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# A Study on Government Initiatives Promoting Green Mobility in The Two Wheeler Industry in India

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**Abstract**

The two-wheeler industry in India has seen rapid growth in recent years, contributing significantly to both economic development and environmental challenges. Amid growing concerns over air pollution, fuel consumption, and climate change, the Indian government has introduced a range of initiatives to promote green mobility within the two-wheeler sector. This study explores the key policies, incentives, and technological advancements driving the transition toward sustainable mobility in the industry. By analyzing government initiatives such as subsidies for electric two-wheelers, the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) schemes, and the National Electric Mobility Mission Plan (NEMMP), the paper assesses their impact on market trends, consumer behavior, and industry growth. The findings indicate a strong shift toward electric vehicles (EVs), driven by regulatory frameworks, financial incentives, and evolving consumer preferences. Furthermore, the study identifies the challenges and opportunities in scaling up green mobility solutions, including infrastructure development, affordability, and consumer awareness. This research contributes valuable insights into the evolving landscape of green mobility in India's two-wheeler industry and provides recommendations for enhancing the effectiveness of government policies.

**Keywords:** *Green mobility, Two-wheeler industry, Government initiatives, Electric vehicles, Sustainable transportation, Environmental policies.*

## 1. Introduction

As a response to increasing environmental issues and the urgency of sustainable development, green mobility has become a critical solution within the transport industry. Green mobility is defined as environmentally friendly transportation systems that make use of electric vehicles (EVs), hybrid



vehicles, and alternative fuels in order to reduce pollution and carbon emissions. The transition is extremely important for India, where quick urbanization and increasing car ownership have been primarily responsible for deteriorating the environment. Realizing this challenge, the Indian government has been actively encouraging green mobility through several policies and incentives to promote EV adoption (NITI Aayog, 2020).[1]

The two-wheeler sector dominates India's transport sector. Being the largest two-wheeler market in the world, India has seen more than 15 million two-wheeler sales during 2022-23, evidence of its huge impact on mobility in urban and rural areas (SIAM, 2023).[2] Nevertheless, this mass usage has also introduced high levels of air pollution. Studies show that two-wheelers account for almost 30% of vehicle emissions in urban cities, which is a serious environmental and public health hazard (TERI, 2021).[3] Therefore, the encouragement of electric two-wheelers has emerged as a priority area for policymakers.

To ease this transition, the government of India launched the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) initiative in 2015. During FAME I, incentives were offered to buyers of EVs, manufacturers, and infrastructure providers, enhancing market penetration. FAME II was launched in 2019 with an increased budget of ₹9,745 crore to further promote EV adoption. This stage focused on electric two-wheelers by providing subsidies on the basis of the battery capacity to make them affordable to customers **(**Ministry of Heavy Industries, 2019).[4] Further, lowering the GST rate on EVs from 12% to 5% encouraged the buyers as well (Central Board of Indirect Taxes and Customs, 2019).

State governments have also introduced policies to complement these national-level efforts. For instance, Delhi's EV Policy 2020 provided financial incentives to electric two-wheeler buyers and promoted charging infrastructure in public spaces (Delhi EV Policy, 2020).[5] Similarly, Maharashtra's EV Policy 2021 focused on reducing the upfront cost of EVs while expanding battery-swapping facilities and charging stations (Maharashtra EV Policy, 2021).[6] Moreover, NITI Aayog's National Electric Mobility Mission Plan (NEMMP) has been pivotal in formulating India's long-term EV plan to position the nation as a world leader in electric vehicle production (NITI Aayog, 2017).

[1] NITI Aayog. (2020). *Advancing Green Mobility in India: Policy Recommendations*. Retrieved from www.niti.gov.in

[2] Society of Indian Automobile Manufacturers (SIAM). (2023). *Annual Report 2022-23*. Retrieved from www.siam.in

[3] The Energy and Resources Institute (TERI). (2021). *Urban Air Pollution and Vehicular Emission Study*. Retrieved from www.teriin.org

[4] Ministry of Heavy Industries. (2015). *FAME India Scheme*. Retrieved from www.mhi.gov.in

[5] Government of Delhi. (2020). *Delhi Electric Vehicle Policy*. Retrieved from www.delhi.gov.in

[6] Government of Maharashtra. (2021). *Maharashtra Electric Vehicle Policy*. Retrieved from www.maharashtra.gov.in

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The current study seeks to measure the impact of these government initiatives in popularizing electric two-wheelers in India. Using secondary data, the study will assess the incentives, policy framework, and the resulting industry reactions' impact on the adoption trend of EVs. The study will also discuss primary challenges such as charging infrastructure availability, gaps in consumer awareness, and cost.

