



States in the Driver's Seat

Policies localizing electric vehicle and battery manufacturing in India

IISD REPORT



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States in the Driver's Seat: Policies localizing electric vehicle and battery manufacturing in India

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Executive Summary

The global automotive industry is undergoing a structural shift driven by transport electrification and increasing electric vehicle (EV) adoption. As the world's fourth-largest automotive base—valued at nearly USD 240 billion, contributing about 7.1% of GDP, and supporting over 30 million direct and indirect jobs—India holds the potential to create local manufacturing opportunities through the EV transition.

In 2024 alone, global investments in EVs reached USD 763 billion, with an additional USD 39 billion invested in charging infrastructure. India holds a small (2%) but rapidly growing share in global investments in battery EVs. EV manufacturing requires a fundamentally different industrial configuration. It is capital-intensive, electronics- and battery chemistry-driven, and significantly more exposed to global supply chains than conventional automotive manufacturing. That means existing automotive strengths do not automatically translate into competitiveness in EVs and batteries. Continued dependence on imported batteries, power electronics, and advanced materials—particularly from China—risks widening India's trade deficit and exposes the industry to supply chain disruptions.

This underscores the urgency of deepening EV and battery supply chain localization. The Government of India has introduced several supply-side measures to localize the EV and battery supply chains—notably 1) two Production Linked Incentive (PLI) schemes for automobile and auto components and advanced chemistry cells, 2) a phased manufacturing program for claiming EV demand incentives, 3) PLI and Modified Electronics Manufacturing Cluster schemes for large-scale electronics manufacturing, and 4) a scheme to promote manufacturing of sintered rare-earth permanent magnets in India. Proposed Corporate Average Fuel Efficiency III (2027-2032) standards are also expected to encourage original equipment manufacturers (OEMs) to scale production of zero-emission vehicle (ZEV) sales, provide demand certainty, and localize the EV supply chain.

While these policy instruments help bridge certain cost disadvantages for EV manufacturers through output-linked incentives and demand creation, they do not fully overcome deeper structural barriers. At the time of writing, net localization for several high-cost EV components—such as batteries, motors, DC-DC convertors, and on-board chargers—remains below 20% in India. Persistent challenges include limited access to long-term patient capital, technology risk, availability of plug-and-play industrial infrastructure, investment-ready project pipelines, and thin domestic supplier depth for the manufacturing of advanced components. Our stakeholder consultations revealed that many of these policy levers fall within the remit of state governments. At the time of writing, 33 out of 36 states and union territories in India have notified EV policies, reflecting strong and widespread confidence among subnational governments in the shared EV adoption goals. Yet there is limited evidence of how state-level policy choices are localizing manufacturing outcomes across the EV supply chain in India.

This study provides specific actions for state and central governments to strengthen the policy framework for localizing EV and battery manufacturing by analyzing

1. how state policies complement central government incentives across the EV supply chain in India,



2. which policy instruments are most effective in de-risking capital-intensive and first-of-their-kind¹ EV and battery manufacturing projects, and
3. how Indian states compare with each other across the EV value chain and the inter-state cross-learning for policy design.

The report examines these questions by comparing relevant state policies across 14 major automotive states in India. It uses a systematic review of state EV and industrial policies, findings from an industry perception survey, state-level stakeholder convening, and consultations. The analysis documents the availability of policy instruments, their impact on capital cost and operating cost structures for different actors across the EV supply chain, and the lessons learned.

Localization cannot be achieved through central policies alone. States control critical levers—land acquisition, power tariffs, logistics infrastructure, and regulatory clearances—that determine EV and battery manufacturing competitiveness and investment decisions.

Key Findings

Central supply-side EV and battery policies are beginning to translate into investments spanning the EV value chain. These investments reflect early but tangible progress on localization across the value chain, but are leading to geographically dispersed manufacturing outcomes.

At least 14 states in India provide financial support through capital expenditure- or operating expenditure-reducing measures for localizing EV and battery manufacturing, indicating a growing ambition among Indian states to attract investments in the sector. Non-financial state enablers such as testing facilities, single-window clearance systems,² and workforce development also exist, although their nature differs across states. Most relevant policy instruments support activities such as EV assembly, automotive component manufacturing, battery manufacturing, and research and development (R&D). However, state policies remain less differentiated for midstream (such as production of cathode active materials, or precursor materials) and upstream (critical minerals mining or sourcing) segments of the value chain, demonstrating growing policy maturity for downstream segments but nascency in terms of an emerging integrated value chain strategy.

Policy-relevant insights from the study include:

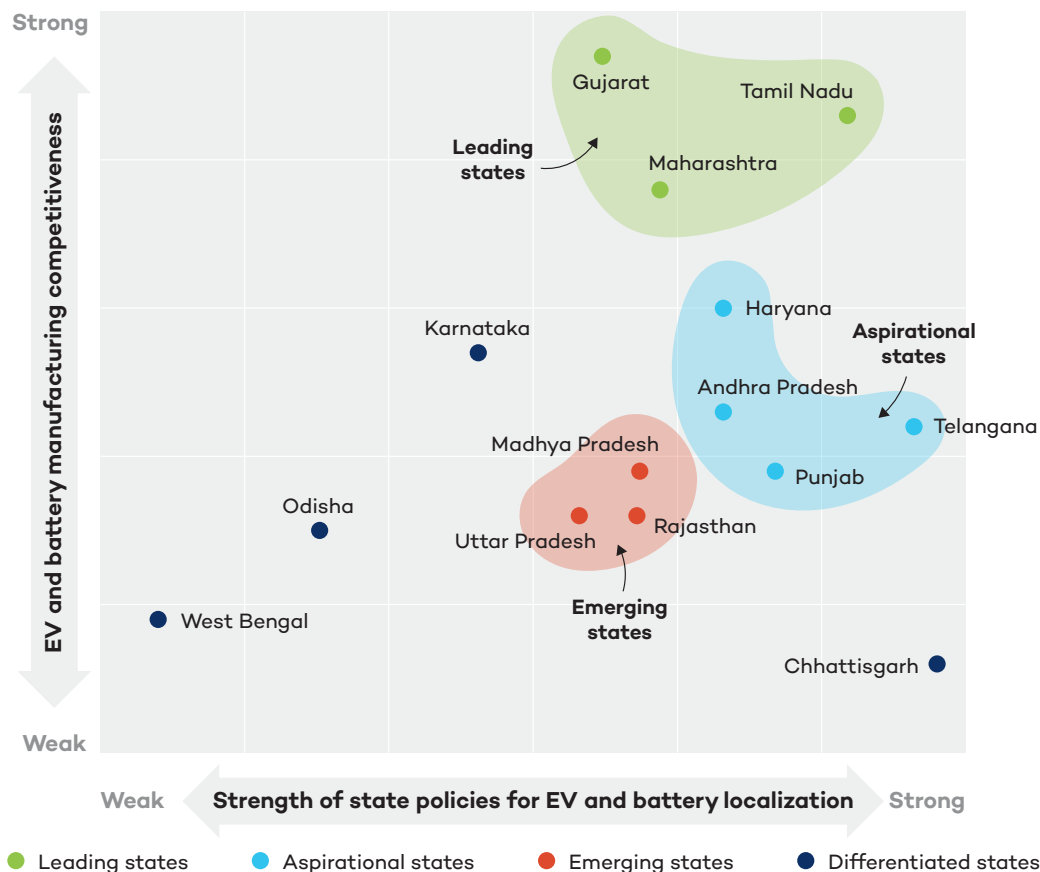
¹ In the context of battery manufacturing, first-of-their-kind projects refer to the first commercial-scale deployment of a new battery technology, chemistry, or manufacturing process. These projects bridge the “valley of death” between laboratory-proven technology and mature, high-volume production (often called “Nth-of-a-Kind”).

² A single-window clearance system is a one-stop portal for investors. It enables them to digitally access state-related business approvals and apply them according to their business requirements. Investors can track their application progress and access relevant resources and support services, such as chatbots, as in the case of Karnataka (Invest Karnataka, n.d.). The portal is designed to assist investors in a transparent, time-bound, and hassle-free manner. However, what is offered differs across states.



- 1. Alignment between centre and state policies strengthens the overall incentive stack:** State incentives reduce location-specific costs, while central government incentives reward production and value addition. However, most state policies lack deliberate coordination with central incentives, limiting overall effectiveness. Most state EV and industrial policies are not designed to align with the central government incentives, reducing the effectiveness of the incentive stack. Only one state (Andhra Pradesh) offered a structured top-up to central government incentives and is increasingly becoming attractive for capital-intensive segments, such as cell manufacturing due to better policy complementarity.
- 2. Targeted policy instruments that address specific cost barriers are needed for effective localization:** States have distinct strengths across the EV and battery value chain. Yet many deploy similar incentives across all segments, rather than focusing on specific areas (e.g., focusing on batteries, electronics, recycling, or midstream components) aligned with their industrial advantages. Leading states like Tamil Nadu, Maharashtra, and Gujarat—driven by the depth of their automotive ecosystem and competitive manufacturing—are best placed for integrated localization, while aspirational states such as Andhra Pradesh and Telangana can specialize in segments like electronic components and batteries. Emerging states (e.g., Uttar Pradesh) may achieve a greater impact by prioritizing downstream assembly and improving manufacturing fundamentals.

Figure ES1. States' strengths for localizing capital-intensive EV segments



Source: Authors' analysis.



- 3. State policies are often insufficient to de-risk capital-intensive midstream and upstream battery investments:** Localizing midstream and upstream production of battery-grade raw materials and components involves high capital risk, technology risk, raw material price volatility, and long payback periods. Most states analyzed in the study attempt to de-risk EV and battery projects by improving general capital expenditure and operating expenditure concerns, making them unable to absorb the unique technological and demand risks inherent in midstream and upstream first-of-their-kind battery manufacturing investments. Similarly, output-linked incentives by the central government, such as PLI schemes, also reward only realized production, making these segments the hardest to localize.

Recommendations

Looking ahead, deepening EV and battery localization in India will require a shift from incentive competition toward coordination, specialization, and ecosystem building. For policy-makers, this implies three broad priorities. First, policy stacks—across central and state levels—must more deliberately de-risk capital-intensive and first-of-their-kind investments through upfront support, patient capital instruments, and faster project execution. Second, states need to move beyond fragmented incentives toward integrated ecosystem development that combines plug-and-play infrastructure, testing and certification capacity, skill development, and micro, small, and medium-sized enterprise integration. Third, demand certainty—through public procurement, ZEV mandates, and the creation of low-emission zones—will be critical for reducing market risk and crowd in private investment across the value chain.

For future policy design, states should adopt differentiated value-chain strategies based on existing industrial strengths rather than attempting full vertical integration.

To enable an effective policy stack for localizing EV and battery manufacturing in the country, central and state governments can focus on the following actions.

- 1. Design subnational support measures that de-risk midstream and upstream battery investments.** State governments may need to use policy instruments other than subsidies and grants to de-risk midstream and upstream battery investments, such as indirect equity investment models (e.g., fund-of-funds approach or co-investment models).
- 2. Provide dedicated policy support for R&D investments, patent filing, and strategic intellectual property (IP) creation in the battery value chain.** The Government of India could establish a dedicated scheme to accelerate domestic battery and cell R&D and IP creation, similar to the Ministry of Electronics and Information Technology's Design-Linked Incentive scheme for semiconductor design.



Public support should reward localization-relevant R&D expenditure on novel product design and IP creation and tie later incentives to productization and deployment.

- 3. Conduct fresh rounds for PLI Auto to increase industry participation as downstream manufacturing for EV OEMs and component suppliers matures.** Broadening participation would expand the number of beneficiaries, spread incentives across a wider set of firms, and increase the uptake of incentives during the scheme period while ensuring that domestic value addition criteria are maintained.
- 4. Develop project preparation facilities and plug-and-play industrial land infrastructure at the state level to further accelerate cell and battery manufacturing.** Project preparation facilities at the state level—which develop bankable, investment-ready projects—can help attract further investments in midstream and upstream projects and reduce execution risks. Planned and dedicated industrial parks that provide reliable, high-quality power and supply, testing and certification facilities, environmental management systems, waste-handling and chemical storage infrastructure, and efficient logistics connectivity can help attract anchor investors and lead to a domino effect in the localization of the EV supply chain.
- 5. Bridge the skill gap by establishing a dedicated skilled workforce development program for EV and battery manufacturing.** The central government skilling program needs to go beyond repair and maintenance training to deep-tech manufacturing and align vocational training with industry requirements, thereby increasing industry–academic partnerships, enhancing practical competencies, and producing a future-ready workforce.
- 6. Introduce clear public procurement and phased ZEV mandates to boost demand and reduce market risk for domestic manufacturers.** Cross-learning from global experiences shows that phased ZEV mandates can help provide the regulatory signal to OEMs to transition to EVs and create an enabling ecosystem for component suppliers.



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Abbreviations and Acronyms

ACC	advanced chemistry cell
CapEx	capital expenditure
DC	direct current
DVA	domestic value addition
EV	electric vehicle
FAME	Faster Adoption and Manufacturing of Electric Vehicles
FY	financial year
GDP	gross domestic product
GW	gigawatts
ICE	internal combustion engine
IP	intellectual property
ITI	industrial training institute
MSME	micro, small, and medium enterprises
NEV	new-energy vehicle
OEM	original equipment manufacturer
OpEx	operating cost
PLI	Production Linked Incentive
QP	qualification pack
R&D	research and development
SGST	State Goods and Services Tax
ZEV	zero-emission vehicle



1.0 Introduction

The global automotive industry is undergoing a structural shift driven by transport electrification and electric vehicle (EV) adoption. In 2024, global EV sales reached over 27 million units across vehicle segments, supported by USD 763 billion in EV³ investments, with an additional USD 39 billion invested in charging infrastructure (International Energy Agency, 2022; International Renewable Energy Agency & Climate Policy Initiative, 2025). India holds a small (2%) but rapidly growing share in global investments in battery EVs (International Renewable Energy Agency & Climate Policy Initiative, 2025). As the world's fourth-largest automotive base—valued at nearly USD 240 billion⁴, contributing about 7.1% of GDP, and supporting over 30 million direct and indirect jobs—the EV transition can create several local manufacturing opportunities in India (Automotive Component Manufacturers Association of India Mobility Foundation, 2025; International Council on Clean Transportation, 2021, 2025; NITI Aayog, 2025a).

