



Capital flows in India's electric transport sector

Assessing investment trends and mechanisms to unlock capital

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Contents

Key findings 4

Executive summary..... 5

The evolution of India’s electric transport sector 7

The electric transport sector investment landscape..... 8

Our investment estimation methodology at a glance 10

Major observations 14

Closing the investment gap: Pathways forward 27

Conclusion 32

Annexure I: Approach to measuring investments 34

Annexure II: Data and methodology..... 36

About IEEFA..... 45

About the authors 45

Acknowledgements 45

Figures and tables

Figure 1: India's electric transport investments, 2020–2025 (INR crore)*	5
Figure 2: India's EV sales and adoption rates, 2020–2025.....	9
Figure 3: Estimating India's electric transport investments	13
Figure 4: Annual investments in the electric transport sector.....	15
Figure 5: EV manufacturing investments, FY2020–25 (INR crore).....	16
Figure 6: Union government EV support schemes—outlays vs disbursements	22
Figure 7: State EV purchase subsidy disbursements (estimated).....	24
Figure 8: EV manufacturing investment announcements, 2024–2025 (INR crore).....	25
Figure 9: Electric transport realised vs required investments, 2020–2030.....	26
Figure 10: The vicious cycle of finance, investment and demand stalling EV adoption.....	28
Figure 11: Integrated financing platform for EVs	30
Figure 12: Governance structure for the proposed integrated financing platform	31
Table 1: Number of public EV chargers in India.....	20
Table 2: Accounting line items pertaining to uses of funds by OEMs.....	37
Table 3: Accounting line items pertaining to sources of capital of an OEM.....	37
Table 4: Data sources.....	38

Key findings

India's electric vehicle (EV) sector attracted ~INR2.23 lakh crore (USD25.6 billion) in investment from 2020 to 2025, or 18% of the estimated total investment needed by 2030.

In 2024 and 2025, EV investment announcements shifted decisively from three-wheelers to four-wheelers, driven by surging demand for premium electric cars.

Public charging infrastructure investment from 2020 to 2025 amounts to ~9.6% of the INR20,600 crore (USD2.36 billion) estimated to be required by 2030.

Commercial EV borrowers face interest rates of 15–33%, which offset the total cost of ownership advantages of EVs. An integrated financing platform—combining credit guarantees, residual value protection, battery-as-a-service, and co-lending—could bring rates closer to 8–12%.

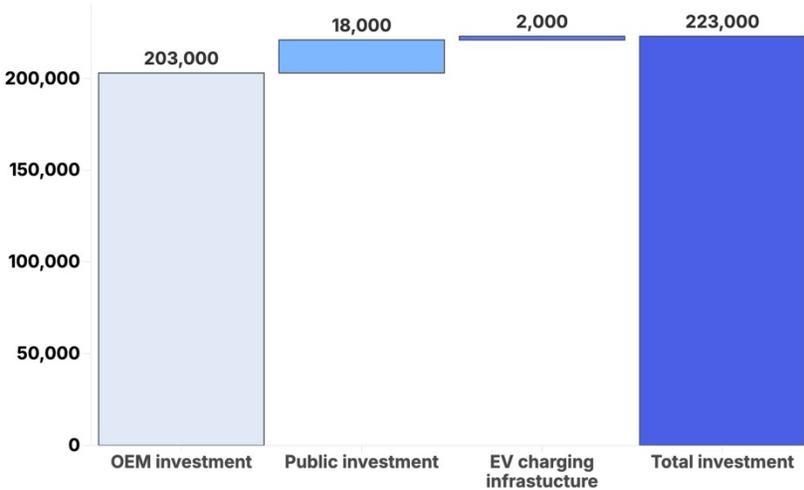


Executive summary

India has a vision to increase the share of EV sales to 30% in private cars, 70% in commercial vehicles, 40% in buses, and 80% in two- and three-wheelers by 2030. Achieving these goals requires substantial investment in electric vehicle (EV) manufacturing, charging infrastructure, and supportive ecosystems. This report provides a consolidated view of realised investments between 2020–2025, identifies the investment gap, and outlines pathways to mobilise capital for the next phase of India’s electric transport transition.

IEEFA estimates a capital deployment of ~**INR2,23,119 crore (USD25.6 billion)** across three measurable nodes of India's electric transport ecosystem from 2020 to 2025. These include investments by vehicle manufacturers (original equipment manufacturers – OEMs), public subsidies and incentives and investments in public charging infrastructure. Investments in OEM manufacturing capacity accounted for the bulk of the investments during this period (Figure 1).

Figure 1: India’s electric transport investments, 2020–2025 (INR crore)*



Sources: IEEFA estimates, company financials, and budget documents.
*Notes: Figures have been rounded off. Public investments include only direct fiscal support extended through government schemes. Our estimates also exclude investments made by component manufacturers, non-fiscal incentives and capex subsidies given by states for EV manufacturing.

However, this figure represents only about **18%** of the roughly **INR12,50,000 crore (USD143.41 billion)** required to meet India’s transport electrification targets by 2030, based on publicly available projections. Mobilising the remaining **INR10,26,881 crore (USD117.82 billion)** by 2030 presents a significant challenge.

From 2020–2025, electric three-wheelers (E3Ws) had the largest share (~78%) of investments among vehicle segments, due to the segment’s maturity and the achievement of commercial-scale operations. Electric two-wheelers (E2Ws, mostly scooters), electric four-wheelers (E4Ws, mostly cars) and electric buses (e-buses) accounted for the remainder. However, investment

announcements in 2024 and 2025 revealed a marked shift in potential investments towards E4Ws, driven by rising demand for premium electric cars.

Among financing sources, internal accruals accounted for the largest share of realised EV manufacturing investment (INR1,59,701 crore/USD18.32 billion), followed by debt (INR36,738 crore/USD4.22 billion) and equity (INR6,455 crore/USD740 million). This aggregate pattern masks segment-level differences. Internal accruals dominate fragmented and incumbent-led segments, while debt and equity play a larger role in segments with greater scale, demand visibility, and firm maturity.

Government subsidies under the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) scheme and other Union- and state-level policies catalysed adoption by disbursing INR18,251 crore (USD2.09 billion) from FY2020–24. While public investments grew during the period, disbursements are below budgeted outlays due to several implementation bottlenecks.¹

Public EV charging grew rapidly (from 5,151 chargers in 2020 to 39,485 in 2025), but remains far below global benchmarks. India's charger-to-EV ratio significantly lags China, the EU, and the US. Investment in charging infrastructure from 2020–2025 accounted for only 9.6% of the INR20,600 crore (USD2.36 billion) required by 2030. Investment in EV charging faces challenges due to limited investor interest, as public EV charging remains an unproven business model, with many charging stations reporting low usage and high initial costs.

With an estimated 82% of required investments pending, India must attract diverse financing sources to mobilise capital at scale to meet the 2030 electric transport goals. Bridging the INR10,26,881 crore (USD117.82 billion) EV manufacturing and charging infrastructure investment gap in five years requires moving beyond traditional subsidy-led approaches to systemic derisking mechanisms that unlock private capital at scale.

IEEFA proposes an integrated EV financing platform bundling partial credit guarantees, residual value protection, battery-as-a-service models, and co-lending structures. Development finance institutions with existing guarantee infrastructure and bank relationships would anchor such a platform—Small Industries Development Bank of India (SIDBI) is well-positioned for the micro, small, and medium enterprises (MSME) segment (commercial two- and three-wheelers, small fleet operators), while India Infrastructure Finance Company Limited (IIFCL) could serve larger commercial and institutional buyers. Partnering with OEMs, banks, and non-banking financing companies (NBFCs), and drawing on carbon revenue streams, such a platform could unlock low-cost bank financing through comprehensive risk coverage.

¹ The analysis focuses on realised fiscal flows (actual disbursements), and therefore excludes tax forgone, which reflects revenue not collected rather than observable public expenditure.

The evolution of India's electric transport sector

India's electrified transport sector is a diverse ecosystem that includes electric vehicle (EV) manufacturers, vehicle component manufacturers (including batteries and other equipment), charging equipment manufacturers, charge point operators, electricity suppliers, vehicle sales dealers, equity investors, banks and financial institutions, and buyers (vehicle users).

The sector attracted a significant number of new entrants, especially in the two- and three-wheeler segments, as established automakers initially adopted a wait-and-watch approach. The industry was shaped by government policies—at the Union and state levels—that set targets, provided incentives for manufacturing and purchasing EVs, and mandated the use of zero-emission vehicles in certain cases.

When the Union government launched the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) scheme in April 2015, it laid the groundwork for establishing the EV industry. Subsequent launches of FAME II (in 2019), PM Electric Drive Revolution in Innovative Vehicle Enhancement (PM E-DRIVE), and several state-level EV policies (from 2017), have propelled the industry to new heights. In a previous study, IEEFA examined the impact of Union- and state-level policies on EV sales and adoption rates over a decade (2014–2023), and found that policy market multipliers ranged from 9 to 21 across vehicle segments.² This indicated that government policies catalysed much larger market creation beyond direct policy impacts.

Having established a base with reasonable sales and adoption rates, the central government started tapering purchase subsidies in April 2023.³ For instance, the purchase subsidy on electric two-wheelers (E2Ws) was reduced by 83% from INR15,000 (USD172) per kilowatt-hour (kWh) in FY2022-23 under FAME-II to INR2,500 (USD29)/kWh in 2025 under the PM E-DRIVE scheme.⁴ This indicates the government's aim to transition the industry from a subsidy-driven one to a market-led, mature industry.⁵

While the Union government has begun tapering purchase subsidies to transition the industry toward a more market-led model, the pace of maturity varies across vehicle segments. Electric scooters and three-wheelers (E3Ws) have made significant progress in terms of model availability, sales, and adoption rates, whereas commercial electric cars, electric bikes, trucks, and private buses continue to depend on policy support to scale. One way to assess whether market-led scaling is occurring is through total cost of ownership (TCO), which captures the lifetime economic competitiveness of EVs relative to conventional vehicles. Another approach, used in this report, is to track investment flows

² IEEFA. [From incentives to adoption: A decadal review of India's EV subsidy effectiveness](#). May 2025.

³ The rationale and evidence behind which was discussed in our earlier report referenced in footnote 2.

⁴ All INR to USD conversions in this report were made at the average 2025 exchange rate of 1USD = 87.16INR.

⁵ IEEFA. [PM E-DRIVE amendments: Aligning incentives with a maturing market](#). September 2025.

into the sector, as sustained private capital deployment signals confidence in long-term commercial viability.

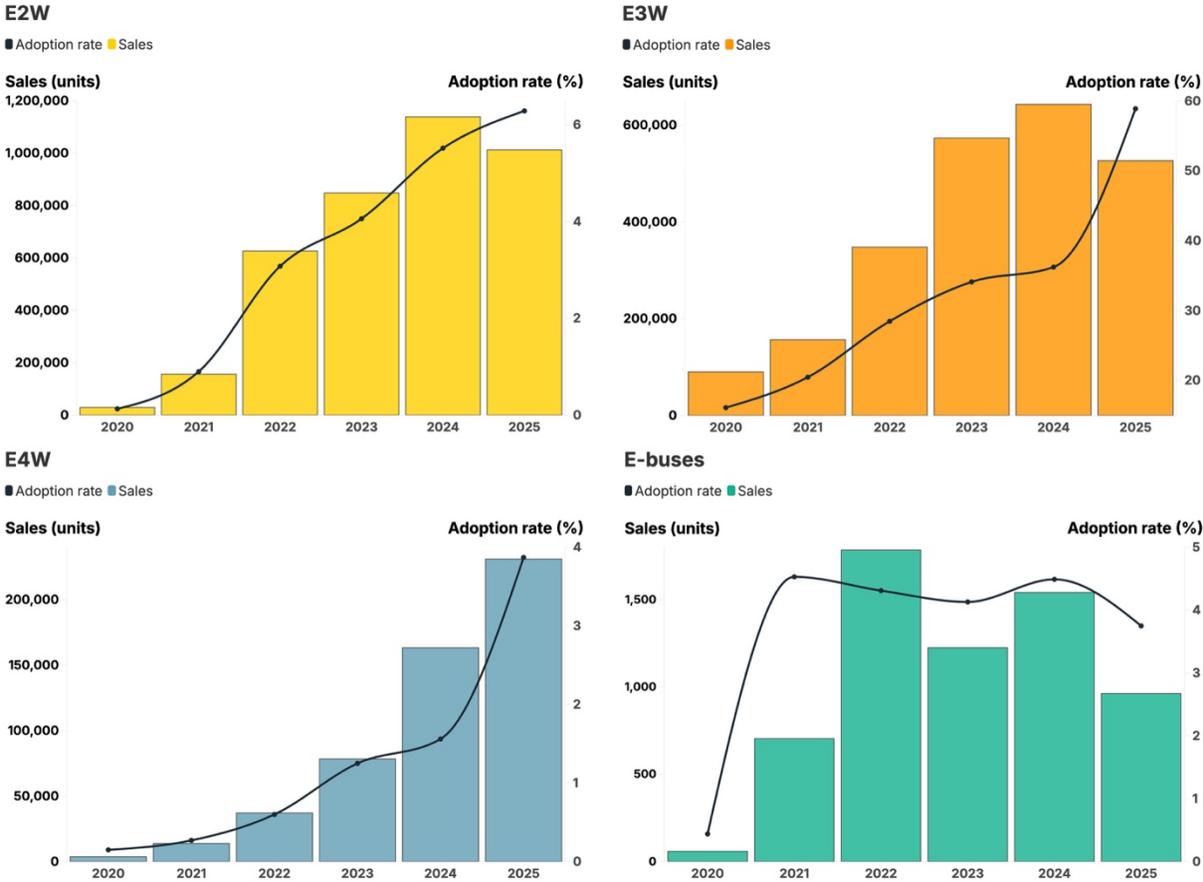
The electric transport sector investment landscape

India has a vision to increase the share of EV sales to 30% in private cars, 70% in commercial vehicles, 40% in buses, and 80% in two- and three-wheelers by 2030.⁶ Progress toward these goals has accelerated in recent years, with overall EV sales rising steadily across segments. However, adoption remains uneven, while E2Ws and E3Ws have gained meaningful traction in absolute sales term, adoption rates in most segments remained below 10% as of 2025 (Figure 2).⁷ The industry structure reflects this divergence, with E2Ws and E3Ws (passenger and cargo) dominating the market, followed by electric cars (E4Ws) and buses. Notably, E2W sales crossed the one million mark for the first time in 2024, signalling growing scale and market acceptance in the segment.

