An Awareness of Electric Vehicles for Sustainable Development in India

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Abstract
This article provides a exhaustive discussion on the impact of Electric Vehicles (EVs) on the environment, public health, and consumer behaviour. It emphasizes that EVs are an environmentally friendly alternative to traditional automobiles, which contribute significantly to greenhouse gas emissions and air pollution. By reducing these emissions, EVs can improve air quality, particularly in metropolitan areas, and promote sustainable mobility. The article also explores the health implications of vehicle emissions, noting that long-term exposure can reduce an individual's lifespan by up to ten years. In contrast, EVs, with no tailpipe emissions, help to mitigate this risk and improve overall air quality in the urban settlements, contributing to enhanced quality of life. However, the largescale adoption of EVs is not solely dependent on their environmental benefits; it also relies heavily on consumer awareness, perceptions, and purchase intentions. Consumer attitudes toward EVs influence their willingness to adopt these sustainable technologies. Thus, understanding these factors is vital for promoting EV adoption. The article concludes by highlighting the significance of government initiatives to raise public awareness about the advantages of EVs and to promote sustainable development. By addressing consumer concerns and educating the public about the benefits of EVs, governments can help accelerate the changeover to cleaner, more ecological transportation systems.

Keywords: Deterioration, Sustainable, EVs, Perceptions, Awareness, Transportations, Emission, Incentives

Introduction

The evolution from traditional Internal Combustion Engine (ICE) vehicles to Electric Vehicles (EVs) holds immense potential for reducing vehicular pollution, especially in a country like India that grapples with high levels of air pollution. Here are key advantages and state initiatives that are driving this shift:

Environmental Benefits

- No Exhaust Emissions: EVs do not emit harmful gases to environment like carbon dioxide (CO2) or nitrogen oxides (NOx), reducing air pollution and improving air quality.
- Cleaner Transportation: Since EVs can be powered by sources of renewable energy like solar and wind, they offer a pathway toward a more sustainable and cleaner energy future.

Government Incentives

Subsidies and Incentives

To support EV adoption, the government is offering a range of financial incentives:

- Tax Benefits: Buyers of EVs can claim tax rebates on loans for purchasing electric vehicles.
- Reduced Registration Fees: EVs often come with lower registration and road tax fees, making them more affordable.
- Infrastructure Development: Governments are investing in the development of charging stations and battery-swapping infrastructure to ease concerns about range anxiety.

Cost Competitiveness

- Lowering Upfront Costs: Manufacturers are introducing various strategies to eradicate the cost of EVs, including reducing the price of batteries-the most expensive component. In some cases, the initial purchase price of an EV may become comparable to that of a traditional ICE vehicle.
- Long-term Savings: Although the upfront cost may still be high in certain cases, the overall cost of ownership is lower due to reduced fuel expenses and minimal maintenance costs.

Thus, the above factors create a compelling case for transitioning to electric vehicles, especially in urban areas where pollution is a major concern.

Background

India's path to sustainable development is currently at a critical turning point. The nation, whose economy is among the fastest-growing and largest in the world, must strike a balance between environmental stewardship and economic progress. As EV use has grown globally, India has set high goals for EV penetration in order to overcome this obstacle. But with just 1.32% of registered vehicles in India being electric vehicles in FY 2021–2022, reaching the stated goal of 30% EVs by 2030 will require cooperation from the public, private, and consumer sectors. Adopting an ecosystem approach, in which all parties actively engage and make contributions, is essential to build an environment that is favourable and supportive of the expansion of the Electric Vehicle (EV) market in India. Through a thorough analysis of this methodology, we can unearth the motivations underlying India's Electric Vehicle (EV) revolution and investigate its capacity to influence India's sustainable trajectory. India's EV market is anticipated to grow quickly, making EV adoption there appear hopeful. Ten million electric vehicles are predicted to be sold yearly by 2030, with a projected 49% compound annual growth rate in the next few years. Sales of Electric Vehicles (EVs) are already rising sharply in states that have actively supported this transition with infrastructure and policy. In December 2022, Delhi reported that 16.8% of all vehicle sales were EVs, demonstrating an amazing 86% YoY growth.

