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The Economics of Electric Vehicles in India: Is Green Mobility Financially Viable for the Average Consumer

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ABSTRACT

This paper explores the rise of electric vehicles (EVs) in India, tracing their history, policies, costs, behavioral challenges, and case studies. It evaluates whether electric vehicles and other green mobility options are economically and environmentally feasible for India.

INTRODUCTION

Automobiles powered by electricity rather than conventional internal combustion engines that run on petrol or diesel are known as electric vehicles, or EVs. They store energy in rechargeable batteries, which then drive an electric motor to move the car. Compared to traditional cars, EVs are far cleaner and more environmentally friendly because they don't burn fossil fuels while in motion, which results in zero tailpipe emissions. EVs can be classified as fully electric, plug-in hybrid (which combines a battery and a fuel engine), or hybrid (which charges itself without a plug).

EVs not only reduce pollution but also provide advantages like reduced noise, smoother driving, and lower operating costs. They can be charged at public charging stations, which are becoming increasingly prevalent, or at home using a regular outlet. EVs are becoming more feasible for daily use thanks to advancements in battery technology that increase driving range and shorten charging times. EVs are viewed as a critical step in lowering reliance on fossil fuels and addressing climate change, as governments and businesses around the world push for sustainable transportation.

In India, the electric vehicle (EV) movement started out slowly but is now rapidly accelerating. The 1996 launch of the Reva electric vehicle, a compact city car that signalled the beginning of the clean mobility experimentation phase, was the first major step taken by the country. However, it wasn't until 2015 that the government introduced focused initiatives like the Faster Adoption and Manufacturing of Electric Vehicles scheme (FAME) that the widespread adoption of EVs really took off. FAME was implemented as part of the National Electric Mobility Mission Plan to promote sustainable transportation, reduce vehicle emissions, and lessen reliance on fossil fuels. By offering financial incentives to both manufacturers and consumers, the program lowers the cost of EVs while promoting investment in R&D, local production, and charging infrastructure.

The rise of green mobility is a comprehensive shift towards sustainable transportation that prioritises lowering greenhouse gas emissions, improving air quality, and reducing reliance on fossil fuels. It goes beyond simply lowering fuel prices. The use of electric cars and other cleaner transportation options is essential for protecting the environment and reducing the effects of climate change in India, where cities are plagued by dangerously high levels of air pollution and growing oil import costs. By creating opportunities in EV manufacturing, battery innovation, renewable energy integration, and charging infrastructure, green mobility also encourages new business endeavours, which boosts employment and the economy. Additionally, it shapes transportation trends by promoting last-mile connectivity, shared

mobility models, and integration with smart city initiatives, all of which change how people move through both urban and rural environments. In order to demonstrate that green mobility is a multifaceted transformation with effects on the environment, the economy, and society, this paper examines the history, costs, regulations, challenges, and case studies of EV adoption in India.

This leads us to the main question of this paper: Are electric vehicles (EVs) and other green mobility options really feasible for a nation like India, both environmentally and economically? This essay will examine whether green mobility can transcend from a futuristic ideal to a workable reality by examining history, policies, costs, and case studies.

BACKGROUND ON THE INDIAN EV MARKET

Over the past ten years, the Indian electric vehicle (EV) market has seen a rapid transformation due to a combination of shifting consumer preferences, private sector investment, and government policies. The 1996 launch of the Reva was India's first significant move towards electric vehicles, but up until the mid-2010s, when growing worries about air pollution, energy security, and reliance on fossil fuels started to influence policy, adoption of EVs was slow. A watershed was reached in 2015 when the government introduced the FAME (Faster Adoption and Manufacturing of Hybrid and Electric Vehicles) program. The program set the stage for a more organised EV ecosystem in the nation by providing subsidies for electric cars, buses, two-wheelers, and three-wheelers as well as incentives for charging infrastructure.