⁶ NITI Aayog-RMI. [India's electric mobility transformation](#). April 2019. Page 8.

⁷ Adoption rate is defined as the proportion of EV sales relative to total vehicle sales (across all fuel types) within a specific vehicle segment for a given year.

Figure 2: India’s EV sales and adoption rates, 2020–2025



Sources: Vahan, Government of Telangana, IEEFA (Data for 2025 until November)

While EV sales and model availability have expanded significantly, progress remains uneven. In more mature segments such as scooters and E3Ws, total cost of ownership (TCO⁸) advantages are increasingly evident, whereas in segments such as commercial four-wheelers, buses, and certain use cases, operating economics and deployment models are still evolving. Charging infrastructure is expanding rapidly, although continued investment is required to improve coverage, utilisation, and reliability at scale. Questions around battery residual value and asset performance are gradually being addressed through better data and emerging business models. At the same time, financing remains a central lever for accelerating adoption—both in terms of mobilising capital for manufacturers and infrastructure providers, and ensuring affordable credit for vehicle buyers. Strengthening these enabling conditions will be critical to sustaining momentum and achieving India’s 2030 electrification targets.

⁸ The total direct and indirect cost of acquiring and operating a vehicle over its lifetime.

Studies have estimated the required investments to achieve India's 2030 electric transport vision. The Rocky Mountains Institute (RMI) and the National Institution for Transforming India (NITI) Aayog estimated that the cumulative capital cost (2020–2030) of achieving India's weighted-average EV sales penetration of 70% in 2030 was about INR19,70,000 crore (USD266 billion) across vehicles, EV supply equipment, and batteries (including replacements).⁹ Another study by the Council on Energy, Environment and Water-Centre for Energy Finance (CEEW-CEF) estimated a cumulative investment need of INR12,50,000 crore (USD143.41 billion) for EV production and charging infrastructure development by 2030.¹⁰

Given these estimates, IEEFA's research focused on realised investments by vehicle segment and by capital source from 2020 to 2025. Primarily, our work had the following objectives:

- Historical analysis of investment flows—by vehicle segment and by investment source
- Assessing the investment gap to achieve the electric transport goals by 2030
- Identifying a way forward to attract additional capital into the electric transport sector.

Our investment estimation methodology at a glance

India's electric transport sector comprises a multi-tier value chain. Upstream, raw material suppliers and chemical producers provide inputs for battery cells, which cell and module manufacturers process into energy storage components.¹¹ Battery pack assemblers integrate these with management systems, while component manufacturers produce EV-specific parts—electric motors, power electronics, vehicle control systems—alongside conventional automotive components. OEMs integrate these into complete vehicles, sourcing from Tier-1 suppliers (integrated modules), Tier-2 suppliers (individual components), and Tier-3 suppliers (raw materials and basic parts). Downstream, dealer networks handle distribution, while charge point operators deploy public charging infrastructure. Public fiscal support flows into this ecosystem at multiple points: demand-side subsidies reduce purchase costs for buyers, while supply-side incentives support domestic manufacturing scale-up.

Our analysis focuses on nodes where capital flows can be systematically measured and verified between 2020 and 2025. These include OEM manufacturing investment, which can be extracted from audited financial statements; Union and state fiscal support, which can be tracked through budget documents and policy parameters; and public charging infrastructure, where deployment data enables estimation of hardware investment. Each is discussed in detail below.

⁹ RMI-NITI Aayog. [Mobilising finance for EVs in India](#). January 2021. Page 6.

¹⁰ CEEW-CEF. [Financing India's transition to electric vehicles](#). December 2020. Page xiii.

¹¹ CEEW-CEF. [Financing India's transition to electric vehicles](#). December 2020. Page 17.

What did we measure?

Total estimated investment comprises three components:

$$\text{Total investments} = \text{OEM} + \text{Union and state fiscal support} + \text{charging infrastructure investment}$$

OEM manufacturing investment captures private capital deployed by vehicle manufacturers to build production capacity, including assembly facilities, equipment, tooling, (research and development) R&D infrastructure, and working capital. Union fiscal support captures realised disbursements under Union government schemes, encompassing both demand-side subsidies (FAME, PM E-DRIVE, PM eBus Sewa) and supply-side production incentives (Production-Linked Incentive (PLI) scheme for automobiles and auto components). State fiscal support captures estimated disbursements under state-level EV purchase subsidy schemes. Charging infrastructure investment captures capital deployed into public charger hardware.

This framework isolates measurable investment flows at distinct points in the ecosystem: private investment in manufacturing capacity, public expenditure to stimulate both demand and domestic production, and infrastructure deployment to support vehicle adoption. The analysis focuses on realised flows—capital actually deployed and subsidies actually disbursed—rather than announced intentions or budgeted allocations. We measure manufacturing investment rather than consumer expenditure because the latter conflates production costs with margins, taxes, and dealer mark-ups, obscuring capital actually reinvested in building domestic capacity (see [Annexure I](#) for detailed discussion).

Several segments of the value chain—component suppliers, battery cell manufacturing, private charging infrastructure—fall outside this analysis due to data constraints. These exclusions are discussed in a later sub-section, “Scope and boundaries of analysis”.

Estimating OEM manufacturing investment

OEM manufacturing investment is defined as capital directed toward building EV manufacturing capacity at the OEM level: assembly facilities, production equipment, tooling, R&D infrastructure, and additional working capital required to support expanded production. Manufacturing investment directly reflects domestic capacity building, and indicates whether firms are committing capital to sustain the transition rather than responding to short-term demand signals.

The analysis draws on audited OEM financial statements from the CMIE Prowess database to measure capital expenditure and financing structure, combined with vehicle registration data from the Vahan Dashboard.^{12,13} Financial data is available for OEMs accounting for 47.3% of EV

¹² CMIE. [Prowess database](#).

¹³ Government of India. Parivahan Sewa. [Vahan Dashboard](#)

registrations during 2020–2025.¹⁴ These firms form the basis for estimating the investments of remaining 52.7% OEMs whose financials are not available in the database.

To estimate investment by manufacturers without publicly available financials, we use the investment-to-sales ratio (ISR). For each vehicle segment and year, we calculate ISR by dividing total investment by total EV sales for reporting firms. This ratio is then applied to the sales of firms without available financials in the database, to estimate their investment. The approach assumes that manufacturers in the same segment and year exhibit broadly similar investment intensity per vehicle sold.

Two adjustments account for situations where this assumption may not hold. First, new entrants typically invest heavily in facilities and equipment while generating limited initial sales, resulting in higher investment intensity than established manufacturers. For manufacturers whose first EV sales occur within the sample period, we apply a higher entry-phase ISR in their first year. Second, several OEMs—particularly in four-wheelers—produce both internal combustion engine (ICE) and electric vehicles. Attributing their entire investment to EVs would overstate EV-specific capital deployment. For these diversified manufacturers, we estimate the EV share of their business and allocate investment proportionally.

A detailed discussion of ISR construction, representative firm selection, and robustness checks is provided in [Annexure II](#). Overall, this approach ensures that we capture the realised capital commitments and helps in classifying the investment by financing source: equity, debt, and internal accruals.

Estimating public fiscal support

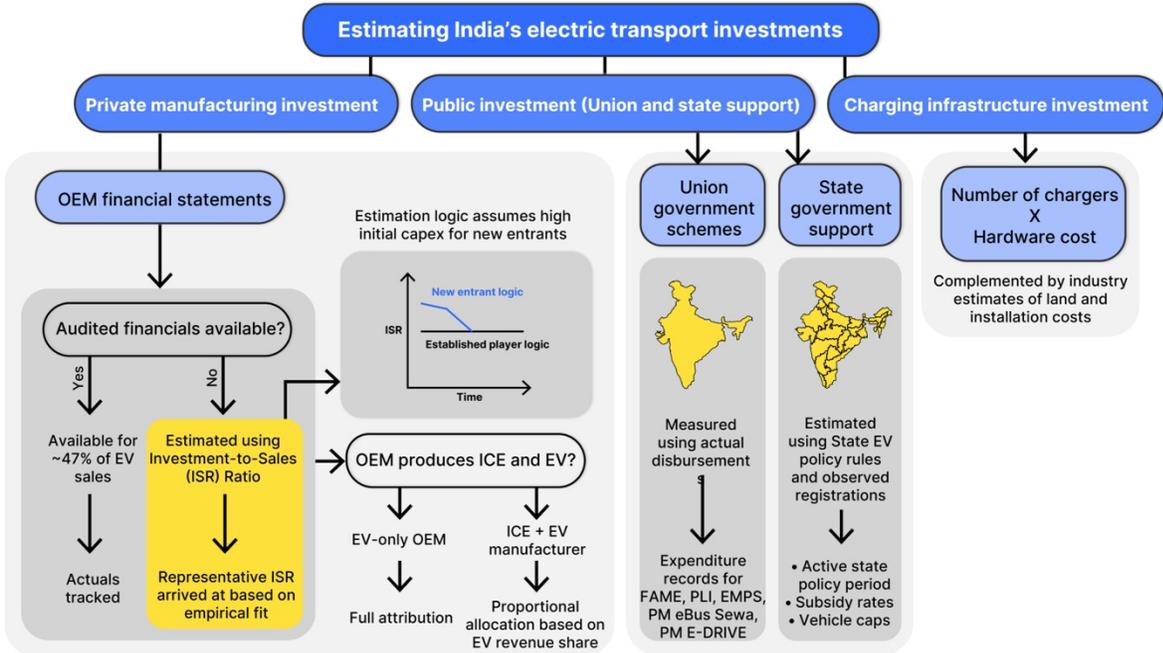
Public fiscal support is measured separately at the Union and state levels. At the Union level, we measure actual disbursements. Scheme-wise expenditure data are drawn from Union Budget documents and the Ministry of Heavy Industries' Demand for Grants, ensuring that estimates reflect realised fiscal outflows under programmes such as FAME, PLI, PM eBus Sewa, PM E-DRIVE etc. At the state level, disbursement data are not consistently disclosed. We therefore estimate realised support under state EV purchase-subsidy schemes using a rule-based methodology. This involves mapping policy parameters, such as per-kWh subsidy rates, per-vehicle caps, battery size assumptions, and cumulative eligibility limits, to observed EV registration data to estimate the subsidy amount that would have been disbursed under each policy regime. A detailed description of this methodology is provided in [Annexure II](#). Figure 3 below outlines the components and methodology used in our study.

¹⁴ Our universe of OEMs comes from the OEMs covered in Vahan Dashboard.

Estimating EV charging infrastructure investments

We estimated public EV charging investment using a deployment-based proxy, as firm-level financials lack charger-specific capital expenditure (capex) detail. Our methodology compiles observed annual public charger additions from administrative sources, disaggregates into slow (AC/sub-10kW) and fast (DC Bharat/ combined charging systems [CCS]) categories by technology share, and holds deployment numbers fixed across scenarios to reflect actual rollout.

Figure 3: Estimating India’s electric transport investments



Source: IEEFA

Three scenarios—conservative (slow-charger heavy), base (balanced), aggressive (fast-charger heavy)—assign plausible power-band mixes without changing charger counts. Investment is then calculated by multiplying chargers per category/power band by per-charger hardware capex benchmarks from public procurement data (Government e-Marketplace [GeM], manufacturers), capturing only hardware costs and excluding installation, grid upgrades, land, financing, software, operations and maintenance, and subsidies as a conservative lower bound. To arrive at a more comprehensive investment figure for the total investments, we added a ballpark mark-up for installation and set-up costs as available in the public domain.

