Roadmap for an Automotive Component Technology Upgradation Financing Facility

September 2025

CLIMATE POLICY INITIATIVE

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Responsibility for the information and views set out in this publication lies with the authors.

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ABOUT CLIMATE POLICY INITIATIVE

CPI is an analysis and advisory organization with deep expertise in finance and policy. Our mission is to help governments, businesses, and financial institutions drive economic growth while addressing climate change. CPI has seven offices around the world in Brazil, India, Indonesia, South Africa, the United Kingdom, and the United States.

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LIST OF ABBREVIATIONS

AAC	Automobile and Auto-Components
ACM	Auto-component manufacturers
ACC	Advanced Chemistry Cells
ACMA	Automotive Component Manufacturers Association
AC-TUFF	Automotive Component- Technology Upgradation Financing Facility
ATUFS	Amended Technology Upgradation Fund Scheme
BMS	Battery management system
Capex	Capital expenditure
CFC	Common facility centers
CGTMSE	Credit Guarantee Fund Trust for Micro and Small Enterprises
CPI	Climate Policy Initiative
DC	Die casting
DFI	Development financial institution
DoE	Department of Energy
DVA	Domestic value addition
EV	Electric vehicle
FAME	Faster Adoption & Manufacturing of (Hybrid &) Electric Vehicles
FI	Financial institution
FCI	Fixed capital investment
GCF	Green Climate Fund
GoI	Government of India
IBA	Indian Banks' Association
ICE	Internal combustion engine
ICRA	Investment Information & Credit Rating Agency
IFC	International Finance Corporation
M&A	Mergers & acquisition
MRV	Monitoring, reporting and evaluation
MSME	Micro, small, and medium enterprises
NBFC	Non-banking financial companies
NPD	New product development
OECD	Organization for Economic Co-operation and Development

OEM	Original equipment manufacturer
PE	Private equity
PFI	Partner financial institutions
PLI	Production-linked incentive
PMP	Phased Manufacturing Program
PM E-DRIVE	PM Electric Drive Revolution in Innovative Vehicle Enhancement
PMU	Program Management Unit
R&D	Research & development
SBA	Small Business Administration
SIDBI	Small Industries Development Bank of India
SMT	Surface mount technology
SPV	Special purpose vehicle
TA	Technical assistance
VC	Venture capital

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EXECUTIVE SUMMARY

India's transition to electric mobility creates a decisive window to build an advanced domestic manufacturing ecosystem while safeguarding jobs and competitiveness across the auto-component supply chain. Climate Policy Initiative (CPI) assesses that micro-, small-, and medium-sized enterprises (MSMEs), which act as the backbone of the automotive component industry, must rapidly upgrade their technology, processes, and skills to participate effectively in electric vehicle (EV) value chains. Yet they remain constrained by expensive capital, limited risk appetite, and uneven access to policy support. This analysis proposes the establishment of an Automotive Component Technology Upgradation Financing Facility (AC-TUFF) to catalyze affordable, patient capital and targeted technical assistance (TA) for MSMEs undertaking EV transition projects.

The EV market opportunity is large and time-sensitive. By FY2035, annual demand for key EV components in India—battery packs, motors, power electronics, and connectivity/control systems—could reach INR 3.86 lakh crore (USD 46.17 billion), with sizable domestic value addition potential. MSMEs can capture significant shares in lower capital expenditure and modular sub-segments (e.g., battery-pack assembly, housings, wiring harnesses, printed circuit board assembly for control systems) but require well-structured capital and de-risking instruments to overcome barriers to entry and scale. CPI estimates that Indian MSMEs will need a cumulative INR 55,000 crore (USD 6.6 billion) of targeted investment in FY2026–FY2035 to maintain current turnover shares as the industry pivots from internal combustion engine vehicles to EVs.

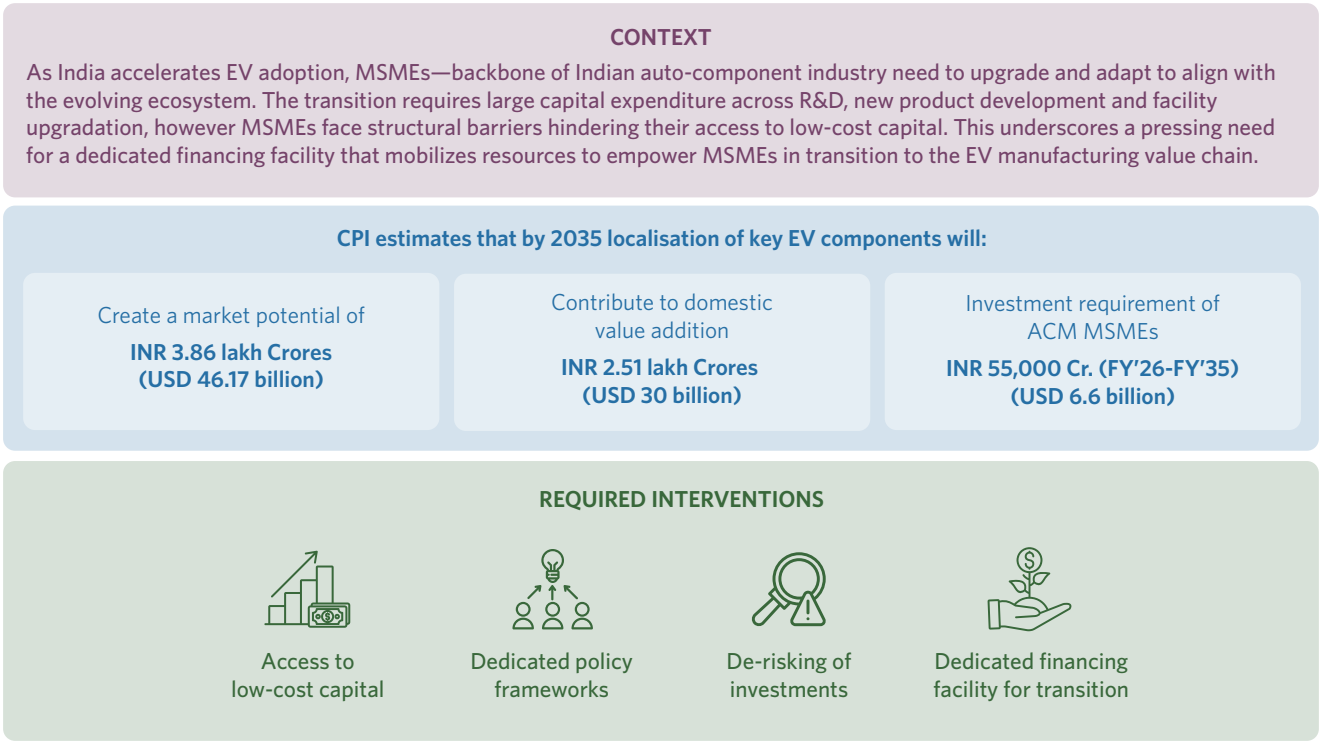
Capital availability is typically misaligned with the transition needs of smaller players. Private equity and venture capital favor late-stage, large-scale players and brand-visible original equipment manufacturers (OEMs). Only a marginal share of these funds supports early-stage research and development or new product development at the component tier. MSMEs with limited access to technology and a greater need for transition capital remain outside the focus of these funds. Traditional bank lending emphasizes backward-looking metrics, collateral, and narrow covenants that penalize firms during technology retooling and ramp-up. While existing enablers, such as credit guarantees, cluster programs, and mass-demand incentives, provide a foundation, there is now an opportunity to design purpose-built solutions that can support MSME retooling at the speed and scale required by the EV transition. However, the financial requirements of MSMEs undergoing a technological shift, such as the EV transition, demand a focused and purpose-built provision.

AC-TUFF addresses these structural gaps in financing the EV transition requirements of auto-component manufacturer (ACM) MSMEs. The proposed facility combines a tiered capital stack—senior commercial capital, concessional capital, and first-loss capital—with integrated technical assistance (TA). It operates through partner financial institutions via on-lending and credit guarantees, and it complements credit with TA for bankable project design, vendor selection, cost and quality optimization, and OEM-market linkage. A dual-credit enhancement—AC-TUFF first loss guarantees plus a 'Credit Guarantee Fund Trust for Micro and Small Enterprises' second loss guarantee—and demand de-risking via OEM offtake can unlock systematic scale. AC-TUFF's phased rollout—in tranches of 6, 18, and 60 months—

aims to build a track record through pilots in high-density clusters and scale nationally upon portfolio validation.

The roadmap emphasizes technology and facility upgradation by enabling the flow of capital into the ACM MSME ecosystem, supported by a system of calibrated eligibility criteria, financial risk mitigation, and transparency through a fit-for-purpose monitoring, reporting, and verification framework. It recommends tiered production-linked incentive (PLI) access for MSMEs, cluster-based common facilities, and structured partnerships with anchor OEMs and PLI champions to deepen technology diffusion. Designed as a revolving, market-building facility, AC-TUFF seeks to accelerate MSME competitiveness, expand localized EV manufacturing, and sustain jobs—advancing India's industrial policy and climate objectives in lockstep.

Figure ES1. Snapshot of CPI analysis



The following chapters set out the context of India's EV transition, assess MSME opportunities and constraints, and present a structured pathway for AC-TUFF.

1. INTRODUCTION

India has set ambitious national targets in response to the global climate crisis, pledging to reach net-zero carbon emissions by 2070 and announcing intermediate goals such as increasing non-fossil power capacity to 500 GW and reducing total projected carbon emissions by 1 billion tonnes by 2030 (MoS&T 2023). Central to these commitments is a strategic energy transition across all sectors—including transport, which accounts for over 10% of India's total CO_2 emissions and whose demand for fossil fuels has historically surged due to rapid urbanization and growth (MoEFCC 2023). Consequently, decarbonizing the transport sector has become a government priority, aiming to shift away from internal combustion engines (ICEs) toward zero-emission vehicles, adopt new propulsion technologies, and develop sustainable mobility ecosystems.

Electric vehicles (EVs) have emerged as the foremost solution in this landscape, promising significant reductions in both greenhouse gas emissions and urban air pollution. The emergence of EVs not only aligns with India's climate and clean air objectives but also presents a unique opportunity to empower domestic manufacturing, promote technological innovation, and enhance industrial competitiveness. The success of this transition is inseparably linked to the country's ability to localize advanced technology EV components and build a resilient, inclusive supply chain—especially given the global race to scale zero-emission vehicles and reduce the automotive sector's dependency on fossil fuels.

The Indian automotive sector is a cornerstone of the nation's economy. At its core stands a dynamic network of micro, small, and medium-sized enterprises (MSMEs), which underpins India's auto-component industry. The auto-component sector generates over 2.3% of national GDP, earn more than INR 1.92 lakh crore[1] (USD 22.9 billion) in exports annually (ACMA n.d.), and provide direct employment for more than 1.5 million people (ACMA 2025). Roughly 75–80% of all auto-component manufacturers (ACMs) are MSMEs, accounting for 25–30% of total industry turnover (CRISIL Research 2024).

India's climate targets and the inevitable shift to EVs are transforming the automotive landscape. This transformation is marked by the obsolescence of several existing components and the emergence of demand for new, technology-driven EV components. MSMEs engaged in ICE components face substantial challenges in transitioning to the EV ecosystem. These challenges include limited access to advanced technology, difficulties in establishing business partnerships with original equipment manufacturers (OEMs) and Tier-1 suppliers, as well as problems in attracting and retaining skilled talent.

Research estimates that up to one-third of ACMs could be significantly impacted by the transition due to powertrain obsolescence and reduced component count (iFOREST 2023). A recent Climate Policy Initiative (CPI) technical brief *Navigating the EV Shift: Opportunities and Challenges for Automotive MSMEs* (2025) presents direct insights from MSME stakeholders and highlights persistent barriers—most notably, the absence of affordable financing for technology upgrades, facility modernization, and workforce development.

1 Conversion rate: 1 USD = INR 83.67 (https://data.worldbank.org/indicator/PA.NUS.FCRF)

Access to affordable capital for EV manufacturing remains a formidable challenge for MSMEs. On the equity front, the influx of private equity (PE) and venture capital (VC) in India's startup ecosystem has favored EV-linked businesses, especially in ride-hailing, charging infrastructure, battery production, and vehicle manufacturing. Over half of all climate-tech startups in India are in the transport and mobility sector, capturing approximately 85% of the country's climate-tech funding in the past decade (IIMA Ventures and MUFG 2025). However, the debt access is not yet as widespread. MSME lending has traditionally been challenging, and the addition of a new capital-intensive business model does not help the situation (NITI Aayog and Institute for Competitiveness 2025). As a result, MSMEs struggle to transform their business models in tandem with industry requirements and keep their growth in line with the overall industry.

On the policy front, government policies have established a supportive foundation with schemes such as the production-linked incentive (PLI) for auto-components and batteries, and the 'Make in India' initiative to champion localization and technology. Generic MSME-focused policies have widened access to collateral-free loans and working capital. Despite these measures, the capital-intensive nature of EV transition projects exposes acute gaps in the timely and risk-optimized delivery of finance for MSMEs. More targeted instruments are essential to unlock transformational investment in auto-component MSMEs.

CPI's previous technical brief proposes the establishment of a specialized Auto-Component Technology Upgradation Financing Facility (AC-TUFF) to direct affordable capital to Indian ACM MSMEs. This report expands on that earlier recommendation by:

- Assessing the market potential and investment needs for MSMEs transitioning to EVs.
- Mapping prevailing investment and policy landscapes related to EV component manufacturing.
- Reviewing existing MSME financing avenues and making the case for a dedicated facility.
- Outlining a clear roadmap for AC-TUFF, aimed at improving capital flows, project bankability, technical upgrades, and the empowerment of MSMEs in India's EV ecosystem.

The next chapter quantifies the size of the EV component opportunity, assessing localization gaps, the scale of potential demand, and the investment required for MSMEs to participate competitively.

2. MARKET POTENTIAL AND INVESTMENT REQUIREMENTS

India's shift to EVs offers transformative opportunities to forge a globally competitive and advanced automotive manufacturing sector. This chapter examines the economic potential of key EV components and explores the opportunities for their production by domestic MSMEs. The analysis provides insights into the investment required to enable these enterprises to transition and integrate into the evolving EV supply chain.

2.1 LOCALIZATION GAP AND OPPORTUNITIES FOR ACM MSMES

India's auto-component industry has historically excelled in localizing ICE vehicle parts—reaching a domestic value addition (DVA) of 85–90% (SIAM and ACMA 2023a). However, the current localization level for EV components remains much lower, at only 35–40% (EVreporter 2024). This gap signals a heavy import dependency but also a vast opportunity for domestic players, especially MSMEs, to participate in the rapidly expanding EV ecosystem.

To accelerate localization and energy security, the Government of India (GoI) has launched the revised Phased Manufacturing Program (PMP) as part of the PM Electric Drive Revolution in Innovative Vehicle Enhancement (PM E-DRIVE) scheme. The PMP mandates progressive domestic manufacturing and assembly of critical EV components while restricting imports of completely knocked-down kits (MHI 2024a). These mandates are designed to deepen domestic supply chains and foster resilient, globally competitive manufacturing capabilities (see also Section 4).