However, India's domestic automotive ecosystem caters largely to internal combustion engine (ICE) vehicles. For EVs, it is heavily dependent on imported high-technology parts, such as power electronics, advanced batteries, semiconductors, and electric drive systems. As EV adoption accelerates, continued reliance on imported batteries, power electronics, and advanced components—particularly from China—risks widening India's trade deficit and exposing the industry to supply chain disruptions.

This underscores the urgency of deepening the domestic localization of EV and battery supply chains. The net localization for several high-cost EV components—batteries, motors, DC-DC convertors, and on-board chargers—remains below 20% in India (Jain, 2024) (see Appendix A for details). Persistent challenges remain despite central government schemes, such as limited access to long-term patient capital, technology risk, availability of plug-and-play industrial infrastructure, investment-ready project pipelines, and thin domestic supplier depth for manufacturing advanced components. Many of these policy levers fall within the remit of state governments, yet there is limited evidence on how state-level policy choices are shaping localization outcomes across the EV supply chain in India.

This study provides specific actions for state and central governments to strengthen the policy framework for localizing EV and battery manufacturing by analyzing

1. how state policies complement central government incentives across the EV supply chain in India,
2. which policy instruments are most effective in de-risking capital-intensive and first-of-their-kind⁵ EV and battery manufacturing projects, and
3. how Indian states compare with each other across the EV value chain and the inter-state cross-learning for policy design.

³ EVs here include battery electric vehicles, plug-in hybrid electric vehicles, and fuel cell electric vehicles. In this report, we use “EVs” to mainly refer to battery electric vehicles.

⁴ The conversion rate used between USD and INR in this report is 84.6.

⁵ In the context of battery manufacturing, first-of-their-kind projects refer to the first commercial-scale deployment of a new battery technology, chemistry, or manufacturing process. These projects bridge the “valley of death” between laboratory-proven technology and mature, high-volume production (often called “Nth-of-a-Kind”).



2.0 Context: Why states matter for EV and battery manufacturing in India

2.1 The Localization Challenge

EV manufacturing requires a fundamentally different industrial configuration. It is capital-intensive, driven by electronics and battery chemistry, and significantly more exposed to global supply chains than conventional automotive manufacturing. That means existing automotive strengths do not automatically translate into competitiveness in EVs and batteries. When compared to competitors like China, leaders in EV and battery manufacturing, auto component makers in India face a cumulative cost disadvantage of nearly 10%, highlighting the structural hurdles for localizing the EV and battery supply chain in India (NITI Aayog, 2025a).

In the context of EV supply chain development, this creates a dual challenge:

- transforming a mature ICE ecosystem into one capable of producing battery cells, power electronics, and advanced components, and
- addressing sector-specific risks that impede investment, slow scale-up, and deepen import dependence.

In practical terms, EV manufacturing costs are concentrated upstream in cells, materials, and electronics rather than in final assembly, and there are greater first-of-their-kind risks, global input dependencies, and steeper learning curves, which increase their sensitivity to policy design. EV and battery ecosystems, thus, need specialized policy instruments that extend beyond conventional automotive manufacturing support. On the capital expenditure (CapEx) side, EV and battery value chains (especially cell manufacturing, power electronics, and precision components) require large upfront investments in specialized equipment, testing, and quality systems, often with long payback periods. On the operating expenditure (OpEx) side, competitiveness depends heavily on power costs and reliability (especially for cells and cathode/anode processing), yields and scrap rates, access to high-quality inputs and raw materials, logistics, and working capital. Finally, risk factors such as policy uncertainty, execution delays, and absence of supplier depth raise the cost of capital and push investors to demand faster returns, which is structurally misaligned with the EV industrialization timeline.

Globally, leading jurisdictions have addressed these barriers through direct de-risking (capital grants and low-cost public finance) and OpEx support (including production-linked manufacturing credits), clear standards and certification systems, and regulatory certainty. China combined large-scale domestic demand creation with below-market equity returns for state-backed players, value-added tax refunds, preferential corporate income tax rates, and early control over upstream and midstream battery supply chains (Deese et al., 2025). The United States and the European Union have responded through large fiscal interventions, including tax credits, grants, and contracts-for-difference-style mechanisms, which aim to de-risk capital investment in battery manufacturing and strategic components (Deese et al., 2025; Reinsch et al., 2023).



2.2 Policy Developments in India

In contrast to leading global jurisdictions, the Government of India's policy stack has relied more heavily on demand incentives and output-linked manufacturing incentives that require firms to first invest and scale before benefits fully materialize.

Demand creation has been enabled through incentives under the Phase I (2015–2019) and the Phase-II (2019–2024) of the Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles (FAME) scheme, which also introduced phased manufacturing requirements to localize key components. The Government of India has continued this support for EV deployment through the PM Electric Drive Revolution in Innovative Vehicle Enhancement (PM E-DRIVE) scheme (2024–2026).

In parallel, the government introduced significant supply-side industrial policies through the Production Linked Incentive (PLI) Scheme for Automobiles and Auto Component Industry (or PLI Auto), with a total budgetary outlay of INR 25,938 crores (USD 3 billion). This scheme includes incentives for original equipment manufacturers (OEMs) and component manufacturers (excluding batteries), such as traction motors, motor controllers, and battery management systems, among others, providing output-linked incentives linked to a minimum domestic value addition (DVA) of 50% (based on determined sales value) (Ministry of Heavy Industries, 2025).

A complementary policy, the PLI for Advanced Chemistry Cell (ACC) Battery Storage (or PLI ACC) was launched in 2021 with a total outlay of INR 18,100 crore (USD 2.1 billion). It targets localization by incentivizing 50 GWh of domestic cell manufacturing capacity. At the time of writing, only 1.4 GWh (2.8%) is operational (Institute for Energy Economics and Financial Analysis & JMK Research, 2026). The scheme requirement to move from 25% to 60% domestic content within 5 years remains challenging, given India's continued dependence on imported cathode/anode materials, electrolytes, and separators.

Another initiative—the Scheme to Promote Manufacturing of Electric Passenger Cars—seeks to attract global OEMs through tariff reductions linked to minimum investment and localization milestones. Collectively, as a policy stack, these schemes address different parts of the localization problem. Demand-side incentives primarily reduce the effective purchase price and create early scale, helping OEMs and suppliers justify initial investments. Output-linked incentives (PLI Auto and PLI ACC) aim to close competitiveness gaps by rewarding DVA and scale economies for OEMs, EV component suppliers, and cell manufacturers once production is underway. However, these instruments are less effective at directly de-risking upfront CapEx and early-stage technology ramp-up.

2.3 The Complementary Role of State Policies in India

State governments in India are best positioned to intervene where national schemes alone cannot sufficiently reduce CapEx and OpEx risks and execution uncertainty. State actions materially improve project bankability and reduce time-to-operation for capital-intensive and scale-sensitive segments such as battery and advanced component manufacturing.



Box 1. Why states matter for EV and battery manufacturing in India

While central government schemes provide the strategic direction for EV and battery manufacturing, states play a decisive role in translating these signals into investable, operational projects. In practice, localization outcomes are shaped by several critical enablers at the state level:

- **Land and industrial infrastructure:** States determine access to industrial land, develop EV and battery manufacturing parks, and provide common infrastructure such as substations, effluent treatment, and logistics connectivity.
- **Fiscal incentives and cost support:** States offer complementary capital and operating incentives, including land rebates, duty exemptions, and tax reimbursements that stack on top of central schemes.
- **Power, water, and utilities:** Electricity tariffs, reliability of electricity supply, water availability, and utility charges—key cost drivers for battery and component manufacturing—are largely governed at the state level.
- **Procurement and market creation:** State-led vehicle fleet electrification and public procurement can provide anchor demand, reducing early-stage market risk for manufacturers.
- **Regulatory facilitation and ease of doing business:** Approval timelines, single-window clearances, and institutional coordination at the state level significantly influence project execution speed and investor confidence.
- **Micro, small, and medium-sized enterprise (MSME) integration and supplier development:** MSMEs—central to India's auto component ecosystem—interact closely with state governments for land access and finance facilitation, skill development, and cluster-based support, making states key actors in integrating MSMEs into emerging EV and battery supply chains.
- **Skill and testing support:** States often provide reimbursements for training, employment subsidies, and grants for testing/homologation labs.

Together, these factors make states pivotal actors in determining where EV and battery manufacturing is located, how quickly projects materialize, and how deeply supply chains localize. This is relevant not only to create local ecosystems but also to manage the disruptive impacts of ICE-to-EV transitions on jobs, job quality, regional inclusion, and workforce transition. Some of these manufacturing levers are also captured in NITI Aayog's India Electric Mobility Index, a first-of-its-kind tool developed to track and benchmark the progress of states and union territories in achieving their electric mobility goals (NITI Aayog, 2025b).

From an investor perspective, states in India function as differentiated investment jurisdictions within a common national policy framework. Firms evaluate Indian states in much the same way they compare countries internationally—by assessing execution risk, policy stability, infrastructure quality, and operating conditions alongside headline incentives. As a result, competitive federalism does not merely increase the number of incentive packages on offer but creates variation in investment attractiveness that can materially influence where EV and battery manufacturing ultimately locates.



Policy instruments and enablement generally used by state governments in India are described in Table 1.

Table 1. What do state EV policies solve? Mapping policy instruments to supply chain barriers

State support measures	What it solves for	Targeted EV value chain segment
CapEx support		
Capital/investment subsidy (one-time or disbursed in tranches)	Upfront CapEx burden, long payback periods, and first-of-a-kind investment risk	Cell and battery manufacturers, auto component suppliers, cathode/anode producers
Stamp duty exemption/reimbursement	Project setup costs	All manufacturing segments
Land subsidy/concessional land/land banks	Entry barrier, site acquisition delays	All manufacturing segments, specifically battery plants with large land needs
Effluent treatment plant/waste management subsidy	Environmental compliance costs	Cell and battery manufacturers, cathode/anode producers, recycling
Research and development (R&D) grants	Technology risk, localization gaps	Cell and battery manufacturers, cathode/anode producers, electronics manufacturing, EV OEMs
OpEx support		
State Goods and Services Tax (SGST) reimbursement	OpEx, cash-flow constraints	EV OEMs, auto component suppliers, cell and battery manufacturers
Electricity duty exemption	Energy-intensive operations	Cell manufacturers, recycling, cathode/anode production, electronics manufacturing
Interest subvention on term loans	Cost of capital	Auto component suppliers, cell and battery manufacturers, EV OEMs
Employment-linked subsidies	High labour costs, job creation	EV OEMs, auto component suppliers
Patent cost reimbursement	Innovation costs	Cell and battery manufacturers, cathode/anode producers, electronics manufacturing
Top-up to central PLI incentives	Insufficient central support	Cell manufacturers, EV OEMs, auto component suppliers
Enablement		
EV adoption targets	Demand uncertainty	Cell and battery manufacturers, EV OEMs, auto component suppliers
Public procurement	Demand uncertainty	Cell and battery manufacturers, cathode/anode producers, EV OEMs
Prototyping and testing facilities	Long development cycles	Cell and battery manufacturers, EV OEMs



State support measures	What it solves for	Targeted EV value chain segment
Export promotion support	Market access, scale constraints	Auto component suppliers, EV OEMs
Single-window clearance and facilitation	Regulatory delays, coordination failures, time-to-market risks	Cell and battery manufacturers, EV OEMs, auto component suppliers
Plug-and-play clusters	Entry barriers, site acquisition delays, coordination failures	Cell and battery manufacturers, EV OEMs, auto component suppliers
Infrastructure development assistance (roads, power, water)	Off-site infrastructure gaps	Cell and battery manufacturers, EV OEMs, auto component suppliers
Centres of Excellence	Technology risk, localization gaps	R&D-intensive manufacturing in cell and batteries, EV OEMs
Technology transfer facilitation	Capability gaps	Cell manufacturing, cathode/anode producers
Skill development & training programs	Skilled labour shortages	Cell and battery manufacturers, EV OEMs, auto component suppliers

Source: Authors' compilation based on stakeholder consultations.

Results are beginning to show. The supply chain shift toward EVs, although small, is visible among Indian OEMs and auto component manufacturers. This is important since many Indian OEMs are intensifying their investments in R&D for EVs and are aggressively expanding their EV product portfolios, with a multitude of launches scheduled across various segments in the forthcoming years. In the fiscal year 2025, supply from auto component makers to EV OEMs accounted for 6.7% of total supply to OEMs at nearly INR 38,190 crore (USD 4 billion) (excluding cost of lithium-ion batteries) (Automotive Component Manufacturers Association of India Mobility Foundation, 2025).