Scope and boundaries of the analysis

Several segments of the EV value chain fall outside this analysis. Component suppliers—tier-2 and tier-3 manufacturers producing motors, power electronics, wiring harnesses, and other parts—rarely publish financials. Where they do, the detail needed to isolate EV-specific investment is typically unavailable; for instance, a power electronics manufacturer supplying both ICE and EV drivetrains does not break out capex by end-use. Battery cell manufacturing is excluded for different reasons: India's domestic cell production remains nascent, and PLI-Advanced Chemistry Cells (ACC) disbursements during the study period have been minimal.

On the infrastructure side, private charging—home chargers, workplace installations, and captive fleet depots—is excluded due to absence of systematic data. No registry tracks residential or commercial charging equipment purchases.

On the fiscal side, state support for EV manufacturing and non-fiscal incentives such as land subsidies, electricity tariff concessions, and stamp duty waivers are acknowledged but not quantified. Disclosure practices vary widely across states, and EV-specific allocations are difficult to isolate from broader industrial promotion budgets.

These boundaries mean the figures presented here represent a conservative lower bound of capital flowing into the sector. Investment by component suppliers, emerging battery cell manufacturers, private charging deployments, and state-level manufacturing incentives would add to these totals but cannot currently be measured with confidence through our methodology.

Supplementary analysis: Announced investments

Publicly announced investments were incorporated as a supplementary source of market intelligence and forward-looking analysis, rather than as a substitute for realised investment estimates. These announcements were identified through a systematic, technology-enabled media review pipeline that used natural language processing (NLP) and contextual classification techniques to scan, filter, and categorise EV-related investment activity across diverse business and financial sources. While such announcements do not provide reliable information on timing or disbursement, they help surface emerging segments, shifts in investor focus, and planned capacity expansion not yet visible in audited disclosures. A detailed description of this methodology is provided in [Annexure II](#).

Major observations

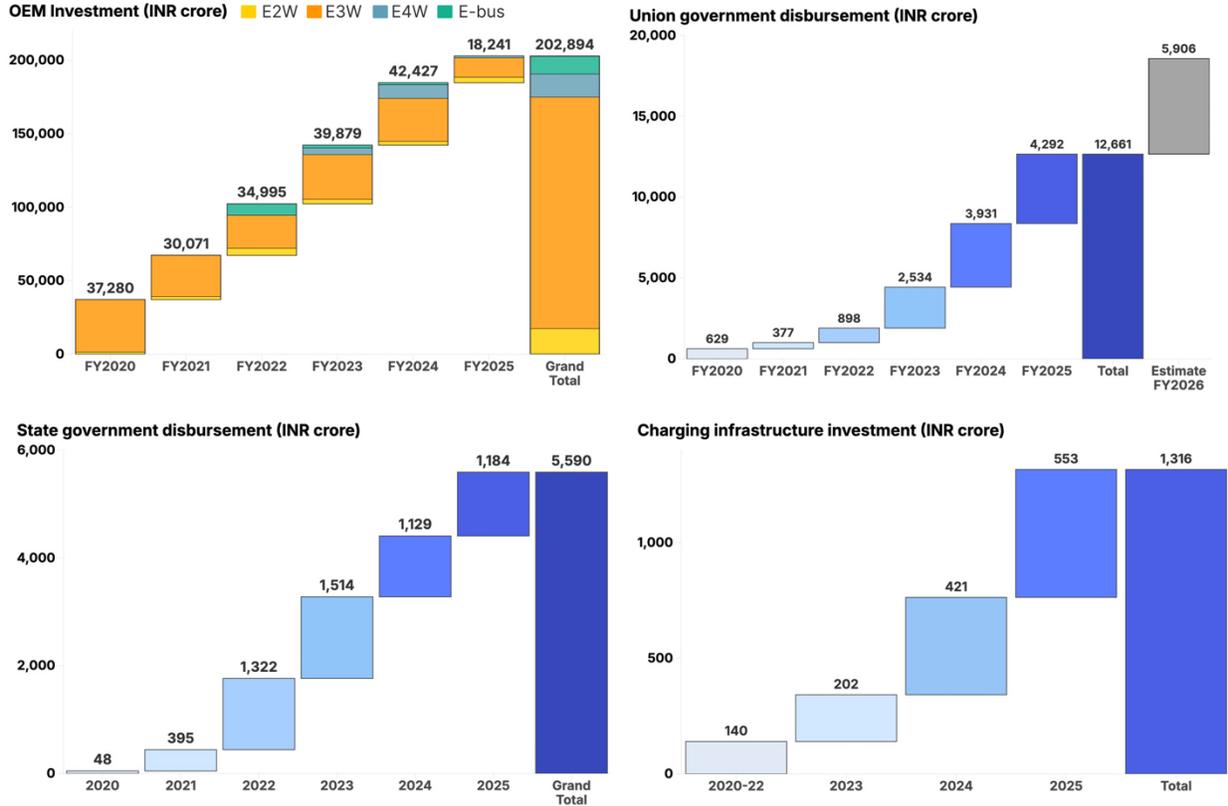
OEM investments moderate to capitalise on established capacities, while charging infrastructure investments continue to rise

India's EV manufacturing story began with investments in the E2W and E3W segments, with the introduction of support schemes such as FAME by the Union government and subsequent state-level subsidies starting in 2017. We note the majority of investments in these two segments, and to an

extent in the electric bus segment, happened before FY2021, when manufacturers, buoyed by policy support and signals, invested in capacity. Post FY2021, OEMs may have aimed to increase sales to improve utilisation of their nameplate capacity. For instance, while sales of E2Ws crossed the one million mark in 2024, established manufacturers, such as Ola Electric and Ather Energy, have installed capacities of two million and 420,000 vehicles a year, respectively.^{15,16} The situation is similar in the E3W segment, while capacity is gradually ramping up in the electric bus and car segments.

From FY2020–25, IEEFA estimates OEM investments across vehicle segments declined at a compound annual growth rate (CAGR) of -13%, from INR37,280 crore (USD4.3 billion) to INR18,241 crore (USD2.1 billion) (Figure 4). We do not see this moderation as a structural weakness rather it should be interpreted in the context of the sector’s investment cycle, substantial capacity expansion had occurred in the preceding years, and the subsequent period likely reflects a shift toward utilisation and scaling of existing facilities rather than continuous greenfield expansion.

Figure 4: Annual investments in the electric transport sector



Sources: Company financials, budget documents, IEEFA

¹⁵ EPC World News. [Ola to build electric vehicle hub in Tamil Nadu](#). 20 February 2023.
¹⁶ Energetica India. [Ather Energy crosses 5 lakh electric scooter production milestone at its Hosur plant](#). 7 October 2025.

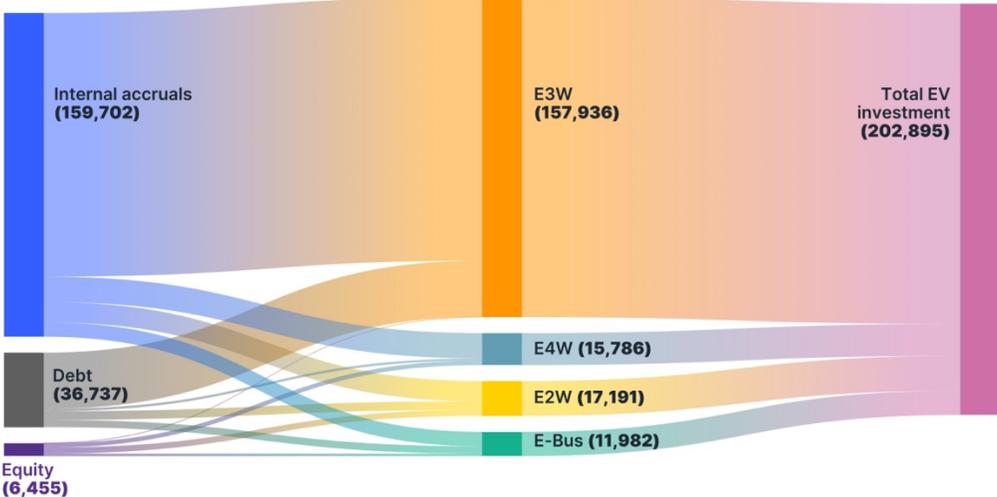
Union and state government subsidy disbursements in the form of purchase incentives increased over the years, peaking in FY2024 and moderating in FY2025 as incentives tapered. This number will continue to moderate as purchase incentives may be available only for certain vehicle segments, such as buses and trucks, while other segments will be largely driven by supply-side mandates.

Our estimates of EV charging investments grew from about INR140.3 crore from 2020–2022 (cumulative for three years) to INR552.7 crore in 2025, at a CAGR of 32%.¹⁷ This upward trajectory reflects accelerating charger deployment and sustained policy emphasis on expanding public charging networks. Despite this growth, India’s public charger-to-EV ratio remains significantly below that of leading global markets, indicating that continued investment will be required to support higher levels of electrification in the future.

E3Ws attract greatest investment

Nearly 78% of estimated OEM investments from 2020–2025 were in the **E3W** segment (Figure 5). This was driven by the cumulative effect of manufacturing activity across a very large and fragmented OEM base, with more than 800 registered OEMs appearing on the Vahan dashboard. Unlike more consolidated vehicle categories, E3W manufacturing capacity has been built by a large number of small and mid-sized firms, each investing independently in assembly lines, tooling, and working capital. In such a fragmented market structure, fixed investments are replicated across many producers rather than consolidated within a few large firms. As a result, even modest firm-level capex, when aggregated across hundreds of active manufacturers over multiple years, translates into a dominant share of total realised manufacturing investment.

Figure 5: EV manufacturing investments, FY2020–25 (INR crore)



Sources: IEEFA, company financials

¹⁷ Annual break-up of chargers installed during the years 2020–2022 is not available. Hence, a consolidated investment number is estimated for the period. However, for calculating CAGR we have considered the period as five years starting from 2020.

This concentration is consistent with the broader pattern documented in IEEFA's earlier EV policy effectiveness analysis, which shows India's EV transition has progressed unevenly across segments, reflecting differences in market maturity, operating economics, and structural barriers.¹⁸

E3Ws dominate total investment also because the segment has reached commercial scale and sustained momentum, as evidenced in our earlier report. The E3W passenger segment was strongly catalysed during FAME-I and continued to expand, with a diminishing reliance on purchase incentives as the market matured, supported by TCO advantages and local regulatory measures. Separately, the E3W cargo segment's growth is strongly linked to operational cost advantages and to the complementary role of state-level policy support in certain use cases.¹⁹ It is also important to note that India is one of the world's top exporters of E3Ws.²⁰ Together, these dynamics help explain why the manufacturing ecosystem and capital deployment are most concentrated in E3Ws over the 2020–2025 window.



The E3W segment attracted the highest investment during 2020–2025, as it was the first to exhibit market maturity and a proven lower total cost of ownership.

E2Ws account for a smaller share of cumulative manufacturing investment despite being a high-volume segment, which is best understood in light of the segment's structural dynamics. While FAME-II played a significant role in catalysing sales growth, E2Ws still represented a modest share of the overall two-wheeler market by the end of 2023.²¹ This indicates that although sales volumes have increased, the segment has not yet reached the scale that would require continuous, large-scale capacity expansion. Moreover, much of the initial manufacturing infrastructure was established earlier in the 2020s, and subsequent growth has often been accommodated through better utilisation of existing capacity rather than fresh capex each year. As a result, strong sales growth does not automatically translate into proportionate increases in reported manufacturing investment.

E4Ws and **e-buses** appear smaller in the consolidated totals for two complementary reasons. Structurally, these segments have faced slower diffusion and higher barriers. For e-buses, IEEFA's earlier analysis found no statistically significant positive effect of Union or state policies on sales and

¹⁸ IEEFA. *From incentives to adoption: A decadal review of India's EV subsidy effectiveness*. May 2025.

¹⁹ In our previous study, the regression results showed that for every 1% decrease in the operating cost of the cargo segment the sales increased by 0.6% while the adoption rates increased by 0.2%

²⁰ Based on shipment-level export data compiled by [Volza](#) from customs filings and bills of lading, India ranks as the second-largest exporter of electric three-wheelers globally.

²¹ It is important to note that India's overall two-wheeler market is predominantly composed of motorcycles, whereas electric two-wheelers are concentrated in the scooter segment, with electric motorcycle models gaining traction only more recently.

adoption rates from 2020 to 2025.²² In addition, early e-bus deployment under FAME-II prioritised rapid scale-up through aggregated tenders, often over operational learning and system maturation. First-generation e-buses have faced reliability, battery degradation, and maintenance challenges, compounded by fragmented control across OEMs, central aggregators, and financially constrained state transport undertakings (STUs).²³ These factors have limited organic market depth, weakened feedback loops between operators and manufacturers, and dampened private investment signals despite substantial public procurement volumes. For commercial E4Ws, policy support (including FAME-II and production-linked incentives) has driven growth, but the segment remains a promising frontier competing with well-established alternatives (notably CNG) and sensitive to subsidy levels.²⁴

Methodologically, the consolidated totals for E4Ws (and, in some cases, e-buses) can also be affected by portfolio attribution choices for diversified OEMs which also produce ICE vehicles, where EV investment is not assumed to equal total OEM investment and is scaled conservatively using EV shares. Figure 5 captures EV-attributable manufacturing investment rather than total automotive capex for diversified incumbents. This proportional attribution approach is also a reason these segments may appear smaller in aggregate, even when underlying corporate investment activity is substantial but largely directed toward non-EV manufacturing platforms.