The shift from ICEVs to EVs fundamentally restructures the industry's bill of materials with fewer, but more technologically intensive, components. While a traditional ICE two-wheeler powertrain has around 170 parts, an EV may have as few as 40, with the core value shifting to software-driven battery systems, power electronics, and control modules (iFOREST 2024). CPI analysis divides core EV components into four categories: battery packs, power electronics, drivetrains, and connectivity & control systems (see Table 1).

Accelerating EV adoption holds large potential for existing and emerging ACMs in India to manufacture these components, unlocking 'sunrise' manufacturing opportunities for those ready to pivot from low-value mechanical parts to high-value electro-mechanical subassemblies and electronics.

Table 1. Core EV components and related opportunities for MSMEs

COMPONENT	DESCRIPTION	MSME OPPORTUNITY
Battery pack	▪ Most critical and expensive EV component, determining range, performance, and cost. ▪ Includes battery assembly and Battery Management System (BMS).	▪ PMP guidelines under the PM E-Drive scheme prohibit the import of battery modules and BMS, favoring domestic assembly (MHI 2024a). ▪ Sub-components (modules, casings, connectors) can be manufactured by MSMEs with expertise in die casting, machining, and press operations.
Powertrain (motor & gearbox)	▪ Converts electrical energy from the battery into mechanical motion to drive wheels. ▪ Includes traction motor and integrated gearbox.	▪ PMP guidelines under E-DRIVE mandate local assembly of traction motors and motor controllers (MHI 2024a). ▪ MSMEs making conventional motors or pumps can move into EV motor production, while those skilled in software and electronics can shift to motor controller manufacturing.
Power electronics	▪ Manages the conversion and flow of electrical power. Their function is critical for performance and energy efficiency. ▪ Includes inverter, motor controller, DC–DC converter, and on-board charger.	▪ PLI Electronics scheme incentivizes the domestic electronics value chain. ▪ MSMEs engaged in electronics manufacturing and those already making converters/inverters for solar industry can tap into EV demand.
Connectivity & control systems	▪ Manage vehicle functions and enable smart features (infotainment, ADAS, telematics). ▪ Encompasses vehicle control units, sensors, and communication systems.	▪ Rising adoption of electronic components in EVs creates strong demand for control systems. ▪ MSMEs in electronics/software can expand into vehicle connectivity and control solutions.

CPI undertook market research to map the conventional capabilities of legacy MSMEs and identify new value streams in the EV value chain for these enterprises, along with associated investment requirements and potential challenges. The analysis shows that MSMEs can leverage their core manufacturing expertise to pursue opportunities such as battery and motor housing, mounting brackets, drive shafts, and wiring harnesses. They can also pursue opportunities such as battery-pack assembly, BMS, and electronic components that require relatively lower capex. Investment needs for these opportunities typically range from INR 1–10 crore (USD 0.12-1.2 million) per manufacturing line, depending on technology, automation level, and capacity. These opportunities have been detailed in Section 2.2.

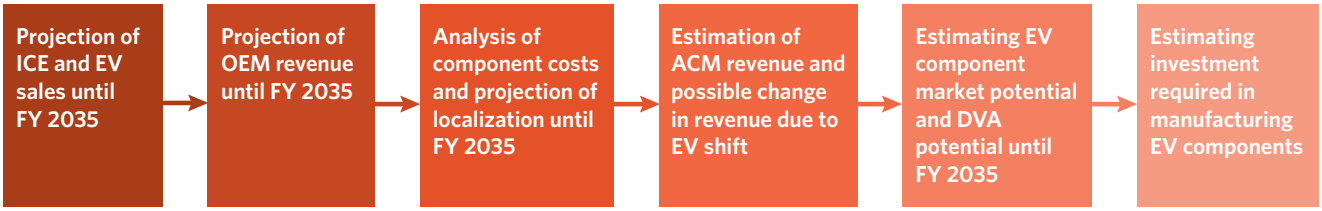
While localization creates clear opportunities for MSMEs, the scale of these opportunities depends on the future size of India's EV component market. The success of their transition depends on a well-structured capital pool and de-risking instruments that support rapid upskilling, technology absorption, and project bankability. The next section analyzes emerging opportunities and market potential for components under each broad category and quantifies the investment required for MSMEs to retain their share in the industry.

2.2 ESTIMATED MARKET POTENTIAL AND INVESTMENT REQUIREMENTS

Unlocking the full value of India's EV market and achieving localization targets requires a massive infusion of capital into the automotive value chain. CPI estimates that the country's total annual market potential for major EV components will reach INR 3.86 lakh crore (USD

46 billion) per year by FY 2035.[2] **However, to maintain their current 25% share in the ACM industry's turnover, MSMEs will require a cumulative investment of INR 55,000 crore (USD 6.6 billion) between FY 2026 and FY 2035.** CPI's approach to estimating the market potential and investment requirements of key EV components is shown in Figure 1 with more detail in the Annexure.

Figure 1. Overall methodology of market potential estimation



The Automotive Component Manufacturers Association of India (ACMA), in a report with McKinsey, projects that the Indian auto-component industry could nearly triple in size to USD 200 billion by 2030, driven by strong domestic demand and a surge in exports to USD 100 billion (McKinsey 2024). The growing EV demand and the associated increase in demand for EV powertrains and components are major tailwinds supporting the sector's growth trajectory. Figure 2 shows CPI estimates of the economic opportunity that EV component localization brings for ACMs, considering future market potential, assuming the localization of EV components gradually increases along with EV penetration over the next ten years (FY 2026-FY 2035).

Figure 2. Market potential and DVA of core EV components in FY 2030 and FY 2035

EV Components (in INR Crores)	FY2030		FY2035	
	Mkt. Pot.	DVA	Mkt. Pot.	DVA
Battery Pack	82,342	37,054	187,956	122,172
Connectivity & control systems	15,268	6,871	39,381	23,628
Motors	29,798	16,726	66,300	49,725
Power electronics	42,099	18,944	92,661	55,597

Source: *CPI analysis*

2 Throughout this report, fiscal years (FYs) run from April 1 to March 31 of the following year. For example, FY 2025 ran from April 1, 2024, to March 31, 2025.

CPI estimates that total annual market value of major EV components will reach INR 3.86 lakh crore (USD 46 billion) by FY 2035, with a DVA of INR 2.51 lakh crore (USD 30 billion)

INVESTMENT REQUIRED

Realizing the immense potential outlined above requires a massive infusion of capital. ACMs, especially MSMEs, face substantial capital demands, both for new plants and machinery and for upskilling and retooling existing assets. CPI estimates indicate that MSMEs need an estimated INR 55,000 crore (USD 6.6 billion) investment to pivot from producing components for a shrinking ICE market to capture a significant share of the emerging EV market. Other analyses of investment requirements in the EV ecosystem broadly align with CPI findings. A NITI Aayog–Rocky Mountain Institute study estimates total EV ecosystem investment needs at INR 19.7 lakh crore (USD 235 billion) by 2030 (NITI Aayog 2021). This is corroborated by analysis from the Investment Information & Credit Rating Agency (ICRA), which projects that major ACMs will invest INR 25,000-30,000 crore (USD 3-3.6 billion) in FY2026 alone, with a specific focus on developing new products, advancing technology, and manufacturing EV components (ICRA 2025).

CPI analysis of the financial statements of various EV and non-EV ACMs, startups, and investment announcements provides an estimate of the overall investment required by MSMEs to realize the estimated market potential while retaining their current market share.

To maintain their current 25% share in the ACM industry's turnover, MSMEs will require a cumulative investment of INR 55,000 crore (USD 6.6 billion) between FY 2026 and FY 2035.

These aggregate figures need to be grounded in the practical realities of MSMEs. The following analysis highlights specific component-level opportunities, associated challenges, and the typical investment required to capitalize on these opportunities.

OPPORTUNITIES AND CHALLENGES FOR ACM MSMES

MSMEs can leverage their existing expertise in conventional manufacturing processes to tap opportunities in the EV ecosystem, such as battery housing, motor housing, and drive shafts. The EV transition also presents opportunities for MSMEs to expand their technical and manufacturing expertise by investing in suitable machinery and manufacturing facilities.

However, securing this investment is a formidable challenge, as the nascent and rapidly evolving nature of the EV components and associated technologies, combined with the high-risk perception for financing MSMEs, creates a unique set of risks that traditional financial institutions (FIs) are often hesitant to underwrite.

Table 2 summarizes the major opportunities that can be realized with conventional manufacturing expertise and new business value streams needing additional technical expertise. The table also summarizes the common challenges hampering MSMEs and the average investment required for some key machinery and equipment involved in manufacturing the components.

Table 2. Opportunities, challenges, and investment required for core components

Conventional manufacturing expertise	New value streams	Challenges	Investment required
Battery pack			
• Aluminum casing /housing – Die casting (DC) • Cooling plates & lines – Extrusion • Copper/aluminum busbars & connectors - Extrusion	• BMS design & manufacturing • Integration of battery pack and BMS	• Establishing business contracts with renowned cell manufacturers • Working capital concerns due to dependence on imports	• Battery assembly: INR 7-10 crore (USD 0.8-1.2 million) (IESA n.d.) • BMS: INR 1.5-2 crore (USD 0.18-0.24 million) (Maxwell energy 2024) • Battery enclosure: INR 2-5 crore (USD 0.24-0.6 million (High-pressure DC machine)
Drivetrain			
• Motor housing/ mounting brackets –DC • Stator winding – coiling • Stator core – Steel lamination • Electrical connectors/ terminals • Rotor shafts – forging/ machining • Bearing	• Motor controller – PCB assembly and software development • Integrating motor with gearbox & inverter • Motor testing and functional tests	• Import dependency: Rare-earth magnets, electrical grade steel • Limited competency in hairpin winding and software development	• Motor housing: Casting – INR 2-5 crore (USD 0.24-6 million) (High-pressure DC machine) • Motor & motor controller: INR 3-4 crore (USD 0.36-0.48 million) (SPREMFI 2024) • Basic surface mount technology (SMT) line: INR 1-2 crore (USD 0.12-0.24 million) (Syrma SGS Technology Ltd. 2022) • Medium automation line: INR 2-5 crore (USD 0.24-6 million)

Conventional manufacturing expertise	New value streams	Challenges	Investment required
Power electronics & electricals			
▪ Wiring harness – Wire cutting, crimping ▪ Resistors and capacitors ▪ Switches – Plastic injection molding, Soldering ▪ Aluminum enclosures – DC/ extrusion	▪ Bus-bar – forming, heat treatment ▪ Direct current-Direct current converters/ On-board chargers/ Inverters– printed circuit board assembly	▪ Greater dependence on imports for raw materials or sub-components ▪ Limited competence in printed circuit board and sensor manufacturing ▪ Greater investment is needed in boosting research and development (R&D) for indigenous technology development	▪ Basic SMT line: INR 1-2 crore (USD 0.12-0.24 million) (Syrma SGS Technology Ltd. 2022) ▪ Medium automation line: INR 2-5 crore (USD 0.24-6 million)
Connectivity and control systems			
▪ Instrument cluster/ In-vehicle infotainment/ telematics	▪ Vehicle control unit ▪ Thermal management system	▪ Limited competency in software development and limited technological know-how	▪ SMT line: INR 1-2 crore (Syrma SGS Technology Ltd. 2022)

Source: *CPI analysis based on publicly available data from company websites and marketplaces*

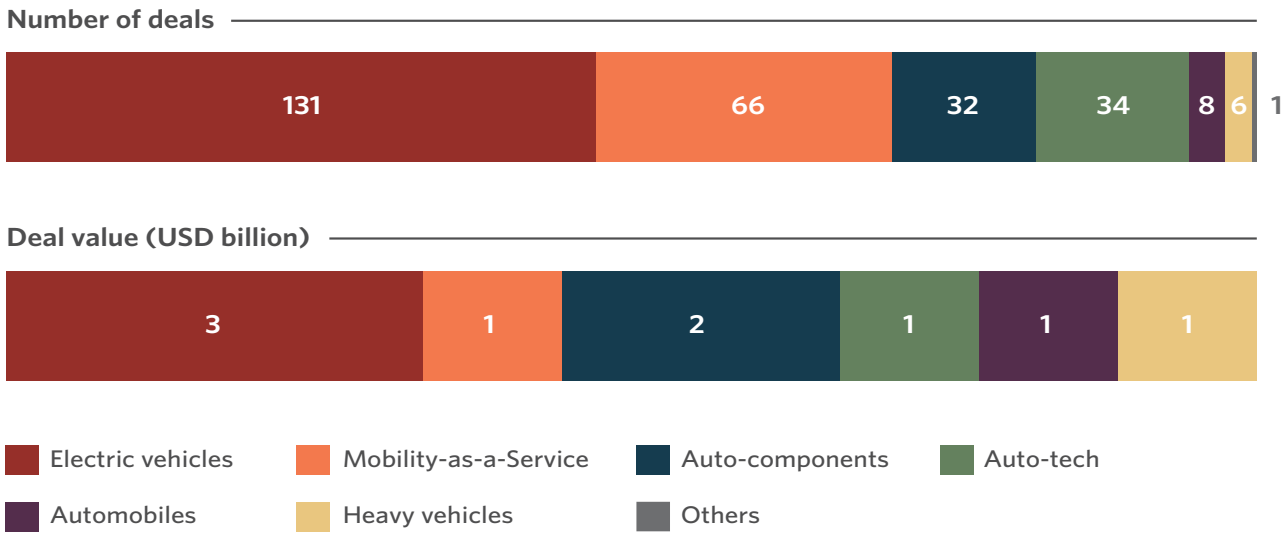
Understanding investment needs is only one part of the challenge. The next chapter examines how capital is flowing into the EV and component ecosystem, and why MSMEs are unable to access their needed share of this funding.

3. LANDSCAPE OF INVESTMENTS IN EVS AND COMPONENTS

As the fourth-largest automotive market in the world, India's automotive industry is a major destination for both domestic and foreign investments and strategic deals aimed at strengthening domestic production capabilities. As the country pursues its twin goals of self-reliance and decarbonization, the EV ecosystem—spanning OEMs, battery manufacturing, and component suppliers—has become the central theme of these investments. Yet, this influx of funds is not evenly distributed across the value chain. While large corporations and EV manufacturers attract substantial capital, MSMEs face persistent challenges in accessing technology and finance due to their limited market presence, narrow product portfolio, and constrained new product development (NPD) capabilities.

This chapter analyzes the current landscape of investments in India's EV and auto-component space, highlighting both the emerging opportunities and the growing disparities between large anchor firms and MSMEs, the investment gap at the component level, and the barriers that limit broader participation. Unpacking these trends lays the basis for targeted interventions and policy reforms discussed in subsequent sections.

