Driving Jobs, Economic Growth, and Climate Action: The Role of Clean Mobility in India

March 2026

CLIMATE POLICY INITIATIVE

ACKNOWLEDGMENTS

This report is part of ongoing work by Climate Policy Initiative (CPI) on sustainable transport and just transition, aimed at developing knowledge and understanding to support effective decision-making. CPI appreciates Dr. Neelesh Gupta, Yagesh Singhania, Akshay Chauhan, Hardik Singhal and Priyam Tyagi from Deloitte Touche Tohmatsu India LLP for supporting the primary research and stakeholder consultations on employment in the automotive sector. The authors also acknowledge and thank CPI colleagues Neha Khanna, Saarthak Khurana and Vivek Sen for their inputs; Kirsty Taylor and Saumya Tiwari for editing and internal review; Tanuj Joshi and Sanjay Chaurasia for layout and design and Deepalika Mehra for research support. Responsibility for the information and views set out in this publication lies with the authors.

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ABOUT CLIMATE POLICY INITIATIVE

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

REGION	SECTOR	KEYWORDS
India	Transportation	Sustainable transportation

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RECOMMENDED CITATION

CPI. 2026. Driving Jobs, Economic Growth, and Climate Action: The Role of Clean Mobility in India. Available online: https://www.climatepolicyinitiative.org/publication/driving-jobs-economic-growth-and-climate-action-the-role-of-clean-mobility

EXECUTIVE SUMMARY

India's automotive sector is undergoing a structural transformation that links jobs, industrial competitiveness, and climate goals. Road transport alone accounts for 12% of India's total CO2 emissions (IEA 2022) and 94% of transport-related CO_2 emissions and without decisive action, these emissions could double by 2050 (WRI 2024). As the country pursues its Atmanirbhar Bharat (Self-reliant India) vision for 2047 and net zero target for 2070, transitioning road transport to sustainable mobility is both an economic and emissions imperative.

A full transition to electric vehicles (EVs) can drive economic growth, employment, and climate action, while also managing risks for workers, industries, and public finance. This report offers a scenario-based, quantitative assessment of the EV transition across India's road transport sector, identifying the policy frameworks and financing pathways required to realize its full potential for sustainable development.

An integrated modeling framework is used to assess what proportion EVs could make up of India's total projected vehicle sales in the financial year (FY) 2047 under two scenarios:[1]

- **A business-as-usual (BAU) scenario** projects 44 million EV sales.
- **An accelerated full electrification scenario (100%)** projects 59 million EV sales.

This study then links these scenarios to detailed estimates of automotive revenues and gross value added (GVA), employment across the value chain, energy demand and emissions, trade balances, ecosystem investments, and fiscal impacts.

KEY FINDINGS

1. **Growth in road transport vehicle demand can create a significant opportunity to scale EV adoption**. Total vehicle sales are projected to grow from about 32 million in 2026 to 59 million by 2047. This offers a great opportunity to scale up EV sales from the 2 million recorded in 2025 (MoRTH 2025; Telangana RTO 2025) to 100% of the 59 million vehicle sales expected by 2047. EV sales growth can be led by early adoption of two- and three-wheeler EVs, followed by four-wheelers, light commercial vehicles, and buses. Trucks, tractors, and other heavy vehicles are expected to follow.
2. **The EV transition will expand automotive manufacturing and component markets.** Under the 100% EV scenario, cumulative incremental automotive manufacturing revenue is estimated at INR 57 lakh crore (USD 683 billion)[2] between 2031 and 2047, and major EV components are projected to constitute a market of about INR 20.5 lakh crore (USD 245 billion) in 2047. This growth creates an opportunity for India to build globally competitive EV supply chains by increasing domestic value addition in line with internal combustion engine vehicle (ICEV) manufacturing.

1 Unless otherwise stated, all years presented in this report relate to financial years. A financial year (FY) in India is the 12-month period from **April 1 to March 31** of the following year. It is the mandatory accounting and tax period for individuals, businesses, and the government to record income, expenses, and profits.

2 All monetary estimations in this report are in current value/price terms, without considering the effect of inflation and INR depreciation.

