n = 41) rate EV performance as equal or superior to conventional ICE engines, though a notable 30.99% remain undecided.

Adoption Barriers (The Mobility Gap)

High Upfront Purchase Price

High upfront purchase price compared to conventional petrol/diesel vehicles.

70 responses



Finding: 62.86% explicitly view higher initial acquisition costs as a key adoption barrier (75.71% including neutral/lean agreement).



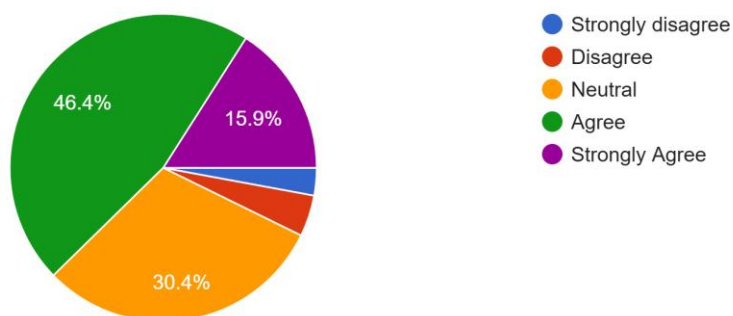
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Range Anxiety

Range anxiety (fear of running out of charge before reaching a destination).

69 responses

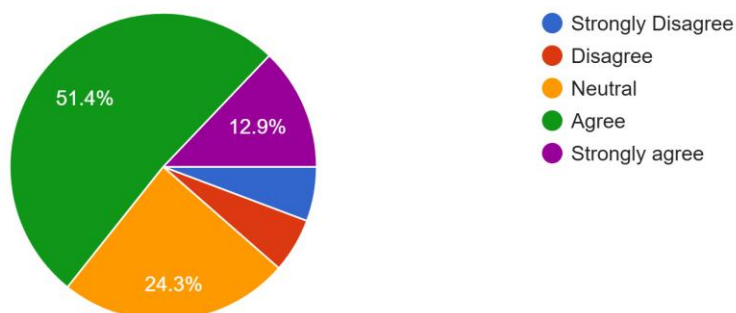


Finding: 62.32% identify fear of running out of power mid-transit as a major operational obstacle.

Inadequate Charging Infrastructure and Wait Times

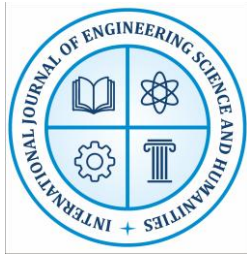
Inadequate public charging network and long charging wait times.

70 responses



Finding: 64.29% state public charging networks and prolonged queue times restrict their transition.

Resale Value Uncertainty and Secondary Market Risks

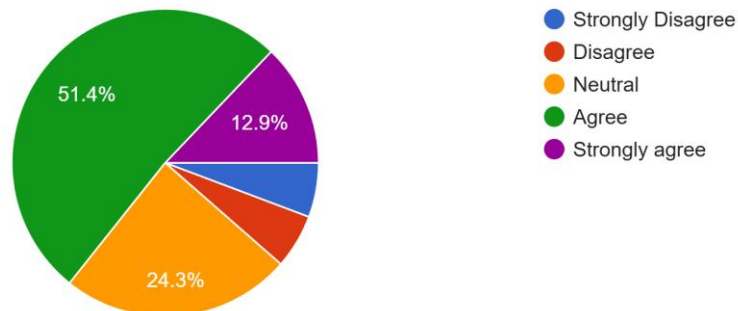


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Inadequate public charging network and long charging wait times.

70 responses

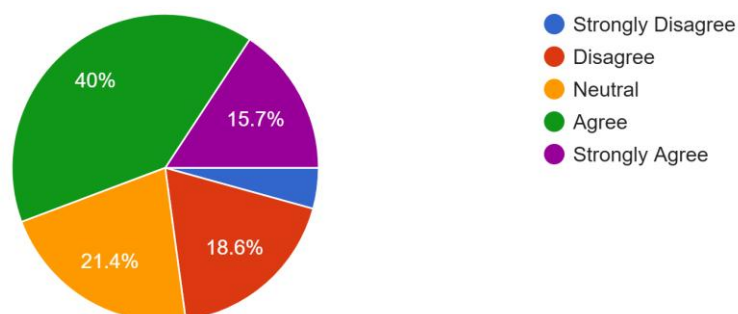


Finding: 55.71% cite secondary market depreciation and battery degradation uncertainty as adoption deterrents.

