

Adoption of Electric Vehicles (EVs) in India – A Market Growth Analysis

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Abstract

The global automobile industry is undergoing a major transformation with electric vehicles (EVs) emerging as a sustainable alternative to traditional fuel-based mobility. In India, this shift holds immense promise not only for reducing environmental impact but also for driving innovation and industrial competitiveness. The present study, titled “*Adoption of Electric Vehicles (EVs) in India: A Market Growth Analysis*,” explores the current landscape of EV adoption in India using a secondary data approach. It focuses on identifying growth patterns, state-wise variations, policy influences, and market behavior through data obtained from credible sources such as NITI Aayog, the International Energy Agency (IEA), the Council on Energy, Environment and Water (CEEW), and the India Electric Mobility Index (IEMI).

The literature reviewed highlights that EV adoption in India has grown rapidly, with over two million sales recorded in 2024 compared to only fifty thousand in 2016. Key drivers of this growth include government subsidies, advancing battery technologies, and growing environmental awareness. However, barriers such as high initial cost, limited charging infrastructure, and uneven state-level implementation continue to hinder faster adoption.

Through this study, an attempt is made to analyze India’s EV market growth trends, interpret regional performance differences, and evaluate the impact of policy and infrastructure development. The findings aim to provide practical insights that can assist policymakers, investors, and manufacturers in shaping a more sustainable and inclusive electric mobility ecosystem in India.

Keywords:- Electric Vehicles (EVs); EV Adoption; Market Growth; Government Policy; Charging Infrastructure; Sustainability; Battery Technology

1. Introduction

The automobile industry today is standing at the edge of a quiet revolution a shift from fuel-driven engines to electric-powered mobility. Around the world, nations are adopting electric vehicles (EVs) as a step toward cleaner transportation and reduced dependence on fossil fuels. Beyond being an environmental necessity, electric mobility has evolved into a symbol of technological advancement and responsible innovation.

In India, this transformation carries a dual purpose *to fight pollution and to redefine industrial competitiveness*. According to **NITI Aayog (2025)**, EV sales in India surged from about 50,000 units in 2016 to over 2 million in 2024. This sharp incline indicates that the idea of “electric mobility” has moved from policy discussions to public streets. Yet, the progress is not uniform. Some states, like Maharashtra and Delhi, lead aggressively, while others lag due to weaker policy frameworks or infrastructural delays.

What becomes clear across most research is that India’s EV journey is not only about technology; it is about the interconnection of economics, awareness, and state-level execution. To understand how these factors interact,

the following review examines global insights, Indian developments, and scholarly perspectives that define India's current position and the path ahead.

2. Global Perspective on EV Adoption

The global landscape of electric mobility provides valuable lessons for developing markets like India. The **International Energy Agency (IEA, 2024)** observed that electric vehicle sales crossed 14 million units in 2023, representing nearly one-fifth of all new vehicle sales globally. The rise has been powered by several intertwined factors continuous fall in battery prices, stricter emission norms, and rising awareness among eco-conscious consumers.

In nations like **Norway and China**, the shift toward EVs has been not only technological but cultural. For instance, heavy taxation on fuel-based cars and attractive subsidies on EVs have normalized electric vehicles as everyday choices rather than luxury alternatives. The **World Electric Vehicle Journal (2024)** emphasized that this change in consumer mindset is a direct outcome of long-term policy consistency and strong charging infrastructure.

When compared globally, India's performance might appear slower, but the growth trend is steady and promising. The literature repeatedly points out that nations which succeeded in rapid adoption did so through a **holistic ecosystem** where affordability, accessibility, and awareness developed simultaneously. This sets a meaningful benchmark for India's strategy, as the country attempts to balance affordability with scale.

3. Overview of the Indian EV Market

India's electric mobility story is dynamic and full of contrasts. The **NITI Aayog Electric Mobility Report (2025)** highlights that two- and three-wheelers dominate over 80% of total EV sales in the country. This is largely because these vehicles align with India's short-distance, high-frequency commuting habits.

The **Council on Energy, Environment and Water (CEEW, 2025)** studied initiatives like *RAAHI* in Amritsar and found that micro-incentives, financial support, and awareness programs significantly improved the adoption rate of electric rickshaws. Such studies reveal that *when financial access and behavioral interventions work together, adoption rises naturally*.

However, the **India Electric Mobility Index (2024)** shows a wide gap between states. Delhi, Maharashtra, and Karnataka rank high on EV readiness due to proactive policies and better infrastructure. In contrast, states with weaker institutional mechanisms struggle to attract investors and consumers alike. This pattern underlines an essential truth about India's EV market national policies can set direction, but localized governance and awareness determine speed.

4. Key Drivers of EV Adoption in India

Multiple forces collectively shape India's EV momentum.

Government support and fiscal incentives stand at the forefront. The **Energy Policy (2022)** study confirms that schemes such as FAME II have significantly reduced upfront costs for two-wheelers and public transport EVs. These subsidies, coupled with reduced GST rates, have made electric mobility more approachable to middle-income consumers.

