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A Comprehensive Analysis of Electric Vehicle Sales Trends, Market Performance and State Subsidy Impact in India (2017–2025)

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Abstract

The transition towards electric mobility in India has accelerated over the past decade, driven by rising environmental concerns, fluctuating fuel prices, and strong policy interventions. This study examines the current landscape, growth trends, and challenges associated with electric vehicle (EV) adoption in India. Using secondary data from government reports, industry publications, and market analyses, the research evaluates the impact of initiatives such as the Faster Adoption and Manufacturing of Electric Vehicles (FAME) scheme, state-level EV policies, and advancements in domestic manufacturing and battery technologies. The findings indicate a significant increase in EV sales, particularly in the two-wheeler and three-wheeler segments, supported by expanding charging infrastructure and declining battery costs. However, barriers including limited charging networks in rural areas, high upfront costs, supply-chain constraints, and concerns regarding grid readiness continue to slow widespread adoption. The study concludes that sustained policy support, investment in localized manufacturing, and development of a robust charging ecosystem are critical for India to achieve its long-term electric mobility and carbon reduction goals.

Key words: Electric Mobility; Charging Infrastructure; Battery Technology; Sustainable Transportation; EV Adoption; Policy Interventions, Two-Wheeler EVs; Three-Wheeler EVs; Grid Readiness.

Introduction

India is witnessing a significant shift in its transportation landscape as electric vehicles transition from a niche alternative to a mainstream mobility solution. This transformation is driven by concerns over air pollution, rapid urbanization, energy security, and the need to reduce dependency on fossil fuels. Globally, EV adoption has gained momentum due to technological advancements, cost reductions in lithium-ion batteries, and policy support. In India, initiatives such as the National Electric Mobility Mission Plan (NEMMP) 2020, the Faster Adoption and Manufacturing of Electric Vehicles (FAME) scheme, and state-level EV policies have accelerated the adoption of battery electric vehicles and hybrid technologies. Despite this progress, India's EV market remains at an early stage compared to countries like China and the United States. Challenges such as limited charging infrastructure, high upfront costs, battery lifecycle concerns, and consumer awareness gaps continue to influence the pace of adoption. This study aims to examine the current movement of electric vehicles in India by analysing policy frameworks, market growth, technological developments, and key barriers affecting the sector. The insights derived from this study can guide policymakers, manufacturers, and stakeholders in strengthening India's transition towards sustainable mobility.

Growth in EV Adoption

Recent years have shown substantial growth in EV adoption in India, especially in the two-wheeler and three-wheeler segments. E-rickshaws have become a major contributor to last-mile connectivity in urban and semi-urban regions. The passenger four-wheeler segment, although slower to grow, is gaining momentum with new launches and improved battery performance.

Government Policy Impact

The FAME II scheme has been instrumental in increasing EV uptake by offering subsidies for electric two-wheelers, three-wheelers, and buses. States like Delhi and Maharashtra have introduced additional subsidies, tax exemptions, and scrappage incentives, resulting in increased consumer interest. However, inconsistent policy implementation and delays in subsidy disbursals remain challenges.

Charging Infrastructure Development

India's charging infrastructure is expanding but remains insufficient for widespread adoption. Most chargers are concentrated in urban centres, leading to range anxiety among potential buyers. Public-private partnerships, highway charging corridors, and battery swapping systems are emerging to address this gap.

Technological Advancements

Battery costs have decreased significantly over the past decade, making EVs more economically viable. Local manufacturing of batteries and electric components is gradually increasing under the "Make in India" initiative. However, dependence on imported lithium and cells continues to pose long-term sustainability risks.

Consumer Awareness and Perception

Studies show that consumers are increasingly aware of environmental benefits but remain cautious due to concerns about charging time, resale value, and the long-term reliability of EV technology. Awareness campaigns and improved product offerings may help accelerate adoption.

Literature Review

Existing literature on EV adoption in India and globally highlights multiple influencing factors, including economic incentives, infrastructure readiness, and technological advancements. Studies by the International Energy Agency (IEA) show consistent global growth in EV sales driven by declining battery prices, increased range capability, and expanding charging networks. Countries like Norway, China, and the Netherlands lead due to strong policy interventions and consumer incentives.