The scope of this study is restricted to the analysis of government-initiated programs and their effect on India's two-wheeler market. Technological innovations and private investment are significant but outside the core area of this research. However, the conclusions will offer an understanding of India's changing green mobility ecosystem and provide suggestions for enhancing future policies and enhancing EV adoption rates.

## 2. Review of Literature

The use of electric vehicles (EVs) in India has been extensively debated in the academic literature, with special focus on government policies, green issues, and consumer behavior. The current studies emphasize the contributions of financial incentives, policy interventions, and technology advancements towards promoting EV uptake.

A number of studies have highlighted government support as key to green mobility growth. India's EV market, Mukherjee and Chakraborty (2021) [7] report, has made considerable strides mainly because of incentive-based schemes such as FAME I and FAME II that have minimized the cost burden on the consumer. The authors point out that subsidies on electric two-wheelers have lowered their costs, especially among middle-income consumers in cities. In addition, Gupta et al. (2020) [8] emphasized infrastructure development under FAME II and indicated that it has enhanced customer confidence in choosing EVs as a result of installing public charging points.

Studies also indicate the environmental advantages of shifting to green mobility. A study by Sharma and Verma (2022)[9] approximated that the mass adoption of EVs in the two-wheeler market would cut vehicular carbon emissions by as much as 30% by 2030. The transition is also in line with India's promise to become a net-zero carbon economy by 2070, as pledged at the COP26 Summit.

[7] Mukherjee, A., & Chakraborty, S. (2021). *Impact of Government Incentives on Electric Vehicle Adoption in India*. *Energy Policy Journal*, 49(3), 231-245.

[8] Gupta, R., Singh, K., & Mehta, P. (2020). *Infrastructure Challenges in EV Adoption under FAME II Scheme*. *Journal of Renewable Energy Studies*, 35(2), 150-168.

[9] Sharma, R., & Verma, M. (2022). *Carbon Emission Reduction through Electric Mobility in India: A Study on Two-Wheelers*. *Indian Journal of Environmental Science*, 41(1), 95-108.

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Consumer behavior research has identified some of the major drivers of EV adoption. Affordability, battery life, and charging ease are essential drivers in the buying decision of electric two-wheelers, as reported by Rana and Kapoor (2021).[10] The research concluded that although green awareness motivates certain consumers, cost savings from reduced fuel and maintenance expenses are more compelling drivers.

State-specific studies have also shed light on regional EV adoption patterns. For example, research by Singh et al. (2023)[11] on Delhi's EV Policy 2020 found that targeted incentives for electric two-wheelers significantly increased sales in the city. Similarly, a study on Maharashtra's EV Policy 2021 by Deshmukh (2022)[12] reported a surge in electric two-wheeler registrations, attributed to the combined effect of purchase subsidies and road tax exemptions.

Nonetheless, issues remain amid these encouraging advancements. Research by authors such as Jain and Prasad (2020)[13] have determined significant barriers to include lack of charging facilities, battery waste management issues, and low customer awareness. If unresolved, such challenges may stifle the EV market's development.

Although there is a large body of literature on EV adoption in India, there is still a research gap in assessing the long-term effect of government incentives on the two-wheeler segment. This research seeks to bridge that gap by examining the effectiveness of these programs, determining the major challenges, and suggesting ways for better implementation.

## 3. Research Methodology

This research employs a descriptive and analytical study design rooted in secondary data to assess the role of government policies in facilitating green mobility in India's two-wheeler sector. Secondary data has been selected as the main methodology because of the availability of detailed reports, official statistics, and scholarly research on EV trend of adoption, policy impacts, and consumer trends.

[10] Rana, A., & Kapoor, D. (2021). *Factors Influencing Consumer Preferences for Electric Two-Wheelers in India*. *Journal of Consumer Research in Emerging Markets*, 12(4), 78-93.

[11] Singh, P., Kumar, R., & Sharma, N. (2023). *Analyzing the Impact of Delhi's EV Policy on Two-Wheeler Sales*. *Delhi Journal of Policy Analysis*, 18(1), 34-52.

[12] Deshmukh, R. (2022). *Evaluating Maharashtra's EV Policy and Its Impact on Two-Wheeler Registrations*. *Journal of Energy and Mobility Research*, 15(3), 210-228

[13] Jain, S., & Prasad, V. (2020). *Barriers to Electric Vehicle Adoption in India: A Critical Analysis*. *Indian Journal of Transportation Studies*, 28(2), 101-125.