India's EV market is distinct in that two- and three-wheelers, which are more reasonably priced and better adapted to urban commuting patterns, have been the main drivers of growth. Two- and three-wheelers have become very popular in both urban and rural areas, despite the fact that the adoption of electric cars has been comparatively slow because of higher initial costs, a lack of adequate charging infrastructure, and worries about driving range. In an effort to lower emissions in public transport, state transport corporations are also implementing electric buses. The variety of India's mobility requirements and the vital role that reasonably priced solutions play in hastening the adoption of EVs are highlighted by this segmentation.

Alongside international firms like Hyundai, BYD, and MG Motor, the market has grown even more with the arrival of domestic producers like Tata Motors, Mahindra Electric, and Ola Electric. Innovation in shared mobility, charging systems, and battery technology has also been fuelled by startups and private investors. Notwithstanding these developments, there are still issues, such as inadequate charging infrastructure, the high price of lithium-ion batteries, and ambiguities surrounding battery disposal and recycling. With its Production Linked Incentive (PLI) program for advanced battery manufacturing and programs to promote R&D and supply chain development, India has placed a strong emphasis on localisation in order to address these issues.

The Indian EV market is expected to grow at an exponential rate in the future. With policies that encourage both supply-side and demand-side initiatives, the government has set lofty goals, such as having 30% of new car sales be electric by 2030. The shift is anticipated to be strengthened further by rising fuel prices, declining battery costs, and increased public awareness of environmental issues. India may become one of the world's biggest EV markets and a centre for creative, reasonably priced electric mobility solutions suited to emerging markets if these initiatives are successfully coordinated.

Over the past ten years, policy support and government intervention have greatly influenced the Indian EV market. The federal and state governments have aggressively supported electric mobility in addition to providing direct subsidies by waiving registration fees, lowering road taxes, and providing incentives to manufacturers. Many states, including Tamil Nadu, Delhi, and Maharashtra, have implemented their own EV policies, frequently providing alluring incentives for purchases and assistance with the construction of charging stations. In order to lower the cost barrier for both consumers and businesses, India also lowered the Goods and Services Tax (GST) on EVs from 12% to 5% and on charging equipment from 18% to 5%. Because of these actions, EVs are now seen as a competitive alternative to conventional internal combustion engines.

Although the rate varies by segment, adoption trends indicate that consumer interest is progressively moving from niche to mainstream. Due to their affordability and widespread use in last-mile connectivity, two-wheelers and three-wheelers have experienced the strongest growth and together make up the majority of EV sales. Since they are an affordable and sustainable mode of transportation, e-rickshaws in particular have become a common sight in many Indian cities. Adoption of passenger cars has been slow but is increasing, particularly in cities where vehicles like the MG ZS EV and Tata Nexon EV have become more well-liked. Meanwhile, increasing interest in electrifying public transport fleets is reflected in the introduction of electric buses in states like Kerala and Karnataka.

The declining total cost of ownership (TCO) of EVs relative to traditional vehicles has been a significant factor in adoption, especially for high-usage markets like delivery services and commercial fleets. Businesses like Amazon, Flipkart, and food delivery startups have started electrifying their fleets of two- and three-wheelers, which lowers operating costs and complies with sustainability pledges. Electric mobility has also become more commonplace in the transportation landscape as ride-hailing services have experimented with adding EVs to their fleets.

Long-term trends show that India is shifting towards a multi-stakeholder strategy that includes the government, business community, and consumers. Although the government's 2030 target of 30% EV penetration is ambitious, there is significant momentum due to growing fuel prices, growing consumer awareness, and the quick development of regional supply chains for batteries and componentry. Although urban areas are setting the pace for adoption, there are also indications of uptake in rural and semi-urban areas, particularly in places where two-wheelers and e-rickshaws predominate in terms of mobility. When taken as a whole, these variables point to India's EV journey being marked by mass-market, cost-driven adoption as opposed to luxury-led demand, which sets it apart from trends observed in North America or Europe.