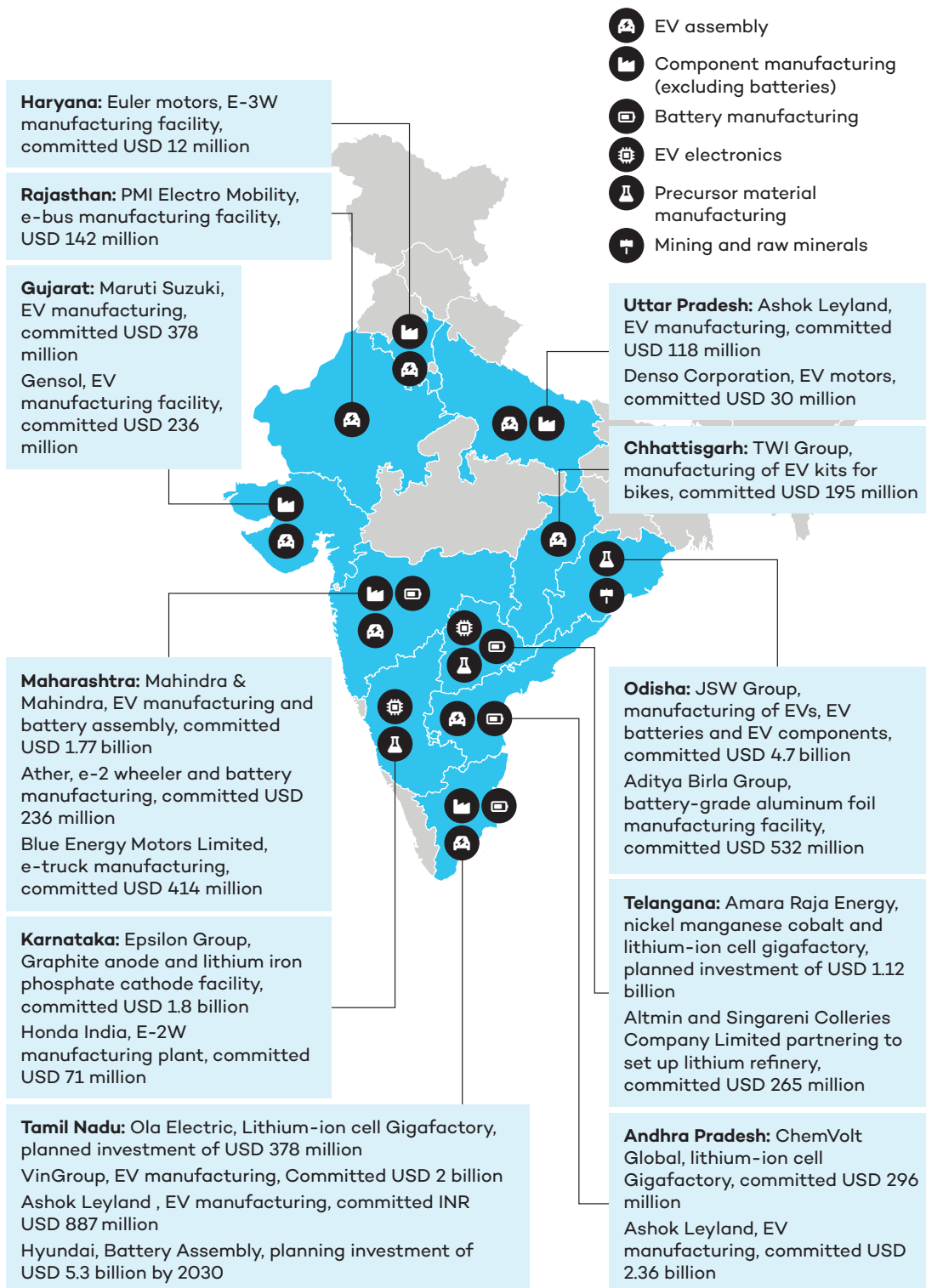
2.4 Recent Investment Announcements Across Indian States

By the end of 2024, announced investments in India's EV manufacturing sector were close to USD 40 billion through 2030, with roughly USD 27 billion earmarked for battery production (Henry, 2025). In addition, the Automotive Component Manufacturers Association of India estimates that suppliers plan to invest about USD 7 billion by financial year (FY) 2028 in components such as engines, electric motors, transmissions, steering systems, power electronics, and high strength steel—segments that together currently make up more than 75% of India's automotive component imports (Henry, 2025). These investments span EV assembly, battery cells and packs, advanced materials, and critical components, reflecting early but tangible progress on localization across the value chain.

Select major investments are listed in Figure 1 to demonstrate how these policy frameworks have translated into on-the-ground investment outcomes.



Figure 1. Recent EV and battery investment commitments across Indian states



Note: This figure is intended to be representative and not comprehensive, based on recent developments in the EV and battery manufacturing ecosystem. Please note this excludes investments in battery recycling, which are critical but beyond the scope of this study.

Sources: Brij, 2024; ET Auto Desk, 2025; EVreporter.com, 2025; Gupta, 2025; ICN Bureau, 2024; India Blooms New Service, 2026; Joshi, 2024; Kulkarni, 2025; Mahindra, 2026; Manshi, 2026; MotoTech, 2024; Murali, 2025; Power Peak Digest, 2026; Projects Today, 2025; Suresh, 2025; Suri, 2024; Suzuki, 2024; The Hindu, 2025; VinFast Auto, 2025.



Tamil Nadu continues to anchor large-scale EV manufacturing. VinGroup has announced a USD 2 billion investment to set up production lines for electric buses, e-scooters, and charging infrastructure in Thoothukudi (VinFast Auto, 2025). Ashok Leyland has committed INR 7,500 crore (USD 887 million) to strengthen EV manufacturing capacity in the state (Gupta, 2025). These investments build on Tamil Nadu's deep automotive ecosystem and align closely with PLI Auto incentives that reward scale and DVA.

Karnataka is emerging as a key hub for upstream and midstream localization. Epsilon Group has announced an INR 15,350 crore (USD 1.8 billion) investment in Ballari to manufacture graphite anodes and lithium iron phosphate cathodes and to establish testing facilities (Suresh, 2025). Honda Motorcycle and Scooter India has committed INR 600 crore (USD 71 million) for an electric two-wheeler manufacturing plant in Kolar (Kulkarni, 2025). Together, these projects support the ACC PLI objective of localizing battery materials and advanced components.

Maharashtra is seeing renewed momentum in EV-linked manufacturing. Blue Energy Motors has announced an INR 3,500 crore (USD 414 million) investment for an integrated electric truck manufacturing facility with in-house R&D, battery pack assembly, and motor manufacturing (Rajni, 2025). Mahindra & Mahindra has committed INR 15,000 crore (USD 1.77 billion) to set up its largest integrated automotive manufacturing facility in Nagpur, capable of producing ICE, EV, and future powertrains, supported by a supplier park to deepen localization (Mahindra, 2026). Ather Energy has announced a INR 2,000 crore (USD 236 million) investment in Bidkin (AURIC) to manufacture electric two-wheelers and battery packs at scale, explicitly strengthening domestic battery pack manufacturing (Joshi, 2024).

Gujarat continues to attract EV assembly investments. Gensol has announced an INR 2,000 crore (USD 236 million) investment in an advanced EV manufacturing facility (ICN, 2024). Maruti Suzuki has committed INR 3,200 crore (USD 378 million) to establish an EV production line at Suzuki Motor Gujarat, with planned output of 250,000 units annually (Suzuki, 2024). These investments leverage Gujarat's manufacturing competitiveness and benefit from central incentives linked to output and localization.

Uttar Pradesh is positioning itself as an emerging EV manufacturing destination. Ashok Leyland has announced an INR 1,000 crore (USD 118 million) electric bus manufacturing facility in Lucknow (Power Peak Digest, 2026). Denso Corporation has committed INR 250 crore (USD 20 million) to manufacture motor generators in Gautam Budh Nagar (ET Auto Desk, 2025). These projects reflect growing downstream localization, supported by central demand and manufacturing incentives.

Andhra Pradesh is attracting battery cell manufacturing. ChemVolt Global has announced an INR 2,500 crore (USD 296 million) investment to set up a 5 GWh lithium ion cell gigafactory (Manshi, 2026). Ashok Leyland has also established an electric bus manufacturing plant in Krishna district (Projects Today, 2025).

Telangana is emerging as a battery and energy storage hub. Amara Raja Energy has announced a planned INR 9,500 crore (USD 1.12 billion) investment to establish a lithium-ion and nickel manganese cobalt cell gigafactory, scalable to 16 GWh by 2030 (Murali,



2025). In parallel, Altmin and Singareni Collieries have committed USD 265 million toward a lithium refinery, signalling early upstream integration (The Hindu, 2025).

Haryana has attracted smaller but focused EV investments. Euler Motors has committed INR 100 crore (USD 12 million) to set up manufacturing and R&D facilities for electric three-wheelers, supporting MSME oriented localization (MotoTech, 2024).

Rajasthan has announced an INR 1,200 crore (USD 142 million) investment by PMI Electro Mobility for an electric bus manufacturing facility, strengthening domestic e-bus production capacity (EVreporter.com, 2025).

Odisha is emerging as a large-scale integrated manufacturing destination. JSW Group has announced an INR 40,000 crore (USD 4.7 billion) investment for an integrated EV and EV battery manufacturing complex, alongside an EV components facility (Suri, 2024). Aditya Birla Group has committed INR 4,500 crore (USD 532 million) to manufacture battery grade aluminum foil, directly supporting battery localization (India Blooms New Service, 2026).

Chhattisgarh has attracted an INR 1,650 crore (USD 195 million) investment by TWI Group to manufacture EV kits for two-wheelers, reflecting early stage component localization (Brij, 2024).

These recent investment announcements across Indian states show that central supply side EV and battery policies, complemented by state EV and industrial policies, are beginning to translate into projects on the ground but can lead to geographically dispersed manufacturing outcomes.



3.0 Approach and Methodology

3.1 Approach

In this study, we used a mixed-methods research design that combined quantitative and qualitative methods to generate a comprehensive and multi-layered evidence-based analysis. The research used

- **industry insights** captured through an EV and battery manufacturing perception survey and one-on-one industry consultations,
- **comparative policy analysis** to study the effectiveness of policy instruments at the state level and inter-state cross-learning for future policy design,
- **state-level consultations and convenings** to better understand the field-level experiences of state policy-makers and governance of EV and battery manufacturing policies, and
- **global cross-learning**, drawing lessons from EV and battery-manufacturing ecosystems in China, the United States, Europe, and other relevant geographies.

Together, these methods were used to assess the design of state policies and their on-the-ground effectiveness for manufacturers across the EV supply chain.

3.2 Methods

3.2.1 Industry Perception Survey

To understand the financial and operational challenges of stakeholders and the role of state policies in EV and battery supply chain localization, we designed and ran an industry perception survey between May and August 2025. Data collection was carried out using an online survey (via Google form). The survey qualitatively assessed the effectiveness of different state-level policy packages and identified the usefulness of existing policy measures in supply chain localization. The survey was completed by 22 companies (see Appendix B for details), including EV component manufacturers, battery assemblers, and cell and precursor material manufacturers across India.

The survey included questions around the following themes:

1. Localization and supply chain challenges
2. Policy enablers for localization and supply chain development
3. Effectiveness of state policy levers
4. Business outlook and strategy

The survey design included



- **structured questions** about the perceived effectiveness of key state-level policy instruments (which in turn helped assign weights to these policy instruments for the comparative policy analysis), and
- **open-ended questions** providing qualitative perspectives on localization barriers, business strategy, and policy expectations.

Responses were reviewed for completeness and consistency. Findings from the survey were validated with secondary data sources and five one-on-one expert consultations to ensure robustness and contextual relevance.

3.2.2 Comparative Policy Analysis of State Policy Packages

In addition to the industry perception survey, a central component of the study is a 2x2 comparative policy analysis of 14 Indian states. These 14 states were identified based on their contribution to automotive manufacturing to the state's gross value added (see Appendix C for the state selection criteria). We then developed a composite 2x2 EV and battery manufacturing score for each state based on (i) the strength of their state policies for EV and battery localization (x-axis) and (ii) manufacturing competitiveness (y-axis) (see Appendix D for details). Using this metric, we assessed how Indian states compare across the EV value chain and their inter-state cross-learning for future policy design.

Key drivers of the x-axis score were the presence and scale of state support measures and their ability to deepen localization in capital-intensive segments of EV and battery manufacturing. CapEx and OpEx support measures included in this analysis were capital subsidies, land concessions, tax incentives, stamp duty waivers, R&D incentives, patent cost incentives, export incentives, employment benefits, and skill and training incentives. We then assigned weights to each of these policy instruments based on the results from the industry perception survey and stakeholder consultations (see Appendix D for an explanation of weights assigned to each support measure). This helped us compute a score for the strength of state policies for EV and battery localization.

For the y-axis score on manufacturing competitiveness, each state was scored on five parameters: investor confidence, MSME presence, logistics ranking, industrial electricity tariffs, and labour wages. Each of these parameters was also assigned weights based on industry consultations to arrive at a score for each state (see Appendix D for details). This helped identify the relative strengths of states in manufacturing in general.

3.2.3 State-Level Consultations and Convenings

As a part of this study, several one-on-one consultations were also held with representatives from industries, transport departments, and special EV/battery cells within state investment promotion bodies at the state government level. States covered during our consultations include Telangana, Tamil Nadu, Karnataka, Andhra Pradesh, Gujarat, Uttar Pradesh, and Maharashtra. We also organized a full-day, state-level, multistakeholder convening in Hyderabad on July 28, 2025, bringing together government policy-makers, investors, and industry leaders from EV OEMs, and component and battery manufacturers to address key challenges and identify actionable strategies for strengthening India's EV and battery manufacturing ecosystem.



4.0 Results: How state policies shape EV supply chain localization

This section presents the results of the comparative policy analysis across 14 Indian states. It includes a systematic review of key industrial, EV, and battery manufacturing policies across Indian states that aim to attract investments and localize the EV supply chain. This helps compare how different state approaches are influencing investment and localization outcomes and informs inter-state cross-learning for future policy design.

4.1 Systematic Review of State Policies Promoting EV and Battery Manufacturing in India

Overall, we find that at least 14 states in India provide financial support through CapEx- or OpEx-reducing measures for localizing EV and battery manufacturing, indicating a growing ambition among Indian states to attract investments in the sector. State enablers (non-financial), such as testing facilities, single-window clearance systems,⁶ and workforce development, also exist, although their nature differs across states. Most policy instruments support activities such as EV assembly, advanced component manufacturing, battery/cell manufacturing, and R&D by complementing these measures in the EV policy with state industrial policies. However, state policies remain less differentiated for capital-intensive midstream (such as production of cathode/anode materials) and upstream (critical minerals mining/sourcing) segments of the value chain—demonstrating growing policy maturity in downstream segments but nascency in an emerging integrated value chain strategy.