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### 3.1 Research Design

The study adopts a descriptive design, with the objective of describing the impact of government policies on the uptake of EVs, and an analytical method for evaluating the effectiveness of these efforts. Through an integration of the two, the study investigates the expansion of electric two-wheelers in terms of government incentives, subsidies, and infrastructure development.

### 3.2 Sources of Data Collection

The research is based solely on secondary data collected from reliable sources including:

- ✓ **Government Reports and Official Websites:** Ministry of Heavy Industries, NITI Aayog, and Central Board of Indirect Taxes and Customs (CBIC) will be utilized to examine policy information, financial incentives, and EV adoption patterns.
- ✓ **Industry Reports:** Reports from the likes of the Society of Indian Automobile Manufacturers (SIAM) and the Federation of Automobile Dealers Associations (FADA) will offer information on EV sales data, market trends, and consumer insights.
- ✓ **Research Papers and Academic Journals:** Peer-reviewed research on green mobility, government policies, and electric vehicle uptake will complement the analysis.
- ✓ **Media Reports and News Portals:** Credible media outlets will provide news on recent policy developments, technological breakthroughs, and market reactions.

### 3.3 Data Analysis Methods

The data collected will be analyzed with the following methods:

- ❖ **Trend Analysis:** The technique will compare changes in EV adoption trends in the last ten years, especially against significant programs such as FAME I, FAME II, and state policies.
- ❖ **Comparative Analysis:** Comparative analysis will be conducted on EV adoption rates between states with active policies and states with low incentives. This will determine the impact of state-level interventions.
- ❖ **Impact Assessment:** Through an analysis of sales growth statistics, price cuts, and charging infrastructure increases, the study will assess the direct effect of government incentives in boosting electric two-wheelers.

### 3.4 Scope and Limitations

The research is confined to analyzing the impact of government efforts on the Indian two-wheeler market. It does not study the effect on four-wheelers, commercial vehicles, or hybrids. Moreover, secondary data provides rich information, yet it might be plagued with issues like data discrepancies or old facts. Attempts will be made to base the research on the latest and authentic sources to provide accurate results.



This approach to methodology will seek to provide a holistic interpretation of how the policy framework of India has affected the development of green mobility within the two-wheeler market. Through synthesizing information from various sources, the research aims to present well-balanced inputs and actionable advice for enhancing the rate of adoption of EVs in India.

## 4. Data Analysis

The proactive measures of the Indian government to enhance green mobility have had a huge impact on the two-wheeler market. A study of the data provided shows evident trends in EV adoption, market growth, and customer behavior. The section discusses the effect of large-scale government schemes, state incentives, and problems encountered during the shift to electric two-wheelers.

### 4.1 Impact of National-Level Policies

The Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) program has been a key contributor to EV uptake. During FAME I (2015-2019), the Indian government provided ₹895 crore towards demand incentives for the purchase of EVs, the development of infrastructure, and pilot studies. As per the Ministry of Heavy Industries (MHI) data, by the end of FAME I, almost 2.8 lakh EVs were sold in India, with electric two-wheelers contributing to more than 90% of overall EV sales (MHI, 2019).[14]

The launch of FAME II in 2019 with a higher budget of ₹9,745 crore spurred the growth of electric two-wheelers. This phase focused on battery-powered vehicles by providing a subsidy of ₹15,000 per kWh, bringing down the initial purchase price. Consequently, sales of electric two-wheelers saw a 300% growth from 2020 to 2023 (SIAM, 2023).[15] Moreover, the lowering of GST on EVs from 12% to 5% helped spur consumer demand by reducing prices (CBIC, 2019).[16]

### 4.2 State Initiatives and Regional Development

A number of state governments rolled out their own EV policies to supplement national initiatives. As an example, in the Delhi EV Policy (2020), consumers received incentives of up to ₹30,000 on electric two-wheelers, in addition to scrappage incentives for aged vehicles. The policy led to a 200% increase in electric two-wheeler registrations in Delhi during the first year (Delhi Government, 2021).[17]

[14] Ministry of Heavy Industries. (2019). *FAME India Scheme (Phase I) Report*. Retrieved from www.mhi.gov.in

[15] Society of Indian Automobile Manufacturers (SIAM). (2023). *EV Market Analysis Report 2022-23*. Retrieved from www.siam.in