Figure 3. M&A and PE investment deals in the automotive industry 2022-2024

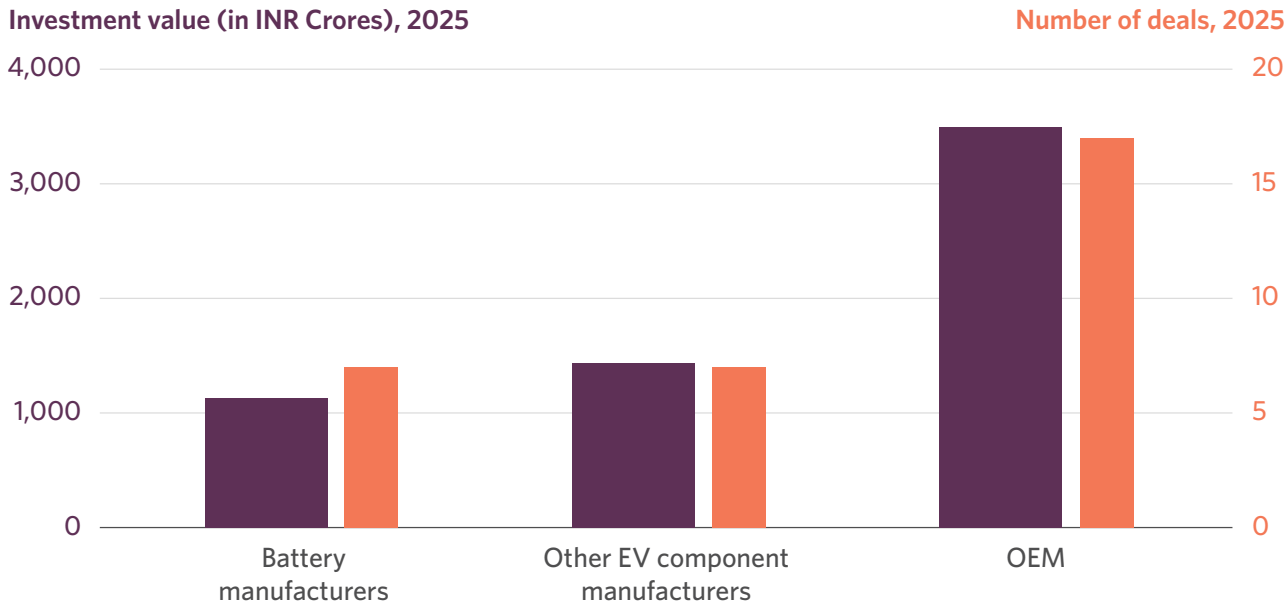


Source: *Grant Thornton deal tracker*

At a macro level, India's automotive industry has attracted a cumulative inflow of INR 3.11 lakh crore (USD 37.17 billion) in foreign direct investment between 2000 and 2024 (GoI n.d.), with 97% of this materializing since 2020, reflecting a recent surge in confidence. Between FY 2022 and 2024 alone, the automotive sector accounted for 5% of all mergers and acquisitions (M&A) and PE deals by volume and 3% by value, totaling INR 59 crore (USD 7.1 million) (Grant Thornton 2025).

The EV ecosystem is rapidly emerging as the key driver of automotive investments in India. CPI analysis of 31 investment deals in FY 2025, totaling USD 725 million, reveals a highly concentrated flow of capital to OEMs as they can scale operations, capture market share, and generate quick returns for investors. Figure 4 shows the total investment amounts and number of deals across OEMs, ACMs, and battery manufacturers.

Figure 4. Analysis of select EV manufacturing investment deals in India in FY 2025



Source: *CPI analysis, EV reporter*

Large OEMs capture 57.7% of total investment (INR 3,500 crore / USD 418 million), highlighting a strong investor preference for companies with direct reach to end-user markets and a proven ability to scale. As the heart of EVs, battery production is the second major investment area (18.6%), reflecting a growing focus on new-energy business, supported by government initiatives like the PLI scheme for Advanced Chemistry Cell (ACC) battery storage. **In contrast, all other EV component manufacturing firms collectively account for just 23.7% of total investment, signaling a crucial funding gap at the core of the EV manufacturing value chain.**

This imbalanced flow of capital has created a landscape with an established top end of OEMs and larger ACMs, which have strong financial backing, access to institutional capital, and a vibrant base of technology-based startups attracting angel investors and VC. There is also a critical 'missing middle' of traditional ACM MSMEs, which struggle to attract transition capital.

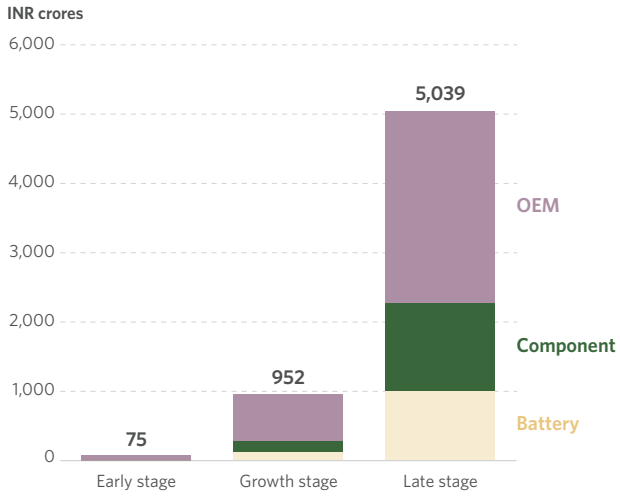
The capital that does enter the ACM sector is heavily skewed toward large, prominent Tier-1 suppliers making substantial investments to develop their EV component portfolios, supported by their access to capital markets and global partnerships. This funding gap is also creating a growing capability gap for MSMEs, which risk being marginalized as large Tier-1 suppliers advance technologically. This could lead to a consolidated supply chain that undermines India's objective of broad-based industrial development.

Although investment activity has grown, MSMEs remain underrepresented. The next section examines the structural and financial barriers that prevent MSMEs from accessing this flow of capital.

3.1 INVESTMENT BARRIERS

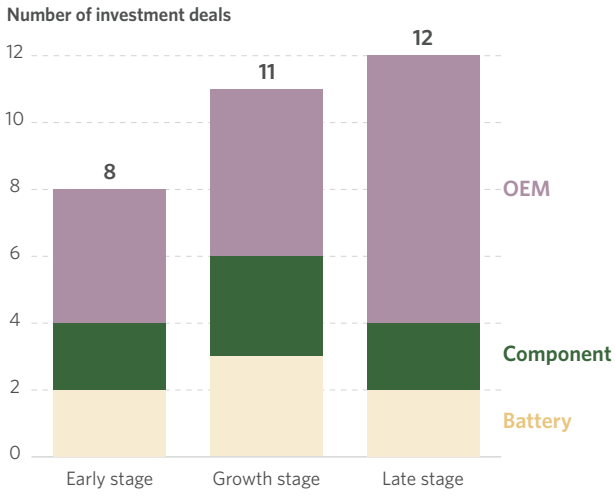
The funding deficit for ACM MSMEs results from interconnected financial, technical, and structural barriers. The prevailing investment thesis is overwhelmingly focused on scaling production. **Figure 5 and 6 show that 75% of investments by volume and 99% by value go to growth- and late-stage companies, indicating a clear focus on achieving scale, capturing market share, and realizing profitability.**

Figure 5. Value of investments in the EV manufacturing value chain by stage in FY 2025



Source: *CPI analysis*

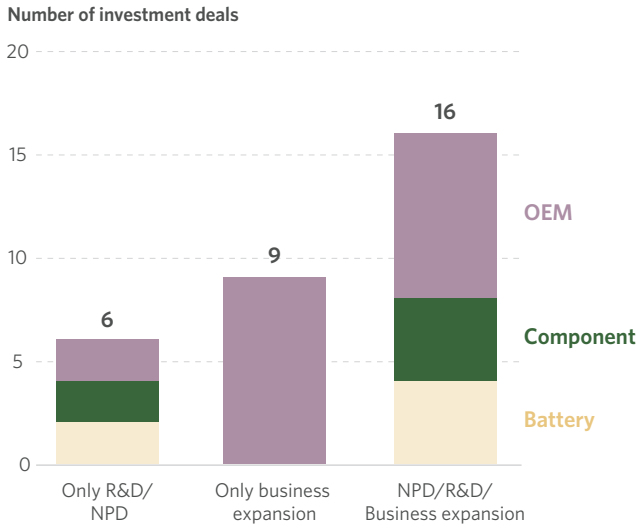
Figure 6. Number of investments in the EV manufacturing value chain by stage in FY 2025



Source: *CPI analysis*

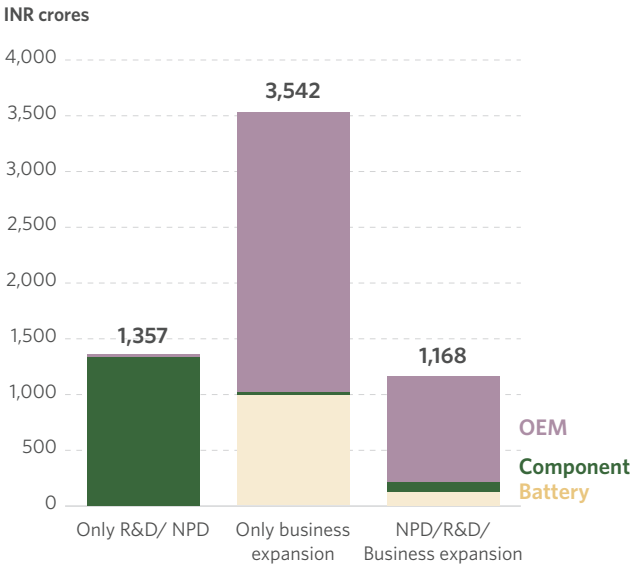
Moreover, about 58.4% of investments by value are focused on business expansion, with limited flows to NPD and R&D. This skewed investment landscape restricts the growth of indigenous technologies and the development of innovative product. Figure 7 and 8 provide a comparative view of the focus areas of the analyzed investments.

Figure 7. Number of investment deals by focus area



Source: *CPI analysis*

Figure 8. Value of investment deals by focus area



Source: *CPI analysis*

ACM MSMEs lack the capital to obtain the technology and talent that investors require, and because they are not perceived as scalable, they cannot secure the funding needed to upgrade their capabilities.

Table 3 summarizes the investment barriers faced by ACM MSMEs in migrating to the EV ecosystem.

Table 3. Key Investment Barriers for ACM MSMEs

Category	Barrier	Description & Impact
Financial & Perceptual	Preference for Scalable, Late-Stage Companies	▪ The PE and VC models favor high-growth businesses, a profile that most MSMEs do not fit. ▪ Early-stage companies represented 25% of all deals but received only 1% of the total investment value.
	Insufficient Funding for Innovation	▪ Only 22% of total investment (USD 162 million) was allocated exclusively to R&D and NPD. ▪ More investment in R&D is needed for component manufacturers to develop domestic alternatives to critical raw materials.
Technical & Operational	Prohibitive Capital Costs	▪ Transitioning to EV components requires significant investment in new machinery and advanced R&D facilities, much of which must be imported.
	Technology Obsolescence & Skill Gaps	▪ Existing machinery for ICE parts is becoming obsolete, and there is a critical shortage of skilled labor in areas like power electronics.
Structural & Market	Fragmented Supply Chain	▪ The ecosystem comprises thousands of small, unintegrated suppliers, complicating quality control and inhibiting large-scale investment.

Bridging these investment gaps depends not just on private capital but also on the enabling role of the government. The following chapter reviews the national and state-level policy frameworks that shape opportunities for MSMEs in the EV transition.

4. POLICY LANDSCAPE AND INTERVENTIONS

India's policy approach to the EV ecosystem has evolved from market stimulation to market shaping. Initial policies, like the Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles (FAME) scheme, focused on consumer incentives. Recognizing that rapid EV adoption could increase imports of high-value components, subsequent policies like the PLI schemes and the Scheme to Promote Manufacturing of Electric Passenger Cars in India were introduced. These supply-side industrial policies and incentives are designed to build a competitive domestic manufacturing ecosystem through minimum investment and DVA criteria for the applicants. National policies often focus on large-scale production, while state policies provide complementary granular support.

This top-down approach has attracted large-scale investments in the Indian EV manufacturing ecosystem. The next phase of India's EV strategy presents an opportunity to build upon this success by deepening the industrial base and further integrating MSMEs. An active and enabling policy environment is crucial in creating a more favorable investment climate that can attract strategic investments and channel private capital effectively across the entire EV ecosystem. This chapter outlines a strategic framework for leveraging the current policy architecture to unlock the full potential of MSMEs and ensure their robust participation in the EV value chain.

4.1 NATIONAL POLICIES

The central government's strategy is underpinned by a suite of policies that are administered primarily by the Ministry of Heavy Industries, each with a specific role in shaping the supply chain.

Table 4. Summary of national EV-related policies

Scheme name	Launch year/ notification	Budget/ Financial outlay (crore)	Key objectives & focus areas	Key provisions & targets
Faster Adoption & Manufacturing of Electric Vehicles (FAME) I	2015	INR 895 (USD 0.1 billion)	Demand generation, technology development, pilot projects, and charging infrastructure.	▪ Financial subsidies and purchase incentives to buyers of electric two-wheelers, three-wheelers, four-wheelers, and buses, making EVs more affordable
Faster Adoption & Manufacturing of Electric Vehicles (FAME) II	2019	INR 10,000 (USD 1.2 billion)	Primarily provides demand incentives with a focus on localization	

Scheme name	Launch year/ notification	Budget/ Financial outlay (crore)	Key objectives & focus areas	Key provisions & targets
Phased Manufacturing Program (PMP)	Attached to FAME-II and PM-E Drive	Non-fiscal	Promotes domestic manufacturing & increases DVA for EV components.	▪ Schedules for increasing customs duties on imported EV parts to incentivize local sourcing. ▪ Mandates progressive localization for key components.
PLI Scheme for Advanced Chemistry Cell (PLI-ACC) Battery Storage	2021	INR 18,100 (USD 2.16 billion)	Establish 50 GWh of ACC manufacturing capacity (MHI 2022)	▪ Minimum 5 GWh capacity, ▪ 60% DVA within five years. ▪ Investment worth INR 225 crore/GWh (USD 27 million/GWh) within 2 years
PLI Scheme for Automobile and Auto-Components (PLI-AAC)	2021	INR 25,938 (USD 3.1 billion)	Incentivize the manufacturing of "Advanced Automotive Technology" (AAT) products	▪ Champion OEM: INR 2,000 crore (USD 0.24 billion) investment ▪ Component Champion: INR 250 crore (USD 30 million) investment ▪ Min. 50% DVA required (MHI 2021a)
Scheme to Promote Manufacturing of Electric Passenger Cars in India	2024	Non-fiscal	Attract investment from global EV OEMs new to India	▪ Reduced 15% customs duty on limited completely built units imports for 5 years (MHI 2024b) ▪ Requires min. INR 4,150 crore (USD 0.5 billion) investment in 3 years and 50% DVA in five years
PM- E Drive	2024	INR 10,900 (USD 1.3 billion)	Accelerate EV adoption, develop charging infrastructure, and build a strong EV manufacturing ecosystem	▪ Implemented through subsidies and capital grants ▪ Offers e-vouchers for EV purchases ▪ Allocates INR 780 crore (USD 0.1 billion) for vehicle testing infrastructure

***Sources**: CPI analysis from policy documents sourced from the MHI*

While the ambitious national policy framework has enabled large corporations, MSMEs struggle to compete due to the capital-intensive nature of projects, the need for scale, and access to high-end technology. National schemes set the overall direction and are complemented by supportive policies and incentives from start governments. The next section reviews these state-level measures.