Equally important is **technological progress**. Battery technology is advancing, driving down prices and improving range two of the biggest concerns for Indian buyers. **Energy for Sustainable Development (2024)** highlighted that the falling battery cost curve and rising fuel prices have altered the perception of EVs from “costly alternatives” to “long-term savings.”

A third, often underestimated driver is **corporate involvement**. Major fleet operators, ride-sharing companies, and logistics firms are now transitioning to electric vehicles to meet sustainability commitments. This ripple effect boosts consumer visibility and trust. When people see EVs functioning efficiently in fleets, delivery services, or public buses, their hesitation reduces.

In essence, EV adoption in India is being powered by **policy intent, technological maturity, and growing social acceptance** three pillars that make this transition irreversible.

5. Barriers and Challenges in Adoption

Despite visible growth, challenges persist some structural, others psychological.

The most prominent is **affordability**. As the **Transportation Research Part D (2021)** notes, high battery costs still inflate EV prices, making them less accessible to the mass market. Unlike developed nations, India lacks extensive financing options and leasing models, which could help spread out costs. Additionally, resale value remains uncertain, making consumers hesitant about long-term ownership.

Another major obstacle is **charging infrastructure**. The **IEA (2024)** found that while urban adoption is growing, rural and tier-2 regions suffer from limited public charging points. The result is widespread “range anxiety” a psychological barrier where potential buyers fear running out of charge during travel.

There are also **awareness and perception issues**. Studies such as **Energy for Sustainable Development (2024)** reveal that misconceptions about maintenance, charging time, and battery life are still common. Interestingly, Indian consumers rely heavily on peer validation they often trust a friend’s experience more than an advertisement. This means every successful EV owner indirectly contributes to future adoption by influencing others.

In summary, India’s EV ecosystem is evolving, but cost, convenience, and confidence remain its three central bottlenecks.

6. Policy Framework and Government Initiatives

Government policy has acted as both the foundation and accelerator of India’s EV transition. According to **NITI Aayog (2025)** and the **IEA (2025)**, programs like FAME I and FAME II introduced subsidies that made EVs commercially viable, while state-level policies encouraged local manufacturing and charging infrastructure. More recently, the **PM E-DRIVE scheme (2025)**, with an outlay of ₹10,900 crore, aims to promote electric buses, trucks, and fleet vehicles across states.

However, as **CEEW (2024–25)** and **Reuters (2025)** note, policy consistency is equally important as policy creation. Some states announce ambitious EV targets but face hurdles in execution due to funding delays or coordination issues. Successful examples like Delhi’s scrappage incentives or Maharashtra’s capital subsidies show that *ground-level execution converts policy into performance*.

These findings imply that the future of EV adoption in India lies not only in framing more policies but in ensuring their **continuity, integration, and adaptability**.

7. Infrastructure Development and Market Growth

Infrastructure is the physical and psychological backbone of EV adoption. Without visible charging points, even well-informed consumers hesitate. The **India Electric Mobility Index (2024)** demonstrated that states with denser charging networks and grid integration policies experience faster growth in EV sales.

The **Energy Policy (2022)** and **IEA (2024)** reports both highlight that establishing fast-charging corridors along highways, office complexes, and housing societies can double adoption rates within a few years. Moreover, **CEEW (2025)** emphasized that when infrastructure improvements are combined with innovative financing models such as battery leasing and pay-per-charge options EV ownership becomes simpler and more attractive.

Private participation is rising too. Automotive firms, oil companies, and startups are investing in nationwide charging networks. This marks an important shift the EV story is no longer government-led alone; it's becoming an ecosystem shared between the public and private sectors.

Together, these changes suggest that India's EV growth is **shifting from policy-driven to market-driven**, which is a sign of maturity in any emerging sector.

8. Research Gap Identified

Although a large body of research exists on India's electric mobility, much of it remains focused on specific components such as consumer perception or policy assessment. There are comparatively fewer studies that use **quantitative secondary data** to track and analyze actual market growth patterns across multiple years and regions.

Existing works also tend to analyze urban or metropolitan perspectives, often overlooking semi-urban and rural trends where the potential for EV expansion is immense. Another gap lies in combining **policy performance metrics with real adoption data**, which would provide a clearer picture of which incentives or programs truly drive growth.

Hence, this study aims to integrate these dimensions policy, infrastructure, and market data through secondary research. By analyzing sources such as **NITI Aayog, IEA, and the India Electric Mobility Index**, the study seeks to provide an evidence-based understanding of how India's EV market has evolved and what patterns can predict its future trajectory.

Final Thoughts

The reviewed literature paints a vivid picture of a country standing at an energy crossroads. India's EV movement is powered by intention and innovation but still constrained by affordability and access. The studies collectively reveal that while technology and awareness are improving, the *real test* lies in consistency consistent policy, consistent infrastructure, and consistent communication to build trust among consumers.

If India manages to synchronize these factors, its EV market has the potential not just to grow but to redefine how mobility, sustainability, and development coexist in an emerging economy.

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