3. **The 100% EV scenario predicts substantially higher macroeconomic benefits between 2031 and 2047 than under BAU:**
    - Automotive manufacturing GVA increases by around INR 13.5 lakh crore (USD 162 billion), 15% more than under BAU.
    - Electricity GVA increases by about INR 9 lakh crore (USD 108 billion), 92% more than under BAU.
    - However, GVA from petroleum product production declines by roughly INR 5.2 lakh crore (USD 62 billion), a 16% drop from BAU.
4. **The transition will reshape fuel import dependence and fiscal avenues.** A 100% EV transition averts estimated imports of 1,085 million tonnes of crude oil and 631 million tonnes of liquefied natural gas (LNG) between 2031 and 2047, compared to the BAU scenario. This drop corresponds to about INR 86.4 lakh crore (USD 1,031 billion) in avoided foreign-exchange expenditure, however, import of EV components could offset part of the import bill averted (detailed in Section 3.2)[3]. Meanwhile, excise duty and VAT revenues from fossil fuel value chains can fall by INR 17.7 lakh crore (USD 212 billion) and INR 26 lakh crore (USD 312 billion), respectively with low ICEV sales. Although this revenue loss would be partly offset by increased goods and services tax of INR 4.5 lakh crore (USD 54 billion) on vehicles and customs duties on EV components, proactive fiscal transition planning will be needed.
5. **Structural shifts across automotive value chains will require targeted skill development to prepare the workforce for EV-related roles.** Employment in vehicle and component manufacturing is projected to grow to 5.4 to 5.8 million by 2047, under the scenarios. While a 100% EV transition may reduce jobs in service, repair, and retail fuel outlets due to changing maintenance and refuelling needs, it is expected to generate around 2 million jobs in charging infrastructure and add up to 423,129 jobs in battery recycling. These shifts highlight both new opportunities and a need to support vulnerable ICE-linked workers through reskilling and transition programs.
6. **Full electrification delivers significant air-quality and tailpipe emissions mitigation benefits**. By 2047, 100% EV adoption could reduce annual tailpipe CO emissions by around 55%, HC+NOx emissions by about 28%, PM emissions by around 29% and CO_2 emissions by 48%, relative to BAU scenario. In addition, annual tailpipe CO_2 emissions from road transport could fall to roughly 55% of the estimated levels in 2030, with cumulative reductions of up to 2 billion tonnes over 2031 to 2047.
7. 100% electrification could increase the power demand by 1,070 TWh per year by 2047, requiring incremental renewable energy generation capacity of 533 GW (a mix of Solar PV & Wind) to power the EV charging infrastructure by clean power.
8. **Ecosystem investment requirements are large but achievable by using catalytic finance.** Cumulative investment needs by 2047 are estimated at around INR 20.4 lakh crore (USD 243 billion) under BAU and INR 45.5 lakh crore (USD 544 billion) under the 100% EV scenario. The investment needs under the 100% EV scenario can be broken down as follows:

3 Our analysis assumes that the percentage of diesel and petrol that would be processed from crude oil remains the same throughout the period of analysis, the demand from other sectors remains constant. We assume the crude oil is imported at USD 85.87 per barrel (bbl). The import bill savings result from a reduction in petrol and diesel consumption by the road passenger transport sector due to the different EV transition scenarios. The actual value of the oil import bill by 2047 could be higher considering change in consumption pattern in other sectors.

- EV component manufacturing: INR 12 lakh crore (USD 145 billion),
- Additional renewable generation capacity and transmission infrastructure: INR 29 lakh crore (USD 346 billion), and
- Charging infrastructure: INR 4.5 lakh crore (USD 53 billion).

CONCLUSION

Policy and financing design will determine whether India captures the full upside of the EV transition. The investment required for a 100% EV transition in India by 2047 could be mobilized through a range of financing approaches, including the catalytic use of public finance to de-risk projects and attract private investment.

Building on existing policies and initiatives, India can accelerate the transition by adopting segment-specific electrification targets, strengthening localization and upstream resource security, and deploying blended finance and guarantees.

Implementation will require establishing dedicated EV financing and coordination institutions, thereby converting a large capital requirement into long-term jobs, industrial, and energy security opportunities.

TABLE OF CONTENTS

LIST OF ABBREVIATIONS

ACMs	Auto Component Manufacturers
ARAI	Automotive Research Association of India
BAU	Business-As-Usual
BS	Bharat Stage
CAGR	Compound Annual Growth Rate
CNG	Compressed Natural Gas
CO	Carbon Monoxide
CO2	Carbon Dioxide
CPI	Climate Policy Initiative
CPO	Charge Point Operator
CSR	Corporate Social Responsibility
DISCOM	Distribution Company
DVA	Domestic Value Addition
EV	Electric Vehicle
e-2W	Electric Two-Wheeler
e-3W	Electric Three-Wheeler
e-4W	Electric Four-Wheeler
e-bus	Electric Bus
e-LCV	Electric Light Commercial Vehicle
e-MHCV	Electric Medium and Heavy Commercial Vehicle
e-tractor	Electric Tractor
FAME	Faster Adoption and Manufacturing of Hybrid and Electric Vehicles
FY	Financial Year
GDP	Gross Domestic Product
GENCO	Generation Company
GHG	Greenhouse Gas
GST	Goods and Services Tax
GVA	Gross Value Addition

HC	Hydrocarbon
ICE	Internal Combustion Engine
ICEV	Internal Combustion Engine Vehicle
INR	Indian National Rupee
LNG	Liquefied Natural Gas
MMT	Million Metric Tonnes
NOx	Nitrogen Oxide
OEM	Original Equipment Manufacturer
PLI	Production-Linked Incentive
PM E-DRIVE	PM Electric Drive Revolution in Innovative Vehicle Enhancement
PPP	Public-Private Partnership
R&D	Research and Development
USD	United States Dollar
VAT	Value Added Tax

LIST OF FIGURES

LIST OF TABLES

1. INTRODUCTION

India's economic transformation is aligning industrial growth with its climate ambitions. Industrial strength and rising technological sophistication increasingly intersect with the global imperative for climate action. As of early 2026, the industrial sector has maintained strong momentum, recording 7% year-on-year growth in real gross value added (GVA), with high-technology segments contributing 46% of total manufacturing value added—a decisive shift toward advanced, innovation-driven production (PIB 2026).