4.2 STATE-LEVEL POLICY SUPPORT

Recognizing the opportunities to attract investment, create employment, and address local environmental concerns, numerous state governments have complemented national frameworks with their own EV and industrial policies. State-level initiatives often serve as laboratories of innovation, piloting targeted and MSME-centric support, including direct

capital subsidies, support for R&D, and unique schemes aimed at facilitating the transition of existing manufacturers.

Table 5. Automotive state-specific fiscal and non-fiscal incentives

STATE	POLICY INCENTIVES
Targeted capital subsidies for MSMEs: Several states leading in the automotive space offer capital subsidies to MSMEs, ranging from 20-30% of Fixed Capital Investment (FCI)	
Tamil Nadu	20% over and above the existing limits for MSME units. (Govt. of Tamil Nadu 2023)
Haryana	▪ Micro-enterprises: 25% of FCI, up to INR 15 lakh (USD 18,000) ▪ Small industries: 20% of FCI, up to INR 40 lakh (USD 48,000) ▪ Medium industries: 20% of FCI, up to INR 50 lakh (USD 60,000) (Govt. of Haryana 2022)
Uttar Pradesh	10% of FCI for EV and battery projects (Govt. of Uttar Pradesh 2022)
Promotion of R&D, Innovation, and Quality Enhancement: Recognizing that the EV transition is technology-driven, some states have introduced measures to enhance the innovation capabilities of local firms including	
Tamil Nadu	▪ Covers up to 20% of intangible R&D costs under the 'Eligible Fixed Assets' category for calculating incentives (Govt. of Tamil Nadu 2023) ▪ Developing dedicated mobility R&D zones in Chennai, Coimbatore, and Hosur with shared infrastructure
Haryana	▪ Promotes innovation by offering grants covering 50% of project costs ○ Up to INR 1 crore (USD 0.12 million) for charging technology and ○ Up to INR 5 crore (USD 0.6 million) for EV technology ▪ Provides financial assistance for patent registration (EVreporter 2022)
Uttar Pradesh and Jharkhand	Offer reimbursement of fees for quality certifications and patent registration (Govt. of Jharkhand 2022; Govt. of Uttar Pradesh 2022)
Unique and Innovative Support Schemes: A key feature of state policies is the introduction of targeted instruments like cluster development initiatives and financial incentives, designed to address specific challenges faced by MSMEs	
Haryana	Offers a one-time grant worth 25% of the book value of the plant and machinery -capped at INR 2 crore (USD 0.24 million) to incentivize MSMEs to entirely shift their operations to EV, EV component, or battery manufacturing (Govt. of Haryana 2022).
Kerala	Launched a suite of financial support schemes for MSMEs, including: ▪ "Mission 1000" scale-up program provides capital subsidies up to INR 2 crore (USD 0.24 million) and interest subventions (Govt. of Kerala 2023). ▪ The Stressed MSME Revival & Rehabilitation Scheme offers loan restructuring and one time interest subvention to support MSMEs showing signs of stress (Govt. of Kerala 2021).
Karnataka	Developing three dedicated clean mobility clusters in Gauribidanur, Dharwad, and Harohalli to bring together OEMs, suppliers, and R&D centers (Govt. of Karnataka 2025)
Tamil Nadu	Leveraging its industrial base in Coimbatore to establish an EV motor manufacturing cluster with shared facilities for testing and development (KNN 2023)

The following table provides a comparative analysis of these MSME-centric provisions across key states, highlighting the diversity of approaches.

Table 6. Comparative analysis of MSME-centric provisions across key states

State	Policy	MSME-Specific Capital Subsidy	Interest Subvention	R&D/ Innovation Support	Skill Development	Unique Schemes/ Provisions
Tamil Nadu	EV Policy 2023	Additional 20% capital subsidy for EV component/ charging infra MSMEs over and above existing scheme	5% rebate on interest for 6 years	R&D expenses included in 'eligible fixed assets'; patent reimbursement; shared R&D zones	Upskilling allowance for the existing workforce	EV motor manufacturing cluster in Coimbatore
Karnataka	Clean Mobility Policy 2025-30	Capital subsidies of 20-30% on Value of Fixed Assets; Stamp duty/registration fee exemptions	Not specified	VC fund for e-mobility startups; shared testing facilities	Collaboration with global institutions and EV-centered training across technical institutions	Three dedicated clean mobility clusters
Maharashtra	EV Policy 2025	Incentives for EV battery and component MSMEs treated on par with "mega projects"	Not specified	INR 15 Crore (USD 1.8 million) R&D grant fund; support for alternative battery chemistries	Not specified	Focus on battery recycling hubs
Haryana	EV Policy 2022	Tiered subsidies: 25% up to INR 15 lakh (USD 18,000) (Micro), 20% up to INR 40 lakh (USD 48,000) (Small)	Not specified	50% grant up to INR 5 crore (USD 0.6 million) for new EV tech; patent support; R&D center grants	Stipend reimbursement	Seed and Conversion Fund (up to INR 2 crore/ USD 0.24 million) for transition
Uttar Pradesh	EV Manufacturing and Mobility Policy 2022	Up to 10% of FCI for EV/battery projects.	Not specified.	50-75% reimbursement for quality certification and patent fees	Stipend reimbursement of INR 5,000 (USD 60) per employee/year	Focus on attracting anchor projects
Gujarat	EV Policy 2021	Capital support under State Industrial Policy 2020	5-7% interest subsidy on term loans	Not specified	Not specified	Reimburse-ment of net SGST to MSMEs under Atmanir-bhar Gujarat Scheme
Kerala	Industrial Policy/ Others	Capital subsidy up to INR 2 crore (USD 0.24 million) under "Mission 1000"	5-, 6% interest rate subvention under various schemes.	Support for detailed project reports (DPRs)	Not specified	Stressed MSME Revival Scheme; Seed funding for startups

***Sources**: Govt. of Tamil Nadu 2023, Govt. of Maharashtra 2025, Govt. of Uttar Pradesh 2022, Govt. of Haryana 2022, Govt. of Gujarat 2021, Govt. of Kerala 2021*

While initiatives in different states provide a supportive ecosystem for ACM MSMEs within the respective states, there is a need for an EV sector and MSME-specific policies that can be scaled up and adopted across the nation to aid in transition and growth of these enterprises in the EV ecosystem. The final part of this chapter outlines potential interventions to close these gaps.

4.3 POTENTIAL INTERVENTIONS

Government initiatives have catalyzed investment and established a strong foundation for domestic EV manufacturing. Furthermore, the following additional interventions can enhance these policies to broaden their reach and foster greater participation from MSMEs.

Table 7. Recommended policy interventions for greater participation from MSMEs

1. EXPANDING ACCESSIBILITY TO PLI SCHEMES
• With an entry investment threshold of INR 150 crore (USD 18 million) for ACMs and INR 3,000 crore (USD 360 million) for OEMs, the PLI-AAC scheme has set the stage for attracting investment from larger corporations (MHI 2021b). • Introducing a tiered PLI structure with specialized windows for smaller firms and MSMEs, featuring more calibrated investment thresholds, would enable a wider range of dynamic enterprises to participate directly
2. BROADENING THE SCOPE OF TECHNOLOGY INCENTIVES
• The PLI-AAC scheme's focus on AAT has successfully spurred investment in high-tech manufacturing, such as traction motors and e-axles. • A component within the scheme can focus on incentives for startups/MSMEs with proven prototypes of AAT products to support their transition and enable technological upgradation.
3. FOSTERING DIRECT PARTNERSHIPS AND SYNERGIES
• PLI schemes have created strong anchor firms that drive demand throughout the supply chain with large-scale investments and minimum DVA criteria. • The policy framework can be enhanced to integrate MSMEs into the supply chain by actively promoting and incentivizing direct partnerships, joint ventures, and mentorship programs between PLI beneficiaries and MSMEs.
4. DEEPENING THE IMPACT OF CLUSTER DEVELOPMENT
• The establishment of EV clusters in states like Karnataka and Tamil Nadu is a progressive step that can be further developed with common facility centers (CFCs) across clusters to maximize benefits for MSMEs. • Public investment can be channeled to equip CFCs with state-of-the-art testing, prototyping, and validation equipment, which can be accessed on a subsidized, pay-per-use basis.
5. ACCELERATING TECHNOLOGY ADOPTION AND SKILL DEVELOPMENT
• The shift to EV technology requires new design and manufacturing capabilities with the latest technical skills. • A concerted effort to support technology transfer and skill development will ensure MSMEs remain competitive. • Policies can promote affordable technology licensing, collaborative R&D projects between industry and academia, and targeted, industry-aligned skill development programs. • Offering financial incentives for MSMEs to upskill their workforce in high-demand areas like power electronics and battery management will ensure MSMEs remain competitive in the EV ecosystem.

Although existing policies have attracted large-scale investment, their impact on MSMEs remains limited. The next chapter turns to the financing ecosystem, analyzing the instruments currently available to MSMEs, the barriers they face, and the structural gaps that remain.

5. FINANCING AVENUES AND GAPS

This chapter examines the specific financing avenues available to MSMEs to raise the INR 55,000 crore (USD 6.6 billion) that CPI has analyzed as required to help them transition to EV component manufacturing. It explores ACM MSMEs' financial characteristics, structural features of existing schemes and avenues, and their suitability for a technology-driven industrial pivot. By identifying the gaps between the investment required and the financing avenues available, this analysis points to opportunities for developing specialized financial tools to support this industrial transition and enhance India's position as a competitive hub for EV manufacturing.

The current financing environment for Indian MSMEs consists of government initiatives, traditional banking channels, and emerging private capital markets. While this ecosystem provides foundational support, its structure was primarily designed for stable, incremental business growth rather than the disruptive, capital-intensive demands of technology-led industrial transformation. An assessment of these prevailing avenues reveals a broad system that may not be sufficiently specialized to meet the needs of ACM MSMEs transitioning to the EV supply chain.

5.1 FINANCING SCHEMES

The GoI, through the Ministry of MSME, has implemented a range of schemes to foster MSME growth by improving access to finance, technology, and infrastructure, which can be utilized by firms for their business expansion, growth, and upgradation.

A key part of this support system is the provision of credit guarantees to address collateral-related barriers to formal credit. The Credit Guarantee Fund Trust for Micro and Small Enterprises (CGTMSE) is the most prominent of these, offering guarantees for credit facilities up to INR 10 crore (USD 1.2 million) for micro and small enterprises and up to INR 20 crore (USD 2.4 million) for startups, with guarantee coverage typically ranging from 75% to 85% (CGTMSE 2025). The Mutual Credit Guarantee Scheme for MSMEs provides a 60% guarantee for credit facilities up to INR 100 crore (USD 12 million) for the purchase of equipment and machinery (MoF 2025a).

Beyond guarantees, the government has sought to stimulate equity through the Self-Reliant India Fund. With a target corpus of INR 50,000 crore (USD 6 billion), this fund-of-funds provides growth capital to promising MSMEs by investing through Securities and Exchange Board of India-registered 'Alternative Investment Funds' to support enterprises with the potential to grow beyond the MSME category (MoMSME 2023).

Several schemes target smaller enterprises and focus on employment generation. The Prime Minister's Employment Generation Program is a credit-linked subsidy scheme for new micro-enterprises with a maximum project cost of INR 50 lakh (USD 60,000) for the manufacturing sector (MoMSME n.d.). The Pradhan Mantri Mudra Yojana provides loans generally up to INR 20 lakh (USD 24,000) (MoF 2025b).

More targeted support is available through the MSME Champions Scheme, which supports modernization and innovation, and the Micro & Small Enterprises Cluster Development Program, which offers assistance for setting up Common Facility Centers (GoI n.d.). For technology-led

ventures, the Credit Guarantee Scheme for Startups offers guarantees for credit instruments up to INR 20 crore (USD 2.4 million) per borrower, though eligibility is restricted to startups recognized by the Department for Promotion of Industry and Internal Trade (DPIIT); however, this excludes most traditional ACM MSMEs (GoI n.d.).

While these schemes cater to the broader MSME sector, incumbent ACM MSMEs need focused instruments for specialized capacity development and significant, long-term, patient capital to achieve a technological pivot. Government schemes address some financing barriers, but debt remains the predominant source of capital for MSMEs. The following section assesses how well debt markets meet MSME transition needs.

5.2 DEBT FINANCING

Debt financing is the predominant method for raising capital to fund regular operations and growth aspirations among Indian MSMEs, particularly family-owned proprietorships or partnerships, as it allows them to maintain ownership and control. However, MSMEs face barriers, such as high collateral requirements and longer processing lead times in accessing formal credit, forcing firms to resort to informal lending markets, which are associated with high interest rates.

CPI analyzed the financial statements of 18 ACM MSMEs and startups (15 non-EV and 3 EV) to understand their key financial metrics and financing avenues. This analysis found that:

- ACM MSMEs saw a median increase in term loans over a five-year period were INR 3.62 crore (USD 432,650). This indicates greater dependence on debt, despite also raising money through the capital markets or through parent companies.
- EV-focused ACMs appear to have higher demand for term loans than their non-EV counterparts, reflecting the capital-intensive nature of the transition.
- The median increase in term loans among EV companies stood at INR 4.1 crore (USD 490,000), indicating higher demand for debt capital among these firms compared to non-EV firms.

Banks and non-banking financial companies (NBFCs) represent the formal credit market, which MSMEs depend on for their credit requirements. The Small Industries Development Bank of India (SIDBI) is the principal FI facilitating access to capital for eligible MSMEs through credit and refinancing options for banks and NBFCs. A 2025 SIDBI report notes that accessing timely and adequate credit remains a primary challenge for 22% of MSMEs, rising to 26% for those in the auto-component sector (SIDBI 2025a).

However, difficulty in accessing formal credit leads many enterprises to the informal market. The estimated credit gap overall in the MSME sector is around INR 20 lakh crore (USD 239 billion) to INR 25 lakh crore (USD 299 billion), with only about 20% of MSMEs having access to formal credit. This forces a large segment, particularly micro-enterprises, to rely on informal sources, where interest rates are often above 30% (NITI Aayog and Institute for Competitiveness 2025).

While the broader auto-component sector is projected to have a healthy performance in FY 2025-26, with revenue growth of 7-10% and stable operating margins (ICRA 2025), industry-level benchmarks may not apply to transitioning ACM MSMEs. Transitioning to a capital-intensive business weakens a firm's financial ratios, as it involves taking on debt for R&D

and retooling before generating revenue. Table 8 provides a summary of projected financial metrics of ACMs in India, along with the implications for MSMEs due to the transition to the EV ecosystem. Greater dependence on high-cost debt to meet capital expenditure requirements can erode the operating margins of ACMs through high interest payments. Formal lenders, who rely on historical performance, may view transitioning MSMEs as higher risk, potentially limiting their access to the formal banking system.

Table 8. Projected financial metrics of ACMs in India

Financial Metric	CRISIL/ICRA projection (FY'26)[3]	Implications for transitioning ACM MSMEs
Revenue growth	**7-10%**	May see initial revenue dips, appearing as a higher risk to lenders
Operating margin	**11-12.5%**	High upfront R&D and retooling costs will compress margins
Capex as % of operating income	**in range of 7-8%**	Significantly higher capex **for the same reasons as above**
Debt-to-earnings before income, tax, depreciation & amortization	**approximately 1.3 times**	Higher due to new term loans for capex
Interest coverage	**approximately 9 times**	Lower due to higher interest payments and potentially lower initial earnings before income, tax, depreciation & amortization

Beyond debt, equity capital can play a role in enabling MSME growth and transition. The next section reviews equity flows and their limitations for smaller enterprises.