Home / Apartment Charging Limitations

Lack of home charging infrastructure (e.g., apartment complex limitations).

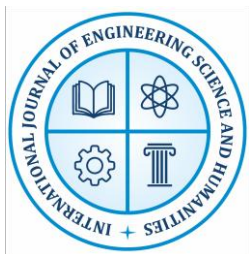
70 responses



Finding: 55.71% face logistical challenges installing personal chargers in residential properties.

Current Adoption Status & Future Intent

Current EV Ownership/Usage

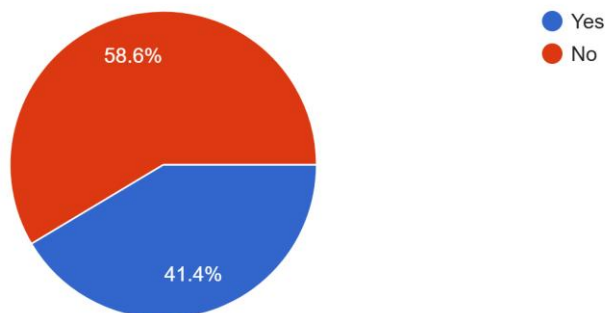


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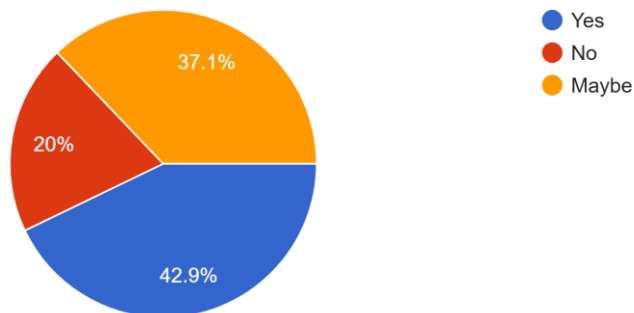
Do you currently own/use a low-emission vehicle?

70 responses

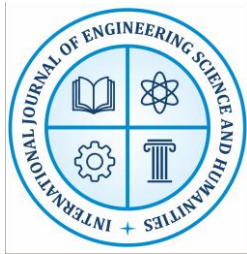


. Have you ever considered purchasing a low-emission vehicle?

70 responses



Finding: Over 80.00% display past or prospective consideration toward buying an EV.
Future Likelihood of Purchasing a Low-Emission Vehicle

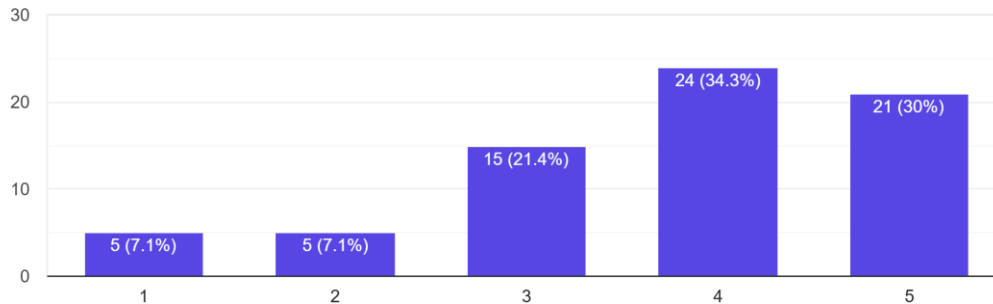


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How likely are you to purchase a low-emission vehicle in the future?