The automotive industry is a key contributor to India's industrial economy and employment landscape. The industry had a turnover of INR 20 lakh crore (USD 240 billion) in 2025, with total vehicle sales of 28 million units. It contributed 7.1% of national GDP, nearly 49% of manufacturing GDP and close to 15% of total goods and services tax (GST) (PIB 2025a; PIB 2026c). It is also India's third-largest employer, supporting over 30 million direct and indirect jobs (PIB 2026a Feb). India has seen a 33% increase in vehicle production between 2015 and 2025. The country is the world's largest market for two-wheelers (2Ws) and three-wheelers (3Ws), and the third-largest for passenger and commercial vehicles combined (Ministry of Finance 2026).

However, dependence on crude oil imports and rising transport emissions present macroeconomic risks. India spent around USD 150 billion on net oil and gas imports in 2025 alone (PPAC 2026). Fluctuations in international crude oil prices expose the economy to external shocks. Furthermore, road transport energy use and related emissions have doubled since 2010, accounting for 12% of India's total CO2 emissions in 2021, making it the third most emitting sector (IEA 2022). With emissions projected to quadruple by 2050, decarbonizing road transport is not just an environmental imperative but a strategic economic necessity (WRI 2024). In this context, transport electrification offers a credible pathway to enhance energy security, while mitigating GHG emissions.

The Government of India is enabling EV adoption through coordinated demand- and supply-side interventions. Purchase incentives via flagship policies, including the Faster Adoption & Manufacturing of Electric Vehicles (FAME) I & II and PM Electric Drive Revolution in Innovative Vehicle Enhancement (PM E-DRIVE), alongside supply-side incentives such as Production-Linked Incentive (PLI) schemes, have stimulated EV demand and domestic manufacturing (PIB 2025c). These policies seek to build indigenous manufacturing capabilities and boost India's competitiveness in emerging clean mobility value chains.

The EV transition will create new employment opportunities in battery manufacturing, charging infrastructure deployment and battery recycling. These emerging segments present opportunities for domestic value addition (DVA), technological upgradation, and new employment generation aligned with high-skill manufacturing and services.

The shift to EVs will disrupt the traditional internal combustion electric vehicle (ICEV) value chain. Internal combustion engine (ICE) specific manufacturing and traditional supply chain players could face revenue risks as demand for ICEVs declines. The ripple effects of the transition extend further, impacting employment and revenue of adjacent sectors, including fuel retail and aftermarket services, such as repair and maintenance. Reduced fossil fuel demand will also have spillover effects on the oil and gas sector and allied industries, creating adjustment pressures across interconnected value chains.

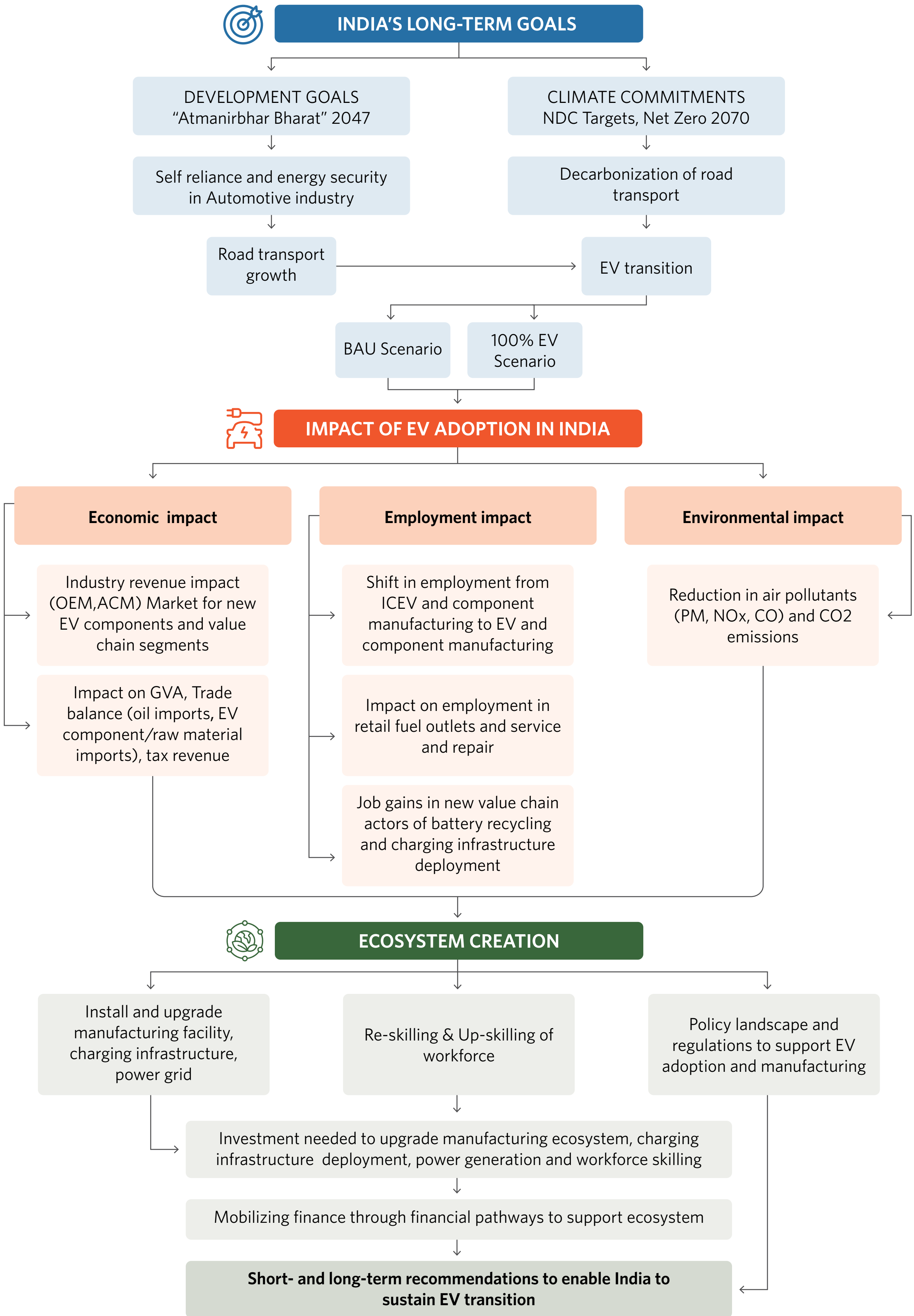
Managing the transition requires evidence-based policy design and focused financial backing, grounded by rigorous impact evaluations and analysis across the automotive value chain. India's broader energy transition ambitions reinforce this need. The Atmanirbhar Bharat (Self-reliant India) vision includes a long-term goal of achieving energy independence by 2047. This ambition, alongside India's commitment to reach Net Zero emissions by 2070, would need a gradual shift from a fossil fuel–dependent economy toward one powered by renewable energy, green hydrogen, and electric mobility (PIB 2025 Aug). This transition will require accelerated action well before 2070, with 2047 emerging as a critical milestone given the long investment cycles across energy, transport, and industrial systems.