5.3 EQUITY

While funding for Indian EV startups surpassed USD 2.1 billion in FY2025 (Kumar 2025), this capital was concentrated in a few large deals for high-profile, late-stage companies and OEMs (see Section 3). VC funds' focus on exponential growth and double-digit gross internal rates of return makes MSMEs less attractive for investment (Kapoor 2024). CPI's analysis of 18 MSMEs found a median return on equity of just 9% over a three-year period, which is below the typical hurdle rates for VC funds. Although MSMEs are less capital-intensive compared to larger ACMs and OEMs, conservative private equity may view them as too risky. The lack of qualified management personnel, capable of maintaining investor relations in these often family-owned businesses, exacerbates this perception.

Initiatives like SIDBI's Fund of Funds for startups (SIDBI 2025b) and the 'Self-Reliant India' Fund aims to channel private investment to this segment. However, their indirect structure means that capital is deployed by fund managers who adhere to their established investment theses, focusing on deals positioned to scale and generate faster and higher returns. MSMEs with constrained balance sheets and resources might miss out on attracting such deals. This could pose a risk to India's EV ambitions, as a well-capitalized domestic supply chain is important for achieving the country's self-reliance goals.

3 CRISIL: Credit Rating Information Services of India Limited; ICRA: Investment Information and Credit Rating Agency of India Limited

Despite the availability of both debt and equity, major structural gaps persist. The next section highlights these systemic barriers that hinder MSMEs from attracting patient and affordable capital.

5.4 CRITICAL GAPS AND STRUCTURAL BARRIERS

Though broadly supportive of MSMEs, the current financial and policy environment falls short of enabling their large-scale, technology-driven transition to EV component manufacturing.

Risk assessment models adopted by lenders prioritize past stability and performance over future potential, hindering capital access for transitioning enterprises. MSMEs often lack the dedicated resources and managerial expertise to meet heavy regulatory compliance requirements and sustain investor relations, making it challenging to secure capital from the equity market.

Table 9. Financial barriers to MSME Transition

Access to formal credit
▪ Banks often require a minimum operational history of two to three years, consistent profitability, and clean credit records, which can disqualify new entities and penalize existing firms that experience a temporary dip in profits during their transition. ▪ Many MSMEs lack the extensive formal credit history or unencumbered fixed assets that banks prefer as collateral. ▪ The move toward digital assessments, while aiming for transparency, may disadvantage firms by relying on rigid, algorithm-based assessments
Weight of regulatory compliance
▪ A report recent study indicates that a typical manufacturing MSME in a single state navigates over 1,450 regulatory obligations annually, with an estimated cost of up to INR 17 lakh (USD 20,317) per year (TeamLease RegTech 2025). ▪ This presents a substantial fixed overheads for a small firm. The complex compliance landscape requires MSMEs to manage numerous registers and prepare for various inspections.
Access to equity markets
▪ VC funds typically invest in profitable or scalable businesses capable of achieving profitability and anticipating returns exceeding a hurdle rate of 10% (Kapoor 2024) ▪ Early-stage startups and MSMEs can find it challenging to achieve such high returns, considering market uncertainty and limited order books.
Limited focus on R&D and NPD
▪ A greater share of private capital flows to enterprises intending to scale their business operations, leaving limited focus on R&D and NPD.

Addressing these barriers requires targeted interventions that reshape incentives for both lenders and investors. The final section of this chapter proposes measures to strengthen the financing ecosystem for ACM MSMEs.

5.5 ENHANCING THE FINANCING ECOSYSTEM FOR ACM MSMES

To address the identified gaps, new targeted interventions can be considered to augment the existing financial architecture. Specialized financial products can be created to make transitioning MSMEs more appealing to conventional lenders.

Table 10. Recommended interventions

Developing specialized financial products and systems
• Optimizing the cost of capital: A dedicated fund could provide interest subvention to reduce the effective interest rate for transition-related loans. • Aligning loan tenors with project lifecycles: Loans with longer repayment schedules (7-10 years) and initial moratoriums on principal repayment (2-3 years) could align debt servicing with expected cash flow. • Building technical expertise in banks: Capacity building for loan officers may help to better assess the viability of EV component business plans.
Specialized transition funds
• Create and incentivize funds focused on investing in established MSMEs undertaking technological upgrades and transition to the EV ecosystem, with return expectations aligned with industrial timelines (e.g., 12-15% internal rates of return over 7-10 years). • Strategic Co-Investment Model: A government-backed entity could act as a cornerstone investor in these funds to catalyze further private investment from family offices and institutional investors.
Catalyzing R&D and innovation
• To close the innovation funding deficit, a dedicated facility to fund the pre-commercialization stages of R&D and NPD is needed (See Box 1). • Recently, the GoI Department of Science and Technology launched its 'Evolutions' program, inviting proposals from startups registered with the Department for Promotion of Industry and Internal Trade that have innovative ideas and products at TRL 3-4 level to avail financial support for further product development, testing, and validation. Expanding the access of such a program to a wider ACM MSME base, along with dedicated funding for collaboration between MSMEs and technical universities or research institutions to foster knowledge transfer (DST 2025).

Box 1. Global Precedents of Grants for EV transition and MSMEs

1. China's supportive ecosystem, including the "Little Giants" program, enables government-certified high-tech SMEs called "Specialized SMEs" to gain preferential access to loans, subsidies, and research funding. The ecosystem fosters increased collaboration among state-run enterprises, research institutes, and SMEs to promote the development of intellectual property (Brown et al. 2023).
2. In April 2025, South Korea's government committed a significant financial support package, including R&D tax incentives and government-backed loans to its auto-parts industry, to ensure its domestic supply chain remains competitive. The package encompasses a KRW 15 trillion (USD 11 billion) fund to address liquidity challenges among manufacturers and a KRW 1 trillion (USD 733 million) fund—capitalized by financial institutions, auto manufacturers, and credit-guarantee funds—to aid component manufacturers in issuing bonds (Vichyanond 2025).

In summary, meeting the financing requirements of MSMEs undergoing transition to the EV ecosystem requires a specialized layer within the current financing ecosystem. This specialized layer needs to align with the long-term, patient, risk-tolerant, and technology-oriented capital needs of ACM MSMEs. While the existing system supports stable businesses, there is a need for an intermediary that understands transition-specific opportunities and can design tailored financial products to drive growth.

These gaps highlight the need for a dedicated facility that can provide patient, risk-tolerant capital alongside technical support. Building on India's policy base, the proposed AC-TUFF serves as a targeted intervention to accelerate the shift toward EV manufacturing. The following chapter presents the proposed design of AC-TUFF and how it can address MSME transition challenges.

6. PROPOSED STRUCTURE FOR AC-TUFF

To address the complex barriers faced by India's automotive MSMEs in transitioning to EVs, CPI proposes the establishment of a purpose-built, blended-finance facility that mobilizes private capital at scale while lowering risks for lenders and enterprises. The facility aligns with the Draft Framework of India's Climate Finance Taxonomy and builds on fiscal measures announced in the Union Budget 2025–26 (MoF 2025c). The Climate Finance Taxonomy sets principles for channeling capital into sustainable activities. Two tenets guide AC-TUFF's design:

- Support for Transition Activities: The taxonomy calls for targeted investment in India's mobility transition. AC-TUFF applies this by helping incumbent ACMs retool for EV platforms.
- Proportionality—Support for MSMEs: The taxonomy recognizes MSMEs' unique constraints and advocates simplified eligibility and compliance. AC-TUFF embeds this proportionality to widen access to green finance

The Union Budget 2025-26 provides the fiscal impetus to translate these principles into action. Key announcements that create a powerful enabling environment for AC-TUFF include:

- Enhanced Credit Support: Raising MSME credit guarantee cover to INR 10 crore (USD 1.2 million) expands bank lending that AC-TUFF can channel and de-risk.
- Clean Tech Manufacturing Push: Customs duty waivers and incentives for domestic EV battery and critical component manufacturing lower the cost and risk of upgrades that AC-TUFF will finance.
- 'Make in India' momentum: The National Manufacturing Mission signals long-term policy commitment, reinforcing AC-TUFF's objectives.

The AC-TUFF would provide patient, low-cost capital and integrated technical support to automotive MSMEs so they can manage transition risks and capture a meaningful share of the projected INR 3.86 lakh crore (USD 46 billion) EV component market by 2035. This chapter sets out the financial architecture, strategic rationale, tiered capital structure, and instruments the facility will deploy.

6.1 INDIAN AND GLOBAL PRECEDENTS

With the need for an AC-TUFF becoming clear, CPI examined existing and past initiatives involving dedicated funds or financing facilities for transitions in different sectors, both in India and globally. This study offered valuable takeaways to inform the proposed structure and roadmap for the AC-TUFF.

6.1.1 INDIAN PRECEDENTS

Concentrated government efforts, including budgetary allocation, can aid the transformation of a sector. In addition, long-term patient capital can aid ACM MSMEs to transition and grow, considering the challenges of the technology learning curve and competitive market dynamics. Two Indian funds serve as informative precedents for the AC-TUFF model:

- The Amended Technology Upgradation Fund Scheme (ATUFS) launched in 1999 and revised multiple times over the years, aimed at modernizing the textile industry, promoting investments in textile infrastructure, boosting employment, and enhancing exports. The GoI supported subsidies on capital investments, focusing on modernizing the textile manufacturing infrastructure. It had an aggregate subsidy disbursement of INR 1,856 crore (USD 222 million) between FYs 2021 and 2023. In addition, the ATUFS attracted a total investment of approximately INR 54,833 crore (USD 6.5 billion), and 80% of investments in India's textile sector between 1999 and 2016 emerged from this scheme (NITI Aayog 2020).
- India Automotive Components Manufacturers Private Equity Fund (IFCI Venture Capital Funds Limited), launched in 2012, was a domestically structured PE fund that invested in Indian ACM firms seeking to transform and grow. The fund had a corpus of INR 190 crore (USD 23 million) raised from FIs, insurance companies, and high-net-worth individuals, and invested in seven companies in the automotive sector and two in the non-automotive sector. The 10-year closed-ended fund aspired to generate returns of 20% per annum from investing in Indian ACMs, and about 68% of investments generated returns to the tune of 17% (IFCI Venture n.d.).

6.1.2 GLOBAL PRECEDENTS: AUTOMOTIVE SECTOR TRANSITION FUNDS

The government can act as a catalyst and risk mitigator, crowding in private capital through guarantees and leverage rather than relying solely on direct lending. Targeted grant support is essential for high-priority activities with strong social and economic externalities. Two initiatives from the US provide key insights:

- In September 2024, US-based Monroe Capital launched its 'Drive Forward' fund to facilitate access to lower-cost capital for small- and medium-sized auto manufacturers to refinance, grow, and diversify their businesses. The fund is structured as a privately managed investment vehicle in collaboration with the US administration to raise USD 1 billion in capital and low-cost government-backed leverage through a Small Business Administration (SBA) license.
- US DoE Domestic Manufacturing Conversion Grants, backed by USD 2 billion from the Inflation Reduction Act, are cost-sharing grants to convert and retool at-risk or shuttered legacy auto facilities for EV production. The program preserves jobs, repurposes industrial assets, and finances high-cost capex that loans alone may not cover.

6.1.3 BLENDED FINANCE FOR DE-RISKING AND IMPACT

The Indian and global precedents explained above highlight the power of blending low-cost government funds and a large pool of private investment to financially support climate and just-transition projects at scale. A layered capital stack with first-loss protection is a proven model for mobilizing private investment at scale and is well-suited to India's MSME financing gap. Blended finance strategically uses catalytic public or philanthropic capital to mobilize private investment by improving risk-return profiles. Layered structures place concessional or first-loss tranches

beneath commercial capital to enable projects to become bankable. Various precedents have demonstrated the catalytic effects of a layered capital stack featuring first-loss protection.

- The Green Climate Fund (GCF) catalytic first-loss equity investment in the Vertelo e-mobility platform in India crowded in commercial capital (GCF 2024).
- Similarly, the 'SDG Loan Fund', managed by Allianz Global Investors, leveraged a first-loss tranche from the Dutch Development Finance Institution (DFI)-FMO and a guarantee from the MacArthur Foundation to mobilize over INR 8,000 crore (USD 1 billion) from institutional investors for lending in emerging markets (Allianz Global Investors 2023).

6.1.4 INTEGRATED SUPPORT MODEL COMBINING FINANCE AND TECHNICAL ASSISTANCE

An effective facility acts as an active partner, not a passive lender, given that capital alone rarely ensures MSME transition success. Programs that pair finance with hands-on support deliver better outcomes. For example:

- The US Department of Energy (DoE) Automotive Supplier Diversification and Conversion program deploys practical playbooks and expert Technical Assistance (TA) teams (universities, manufacturing extension partnerships) to diagnose opportunities, vet business cases, and address workforce and financing hurdles (US DoE 2024).
- International Finance Corporation (IFC) and Organization for Economic Co-operation and Development (OECD) guidance indicates that effective small and medium enterprises (SME) green finance integrates non-financial support—technology advisory, financial management, and market access assistance.

It is therefore proposed to integrate a robust TA window into the AC-TUFF to ensure that projects are investment-ready, capital is deployed effectively, and MSMEs build the necessary capabilities to complete the transition.

Optimal AC-TUFF design emerges from a synthesis of global best practices: A purely grant-based model is not scalable enough for India's vast MSME landscape, while a purely commercial fund will not materialize due to the high risks perceived.