70 responses

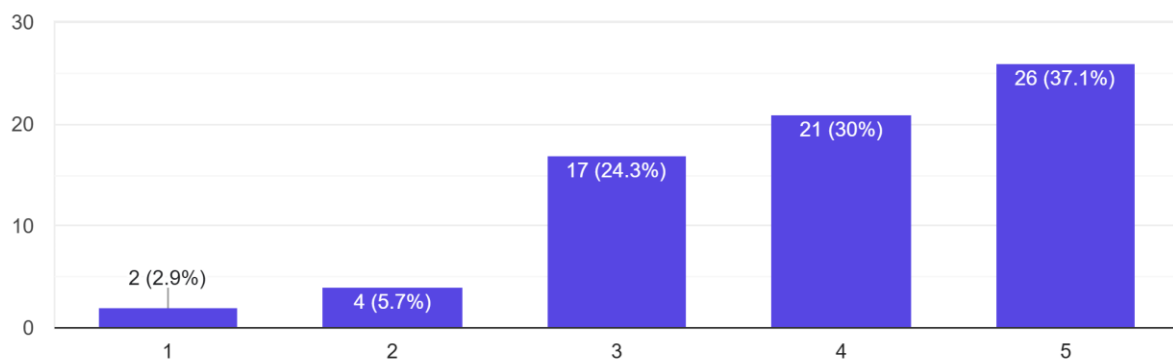


Finding: 64.29% demonstrate a high probability of purchasing an EV in future vehicle refresh cycles.

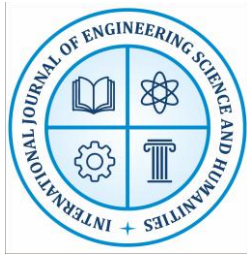
Sensitivity to Infrastructure Improvements and Price Drops

Q24. Better charging station and lower prices would increase my willingness to adopt a low-emission vehicle.

70 responses



Finding: 67.14% (\$n = 47\$) confirm that lower vehicle prices and faster charging stations directly drive adoption willingness.



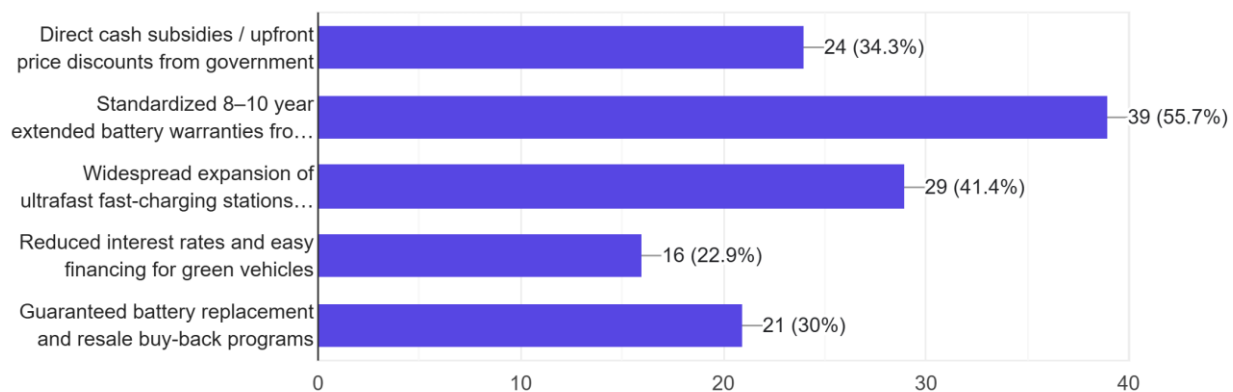
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Most Influential Interventions to Accelerate Adoption

Which of the following interventions would MOST influence you to make the switch? (Select up to 2):

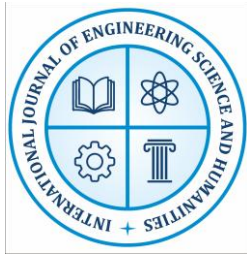
70 responses



Finding: Risk-mitigation features (long-term battery warranties at 55.71%) take precedence over immediate financial subsidies (34.29%).