India's target of 30% electric vehicles by 2030 can be met with the help of current regulations. A sizeable sum of INR 35,000 crore has been set aside in the 2023–24 budget for important capital projects that would help achieve the net-zero energy targets. Furthermore, an 80% increase in funding has been allocated to the FAME-II initiative, which offers incentives and subsidies to promote the use of electric vehicles. These programs show how dedicated the Indian government is to fostering EV adoption and building a sustainable future. In order to reduce car pollution in India, adopting electric vehicles is essential. To overcome obstacles and encourage the widespread use of electric vehicles, policymakers, corporations, and individuals must work together as the nation strives to meet its environmental goals. India is adopting greener and more sustainable modes of transportation. For its people, India has the potential to set an example for a healthier, cleaner, more sustainable, and pollution-free future.

Objectives and Methodology

The overall objective of the study is creating an awareness of Electric Vehicles for Sustainable Development in India. The specific objectives are - to study the growth and benefits of E -Vehicles in India and to analyse the policies of the Government in educating the people for the adoption of E -Vehicles in India.

The study is completely based on secondary sources such as from published literature. The information is also collected from reference books, various journals, government publications, Centre for Science, Technology and Policy Studies CSTEP, e-AMRIT, industry journals, periodicals, newspapers, magazines, annual reports of companies, statistical information etc., past research served as the basis for this investigation. A number of research articles that have been published and compiled online. Google, Google Scholar, news, websites, researches, journals and other sources were searched to obtain secondary data.

Result and Discussion

The ongoing COP 28 summit and its representations highlight how important the protection of environment in present world. There is an urgent need to dispel misunderstandings about range anxiety and charging infrastructure, as well as to educate the public about the advantages of electric vehicles, even while the EV sector awaits improved research and corporate involvement. In order to reduce pollution in India, adopting electric vehicles is essential. To overcome obstacles and encourage the widespread use of electric vehicles, policymakers, corporations, and individuals must work together as the nation strives to meet its environmental goals. India can set the stage for its population to live in a cleaner, healthier, more sustainable, and non-polluting future by adopting cleaner and sustainable transportation solutions.

Government Policies towards the adoption of EV's: In addition to having a good economic impact, the adoption of EVs will assist India in reaching its goal of net zero emissions by 2070. The government is adopting a number of actions to promote the industry's smooth expansion and help it reach the lofty goal of having EV sales penetration of 30% of private automobiles, 70% of commercial cars, 40% of buses, and 80% of two- and three-wheelers by 2030.

Faster Adoption and Manufacturing of (Hybrid and) Electric Vehicles (FAME) I, II:

Table 1 Incentives for Electric Vehicles

Sl. No.	Total Approximate Incentives	Approximate Size of Battery
1	Two-Wheeler: Rs.15000/-per kwh up to 40% of the cost of the vehicles	Two-Wheeler:2 kwh
2	Three-Wheeler: Rs.10000/-per kwh	Three-Wheeler:5 kwh
3	Four-Wheeler: Rs.10000/-per kwh	Four-Wheeler:15 kwh
4	E-Buses: Rs.20000/- per kwh	E-Buses:250 kwh
5	E-Trucks: Rs.20000/- per kwh	

Source: State Incentives for Electric Vehicles

- Production Linked Incentive (PLI) Scheme
- PLI Scheme for National Programme on Advanced Chemistry Cell
- Phased Manufacturing Programme (PMP)
- National Mission on Transformative Mobility and Storage
- E-Amrit: Accelerated e-mobility Revolution for India's Transportation: Measures taken to create awareness about the adoption of EV's in India.

Need to Drive EV Adoption in India

Lower Running Costs: Electric Vehicles (EVs) offer significantly lower running costs compared to gasoline or diesel-powered vehicles. Rather than relying on fossil fuels, EVs run on electricity, making charging more cost-effective than filling up with fuel. When charged with renewable energy, such as from solar panels, the environmental impact and electricity costs are reduced even further.