Table 11. Comparative analysis of Indian and global precedents

Feature	India Automotive Components Manufacturers Private Equity Fund (India)	Monroe Capital Drive Forward Fund (USA)	DoE Conversion Grants (USA)
Objective	Support ACMs with capital for growth projects and generate high returns for their investors	Finance transition of auto suppliers to EV/advanced tech	Retool at-risk/shuttered auto plants for EV production
Target	Auto-parts and component manufacturers	Small and medium auto suppliers	Legacy auto manufacturing facilities
Structure	Domestic fund	Public-private partnership (privately managed fund with SBA guarantee)	Direct Government Grant Program

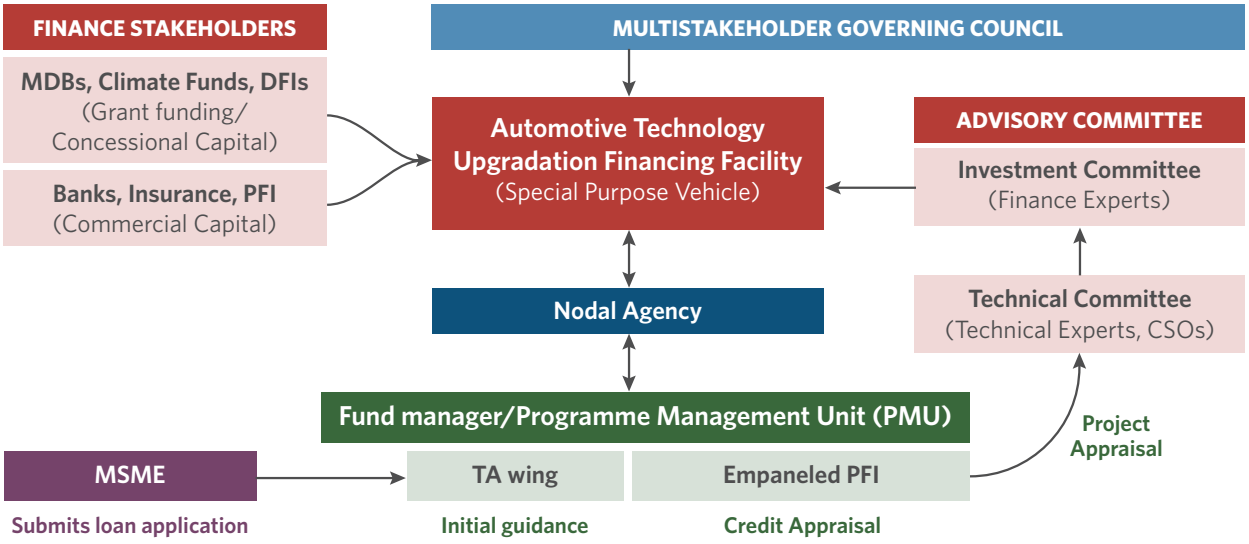
Feature	India Automotive Components Manufacturers Private Equity Fund (India)	Monroe Capital Drive Forward Fund (USA)	DoE Conversion Grants (USA)
Key Instrument	PE fund	Government-guaranteed loans	Cost-shared grants (up to 50%)
Capital Source	FIs, insurance companies, and high-net-worth individuals	Private capital + SBA-backed leverage	Federal budget (Inflation Reduction Act)
Key Insight	Supported expansion of production capacity, strengthening working capital & entering new markets	Scalable model using public funds to de-risk private capital	Targeted support for high-cost capex and job retention

Insights from Indian and global precedents inform the design choices for the AC-TUFF. Building on these lessons, the following section presents a detailed architectural blueprint for the facility.

6.2 ARCHITECTURAL BLUEPRINT OF THE AC-TUFF

Based on established imperatives and precedents, this section outlines our blueprint for the AC-TUFF, utilizing a modular architecture that integrates financial instruments and non-financial support into a single, mission-driven platform. Figure 9 illustrates the proposed AC-TUFF structure and highlights the relationship between the various stakeholders.

Figure 9. Proposed overall structure of the AC-TUFF



The facility can be constituted as a dedicated special purpose vehicle (SPV), likely structured as a not-for-profit company. Legal separation from existing departments or FIs is critical to ensure agile decision-making, specialized focus on the EV sector, and the ability to secure and manage capital from different classes under a single umbrella. The operational framework will leverage a partnership-based model for efficiency, transparency, and effective risk management. The facility's on-lending and guarantee model will leverage the reach of Partner Financial Institutions (PFI) while embedding strong risk management. The following sections elaborate on the proposed AC-TUFF governance structure, the roles of various stakeholders involved, the layered structure of capital sources, the operational framework, and the overall fund flow process.

6.2.1 GOVERNANCE STRUCTURE

The AC-TUFF requires a governance framework that safeguards independence, ensures expertise, and aligns stakeholders. A multi-stakeholder governing council will be constituted to provide strategic oversight and ensure alignment with national priorities. The council's composition is designed to bring together key perspectives. The facility can be housed under a Nodal Agency and managed by a Fund Manager under the guidance of an Investment Committee and a Technical Advisory Committee. The roles and responsibilities of these entities are described below.

NODAL AGENCY

- An ideal nodal agency must be an institution with a clear understanding of the financing requirements, challenges, and operating conditions of MSMEs and with vast experience in securing and handling capital (e.g., SIDBI), from different classes of investors.
- The role of a nodal agency would involve housing the AC-TUFF secretariat, providing initial operational support, and acting as a key channel for DFI capital.

FUND MANAGER

The Fund manager would be stationed in a separate unit under or in partnership with the nodal agency.

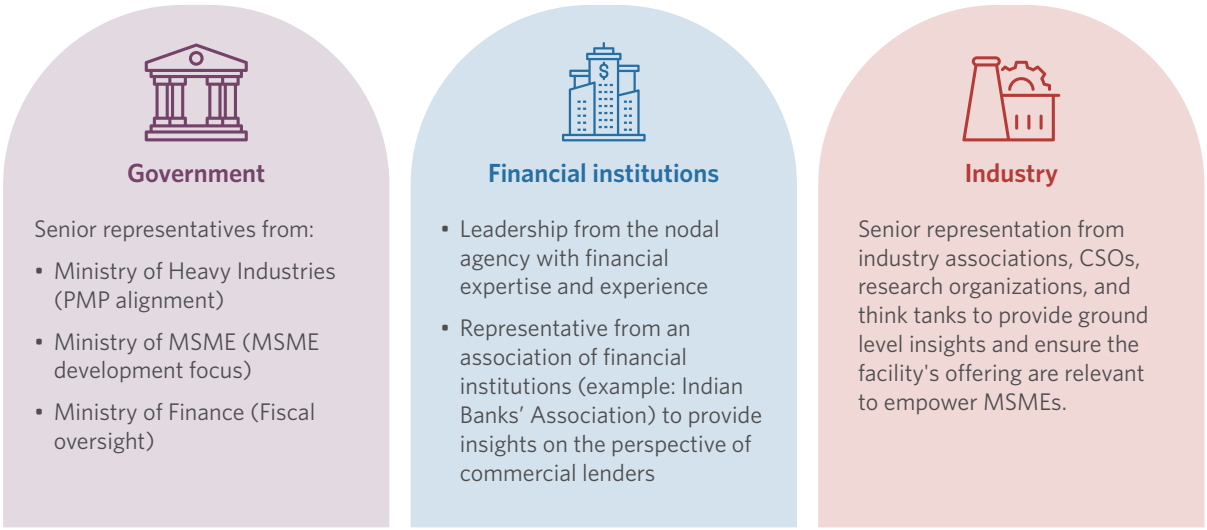
- The role of the fund manager would include raising capital from private equity investors and high-net-worth individuals and managing the operations of the SPV.
- The fund manager will house a project management unit (PMU) which appoints specialists in climate finance, automotive technology, environmental and social safeguards, gender, and monitoring and evaluation.

ADVISORY COMMITTEE

To ensure separation of powers and specialized oversight, two distinct committees are proposed, reflecting global best practices in fund management:

- The Investment Committee would make all credit decisions (loans and guarantees). To build market confidence, it would prioritize financial expertise, be chaired by an independent expert, and include representatives from the fund manager and key investors (e.g., DFIs). It would apply rigorous risk and financial analysis free from undue influence.
- The Technical Committee would guide the TA wing and oversee environmental, social, and technical objectives. Members may include ACMA, technical institutions such as the Automotive Research Association of India, and civil society experts in sustainability and just transition. It will ensure sector relevance, technical rigor, and impact.

Figure 10. Members of the technical committee

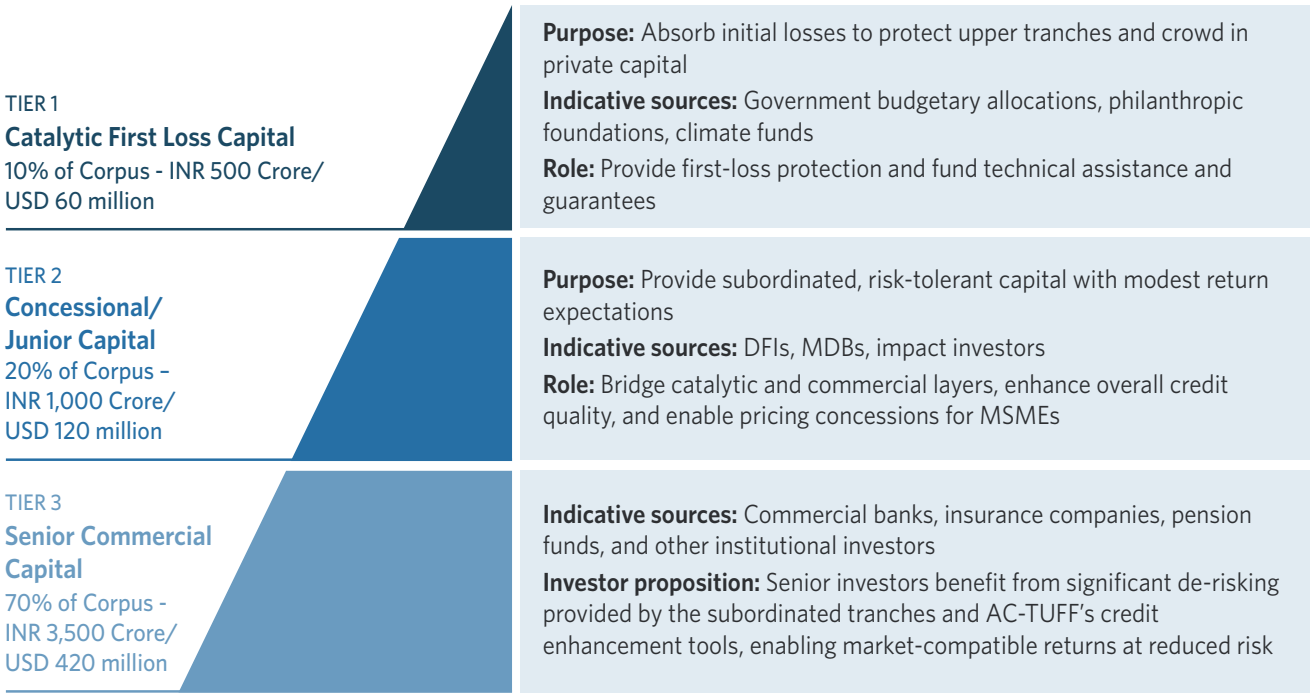


This structure would ensure that the AC-TUFF's strategy was informed by policy objectives, financial sector realities, and the practical challenges faced by the industry.

6.2.2 CAPITALIZATION AND FUND STRUCTURE

The AC-TUFF would leverage the wide outreach of partner financial institutions (PFIs) and offer a suite of carefully designed financial products to meet the diverse needs of transitioning MSMEs. The facility is envisioned to employ a three-tier capital stack that segments risk and matches the mandates of different investor classes—from catalytic concessional capital to fully commercial money. Figure 11 provides an indicative structure and capital allocation for the financing facility.

Figure 11. Proposed capital stack of the AC-TUFF



Low-cost capital from government budgets can provide the initial layer of protection as a first-loss capital, signaling policy alignment to prospective investors. Additionally, contributions from philanthropic foundations and climate funds can strengthen the first-loss capital reserve, thereby providing investors with greater confidence. The second tier of the structure will include patient and concessional capital from DFIs, MDBs, and impact investors, who work with focused climate and sustainability targets. This pool of concessional capital would help reduce the overall cost of capital under the AC-TUFF.

First-loss capital protection and concessional capital provided by Tier-I and Tier-II investors could attract senior commercial capital from commercial banks, institutional investors, and insurance companies aiming to tap into the growing EV market potential and generate profitable returns by investing in the facility.

6.2.3 FINANCIAL INSTRUMENTS/PRODUCTS

To address diverse transition pathways and constraints, the AC-TUFF would deploy a targeted toolkit rather than a single product, each designed to address the distinct capital needs and constraints faced by MSMEs at different stages of their transition journey. The toolkit would encompass a dedicated credit guarantee, a technical assistance grant for eligible MSMEs, and a first-loss default guarantee cover for investors. Figure 12 provides a summary of some of the key financial instruments that would be an integral part of the AC-TUFF.

Figure 12. Financial instruments/products

TECHNOLOGY UPGRADATION TERM LOANS

Use: CAPEX for EV component manufacturing (new plant and machinery, retooling).

Terms: Concessional pricing (for example: repo rate plus 1–2%, tenors of 7–10 years, and 1–2 years moratoriums)

Rationale: Aligns repayment with cash-flow ramp-up in long-gestation, capital-intensive projects.

DEDICATED CREDIT GUARANTEE SCHEME

Design: Partial credit guarantees covering a share of the principal default on eligible PFI loans to MSMEs.

Impact: Reduces lender loss-given-default and expands credit access for firms with collateral gaps.

FIRST-LOSS DEFAULT GUARANTEE FOR PFIs

Design: Portfolio-level cover in which AC-TUFF absorbs, for example, the initial 10–15% of losses on a defined book of EV transition loans originated by a PFI.

Impact: Encourages PFIs to build dedicated MSME transition portfolios with capped downside.

TECHNICAL ASSISTANCE GRANT

Design: One-time grant up to a predefined amount (Eg: INR 5 lakh), typically co-financing up to 75% of expert costs.

Use: Technology assessments, preparation of bankable detailed project reports (DPRs), and related pre-investment work.

Impact: Makes high-quality advisory affordable and improves bankability.

6.2.4 INTEGRATED TECHNICAL ASSISTANCE WING

The TA wing is proposed as a non-financial vertical that is arguably as important as the financial instruments, converting AC-TUFF from a lender into an execution partner. The TA wing would be housed under the PMU and would act under the guidance of the technical advisory committee. Figure 13 highlights the key functions of the integrated TA wing.

The TA wing provides comprehensive support for MSMEs on both the technical and business fronts. With investments in the EV ecosystem being capital-intensive, the TA wing will aid the MSMEs in validating the long-term relevance of the technology, supporting market analysis and risk analysis, as well as developing robust business plans. The TA wing will also enable increased market reach for the MSMEs by aiding in achieving quality certifications and engaging with OEMs and Tier-1 suppliers.

Figure 13. Functions of integrated TA wing

Technology Scouting and Vetting

Maintains a curated database of proven EV component technologies and credible equipment vendors to prevent obsolete or unproven investments.

Business Plan Development and Validation

Supports MSMEs with bankable DPRs, including financial modeling, market analysis, and risk assessment aligned to PFI standards.

OEM and Tier-1 Market Linkages

Facilitates and guides MSMEs through onboarding with EV OEMs and Tier-1 suppliers.

Quality Certification Support

Assists MSMEs in obtaining required industry certifications which are often prerequisites for becoming a supplier to major OEMs.

Cluster-based TA Delivery

To maximize reach and efficiency, workshops, training sessions, and one-on-one clinics will be organized in major automotive hubs, leveraging the existing industrial density.