Suggestions

1. **Improve public awareness:** Conduct targeted awareness campaigns explaining the environmental, economic, and health benefits of low-emission vehicles.
2. **Reduce purchase costs:** Provide subsidies, tax benefits, low-interest loans, and registration-fee reductions to make low-emission vehicles more affordable.
3. **Develop charging infrastructure:** Increase the number of reliable and accessible charging stations, particularly in residential areas, workplaces, highways, and rural locations.
4. **Strengthen policy support:** Governments should introduce clear long-term policies, stricter emission standards, and incentives for manufacturers and consumers.
5. **Improve consumer confidence:** Vehicle manufacturers should provide transparent information about battery life, maintenance costs, driving range, warranty coverage, and resale value.
6. **Address the awareness–adoption gap:** Since awareness does not necessarily lead to purchase, policies should focus not only on informing consumers but also on removing barriers such as high prices, limited infrastructure, and concerns about vehicle performance.



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7. **Encourage institutional adoption:** Government departments, companies, taxi services, and public transport operators should include low-emission vehicles in their fleets to increase visibility and public acceptance.

Conclusion

The study concludes that there is a noticeable gap between consumer awareness and the actual adoption of low-emission vehicles. Consumers are increasingly aware of electric and hybrid vehicles and their environmental benefits, but awareness does not always lead to actual purchase or usage. This indicates that having knowledge about green mobility is only the first step towards sustainable transportation.

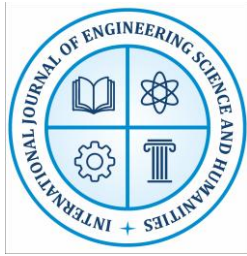
The study identifies several factors that may prevent consumers from converting their awareness and positive intentions into actual adoption. High initial purchase cost, inadequate charging infrastructure, limited availability of suitable vehicle models, maintenance concerns, battery-related issues, range anxiety, and uncertainty about long-term performance can influence consumers' purchasing decisions. Thus, economic and practical barriers remain important challenges to wider adoption.

The findings also suggest that government support and infrastructure development are important for reducing the green mobility gap. Financial incentives, affordable financing options, expansion of charging facilities, better after-sales services, and clear information about government schemes can increase consumer confidence and encourage adoption.

Overall, the study highlights that awareness alone is not sufficient to achieve green mobility. A coordinated approach involving government authorities, automobile manufacturers, financial institutions, and consumers is required. By reducing economic and infrastructural barriers and providing reliable information, the gap between awareness, purchase intention, and actual adoption can be reduced. Therefore, the successful transition towards low-emission mobility in Indore depends on creating an environment in which consumers can easily and confidently convert their awareness and intentions into actual sustainable transportation choices.

References

- Goel, S., Sharma, R., & Rathore, A. K. (2021). A review on barrier and challenges of electric vehicle in India and vehicle to grid optimisation. *Transportation Engineering*, 4, 100057.
- Jaiswal, D., Kaushal, V., Kant, R., & Singh, P. K. (2021). Consumer adoption intention for electric vehicles: Insights and evidence from Indian sustainable transportation. *Technological Forecasting and Social Change*, 173, 121089.
- Kaur, R., & Reen, T. K. (2026). Determinants of electric vehicle adoption: A PRISMA-based systematic review of consumer perceptions and behavioural intentions in the Indian context. *ShodhPrabandhan: Journal of Management Studies*, 3(2).



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- Khurana, A., Kumar, V. V. R., & Sidhpuria, M. (2020). A study on the adoption of electric vehicles in India: The mediating role of attitude. *Vision*, 24(1), 61–71.
- Kumar, R. R., & Alok, K. (2020). Adoption of electric vehicle: A literature review and prospects for sustainability. *Journal of Cleaner Production*, 253, 119911.
- Patel, M., Singh, R., Arora, P., & Mahapatra, D. (2024). EV adoption in India: Barriers and policy solutions from manufacturers' and consumers' perspectives. *Energy for Sustainable Development*, 101583.
- Tarei, P. K., Chand, P., & Gupta, H. (2021). Barriers to the adoption of electric vehicles: Evidence from India. *Journal of Cleaner Production*, 291, 125847.
- Yadav, R., & Yadav, R. (2024). Are consumers ready to adopt electric vehicles? Analyzing the barriers and motivators associated with electric vehicle adoption in India: Policy implications for various stakeholders. *Energy Policy*, 190, 114109.
- <https://vahan.parivahan.gov.in/>
- <https://heavyindustries.gov.in/>
- <https://powermin.gov.in/>
- <https://www.pib.gov.in/PressReleasePage.aspx?PRID=2151390>