Internal accruals are the biggest source of capital on aggregate, but the proportion of sources of capital varies across segments

At the aggregate level, internal accruals account for the largest share of EV manufacturing investment, amounting to INR159,701 crore (USD18.32 billion), compared with INR36,738 crore (USD4.22 billion) from debt and INR6,455 crore (USD740 million) from equity (Figure 5).²⁵ This headline composition reflects the mix of firms captured in the dataset and the ISR-based allocation framework used in the analysis, rather than the financing strategy of any individual OEM. However, the headline composition alone obscures variation across vehicle segments. Financing structures differ sharply by segment, reflecting differences in market maturity, firm structure, revenue visibility, and lender and investor risk perception, rather than a uniform constraint on external capital.

E2Ws present the most balanced profile: 30% equity, 37% debt, and 33% internal accruals. This is characteristic of a segment where OEMs have achieved production scale, repeat sales, and operational stability. As E2W manufacturers expanded output and built track records, lenders could observe cash flow and working capital cycles, enabling a gradual expansion of balance sheet lending

²² The lack of statistical significance in the e-bus segment is primarily attributable to methodological and structural factors. Methodologically, adoption was driven by aggregated public procurement tenders (specifically the Gross Cost Contract model) rather than organic market decisions, which resulted in registrations that correlated weakly with the unit-level price signals used in our regression models. Structurally, these incentives were largely restricted to State Transport Undertakings (STUs), which comprise less than 7% of India's total bus fleet, leaving 93% of the market largely unaffected by policy mechanisms.

²³ The Ken. [14,000 stalled e-buses. How many agencies does it take to fix them?](#) 7 January 2026.

²⁴ IEEFA's previous [study](#) found that the FAME-II subsidy generated a 21x market multiplier effect in the E4W segment, underscoring its strong responsiveness to demand-side incentives.

²⁵ Internal accruals include operational cash flows, retained earnings, and working capital releases.

to OEMs. Equity investment, in turn, followed visible scale-up and business model validation. The resulting financing mix reflects a reinforcing dynamic in which manufacturing scale improves firm-level creditworthiness, which in turn broadens access to external capital and supports further capacity expansion.

E3Ws relied heavily on internal accruals (81%), with limited debt (19%) and negligible equity at the manufacturer level. This reflects structural constraints rather than choice per se: the sector, as we discussed earlier, is fragmented, dominated by small and mid-sized OEMs lacking scale, collateral, and governance depth to access institutional finance. Policy uncertainty around deployment and technology has further dampened investor appetite. Yet demand remains strong; E3Ws were among India's first EVs to scale, driven by commercial use, favourable economics, and annual growth exceeding 40% even as subsidies declined, relying on organic demand.²⁶ Manufacturers have thus pursued incremental, cash-funded expansion, using retained earnings and short-term credit. With production dispersed across many small firms, lenders assess risk on fragmented balance sheets rather than sector-wide performance, keeping internal accruals as the primary financing channel and debt as a complement, despite robust market demand.

E4Ws are predominantly financed through internal accruals, accounting for ~70% of investment, with debt ~23%, and equity ~7%. This pattern likely reflects the dominance of incumbent automotive OEMs, which are transitioning from internal combustion engine platforms to electric models. For these companies, EV manufacturing investment is primarily a strategic redeployment of internal capital rather than an externally financed expansion. Strong parent balance sheets enable OEMs to self-fund early EV capacity while selectively using debt for working capital and tooling. The limited role of equity naturally reflects the incumbent-led nature of E4W manufacturing from 2020 to 2025, rather than a lack of external interest.

E-buses exhibit a distinct yet economically coherent financing structure: 15% equity, 42% debt, and 44% internal accruals. The relatively high debt share reflects the bankability of e-bus manufacturing in India, where most e-buses are supplied under medium-term (~12 year) procurement contracts with STUs.²⁷ These contracts provide OEMs with assured offtake and predictable revenue visibility, materially reducing demand risk at the manufacturer level. Lenders can therefore underwrite working-capital and capex exposure against confirmed government orders rather than speculative market demand. This, in turn, supports a larger role for debt despite high unit costs and longer production cycles. Equity plays a more targeted role, supporting upfront investments in tooling, assembly lines, and execution capacity, particularly for newer entrants and firms expanding dedicated e-bus platforms. Internal accruals remain significant because a large share of electric bus

²⁶ IEEFA. [From incentives to adoption: A decadal review of India's EV subsidy effectiveness](#). May 2025.

²⁷ This financing structure is reinforced by continued reliance on public procurement in the e-bus segment. The FY2026–27 budget reiterates this role by announcing the procurement of 4,000 e-buses under the Purvodaya regional development focus. Such medium- to long-term procurement programmes by state and central agencies provide assured demand visibility, underpinning the bankability of e-bus manufacturing and sustaining the prominence of debt financing in this segment.

manufacturing is undertaken by established vehicle manufacturers, which can fund EV expansion partly through retained earnings from their legacy internal combustion engine operations.

These patterns underscore a central insight—manufacturer-side financing structures evolve endogenously with scale, visibility, and institutional learning. The E2W segment illustrates how sustained growth and operating track record at the OEM level can trigger a virtuous cycle, in which improved risk perception expands access to debt and attracts equity, reducing exclusive reliance on internal accruals. In contrast, E3Ws remain constrained by fragmentation and limited financial intermediation. The aggregate dominance of internal accruals should therefore be interpreted as a snapshot of EV manufacturing segments at different stages of financial maturity, rather than a structural limitation of capital availability to the sector.

A useful way to read Figure 5 is therefore not as a definitive capital market story, but as an integrated snapshot of where investment has concentrated by segment, and how the sector's observed and inferred investment has been financed in aggregate, given available disclosures and the ISR-based estimation architecture.

A formidable gap persists in public EV charging infrastructure

India's public EV charging landscape evolved rapidly in the first half of the 2020s, especially from 2020–2022 and in 2025, when the number of chargers grew at a CAGR of ~33%, increasing from 5,151 to 39,485 (Table 1). The early phase (2020–2021) of charger installations was largely policy-driven and carried out by oil marketing companies (OMCs), such as Indian Oil, Hindustan Petroleum, and Bharat Petroleum, a few power distribution companies (e.g., BSES), and a handful of private companies (e.g., Tata Power and Ather Energy). However, by 2024 and 2025, several private charging point operators (CPOs) had entered the field, joining the OMCs and vehicle manufacturer-linked charging networks. In 2026, a wide variety of CPOs exist: standalone and with convenience stores, manned and unmanned, in cities and on highways.

Table 1: Number of public EV chargers in India

	2020-22	2023	2024	2025	2030 target
Public charging stations	5,151	11,903	25,202	39,485	1,320,000

Sources: IEEFA, Confederation of Indian Industry, The Energy and Resources Institute

Nevertheless, given the growing number of sales across EV segments and their expanding use cases, public charger installations have fallen short of expected levels. India's public charger-to-EV

ratio of 1:235 is far lower than China's (1: ~1.5–3), the EU (1:6–11), and the US (1:15–25).^{28,29,30,31} To achieve a 1:40 ratio, India will need 1.32 million chargers by 2030, according to industry estimates.³²

Based on the number of installations, IEEFA estimates EV charging infrastructure could have attracted investment worth INR1,037 crore–1,316 crore (USD120 million–150 million) from 2020–2025, excluding land and upstream power infrastructure.³³ This is a conservative, hardware-focused estimate that excludes land, upstream power infrastructure, and installation costs. Installation and setup costs, including connection charges and land lease, can add up to 20-50% to the cost of a public charging station.³⁴ Adding the numbers at the top of the range of our estimate, India's investment in public charging infrastructure would likely be ~INR1,974 crore (USD230 million) from 2020 to 2025. This is just 9.6% of the total required investment of INR20,600 crore (USD2.36 billion) by 2030, as estimated by CEEW-CEF.

Investments in EV charging are hindered by weak investor appetite, as public EV charging remains an unproven business model, with many charging stations experiencing low utilisation and high upfront costs among other structural issues.³⁵ Charging infrastructure expansion is also hindered by delays in site acquisition and grid connections. The siting of charge points is crucial to achieve reasonable utilisation rates, and good sites are limited to prime locations in urban areas. Further, distribution grids in semi-urban and rural areas require infrastructure upgrades to support fast chargers.



The public EV charging market is still evolving, with structural unknowns limiting the pace of capital deployment.

While patient capital flowed into the CPO business from 2020–2025, with the expectation of break-even in about five years, attracting the next level of investment requires proven business models for expansion.

²⁸ Institute for Transportation and Development Policy. [Accelerating charging infrastructure for India's electric future](#). 11 November 2025.

²⁹ Duevolt. [China EV Charging Station Market Analysis - Jun 2024](#). July 2024.

³⁰ Statzon. [Navigating Europe's EV Charging Expansion](#). March 2025.

³¹ Pew Research. [Electric vehicle charging infrastructure in the U.S.](#) May 2024.

³² Confederation of Indian Industry. [Roadmap for future mobility 2030](#). 25 July 2023.

³³ This estimate is derived using a deployment-based proxy methodology that infers EV charging infrastructure investment from observed public charger additions, disaggregated by charger type (slow AC, Bharat DC001, and CCS fast chargers) and applied to hardware capex benchmarks. Hardware cost is used as the basis for this estimate as it is the most consistently trackable component across installations. Alternative scenarios are constructed to reflect plausible charger-type and power-band configurations for the same observed deployment, yielding an investment range rather than a point estimate. See [Annexure II](#) for more details.

³⁴ CEEW-CEF. [Financing India's transition to electric vehicles](#). December 2020. Pg: 27.

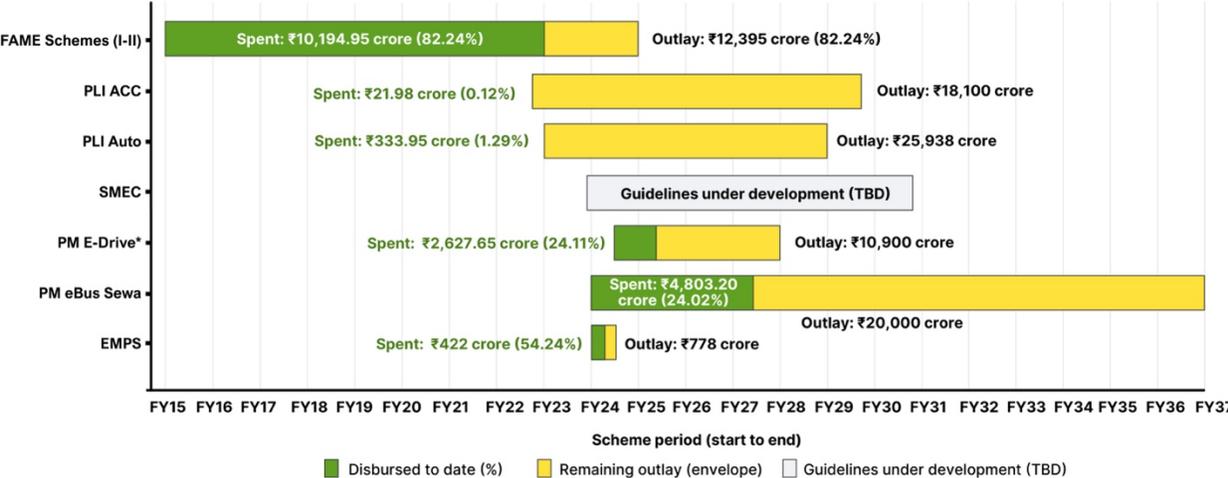
³⁵ IEEFA. [Upgrading India's Public EV Charging Experience](#). September 2024.

Public investments rise, but localisation challenges limit disbursements

Public fiscal support for India’s electric transport transition is channelled through both Union and state governments, spanning demand-side purchase incentives, supply-side manufacturing support, and targeted programmes for e-bus deployment. In this analysis, Union government support is measured using scheme-wise outlays and disbursements reported in official budget documents and Demand for Grants. State support is captured through a policy rule-based estimate of purchase subsidies linked to observed vehicle registrations. State support for EV manufacturing and broader industrial incentives are acknowledged but not included due to limited disclosure and the difficulty of isolating EV-specific spending within broader industrial promotion budgets.

The Union government’s disbursements steadily increased following the introduction of the FAME-I scheme and rose sharply from INR377 crore (USD40 million) in FY2021 to a high of INR4,292 crore (USD490 million) in FY2025, when several schemes took effect. By FY2025, Union government investments amounted to INR12,661 crore (USD1.45 billion).