Against this backdrop, assessing the implications of a 100% EV scenario is key to understanding the scale of benefits, challenges and support required across the economy. This study, therefore, conducts a quantitative, scenario-based assessment of India's automotive value chain with EV adoption under a business-as-usual (BAU) and a full electrification (100% EV) scenario, which could be achieved with additional policy support. In addition to evaluating electrification across major road transport segments, the analysis also incorporates the potential electrification of tractors, given their significant contribution to diesel consumption and emissions in India.

1.1 REPORT OBJECTIVES

This report analyzes the impact of a complete transition to EVs on economic growth, jobs, and climate action in India by 2047. It captures impacts across manufacturing, employment, energy demand, and emissions to provide a comprehensive evaluation of the opportunities and transition risks associated with large-scale electrification (see Figure 1.).

Figure 1: Outline of analysis undertaken in this study



***Source:** CPI*

Through data analysis, policy review, and stakeholder consultations, the study has tried to achieve the following objectives:

I. Project on-road stock and EV sales across all major transportation segments under a BAU and accelerated EV penetration pathway through 2047.

II. Assess the impact of the EV transition on automotive industry revenues and overall GVA, accounting for DVA in key EV components.

III. Estimate the implications of EV uptake for energy demand, emissions intensity, oil and gas imports, and EV component and raw material imports, reflecting varying levels of domestic manufacturing.

IV. Analyze workforce impacts, including changes in workforce structures, emerging skill requirements, and the scale of reskilling and upskilling needed.

V. Evaluate the current capacity and readiness of skilling programs, distribution companies, and charging infrastructure to support EV adoption, and estimate the investment required to bridge identified gaps.

VI. Develop policy recommendations and financial pathways based on key findings to guide policymakers and industry stakeholders in creating effective support packages.

The evidence-based insights derived from this work aim to support policymakers in designing effective decarbonization and workforce strategies, guide industry in investment and workforce transitions, and assist financial and skill development institutions in aligning frameworks with India’s evolving clean mobility landscape.

2. EV TRANSITION SCENARIOS

India's growing mobility demand, urbanization, and rising income are intersecting with climate commitments and industrial policy ambitions. Over the next two decades, the direction and pace of EV adoption could not only influence emissions trajectories and energy security but also manufacturing competitiveness, fiscal outcomes, and employment outcomes. A clear articulation of plausible transition pathways is therefore essential to understand the magnitude of change and the trade-offs embedded in different policy choices.

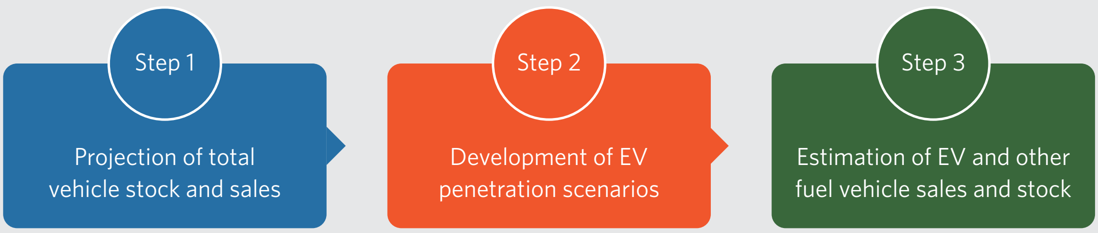
This section lays out two EV transition scenarios through 2047, projecting EV sales and stock trajectories. These scenarios serve as the reference point for subsequent economic, fiscal, and environmental impact assessments in this study.