India's EV ecosystem still faces major structural obstacles despite these advancements. With fewer than 20,000 public charging stations across the country for more than 2 million EVs, the charging infrastructure is still insufficient, which contributes to "range anxiety." Whether India's electrical supply can support widespread EV adoption, particularly in smaller towns and rural areas, is another question raised by grid capacity and reliability. Even though operating costs are lower, middle-class buyers' access to EVs is still restricted by their high initial cost, which is mostly caused by the high cost of imported lithium-ion batteries. Other undeveloped areas include battery recycling and end-of-life management, which present logistical and environmental challenges as adoption grows.

The ecosystem of domestic manufacturing presents another difficulty. India's supply chain is vulnerable due to its current heavy reliance on imports from China and other nations, despite PLI schemes' efforts to localise battery production. Long-term investment may be deterred by the unclear policy environment, which includes fluctuating subsidy structures and discussions about whether to offer incentives to hybrids. Uneven consumer awareness exists as well. While urban consumers are starting to adopt EVs for economic and environmental reasons, rural and semi-urban consumers are still wary because of worries about resale value, maintenance, and access to charging stations. If India is to move from policy-driven growth to sustainable, market-driven adoption in the upcoming ten years, these problems must be resolved.

With major cities like Delhi, Bengaluru, Hyderabad, and Mumbai leading adoption, urban India has been the main driver of EV growth. Stronger networks of charging infrastructure, increased purchasing power, and state-level incentives (like Maharashtra's road tax waivers and Delhi's EV subsidies) have all contributed to the trend's increased appeal in urban areas. Additionally, urban consumers benefit from shorter commutes, which are in line with current EV ranges, and are more influenced by environmental awareness campaigns. EV visibility in cities has been further cemented by the electrification of fleets by delivery services, ride-hailing applications, and municipal transportation corporations.

On the other hand, EV adoption is much slower in rural and semi-urban areas. The higher upfront costs of EVs are prohibitive due to a number of obstacles, such as a lack of charging stations, a weak or inconsistent electrical supply in some areas, and lower disposable incomes. Private vehicle ownership is generally low for many rural households, and when it does occur, two-wheelers predominate. Although e-rickshaws and electric two-wheelers have started to make inroads into smaller towns, adoption is still uneven and mostly depends on local policy initiatives and the availability of infrastructure for charging or battery swapping.

COST COMPARISON: EVS VS PETROL CARS

1 Using the Tata Nexon EV and petrol as examples:

Whether electric vehicles (EVs) are more cost-effective than traditional gasoline-powered cars is a major concern for Indian consumers. Even though EVs are usually more expensive to buy initially, their long-term operating costs frequently make up for this difference. The Tata Nexon EV, for instance, costs roughly ₹5–6 lakh more than its petrol counterpart. One of the biggest turnoffs for Indian consumers who are price conscious is still this initial disparity.

OPERATING COST

However, the EV has a distinct advantage when comparing operating costs. Depending on electricity rates and charging techniques, driving a gasoline-powered vehicle costs approximately ₹5–6 per km, while an electric vehicle costs approximately ₹1–1.5 per km. These savings add up over time for high-mileage users, like fleet operators or daily commuters, and frequently make the higher purchase price justified.

MAINTENANCE

Another area where EVs are advantageous is in maintenance. EVs need less maintenance and repairs because they don't have gearboxes, engines, or other intricate mechanical parts. According to industry estimates, EV maintenance can be nearly 50% less expensive annually than that of gasoline-powered cars. In addition to lowering ownership costs, this less maintenance attracts younger customers who place a higher value on convenience.

BATTERY

Battery replacement is the primary long-term issue. Although lithium-ion batteries usually last 8 to 10 years, replacing them can cost up to ₹5 lakh, which is a significant financial burden. With longer warranties and financing plans, manufacturers are starting to address this, but India's battery recycling and end-of-life management systems are still in their infancy. The high initial cost and battery replacement expense are therefore still major obstacles to wider affordability, even though EVs offer strong long-term financial benefits in terms of operating and maintenance costs.