Researchers have emphasized the role of government policy in shaping EV adoption. The NEMMP 2020 laid the foundation for EV promotion, focusing on domestic manufacturing and technology development. The FAME I and FAME II schemes emphasize demand incentives, charging infrastructure development, and support for public transport electrification. State governments—including Delhi, Maharashtra, Karnataka, and Tamil Nadu—have introduced their own EV policies to attract investments and boost local adoption.

Several studies identify cost as a major determinant of EV adoption. Though operating costs for EVs are lower, higher upfront costs due to battery components remain a challenge. Consumer perception studies reveal concerns regarding driving range, charging availability, and uncertainty about battery durability. Research on EV technologies highlights the need for advancements in battery energy density, charging speed, thermal management, and recycling systems. India, being heavily reliant on imported cells, faces supply-chain bottlenecks that hinder rapid scaling. Overall, literature suggests that while India is progressing toward electrification, infrastructural and economic barriers still need systematic attention.

Need for the Study

Rapid EV market expansion in India has created the need to analyse long-term sales trends, especially given accelerated growth post-2021. Policy variations across states (subsidies, tax exemptions,

incentives) significantly impact EV adoption; understanding these patterns helps policymakers and industry stakeholders. Two-wheeler dominance in EV sales (over 90% share) makes it necessary to track the performance of leading companies and market shifts. India's climate commitments (net-zero by 2070) require deep understanding of EV uptake to plan future infrastructure. Increasing private-sector investments in EV manufacturing, battery technologies, and charging networks require data-driven insights. Shift in consumer behaviour towards sustainability and rising fuel costs makes EV adoption trends crucial for strategic decision-making.

Objectives of the Study

1. To examine the category-wise growth trends of electric vehicles (E-2W, E-3W, E-4W) in India from 2017–2025.

2. To analyse state-wise electric vehicle sales performance with a focus on high-performing states during 2024–25.

3. To assess the role of state-level subsidies (for EV cars and two-wheelers) in influencing EV adoption.

Methodology

The study will follow a descriptive and analytical research design. The study used Secondary Data collected from VAHAN Portal (EV registration data), SIAM (automobile industry statistics), State Government EV Policy Documents, India EV Report 2024–25, Industry publications & government portals. The data types are Category-wise EV sales (E-2W, E-3W, E-4W) from 2017–2025, Monthly E-2W sales data (2024 & 2025), State-wise EV sales and subsidy structure and Company-wise sales volumes for FY 2023 & FY 2024. In order analyse the data, the percentage growth rate, CAGR and forecasting techniques were used to identify the variations.

Category wise Sales Performance of E Vehicles in India [Figures in Numbers]

Year	Category		
	E-4W	E-3W	E-2W
2017-18	1204	91970	2005
2018-19	1885 (56.56)	116031 (26.16)	28007 (1296.86)
2019-20	2377 (26.10)	143051 (23.29)	26834 (-4.19)
2020-21	5154 (116.83)	90898 (-36.46)	44803 (66.96)
2021-22	18622 (261.31)	172543 (89.82)	252642 (463.90)
2022-23	47499 (155.07)	401882 (132.92)	728054 (188.18)
2023-24	90432 (90.39)	632485 (57.38)	944126 (29.68)
2024-25	112229 (24.10)	699023 (10.52)	1150725 (21.88)

Source: VAHAN (as of August, 2025)

Note: Figures in Parentheses show percentage growth over previous year

The data given in the above table reveals that E-2W (Electric 2-Wheelers) has consistently been the category with the highest sales volume, especially showing a steep exponential growth starting from 2021-22. E-3W (Electric 3-Wheelers) is the second-largest category, also demonstrating a strong growth trend, though at a less steep rate than E-2W in the later years. E-4W (Electric 4-Wheelers) has the lowest sales volume but shows the most dramatic growth percentage-wise, moving from a few thousand units to over 100,000 units by 2024-25, clearly reflecting a significant increase in consumer adoption in this segment. There is a noticeable dip in E-3W sales during 2020-21, which may correspond to the COVID-19 pandemic and associated lockdowns. All categories saw a strong rebound in subsequent years.