[16] Central Board of Indirect Taxes and Customs (CBIC). (2019). *GST Notification No. 12/2019 - Reduction of GST on Electric Vehicles*. Retrieved from www.cbic.gov.in

[17] Government of Delhi. (2021). *Delhi Electric Vehicle Policy Progress Report*. Retrieved from www.delhi.gov.in

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Likewise, Maharashtra's EV Policy 2021 provided incentives of up to ₹25,000 on electric two-wheelers with an emphasis on increasing charging infrastructure. Consequently, Maharashtra witnessed a 180% growth in EV sales in two years (Maharashtra Government, 2022).[18] Tamil Nadu, Karnataka, and Gujarat also saw significant growth, indicating the positive impact of localized incentives.

### 4.3 Growth in Electric Two-Wheeler Market

The Indian electric two-wheeler sector has witnessed consistent growth since the launch of these initiatives. FADA (2023) states that electric two-wheeler sales were at 8.46 lakh units in 2023, whereas in 2020, it was 1.52 lakh units. The increase is due to enhanced affordability, increased charging infrastructure, and increasing environmental concerns.

The key players like Ola Electric, Ather Energy, and Hero Electric have taken advantage of these incentives to grow their product line. For example, Ola Electric's launch of the Ola S1 with affordable pricing and government incentives led to historic sales in 2023.

### 4.4 EV Adoption Challenges

Challenges exist even with favorable growth trends. Lack of a wide charging infrastructure remains a major hurdle, especially in rural and semi-urban regions. India has only 7,000 public charging points at present, as per the Energy and Resources Institute (TERI), which is not sufficient for mass EV adoption (TERI, 2023).[19]

Affordability issues still remain, particularly among low-income communities. Although subsidies have minimized up-front costs, the exorbitant cost of EV batteries is still a stumbling block. Furthermore, consumer uncertainty over battery life, maintenance charges, and inadequate information on government incentives has deterred take-up in some areas.

### 4.5 Key Trends and Observations

- **Urban vs. Rural Divide:** EV adoption remains greater in metropolitan cities because of superior infrastructure, while rural sections still depend intensely on traditional two-wheelers.
- **Consumer Preferences:** Consumers' demand for affordable electric scooters with a longer battery lifespan has increased strongly.

[18] Government of Maharashtra. (2022). *Maharashtra Electric Vehicle Policy Report*. Retrieved from www.maharashtra.gov.in

[19] The Energy and Resources Institute (TERI). (2023). *India's EV Charging Infrastructure Study*. Retrieved from www.teriin.org

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- **Environmental Impact:** Research has depicted a 20-25% decline in city vehicle emissions within regions with excellent EV adoption, enhancing air quality and lowering carbon footprints (Sharma & Verma, 2022).[20]

## 5. Findings and Recommendations

The study of government programs encouraging green mobility in the two-wheeler sector finds noteworthy advancements and continuing challenges. This section outlines important findings derived from the data analysis and provides actionable suggestions to fill gaps and boost EV adoption in India.

### 5.1 Key Findings

**1. Positive Impact of Government Incentives:** Government policies such as FAME I and FAME II have been instrumental in propelling EV uptake. The subsidy regime under FAME II, offering ₹15,000 per kWh, has actually lowered the cost of purchase of electric two-wheelers, leading to a 300% rise in EV sales from 2020 to 2023 (SIAM, 2023). Furthermore, the 5% GST levy on EVs has helped make electric two-wheelers more affordable for customers (CBIC, 2019).[21]

**2. Regional Disparities in EV Adoption:** While states like Delhi, Maharashtra, and Tamil Nadu have seen remarkable growth due to proactive policies, other regions have lagged behind. For instance, Delhi's targeted incentives under the Delhi EV Policy 2020 boosted EV registrations by 200% in the first year (Delhi Government, 2021). Conversely, adoption rates in states with minimal policy interventions remained significantly lower (Singh et al., 2023).[22]

**3. Infrastructure Gaps Remain a Key Barrier:** Even with increasing EV adoption, India's charging network is underdeveloped. According to the Energy and Resources Institute (TERI), India only had 7,000 public charging points in 2023, which is not enough to enable mass adoption of EVs (TERI, 2023). The shortage of charging points, particularly in rural India, still discourages consumers from shifting to electric two-wheelers.

**4. Affordability Issues for Low-Income Segments:** Though subsidies have lowered initial purchase prices, the cost of EV batteries is still a concern. Battery prices account for almost 40% of the overall vehicle price, according to Mukherjee and Chakraborty (2021),[23] making EVs less affordable for price-sensitive customers.