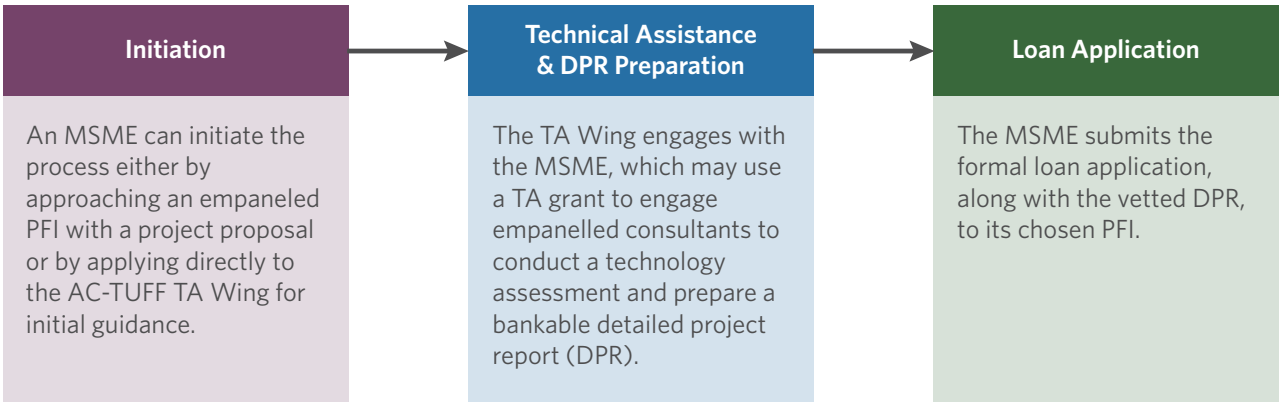
6.3 ELIGIBILITY AND APPLICATION PROCESS

The application process is designed to be MSME-friendly, integrating financial and technical support. An MSME meeting the eligibility criteria listed in Figure 14 can approach empaneled PFIs or the TA wing of the AC-TUFF to initiate the overall application process. Figure 15 provides the process flow for MSME applications. The role of the TA wing is crucial in the application process, as they aid in carrying out the technology assessment for the proposed project and vetting the detailed project report. This ensures that qualified MSMEs are facilitated in applying for the loan under the financing facility.

Figure 14. Eligibility criteria for MSME participation

- **Registration:** Must be a registered MSME on the GoI's Udyam portal
- **Experience:** Demonstrates at least three years of operations in auto-component manufacturing
- **Project Scope:** Targets EV components listed under the government's Phased Manufacturing Program (PMP)
- **Commitment to transition:** Commits to the mandatory TA process and prepares a credible transition plan
- **Financial prudence:** Maintains a clean credit history with no existing defaults

Figure 15. Application process flow



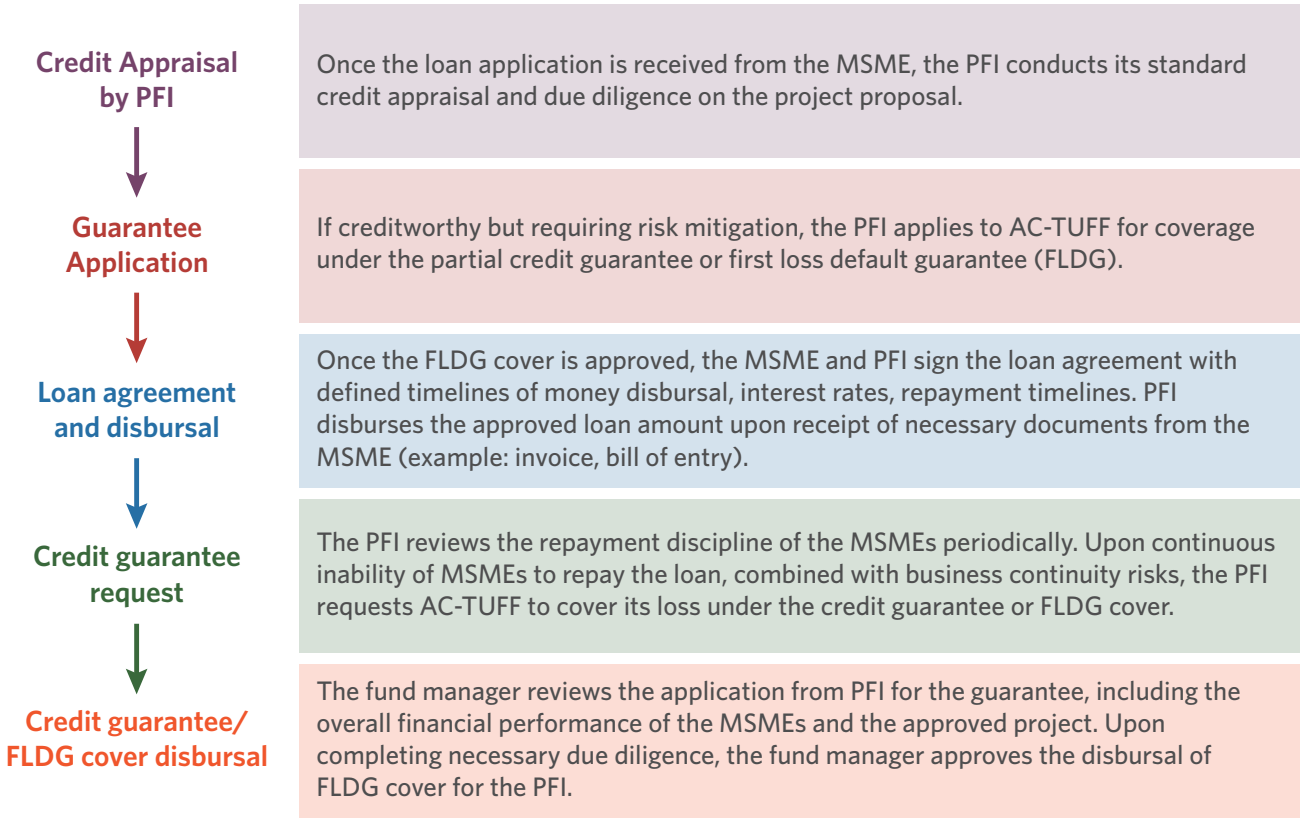
6.4 OPERATIONAL FRAMEWORK AND FUND FLOW

PFIs will be public and private sector banks, small finance banks, and select, well-regulated NBFCs. These partners will conduct primary credit appraisal, due diligence, sanction, and disbursement using existing networks and underwriting frameworks. Figure 16 explains the critical steps involved in the fund flow process once the loan application is submitted by the MSME. The PFIs carry out due diligence activities, including credit appraisal and risk assessment, to determine the need for credit guarantee cover or an FLDG cover from the AC-TUFF.

With the completion of the due diligence process and approval from the fund manager for guarantee cover, the PFI and the MSME applicant sign a formal loan agreement with defined

terms and conditions before the disbursal of the loan amount to the applicant. In case of defaults from the MSME, the PFI applies to the fund manager to claim the guarantee. The fund manager will approve the disbursal of the guarantee amount to the PFI upon reviewing the validity of the request and analyzing the reason for loan defaults.

Figure 16. Flow of the funds.



6.5 FINANCIAL RISK MITIGATION FRAMEWORK

Beyond the de-risking inherent in the layered capital stack, the AC-TUFF would employ a robust framework of contractual and market-based mechanisms to manage portfolio-level risk. This would ensure the facility's financial sustainability and protect investor capital, particularly senior lenders.

DEMAND DE-RISKING THROUGH OEM OFFTAKE AGREEMENTS

A primary risk for any component manufacturer is the uncertainty of market demand for EVs. To mitigate this, the PMU would facilitate, and when appropriate require, a tripartite memorandum of understanding or offtake agreement among the MSME, AC-TUFF, and target OEMs before disbursement of large capex loans. Securing such agreements improves revenue visibility, reduces market risk, and strengthens credit profiles.

CREDIT ENHANCEMENT VIA A DUAL-LAYER GUARANTEE STRUCTURE

AC-TUFF's partial risk guarantee would act as first-loss cover with the CGTMSE providing a second-loss backstop. This structure is proposed to enhance capital efficiency and extend guarantees across more loans by leveraging an existing scheme, allowing the AC-TUFF to amplify its credit enhancement impact beyond what its own capital would permit alone.

SYSTEMATIC PORTFOLIO DIVERSIFICATION

To avoid concentration risk, the facility's investment mandate would require the Fund Manager to ensure systematic diversification of the loan portfolio. This will be managed across multiple dimensions:

- Geographic Diversification: Allocations across key clusters (e.g., Pune–Chakan, Hosur–Bengaluru, National Capital Region).
- Component Diversification: Exposure across multiple EV sub-components to avoid product concentration.
- Enterprise Size Diversification: Balanced mix across MSME sizes to manage heterogeneous risk profiles.

6.6 EXIT STRATEGIES

A forward-looking exit strategy is crucial to ensure the facility's sustainability and long-term impact. AC-TUFF would embed clear exit paths to recycle capital and deepen markets:

- Commercial Refinancing: After a three-year performance record, the AC-TUFF would encourage and support borrowers to refinance concessional loans with standard commercial bank credit, freeing capacity for new MSMEs.
- Securitization: For mature pools, AC-TUFF would aggregate loans and issue green asset-backed securities. This recycles capital at scale and seeds a new asset class—securitized debt backed by Indian EV supply-chain MSMEs—unlocking larger bond-market participation.

With the structure of the AC-TUFF defined, the next step is to operationalize it. The following roadmap outlines a phased rollout plan to establish early traction, validate the model, and scale the facility nationwide.

7. ROADMAP FOR ROLLOUT OF THE FACILITY

Operationalizing the AC-TUFF will require a phased approach that balances urgency with careful institution building. The roadmap proposed here provides an indicative sequence of actions to move from facility establishment to national scale-up. Each phase is designed to deliver tangible outcomes, build investor confidence, validate operating models, and deepen MSME participation—while minimizing risks. The following sections outline the key objectives, actions, and expected results for each stage of rollout.

7.1 PHASE 1: ESTABLISHMENT AND CAPITALIZATION (MONTHS 0-6)

The first phase focuses on institution building and credibility. Key actions include constituting the governing council, setting up the SPV and fund manager, securing anchor capital (first-loss and concessional tranches), and establishing partnerships with priority financial institutions. Early success in this phase will depend on transparent governance, clear eligibility criteria, and a visible commitment of public capital to de-risk private investment.

Figure 17. Key actions under phase 1 of the roadmap for rollout of the facility

Legal/Governance Foundation

Policymaker issues formal notification to establish AC-TUFF policy, sets up the Special Purpose Vehicle (SPV) and constitutes a multi-stakeholder Governing Council (Ministries, Nodal agency, IBA, ACMA).

Securing Anchor Capital/Partnerships

First loss/catalytic capital (INR 250 crore) earmarked from the Union Budget, MoUs with Nodal agency and anchor DFI investor. Pursue MDB (e.g., World Bank) and climate fund commitments.

Operational Framework

Develop detailed operational guidelines (eligibility, processes, risk protocols, monitoring & evaluation) with stakeholder consultation before final notification.

Team & Partner Onboarding

Appoint professional Fund Management Team , select TA consortium for technical/financial support.

7.2 PHASE 2: PILOT LAUNCH & ECOSYSTEM BUILDING (7-18 MONTHS)

This phase pilots the facility in selected automotive clusters with high MSME density (e.g., Pune, Chennai, Hosur). The objective is to test lending products, TA services, and credit guarantee mechanisms in real-world conditions. Equally important is building the ecosystem—partnerships with OEMs, cluster associations, and technical institutes to ensure MSMEs have both capital and non-financial support. Success will be measured by the first set of financed projects and the creation of replicable playbooks for scaling.

Figure 18. Key actions under Phase 2 of the facility rollout roadmap

Pilot program launch

Target 100–150 MSMEs in 2–3 high-density clusters (Tamil Nadu, Maharashtra, NCR). Focus on high-localization EV components under PMP.

Building financial ecosystem

Onboard 5–7 banks/NBFCs as PFIs via MoUs. Conduct intensive training on EV transition and AC-TUFF credit/guarantee operations.

Awareness & pipeline generation

Outreach campaigns, roadshows and workshops with industry associations (ACMA, SIAM), local MSME groups, launch dedicated AC-TUFF portal.

TA playbook

Create EV Transition Playbook for MSMEs covering technology, vendor selection, capex planning, quality compliance as per OEM/ certification. Provide hands-on advisory during the pilot.

7.3 PHASE 3: FULL-SCALE OPERATIONS (MONTHS 19–60)

Once pilot results validate the model, the facility should expand to a national scale. This includes increasing capitalization through institutional investors, onboarding additional PFIs, and extending support to a wider set of MSME segments. Phase 3 should also institutionalize credit enhancement structures, mainstream TA services, and deploy co-investment models with OEMs and DFIs. By the end of this phase, the AC-TUFF should be positioned as a revolving, self-sustaining facility aligned with India's industrial and climate goals.

Figure 19. Key actions under Phase 3 of the facility rollout roadmap

Pan-India rollout

Replicate in major Indian automotive clusters. Expand PFI network (banks, NBFCs, Small Finance Banks) for deep MSME coverage.

Mobilizing commercial capital

Use pilot performance data to attract Senior Commercial Capital (INR 3,500 crore; target insurance/pension funds, commercial banks).

Monitoring & evaluation framework

Implement real-time digital dashboard for KPIs: loan disbursements, NPAs, leverage ratio, jobs, components localized, private capital.

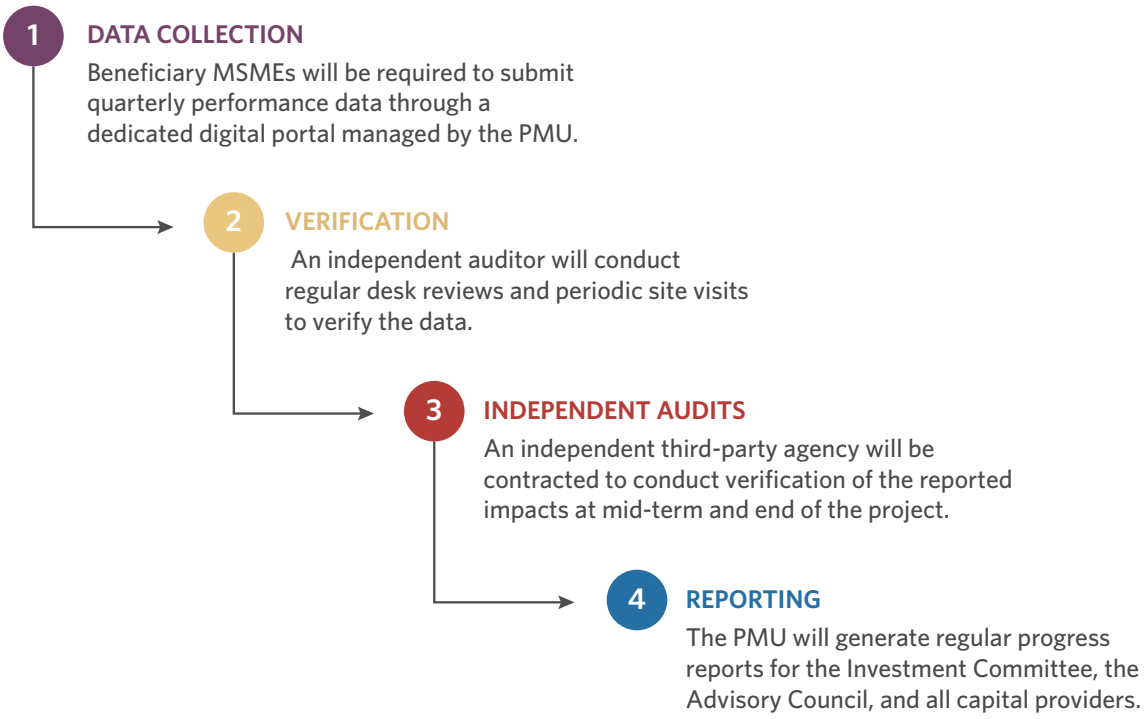
Policy feedback loop

Half-yearly Governing Council reviews, evidence-based feedback to Ministries—ensures dynamic adjustments to PMP, policy support, standards, etc.

