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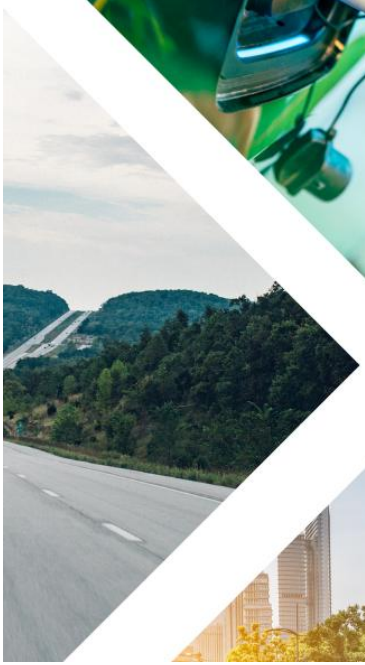
POLICY ADVISORY & RESEARCH

INDIA'S ELECTRIC VEHICLE LANDSCAPE



POLICY NOTE
APRIL 2025

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1 Introduction

The Indian automobile industry, currently the fifth largest globally, is experiencing rapid growth and transformation. The major force behind this revolution is the introduction of the transition from Internal Combustion Engine (ICE) vehicles to the adoption of Electric Vehicles (EVs). Electric Vehicles play a vital role in combating climate change across the globe by helping to cut down emissions and reducing dependence on fossil fuels. Globally, the demand for EVs has been on the rise with 11.2 million EVs sold in China[1], 1.3 million EVs in the United States[2] and 2 million in India in 2024 and these numbers are expected to rise even further this year. To meet the demand for consumption, governments worldwide have implemented policies to strengthen the supply chain of electric vehicles. This paper aims to review the extent to which the policies implemented in India have resulted in the localisation of the supply chain and the hurdles that linger in the EV Industry.

2 India's Journey in EV Policy

India's journey in EV policy has evolved significantly over the years, with strategic initiatives aimed at boosting EV adoption and infrastructure. The government intends to achieve a 30% EV penetration target in the automobile market by 2030 and significant self-reliance in research and development in the field by 2047 under the Viksit Bharat Initiative.

The National Electric Mobility Mission Plan 2020, launched in 2013 with an outlay of US$~1.68 billion, set the foundation for electric mobility. This was followed by the FAME-I scheme in 2015[3], which provided financial incentives for EVs. In 2016, the Ministry of Road Transport and Highways (MoRTH) incorporated EV charging provisions into building bylaws. By 2018, EVs were exempted from permit requirements, and guidelines for charging infrastructure were introduced. The FAME-II schemes, launched in 2019 with US$~1.2 billion, further strengthened incentives while reducing GST on EVs and charging stations. The government accelerated its efforts in 2021, launching the Production Linked Incentive (PLI) scheme with US$3.2 billion for auto components, US$2.2 billion for advanced battery storage, and a vehicle scrappage policy. In 2022, key developments included the release of the Battery Swapping Policy and Battery Waste Management Rules, along with stringent battery testing standards.[4]

By 2023, India joined the Mineral Security Partnership (MSP) to secure critical EV resources, and the PM e-Bus SEWA scheme was launched with US$~2.4 billion in financial assistance to boost electric public transport. Moreover, the Indian government is set to introduce a new EV policy that will reduce import duties on electric cars from 110% to 15%.[5] This will allow companies like Tesla and General Motors to open shops in India. However, the government has set certain prerequisites like a minimum

[1] Autovista24. (2025, February 21). *Which brand won the battle for China's EV market?* Autovista24. Retrieved from https://autovista24.autovistagroup.com/news/which-brand-won-the-battle-for-chinas-ev-market

[2] EV Design & Manufacturing. (2025). *The state of the electric vehicle industry in 2025 and beyond.* Retrieved from https://www.evdesignandmanufacturing.com/news/state-electric-vehicle-industry-2025-beyond

[3] Press Information Bureau (PIB). (2025). *Government initiatives and updates on electric vehicles in India.* Retrieved from https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1942506

[4] NITI Aayog. (2022). *Battery swapping policy draft 2022.* Retrieved from https://www.niti.gov.in/sites/default/files/2022-04/20220420_Battery_Swapping_Policy_Draft.pdf

[5] GoodReturns. (2025). *India's new EV policy to slash import tariffs from 110% to 15%: Massive EV price crash coming.* Retrieved from https://www.goodreturns.in/news/india-s-new-ev-policy-to-slash-import-tariffs-from-110-to-15-massive-ev-price-crash-coming-1408409.html

investment of ₹4,150 crore and specified annual revenue targets within five years of setting. It also introduces reduced import duties for up to 8,000 premium EVs priced above US$35,000 annually, though any imports beyond this limit would have the standard 110% duty. This should make premium EVs more affordable in the Indian market.

To localise the supply of EVs, the companies are required to set up local production plants by the end of the third year and achieve 25% local value addition by the third year, increasing to 50% by the fifth year. These progressive policies highlight India's commitment to accelerating EV adoption, reducing emissions, and strengthening domestic EV manufacturing.

Additionally, schemes promoting electric mobility (e-mobility) in India have got a renewed push in the Union Budget 2025-26 with a funding increase of over 20% compared to last year, while the scheme to Promote Manufacturing of Electric Passenger Cars in India (SMEC), which was started in 2024 to encourage adoption and manufacturing of EVs, doubled in FY26 to ₹12 crore from ₹6.16 crore in FY25 (RE) and the PM-eBus Sewa Scheme, with a focus on pushing electric bus operations, rose from ₹500 crore in FY25 (RE) to ₹1310 crore in FY26 (BE).