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COST COMPARISON SUMMARY

(EVS VS. PETROL CARS)

Initial Cost: EVs, such as the Tata Nexon EV, cost roughly ₹5–6 lakh more than their gasoline-powered equivalents.

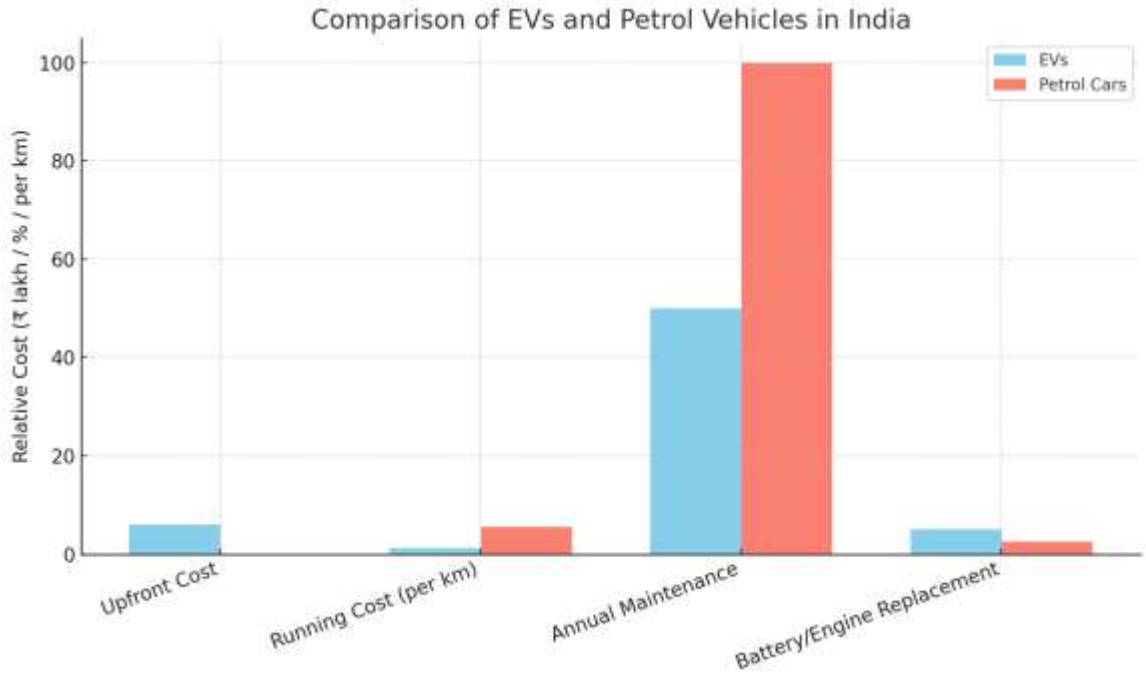
Running Cost: EVs are significantly less expensive to operate than gasoline-powered vehicles, costing about ₹1 to 1.5 per km as opposed to ₹5 to 6 per km.

Maintenance: Since EVs don't have complicated mechanical components, they require less maintenance, which lowers yearly maintenance costs to almost half of those of gasoline-powered vehicles.

Battery Replacement: The largest long-term expense concern is battery replacement, which can cost up to ₹5 lakh even though EV batteries last 8 to 10 years.

Figure 1

Graph comparing electric and petrol vehicles in India



POLICY ANALYSIS: TAX SUBSIDIES AND THEIR EFFECTIVENESS

Launched in April 2019, the FAME II (Faster Adoption and Manufacturing of Electric Vehicles) scheme received a ₹10,000 crore initial allocation, which was subsequently raised to ₹11,500 crore in February 2024. Demand-side incentives accounted for about 61% of the funds (₹7,048 crore), while electric buses and charging infrastructure accounted for 35% (₹4,048 crore). FAME-II met 75% of its two-wheeler incentive goals, 84% of its three-wheeler targets, 55% of its passenger car targets, and 66% of its bus targets.