EV Sales in Top Ten States in India and its Share In Total During 2024-25

Sl. No	State	EV Sales
1	Uttar Pradesh	377565 (25.14)
2	Maharashtra	246250 (16.40)
3	Karnataka	173624 (11.56)
4	Tamil Nadu	137699 (9.17)
5	Bihar	113644 (7.57)
6	Madhya Pradesh	107258 (7.14)
7	Rajasthan	106963 (7.12)
8	Delhi	83488 (5.56)
9	Kerala	82415 (5.49)
10	Telangana	72806 (4.85)
	Total	1501712 (100)

Source: India EV Report 2024-25

Note: Figures in bracket shows the market share of respective companies

Uttar Pradesh leads the market significantly, accounting for over a quarter of the total EV sales among the top 10 states with 377,565 units (25.14%). Maharashtra holds the second position with 246,250 units (16.40%). The top three states—Uttar Pradesh, Maharashtra, and Karnataka—collectively account for over 53% of the total EV sales.

One can understand from the table that Uttar Pradesh leads the country with 3.77 lakh EV sales, UP ranks first, contributing the highest share nationally. This may be due to massive population base, strong rural mobility demand, expanding charging infrastructure. UP has emerged as a major EV hub in the northern region. Maharashtra holds second position, with 2.46 lakh units, Maharashtra continues to be an EV-strong state. Higher adoption of E-4Ws in urban areas (Mumbai, Pune) presence of multiple EV manufacturing and assembly units supportive state EV policy. Southern states among top performers Karnataka (1.73 lakh). . Tamil Nadu (1.37 lakh) known as the "EV manufacturing hub of India. There is an increasing adoption in both personal and commercial EV segments in the state.

Eastern and central states rising fast, Bihar (1.13 lakh) high demand for E-3Ws and low-speed E-2Ws, driven by affordability. Rapid electrification of last-mile transport. Madhya Pradesh (1.07 lakh), strong participation in commercial EVs and shared mobility. Both regions reflect major EV penetration even without heavy state subsidies. Rajasthan close behind with 1.06 lakh units despite no state subsidy, Rajasthan shows impressive adoption. In general, EV adoption is more in highly urban states, Delhi (83,488 units), High adoption of E-2Ws and E-4Ws driven by strict pollution norms, attractive state incentives & scrappage policies and dense charging infrastructure. Kerala (82,415 units), mid-sized state showing exceptional EV penetration per capita. Telangana (72,806 units), consistent growth due to Hyderabad's tech-driven population and supportive policies. The data suggests that India's EV growth is no longer confined to urban centres—it is expanding rapidly across tier-2 and tier-3 cities, especially through E-2Ws and E-3Ws.

Monthly e-2Ws sales in 2024 and 2025

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Total
2024	82153	82747	140351	65666	77330	80002	107658	89078	90549	140225	119996	1075755
2025	98425	76717	131452	92531	101058	106053	103600	105106	104955	144625	116849	1181371
% Δ	20	-7	-6	41	31	33	-4	18	16	3	-3	10