However, specific schemes have been excluded entirely, or their funding has been reduced like the funding for Faster Adoption and Manufacturing of (Hybrid and) Electric Vehicle in India (FAME - India) has significantly decreased from ₹4,000 crore in FY24 to ₹2,058 crore in FY25 (RE). The scheme, which supports EV purchases and charging infrastructure under its Phase II (ongoing since 2015), received no budget allocation for FY26. Similarly, the Electric Mobility Promotion Scheme, which offered subsidies for advanced battery-fitted EVs with a ₹500 crore budget until July 2024, has also been excluded from the latest Union Budget 2025-26.[6]

This shift in budget priorities indicates India's transition from EV adoption incentives to boosting domestic manufacturing through the Production-Linked Incentive (PLI) scheme, aiming to strengthen local production and reduce import dependence.

The government has initiated multiple reforms to incentivise consumers to adopt EVs. They include issuing guidelines and standards for EV Charging Infrastructure to create a connected & interoperable EV charging infrastructure network in the country. These guidelines also facilitate electricity connections for EV charging stations. The Ministry of Finance has also reduced GST on EVs from 12% to 5%. The MoRTH has announced that the battery-operated vehicles will be given green licence plates, exempted from permit requirements, and waived road tax. Moreover, the Ministry of Housing and Urban Affairs has amended the Model Building Bye-Laws, mandating the inclusion of charging stations in private and commercial buildings. [7]

Despite these efforts, the EV supply chain has not been able to localise at a rapid pace. While OEMs have been driving tier-1 localisation through limited local value addition on some components, true tier-2/3 localisation has yet to be achieved. [8] The localisation of EVs has been particularly challenging

[6] The Hindu. (2025). *Union Budget 2025: Allocation for electric mobility schemes rises by 20%.* Retrieved from https://www.thehindu.com/data/union-budget-2025-allocation-for-electric-mobility-schemes-rise-by-20/article69167749.ece

[7] Press Information Bureau (PIB). (2025). *Government initiatives for electric vehicle promotion in India.* Retrieved from https://pib.gov.in/PressReleaseIframePage.aspx?PRID=2085206

[8] PwC India. *Localisation of EV component supply chain in India*. PwC. Retrieved from https://www.pwc.in/assets/pdfs/industries/automotive/localisation-of-ev-component-supply-chain-in-india.pdf

due to the nature of components/assemblies and the available ecosystem in India. The Bill of material for EVs, which is different from the previously existing components for ICE, such as batteries with advanced chemistry, electric motors, power electronics and software, were not pre-existing in India and now make up at least 50–60% of an EV. Thus, it necessitates focusing on the key dimensions of tier-1 manufacturing presence, intellectual property (IP) and local workforce skillsets for any local development. Besides, the need for rare earth raw materials and the high content of electronic chip parts further challenge the potential for local value addition.

These issues have been to an extent addressed by the government, however, there are multiple questions from industry stakeholders: What happens when incentives run out? Would FAME II be extended? Would it have more stringent PMP requirements given that the Government is investing heavily in PLIs? Is tier-1 localisation enough? How would significant value addition move to India? Moreover, Despite the rolling out of EV policies, why are the states unable to capitalise on this growing trend of EVs and scale up their sales?

These questions need serious consideration and be worked upon by the respective stakeholders.

3 Market Share of EVs in India

India's EV sector is experiencing rapid growth, fuelled by government incentives, rising environmental concerns, and technological advancements. India has established an objective to elevate the proportion of EV sales to 30% in private cars, 70% in commercial vehicles, 40% in buses, and 80% in two-wheelers and three-wheelers by the year 2030. This ambitious objective will be 80 million EVs on Indian roads by 2030.[9] Additionally, India strives to produce complete domestic EVs through the 'Make in India' initiative. EV sales in India have reached a historic milestone this year, crossing the 2 million marks for the first time. In 2023, total EV sales were ~1.6 million units; Excitingly, in 2024 that figure surged to over 2 million units, marking a growth of 24%, reflecting an increase in consumer demand. Consequently, the penetration of EVs in India's overall vehicle market increased to approximately 8%, up from 6.8% the previous year.[10]

[9] India Brand Equity Foundation (IBEF). (n.d.). *Electric vehicle industry in India.* Retrieved from https://www.ibef.org/industry/electric-vehicle

[10] JMK Research. (2024). *India's electric vehicle sales crossed 2 million in CY2024.* Retrieved from https://jmkresearch.com/indias-electric-vehicle-sales-crossed-2-million-in-cy2024