Figure 6: Union government EV support schemes—outlays vs disbursements



Sources: IEEFA; *Notes: PM E-Drive is a fund-limited scheme and is co-terminus with the exhaustion of the allocated fund: green fill shows cumulative disbursements to date as a share of total outlay, stock depiction, not a spend schedule.

While public investments in the electric transport sector have increased steadily, disbursements have lagged budgeted outlays across several schemes, a gap that should be interpreted primarily as a function of scheme design and sequencing rather than weak policy intent (Figure 6). Demand-side schemes such as FAME-I and II achieved relatively higher utilisation, disbursing about INR9,465 crore (USD1.09 billion) (about 76% of the budgeted INR12,395 crore [USD1.42 billion]) during their programme period. Newer supply-side schemes have shown lower utilisation due to their conditional, milestone-based structures. In particular, public support under the PLI framework is explicitly tied to localisation and production outcomes, which delays disbursements in the early years.

Within this, the PLI Auto scheme is beginning to show traction as firms meet localisation thresholds and scale up manufacturing, suggesting disbursements are likely to accelerate in coming years. The PLI ACC scheme has faced deeper structural challenges due to high entry thresholds and heavily back-loaded incentives. Overall, the observed disbursement gaps largely reflect the time required for domestic supply chains and localisation to materialise, rather than an absence of public investment commitment.

Disbursement dynamics across schemes reflect a combination of regulatory design features and implementation realities. Under FAME, stricter localisation norms and enhanced compliance monitoring influenced the pace of subsidy release, alongside softer demand in segments such as E4Ws and buses. Under the PLI framework, incentive payouts are inherently deferred due to domestic content requirements and production-linked thresholds, meaning that fiscal outflows materialise only as firms achieve scale and localisation milestones. These patterns underscore that disbursement timing is embedded within policy architecture and market evolution, rather than indicative of diminished public commitment.

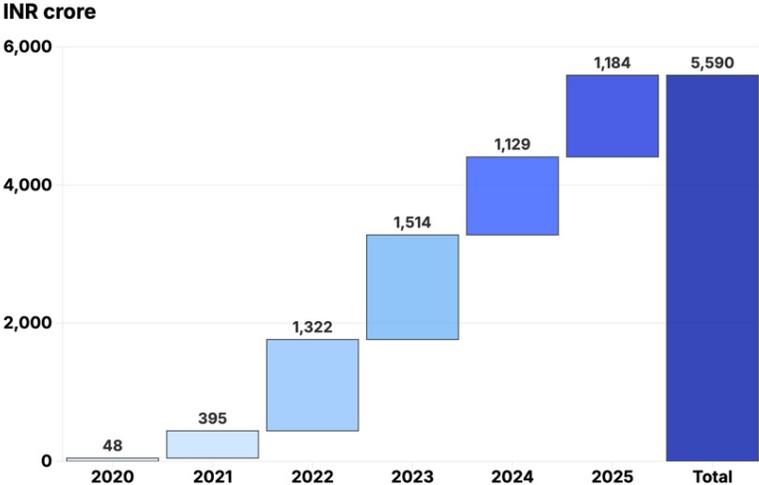


Public investments increased over time, but disbursements are below planned outlays due to implementation bottlenecks.

More recently, disbursements under the PM eBus Sewa and PM E-DRIVE schemes have been affected by the structural realities of e-bus deployment. Public e-bus procurement remains heavily centralised and routed through aggregating agencies, while day-to-day operations fall on financially stressed state transport undertakings. As documented in early fleet experience, reliability issues, battery degradation concerns, and fragmented responsibility across OEMs, aggregators, and operators have slowed deployment and raised operational risk.³⁶ These factors have reduced the pace at which sanctioned buses become fully operational, delaying performance-linked payments under PM eBus Sewa and milestone-based disbursements under PM E-DRIVE. Inadequate charging infrastructure and procurement, and contracting bottlenecks further compound these challenges, widening the gap between announced outlays and realised expenditure.

³⁶ The Ken. [14,000 stalled e-buses. How many agencies does it take to fix them?](#) 7 January 2026.

Figure 7: State EV purchase subsidy disbursements (estimated)



Sources: IEEFA, Vahan dashboard

State governments have also been notifying EV support policies since 2017, and by 2024, almost all states in India had subsidies for EV manufacturing, the purchase of EVs, or waivers on road tax and registration charges, or a combination. While state government subsidies and incentives for EV manufacturing are not disclosed, IEEFA estimates of purchase subsidies show a rising trend from about INR48 crore (USD10 million) in 2020 to INR1,184 crore (USD140 million) by 2025, a 25-fold increase in annual disbursements (Figure 7). These figures should be read as an indicator of realised demand-side fiscal support, not as a comprehensive measure of total state spending on the EV transition.

Supplementary analysis: Investment announcements indicate a shift towards E4Ws

While realised EV manufacturing investments from 2020–2025 reflect the structure and maturity of segments that scaled earlier, recent investment announcements provide a signal of where the next phase of capacity expansion will occur.³⁷ Unlike realised investments, which are captured through audited financials and ISR-based allocation, announced investments reflect stated intent and strategic positioning, and are not incorporated into our realised investment estimates, which we presented earlier.

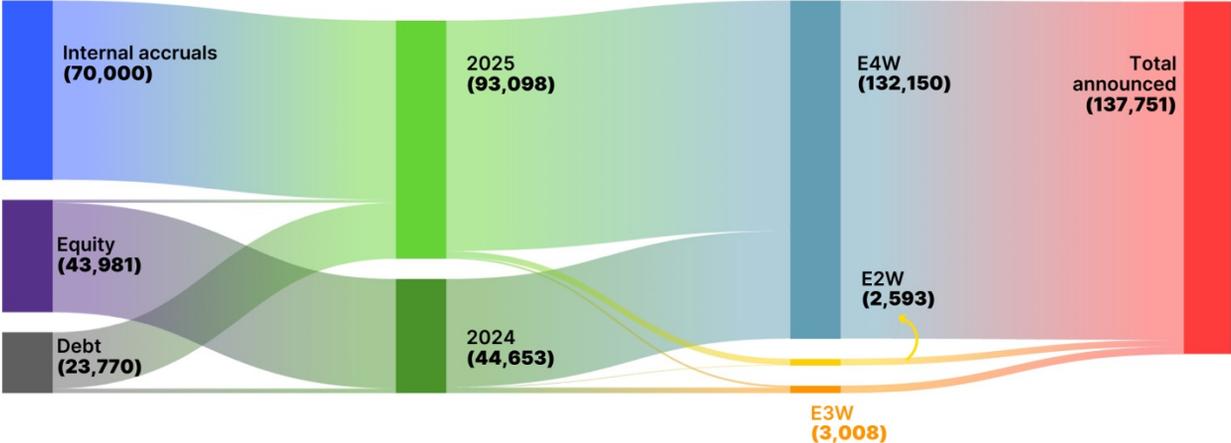
³⁷ Investment announcements reflect manufacturing projects that have moved beyond expressions of interest to advanced commitment, such as public disclosure of investment size, project location, technology scope, or initiation of land acquisition, supplier contracting, or financing arrangements. These investments are categorised by year, and mapped to EV segments based on the intended end-use of capacity. Figure 7 should be read as a flow of announced manufacturing capital from announcement year to EV segment, illustrating how investment intent is distributed across segments and over time, and how these flows aggregate into total announced investment. The figure does not represent realised capex, nor does it imply that all announced investments will be executed on the stated timeline.

An examination of mature investment announcements in 2024 and 2025 reveals increased investment intent toward E4Ws. Of the total announced investment during this period, ~INR132,150 crore (USD15.16 billion) are directed toward E4W manufacturing, compared to INR2,593 crore (USD300 million) for E2Ws and INR3,008 crore (USD350 million) for E3Ws (Figure 8). This contrasts with the realised investment pattern over 2020–2025, when E3Ws accounted for a large share of cumulative manufacturing investment, reflecting their earlier commercialisation and faster scale-up.

The difference between realised and announced investment patterns underscores the role of timing and market sequencing. Historically, E4W manufacturing faced multiple constraints, including high upfront capital requirements, limited model availability, uncertain demand, range anxiety among consumers and slower adoption relative to other segments. These factors curtailed large-scale manufacturing investment from 2020–2025, even as other segments absorbed capital more rapidly. As a result, realised E4W investment remained comparatively modest during this period. These constraints appear to be easing.

The clustering of announced investments in 2024 (INR44,653 crore/USD5.12 billion) and especially 2025 (INR93,098 crore/USD10.68 billion) coincides with a rapid expansion in E4W model offerings, the entry of new domestic and international players, and a broader push toward platform-based manufacturing strategies. Moreover, 2025 data shows a momentum shift in E4W sales towards the premium car/SUV segment, as electric cars emerge as the preferred second-car choice.³⁸ In this sense, Figure 8 captures the transition of E4Ws into a capital-intensive build-out phase, even if realised investments have yet to fully reflect this shift.

Figure 8: EV manufacturing investment announcements, 2024–2025 (INR crore)



Sources: IEEFA, news articles and company press releases

³⁸ JATO Dynamics. [Range over price: India’s EV market pivots to premium in H1 2025](#). 25 September 2025.

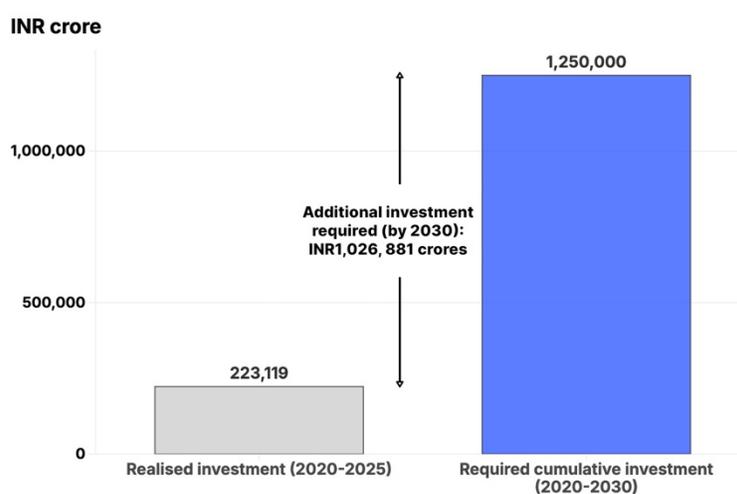
Most EV sector investments are yet to be realised in the decade

While India's transition to electric transport has accelerated, it has a long way to go in both sales and investment. IEEFA estimates of investments in EV manufacturing, government subsidies and incentives, and EV charging infrastructure from 2020–2025 amount to ~INR223,119 crore (USD25.6 billion). These estimates are conservative, as they do not include investments by vehicle component manufacturers, state capital subsidies to EV manufacturers, and non-fiscal state incentives.³⁹

Nevertheless, IEEFA's estimate amounts to just 18% of the INR12,50,000 crore (USD143.41 billion) in investment estimated by CEEW-CEF to achieve India's electric transport goals by 2030. While India is halfway through the decade, it has a mammoth task to mobilise 82% (INR10,26,881 crore/USD117.82 billion) of the required investments by 2030 (Figure 9).

Although our estimates are conservative, the large gap between the realised and required investments indicates the scale of the challenge ahead. Since 2020, India has recovered from a COVID-induced economic slowdown and major disruptions to global supply chains, to launch a nascent industry with policy support, finetuned to suit changing market conditions. In this period, innovation spawned new automobile and component manufacturing companies, and traditional auto makers adopted new EV strategies.

Figure 9: Electric transport realised vs required investments, 2020–2030



Sources: IEEFA, CEEW-CEF

Nevertheless, the industry also faced several challenges during this time. Lack of established supply chains, new and evolving battery technologies, limited historical vehicle performance data, and the

³⁹ For more detail on the challenges in estimating the investments, see [Annexure I](#).

high upfront cost of vehicles led to high-risk perceptions among buyers and investors. High dependency on policy support also made the industry vulnerable to shifts in budgetary priorities.

Yet even as government fiscal support tapers, market-driven factors should drive growth in established vehicle segments. However, given the large investment gap, innovative measures must be introduced to reduce risk and attract additional capital at a reasonable cost. Government support may still be needed, in the form of incentives and mandates, to drive electrification across vehicle segments, especially in lagging segments and vehicle types such as motorcycles, trucks, and buses.