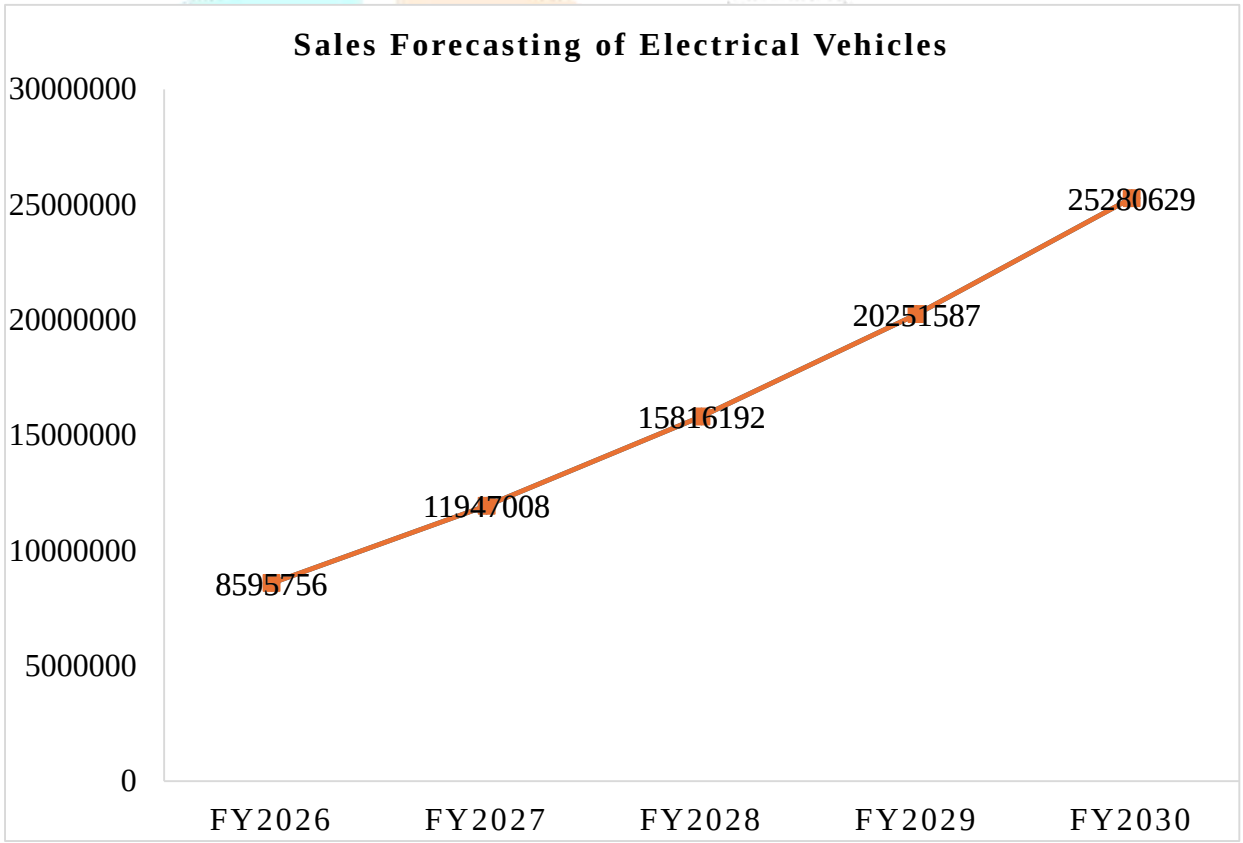
Source: Vahan Data, December, 2025

Monthly sales of e-2W sales was given in the table. It reflects that total E-2W sales increased from 10.75 lakh (2024) to 11.81 lakh (2025). This represents an annual growth of +10%. It indicates continued market expansion and improved consumer confidence in EVs. Months April (+41%), May (+31%), and June (+33%) show major recovery. The reasons may be launch of updated 2025 models with better range, state-specific EV incentives, stronger dealership networks and rising petrol prices boosting EV preference. The monthly E-2W sales data for 2024 and 2025 shows that the Indian EV two-wheeler market is growing steadily (+10% overall).

Segment wise EV Projection

Sl. No	Vehicle Category	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030
1	e-2W	7239348	10184926	13585145	17480869	21887419
2	e-3W	722710	877213	1062890	1285157	1544865
3	e-4W(P)	544297	763591	1012072	1291693	1614188
4	e-4W(C)	78266	106110	136361	169031	203723
5	e-Bus	11135	15168	19724	24837	30434
	Total	8595756	11947008	15816192	20251587	25280629

Note: e-4W(P) = most commonly refers to Electric Four-Wheeler (Passenger)
e-4W(C) = most commonly refers to Electric Four-Wheel Commercial Vehicles



From the data and the graph, it has been observed that e-2W dominates the EV market. It makes up around 84% of total EV volume in 2026 and still around 87% by 2030. It shows a strong growth with a 4-year CAGR of 31%. e-3W remains the second-largest category. It consistently grows, crossing 1.5 million units by FY 2030 with the CAGR of 21%. The passenger e-4W (e-4W P) grows rapidly, nearly triples from FY 2026 to FY 2030. Registering CAGR approximately 31%, indicating strong consumer adoption. Commercial e-4W (e-4W C) shows stable growth at 26% CAGR. e-Bus segment shows steady expansion. It grows from 11k to 30k units with the CAGR 28%. It reflects increasing public transport electrification.

Company-wise Analysis of Electric Two-Wheeler Sales

Sl. No	Company	FY 2024 (Units)	FY2025 (Units)
1	Ola Electric	350060 (34.47)	359202 (28.69)
2	TVS Motor	200906 (19.79)	252570 (20.88)
3	Bajaj Auto	112591 (11.09)	238743 (19.73)
4	Ather Energy	119911 (11.81)	141334 (11.68)
5	Hero MotoCorp	18925 (1.86)	50740 (4.19)
6	Ampere	57404 (5.65)	41854 (3.46)
7	Bgauss Auto	16200 (1.60)	18982 (1.57)
8	Revolt Intelli Corp	7736 (0.76)	11757 (0.97)
9	Pur Energy	7868 (0.77)	10505 (0.87)
10	Ward wizard Innovations	9138 (0.90)	9515 (0.79)
	Others	114704 (11.30)	74570 (6.16)
	Total	1015443 (100)	1209772 (100)