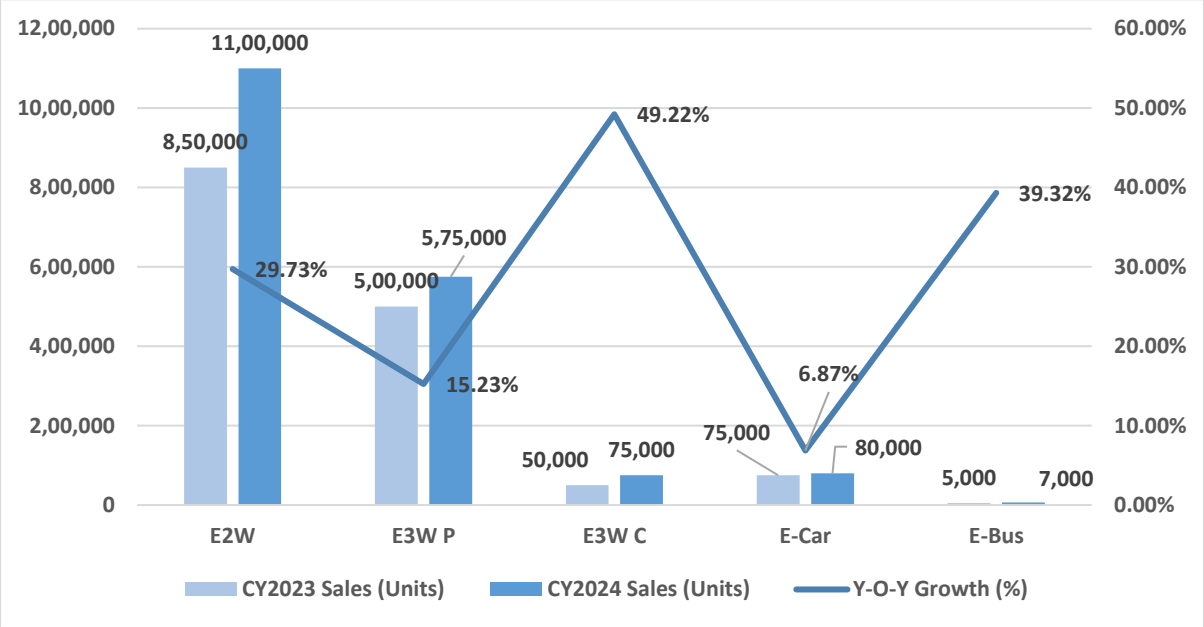

Figure 1: Comparison of EV Sales, Growth Rate, and Market Penetration by Category (CY2023 vs. CY2024)

Source: JMK Research

The chart in Figure 1.0 compares EV sales in CY2023 and CY2024 across five categories: E-2W, E-3W Passenger, E-3W Cargo, E-Car, and E-Bus.

E-2W sales grew by 29.73% YoY, with the highest EV penetration (~58.18%). E-3W Passenger saw 15.23% YoY growth, while E-3W Cargo had strong growth at 49.22%. E-Car sales rose by 6.87% YoY, but penetration remained low (~2.43%). The E-Bus segment grew by 39.32% YoY, with moderate penetration (~4.06%).[11]

On the infrastructure side, as of March 2025, there are 24,809 operational public EV charging stations nationwide[12], Maharashtra has the highest number of EV charging stations, followed by Delhi and other states. A recent Confederation of Indian Industry (CII) report emphasised the necessity of establishing at least 1.32 million charging stations in India by 2030 to facilitate the rapid growth of electric vehicles, requiring over 4,00,000 installations annually.[13]

[11] JMK Research. (2024). *India's electric vehicle sales crossed 2 million in CY2024.* Retrieved from https://jmkresearch.com/indias-electric-vehicle-sales-crossed-2-million-in-cy2024/

[12] Moneycontrol. (2024). *Maharashtra takes the lead in public charging stations, Delhi secures second place.* Retrieved from https://www.moneycontrol.com/news/business/maharashtra-takes-the-lead-in-public-charging-stations-delhi-secures-second-place-10864881.html

[13] India Brand Equity Foundation (IBEF). (n.d.). *Electric vehicle industry in India.* Retrieved from https://www.ibef.org/industry/electric-vehicle

4 Supply Chain Analysis of EVs in India

As EVs become a crucial part of the transition to sustainable mobility, understanding their supply chain is essential. A strengthened EV supply chain ensures efficiency, cost-effectiveness, and sustainability while also reducing reliance on fossil fuels, most importantly, freedom from the geopolitical risks and independence on imports from China. To understand the supply chain of EVs, one has to trace the supply of batteries, the core part of EVs. The critical part of a battery is the battery pack, which contains individual battery cells made with various materials. The cell contains the following six key components: cathode material, anode material, electrolyte, separator, positive current collector, and negative current collector. The cathode is the costliest part of the battery, representing between 50% and 60% of battery cell costs, and 90% of the cathode material costs are raw materials, which depend on the battery chemistry.[14] The most common cathode chemistries today are nickel-cobalt-manganese (NCM) cathodes and LFP cathodes. The other core part of the battery is the anode, which is mainly graphite. Ultimately, these cell components function together to convert chemical energy into electricity that powers the vehicle.

The manufacturing supply chain for electric vehicle batteries proceeds from raw materials and precursor materials to cell components and battery cells and packs, eventually reaching the end of their useful lives when some batteries are recycled and reincorporated into the battery supply chain. (Figure 2.0) The stages of the EV supply chain are elaborated further highlighting the status quo and the challenges India faces in securing the downstream and upstream supply chain of EVs.

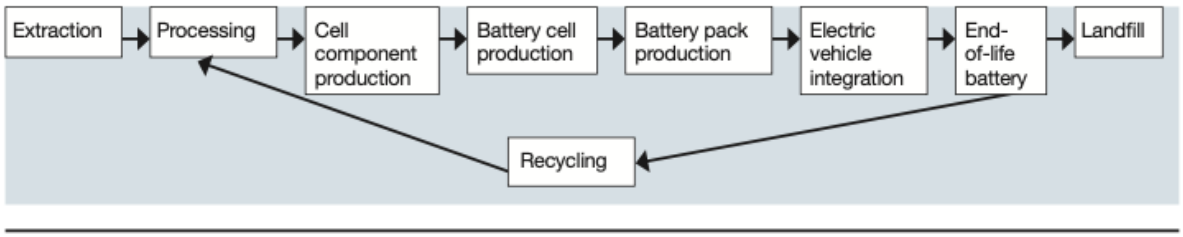

Figure 2.0 Global Supply Chains of EV Batteries

Source: International Energy Agency

4.1 Raw Material Extraction & Processing

The foundation of the EV supply chain lies in the extraction and processing of critical raw materials. Lithium, cobalt, nickel, graphite, and manganese are essential for lithium-ion batteries, while aluminium, steel, and rare earth elements are crucial for EV motors and body structures. These materials undergo refining and processing to be converted into usable components, such as lithium carbonate, for battery production. However, their global supply is concentrated in a few countries, creating geopolitical risks and potential supply chain disruptions.