Sales were significantly impacted by these incentives. Volumes of electric two-wheelers (E2Ws) increased by nearly 34 times, from about 19,330 units in FY2019 to over 650,000 units in FY2023. Nevertheless, by the end of 2021, the overall EV share of the two-wheeler market was only 4%. This demonstrates that although subsidies significantly increased sales in absolute terms, they had relatively little effect on the composition of the market as a whole.

Furthermore, according to analyses, every rupee of public investment produced remarkable market leverage, up to a 21x market multiplier across all segments.

For electric three-wheeler passenger vehicles (E3WPs), FAME-I specifically had a multiplier effect of about 10×, with an estimated 27,000 extra units directly attributable to subsidy incentives; by March 2019, actual sales had reached 267,000.

States have been instrumental in providing customised local incentives to supplement federal subsidies. Notably:

Delhi: Provides various advantages, such as exemptions from road tax and registration fees, a 15% purchase subsidy for specific EVs, and subsidies based on battery capacity (e.g., up to ₹30,000 for two-wheelers). By 2027, Delhi hopes to have 95% of newly registered vehicles be electric and has committed to putting fast charging stations every 5 km.

Maharashtra: To encourage adoption, Maharashtra first suggested a 6% EV sales tax but later withdrew it. Additionally, it offers EV buyers strong manufacturing incentives and exemptions from road taxes.

The states of Gujarat, Tamil Nadu, and Uttar Pradesh place a strong emphasis on infrastructure development and supply-side incentives. For example:

Gujarat: It has set up more than 280 charging stations, encourages EV manufacturing, and provides subsidies (₹20,000 for two-wheelers and ₹50,000 for three-wheelers).

Tamil Nadu: With high rates of adoption and focused manufacturing support, Tamil Nadu is a leader in innovation and investment.

Uttar Pradesh: Uttar Pradesh has installed more than 200 charging stations in nine cities under FAME-II, offers generous purchase subsidies (up to ₹1 lakh for cars), and leads the nation in EV sales (16% of total EV sales in Q4 FY23–24).

According to state benchmarking, Maharashtra (≈16.5%) and Delhi (≈18.9%) have the highest EV penetration rates. Gujarat (≈11.3%) and Tamil Nadu (≈14.7%) both show excellent performance, bolstered by an emphasis on green infrastructure and manufacturing.

Although they were successful in boosting demand, subsidies have revealed weaknesses:

Concerns regarding long-term fiscal sustainability have been raised by the fact that increased adoption has drastically decreased government revenue from petrol and diesel taxes.

When non-compliant EV manufacturers were penalised, implementation problems arose, leading to some smaller two-wheeler manufacturers losing up to 55% of their sales and shifting the market towards compliant OEMs.

Experts warn that subsidies are insufficient on their own. New approaches, such as scale efficiencies, long-term infrastructure planning, and cost reductions through localising battery manufacturing, highlight the necessity of technology-driven adoption.

BEHAVIORAL INSIGHTS:

BARRIERS TO EV ADOPTION

Consumer psychology still has a significant influence on EV adoption in India, even in the face of generous subsidies, declining battery prices, and growing environmental consciousness. Range anxiety, or the worry that an EV will run out of power before the driver can get to a charging station, is one of the most enduring issues. The fact that the majority of public charging stations are grouped in big cities, leaving highways and small towns underserved, adds to this anxiety. The perception of risk frequently outweighs the reality, even for customers whose daily commutes are well within an EV's range.

Another significant psychological barrier is the high initial cost of EVs. Indian consumers are typically very price-sensitive and favour immediate affordability over long-term savings, even though lifetime operating costs are lower. Even with subsidies, many consumers are reluctant to move from less expensive petrol models due to present bias, a bias in behavioural economics that refers to short-term financial decisions.