Source: SIAM [Society of Indian Automobile Manufacturers]
Note: Figures in bracket shows the market share of respective companies

Market Leadership and share shift was observed from the data given in the above table. Ola Electric maintained the top position but saw its market share decrease significantly from 34.47% to 29.69%, despite a slight increase in absolute sales (2.61%). TVS Motor and Bajaj Auto closed the gap on Ola, with TVS increasing its share to 20.88% and Bajaj Auto seeing its share nearly double to 19.73%. Highest Growth Performers are Hero MotoCorp recorded the highest percentage growth at 168.11%, significantly increasing its sales and market share. Bajaj Auto was the major driver of absolute market growth, more than doubling its sales with 112.04% growth, adding over 126,000 units in FY 2025. Sales Decline was noticed in Ampere and the collective "Others" segment experienced a decline in sales and market share, suggesting consolidation of the market share towards the major players.

Government Subsidy

Government subsidies-such as purchase incentives, per kWh financial support, and road tax exemptions-play a major role in influencing EV adoption. India's EV ecosystem relies heavily on state-level EV policies and the central government's FAME-II scheme**.** Understanding the relationship between subsidies and EV sales helps identify which policies drive adoption and where market pull exists even without incentives. The maximum subsidy and road tax discount are given in the following table for Scooters & Bikes.

State-wise Government Subsidy on Electric Vehicles (Scooters & Bikes)

Sl. No	States	Subsidy (Per kWh)	Maximum Subsidy	Discount on Road Tax in %
1	Maharashtra	₹5,000	₹25,000	100%
2	Assam	₹10,000	₹20,000	100%
3	Gujarat	₹10,000	₹20,000	50%
4	West Bengal	₹10,000	₹20,000	100%
5	Meghalaya	₹10,000	₹20,000	100%
6	Bihar	₹10,000	₹20,000	100%
7	Rajasthan	₹2,500	₹10,000	NA
8	Odisha	NA	₹5,000	100%
9	Madhya Pradesh	Nil	Nil	99%
10	Punjab	Nil	Nil	100%
11	Telangana	Nil	Nil	100%
12	Kerala	Nil	Nil	50%
13	Uttar Pradesh	Nil	Nil	100%
14	Karnataka	Nil	Nil	100%
15	Andhra Pradesh	Nil	Nil	100%

Source: https://www.godigit.com/ev-guides/state-wise-ev-subsidies

The maximum subsidy per kWh seen in the data is ₹10,000 per kWh, offered by Assam, Gujarat, West Bengal, Meghalaya, Bihar. These states are giving the strongest monetary push for EV adoption based on battery size. Several states offer a maximum cap of ₹20,000, Maharashtra gives the highest maximum subsidy of ₹25,000, despite a lower per-kWh rate. Road tax discounts vary significantly from state to state. Subsidy structures vary widely across states, reflecting different approaches to EV promotion. Some states prioritize direct financial incentives (e.g., Maharashtra, Assam). Others focus on tax reduction instead of subsidies (e.g., Punjab, Telangana). A few states provide very limited support (Rajasthan, Kerala). Several states with no subsidies still promote EVs through full road tax waivers**,** which greatly reduces upfront costs.

Conclusion

The analysis reveals that India's EV market has shown exponential growth, especially in the electric two-wheeler segment, which crossed 1.15 million units in 2024–25. Category-wise data indicates that E-2Ws continue to dominate, followed by strong growth in E-3Ws and increasing acceptance of E-4Ws. State-wise sales highlight Uttar Pradesh, Maharashtra, Karnataka, and Tamil Nadu as leading adopters, supported by a mix of population, urbanization, and policy incentives. Government subsidies, particularly in states like Gujarat, Assam, Maharashtra, and West Bengal play a crucial role in influencing buying decisions. Companies like TVS, Bajaj, Ather, and Hero MotoCorp gaining momentum, while Ola Electric shows fluctuations despite high volumes. The industry is consolidating, with new players like River Mobility and Pur Energy showing rapid growth.

Overall, India's EV ecosystem is moving toward maturity, driven by supportive government policies, technological improvements, and rising consumer acceptance. However, sustained long-term growth will require stable state-level incentives, stronger charging infrastructure, improved battery technology, and consumer awareness programs.

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