The Democratic Republic of Congo dominates cobalt mining, primarily controlled by Chinese firms, while Chile holds the largest lithium reserves and is nationalising its industry to secure its supply

[14] International Energy Agency (IEA). (2024). *Global EV outlook 2024: Trends in electric vehicle batteries.* Retrieved from https://www.iea.org/reports/global-ev-outlook-2024/trends-in-electric-vehicle-batteries

chain.[15] Other critical minerals are concentrated in Brazil, Australia, the Philippines, and China. Although China does not possess the largest reserves of these minerals, it leads in refining and processing, accounting for 85-90% of rare earth element refining and over 60% of lithium, nickel, and cobalt processing. Additionally, China dominates battery component manufacturing, producing the majority of global separators, cathodes, and anodes. [16]

India possesses limited lithium, nickel, and cobalt reserves but has abundant copper, graphite, and manganese, which are crucial for battery supply chains. However, its processing capabilities remain underdeveloped. The country's EV industry relies on a variety of mineral resources that are unevenly distributed across states. Odisha holds the largest share of nickel and cobalt iron deposits essential for EV battery production, followed by Jharkhand and Nagaland. Other states like Rajasthan, Bihar, and Andhra Pradesh house major mica belts, while Odisha, Chhattisgarh, and Karnataka contain pegmatite belts, making them key regions for lithium exploration. Karnataka's Mandya and Yadgiri districts have also been identified as potential lithium-rich zones.

To accelerate the discovery of deep-seated critical minerals, India has introduced a new mineral concession, the Exploration Licence, allowing reconnaissance and prospecting operations. To accelerate this process, 20 exploration blocks have been allocated for auction, with Rajasthan, Karnataka, Maharashtra, Andhra Pradesh, Madhya Pradesh, and Chhattisgarh leading the notification of blocks for exploration.

Beyond raw material extraction, several states are making strides in battery recycling initiatives. Delhi, Madhya Pradesh, Punjab, Telangana, and Uttar Pradesh offer subsidies on loans for investments in recycling equipment and machinery, ensuring efficient reuse of critical materials. India's battery cell production currently accounts for less than 1% of the global market, though domestic companies are expanding, particularly in anode material manufacturing.

Battery assembly in the country is primarily concentrated in the two- and three-wheeler segments, driven by strong local demand and government incentives. Strengthening the battery value chain is critical to reducing reliance on imports and ensuring global supply chain resilience. However, mining projects in India face long lead times of 12–16 years due to regulatory challenges, environmental concerns, and local opposition. While capital costs in India are lower than in the U.S. or EU, they remain 20–90% higher than in China, posing a competitive challenge for domestic production.

4.2 Battery Manufacturing

Beyond raw material extraction, battery manufacturing involves the production of key components, including cathodes, anodes, electrolytes, and separators. These materials are used to manufacture lithium-ion battery cells, which are then assembled into battery modules and packs, followed by quality testing and energy density optimisation. The battery accounts for a significant 30–40% of the vehicle BoM cost, with roughly 18–22% of this cost locked in battery cell raw materials (largely rare

[15] U.S. Army War College, Strategic Studies Institute (SSI). (2024). *China in the Democratic Republic of the Congo: A new dynamic in critical mineral supply chains.* Retrieved from https://ssi.armywarcollege.edu/SSI-Media/Recent-Publications/Article/3938204/china-in-the-democratic-republic-of-the-congo-a-new-dynamic-in-critical-mineral/

[16] Goldman Sachs. (n.d.). *Resource realism: The geopolitics of critical mineral supply chains.* Retrieved from https://www.goldmansachs.com/insights/articles/resource-realism-the-geopolitics-of-critical-mineral-supply-chains

earth).[17] This is a significant value that is completely determined by reserves of raw materials and lies beyond the scope of localisation. India's lithium-ion battery manufacturing capacity is still in its early stages, with only 6.7 GWh of nameplate capacity commissioned by the end of 2023. However, with an additional 246 GWh announced through 2035, the landscape is set to change significantly. The realisation of these targets depends on factors such as delays in plant commissioning, market maturity, and domestic manufacturers' experience.

India has a distinct cost advantage in lithium iron phosphate (LFP) cell production. Production Linked Incentives (PLI) could make Indian-made LFP cells cheaper than those from China. However, Indian manufacturers face competition from Chinese imports due to low logistics costs. Shipping batteries from China to India costs just US$1.2/kWh compared to US$8/kWh for Europe[18]. Moreover, given India's lower costs in these areas, the country has strong potential to produce batteries at a globally competitive rate. For instance, LFP cells produced in India at US$45/kWh could be US$3.5/kWh cheaper than those from China and significantly more affordable than those made in Germany or the U.S., where costs exceed US$60/kWh. However, achieving this cost efficiency will require scaling production to multi-gigawatt levels and developing a fully localised supply chain. Additionally, balancing domestic demand with export opportunities will be crucial. With recent policy shifts, such as the reduction in import duties for foreign EV manufacturers, Indian producers may face increased competition. However, geopolitical shifts, particularly in the U.S. and Europe, are opening new markets for battery exports.

4.3 EV Component & Vehicle Manufacturing

The production of EV components and vehicle manufacturing involves key processes such as electric powertrain development, chassis and body manufacturing, battery pack integration, and final assembly. Electrical and electronic (E/E) components now account for 15–20% of the total bill of materials (BoM), with the powertrain contributing significantly[19].