Low Maintenance Costs: EVs have fewer moving parts than internal combustion engine vehicles, resulting in lower maintenance requirements and costs. Unlike traditional vehicles, which require regular oil changes and engine maintenance, EVs are simpler to maintain.

Zero Tailpipe Emissions: EVs produce no tailpipe emissions, which helps to reduce overall carbon footprints. When powered by renewable energy, the environmental impact is minimized further, promoting cleaner, more sustainable driving.

Tax and Financial Benefits: Government incentives such as lower registration fees and road taxes make purchasing EVs more financially attractive compared to traditional gasoline or diesel vehicles.

Environmental Impact of Fossil Fuels: Gasoline and diesel usage contributes significantly to environmental degradation and public health concerns. In contrast, EVs have much lower emissions, with higher energy efficiency-EVs can convert up to 60% of grid energy to power, while gasoline vehicles waste nearly 80% of the energy contained in fuel.

Quiet and Easy Operation: EVs are quiet and simple to operate, with no gears to manage. Driving an EV involves only steering, braking, and accelerating. Charging is also convenient-whether at home or through public charging stations-and reduces noise pollution.

Convenience of Home Charging: Avoid the hassle of gas stations by charging your EV at home. Simply plug in your car overnight or a few hours before you need to drive. Fast chargers and battery-swapping services for two-wheelers provide additional flexibility for on-the-go charging.

Reasons for Lack of Customer Awareness

Lack of Proper Communication: The benefits of EVs are not widely publicized, leading to limited awareness about their advantages. Increased exposure through media and government efforts is necessary to boost consumer understanding.

Lack of Familiarity with EV Technology: Many potential buyers are unfamiliar with EV technology, believing that EVs are less cost-effective and harder to maintain. This misconception, combined with a lack of knowledge about available models and incentives, hampers adoption.

Lack of Knowledge: Consumers' willingness to adopt EVs is closely tied to their level of knowledge. The more people understand the advantages of EVs, the more likely they are to consider purchasing one.

Ways to Increase Customer Awareness

Create a Robust EV Ecosystem: A well-developed EV infrastructure, including more charging stations, is key to encouraging EV adoption. Highlighting the long-term financial benefits of EV ownership-lower operating and insurance costs-can motivate consumers to switch.

Organize Public Awareness Events: Public events like EV exhibitions, test drives, and demonstrations are effective ways to familiarize consumers with EVs. Increasing exposure through fleet usage and media coverage can help create a broader understanding of the technology.

Recognition and Awards: Recognizing and rewarding organizations and individuals promoting EV adoption can further raise awareness and encourage others to embrace electric mobility.

Your write-up on government efforts to spread Electric Vehicle (EV) awareness in India is comprehensive and covers several key initiatives and campaigns. Here's a refined version that emphasizes the significance of these efforts and provides a clearer flow:

Government Efforts to Spread EV Awareness

1. Adoption of Electric Vehicles in Schools: Schools have a pivotal role in setting an example for sustainable practices. By adopting electric buses, schools can benefit from lower fuel and maintenance costs while significantly reducing air pollution. This initiative not only promotes a healthier environment for students but also instills environmentally conscious values in future generations.
2. "GO Electric" Campaign: Launched in February 2021, the national "GO Electric" campaign aims to raise awareness about the benefits of electric mobility and clean energy solutions, including EV charging infrastructure. Through public events, educational materials, and industry exhibits, this campaign seeks to demystify EV technology and encourage widespread adoption across the country.
3. The Shoonya Campaign: The "Shoonya – Zero Pollution Mobility" campaign, administered by NITI Aayog and supported by over 130 corporate partners, aims to enhance air quality in India by promoting the use of electric vehicles (EVs) for ride-hailing and delivery services. The term "Shoonya," meaning zero in Sanskrit, signifies a new beginning toward zero-emission vehicles. This campaign not only raises consumer awareness but also highlights industry efforts while striving for 100% electrification in urban delivery services.
4. Tata Motors' "Never Been to EVergreen" Campaign: On World EV Day, Tata Motors launched the "Never Been to EVergreen" campaign, emphasizing the importance of creating an 'EVergreen Bharat' through sustainable mobility solutions. This campaign focuses on fostering a culture of electric vehicle adoption and sustainability.
5. The Panchamrit Framework: The five principles of "Panchamrit" — sustainability, adaptability, efficiency, inclusivity, and synergy-resonate deeply with the need for EV adoption. These principles align with India's global commitment to combating climate change, underscoring the urgency of transitioning to cleaner transportation modes.