These measures shape different dimensions of project viability across the EV supply chain, with some addressing upfront capital intensity and others operating costs and cash flow over time. The effectiveness of state policies depends not only on the presence of individual instruments but also on how they are combined and sequenced. Policy instruments that are misaligned with a company's needs (such as back-loaded incentives for highly capital-intensive projects or fragmented support spread across multiple policies) may fail to materially improve investment decisions. Conversely, states that align fiscal incentives with infrastructure readiness, permitting speed, homologation, and testing capabilities that significantly reduce time to market are better positioned to convert policy ambition into operational manufacturing capacity.

⁶ A single-window clearance system is a one-stop portal for investors. It enables them to digitally access state-related business approvals and apply according to their business requirements. Investors can track their application progress and access relevant resources and support services, such as chatbots, as in the case of Karnataka (Invest Karnataka, n.d.). The portal is designed to assist investors in a transparent, time-bound, and hassle-free manner. However, what is offered differs across states.



Table 2. Systematic review of state policies relevant to promoting EV and battery manufacturing

	CapEx support measures			OpEx support measures					
	Capital subsidy	Land concessions	Stamp duty waivers	R&D incentives	Export incentives	SGST reimbursement	Patent cost incentives	Employment incentives	Skill and training incentives
Tamil Nadu	✓	✓	✓	–	✗	✓	✓	✓	✓
Karnataka	✓	✗	✓	✓	✗	✗	✗	✗	–
Maharashtra	✓	✗	✓	✓	–	✓	✗	✗	✗
Gujarat	✓	✓	✗	✓	–	✗	✓	✗	–
Uttar Pradesh	✓	–	✓	✗	✗	✗	✓	–	✓
Andhra Pradesh	✓	✗	✓	✓	✗	✓	✓	✓	✓
Telangana	✓	✓	✓	–	✓	✓	✓	✗	✓
Madhya Pradesh	✓	–	✗	✓	✓	✗	✓	✓	–
Haryana	✓	✗	✓	✓	✗	✓	✓	✓	✓
Rajasthan	✓	–	✓	✗	✗	✓	✗	✓	✓
Punjab	✓	–	✓	–	✗	✓	✗	✓	✓
Odisha	✓	✓	✓	✗	✗	✓	✓	✓	✓
West Bengal	✗	✗	✗	–	✗	✗	✗	✗	✗
Chhattisgarh	✓	✓	✓	–	✓	✓	✓	✓	✓

✓ State policies actively provide support (score 4,5 depending on scale).

– State policies make provision for enablement but are unclear on the size and nature of financial benefit (score 3), if any.

✗ State policies make no mention of the support measure (score less than 3).

Source: Compiled by authors based on state EV and industrial policies.



Tamil Nadu has one of the most comprehensive EV policies in India, consolidating all supply-side incentives into the Tamil Nadu Electric Vehicles Policy 2023 (2023–2028), which improves policy clarity and accessibility for industry stakeholders (Government of Tamil Nadu, 2023). The state offers a flexible EV Special Manufacturing Package, giving firms a choice of incentives aligned with business models and cash-flow requirements. Eligible incentives include SGST reimbursement, a turnover-based subsidy, capital subsidies, and a dedicated ACC capital subsidy for EV battery manufacturing, subject to defined thresholds (Government of Tamil Nadu, 2023). Tamil Nadu also provides a standard incentive stack—common across several states—including stamp duty waivers, employment-linked subsidies, electricity duty exemptions, intellectual property (IP) cost reimbursement, and interest subvention of up to 5% on term loans for up to 6 years (Government of Tamil Nadu, 2023).

To support the transition of existing automotive firms, the policy offers an up-skilling allowance for up to 10% of the EV production workforce, with training subsidies of INR 4,000 (USD 47) per worker per month for 6 months for state residents (Government of Tamil Nadu, 2023). EV-related courses are offered through the Tamil Nadu Skill Development Corporation and other state institutions (Government of Tamil Nadu, 2023).

Karnataka's Clean Mobility Policy 2025-2030 (2025–2030) consolidates most supply-side incentives within a single, industry-friendly policy framework. It offers capital subsidies to MSMEs, as well as large, mega, and ultra-mega enterprises, differentiated by regional zoning and fixed assets (Government of Karnataka, 2025).

A key feature is the staggered disbursement structure: capital subsidies for MSMEs are released in two instalments; medium enterprises get four equal annual instalments; and large, mega, and ultra-mega enterprises get five equal instalments after commercial production (Government of Karnataka, 2025). Karnataka also offers supporting incentives, such as stamp duty reimbursement and R&D support focused on ecosystem development, particularly for advanced chemistry batteries (Government of Karnataka, 2025). The policy supports anchor investors by incentivizing the first enterprise in advanced chemistry batteries by reimbursing 30% of eligible R&D expenditure, subject to a maximum of INR 1 crore (USD 0.1 million) during the policy period (Government of Karnataka, 2025). Karnataka further offers a one-time capital subsidy of up to 50% of the cost of establishing effluent treatment plants, capped at INR 2.5 crore (USD 0.3 million), which is particularly relevant for environmentally intensive battery manufacturing operations (Government of Karnataka, 2025).

The policy also promotes clean mobility clusters through public–private partnerships to co-locate OEMs and suppliers (Government of Karnataka, 2025). The three upcoming clusters—Gauribidanur in Chikkaballapur, Chikkamalligewada in Dharwad, and Harohalli in Ramanagara—will offer ready-to-occupy land, factory/sheds, plug-and-play incubation facilities, testing labs, proving grounds, and homologation facilities (Government of Karnataka, 2025).

Maharashtra released the Maharashtra Electric Vehicle Policy-2025 (2025–2030) in May 2025, prioritizing EV adoption, charging infrastructure expansion, and EV manufacturing (Government of Maharashtra, 2025). While the policy signals manufacturing intent, it provides limited direct supply-side incentives, with support largely confined to R&D through



the Chief Minister's EV R&D Grant, backed by a dedicated corpus of INR 15 crore (USD 1.8 million) (Government of Maharashtra, 2025).

Supply-side manufacturing support is instead anchored in the Maharashtra Industrial Policy 2019, which considers EV manufacturing, infrastructure, and servicing as a thrust sector, and the Package Scheme of Incentives 2019, which extends incentives for D+ category industries to EV, battery, and cell manufacturing. Additional support is provided through the Maharashtra Thrust Sector Policy 2024, which designates cells and batteries—including lithium-ion, lithium titanium oxide, hydrogen fuel cell, and ACC products—as thrust sectors⁷ (Maharashtra Industrial Development Cooperation, n.d., 2019). The industrial policy draws on a commissioned export strategy study that identifies automobiles and auto components as priority sectors, proposing measures such as the establishment of export promotion councils, support for export-oriented infrastructure, and stamp duty exemption (Maharashtra Industrial Development Cooperation, 2019).

Gujarat's State Electric Vehicle Policy-2021 (2021–2025) does not provide direct incentives for EV or EV component manufacturing. Instead, it directs industry stakeholders to the Gujarat Industrial Policy 2020. Under the state's industrial policy, capital subsidies are available to MSMEs as well as to large, mega, and ultra-mega projects, linked to eligible term loan amounts (Government of Gujarat, 2020).

Unlike other states, Gujarat does not offer incentives such as stamp duty exemptions or SGST reimbursement. Instead, the state prioritizes sustainability-focused support through capital subsidies for environmental infrastructure, such as common environmental facilities and incentives for industries achieving at least 50% waste recovery (Government of Gujarat, 2020).

The state provides financial support through partial reimbursement of costs for filing of domestic and international patents. In addition, private companies establishing research and product development centres are eligible for support up to 30% of the project cost for machinery and equipment, capped at INR 5 crore (USD 0.6 million) (Government of Gujarat, 2020). Similar assistance is available for laboratories established by industry associations. The policy also supports contract or sponsored research undertaken in collaboration with recognized R&D institutions or All India Council for Technical Education-approved technical colleges (Government of Gujarat, 2020). While the industrial policy expresses intent to introduce industry-specific short-term, long-term, and modular courses through industrial training institutes (ITIs), polytechnics, and engineering colleges, it does not explicitly target EVs and battery manufacturing. It also highlights gaps between industrial skill requirements and workforce availability across sectors in the state (Government of Gujarat, 2020).

⁷ The policy aims to promote and incentivize 10 anchor units in identified Thrust Sectors, which currently include batteries. To qualify as an anchor unit, a company must invest at least INR 10,000 crore (USD 1.9 billion) in fixed capital and create a minimum of 4,000 jobs, both direct and indirect. The investment period must not exceed 10 years, with a minimum investment of at least INR 4,000 crore (USD 472.8 million) within the first 5 years.



Uttar Pradesh's Electric Vehicle Manufacturing and Mobility Policy 2022 (2022–2027) consolidates supply-side incentives within a single framework, streamlining access for industry stakeholders. The policy provides high-ceiling capital subsidies, reaching up to INR 1,000 crore (USD 118 million) for the first two Integrated EV projects and the first two Ultra-Mega Battery Projects (Government of Uttar Pradesh, 2022). These subsidies are back-loaded, with disbursement spread over 20 years through equal annual instalments after commercial operations commence (Government of Uttar Pradesh, 2022).

The policy omits several common incentives, including SGST reimbursement and electricity duty exemption, which are available in many other states. It does, however, provide reimbursement of patent registration fees for acquiring domestic or international patents. In addition, the policy promotes the establishment of Centres of Excellence focused on EVs, batteries, and charging infrastructure by government bodies, public sector undertakings, and private entities (Government of Uttar Pradesh, 2022). Five centres are eligible for grants of 50% of the project cost, capped at INR 10 crore (USD 1.2 million) per centre, to be released over a period of 5 years (Government of Uttar Pradesh, 2022). The policy also includes a one-time skill development incentive of INR 5,000 per employee per year, applicable to the first 50 employees in EV manufacturing, EV component manufacturing, and charging and battery equipment manufacturing units (Government of Uttar Pradesh, 2022).

Andhra Pradesh's Sustainable Electric Mobility Policy (4.0) (2024–2029) offers a comprehensive package of supply-side incentives. The policy provides investment subsidies for MSMEs linked to either fixed capital investment or annual turnover and disbursed in three annual instalments after claim approval (Government of Andhra Pradesh, 2024). For sub-large, large, and mega enterprises, incentives are linked to annual turnover and domestic value added. A distinctive feature of the policy is its top-up to central government incentives, such as the Government of India's PLI schemes. Eligible projects may receive an additional 10% of the central government incentive from the state, capped at 5% of the fixed capital investment, enabling effective stacking of state and central support (Government of Andhra Pradesh, 2024). The policy also includes a decarbonization subsidy in the form of capital support for activities such as e-waste recycling and vehicle scrapping facilities (Government of Andhra Pradesh, 2024). The policy provides a training subsidy for MSME manufacturers, reimbursing 100% of the employer's contribution to the Employees' Provident Fund, subject to an annual cap of INR 1 lakh per enterprise, for 3 years from the commencement of production (Government of Andhra Pradesh, 2024).

Telangana's State Electric Vehicle and Energy Storage Policy (2020–2030) is integrated with energy storage, resulting in a comprehensive framework. The EV policy links EV and energy storage incentives to the Telangana Electronics Policy 2016, which supports electronic products, electronic manufacturing services, and semiconductor and electronic components (Government of Telangana, 2021). The state provides a robust set of supply-side incentives, including a 20% capital investment subsidy capped at INR 30 crore (USD 3.5 million) for mega enterprises,⁸ with scope for case-to-case customization for mega and strategic projects (Government of Telangana, 2021). Standard incentives include stamp duty reimbursement,

⁸ Mega enterprises are defined as industrial units with capital investment \geq INR 200 crore (USD 23.6 million) or generating employment for more than 1,000 persons.



SGST reimbursement, electricity duty exemption, and patent cost subsidies (Government of Telangana, 2021). Under the Telangana Electronics Policy 2016, the state also offers land at affordable costs and a 25% subsidy on lease rentals for a period of 10 years.

While the EV policy does not specify quantitative R&D incentives, Telangana demonstrates strong institutional depth through initiatives such as the T-Fund, which offers financial support to startups, including in EV and battery R&D and T-Works, India's largest prototyping centre. T-Works provides facilities for EV components, vehicle assemblies, and battery prototyping (Government of Telangana, n.d.-a). The policy also expresses intent to establish mega EV and energy storage system clusters and to partner with leading technical institutes to set up Centres of Excellence for market-focused research on battery technologies, battery management systems, motors, and controllers.

Madhya Pradesh's Electric Vehicle Policy 2025 (2025–2030) directs EV and EV component manufacturers to the Madhya Pradesh Industrial Promotion Policy 2025, which outlines all supply-side incentives (Government of Madhya Pradesh, 2025a). The industrial policy provides a comprehensive incentive package for large-scale industrial units, including Basic Investment Promotion Assistance with a maximum limit of INR 200 crore (USD 24 million), disbursed in seven equal annual installments (Government of Madhya Pradesh, 2025b). The policy does not clearly specify whether this incentive applies to MSMEs.

Additional incentives—less commonly offered by other states—include

- Infrastructure Development Assistance covering 50% of costs for power, water, gas pipelines, roads, drainage, and sewage infrastructure up to the factory gate (capped at INR 5 crore or USD 0.6 million);
- Green Industrialization Assistance, providing 50% capital subsidy for waste management systems (up to INR 5 crore or USD 0.6 million), and up to INR 10 crore (USD 1.9 million) for establishing effluent treatment plants with zero liquid discharge; and
- 100% reimbursement on patents, copyright, and trademark filing costs (capped at INR 10 lakh or USD 11,820 per unit) (Government of Madhya Pradesh, 2025b).

The policy also offers incentives for employing persons with disabilities. For manufacturing units attracting foreign direct investment, additional incentives include reimbursement of 50% international technology transfer costs capped at INR 1 crore (USD 0.1 million) if local vendor development occurs, along with supplementary Basic Investment Promotion Assistance (Government of Madhya Pradesh, 2025b).