In India, the growing two-wheeler and three-wheeler EV market has led to increased demand for brushless DC (BLDC) motors, attracting investments from both startups and large tier-1 companies. However, these motors rely heavily on Chinese imports for critical child parts like rare earth magnets and laminated stators, limiting domestic value addition. High-value technologies such as permanent magnet synchronous motors (PMSM) and e-axles are still in the early development stages locally. Additionally, high-voltage power electronics—such as connectors, contactors, relays, and DC-DC converters—remain largely imported from China and Taiwan due to high capital requirements. Proprietary systems like battery management systems (BMS), motor control units (MCUs), and vehicle control units (VCUs) also depend on foreign-made semiconductor chips, printed circuit boards (PCBs), and thermal interface materials (TIMs), with Indian OEMs still developing capabilities in complex E/E system design.

[17] Economic Times Auto. (2023). *Lithium-ion and beyond: EV battery raw material refining and manufacturing [Opinion].* Retrieved from https://auto.economictimes.indiatimes.com/news/auto-technology/lithium-ion-and-beyond-ev-battery-raw-material-refining-and-manufacturing-opinion/100867972

[18] NITI Aayog. (2022). *Capturing value of ACC battery manufacturing.* Retrieved from https://www.niti.gov.in/sites/default/files/2022-04/Capturing-Value-of-ACC-Battery-Manufacturing_web_1.pdf

[19] S&P Global Mobility. (n.d.). *Electric vehicles & battery production in India.* Retrieved from https://www.spglobal.com/mobility/en/research-analysis/electric-vehicles-battery-production-india.html

Software plays a crucial role in EVs, managing performance, thermal control, and over-the-air (OTA) updates. While not directly listed in BoMs, software-driven black-box assemblies hold significant value but are challenging to localise without tier-1 support. Some localisation is taking place in testing and flashing, but these processes rarely influence supplier selection. Automakers are pushing for in-house software development to enhance efficiency and security, yet India's reliance on imports for semiconductor and electronic components remains a major constraint. Strengthening domestic manufacturing, reducing dependence on foreign supply chains, and building a robust semiconductor ecosystem will be critical to achieving greater self-sufficiency in EV production.

4.4 Logistics, Infrastructure & Energy Supply

The expansion of EV logistics, infrastructure, and energy supply is crucial for sustainable growth. Efforts are focused on developing charging networks, integrating EVs with the power grid, and promoting renewable energy use. Charging infrastructure includes home, public, and fast chargers, with home chargers taking six to 19 hours and public stations reducing this to around an hour. To improve accessibility, the Ministry of Power clarified in 2018 that EV charging does not require a license under the Electricity Act of 2003.

Additionally, NITI Aayog introduced a draft Battery-Swapping Policy in 2022, allowing users to exchange depleted batteries for charged ones, offering flexibility and reducing wait times. However, two major issues persist: power outages caused by inefficient transmission and distribution and a shortage of public charging stations, both of which deter potential EV buyers[20]. As EV adoption accelerates, electricity demand will rise, but India's dependence on coal-fired power plants raises environmental concerns, including air pollution and health hazards. Transitioning to cleaner energy sources will be essential to minimise the negative impacts of coal-based electricity generation.

Managing the increased electricity load from EVs requires careful planning, as studies by TERI[21] highlight the potential for localised overloading of power distribution networks due to uneven EV adoption across cities. Financial barriers also hinder growth, with a 2022 study by NITI Aayog, RMI, and RMI India noting that lenders remain hesitant due to product quality concerns and uncertain resale values. Beyond financing, the industry faces challenges related to workforce technical expertise, research and development capabilities, and the availability of critical ancillary auto components. Additionally, backward linkages with metal industries, capital equipment, trucking, warehousing, logistics, and dealership networks play a crucial role in scaling the EV ecosystem. Addressing these bottlenecks through targeted policies, investment in infrastructure, and workforce skill development will be key to ensuring a robust and sustainable EV industry in India.

4.5 Consumer Use & Maintenance

The transition to electric vehicles in India has received mixed reactions from consumers. While the government has taken steps to expand charging networks with fast, home, and public charging stations, issues such as power transmission inefficiencies and dependency on coal-based electricity

[20] Press Information Bureau (PIB). (n.d.) Retrieved from https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1983058

[21] NITI Aayog. (2023). *Electric vehicles charging infrastructure.* Retrieved from https://www.niti.gov.in/sites/default/files/2023-05/Final-smaller_Electric-Vehicles-Charging-Infrastructure.pdf

hinder sustainable growth. The Ministry of Power clarified 2018 that EV charging does not require a license under the Electricity Act, encouraging private investment in charging stations[22].

NITI Aayog's 2022 draft Battery-Swapping Policy offers an alternative solution to reduce charging time and operational delays. However, the EV supply chain also faces roadblocks related to workers' technical expertise, R&D capabilities, availability of ancillary auto components, and integration with sectors like logistics, warehousing, and credit financing. These gaps, coupled with an uneven distribution of EV adoption within cities, create the risk of overloading certain sections of the power distribution network, affecting long-term scalability.

Consumer confidence in EVs is also shaped by a lack of awareness, safety concerns, and maintenance challenges, all of which directly impact the supply chain. The launch of NITI Aayog's e-Amrit portal in 2021 aimed to bridge this knowledge gap, yet the adoption of EVs remains hindered by range anxiety and limited charging stations. Incidents of EVs catching fire due to defective battery management systems and poor-quality lithium-ion cells have further fueled scepticism, prompting the government to introduce stricter battery safety standards.