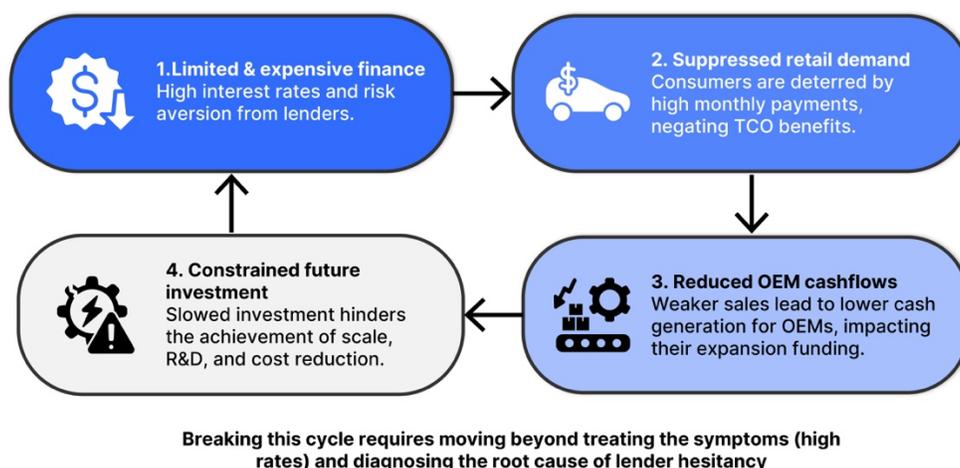
Closing the investment gap: Pathways forward

IEEFA's analysis of INR2,23,119 crore (USD25.6 billion) in realised investment in the electric transport sector from 2020 to 2025 indicates that the EV manufacturing sector is predominantly financed through internal accruals (73%). This also reflects that manufacturers are scaling existing production capacity in response to demonstrated market demand. The remaining 82% of the required capital (INR10,26,881 crore/USD117.82 billion) by 2030 cannot be funded solely through internal accruals. More critically, manufacturing economics depend on scale: unit costs decline substantially with volume, requiring sustained high-volume demand to justify large capacity investments. This creates an investment-demand sequencing challenge: manufacturers need demonstrated demand to commit capital primarily raised through external sources, yet demand realisation depends on factors beyond vehicle pricing and availability, particularly the cost and accessibility of loans by commercial segment borrowers across the EV segment (Figure 10Figure 11). This is evident from commercial financing rates of 15–21% from banks and 18–33% from NBFCs.⁴⁰

This creates a self-reinforcing dynamic: limited access to affordable finance dampens demand, which in turn slows capacity expansion. Slower scale and reduced cash-flow visibility reinforce lender risk perceptions, keeping the cost of capital elevated. Breaking this cycle does not require large-scale subsidies but targeted interventions that reduce uncertainty about asset performance, residual values, and cash-flow stability. Strengthening consumer and fleet financing, therefore, emerges as a critical lever to convert India's policy-driven electric mobility transition into a self-sustaining investment cycle.

⁴⁰ Government of India. NITI Aayog. [Financing Options](#). Accessed on 27 January 2026.

Figure 10: The vicious cycle of finance, investment and demand stalling EV adoption



Source: IEEFA

Why traditional auto finance breaks down for EVs

India's auto-lending market is well established, serving both personal and commercial borrowers. The key lending institutions include Scheduled Commercial Banks (SCBs) and NBFCs—many of which are new fintech companies—each serving distinct customer segments with varying risk appetites. Banks dominate prime borrower segments with competitive rates (6.5–11% for personal cars, including favourable EV rates), while NBFCs serve commercial drivers, small business owners, and borrowers lacking formal income documentation, often through higher-cost lending.

Auto lending relies on two underwriting premises EVs do not yet offer at scale. First, decades of lending data on ICE vehicles has enabled tight loss-given-default estimates. Second, resale markets for ICE vehicles are liquid. Lenders can predict that a repossessed three-year-old commercial vehicle will complete liquidation within 30–60 days through organised resale networks. This second repayment source supports high loan-to-value ratios, often 85–90% for new vehicles.



EVs present credit assessment challenges that conventional auto finance isn't structured to handle ... driving commercial borrowers to pay 18–33% interest rates that can eliminate the cost advantages EVs offer.

EVs challenge these fundamentals through two core risks. First, battery valuation uncertainty: batteries constitute 35–40% of EV value but degrade unpredictably based on thermal history, charging patterns, and usage intensity.⁴¹ The market lacks standardised, non-invasive battery health

⁴¹ Observer Research Foundation. [Powering Ahead: The Future of EV Battery Manufacturing in India](#). 12 December 2025.

diagnostics for resale transactions, forcing lenders to assume weak collateral value. Rapid battery chemistry evolution (nickel manganese cobalt [NMC] to lithium ferro phosphate [LFP] to potentially sodium-ion) adds obsolescence risk, which is relatively absent in ICE powertrains.

EVs present credit assessment challenges that conventional auto finance isn't structured to handle—battery degradation is difficult to assess, resale markets remain thin, and charging requirements affect vehicle utilisation—driving commercial borrowers to pay 18–33% interest rates that can eliminate the cost advantages EVs offer.

Second, operational risk in commercial use: charging dependency directly affects vehicle utilisation; commercial EVs requiring multi-hour charging windows generate structurally lower earning capacity than ICE vehicles refuelling in minutes, affecting debt service capacity. Early e-bus experience has reinforced these concerns: Bengaluru Metropolitan Transport Corporation recorded 14,000+ breakdowns between 2022–2025, including 2,000+ mechanical failures, as 2019–2021 cohorts approach the four- to-five-year mark, when reliability issues intensify.⁴²

These risks translate directly into elevated financing costs: commercial two- and three-wheeler buyers—the largest EV adoption segment—face interest rates of 18–33% from NBFCs, offsetting potential total cost of ownership benefits.^{43,44} Individual risk-mitigation instruments exist—partial credit guarantees, residual value protection platforms (Turno,⁴⁵ TrusTerra⁴⁶), battery-as-a-service models (Vidyuttech⁴⁷), blended finance structures (Vertelo⁴⁸)—but fragmented deployment and coverage gaps drive up interest rates.

A commercial borrower seeking financing at competitive rates would need to independently access partial credit guarantees from one institution, arrange residual value protection from a separate platform, potentially structure a battery-as-a-service agreement with a third provider, and then approach banks or NBFCs with this assembled package. This fragmentation creates transaction costs and leaves gaps in risk coverage that lenders ultimately price into interest rates. What is needed is not new instruments are not needed, rather an integrated architecture that bundles these capabilities at the point of lending, to eliminate unhedged risk that drives up pricing.

Enabling bank participation through risk management

IEEFA proposes an integrated financing platform to serve commercial fleet operators and individual commercial vehicle owners, who borrow at interest rates of 15–33%. Fleet operators include taxi and

⁴² TheKen. [14,000 stalled e-buses. How many agencies does it take to fix them?](#) 7 January 2026.

⁴³ Government of India. NITI Aayog. [Financing Options](#). Accessed on 27 January 2026.

⁴⁴ Commercial EV financing rates vary by vehicle segment and lender type: electric two-wheelers and three-wheelers are 15–21% from banks and 18–33% from NBFCs; commercial cars are 8.5–13% from banks and 12–18% from NBFCs; buses are 9–12% from banks and 12–15% from NBFCs.

⁴⁵ Turno. [Electric Auto Marketplace](#).

⁴⁶ TrusTerra. [Used EVs](#).

⁴⁷ Vidyut. [EV Sales](#).

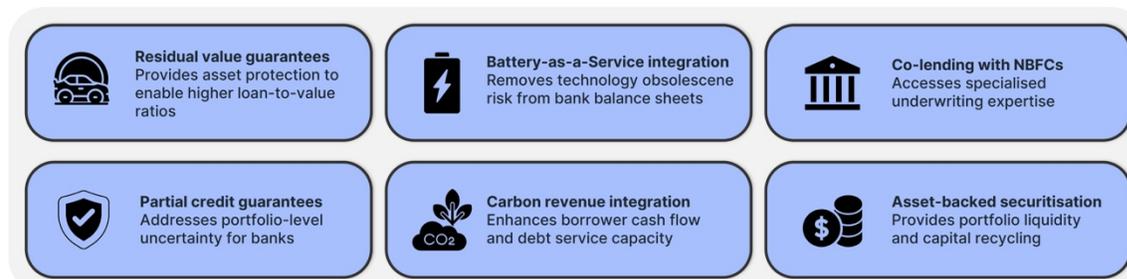
⁴⁸ Vertelo. [Driving India's EV Transition](#).

ride-hailing aggregators, last-mile delivery companies, and corporate fleets. Individual owners comprise auto-rickshaw drivers, goods carriers, and commercial two-wheeler operators. The platform's value proposition is direct: enable these borrowers to access bank-rate financing in the 8–12% range by presenting lenders with a comprehensive risk-mitigation toolkit rather than requiring borrowers to assemble it themselves.

Platform architecture

This proposal does not involve any new risk-mitigation tools. Rather, we propose integrating the four instruments discussed earlier into a unified structure co-ordinated at the point of lending (Figure 11), along with two additional financial instruments. Partial credit guarantees from development finance institutions share first-loss risk with banks. Residual value protection mechanisms provide contractual minimum residual values through standardised battery diagnostics. Battery-as-a-service arrangements separate battery ownership for high-utilisation commercial fleets where operational leasing makes economic sense. Co-lending structures would blend low-cost bank funding with specialised NBFC underwriting expertise, while securitisation pathways would provide capital recycling once loan portfolios develop sufficient performance history. Finally, carbon revenue integration can provide supplementary cash-flow support when monitoring and verification costs remain economically justified relative to the potential credit generation.⁴⁹

Figure 11: Integrated financing platform for EVs



Source: IEEFA

Institutional structure and governance

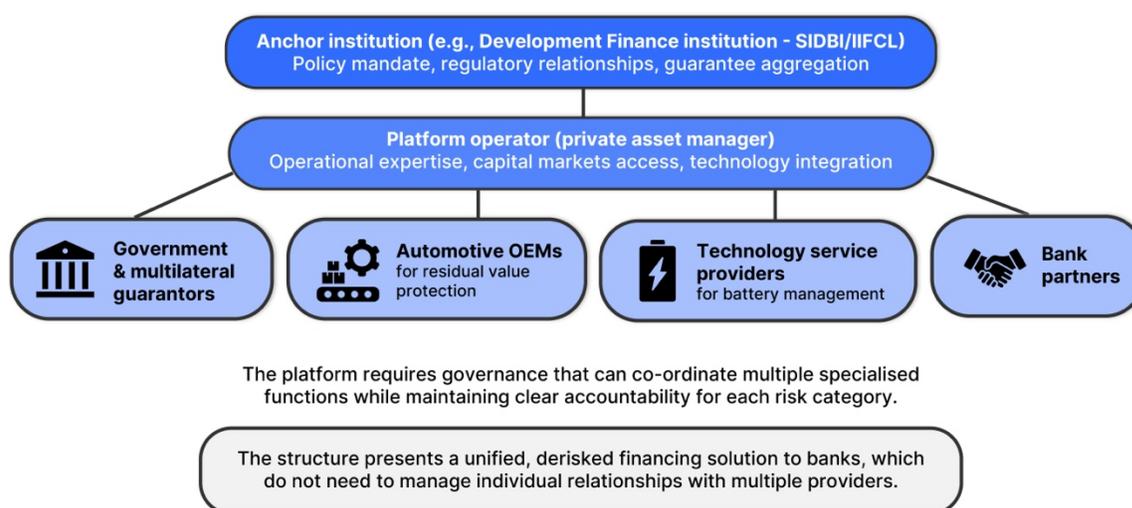
The platform requires both financial and technical anchoring to function effectively. Development finance institutions present logical financial anchor given their experience with guarantee mechanisms, and co-lending arrangements with banks and NBFCs. SIDBI could serve this role for the micro, small, and medium enterprise (MSME) segment—commercial two-wheelers, three-wheelers, and small fleet operators—leveraging its existing guarantee infrastructure and NBFC relationships. For larger commercial deployments—bus fleets, corporate vehicle programmes, and

⁴⁹ India's Carbon Credit Trading Scheme (CCTS) framework provides for the development of methodologies under the voluntary carbon market, including coverage of transport-sector. Detailed rules, eligibility criteria, and monitoring, reporting, and verification (MRV) methodologies for transport-based credit generation are under development and expected to be notified in 2026.

institutional buyers—India Infrastructure Finance Company Limited (IIFCL) is particularly well-positioned; the institution has established expertise in credit enhancement, subordinated debt, and blended finance mechanisms, and is actively seeking to expand infrastructure financing to include commercial EVs as an eligible sector.⁵⁰

Establishing such a platform would be challenging given it involves multiple institutions with different mandates and operational frameworks, but it is necessary to overcome the structural barriers to scaling commercial EV financing across vehicle segments and borrower types.

Figure 12: Governance structure for the proposed integrated financing platform



Source: IEEFA

The financial anchor must aggregate guarantee capacity from government and multilateral sources, co-ordinate with OEMs and fintech companies on residual value protection, integrate technology service providers for battery management, and present unified financing solutions to bank partners. Banks need to interact with a single counterparty rather than manage relationships with multiple specialised providers for each risk component (Figure 12). The mechanism would work across segments: SIDBI for individual owners and small fleets; IIFCL for large operators and public transport. If commercial EVs are added to the Harmonised Master List as IIFCL has proposed, the sector would gain access to long-term financing and institutional investors—essential preconditions for such platforms to scale.⁵¹

Under the proposed structure, partial credit guarantees would be deployed through established institutional mechanisms, drawing on existing commercial credit risk assessment frameworks. OEMs would provide residual value guarantees through contractual buyback commitments or partnerships with fintech resale platforms that establish standardised battery diagnostics and vehicle valuation

⁵⁰ The Economic Times. [IIFCL wants space infra, commercial EVs in core list](#). 7 January 2026.