On workforce development, the EV policy provides for the incorporation of EV-related courses across the existing 53 polytechnic colleges and 271 ITIs (Government of Madhya Pradesh, 2025a). To support the transition of small- to medium-sized automobile repair shops, ITIs and engineering institutions will also offer free, hands-on EV repair training for service professionals (Government of Madhya Pradesh, 2025a).

Haryana provides a comprehensive suite of supply-side incentives through the Haryana Electric Vehicle Policy 2022 (2022–2027). While capital subsidy ceilings are relatively modest—up to INR 20 crore (USD 2.4 million) for mega enterprises—the policy introduces



two notable instruments (Government of Haryana, 2022). The Seed and Conversion Fund offers one-time support to existing units fully transitioning to EVs, EV components, or EV battery manufacturing, granting 25% of the book value of plant and machinery or INR 2 crore (USD 0.2 million), whichever is lower, to micro, small, and large enterprises (Government of Haryana, 2022). This measure can be particularly significant for MSME auto and auto component manufacturers in the state.

These incentives are supplemented by standard measures, such as SGST reimbursement, stamp duty concessions, employment generation subsidies, and patent cost subsidies. The policy also encourages state government organizations, public sector undertakings, and private firms to set up Centres of Excellence for EV manufacturing, with five eligible for grants covering 50% of project cost, capped at INR 5 crore per centre (Government of Haryana, 2022). To promote water recycling, the state reimburses 50% of the cost of water treatment plants, up to INR 50 lakh (USD 59,101), for the first five eligible units in the medium, large, mega, and ultra-mega categories for EV, EV components, charging, and battery manufacturers (Government of Haryana, 2022).

Rajasthan's Electric Vehicle Policy 2022 (2022–2027) channels major supply-side incentives through the Rajasthan Investment Promotion Scheme 2019. The policy offers a capital subsidy capped at INR 50 lakh (USD 59,101) for investments of INR 25 crore (USD 2.9 million) and above, representing a relatively low ceiling compared to other states, given the capital-intensive nature of EV manufacturing (Government of Rajasthan, 2022). A relatively uncommon provision is the interest subsidy of 5% on term loans for plants and machinery, available for up to 5 years and capped at INR 1 crore (USD 0.1 million) per year (Government of Rajasthan, 2022). The policy also provides standard incentives found in several other states, such as the stamp duty exemption, electricity duty exemption, employment generation subsidy, and land tax exemption. On workforce development, the policy commits to introducing short courses on electric mobility, EV supply equipment, repair and maintenance, and battery manufacturing and maintenance through the Rajasthan Skills & Livelihood Development Corporation, and at least five polytechnic colleges or ITIs are to be identified as Pilot Skilling Institutions (Government of Rajasthan, 2022).

Punjab's Electric Vehicle Policy 2022 (2022–2025) offers a largely comprehensive set of supply-side incentives, covering most instruments used by other states, except patent cost subsidies. A key feature is the policy's strategic flexibility, which allows for customized, case-specific incentive packages to attract giga-scale battery manufacturing units. The policy encourages Punjab's established tractor manufacturing base to transition to e-tractor production, with additional incentives proposed to attract investment based on the merit of project proposals (Government of Punjab, 2023). On workforce development, the policy stipulates that technical institutions establish specialized master's programs in smart mobility solutions and implement a scholarship program for the first 2,000 students, aimed at training new engineers in the EV sector (Government of Punjab, 2023).

Odisha's Electric Vehicle Policy 2021 (2021–2025) has a narrow manufacturing focus, covering only micro and small EV battery manufacturing units. It directs eligible firms to the Odisha MSME Development Policy, 2016 (Commerce & Transport Department, 2021). This policy design creates a structural limitation, as EV OEMs and battery cell manufacturers are typically capital intensive and may not qualify as micro or small enterprises.



Under the Odisha MSME Development Policy, 2016, new micro and small enterprises are eligible for capital subsidies up to INR 1 crore (USD 0.1 million), along with select incentives less commonly offered by other states. These include seed capital assistance for first-generation women, Scheduled Castes, Scheduled Tribes, and differently abled entrepreneurs (10% of term loan, capped at INR 15 lakh or USD 17,730) in industrially backward districts, through a project report subsidy and reimbursement of water conservation audit costs (Government of Odisha, 2016). Separately, the EV policy mentions that the state may explore Memorandums of Understanding with lithium cell manufacturers to establish battery assembly plants, indicating intent but without the necessary fiscal support mechanisms (Commerce & Transport Department, 2021).

On workforce development, the EV policy focuses primarily on captive training of EV drivers, mechanics, and charging station staff through world-class skill centres of auto OEMs and energy operators. It also suggests that these centres offer short training courses for ICE mechanics transitioning to EV repair and servicing (Commerce & Transport Department, 2021).

West Bengal's Electric Vehicle Policy 2021 (the period for application is not clearly mentioned in the policy) does not identify the promotion of EV manufacturing as a primary objective (Government of West Bengal, 2021). Consequently, supply-side incentives are largely absent, with only limited support for R&D and skill development in the sector and no direct financial incentives provided. In terms of skill development and training, its focus remains largely confined to employment in maintenance, servicing, and driving roles.

Chhattisgarh's State Electric Vehicle Policy 2022 (2022–2032) provides selective supply-side incentives but primarily directs manufacturers to the Chhattisgarh Industrial Development Policy. The most recent Industrial Development Policy (2024–30) establishes a comprehensive incentive package for MSMEs and large enterprises in the electronics and electrical sector, encompassing EV manufacturing (Government of Chhattisgarh, 2024). The policy designates electric two-wheelers, three-wheelers, four-wheelers, batteries, and hydrogen fuel-cell vehicles as thrust areas, with additional incentives available in specific cases, particularly for MSMEs (Government of Chhattisgarh, 2024). State-specific incentives include project report cost reimbursement, technology purchase subsidies for acquisitions from government research institutions, environmental management subsidies linked to carbon credit receipts, and reimbursement of water and energy audit expenses (Government of Chhattisgarh, 2024). The policy also provides for customized incentive packages for units investing INR 1,000 crore (USD 118 million) or more in fixed capital or generating employment for 1,000 or more local residents (Government of Chhattisgarh, 2024).

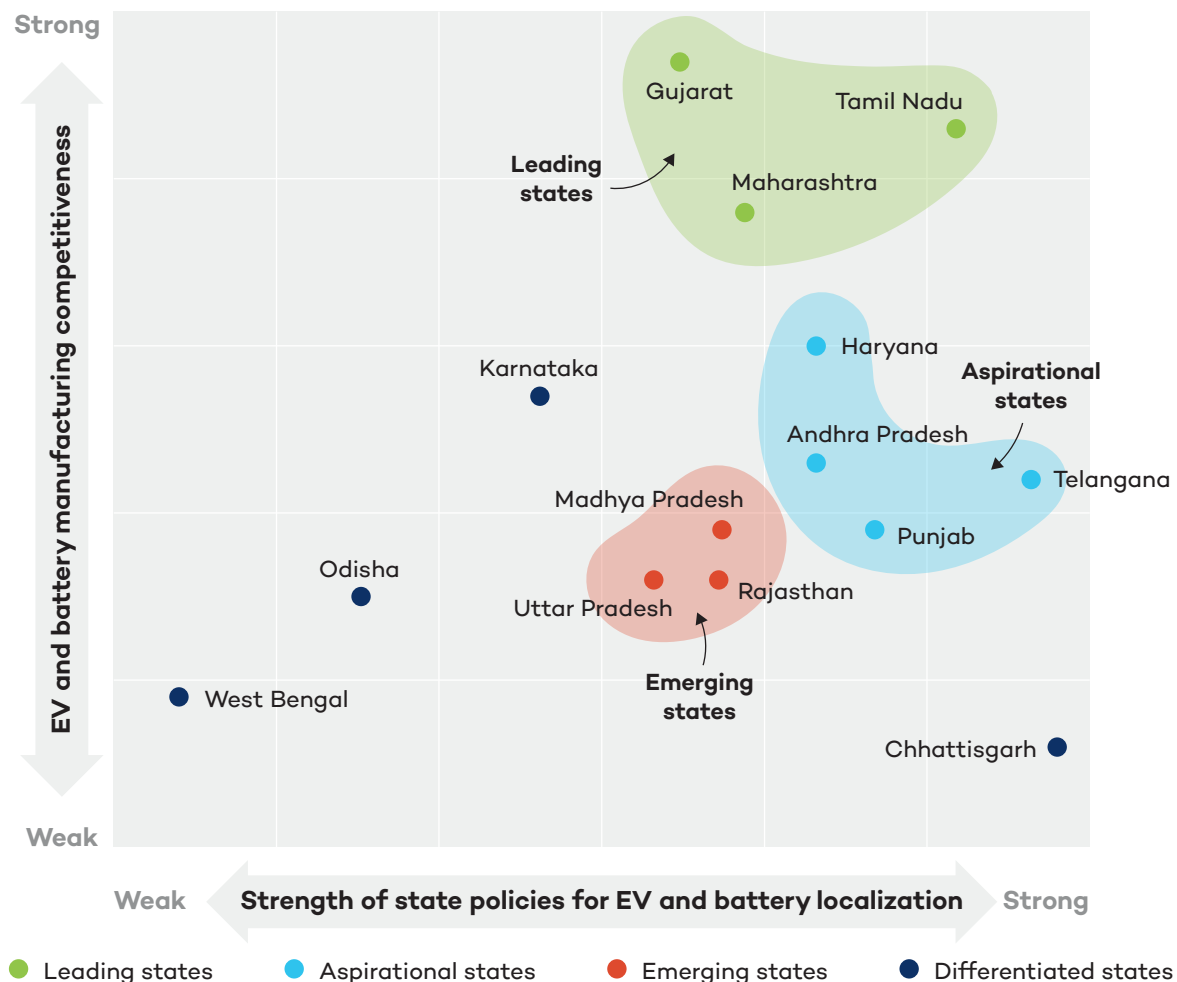
On workforce development, the policy offers training-expense reimbursement for MSMEs and large enterprises employing skilled and semi-skilled workers domiciled in Chhattisgarh with monthly wages below INR 50,000, through a one-time reimbursement of either one month's wage or INR 15,000 per person, whichever is lower (Government of Chhattisgarh, 2024).



4.2 Results: Comparative policy analysis

The systematic review shows a high degree of convergence in state-level EV and battery manufacturing policies. All 14 states covered in the analysis deploy a broad mix of CapEx and OpEx support measures, with capital subsidies, land concessions, stamp-duty waivers, and SGST reimbursement emerging as near-universal instruments to attract manufacturing investments. R&D incentives, patent-cost reimbursements, employment incentives, and skill-development provisions are also embedded across most state EV and industrial policies, signalling growing recognition that localization requires ecosystem-level interventions. This can also be seen in the crowding effect on the right side of the scatter plot in Figure 2.

Figure 2. States' strengths for localizing capital-intensive EV segments



Source: Authors' analysis.

However, the analysis reveals that despite growing ambition and policy experimentation, several systemic gaps persist across state approaches to localizing EV and battery manufacturing. The widespread use of similar policy instruments across states suggests limited differentiation in incentive design based on states' manufacturing competitiveness, with



variations emerging more in the scale, sequencing, and targeting of support rather than in the choice of instruments themselves.

States positioned in the upper-right quadrant can be categorized as “leading states,” exhibiting a convergence of strong policy support and favourable automotive manufacturing fundamentals, indicating higher readiness for localizing capital-intensive and first-of-their-kind EV segments such as gigafactories. These include Tamil Nadu, Gujarat, and Maharashtra, driven by higher manufacturing competitiveness, the depth of their automotive ecosystems, and strong industrial policies.

Beyond these structural advantages, additional factors strengthen the attractiveness of these states as EV manufacturing hubs, which are not fully captured in the assessment framework. One important example is the availability of advanced testing and validation infrastructure. Tamil Nadu, in particular, benefits from the presence of the Global Automotive Research Centre, one of India’s four premier automotive testing institutes (Government of Tamil Nadu, 2023). Its dedicated Electric Vehicle Lab offers FAME II testing and facilities for battery life-cycle and safety testing, electric motor analysis, EV component durability assessment, charging infrastructure evaluation, vehicle benchmarking, and design verification (Government of Tamil Nadu, 2023). These facilities are widely used by EV OEMs operating in Tamil Nadu and surrounding states, reinforcing the state’s ecosystem for automotive and EV innovation.

A second cluster, categorized as “aspirational states”—including Andhra Pradesh, Telangana, Haryana, and Punjab—shows strong ambition as reflected through generous state incentives for localizing manufacturing but competes with leading states on manufacturing competitiveness. Within this cluster, Telangana demonstrates strong policy attractiveness for capital-intensive EV segments due to the synergy between the state’s EV and Energy Storage System Policy and the Electronics Policy and development of EV clusters that help overcome land barriers. Despite slightly lower manufacturing competitiveness due to higher labour costs and the absence of port connectivity, the state demonstrates a mature ecosystem for manufacturing electronic components used in EVs and in first-of-their-kind segments. Andhra Pradesh, on the other hand, stands out for offering a structured top-up to central government incentives and is increasingly becoming attractive for capital-intensive segments, such as cell manufacturing due to better policy complementarity.

A third cluster of states, “emerging states,” includes Uttar Pradesh, Madhya Pradesh, and Rajasthan, where there is lower targeted policy support for capital-intensive EV segments, positioning them well for specific downstream segments of the EV value chain, such as vehicle/battery assembly and component manufacturing, that are relatively less capital-intensive activities. These states are increasingly positioning themselves as competitive alternatives by offering large land parcels, dedicated EV parks, and streamlined approvals. In these states, announcements tend to focus on electric buses, commercial vehicles, three-wheelers, and component manufacturing—segments where scale, public procurement, and proximity to domestic markets play a larger role than export orientation. Madhya Pradesh stands out in its positioning around the National Automotive Test Tracks, signalling a growing recognition among states that testing, homologation, and certification capacity are also becoming important levers for attracting downstream EV manufacturing.