Despite rising sustainability consciousness, many consumers remain wary of EV ownership, with studies showing that 51% of EV owners consider switching back to ICE vehicles due to high maintenance costs and the unavailability of skilled technicians. Moreover, while digital platforms are reshaping car-buying behaviour, the absence of well-developed flexible ownership models, such as leasing and pay-per-use options, adds another layer of hesitation. To truly integrate EVs into India's mainstream mobility landscape, strengthening the supply chain through improved R&D, workforce training, localised manufacturing, and better financing mechanisms will be essential.

4.6 End-of-Life Management & Recycling

India's transition to electric mobility demands a robust end-of-life management system, yet the economic and policy landscape surrounding battery recycling and repurposing remains underdeveloped. The Ministry of Environment, Forest, and Climate Change introduced the Battery Waste Management Rules, 2022 to ensure environmentally sound disposal of EV batteries under an Extended Producer Responsibility (EPR) framework. By mandating producers and importers to collect, recycle, or refurbish used batteries while prohibiting landfill disposal and incineration, the policy aims to create a circular economy for critical minerals like lithium, cobalt, and nickel. However, despite this regulatory push, private sector participation in battery recycling and second-life applications remains limited, with few startups investing in large-scale battery recovery, material extraction, or energy storage solutions.

From an economic perspective, the absence of advanced recycling infrastructure and formalised vehicle dismantling processes limits the potential value recovery from end-of-life EV components. While repurposing used batteries for energy storage, such as solar grid applications, could address India's growing renewable energy needs, the market remains fragmented due to inadequate investment and technological constraints. Additionally, the lack of a centralised trading platform for recycled battery materials, despite the EPR certification mechanism, slows down market incentives for businesses to engage in sustainable battery disposal. The few startups in this space face high entry barriers, including capital-intensive processes, regulatory uncertainties, and limited government-backed incentives.

[22] Ministry of Power, Government of India. (n.d.). *Clarification on electric vehicle (EV) charging infrastructure.* Retrieved from https://powermin.gov.in/sites/default/files/uploads/Clarification_EV.pdf

5 States-wise Breakdown of EVs in India

Consequent to the government of India's push towards the paradigm shift from ICE to large EV penetration in the country by 2030, several states in India have proposed and notified their EV policies aimed at promoting manufacturing and increasing demand for EVs in their respective states. The state governments have taken various initiatives to attract manufacturing and adoption of EV fleet and related technologies. A combination of indicators has been used to analyse the regional and state-level penetration of EVs in India. This includes an assessment of policy interventions, examining the year of establishment, key features, and implementation strategies of EV policies across different states to understand their impact. Additionally, the study evaluates the incentives provided by states, both fiscal and non-fiscal, to determine their role in promoting EV adoption. The availability and adequacy of charging infrastructure have also been analysed to assess the readiness of different states for EV integration. Furthermore, the downstream supply chain and EV sales data have been examined to gauge consumer response and overall market trends in India.

5.1 Policy Analysis

All States and UTs in India have their own EV policies (except Puducherry and Nagaland), which, apart from providing an EV ecosystem, also focus on attracting investments in the EV sector. While the central government has been running various programs and schemes like FAME I & II, the State Governments drive their policies. While the adoption of EVs started at a very slow pace in 2014-15, the momentum has picked up now, with a surge in states contributing to the growth of EVs in India.

The table 1 below highlights the EV policy landscape across Indian states and union territories, showcasing their commitment to electric mobility. Most active states like Maharashtra, Karnataka, Tamil Nadu, Delhi, and Gujarat have strong policies emphasising manufacturing, infrastructure, and subsidies. Several states, including Maharashtra, Tamil Nadu, Odisha, and Andhra Pradesh, have amended their policies to enhance incentives and infrastructure. A notable feature is Delhi's so-called "EV cell", which was established in 2022 to speed up the implementation of EV policy, facilitate the disbursement of incentives, and accelerate the development of the EV charging network. This feature could also be adopted by other states.

The key focus areas of most states include charging network expansion, financial incentives, and skill development. However, Nagaland and Puducherry remain without a formal EV policy, which may slow adoption compared to states with structured incentives.

Table 1: State-wise Breakdown of EV Policy

State/UT	EV Policy Name	Year Introduced	Amendment Status/New Order or scheme Released	Key Features
Andhra Pradesh	Andhra Pradesh Electric Mobility Policy	2018	2024	Incentives for EV manufacturing, charging infra push, aims for 1 million EVs by 2024
Arunachal Pradesh	Arunachal Pradesh EV Policy	2022	Not Amended	Focus on clean transport, subsidies for 2W, 3W, charging infrastructure incentives

Assam	Assam Electric Vehicle Policy	2021	Not Amended	Subsidies for EVs, tax waivers, charging infra expansion
Bihar	Bihar Electric Vehicle Policy	2019	2023	Higher subsidies for e-rickshaws, focus on rural EV adoption
Chhattisgarh	Chhattisgarh EV Policy	2022	Not Amended	EV incentives, charging station network expansion
Chandigarh	Chandigarh EV Policy	2022	2023	Strong focus on pollution control, purchase incentives, public awareness campaigns
Delhi	Delhi EV Policy	2020	Not Amended	Extensive incentives, scrappage policy, charging infra push
Goa	Goa Electric Mobility Promotion Policy	2021	2024	Focus on EV tourism, incentives for EV purchases and infra
Gujarat	Gujarat State Electric Vehicle Policy	2021	2024	Purchase incentives, focus on charging infra, EV manufacturing support
Haryana	Haryana Electric Vehicle Policy	2022	2023	Support for EV production, infrastructure development, incentives for 2W & 3W
Himachal Pradesh	Himachal Pradesh EV Policy	2022	2023	Public transport electrification, charging infrastructure focus
Jharkhand	Jharkhand Electric Vehicle Policy	2022	Not Amended	Subsidies for EV buyers, charging infra expansion, focus on job creation
Karnataka	Karnataka Electric Vehicle Policy Karnataka Clean Mobility Policy (2025)	2017	2025	First state to have an EV policy, subsidies for manufacturing, infra boost Aims to develop a comprehensive ecosystem for electric and hydrogen-based vehicles in the state
Kerala	Kerala Electric Vehicle Policy	2019	Not Amended	EV purchase incentives, charging station expansion, focus on R&D
Madhya Pradesh	Madhya Pradesh Electric Vehicle Policy	2019	2025	Purchase subsidies, incentives for charging infrastructure
Maharashtra	Maharashtra Electric Vehicle Policy	2021	2025	Subsidies for 2W, 3W, 4W, and buses, incentives for infra & manufacturing
Manipur	Manipur Electric Vehicle Policy	2022	Not Amended	Charging infra push, subsidies for 2W, 3W
Meghalaya	Meghalaya Electric Vehicle Policy	2021	Not Amended	Incentives for public & private EV adoption, focus on hilly terrain solutions
Mizoram	Mizoram Electric Vehicle Policy	2022	Not Amended	Encourages clean transport adoption, incentives for buyers