Box 1. Methodology for EV transition scenarios

We developed two EV transition scenarios to project EV sales considering 1) projected total vehicles, and 2) projected EV penetration. As shown in Figure 2 and detailed further in Annexure 7.1, these steps involved the following:

1. Projecting India's total vehicle stock and annual vehicle sales through 2047 using the Gompertz function (Singh et al. 2019a). This sigmoidal function models how a country's economic development affects vehicle ownership patterns. Economic development was based on the Reserve Bank of India's projections of GDP per capita for India to become a developed country by 2048 (RBI 2023).
2. Developing two EV penetration scenarios considering India's current EV-related policies, developmental aspirations and decarbonization goals.
3. Estimating segmentwise EV and nonEV sales and stock, and their impact on India's economy and emissions.

Figure 2: Approach to scenario development, vehicle sales and stock estimation



2.2 ROAD TRANSPORT DEMAND PROJECTIONS

CPI projects an expanding automotive market through 2047. Total annual vehicle sales (excluding e-rickshaws)[4] are expected to increase from around 31 million in 2026 to 54.5 million

4 E-rickshaw sales and stock are estimated using a different approach under the two developed scenarios, with detailed methodology in Annexures. Their sales are estimated to reach between 3.9 to 4.6 million by FY2047.

by 2047, as shown in Table 1. Increasing vehicle ownership across income groups is driven by rising mobility demand amid economic expansion and urbanization. 2Ws hold the largest share of sales throughout the projection period, supported by affordability and their prominence for personal commutes.

However, as India's per-capita income increases, household mobility preferences and private vehicle ownership are likely to shift from 2Ws to cars and could result in a near doubling of 4W sales by 2047 (Singh et al. 2019a). Among commercial vehicles, buses are seeing high growth driven by increased demand for mass transit solutions and urbanization.

Table 1: Vehicle sales forecast for different vehicle segments until 2047

Vehicle segments	2026	2030	2035	2040	2047
Two-wheeler (2W)	23,581,285	26,813,533	31,793,447	36,512,009	40,111,259
Three-wheeler (3W)	745,396	813,106	962,499	1,159,650	1,406,412
Four-wheeler (4W)	4,620,311	5,404,595	6,426,108	7,656,146	9,271,842
Buses	119,517	136,748	184,307	257,882	347,159
Light Commercial Vehicle (LCV)	584,074	948,935	1,104,585	1,257,683	1,594,956
Medium and heavy commercial vehicle (MHCV)	373,460	481,767	514,054	616,399	748,841
Tractor	954,631	978,369	1,013,918	1,040,976	1,058,418
Total sales	**30,978,675**	**35,577,053**	**41,998,919**	**48,500,745**	**54,538,888**

Source: *CPI analysis*

2.3 SCENARIOS OF ANALYSIS

The assessment of the impact of EV adoption on India's road transport sector is anchored in two EV penetration pathways: a BAU scenario and an aggressive 100% EV sales scenario by 2047, as described in Table 2).

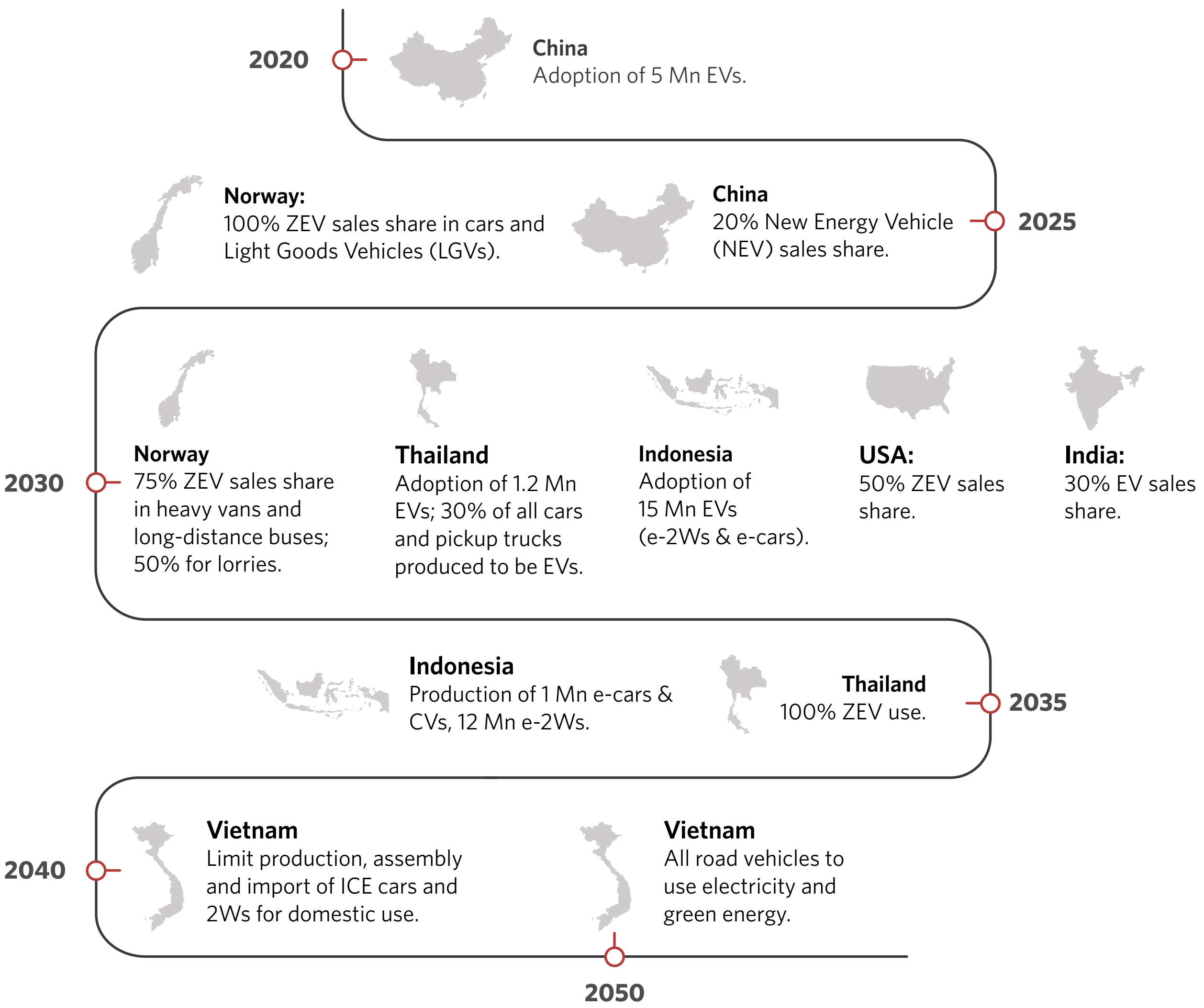
Table 2: Description of scenarios developed for EV adoption