A fourth but more disparate set of states, categorized as “differentiated states,” includes Karnataka, Odisha, Chhattisgarh, and West Bengal, which comprise a heterogeneous group but may be better suited for niche segments of the EV value chain. For example, Chhattisgarh, with its new industrial policy, is providing a customized incentive package for large-scale investments in downstream manufacturing but remains behind its peers in investment outcomes due to weaker scores on manufacturing competitiveness. Karnataka offers generous R&D incentives for advanced chemistry batteries, building on its niche strengths and now moving actively toward cluster development. These states suggest rising potential for tapping into their industrial strengths if supported by stronger manufacturing fundamentals.

The comparative policy analysis shows that states can move between these groups when combined with the right set of policy stacks—one that matches their manufacturing competitiveness or niche strengths. As interest in EV supply-chain localization grows, Indian states have an opportunity to tailor policies to the specific value-chain segments where they hold manufacturing advantages and target support accordingly. This can help deepen ecosystem development and improve localization outcomes.

Policy-relevant insights from this chapter:

- 1. Alignment between centre and state policies strengthens the overall incentive stack:** State incentives reduce location-specific costs, while central government incentives reward production and value addition. However, most state policies lack deliberate coordination with central incentives, limiting overall effectiveness. Most state EV and industrial policies are not designed to align with the central government incentives, reducing the effectiveness of the incentive stack. Only one state (Andhra Pradesh) offered structured top-up to central government incentives and is therefore becoming increasingly attractive for capital-intensive segments such as cell manufacturing due to better policy complementarity.
- 2. Targeted policy instruments that address specific cost barriers are needed for effective localization:** Indian states exhibit varying strengths and differentiated competitive advantages across the EV and battery value chain, suggesting a need for strategic specialization rather than uniform policy replication. Despite these varying strengths, many states deploy broadly similar incentive instruments, often targeting all EV segments across the value chain with relatively few states explicitly articulating segment-specific strategies (for example, focusing on batteries, electronics, recycling, or midstream components) aligned with their existing industrial strengths.

Leading states with large automotive clusters and competitive manufacturing, such as Tamil Nadu, Maharashtra, and Gujarat, are structurally better placed to localize an integrated EV value chain. In contrast, aspirational states, such as Andhra Pradesh and Telangana, can localize specific parts of the value chain, such as electronic component and battery cell manufacturing, to avoid competing for investments with leading states that fare better on manufacturing competitiveness, driven by the depth of their automotive ecosystem. In contrast, emerging states with large automotive supplier ecosystems (e.g., Uttar Pradesh) may achieve greater localization impact by prioritizing downstream assembly, offering working-capital support for component suppliers, and improving manufacturing fundamentals (including improving ease of doing business, electricity tariffs, labour wages, and logistics).



3. State policies are often insufficient to de-risk capital-intensive midstream and upstream battery investments: Localizing midstream and upstream production of battery-grade raw materials and components involves high capital risk, technology risk, raw material price volatility, and long payback periods. Most states analyzed in the study attempt to de-risk EV and battery projects by improving general CapEx and OpEx concerns, making them unable to absorb the unique technological and demand risks inherent in midstream and upstream first-of-a-kind battery manufacturing investments. Similarly, output-linked incentives by the central government, such as PLI, also reward only realized production, making these segments the hardest to localize.



5.0 Looking Forward: Recommendations and comparative policy lessons

Recommendation 1: De-risk midstream and upstream investments

Design subnational support measures that de-risk midstream and upstream battery investments. State governments may need to use policy instruments other than subsidies and grants to de-risk midstream and upstream battery investments, such as indirect equity investment models (e.g., such as fund-of-funds approach or co-investment models). This is pertinent for aspirational states, such as Andhra Pradesh and Telangana, that are interested in deepening cell manufacturing and differentiated states, such as Chhattisgarh and Odisha, that are better suited to capturing value upstream.

Localizing production of first-of-their-kind batteries, cells, and cathode active materials involves high capital requirements, technology risk, raw material price volatility, and long payback periods that are difficult for individual firms or private capital to absorb. While output-linked incentives such as PLI are effective in rewarding realized production, such a policy instrument is less suited to address critical risks associated with manufacturing, such as first-of-their-kind battery, cell, and cathode active materials in India, making these segments the hardest to localize.

Indirect equity investment models, such as a fund-of-funds approach or co-investment models, can help crowd in private investments and attract long-term patient capital from sovereign wealth funds and pension funds, ensure private sector due diligence, and signal long-term government commitment without needing to directly pick winners and losers. This transition allows states to share the long-term financial success of the projects they support and participate in local ecosystem development.

In fact, governments across the world are increasingly coming to terms with the absence of sufficient long-term patient capital and price stability mechanisms for localizing battery and cell manufacturing, which may reflect a deeper market failure. Traditional venture capital, which emerged primarily to support information technology startups, often avoids such first-of-a-kind energy hardware sectors (also called “deep-tech”) because the time to commercial viability (5–10 years) exceeds typical traditional venture capital investment horizons (3–5 years) (International Energy Agency, 2022). The nascent nature of the sector creates information asymmetries, limiting investor confidence and resulting in lower investments in innovative companies (South Asia Regional Energy Partnership & Invest India, 2023). During our consultations, industry players also mentioned that many investors focus on quick returns, which is often in conflict with the sector’s requirement for patient capital to develop and commercialize high-quality products.



Box 2. Scaling up subnational policy experiments

Public policy interventions and government support programs that de-risk investments in midstream and upstream battery manufacturing can support pilot-scale manufacturing, and early commercialization can lower technology risk, making it more attractive to private capital. Global experience shows that several sub-provincial governments are increasingly using equity investments (rather than just traditional grants or tax breaks) to attract and scale battery and EV manufacturing.

For example, state-controlled funds in the city of Hefei, the capital of Anhui province, bought a 24% stake in the EV manufacturer Nio in 2020 for RMB 7 billion (USD 1 billion). The investors include state-controlled Hefei Construction Investment Holding (Group) Co. Ltd, CMG-SDIC Capital Management Co. Ltd, and Anhui High and New Technology Industrial Investment Co. Ltd. (Reuters, 2020). Similarly, Hangzhou municipal government invested RMB 3 billion (USD 0.43 billion) in Zhejiang LeapMotor Technologies Ltd. in a pre-initial public offering funding round in 2021 (Bloomberg, 2023).

Some experiments are also underway in India. T-Fund—a co-investment fund set up by the Information Technology, Electronics and Communication Department of the Government of Telangana—has allocated INR 15 crore to initiate research and innovation, including for startups in EV and battery technologies through a collaborative environment. T-Fund invests in startups alongside established angel investors and venture capitalists, with an investment limit of 20% of its investable funds in any single portfolio (Department for Promotion of Industry and Internal Trade, 2022). This innovative co-investment vehicle is already yielding early results in helping startups scale up.

Recommendation 2: R&D, IP, and patent filing

Provide dedicated policy support for R&D investments, patent filing, and strategic IP creation in the battery value chain. The Government of India could establish a dedicated scheme to accelerate domestic battery and cell R&D and IP creation, similar to the Ministry of Electronics and Information Technology's Design-Linked Incentive scheme for semiconductor design. Public support should reward localization-relevant R&D expenditure on novel product design and IP creation and tie later incentives to productization and deployment.

India's EV ecosystem continues to rely heavily on imported technologies due to historically low investment in R&D. According to World Intellectual Property Organization data, 170,000 patents were granted globally between 2010 and 2022 for electrical machinery, apparatus, energy, and semiconductors. Of these, 35% came from China, while just over 0.3% came from India (World Intellectual Property Organization, 2025).

R&D grants were also viewed as an important policy lever for localization by 32% of respondents in our industry survey. India's R&D ecosystem for EV and battery manufacturing is still developing. Frequent product design changes and short innovation cycles in countries like China and South Korea make it hard for domestic players to standardize specifications or



invest in automation without risking obsolescence. This often forces manufacturers to depend on licensed or imported technologies, limiting the growth of indigenous IP.

A design-linked incentive scheme, similar to the existing scheme for semiconductors, could tie disbursements directly to IP creation and commercialization milestones registered with Indian authorities. Our industry consultations revealed that to facilitate advancement from concept to commercialization, the incentive structure could be implemented in a phased manner:

- 40% of the support disbursed at the IP filing stage, incentivizing early-stage innovation, particularly among startups and MSMEs.
- 60% released upon demonstrable productization on the basis of net sales turnover, supporting technology maturation, pilot deployment, and initial manufacturing readiness.

At the IP creation stage, the patents in battery and cell technology should show clear novelty and align with localization or technology-gap priorities. At the commercialization stage, the IP should showcase demonstrable productization supporting technology maturation, pilot deployment, and initial manufacturing readiness. This strategic approach would help ensure that the IPs incentivized are useful and value innovation. With appropriate safeguards and monitoring mechanisms, such a scheme could play a significant role in positioning India as a competitive developer of battery technologies.

Recommendation 3: Expanding scope under PLI Auto

Conduct fresh rounds for PLI Auto to increase industry participation as downstream manufacturing for EV OEMs and component suppliers matures. Broadening participation would expand the number of beneficiaries, spread incentives across a wider set of firms, and increase the uptake of incentives during the scheme period while ensuring that DVA criteria are maintained. Since the launch of the scheme in 2021, the EV manufacturing ecosystem in India has matured considerably, and several firms that were previously ineligible now meet the investment and scale requirements of the scheme.

As mentioned in Section 2.2 of this report, the PLI Scheme for Automobiles and Auto Component Industry has a total budgetary outlay of INR 25,938 crore (USD 3 billion) and provides output-linked incentives for OEMs and component manufacturers (excluding batteries) linked to a minimum DVA of 50% (Ministry of Heavy Industries, 2025). At the end of 2025, while 82 applicants had been approved under the scheme, only eight applicants under the champion OEM category and 10 applicants under the champion component category had received DVA certification for 94 variants and 37 variants, respectively (Press Information Bureau, 2026c). Total incentive disbursements till end-January 2026 thus remain low at INR 2,378 crore (INR 280 million)—9% of the scheme outlay.

When the PLI Scheme for the Automobile and Auto Component Industry was launched in 2021, it also established stringent eligibility criteria for participating firms. These criteria included high thresholds for prior revenue and investments in fixed assets for firms to be eligible to participate. As a result, several new firms operating in the electric mobility space were unable to qualify despite scaling ambitions.



Our industry stakeholders and, more recently, the Department-Related Parliamentary Standing Committee on Industry also highlighted that calibrated relaxation of the revenue and fixed asset eligibility criteria can help broaden participation and support emerging EV manufacturers and technology-focused startups to participate in the scheme benefits without diluting the DVA requirement (Press Information Bureau, 2026b). Enabling such firms to access incentives through periodic and fresh application windows would help ensure that the scheme remains responsive to the rapidly evolving EV manufacturing landscape and reinforce the scheme's broader objective of deepening localization across the EV value chain.

Recommendation 4: Project preparation and infrastructure development

Develop project preparation facilities and plug-and-play industrial land infrastructure at the state level to further accelerate cell and battery manufacturing.

Dedicated project preparation facilities and investment facilitation platforms at the state level that develop bankable, investment-ready projects can help attract further investments in midstream and upstream projects and reduce execution risks. Such facilities/platforms can be anchored in the investment department/cells of state governments and facilitated by Invest India at the centre.

Our industry consultations revealed that delays in state-level regulatory approvals add to the administrative burden. Although most states have established single-window clearance mechanisms for manufacturing industries, these systems often function primarily as coordination portals rather than as fully empowered authorities. Most states lack a project-preparation facility to support high-risk and regulatory-intensive sectors, such as EVs, EV components, and batteries. As a result, investors continue to encounter complex, multi-layered approval processes involving land, environmental, and hazardous waste regulations at the state and local levels. This complexity results in significant delays, even when a single-window clearance system is available.

State-level project preparation facilities and investment facilitation platforms can provide technical, financial, and legal support to design bankable projects, standardize deal structures, and reduce fragmentation. Creating investment-ready large project pipelines will accelerate the mobilization of public and private capital across sunrise sectors like EV and battery manufacturing.



Box 3. From transition to transactions: The role of project preparation facilities in attracting EV investments

GET.invest is a European multi-donor program implemented by Deutsche Gesellschaft für Internationale Zusammenarbeit, with support from the European Union, that mobilizes private investment in clean energy across sub-Saharan Africa, the Caribbean, and the Pacific (GET.invest, 2026). It operates as a project preparation and investment facilitation platform, supporting developers to structure bankable projects and connect with financiers. Through its Finance Access Advisory, GET.invest provides assistance to companies with financial modelling, investment documentation, and investor outreach, while initiatives such as finance catalysts help build pipelines of investment-ready projects (GET.invest, 2025).

An illustrative deal-flow example is GOGO Electric, which develops electric motorbike batteries and solar-powered battery-swapping infrastructure for Uganda's motorcycle taxi sector (GET.invest, 2025). Through GET.invest advisory support—including market research, competitor analysis, and financial modelling—the company refined its investment strategy, secured strategic partners, and raised EUR 7.1 million, enabling the expansion of electric motorcycles and battery manufacturing capacity in East Africa. GOGO Electric is now scaling up to build East Africa's largest lithium-ion battery factory (GET.invest, 2025).

Beyond individual projects, GET.invest also develops model business cases for EV ecosystems, such as electric two-wheeler fleets paired with battery-swapping stations powered by solar mini-grids. These examples demonstrate how project preparation facilities can convert policy ambition into bankable e-mobility investments in emerging markets.

Planned and plug-and-play industrial parks that provide reliable, high-quality power and supply, testing and certification facilities, environmental management systems, waste-handling and chemical storage infrastructure, and efficient logistics connectivity can also help attract anchor investors and lead to a domino effect in localizing the EV supply chain. State governments play a central role in such enablement and should identify pre-approved industrial land to enable better forward and backward industrial linkages.