Adoption is made more difficult by ignorance and ignorance. The true operating costs of EVs, the availability of home charging options, and government incentives are still unknown to many consumers. This lack of knowledge perpetuates preconceived notions and keeps EVs from being viewed as useful and cost-effective. Negative perceptions have also been shaped by safety concerns, especially in relation to media reports of battery fires, despite the fact that these incidents are uncommon in comparison to accidents involving gasoline-powered vehicles. Without open communication from regulators and manufacturers, trust is hard to regain once it has been damaged.

Lastly, these behavioural barriers are made worse by infrastructure deficiencies. The absence of charging stations deters prospective buyers in smaller towns where EV adoption could drastically reduce reliance on expensive fossil fuels. This perpetuates a vicious cycle in which low adoption deters infrastructure investment, and inadequate infrastructure deters adoption. In order to break this cycle, behavioural nudges that normalise EV use and foster trust, like open charging stations, open information campaigns, and community-based demonstration projects, are just as important as policy changes.

MINI CASE STUDIES

Tata Motors: With the Nexon EV emerging as the best-selling electric vehicle in India, Tata Motors has taken the lead in the EV market. Customers' faith in the company's established brand, wide dealer and service network, and aggressive pricing strategy are the main drivers of its success. The lack of charging infrastructure, especially in non-metropolitan areas, still limits adoption and keeps many prospective buyers from making the full commitment to EV ownership. The Tata case demonstrates how after-sales support and brand credibility can lower adoption barriers but not completely compensate for infrastructure deficiencies.

Okinawa Autotech: Okinawa Autotech has established itself as a top producer of reasonably priced electric scooters, appealing to Indian customers who are budget conscious. The growing need for affordable mobility solutions, particularly in urban and semi-urban markets, is reflected in its success. But issues with battery longevity, safety, and quality have seriously damaged its reputation. Consumer confidence has been eroded by reports of scooter fires, demonstrating that affordability is insufficient on its own and that safety, dependability, and regulatory compliance are critical for long-term EV adoption.

SUN Mobility: With the help of SUN Mobility's ground-breaking battery swapping model, EV owners can now easily swap out their depleted batteries for fully charged ones. By directly addressing range anxiety and decreasing downtime, this strategy makes EV use more feasible for high-mileage users and commercial fleets. Despite the model's great potential, its influence has been constrained by the requirement for broad manufacturer adoption and standardisation. The example of SUN Mobility shows how technological innovation can break down psychological barriers, but it also emphasises how difficult it is to scale infrastructure in a market that is fragmented.

Euler Motors: Focussing on the commercial EV market, specifically electric delivery trucks, Euler Motors has forged alliances with significant businesses like BigBasket. Its approach takes into account the particular requirements of last-mile delivery drivers, who place a high importance on vehicle dependability and low operating costs. Success for Euler depends on offering robust service and support networks to guarantee uptime in addition to long-lasting automobiles. The company demonstrates how EV adoption can be accelerated by focussing on niche markets with tailored solutions, particularly when paired with business-to-business (B2B) partnerships.

BluSmart: India's first all-electric ride-hailing service was invented by BluSmart, which mainly serves Bengaluru and Delhi. BluSmart exemplifies how EVs can thrive in the shared mobility space by providing clients with an environmentally friendly substitute for traditional taxis. Its fleet-based business strategy guarantees increased EV usage and lessens reliance on private ownership. Nonetheless, the business still has issues with fleet management and charging outages, which have an impact on service availability. BluSmart's example highlights the significance of fast-charging solutions for commercial operations while demonstrating how shared mobility can hasten the adoption of EVs in urban areas.

FINDINGS AND DISCUSSION

The study's conclusions show that while India's electric vehicle (EV) revolution is advancing, it is doing so unevenly, with growth concentrated in particular markets and regions. Due to consumer demand for reasonably priced last-mile mobility and government subsidies, two- and three-wheelers have become the most popular categories. However, because of their high initial costs, inadequate infrastructure for charging, and reluctance from consumers, passenger cars and heavy vehicles fall behind. Although EV adoption is no longer a fringe trend, the evidence indicates that the shift from policy-driven growth to mass-market acceptance is still in progress.