Scenario	Description
Business-as-usual	• Long-term EV penetration targets are extended beyond 2030 to project a gradual expansion of EV adoption through 2047, consistent with current policy and market trends. • Annual EV penetration levels are estimated using the compound annual growth rate (CAGR) to achieve projected intermediate targets.
100% EV adoption	• Frames the mobility transition as an integral part of India's long-term development pathway by projecting 100% EV adoption by 2047. • Based on this optimistic target, India's EV trajectory is estimated based on EV adoption levels of different countries undergoing similar mobility.

The two scenarios establish segment-wise electrification projections based on current EV penetration rates and assumed long-term adoption patterns. These trajectories subsequently determine the distribution of other fuel types—petrol, diesel, and compressed natural gas (CNG) across each vehicle segment. In both scenarios, EV adoption trends remain consistent up to 2030, considering India's ambition of achieving 30% EV penetration by 2030 and the prevailing policy environment that continues to support electric mobility uptake (PIB 2023). Beyond 2030, the EV adoption pace diverges as per the assumed long-term adoption projections in the two scenarios.

The study benchmarks India's EV transition against Vietnam and China to derive realistic segmentwise electrification trajectories for the 100% EV scenario. Vietnam is an appropriate peer due to its similar income profile and rapidly emerging EV market, with a well-defined electrification roadmap across vehicle segments through 2050 (World Bank 2024). China offers valuable insights as a global benchmark, owing to its accelerated EV adoption and strong policy support. Figure 3 highlights how Asian countries and other leading global EV adopters, such as Norway and the US, have adopted phased, segment-specific EV deployment targets.

Figure 3: Policy target across countries for vehicle electrification



Source: *OECD 2022; Oxford Institute of Energy Studies 2023; IISD 2025; WFW 2025; PSA 2026*

Five-year interval projections for 2030-2047 have been developed considering the key policies for promoting EV adoption to guide the pace of electrification. Table 3 presents the assumed EV sales penetration from 2030 to 2047 across vehicle segments under the two CPI-developed scenarios. These EV penetration levels are used on the vehicle sales forecast in Table 1 to project EV sales in section 2.4.