Procurement of suitable land with forward and backward industry linkages is currently a major challenge for EV and battery manufacturing. This is especially important for battery manufacturing, given that setting up a manufacturing plant with 1 GWh of annual capacity requires approximately 55 acres of land (Savills, 2025). Industry players cited challenges related to processes involving the conversion of agricultural land to industrial land, which remains cumbersome and may lead to the diversion of productive land. EV and battery manufacturers also mentioned prolonged timelines in securing land parcels of optimal size due to the large quantities required and the fragmented nature of the land market, causing significant project delays and increasing project costs. In several states, high land costs and the lack of coordinated access to utilities, such as power, water, and transportation networks, also deter potential investors. The Government of India's recent move to financially support states in the development of world-class industrial parks through Bharat Audyogik Vikas Yojna (BHAVYA) is a good first step in this direction (Press Information Bureau, 2026a).



Box 4. Cross-learning from China's hub-and-spoke industrial model and Telangana Mobility Valley in India

Global and local experiences show that planned and dedicated industrial parks help attract anchor investors and lead to a domino effect in localizing the EV supply chain. For example, in China, Shenzhen planned to build 20 advanced manufacturing industrial parks for strategic emerging sectors and industries of the future, including new-energy vehicles (NEV) and intelligent connected vehicles.⁹ These parks were envisioned over a total area of 300 km² in the districts of Bao'an, Guangming, Longhua, Longgang, Pingshan, and Shenshan (Xinhua, 2022).

For example, the Pingshan New Energy Automobile Industrial Park has emerged as a key cluster, concentrating manufacturers, research institutes, and service providers across the full automotive value chain—from intelligent chassis and energy storage to automotive-grade chips, in-vehicle systems, autonomous driving, and vehicle-road-cloud integration. The industrial park offers infrastructure conducive to NEV development, which includes high-rise, prefabricated factories with intelligent vertical design to maximize land use and production efficiency, and a vertical transport network to allow vehicles to reach higher floors directly. The park is also host to multiple research institutions and facilities to facilitate R&D, testing, verification, and product piloting. Pingshan is home to more than 300 NEV companies, including BYD. The district's intelligent connected vehicle and NEV sectors recorded a combined output of close to RMB 500 billion (USD 71.5 billion) in 2024 (People's Government of Pingshan District, 2025).

Another example from China is its NEV industry, which is characterized by multi-node clustering and belt distribution. It is mostly concentrated in the Yangtze River delta, Pearl River delta, and the Chengdu-Chongqing and Beijing-Tianjin-Hebei regions. The Yangtze River delta is a major NEV manufacturing cluster in China. This region has developed a "four-hour NEV industrial circle" made up of localities with distinct advantages: Shanghai produces the chips and software that make up the brains of NEVs; Jiangsu provides power batteries; Zhejiang provides integrated diecasting machines; and Anhui specializes in final assembly. The complete NEV industrial chain is established within a 4-hour circle. Shanghai is home to SAIC Motor and Tesla; Jiangsu and Anhui host Nio, Li Auto, Chery, and JAC; and Zhejiang is home to the GEELY Group and some other startups in this segment (Xuejie & Zeyuan, 2024).

In India, Telangana is one of the first states advancing a dedicated mobility cluster, the Telangana Mobility Valley, consisting of four mega clusters spread over 3,000 acres in and around Hyderabad providing state of the art infrastructure¹⁰ (Bharadwaj, 2023). The Telangana Mobility Valley project includes an engineering and innovation cluster on 1,200 acres in Vikarabad district. Two EV manufacturing clusters are being planned at Zaheerabad and Seetharampur, with an upcoming energy storage cluster at Divitipally (Bharadwaj, 2023).

⁹ Intelligent connected vehicles refer to vehicles with environmental perception, intelligent decision making, automatic control, or interaction with external information, and even collaborative control functions (Code of China, 2020).

¹⁰ The cluster will include support infrastructure such as roads, power, and water supply. It will provide built-up spaces with ready factory sheds primarily for use with MSME units. Common facilities for design, prototyping, and testing will be accessible to all units within the cluster. Additional infrastructure will comprise drainage systems, common effluent treatment plants, sewage treatment plants, and utilities, including power, gas, and water. The development will offer a state-of-the-art business environment with amenities such as convention and exhibition centres, shared facilities for staffing and training, and a logistics hub equipped with multimodal transport to ensure safe and efficient cargo handling (Government of Telangana, n.d.-b).



Recommendation 5: Workforce development

Bridge the skill gap by establishing a dedicated skilled workforce development program for EV and battery manufacturing. The central government skilling program needs to go beyond repair and maintenance training to deep-tech manufacturing and align vocational training with industry requirements, thereby increasing industry–academic partnerships, enhancing practical competencies, and producing a future-ready workforce.

Under the central government's flagship skilling scheme—the Pradhan Mantri Kaushal Vikas Yojana under the Ministry of Skill Development & Entrepreneurship—Sector Skill Councils are tasked with promoting industry connection through conducting skill gap studies, developing curriculum, and facilitating on-the-job training for implementation of the scheme (Ministry of Skill Development and Entrepreneurship, n.d.). An analysis of five major Sector Skills Councils relevant to the EV and battery sector in Table 3 shows that only 21 qualification packs (QPs)—a set of industry-defined standards aligned to specific job roles developed by these councils—were for EVs and batteries. For batteries alone, only 5 QPs were developed—two by the Automotive Skill Development Council and three by the Electronics Sector Skill Council of India. There is no dedicated Skill Council for developing the skilling standards for batteries. This points toward a lack of sufficient industry-ready standards in the EV and battery manufacturing sector, which is crucial for filling the skill gap.

Table 3. QPs related to EV manufacturing

Skill Council name	Number of QPs (total)	QPs related to EV and battery repair/maintenance/charging	QPs related to manufacturing
Hydrocarbon Sector Skill Council	78	1	0
Automotive Skill Development Council	126	5	6
Power Sector Skill Council	30	0	0
Electronics Sector Skill Council of India	101	2	4
Skill Council for Green Jobs	58	3	0

Source: Automotive Skills Development Council, 2025; Electronics Sector Skills Council of India, 2025; Hydrocarbon Sector Skill Council, 2025; Power Sector Skill Council, 2025; Skill Council for Green Jobs, 2025.

Based on these QPs, there are eight job roles corresponding to EVs identified in the PMKVY 4.0 dashboard developed by the Ministry of Skill Development and Entrepreneurship: five pertain to manufacturing (EV assembly operator, technician, product design engineer, quality control inspector, and test engineer) and three are related to service and maintenance (maintenance technician, service, and service lead technician) (Ministry of Skill Development and Entrepreneurship, n.d.). The enrolment data in job roles pertaining to EVs shows active enrolment (at 65,422) of students in service and maintenance roles such as EV maintenance



technician, service, and service lead technician. On the contrary, only 2,151 enrolments were in manufacturing-related courses such as those for EV assembly operator, technician, product design engineer, quality control inspector, and test engineer (PMKVY 4.0 Dashboard, n.d.).

While the Skill Councils have taken a first step in designing some QPs for downstream EV manufacturing, there also remains a near absence of QPs for upstream and midstream segments of the EV supply chain. The Skill Council for Mining has only one course related to rare-earth element extraction, with weak linkages to a component crucial in the EV supply chain—rare-earth permanent magnets. There is a need to develop specialized courses for all segments of the EV supply chain to ensure the availability of an industry-ready skilled workforce.

Box 5. Cross-learning from subnational efforts on EV and battery workforce skilling programs

China has been able to meet the demand for skilled workers by the electric car industry through a vocational training push. Back in 2019, the country called for 300 business entities to provide or sponsor training and also created a nationally recognized skill certification framework. The launch of the BYD Field Engineer College in 2023, in collaboration with vocational schools in the Henan province of Zhengzhou—which is home to a new BYD factory—is an example of collaboration between industry and academia, which can pave the way for course design relevant to industry requirements (Gupta & Kulshreshtha, 2024).

Several states have introduced initiatives to address this need. For instance, in Tamil Nadu, many skilling initiatives are underway to redesign curricula in engineering and polytechnic colleges—specifically in electrical, electronics, mechanical, and automobile disciplines—and to install EV practical modules to facilitate laboratory-based learning to meet EV industry requirements. To strengthen industry–academia linkages, the Government of Tamil Nadu has established WorkLabs,¹¹ a cell within Guidance,¹² to promote and expand partnerships between industry and academic institutions.

Another example is Karnataka, which is promoting industry and government partnerships such as the partnership between the Government of Karnataka and Tata Technologies Ltd, offering long-term and short-term courses. The Karnataka Clean Mobility Policy 2025–2030 highlights a partnership between Tata Technologies Ltd. and the state government, which aims to transform 150 ITIs into technology hubs (Government of Karnataka, 2025). This initiative will offer training to approximately 20,000 individuals annually through long-term courses and to 1 lakh professionals annually through short-term courses (Government of Karnataka, 2025).

¹¹ WorkLabs aims to equip graduates with industry-ready skills. It will drive experiential learning initiatives such as live projects, internships, and skilling programs to enhance collaboration between academia and industry.

¹² Established in 1992, Guidance is the Government of Tamil Nadu's nodal agency for investment promotion and single-window facilitation. It offers continuous support through a team of sector experts, policy advisors, and international consultants, promoting collaboration among industry stakeholders, community partners, and various government departments (Government of Tamil Nadu, n.d.).



We find that while many states in India include skills development provisions within EV or industrial policies, these programs often remain generic and insufficiently tailored to emerging needs in battery chemistry, power electronics, software integration, testing, and recycling. Our consultations highlighted that EV manufacturing often requires shop-floor technical skills, such as knowledge of battery chemistry, EV powertrain assembly, and end-of-line testing of batteries, motors, and power electronics (Nimesh et al., 2024). In addition to manufacturing, systems integration capabilities that are required need software and firmware experts who can embed intelligence into EVs, enabling features such as real-time monitoring, predictive maintenance, and connectivity (Nimesh et al., 2024). There is also a need to develop skills for the end-of-life management of vehicles—especially for batteries, considering the presence of valuable critical minerals such as lithium, cobalt, and nickel—and their potential in second-life applications.

A shortage of skilled workforce and an absence of targeted skilling pipelines at the state level is linked to clusters, anchor manufacturers, and MSME suppliers, limiting the availability of job-ready talent and increasing reliance on firm-level training, raising costs for manufacturers and slowing ecosystem development. A recent report by the Society of Indian Automobile Manufacturers indicates that achieving full localization of EV components will require 30,000 EV-ready workers annually until 2030, an increase from the current rate of 15,000 per year (Manufacturing Today, 2024). The estimated hiring cost for EV-ready workers is INR 7,671 crore (USD 907 million), with training expenses projected at INR 5,881 crore (USD 695 million), resulting in a total talent investment of approximately INR 13,552 crore (USD 1.6 billion) across both blue- and white-collar positions (Manufacturing Today, 2024). Without dedicated support mechanisms and enablement, MSMEs and their employees risk being crowded out of the EV transition.

Recommendation 6: Public procurement and ZEV mandates

Introduce clear public procurement and phased ZEV mandates to boost demand and reduce market risk for domestic manufacturers. Cross-learning from global experiences shows that phased ZEV mandates can provide the regulatory signal OEMs need to transition to EVs and create an enabling ecosystem for component suppliers. Although discussions regarding ZEV mandates in India are still in the early stages, both national and state governments have expressed interest in pursuing long-term ZEV transition goals and their role in facilitating this transition. During state-level consultations organized by the International Council on Clean Transportation, state representatives indicated that a central notification outlining preliminary considerations for establishing a ZEV mandate in India would be beneficial (International Council on Clean Transportation, 2023). Implementing a national mandate could set a precedent, while subnational coordinated action may help create a supportive market environment.

During our industry survey, 59% respondents considered ZEV mandates as the top supply-side enabler that the centre can introduce to boost EV production. Currently, India does not have ZEV mandates at either the national or state level. There are some ongoing efforts to nudge suppliers toward EVs and incentivize production under the latest corporate average



fuel efficiency norms, which allow for super credits for EVs, but these are not equivalent to ZEV mandates (Deo & Kaur, 2024). ZEV mandates are government policies that require automakers to sell a specified percentage of ZEVs, such as battery electric vehicles, hydrogen fuel-cell vehicles, and plug-in hybrids, as part of their total sales. These mandates are designed to reduce greenhouse gas emissions and accelerate the transition to cleaner transportation.

Internationally, ZEV mandates have been adopted at both the federal and national levels. For instance, California's Advanced Clean Cars Program requires automakers to incrementally increase ZEV sales, and several U.S. states, including New York, Massachusetts, and Oregon, have adopted similar mandates. At the national level, China's NEV credit system operates in a comparable manner (International Council on Clean Transportation, 2018). Automakers are required to produce and sell a minimum proportion of NEVs, including battery electric vehicles, plug-in hybrids, and hydrogen fuel-cell vehicles.

Another policy instrument to create demand certainty and reduce market risk for domestic manufacturers can be clear public procurement targets. Explicit public procurement targets for EVs in most states in India are currently limited to public transport, such as procurement of electric buses and electrification of government fleets. Our stakeholder consultations highlighted the need to strengthen India's battery policy and regulatory framework to better support domestic innovation, manufacturing, and recycling. In the absence of clear procurement mandates for locally produced batteries, domestic manufacturers struggle to compete with imports. This lack of demand certainty has, in turn, dampened investment in upstream segments such as active materials and equipment manufacturing.



6.0 Conclusion

This report finds that while national policies provide strategic direction and financial anchors, they are insufficient on their own to overcome the capital intensity, technology risk, and long payback periods that characterize EV and battery manufacturing—especially in midstream and upstream segments.

State governments have therefore emerged as decisive actors in translating national ambitions into on-the-ground manufacturing outcomes. States control the core enablers that shape investment decisions: access to land, industrial infrastructure, power tariffs, logistics connectivity, regulatory clearances, workforce development, and localized fiscal support. The report shows that states are increasingly functioning as differentiated investment jurisdictions within a common federal framework.