Odisha	Odisha Electric Vehicle Policy	2021	2024	Purchase subsidies, manufacturing incentives, charging infra development
Punjab	Punjab Electric Vehicle Policy	2022	Not Amended	Subsidies for EVs, support for charging infra, focus on skill development
Rajasthan	Rajasthan Electric Vehicle Policy	2022	Not Amended	Financial incentives, charging station expansion
Sikkim	Sikkim EV Policy	2022	Not Amended	Focus on clean transport, incentives for private & public EVs
Tamil Nadu	Tamil Nadu Electric Vehicle Policy	2019	2023	EV industry incentives, charging infra push, skill development
Telangana	Telangana Electric Vehicle Policy	2020	2025	EV adoption subsidies, manufacturing and infra incentives
Tripura	Tripura EV Policy	2022	Not Amended	Focus on two-wheelers, charging infra expansion
Uttar Pradesh	Uttar Pradesh Electric Vehicle Policy	2020	2022	Incentives for EV buyers, charging infra, focus on rural adoption
Uttarakhand	Uttarakhand Electric Vehicle Policy	2020	Not Amended	Financial incentives, EV manufacturing push
West Bengal	West Bengal Electric Vehicle Policy	2021	Not Amended	Subsidies for 2W, 3W, public transport electrification
Puducherry	No Policy			
Nagaland	No Policy			

The chart represents the count of States/UTs based on their EV policy amendment status. A significant number of States/UTs have not yet amended their EV policies, indicating slow policy revisions or a lack of urgency in updating regulations. A few States/UTs have introduced new EV schemes in 2024 or released new orders in 2025, suggesting recent policy developments. Amendments in 2022, 2023, 2024, and 2025 are relatively low, highlighting that only a handful of states are actively revising their EV policies. The presence of blank values indicates missing data or States/UTs that haven't reported their amendment status. Overall, while some policy advancements are happening, a majority remain unchanged, potentially impacting EV adoption and infrastructure growth.

5.2 Incentive

Delhi, Maharashtra, Uttar Pradesh, Gujarat, and Tamil Nadu have emerged as leaders in the EV sector, offering strong incentives to encourage adoption and manufacturing. Delhi provides significant subsidies, including ₹30,000 for electric two-wheelers (E-2Ws) and ₹1.5 lakh for electric four-wheelers (E-4Ws), alongside scrappage incentives and exemptions from road tax. Maharashtra also extends financial support with up to ₹10,000 per E-2W and ₹2.5 lakh for electric buses, further enhancing adoption through early bird incentives. Uttar Pradesh, the highest EV-selling state, promotes uptake through a ₹5,000 per kWh subsidy for E-2Ws and ₹20,000 for E-4Ws, reinforcing its leadership in EV penetration. Gujarat's ₹10,000 per kWh incentive, coupled with 100% tax waivers,

has made EVs more affordable, while Tamil Nadu focuses on bolstering local manufacturing by offering tax benefits and industry-specific incentives.

States such as Odisha, Bihar, and Chandigarh have prioritised demand-side incentives, including exemptions from road tax and registration fees, purchase subsidies across multiple vehicle categories, and support for retrofitting and scrappage. These efforts align with electricity tariff incentives aimed at reducing the cost of charging infrastructure. In contrast, states like Arunachal Pradesh, Nagaland, and Ladakh offer minimal incentives, leading to slower EV adoption and a weaker supply chain. A clear trend emerges where industrialised and high-population states have taken proactive measures to integrate EVs into their transportation landscape, while north-eastern and smaller states lag due to limited policy focus and infrastructure constraints. Additionally, a combination of fiscal and non-fiscal measures, such as charging station development, battery production support, and regulatory frameworks, is becoming a key strategy to create a balanced push-and-pull effect for accelerating EV adoption across India.

5.3 Charging Infrastructure

ındia's EV charging infrastructure is expanding, but its distribution remains highly skewed, with certain states leading while others lag behind (Annexure). Maharashtra, Karnataka, Delhi, Gujarat, and Tamil Nadu have successfully developed dense charging networks due to strong policy frameworks, urban demand, private sector involvement, and proactive government interventions. These states benefit from financial incentives, streamlined land acquisition, and reliable electricity grids, making it easier to establish charging stations.

However, states like those in the Northeast, Jharkhand, and smaller Union Territories face significant roadblocks, including low EV adoption, weak grid infrastructure, and geographic and logistical challenges. Even states with progressive EV policies, like Uttar Pradesh and Rajasthan, have slower implementation due to bureaucratic delays, land acquisition hurdles, and inconsistent subsidy disbursement under schemes like FAME-II.