Table 3: EV sales penetration across vehicle segments under two scenarios

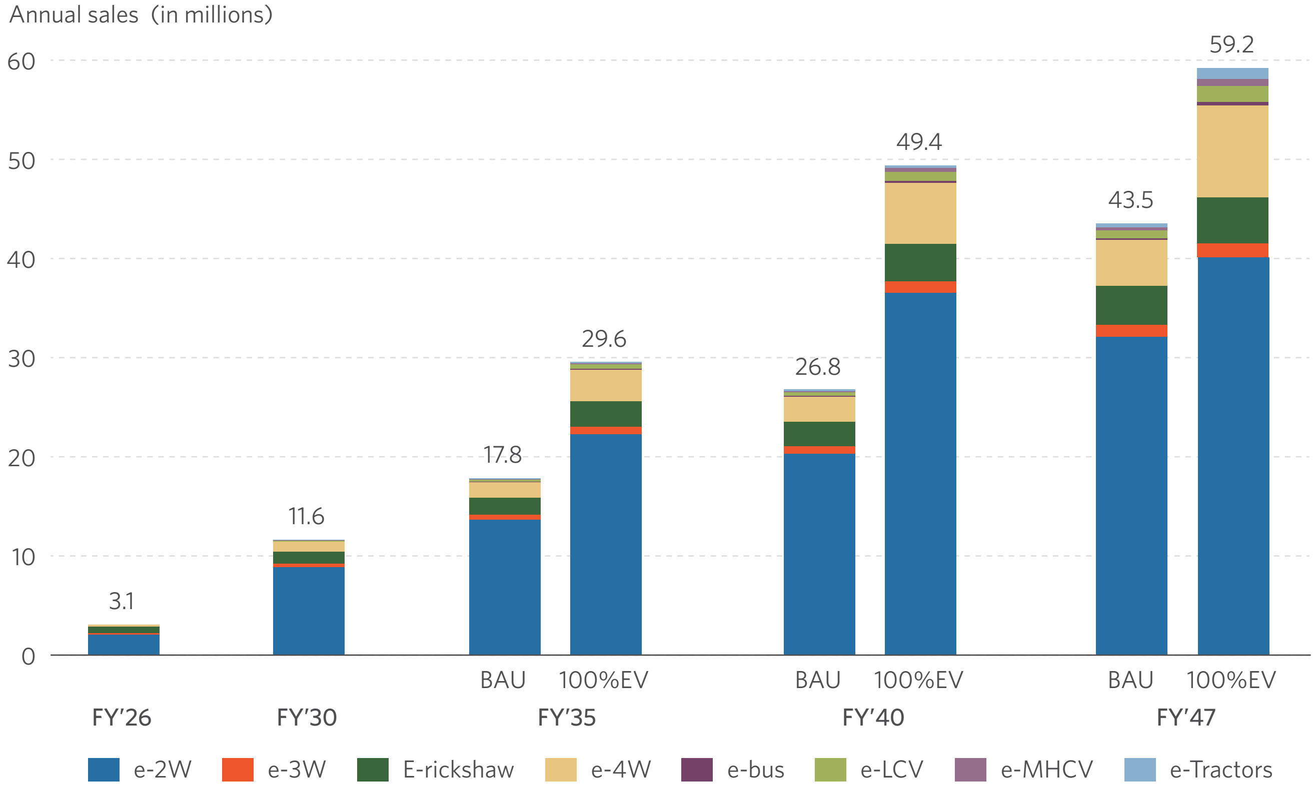
Vehicle segments	2030	2035		2040		2045		2047	
		BAU	100% EV	BAU	100% EV	BAU	100% EV	BAU	100% EV
e-2W	33%	43%	70%	56%	100%	72%	100%	80%	100%
e-3W	45%	54%	80%	65%	100%	79%	100%	85%	100%
e-4W	18%	24%	50%	33%	80%	44%	100%	50%	100%
e-bus	15%	20%	35%	27%	65%	36%	88%	40%	100%
e-LCV	15%	21%	45%	30%	75%	43%	100%	50%	100%
e-MHCV	5%	9%	20%	17%	60%	31%	86%	40%	100%
e-Tractor	5%	9%	12%	17%	29%	31%	70%	40%	100%
Total EV share	**30%**	**39%**	**65%**	**50%**	**94%**	**65%**	**99%**	**73%**	**100%**

Source: *CPI analysis*

2.4 SCALE OF EV TRANSITION

Vehicle registration data indicate that EV adoption has accelerated rapidly in India. However, there is variation across segments depending on duty cycles, incentives, and cost dynamics. Between 2019 and 2025, EV sales in the country had a CAGR of 55% (Telangana RTO 2025; MoRTH 2025). CPI's projections highlight that EV sales can achieve accelerated growth, increasing from 2 million units in 2025 to 11.6 million by 2030 and to 44 million by 2047 under the BAU trajectory. A full transition to EVs by 2047 would raise annual sales to 59 million, with light EVs (electric 2Ws and 3Ws) expected to dominate due to lower costs and a strong domestic manufacturing base. Figure 4 presents projected EV sales across all vehicle classes for 2026–2047, anticipating market trends, policy interventions, targets, and charging infrastructure expansion.

Figure 4: Projected EV sales across vehicle segments



Source: *CPI analysis*

Sales and stock projections through 2047 point to an unprecedented expansion of India's mobility market, with EVs poised to dominate across vehicle segments. EV sales under the two scenarios are expected to have ripple effects across the broader economy, including on industry revenue, employment, and emissions, as assessed in the subsequent sections.