7.4 MONITORING, REPORTING, AND VERIFICATION FRAMEWORK

A robust MRV framework underpins all phases, ensuring transparency, accountability, and credibility with investors and policymakers. The framework should track capital mobilization, MSME participation rates, technology upgrade outcomes, and socio-economic co-benefits such as job retention. Independent third-party verification and digital reporting systems can reinforce trust and enable mid-course corrections.

Figure 20. MRV process



7.5 PHASED ROLLOUT AND KEY PERFORMANCE INDICATORS

Clear KPIs are essential to measure progress and build stakeholder confidence. These should include capital deployed, leverage ratios achieved, number of MSMEs supported, proportion of financing tied to technology upgrades, and geographic spread of beneficiaries. KPIs should evolve across phases—from operational milestones in Phase 1 to portfolio-level performance in Phase 3—ensuring that the AC-TUFF delivers both developmental and financial outcomes. Table 12 summarizes the phased rollout plan, providing clear, measurable targets for each phase. This serves as an accountability framework for the facility's management and a transparent progress report for its stakeholders.

Table 12. AC-TUFF phased rollout plan

Phase	Key activities	Timeline	Key performance indicators
Phase 1: Establishment	• Legal entity formation • Secure anchor capital: INR 250 crore (USD 30 million) • Finalize operational guidelines • Onboard Fund Manager & TA Partner	Months 0-6	• AC-TUFF legally established • Anchor capital secured • Guidelines notified • Key partners appointed
Phase 2: Pilot Launch	• Launch in three auto clusters • Onboard 5-7 PFIs • Conduct 10+ awareness workshop • Develop TA Playbook	Months 7-18	• 100 MSMEs financed • INR 500 Crore (USD 60 million) of financing facilitated (AC-TUFF + PFIs) • PFI non-performing asset in the portfolio <2% • Feedback from pilot MSMEs and PFIs
Phase 3: Full-scale operations	• Pan-India rollout • Raise full commercial capital: INR 3,500 crore (USD 418 million) • Implement digital M&E dashboard • Establish policy feedback loop	Months 19-60	• 1,500+ MSMEs financed • Full INR 5,000 crore (USD 0.6 billion) corpus mobilized • 50+ new EV components localized by MSMEs • 50,000+ jobs created/retained • Private capital leverage ratio of 1:7 achieved

The phased rollout provides a clear pathway to establish the AC-TUFF, validate its model through pilots, and scale it into a national facility that can mobilize capital and support MSMEs at scale. With the roadmap defined, the next chapter distills the key insights from this analysis and sets out actionable recommendations for policymakers, financial institutions, and industry leaders to ensure the AC-TUFF's success.

8. CONCLUSIONS AND RECOMMENDATIONS

The transition to electric mobility is a generational industrial transformation for India. Its success hinges on the ability of the auto-component MSME sector, the backbone of the current automotive industry, to navigate this shift. After exploring the significant barriers these MSMEs face, this report has proposed a detailed architectural blueprint for an AC-TUFF to address these challenges. We now present the core conclusions on the facility's design along with a set of actionable recommendations for its implementation.

8.1 CONCLUSIONS ON THE AC-TUFF STRUCTURE

A dedicated financial intervention is necessary to unlock the full potential of auto-component MSMEs within the EV value chain. The proposed design of the AC-TUFF presents a direct and comprehensive response to prevailing market failures and policy gaps that hinder this transition. The structural pillars underpinning AC-TUFF are identified as the most effective and contextually appropriate approach for India.

- A blended-finance SPV is recommended as a core structure, given that a government-only fund would lack the necessary scale, while a fully commercial fund is unlikely due to perceived risk. Combining a small public/philanthropic first-loss tranche with commercial capital can de-risk investments and leverage much larger pools of private funds, following global precedents.
- Integrated TA as a critical enabler to address MSME barriers such as lack of technical know-how, business plan preparation, or compliance with OEM standards. A built-in TA component can ensure effective capital utilization, reduce project failure, and build lasting institutional capacity. This can progress the AC-TUFF beyond just a financier to become a true enabler of MSME transformation.
- A partnership-driven operational model can drive efficiency and scalability, avoiding the inefficiencies of establishing a new bureaucratic entity. The AC-TUFF would leverage the existing infrastructure of PFIs for credit appraisal, risk-sharing, and on-lending functions. The facility's proposed anchoring within an established entity like SIDBI as the nodal agency would be beneficial, given SIDBI's expertise in MSME financing, credibility with domestic and international DFIs, and its institutional capacity to manage such programs at scale.

8.2 ACTIONABLE RECOMMENDATIONS

To translate the AC-TUFF blueprint into reality, a clear and decisive implementation path is required. The following actionable recommendations provide a strategic guide for stakeholders:

Prioritize Swift Institutionalization and Governance Setup

- To build credibility and momentum, stakeholders must move quickly to establish the facility's foundational structure by formally notifying the AC-TUFF policy.
- This also includes the legal incorporation of the SPV by forming a multi-stakeholder governing council and securing the first-loss capital from the budget within six months.

Adopt a Phased, Evidence-Based Rollout Starting with a Pilot:

- A national rollout should be preceded by a controlled pilot phase in 2-3 high-density automotive clusters (e.g., Tamil Nadu, Maharashtra, or the National Capital Region) to test and refine operational guidelines, financial instruments, and TA delivery.
- Data and success stories from the pilot will be crucial for de-risking the proposition for large-scale commercial investors in the subsequent scaling phase.

Mandate the Integration of Financial and Non-Financial Support:

- The link between financing and TA must be hardwired into the facility's operations from day one.
- Access to the TA Grant and EV Transition Playbook guidance should be integral for MSMEs seeking financing under the facility. This would help to ensure that projects are well-vetted and bankable, which is critical for the long-term financial health of the loan portfolio.

Build a Collaborative Ecosystem, Not Just a Fund:

- The AC-TUFF's success depends on proactive engagement with industry bodies (ACMA, SIAM), OEMs, and PFIs.
- This includes intensive training for banking officials to sharpen their project evaluation capacity and organizing roadshows to generate a strong pipeline of quality applications.

Design for Scale and Sustainability from the Outset

- Design the AC-TUFF as a revolving fund, i.e., reinvesting returns and fees to build its capital base.
- Furthermore, the M&E framework must track metrics (like the private capital leverage ratio) to attract institutional investors during the scaling phase.

Embed a Just Transition Framework into Operations:

- The AC-TUFF should integrate "just transition" metrics, including tracking job quality, creation and retention, access to finance for underserved enterprises, and opportunities for women and disadvantaged entrepreneurs. This aligns with national equity goals and enhances the facility's appeal to international development and climate finance partners.

Establish a Dynamic Policy Feedback Loop:

- The AC-TUFF is uniquely positioned to gather ground-level data on the challenges and successes of the MSME transition.
- Establishing a formal evidence-based feedback mechanism between the Governing Council, MHI & MoMSME will enable agile, data-driven adjustments to the government's 'Phased Manufacturing Programme' and other relevant policies.

This report presents CPI's indicative structure and roadmap for establishing the AC-TUFF, based on available evidence, precedents, and stakeholder insights. While it offers a practical framework for addressing MSME financing gaps, we recognize that a deeper, industry-wide analysis and consultation will be essential to determine the most suitable structure, instruments, and implementation pathways for the facility.

9. ANNEXURE

9.1 METHODOLOGY AND ASSUMPTIONS

Market potential and future investment requirements of EV components

The following section provides a detailed description of the methodology adopted to estimate the market potential and the investment required by MSMEs to retain their existing market share of core EV components briefed in Chapter 2. Table A1 provides the methodology along with the assumptions and sources considered.

Figure A1. Localization estimates of core EV components

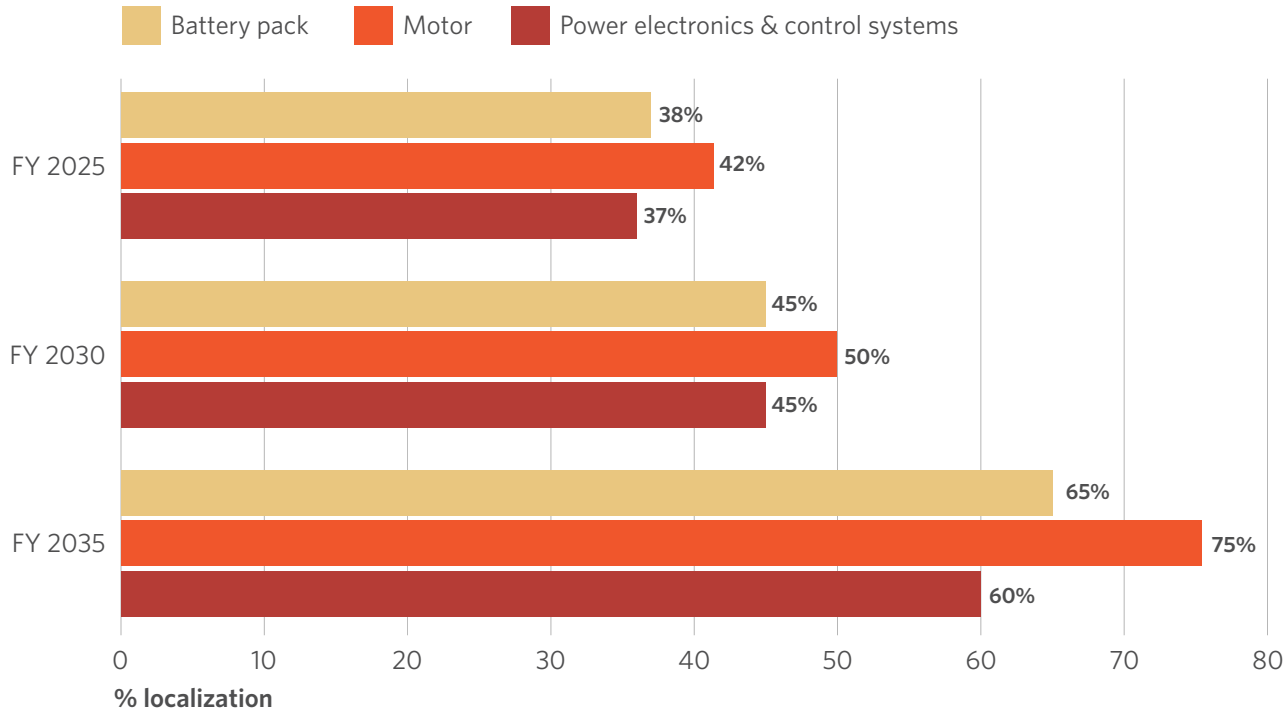


Table A1 Assumptions, detail methodology and sources for estimation of market potential and investment requirement

Description	Assumption/ Methodology	Sources
Projection of ICE and EV sales until FY 2035	▪ Vehicle sales have been projected using compound annual growth rate from FYs 2015–2019, excluding FY 2020–2024 due to COVID distortions. ▪ EV penetration has been modeled to align with the GoI target of 30% by FY 2030. Segment-wise assumptions: 2W (30%), 3W (80%), Cars & LCV (15%), M/HCV (3%). ▪ EV penetration projected until FY 2035: 2W (50%), 3W (100%), Cars & LCV (25%), M/HCV (10%). Overall EV share projected to be 49%.	FADA, SIAM historical sales data GoI EV target of 30% by FY 2030

Description	Assumption/ Methodology	Sources
Projection of OEM revenue until FY 2035	• Prices of ICE vehicle segments were projected until FY 2035 based on past trends and available data. • 2W (5.3% avg increase, 2013–2023) • 4W (8.5% CAGR, 2019–2024) • 3W & LCV (6.9% CAGR, 2015–2024), • M/HCV (5% avg increase).	Public eCommerce Listings
	• Existing literature data were considered to project prices of EVs until FY 2035. **EV 2W & 3W** • Costs to reduce by 58% by 2030 (vs 2020) as per literature • Subsequent cost changes were derived by considering 3% annual reduction in battery costs based on literature data and assuming a 2% annual increase in non-battery costs, and 3% annual increase in assembly and other costs **EV Cars & LCVs:** • ~25% cost reduction by 2030 (vs 2022) based on literature • Post-2030: 3% annual reduction in battery prices is considered based on literature and annual cost reduction from 2022 to 2030 has been considered from 2030 to 2035 **EV M/HCVs** • Cost reduction of 48% by 2030 and 53% by 2040 (vs 2023) based on literature data.	(Rokadiya et al. 2021) (Slowik et al. 2022) (Kaur et al.)
Component cost analysis & localization projection until FY 2035	• Current and future breakdowns of EV component costs were considered by ICCT and ACMA studies for our analysis. • Future localization levels for ICE vehicles were projected based on current localization levels and future localization targets as per ACMA-SIAM reports. • EV localization projections were considered based on existing literature and open-source data. (Figure A1) • By incorporating the cost projections of major components and their localization percentages, overall localization percentages for EVs have been estimated through FY 2035.	ICCT, ACMA (SIAM and ACMA 2023b) (EV reporter 2021; Balachandar 2024)
Estimation of ACM revenue & EV shift impact	• Material costs extended to FY 2035 and combined with localization assumptions to estimate ACM revenue. • Revenue impact analyzed under two scenarios: with EV transition vs 100% ICE baseline to estimate potential impact on ACM revenue due to EV adoption.	OEM financial statements; ACMA data
EV component market potential until FY 2035	• Prices of EV components were projected until FY 2030 using existing literature data for different vehicle segments. • Price change between FY 2030 and FY 2035 projected using the average annual cost difference until FY 2030.	ICCT, ACMA
Investment requirement in EV component manufacturing	• Investment estimated via single-entity model for simplicity. • A financial review of ACM MSMEs and startups was carried out to examine key financial metrics such as return on equity (ROE), return on capital employed (ROCE), and EBIT % • Using the average EBIT %, ROCE %, the investment required is calculated as follows • EBIT=Market potential* EBIT % • Capital employed=EBIT/ROCE • Investment required= (Capital employed*Share of fixed assets) *(1+Depreciation rate) • Considering the high upfront capital requirement for EV components, the share of fixed assets is assumed at 85% initially and further reduced to 65% by FY 2035. • A depreciation rate of 7.5% is assumed.	CPI analysis of financial statements of select few ACM MSMEs/startups

Table A2 Investment required for EV component manufacturing

Component	FY 2030				FY 2035			
	INR Crore		USD billion		INR Crore		USD billion	
	Total	MSME	Total	MSME	Total	MSME	Total	MSME
Batteries	66,692	16,673	7.75	1.94	164,740	41,185	19.16	4.79
Motor-reducer	8,225	2,056	0.96	0.24	21,382	5,345	2.49	0.62
Power electronics	9,315	2,329	1.08	0.27	23,907	5,977	2.78	0.69
Connectivity-control systems	3,378	845	0.39	0.10	10,160	2,540	1.18	0.30
Total investment	**87,611**	**21,903**	**10.19**	**2.55**	**220,188**	**55,047**	**25.60**	**6.40**

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