ROLE OF POLICY AND SUBSIDIES

The EV landscape has been significantly shaped by government policy. With a budget of more than ₹11,500 crore, the FAME-II scheme dramatically increased sales of two- and three-wheelers, illustrating how focused incentives can change affordability. National efforts have been strengthened by state-level initiatives like Uttar Pradesh's generous purchase subsidies and the rollout of charging infrastructure, or Delhi's 15% EV subsidy and exemption from road tax and registration fees. Subsidies do have drawbacks, though, as they can distort the market by favouring particular vehicle categories and impose financial burdens by lowering fuel tax revenues. Sustainable growth will eventually depend on the shift to technology-driven cost reductions, such as economies of scale and localised battery production.

CONSUMER BEHAVIOR AND TRUST

One important finding is that behavioural and psychological factors, in addition to economic ones, influence the adoption of EVs. Barriers include range anxiety, lack of consumer knowledge, and safety concerns after battery fire reports. Despite higher operating costs, many people prefer gasoline-powered vehicles due to the present-bias effect, which causes consumers to prioritise immediate affordability over long-term savings. Lack of infrastructure and concerns about resale value are other reasons why consumers in rural and semi-urban areas are still hesitant. Establishing community-based adoption models that normalise EV ownership, transparent communication from manufacturers, and demonstration projects in smaller towns will all be necessary to foster trust.

BUSINESS MODELS AND INDUSTRY INNOVATIONS

New business models are being developed by the private sector in response to these obstacles. Battery swapping is being experimented with by companies such as SUN Mobility, which addresses range anxiety and minimises downtime, especially for fleets. BluSmart's all-electric ride-hailing service demonstrates how shared mobility can bring EVs into the mainstream urban transportation ecosystem without having to pay for them up front. The use of EVs in logistics, where lower operating costs directly benefit businesses, is further demonstrated by Euler Motors' alliances with delivery services like BigBasket. According to these models, early market transformation may be fuelled by fleet-based adoption before widespread personal ownership occurs.

INFRASTRUCTURE AND TECHNOLOGY GAPS

The infrastructure for charging continues to be a significant bottleneck. Even though there were more than 25,000 public charging stations in India by the end of 2024, smaller towns are underserved because most of them are located in a small number of urban centres. Adoption disparities between urban and rural areas are made worse by this unequal distribution. Concerns regarding energy security and supply chain vulnerability are also raised by India's continued heavy reliance on imported lithium-ion cells, mostly from China. Although progress is slow, the government's Production Linked Incentive (PLI) program for battery manufacturing is a step in the right direction. For long-term viability, these gaps must be filled.

CASE STUDY INSIGHTS

The case studies also highlight how varied India's EV market is. While Okinawa's battery quality issues underscore the dangers of insufficient safety regulations, Tata Motors shows how dealer networks and brand trust can hasten adoption. Although scalability is still an issue, SUN Mobility's swapping model suggests creative ways to address range anxiety. BluSmart emphasises the potential and constraints of shared mobility in removing ownership barriers, while Euler Motors demonstrates the potential of B2B adoption, where economics strongly align with EV benefits. Collectively, these illustrations demonstrate that the Indian EV market is a patchwork of intersecting tactics, obstacles, and prospects rather than a singular narrative.

LONG-TERM OUTLOOK

The results indicate that rather than luxury vehicles, India's EV growth will probably be mass-market driven and bottom-up, driven by fleet operators, reasonably priced two-wheelers, and three-wheelers. Although policies have been essential in boosting demand, the pace of adoption will ultimately be determined by industry innovation, infrastructure preparedness, and consumer psychology. India must bridge the gap between urban and rural adoption, lower battery

costs through localisation, extend charging networks outside of metro areas, and restore consumer confidence through safety and awareness initiatives if it is to meet the government's ambitious target of 30% EV penetration by 2030.