The comparative analysis highlights that competitive advantage across states is shaped less by the nominal generosity of incentives and more by how well policy instruments are matched to specific cost and risk barriers. Leading manufacturing states with deep automotive ecosystems are structurally better placed to localize integrated EV value chains. At the same time, several aspirational and emerging states are beginning to carve out niches—whether in battery cell manufacturing, electronics, materials processing, or downstream assembly—by leveraging targeted incentives, land availability, and emerging clusters. These diverse pathways underscore the limits of uniform policy replication and point to the need for greater strategic differentiation.

Looking ahead, deepening EV and battery localization in India will require a shift from incentive competition toward coordination, specialization, and ecosystem building. For policy-makers, this implies three broad priorities. First, policy stacks—across central and state levels—must more deliberately de-risk capital-intensive and first-of-a-kind investments through upfront support, patient capital instruments, and faster project execution. Second, states need to move beyond fragmented incentives toward integrated ecosystem development that combines plug-and-play infrastructure, testing and certification capacity, skills pipelines, and MSME integration. Third, demand certainty—through public procurement, ZEV mandates, and the creation of low-emission zones—will be critical to reduce market risk and crowd in private investment across the value chain.



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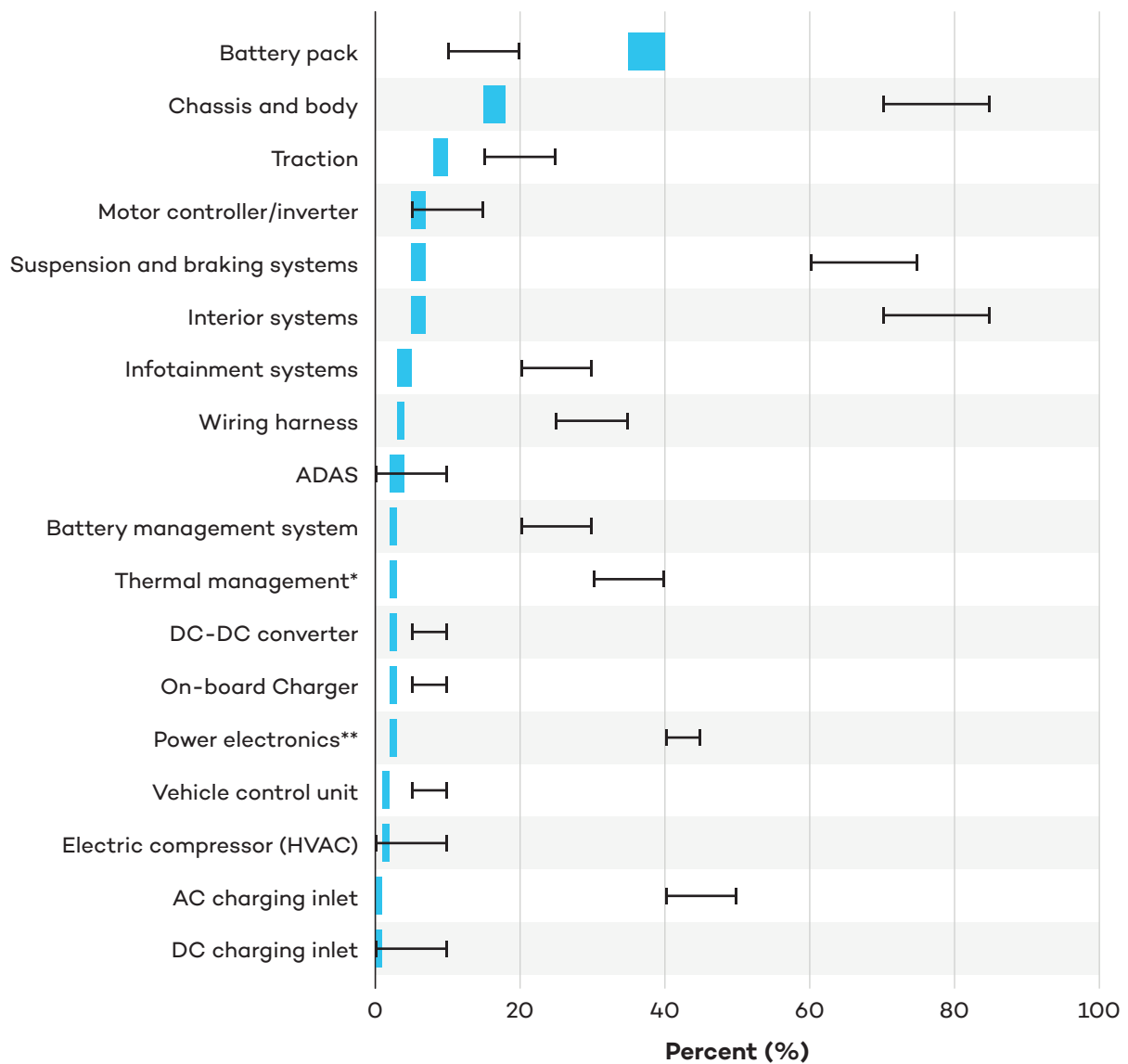


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Appendix A. Net Localization of EV Components in India

Figure A1. Breakdown of bill of materials for a typical electric four-wheeler passenger vehicle in India



* E.g., battery cooling
 ** E.g., miniature circuit breakers, safety relays

■ Cost of EV component in bill of materials, as share of total EV cost
 ┆ Net localization range

Notes: Net localization = value of raw material/child part sourced from India + assembly value addition done in India

*Indicative based on secondary literature and industry consultations

Source: Compiled by authors based on Jain, 2024.



Appendix B. List of Respondents to the Industry Perception Survey

Cygni Energy Private Limited
Lico Materials Private Limited
Luvitus International
Global electronics
The Energy Company
Replus Engitech Private Limited
Reliance Industries Limited
Replus Engitech Private Limited
Batx Energies Private Limited
Goodenough energy
Nile Li-Cycle Private Limited
Jaraenertek
Attero Recycling Private Limited
Minimines
Evergreen Recyclekaro India Limited
Alteons Energy
Folks force Private Limited
EEzyVolt Energy Private Limited
Evstacks Private Limited
PWR Nukleus Technologies Private Limited
Hindustan Zinc Limited
Global Electronics



Appendix C. State Selection Criteria

Table C1. India's automotive supply chain and its contribution to economic growth

State	Automotive manufacturing (% of state gross value added)	Automotive manufacturing output (USD billion)	Automotive supply chain highlights
Haryana	26%–33%	6.6–7.8	Gurugram-Manesar belt – Maruti Suzuki, Honda Motorcycle, and supplier network
Tamil Nadu	8%–19%	30.1–33	The “Detroit of India” – Hosts ~30% of India's auto exports with Hyundai, Renault-Nissan, BMW, and auto component clusters
Maharashtra	6%–13%	27.7–34.3	Pune as auto hub – Tata Motors, Bajaj Auto, Mahindra, Volkswagen, and component suppliers
Gujarat	5%–7%	12.0–14.5	Sanand auto cluster – Tata Motors, Ford (former), and growing auto ancillary industries
Karnataka	4%–9%	9.6–12.85	Bengaluru-Bidadi hub – Toyota, Volvo, Scania, TVS, and Honda Motorcycle plants
Rajasthan	1%–9%	2.2–5.2	Neemrana – Hero MotoCorp, Honda Cars, and expanding Japanese auto investments
Madhya Pradesh	1%–7%	2.2–3.9	Pithampur – Force Motors, Eicher, and growing auto ancillary presence
Uttar Pradesh	2%–6%	3.0–3.9	Emerging hub – Yamaha, auto parts in Noida, and industrial corridors boosting activity
Andhra Pradesh	2%–6%	3.6–6.3	Sri City – Isuzu, Hero MotoCorp, Kia Motors and auto component manufacturing growth in the Penukonda industrial area



State	Automotive manufacturing (% of state gross value added)	Automotive manufacturing output (USD billion)	Automotive supply chain highlights
Telangana	1%–2%	2.2–2.9	Several large players in the Telangana Mobility Valley, auto parts and small-scale manufacturing
Punjab	1%–2%	1.1–1.4	Ludhiana – Auto parts manufacturing, Hero Cycles, and smaller vehicle assembly units
West Bengal	1%–2%	0.8–1.1	Limited but notable – Tata Hitachi (Kharagpur) and auto parts production
Odisha	<1%	0.4–0.5	Minor role – Primarily steel for auto inputs, not direct vehicle manufacturing
Chhattisgarh	<1%	0.2–0.4	Indirect role – Steel and aluminum supply for automotive industry, limited assembly activity

Source: Calculated by authors based on Ministry of Statistics and Programme Implementation, 2025.



Appendix D. Detailed Methodology for Comparative Policy Analysis

For the 2x2 comparative policy analysis, we developed a composite score for each state based on (i) the strength of each state's policies for electric vehicle (EV) and battery localization (x-axis) and (ii) manufacturing competitiveness (y-axis).

Strength of State Policies for EV and Battery Localization

To calculate the composite score, we used the results from the systematic review of state policies and ranked each support measure based on its presence in state policies and its strength. A score of 5 or 4 was assigned when support was available and generous in size, including clarity on the size of incentives; a score of 3 when state policies make provision for enablement but are unclear on the size and nature of financial benefit; and score of 2 or 1 when state policies have a weak link to complementary policies or make no mention of the support measure.

We then assigned weights to different policy instruments based on the industry survey findings and stakeholder consultations. Key support measures included capital expenditure (CapEx) and operational expenditure (OpEx) support measures, such as capital subsidies, land concessions, tax incentives, stamp duty waivers, research and development (R&D) incentives, patent cost incentives, export incentives, and employment benefits. The rationale for the weighting is provided in Table D1.

Table D1. Weights assigned to support measures to assess the attractiveness of state policy packages for capital-intensive EV segments

Support measures	Weight (%)	Rationale
Capital subsidy (upfront)	25	Upfront capital support directly reduces first-of-a-kind risk and lowers effective project CapEx.
Land incentives	20	Large EV and battery plants are land- and infrastructure-intensive, and delays or costs in land aggregation are often significant barriers to project execution and financial close.
State Goods and Services Tax (SGST) reimbursement	15	SGST reimbursement materially improves early cash flows and operating margins, which strengthens debt-service capacity and overall project bankability.
R&D incentives	10	R&D incentives matter when they support scale-up, testing, and process optimization, but are secondary to CapEx and land in determining manufacturing location.



Support measures	Weight (%)	Rationale
Stamp duty waiver	10	Transaction-cost relief reduces friction and timelines at project initiation, which is especially relevant in states with complex land administration.
Export incentives	7	Export incentives improve long-term competitiveness but have limited influence on initial investment decisions for domestic-market-oriented manufacturing.
Patent cost incentives	5	Patent cost support signals innovation objectives but has minimal impact on the economics or execution risk of large-scale manufacturing.
Employment incentives	5	Employment incentives help offset operating costs and support political buy-in but are rarely decisive for investment decisions in highly automated, capital-intensive facilities.
Skill and training incentives	3	Support for workforce development is useful for long-term ecosystem building, but it has limited influence on location decisions given the capital-intensive nature of the sector.

Source: Authors' analysis informed by industry survey results and one-on-one stakeholder consultations.

The strength of state policies for EV and battery manufacturing was then calculated as a weighted average of the support measures offered in each state (x-axis score).

Table D2. Methodology for calculating the strength of state policies for EV and battery manufacturing

Support measure/ state	Capital subsidy	Land concessions	Stamp duty waivers	R&D incentives	Export incentives	SGST reimbursement	Patent cost incentives	Employment incentives	Skill and training incentives	Composite score
Weights	25%	20%	10%	10%	7%	15%	5%	5%	3%	100%
Tamil Nadu	5	5	5	3	2	5	5	5	5	4.6

Source: Authors' analysis.

The x-axis represents the strength of state policy packages for capital-intensive EV segments—an area where policy support can be most material for deepening localization.



Manufacturing Competitiveness

We then scored each state based on its manufacturing competitiveness (y-axis). Each state was scored from 1 (weak) to 5 (strong) using 2023/2024 data on its Ease of Doing Business rankings (from India's 2024 Business Reforms Action Plan), policy stability, industrial electricity tariffs in the state, and labour wages (Press Information Bureau, 2025). This helped identify the competitiveness score for manufacturers across these 14 states.

The y-axis represents the manufacturing competitiveness of a state, which is an ecosystem enabler for EV and battery localization, crucial for attracting original equipment manufacturers, suppliers, and battery manufacturers. To analyze this, we selected five parameters and assigned weights to them based on the feedback received from stakeholder consultations (Table D3).

Table D3. Weights assigned to parameters to assess manufacturing competitiveness for capital-intensive EV manufacturing

Parameter	Weight (%)	Rationale
Micro, small and medium-sized enterprise (MSME) presence	30	Enables supplier depth for forward and backward linkages
Investor confidence	25	Measured by the Ease of Doing Business category, ensuring long-term investor confidence
Logistics	20	Defined as port/highway access (e.g., Tamil Nadu's Chennai Port), which enhances supply chain efficiency and export potential
Electricity tariffs	15	Reflecting industrial power costs which affect operational expenses
Labour wages	10	Lower wages reduce costs but are less critical for capital-intensive EV manufacturing

Source: Authors' analysis informed by industry survey results and one-on-one stakeholder consultations.

These parameters are selected based on their role in creating a competitive manufacturing environment, with higher weights for MSME presence as suppliers and investor confidence due to their decisive influence on investment decisions.

The EV and battery manufacturing competitiveness (y-axis score) was then calculated as a weighted average of the relative rank of each state across these five parameters.



Table D4. Methodology for calculating the manufacturing competitiveness of each state for EV and battery manufacturing

Indicator/ state	MSME presence	Investor confidence	Logistics	Electricity tariffs	Labour wages	Composite score
Weights	30%	25%	20%	15%	10%	100%
Tamil Nadu	5	3	5	4	3	4.2

Source: Authors' analysis.

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