Additionally, the preference for private, home-based charging in low-density areas reduces the commercial viability of public charging stations. This uneven growth slows national EV adoption and risks creating an imbalance where only metro cities and industrial hubs benefit from electrification. Addressing these disparities requires region-specific policy interventions, faster regulatory approvals, and strategic investments in rural and semi-urban infrastructure. A focus on localised incentives, simplified subsidy processes, and PPP models could accelerate equitable EV infrastructure development across the country.[23]

[23] Press Information Bureau (PIB). (2024).Retrieved from https://pib.gov.in/PressReleasePage.aspx?PRID=2102783

5.4 State-wise EV Sales

The state-wise EV sales data in the Annexure reveal significant regional disparity in electric vehicle adoption. States like Delhi, Maharashtra, Karnataka, Tamil Nadu, and Gujarat have introduced well-structured EV policies, offering financial incentives, subsidies on EV purchases, tax exemptions, and infrastructure development plans to promote adoption. These policies are complemented by strong industrial support, leading to the development of EV manufacturing hubs and charging networks.

Despite having the highest EV sales, Uttar Pradesh faces challenges in policy execution, reflecting a gap between policy intent and implementation. Bihar, Assam, and West Bengal are emerging players with policies focusing on affordability and public transport electrification, but their ecosystem development remains slow. Meanwhile, states like Jharkhand, Chhattisgarh, and many in the Northeast struggle with limited policy frameworks, lower consumer incentives, and weaker infrastructure. Some Union Territories and smaller states, such as Goa and Ladakh, have ambitious policy goals but face geographical and logistical hurdles that slow execution. The effectiveness of EV policies is directly tied to regional economic conditions, government proactiveness, and industrial participation. To ensure balanced EV adoption across the country, states with weaker policies need strategic interventions, such as streamlined incentives, industry collaborations, and targeted infrastructure investments to bridge the growing disparity.

6 Conclusion

India's evolving EV policy signals a strategic shift from prioritising adoption through direct subsidies to fostering domestic manufacturing and self-reliance. The increased focus on the Production-Linked Incentive (PLI) scheme and reduced budget allocations for consumer-centric subsidies indicate a long-term vision of strengthening the EV supply chain and reducing dependence on imports. While this transition aims to build a robust ecosystem, it poses short-term challenges, such as affordability concerns, limited charging infrastructure, and greater technological advancements in battery production.

To sustain the momentum of EV growth, a balanced approach is essential—one that supports manufacturing while ensuring accessibility and affordability for consumers. Strengthening R&D, expanding charging networks, and fostering private-sector investment will be key to overcoming barriers. Stable policy frameworks and state-level collaboration can also drive localised production and adoption. A coordinated effort across industries, policymakers, and stakeholders will be crucial in positioning India as a global leader in the electric mobility sector.

7 Annexure

State-wise EV Sales IN 2024

Source: Ministry of Heavy Industries

State	EV SALES	State	EV SALES
Uttar Pradesh	20,708	Uttarakhand	855
Bihar	6,582	Tripura	757
Delhi	5,673	Jammu and Kashmir	680
Karnataka	5,648	Chandigarh	319
Maharashtra	5,348	Goa	260
Tamil Nadu	4,941	Puducherry	114
Assam	4,237	Himachal Pradesh	110
West Bengal	3,345	Manipur	47
Rajasthan	3,225	Mizoram	47
Madhya Pradesh	3,096	Meghalaya	33
Kerala	2,460	DNH and DD	18
Haryana	1,723	Arunachal Pradesh	1

Gujarat	1,503	Nagaland	1
Punjab	1,457	Andaman & Nicobar Islands	-
Odisha	1,336	Ladakh	-
Chhattisgarh	1,331	Andhra Pradesh	1,011
Jharkhand	1,191		

Details of EVCS installed / energized by PSU OMCs in States / UTs

Source: Ministry of Health and Family Welfare

S. N.	State/ UTs	EV Charging Stations under FAME-II Subsidy Scheme		Total No. of EV charging stations installed by OMCs from their own funds as on 01.01.2025
		No. of EV Charger installed as on 01.01.2025	No. of EV Charging Stations energized as on 01.01.2025	
1	Andaman & Nicobar	0	0	6
2	Andhra Pradesh	354	20	912
3	Arunachal Pradesh	2	0	52
4	Assam	83	2	448
5	Bihar	58	2	517
6	Chandigarh	0	0	23
7	Chhattisgarh	30	1	498
8	Delhi	41	5	316
9	Goa	9	0	70
10	Gujarat	312	50	1104
11	Haryana	366	3	1068
12	Himachal Pradesh	21	0	136
13	Jammu & Kashmir	23	0	170
14	Jharkhand	116	0	349
15	Karnataka	370	3	1516

16	Kerala	208	0	679
17	Ladakh	0	0	11
18	Lakshadweep	0	0	1
19	Madhya Pradesh	154	6	1114
20	Maharashtra	431	121	1595
21	Manipur	8	0	57
22	Meghalaya	25	0	54
23	Mizoram	2	0	16
24	Nagaland	10	0	41
25	Odisha	114	0	661
26	Puducherry	7	1	27
27	Punjab	151	2	828
28	Rajasthan	351	7	1482
29	Sikkim	1	0	12
30	Tamil Nadu	444	6	1448
31	Telangana	238	1	1051
32	Tripura	1	0	55
33	Uttar Pradesh	269	10	2561
34	UT of Dadar and Nagar Haveli and Daman and Diu	3	0	12
35	Uttarakhand	41	4	212
36	West Bengal	280	7	933
TOTAL		**4523**	**251**	**20035**

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