[20] Sharma, R., & Verma, M. (2022). *Carbon Emission Reduction through Electric Mobility in India: A Study on Two-Wheelers*. *Indian Journal of Environmental Science*, 41(1), 95-108.

[21] Central Board of Indirect Taxes and Customs (CBIC). (2019). *GST Notification No. 12/2019 - Reduction of GST on Electric Vehicles*. Retrieved from www.cbic.gov.in

[22] Singh, P., Kumar, R., & Sharma, N. (2023). *Analyzing the Impact of Delhi's EV Policy on Two-Wheeler Sales*. *Delhi Journal of Policy Analysis*, 18(1), 34-52.

[23] Mukherjee, A., & Chakraborty, S. (2021). *Impact of Government Incentives on Electric Vehicle Adoption in India*. *Energy Policy Journal*, 49(3), 231-245.

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**5. Consumer Awareness and Perception Issues:** Even after repeated government campaigns, there is a lack of knowledge regarding EV advantages, maintenance, and incentives. A study conducted by Rana and Kapoor (2021)[24] revealed that close to 45% of the prospective buyers had no knowledge of available EV subsidies and tax credits.

### 5.2 Recommendations

**1. Augmented Awareness Campaigns:** As a solution for consumer reluctance, the government ought to introduce focussed campaigns that highlight EV advantages, available subsidy, and savings in the long run. Efforts through schooling institutions, municipalities, and internet platforms will augment outreach, primarily in rural belts.

**2. Charging Infrastructure Extension:** Expanding charging stations, especially in tier-2 and tier-3 cities, is of essence. Incentivizing private players for investments in charging facilities can be encouraged by the government, favoring battery-swapping stations for better convenience (TERI, 2023).[25]

**3. Battery Cost Reduction Strategies:** Encouraging indigenous production of lithium-ion batteries can bring down import dependence and battery prices. Programs like the Production-Linked Incentive (PLI) Scheme for manufacturing batteries need to be scaled up to enhance cost-effectiveness (NITI Aayog, 2022).[26]

**4. Tailored Incentives for Rural Areas:** While steady growth in urban EV adoption is being witnessed, rural areas need tailor-made incentives. Providing greater subsidies on EV buying in rural districts and marketing affordable electricity models can enhance adoption.

**5. Policy Simplification and Consistency:** Simplifying EV policies between states will enhance consumer trust. Having a consistent EV incentive policy can eliminate confusion over eligibility, incentives, and benefits of purchase.

**6. Promotion of Local Startups and Manufacturers:** Promoting local EV manufacturers to create affordable two-wheelers will increase market penetration. Financial assistance to EV startups can foster innovation and decline reliance on overseas vendors.

[24] Rana, A., & Kapoor, D. (2021). *Factors Influencing Consumer Preferences for Electric Two-Wheelers in India*. *Journal of Consumer Research in Emerging Markets*, 12(4), 78-93.
[25] The Energy and Resources Institute (TERI). (2023). *India's EV Charging Infrastructure Study*. Retrieved from www.teriin.org
[26] NITI Aayog. (2022). *Production-Linked Incentive (PLI) Scheme for Advanced Chemistry Cell (ACC) Battery Storage*. Retrieved from www.niti.gov.in

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## Conclusion

Proactive measures by the Indian government have been instrumental in driving electric two-wheeler uptake. Despite major strides, bridging infrastructure gaps, reducing costs, and increasing consumer knowledge are critical for long-term growth. Through well-designed solutions, India can reach its green mobility aspirations and drive environmental sustainability globally.

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9. Sharma, R., & Verma, M. (2022). *Carbon Emission Reduction through Electric Mobility in India: A Study on Two-Wheelers*. *Indian Journal of Environmental Science*, 41(1), 95-108.
10. Rana, A., & Kapoor, D. (2021). *Factors Influencing Consumer Preferences for Electric Two-Wheelers in India*. *Journal of Consumer Research in Emerging Markets*, 12(4), 78-93.
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16. Government of Delhi. (2021). *Delhi Electric Vehicle Policy Progress Report*. Retrieved from www.delhi.gov.in

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17. Government of Maharashtra. (2022). *Maharashtra Electric Vehicle Policy Report*. Retrieved from www.maharashtra.gov.in
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20. NITI Aayog. (2022). *Production-Linked Incentive (PLI) Scheme for Advanced Chemistry Cell (ACC) Battery Storage*. Retrieved from www.niti.gov.in