Conclusion

The market for electric vehicles in India is still in its beginning state, presenting both challenges and opportunities. A comprehensive understanding of consumer needs and preferences can help overcome barriers to EV adoption. Therefore, it is crucial to disseminate awareness of electric vehicles, including cost-benefit analyses, available infrastructure, charging options, and the various models currently on the utility. Public awareness campaigns play a magnificent role in correcting misunderstandings, debunking myths, and emphasizing the long-term advantages of EV adoption helps both the economy as well as the environment. Supporting these campaigns through seminars, media initiatives, and community involvement can significantly enhance public knowledge. The core objective of the EV revolution is the pursuit of sustainability. EVs hold the promise of substantially reducing carbon emissions, improving air quality, and conserving natural resources. By embracing electric mobility, India can meaningfully contribute to global climate change efforts. The journey toward widespread EV adoption requires a collaborative approach from all stakeholders in the e-mobility ecosystem. Through innovation, collaboration, and strategic initiatives, we can accelerate the transition to electric mobility in alignment with sustainability goals.

In conclusion, transitioning to electric vehicles is not just a technological shift; it represents a significant movement toward a cleaner, healthier, and more sustainable future. As India faces the challenges of vehicular pollution and environmental degradation, adopting EVs offers a unique opportunity to redefine our transportation landscape. By collectively embracing electric mobility, we can reduce our carbon footprint, improve air quality, and cultivate a culture of sustainability for future generations. Now is the time to drive change, foster innovation, and lead the world toward a greener future-one electric vehicle at a time.

References

1. Adhikari, M., et al. (2020). Identification and Analysis of Barriers against Electric Vehicle Use. Sustainability, 12(12), 4850.
2. Adnan, N., et al. (2017). A comprehensive review on theoretical framework based electric vehicle consumer adoption research. International Journal of Energy Research, 41(3), 317-335.
3. Bansal, P., et al. (2021). Willingness to Pay and Attitudinal Preferences of Indian Consumers for Electric Vehicles. arXiv preprint, arXiv:2101.08008.
4. Bansal, P., & Kockelman, K.M. (2017). Indian Vehicle Ownership: Insights from Literature Review, Expert Interviews, and State-Level Model. Journal of the Transportation Research Forum, 56(2).
5. Bhalla, P., et al. (2018). A study of consumer perception and purchase intention of electric vehicles. European Journal of Scientific Research, 149(4), 362-368.
6. Davis, F.D., et al. (1989). User acceptance of computer technology: A comparison of two theoretical models. Management Science, 35(8), 982–1003.
7. Digalwar, A.K., & Giridhar, G. (2015). Interpretive structural modeling approach for development of electric vehicle market in India. Procedia CIRP, 26, 40-45.
8. Kumar, R., et al. (2020). Addressing the challenges to electric vehicle adoption via sharing economy: an Indian perspective. Management of Environmental Quality, 32(1), 82-99.
9. Kumar, A., et al. (2018). Commercial viability of electric vehicles in India. International Journal of Mechanical Engineering and Technology, 9(6), 730-745.
10. Motwani, D.B., & Patil, A. (2019). Customer Buying Intention towards Electric Vehicle in India. International Journal of Mechanical Engineering and Technology, 10(5), 391-398.
11. Mukherjee, S.C., & Ryan, L. (2020). Factors influencing early battery electric vehicle adoption in Ireland. Renewable and Sustainable Energy Reviews, 118, 109504.
12. Navalagund, N., et al. (2020). Factors influencing purchase intention towards E-vehicles among the Potential Indian consumers-A study on Karnataka region. Journal of the Social Sciences, 48(3), 1598-1616.