⁵¹ Government of India. Niti Aayog-RMI. [Banking on Electric Vehicles in India](#). July 2022. Page 23.

frameworks. Technology service providers would manage battery-as-a-service arrangements and real-time performance monitoring systems. Banks would participate through co-lending structures, providing low-cost capital blended with NBFC origination and servicing capabilities. Securitisation of mature loan portfolios would be managed by the financial anchor, such as IIFCL, which has capital markets expertise, enabling capital recycling as the platform scales.

Beyond financial anchoring, the platform needs technical capabilities that financial institutions typically lack. Battery health assessment, vehicle performance monitoring, and resale value determination require engineering expertise. An automotive technical institution, such as the Automotive Research Association of India or a consortium of OEMs and technology providers, becomes essential. The technical anchor must establish standardised diagnostics protocols acceptable across manufacturers and financiers, develop certification frameworks for used vehicles, and maintain performance benchmarking systems that enable consistent risk assessment. Without credible technical standards, the residual value guarantees and battery diagnostics that underpin the platform's risk mitigation lose their economic value to lenders.

Ultimately, platform success would depend on sufficient transaction volume across commercial vehicle segments to justify infrastructure investment and develop standardised underwriting processes. Government procurement under schemes such as PM eBus Sewa and framework-based deployment under PM E-DRIVE could provide anchor volume during initial deployment, generating operational precedents and risk data that enable subsequent commercial expansion. The platform requires participation from major OEMs in residual value programs, acceptance of standardised battery diagnostics across manufacturers and financiers, and bank commitments to co-lending at predefined spreads. By enabling commercial buyers to access financing at rates closer to ICE vehicle financing, the platform addresses the demand-side constraint documented in our investment analysis.

Conclusion

In this report, we attempted to estimate realised investments in India's electric transport sector, focusing on actual capital flows rather than announcements. Despite the challenges inherent in this approach, the analysis provides valuable insights into the sector's evolution. Internal accruals continue to dominate as the primary source of capital, and E3Ws attracted the largest share of investments in the early 2020s. By 2025, however, investment patterns began to shift toward E4Ws, particularly cars, reflecting rising demand for premium models.

At the same time, investments in charging infrastructure remain low, hindered by multiple factors. The limited number of chargers installed and the modest capital realised point to the fragility of business models in the EV charging space. Together, these findings highlight a substantial gap between realised and required investments across the ecosystem from 2021–2030. Even with conservative estimates, the shortfall—amounting to INR10,26,881 crore (USD117.82 billion)—

underscores that business-as-usual approaches will not be sufficient to overcome financing challenges.

The trajectory of investment flows will depend heavily on the ease of vehicle financing on the demand side. Manufacturers require clear demand signals, yet conventional financing methods are poorly suited to EVs due to risks around battery performance and residual value. Addressing these challenges will require an integrated financing platform that shares risks among stakeholders appropriately, thereby reducing the overall cost of lending.

Ultimately, the path forward lies in achieving scale in EV adoption. As sales grow, financing can become more conventional through learning effects and improved risk pricing, creating a virtuous cycle of growth. This evolution will be essential to building a long-term, financially self-sustaining EV ecosystem in India.

Annexure I: Approach to measuring investments

Tracking investment flows into India's EV sector requires defining what constitutes "investment" in this evolving landscape. The EV sector spans vehicle manufacturing, component production, technology development, market facilitation, and consumer adoption, each generating distinct financial flows. The key methodological challenge is distinguishing flows that build productive capacity from expenditures facilitating current transactions or redistributing existing value. This study focuses specifically on manufacturing investment by OEMs—capex to establish and expand EV production capacity, including assembly facilities, production equipment, R&D infrastructure, and other fixed assets required for manufacturing operations.

Manufacturing investment as a measure of industrial capacity

Manufacturing investment by OEMs offers a more suitable approach to track investment flows into the EV sector, as it measures commitment to building productive capacity rather than consumption-based transactions. When OEMs invest in assembly facilities, production equipment, specialised tooling, or R&D infrastructure for EV production, this capex directly expands domestic manufacturing ability and creates supply-side infrastructure for sustained production at scale. This differs fundamentally from demand-side financial flows, which facilitate vehicle purchases but do not expand domestic manufacturing capacity.

From an industrial development perspective, manufacturing investment indicates whether domestic firms are building capacity to meet projected demand or whether the market remains import-dependent with limited production scale. This investment creates tangible, productive assets—assembly lines, testing facilities, manufacturing equipment—generating sustained production capability over multiple years. These fixed-asset investments represent substantial commitments to domestic manufacturing capacity, and reflect long-term sectoral commitment.

OEM investment offers several methodological advantages for tracking capacity-building investment, as it provides verifiable metrics derived from corporate financial disclosures subject to accounting standards and audit requirements. The investment figures represent actual capital commitments rather than projected expenditures or indirect calculations based on market transactions. Additionally, OEM investment data avoids the attribution complexities associated with consumer expenditure or supplier investment measurements while providing a clear linkage between measured investment and actual expansion of domestic production capabilities. This measurement approach enables the assessment of progress toward key policy objectives related to industrial competitiveness and localisation of supply chains.

Limitations of alternative investment measurement approaches

Tracking consumer expenditure metrics

Consumer expenditure on EV purchases captures the total economic value of vehicles sold within a given period, representing important market activity and demand patterns. However, this figure conflates multiple cost components, obscuring the underlying manufacturing investment story. The price paid by consumers includes direct manufacturing costs, R&D expenses, distribution margins, dealer markups, warranty provisions, taxes, and company profits across the entire value chain.

While consumer expenditure represents legitimate economic activity, isolating the portion that flows back into expanding domestic production capacity requires detailed assumptions about profit margins, cost structures, and reinvestment patterns that vary significantly across companies, vehicle segments, and time periods. These parameters are rarely disclosed publicly and can change substantially as companies mature or market conditions evolve.

Component supplier investment

Component supplier investment presents significant measurement challenges in distinguishing EV-specific capacity expansion from general automotive production capabilities. Many automotive components—steel and plastic parts, electronic systems, and assembly hardware—serve both ICE and electric vehicles.

Attributing supplier investment specifically to EV manufacturing capacity requires detailed knowledge of production-line configurations, capacity-allocation methods, and product development roadmaps, which are rarely disclosed. Suppliers often invest in flexible manufacturing systems for multiple vehicle types, making it analytically difficult to isolate EV-specific capex.

Furthermore, aggregating supplier investment data across hundreds of component manufacturers poses practical challenges in data collection and verification that may not be feasible.

While supplier investment undoubtedly contributes to sectoral capacity building, the measurement complexities and attribution challenges make it less suitable as a primary metric to track EV-specific industrial capacity development, and thus this was not used in the manner described in this section.

Annexure II: Data and methodology

The core methodology involves extracting capex data from audited company financials, and systematically measuring how these investments are financed across equity, debt, and internal cash generation.

Secondly, to validate trends and provide additional market context, the analysis incorporates systematically tracking investment announcements through automated media monitoring.⁵² This supplementary approach helps identify emerging patterns and new market entrants that may not yet appear in comprehensive financial databases. This is particularly important given India's rapidly evolving EV ecosystem with numerous new entrants and private firms.

Financial statement analysis serves as the primary quantitative foundation, while media-based tracking provides validation and early-stage market intelligence.

Primary approach: Financial statement analysis of OEMs

This study estimates investment flows into India's EV manufacturing sector by analysing OEMs' financial statements, which involves extracting capex data from audited company financials, and systematically measuring how these investments are broadly financed across equity, debt, and internal cash generation. This approach provides direct insight into actual capital deployment.

First, the study quantifies the scale of capital being deployed into EV manufacturing capacity through standard accounting measures of investment activity. Second, it classifies the financing sources funding these investments to understand how the EV transition is being capitalised. This reveals both the magnitude of private capital mobilisation and the evolving financial structure of India's EV manufacturing ecosystem.

Investment measurement through financial statements

Investment measurements are done through specific online items within the "uses of funds" statements that represent actual investments in fixed assets and productive capacity. Rather than tracking all corporate expenditures, the analysis carefully selects accounting categories that capture capital deployed toward building manufacturing capabilities (Table 2).

⁵² Using Really Simple Syndication (RSS) feeds

Table 2: Accounting line items pertaining to uses of funds by OEMs

Investment component	Description	Economic rationale
Additions to gross fixed assets	New manufacturing facilities, production equipment, specialised tooling	Direct capacity expansion for EV production
Capital work in progress	Ongoing construction and equipment installation not yet operational	Multi-year facility development projects
Net pre-operative expenses	Setup costs before production begins (trial runs, training, compliance)	Essential capital for establishing manufacturing capabilities
Working capital increases	Additional inventory, receivables, and operational funding	Capital required to support expanded production scales

These four components are specifically selected because they represent investments in productive capacity. The first three categories directly capture traditional fixed-asset investments. Working capital increases are included because scaling manufacturing operations requires additional capital for higher inventory levels, raw materials, and accounts receivable. This represents real capital deployment necessary for production expansion, not routine operating expenses. However, it is important to note that manufacturing capex figures are likely to include battery pack assembly equipment at OEM plants but exclude upstream cell manufacturing (which is part of supplier investments) and battery purchases (treated as operating costs)—precise attribution is not possible from aggregated financial statements.

This investment measurement approach works directly for standalone EV manufacturers whose operations are predominantly electric. For these companies, the selected line items can be treated as EV-related investments without further adjustment. However, for OEMs that produce both ICE and electric vehicles, an additional step is required to apportion the total observed investment to EV operations. This methodology is discussed in subsequent sections.

Sources of capital classification

The financing analysis classifies investment funding into three standard sources using the corresponding accounting line items in the financial statements (Table 3).

Table 3: Accounting line items pertaining to sources of capital of an OEM

Financing source	Components	Measurement approach
Equity financing	Fresh equity issuance, share premium, convertible securities	External equity capital from investors
Debt financing	Bank loans, bonds, debentures, foreign borrowings, other borrowings	Interest-bearing liabilities
Internal accruals	Operational cash flows, retained earnings, working capital releases	Self-financing through existing operations

For each firm (i)-year (t) with available financials, total private sources are computed and expressed as shares of equity, debt, and internal accruals.

$$\text{Equity share}_{i,t} = \frac{\text{Equity financing}_{i,t}}{\text{Equity}_{i,t} + \text{Debt}_{i,t} + \text{Internal}_{i,t}}$$

$$\text{Debt share}_{i,t} = \frac{\text{Debt financing}_{i,t}}{\text{Equity}_{i,t} + \text{Debt}_{i,t} + \text{Internal}_{i,t}}$$

$$\text{Internal accrual}_{i,t} = \frac{\text{Internal accruals}_{i,t}}{\text{Equity}_{i,t} + \text{Debt}_{i,t} + \text{Internal}_{i,t}}$$

The analysis focuses on private sources of finance as observed in OEM financial statements. Public support is tracked separately using independent public data sources. State public investment is estimated using a policy-consistent, rule-based approach applied to state EV purchase-subsidy frameworks and vehicle registrations. Union support is measured using actual expenditure (disbursement) data from official budget and Ministry of Heavy Industries grant documents.

Data sources and market coverage

The analysis integrates three main data sources to construct a comprehensive picture of investment activity. Vehicle registration data from the Union government's Vahan portal provides complete coverage of EV sales across all manufacturers, serving as the universal measure of market activity. The CMIE Prowess database provides detailed investment and financing information for companies (Table 4).

Table 4: Data sources

Data source	Content	Coverage	Key limitation
CMIE Prowess Database	Audited financial statements	47.3% of EV registrations	Many private firms don't report financials
Vahan Portal	Vehicle registration records	100% of EV sales	No financial information

Data coverage challenge

While vehicle sales are observed for all manufacturers through registration data, detailed financial statements available for OEMs represent only 47.3% of total EV registrations during the study period.⁵³ The remaining 52.7% of sales come from OEMs that either do not disclose standalone financial statements or operate within broader corporate structures without EV-specific breakdowns.

This coverage limitation is particularly pronounced among manufacturers that entered India's EV market after 2020. Some OEMs that operate as divisions of larger corporate groups also pose similar

⁵³ Mostly from the non-E3W vehicle segment.

data availability issues. Therefore, comprehensive sales data exists for all manufacturers, but detailed investment and financing data are available for fewer than half the market participants.

Estimating investment for manufacturers without financial data

The coverage gap necessitates a systematic approach to estimate investment levels for manufacturers without available financial statements. The ISR expresses the capital deployment relative to vehicle production volumes, creating a common denominator that bridges observed and unobserved investment behaviour. Formally, for firm i in year t :

$$ISR_{i,t} = \text{EV investment}_{i,t} / \text{EV sales}_{i,t}$$

Once estimated at the segment level, ISR can be applied to firms without financial disclosures to infer investment from observed sales:

$$\text{Estimated investment}_{j,t} = \text{Average } ISR_{i,t} \times \text{Sales}_{j,t}$$

The average ISR represents the mean ISR calculated from a representative group of OEMs in the same EV segment and year with financial statements available (Box 1) and enables the calculation of actual investment. This ensures investment estimates for non-reporting manufacturers are grounded in observed investment behaviour of comparable firms.