CONCLUSION

In India, electric cars signify a much larger shift towards sustainable, independent, and creative mobility than just a change in automotive technology. Even though EVs are still more expensive initially than traditional petrol and diesel cars, their potential to significantly lower emissions and long-term fuel and maintenance savings make them an essential answer to India's environmental and financial problems. Early adoption has been greatly aided by government support through programs like FAME-II and state-level subsidies, especially for two- and three-wheelers. However, the results of this study highlight the fact that subsidies by themselves cannot sustain the momentum indefinitely.

Three interrelated issues—infrastructure, affordability, and consumer trust—will determine how widely EVs are adopted in India in the future. To lessen range anxiety and close the gap between urban and rural areas, charging infrastructure must be extended outside of cities. After worries about battery quality and fire incidents, clear safety regulations and open communication can restore confidence. Localising battery production and investing in cutting-edge technologies can also reduce costs and secure supply chains. In order to change consumer perceptions and normalise EV use in daily life, behavioural interventions such as awareness campaigns, demonstration projects, and nudges must be used in conjunction with these measures.

Innovation and market experimentation are already offering workable ways to get past obstacles, as demonstrated by case studies of Tata Motors, SUN Mobility, Euler Motors, and BluSmart. Battery-swapping models, fleet electrification, and shared mobility show that EV adoption does not have to follow the conventional ownership path but can instead develop through a variety of situation-specific solutions. India's EV journey differs from Western markets, where adoption is frequently driven by luxury, due to its flexibility.

In the end, India's EV revolution is about redefining mobility to be cleaner, smarter, and more inclusive—it's not just about swapping out gasoline-powered vehicles for electric ones. India has the potential to become a global leader in scalable, reasonably priced electric mobility solutions in addition to meeting its 2030 EV targets if public policy, private innovation, and consumer acceptance all work together well. By doing this, India can transform its present problems—price sensitivity, infrastructural deficiencies, and behavioural barriers—into chances for innovation that might serve as a template for other developing nations.

RECOMMENDATIONS

For the Government: Although its interventions should change over time, the government must continue to act as a catalyst in the development of India's EV ecosystem. Long-term reliance on imports will be lessened and safety issues will be addressed with consistent investment in research and development (R&D) for battery technology, recycling, and alternative chemistries (like sodium-ion or solid-state batteries). To close the gap between urban and rural areas and make sure that EV adoption is not limited to major cities, charging infrastructure expansion to Tier 2 and Tier 3 cities is essential. To ensure a seamless shift from policy-driven to market-driven adoption, subsidies should be progressively reduced over the medium term and reallocated to supply chain localisation and infrastructure development. Stricter safety and quality standards will also aid in regaining consumer trust following battery fire incidents.

For the Industry: The automotive sector needs to understand that affordability and bottom-up approaches will drive India's EV transition. Manufacturers should give mass-market electric two- and three-wheelers priority over luxury cars since they better meet consumer demand and mobility requirements. Since widespread adoption of EV technology will be determined by consumer trust, companies must also address battery safety and durability. Digital and physical consumer education initiatives can help debunk EV myths, stress lifetime cost savings, and draw attention to the advantages of both public and home charging stations. In order to guarantee that customers in semi-urban and rural areas have access to dependable maintenance, companies should simultaneously invest in after-sales service networks and collaborations with nearby companies.

For the Customers: The EV revolution is being driven in equal measure by consumers. Buyers should consider the total cost of ownership (TCO), which frequently favours EVs due to lower running and maintenance expenses, rather than just the upfront cost when making decisions about purchases. By actively embracing shared mobility options like ride-hailing services or EV-based delivery fleets, consumers can hasten the shift and help normalise electric transportation in their local communities. Furthermore, early adopters in Tier 2 and Tier 3 cities can serve as influencers in their local networks by highlighting the advantages of EVs and assisting in dispelling ignorance-based scepticism. Consumer behaviour may change from passive interest to active involvement in India's clean mobility movement as more households take into account long-term economic and environmental benefits.

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