ISR adjustments for entry-phase vs steady-state investment patterns

Manufacturers beginning operations within the study period faced fundamentally different capital requirements than established or relatively mature producers. New entrants must invest heavily upfront in facility construction, tooling, and regulatory compliance while generating limited initial sales volumes. IEEFA identifies new entrants as OEMs whose first EV sales occur within the sample window (2020–2025). For these manufacturers, we apply different ISRs depending on their maturity:

- i. **For established manufacturers:** A representative year-specific average ISR captures investment requirements for firms already operating at scale in that segment and year.
- ii. **Entry-phase ISR calculation:** A segment-level benchmark ISR is applied in the entry year. This benchmark is calculated by:
 - a) Identifying the maximum ISR in each year from all OEMs with actual investment data in that EV segment
 - b) Taking the average of all these yearly maximum ISRs across the sample period

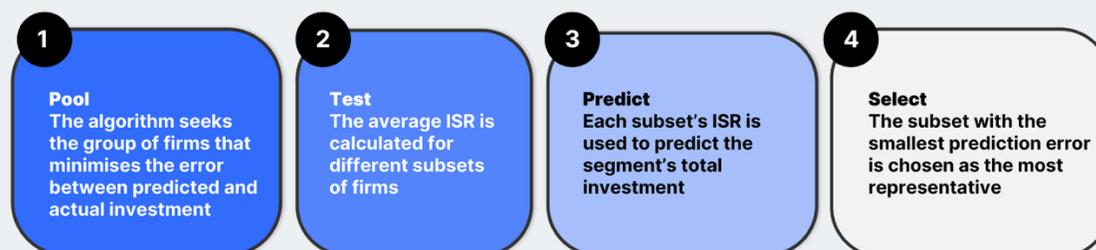
- c) Using this average as the entry-phase benchmark ISR for the first year's investment calculation.

Box 1: Representative firm selection method

Rather than manually selecting large or prominent firms to represent each segment, we employ an algorithmic selection process called **greedy forward selection**, which is a bottom-up combinatorial optimisation method that defines representativeness through empirical fit. The challenge is determining which subset of financially reporting firms should be used to calculate the representative ISR for each segment-year. The steps involved in the selection process are as below:

- All firms with observed financials in that segment-year are included in the candidate pool.
- Candidate subsets of firms are evaluated by computing their average ISR.
- This average ISR is applied to total segment sales to generate a predicted aggregate investment.
- The predicted investment is compared with the observed aggregate investment for that segment-year.
- The subset that minimises the prediction error is selected as the representative group.

Four-step optimisation process



Greedy forward selection algorithm: For large candidate pools, the algorithm iteratively adds firms that most reduce prediction error between predicted and observed aggregate investment, stopping when no further improvement is achieved.

Objective: Minimise the gap between predicted and observed total investment at the segment-year level. This approach avoids subjective bias and ensures ISR values reflect investment behaviour that best explains actual market patterns. The algorithmic selection serves an economic purpose—grounding investment estimates in observed market behaviour rather than assumptions while remaining transparent and reproducible given structural data limitations in India's EV sector.

This method aims to approximate the scaled-up investment intensity that new entrants typically experience during their capital-intensive build-out phase. While not perfectly accurate, it ensures that manufacturers starting EV operations are not assigned steady-state investment intensities, which would substantially underestimate total sector investment requirements.

Estimation in case of diversified OEMs

Several manufacturers, particularly in four-wheelers and commercial vehicles, operate diversified portfolios producing both ICE and electric vehicles. For these OEMs, attributing total observed investment entirely to EV operations would substantially overstate EV-specific capital deployment. Therefore, we approximate EV-specific investments using these steps:

- I. **Calculate share of EV in terms of sales:** The EV share is determined using the proportion of EV revenue relative to the total revenue of the OEM. Where detailed revenue breakdowns are unavailable, we estimate the value of EV sales by multiplying the average prices of EV models launched by that OEM in each year by the total number of EVs sold that year. This estimated EV sales value is then used to determine the EV share of the manufacturer's total vehicle business.
- II. **Proportional investment allocation:** Total observed investment from financial statements is multiplied by the calculated EV share to estimate the portion attributable to EV manufacturing activities.

Announced investments

In addition to realised investment estimates derived from company financial statements, the analysis incorporates investment announcements as a supplementary source of market intelligence. These announcements are not treated as substitutes for realised capital deployment, but as complementary indicators used to validate trends, identify new entrants, and capture forward-looking investment activity that may not yet be reflected in audited financial disclosures.

Announcement data was collected through a structured, technology-enabled media review pipeline. Reputable business, financial, and technology news sources were monitored using automated RSS feeds and targeted keyword queries related to EV manufacturing, batteries, charging infrastructure, and associated financing activities. Retrieved articles were processed through an automated workflow involving deduplication, text cleaning, and metadata extraction.

Natural language processing (NLP) techniques were applied to identify firms, investment events, and transaction characteristics.⁵⁴ A semantic classification layer based on contextual embeddings was used to categorise announcements into broad transaction types, including equity investments, debt

⁵⁴ Natural language processing (NLP) refers to computational techniques that enable systematic analysis of unstructured text, allowing large volumes of news articles and disclosures to be processed consistently to identify relevant entities, events, and themes.

issuances, capacity expansions, joint ventures, and acquisitions.⁵⁵ A stratified sample of announcements was manually reviewed to validate classification accuracy and resolve ambiguity.

While announcement data does not provide reliable information on investment timing or disbursement, it serves as a useful complement to realised investment estimates by highlighting emerging segments, shifts in financing patterns, and periods of elevated investment intent across the EV ecosystem.

EV charging infrastructure investments

We estimate investment in public EV charging infrastructure as one component of a broader effort to track capital mobilisation across India's electric mobility ecosystem, alongside OEM-level investments and public fiscal support. Unlike vehicle manufacturing or battery production, investment in charging infrastructure is not readily observable from firm-level financial disclosures. Most charging service providers are private entities, diversified infrastructure players, or subsidiaries of larger energy and mobility firms, and their financial statements do not consistently report charging infrastructure capex in a comparable or disaggregated manner. As a result, a bottom-up aggregation of charging infrastructure investment based on company financials is infeasible.

To address this limitation, we adopted a deployment-based proxy methodology, which infers investment from observed physical infrastructure rollout rather than reported financial accounts. This approach mirrors the core logic used in system-level EV investment assessments, including those that estimate transition investment by multiplying deployment volumes with representative cost benchmarks. While the NITI Aayog-RMI study forecasts use projected vehicle sales and price forecasts, this analysis applies the same logic *ex post* to realised public charging deployment, using observed charger additions and contemporaneous equipment cost benchmarks.^{56,57}

The estimation proceeds in three steps:

Charger deployment: Annual additions of public chargers are compiled from administrative and industry sources, and disaggregated into slow and fast chargers. **Slow chargers** are public AC and low-capacity chargers typically below 10kW. **Fast chargers** are DC chargers, including Bharat DC001 and CCS across commonly deployed power bands. Fast chargers are further split into Bharat DC001 and CCS categories based on reported technology shares. These deployment figures are

⁵⁵ Contextual embeddings and semantic classification techniques allow investment announcements expressed in different language to be grouped into consistent categories based on meaning rather than keywords alone.

⁵⁶ Government of India. NITI Aayog-RMI. [Mobilising Finance for EVs in India](#). January 2021.

⁵⁷ The hardware procurement price used in this analysis reflects costs embedded in the market price at which chargers are sold. This makes the hardware-cost approach a reasonable proxy for the full economic value of resources mobilised in charger production. Costs incurred downstream by operators, installation, civil works, and grid connection are addressed separately through the third-party adjustment.

treated as fixed inputs across all scenarios, ensuring the analysis reflects actual infrastructure rollout rather than assumed adoption trajectories.

Alternative charging systems: Public datasets do not consistently report charger power ratings or the distribution of chargers across power bands. To address this, the analysis defines three scenarios—Conservative (slow-charger-heavy), Base (balanced), and Aggressive (fast-charger-heavy)—that represent plausible configurations for the same observed charger deployment.⁵⁸ Each scenario assigns representative power mixes to slow chargers and to DC001 and CCS fast chargers across common power bands. Importantly, these scenarios do not alter the number of chargers deployed; they are used solely to characterise differences in charging system configuration and throughput intensity, and to assess how these differences translate into implied capital requirements.

Charging system capex: Investment is estimated by multiplying the number of chargers in each category and power band by representative charging system hardware capex benchmarks. These benchmarks are derived from publicly available procurement data, including GeM listings and OEM disclosures, and reflect the acquisition cost of charging equipment as procured in practice. Capex is applied on a per-charger basis rather than per kW, consistent with charging operator purchasing.

The resulting estimates capture only charging hardware capex. They deliberately exclude installation and civil works, transformers, grid augmentation, land, financing costs, software, and operations and maintenance expenditure, as well as any public subsidies or tax reimbursements. To arrive at a more comprehensive EV charging infrastructure investment figure, we added the costs of land, civil works, and grid connection, as estimated by a third party. This methodology estimates total capital formation but does not enable attribution of financing sources across public and private capital providers.

Public investment (excluding charging infrastructure)

Government fiscal support for EV adoption in India is estimated separately at the Union and state levels, reflecting fundamental differences in data availability and reporting practices. At the Union level, allocations and disbursements under programmes such as FAME, PLI, PM E-DRIVE and PM E-Bus Sewa are drawn from the expenditure budget and the Ministry of Heavy Industries' Demand for

⁵⁸ The charger-type and power-band mixes used in each scenario are assumption-based and designed to span a plausible range of public charging configurations observed in India. The Conservative (slow-charger-heavy) scenario assumes a higher share of slow AC chargers and lower-capacity DC fast chargers, reflecting cost sensitivity, early-stage rollout, and grid-constrained sites. The Base (balanced) scenario reflects existing public charging deployment, with a mix of slow chargers and mid-range DC fast chargers (primarily 30–60kW). The Aggressive (fast-charger-heavy) scenario assumes a higher share of high-capacity DC fast chargers, particularly CCS units above 60kW and in the 180–240 kW range, reflecting corridor charging, fleet-oriented hubs, and emerging highway and urban fast-charging deployments. These mixes are not derived from a comprehensive national dataset on charger power ratings, which is not publicly available, but are constructed to transparently test how different fast-slow charger compositions for the same observed deployment affect implied capital requirements.

Grant documents. These provide actual fiscal outlays and form the basis for estimating realised Union government support for EV adoption.⁵⁹

At the state level, realised fiscal support for EV adoption is not reported in a consistent or disaggregated manner across budgets or official disclosures. While several states provide support to EV manufacturing, infrastructure, and ecosystem development, these expenditures are often embedded within broader industrial promotion or infrastructure budgets, and cannot be reliably isolated for electric vehicles alone. As a result, this analysis focuses exclusively on **direct purchase subsidies for EV adoption**, where policy rules are explicit and observable outcomes can be mapped to realised vehicle registrations. This approach prioritises transparency and defensibility, and should be interpreted as a partial measure of state support, rather than a comprehensive accounting of all EV-related public expenditure.

State-level purchase-subsidy support is therefore estimated using a policy-rule-based proxy methodology that links observed EV registrations to the fiscal parameters specified in state EV policies. The analysis combines (i) a database of state EV policy design parameters by state, segment, and policy period—including per-kWh or per-vehicle subsidy rates, per-vehicle caps, average battery sizes by segment, policy validity windows, and any cumulative vehicle caps—with (ii) annual EV registration data by state, segment, and year for 2019–2025. These datasets are merged into a panel framework that allows year-by-year identification of subsidy eligibility based strictly on policy rules.

For each state-segment combination, an effective subsidy per vehicle is calculated in accordance with the policy design. Per-kWh subsidies are converted to per-vehicle values using segment-level average battery sizes and capped where applicable; where only per-vehicle subsidies are specified, these are applied directly. Subsidised vehicles are counted only within the active policy period, and where cumulative caps apply, vehicles are allocated sequentially across years until the cap is exhausted. Annual fiscal support is then computed as the product of eligible registrations and the effective subsidy per vehicle, and aggregated over time. This methodology estimates the realised fiscal support enabled by state purchase-subsidy policies, and deliberately excludes manufacturing incentives, tax exemptions, charging infrastructure, and other non-purchase support measures, which are addressed separately or remain outside the scope of this analysis due to data limitations.

⁵⁹ Some central schemes, such as FAME and PM E-DRIVE, include allocations for charging infrastructure alongside vehicle incentives. As charging infrastructure investment is independently estimated using a deployment-based approach, reported Union-level fiscal disbursements may overlap conceptually with infrastructure-related support. The two measures are retained separately to distinguish recorded fiscal expenditure from inferred capital formation based on physical deployment.

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