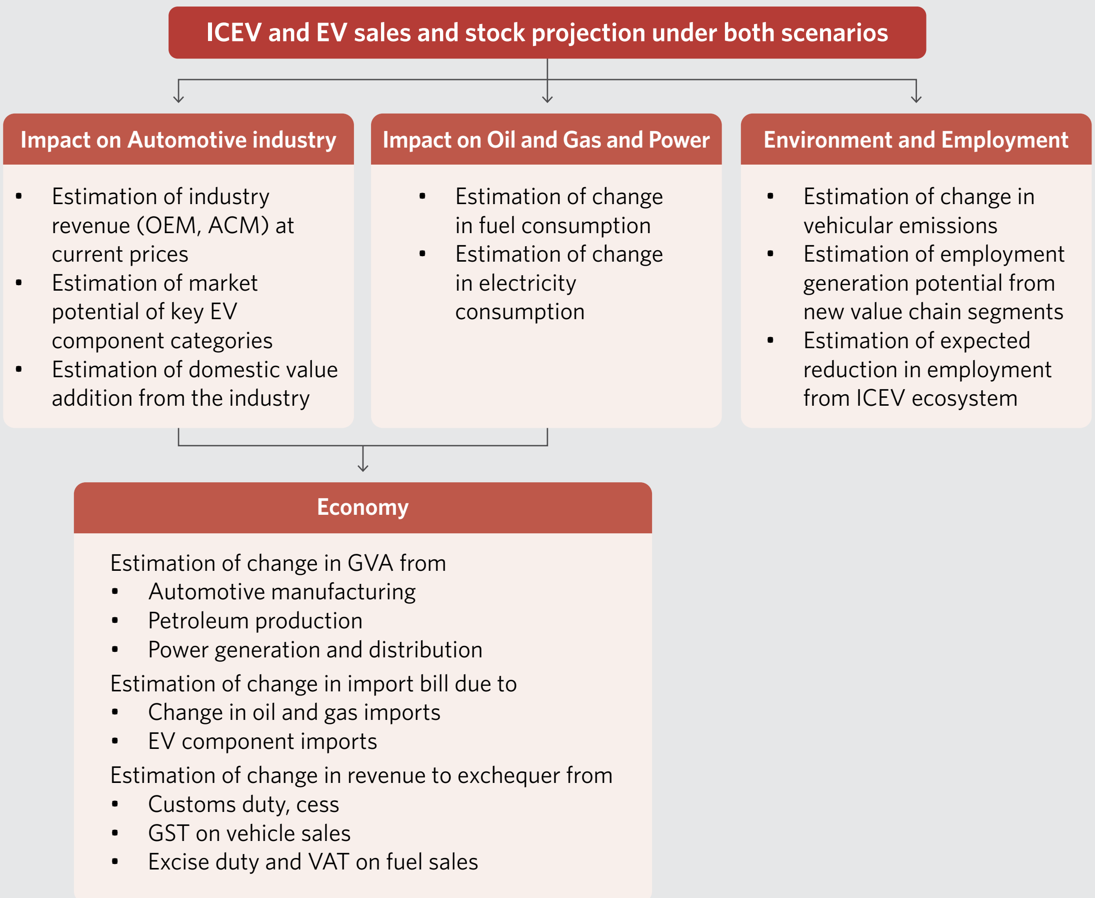
3. IMPACT ON THE AUTOMOTIVE INDUSTRY AND THE ECONOMY

The shift from ICE to electric drivetrains is more than a technological substitution; it entails a structural reconfiguration of industrial value chains. As EV penetration accelerates across vehicle classes, the impacts will cascade through original equipment manufacturer (OEM) revenues, component manufacturing, oil and gas, and other interconnected sectors. This section quantifies these effects, analyzing changes in GVA across key industries and highlighting the central role of DVA in capturing this opportunity.

Box 2. Methodology for assessing impacts

This section combines sectoral modeling with economy-wide indicators to capture impacts across the mobility value chain. Figure 5 provides an overview of the methodology adopted to estimate the impact of EV transition on India's automotive, oil and gas, and power industries. A detailed methodology is provided in Annexure 7.1.

Figure 5: Approach and methodology adopted to estimate impact of EV transition

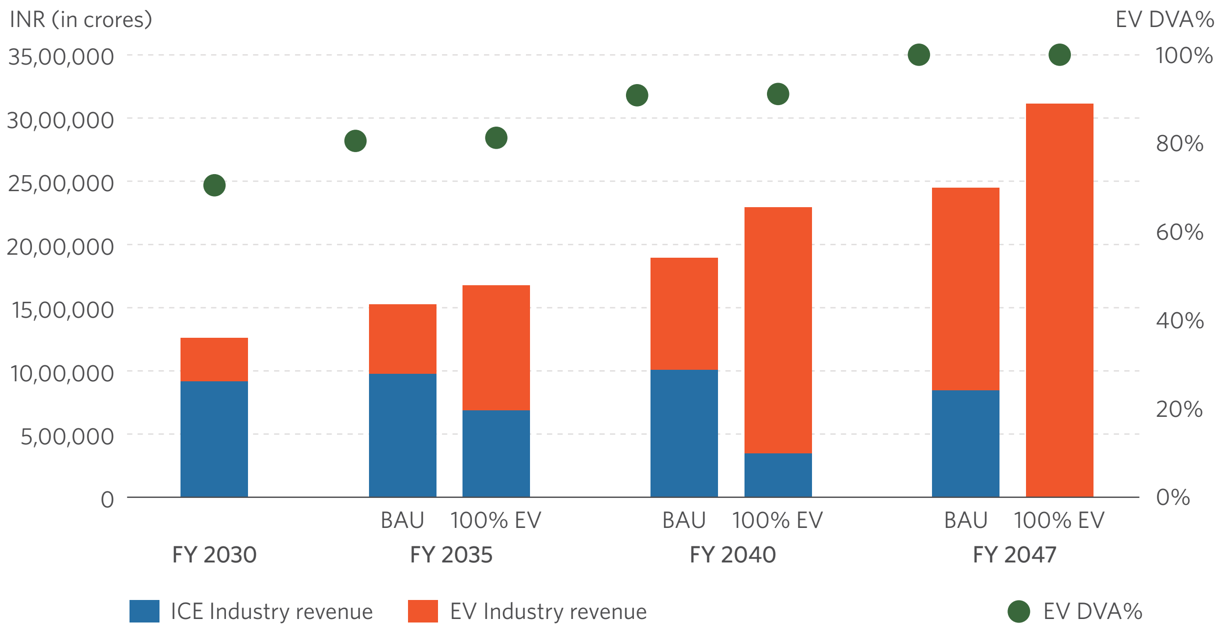


The results presented are aggregated national-level outcomes and do not capture distributional impacts across regions. The analysis is carried out based on current market prices, with a progressive decline in EV costs driven by technological development and anticipated battery price reductions. The effects of inflation and depreciation of the INR against the USD have not been considered. Only domestic sales-based revenue is considered.

3.1 IMPACT ON AUTOMOTIVE INDUSTRY REVENUE

The fundamental differences between EVs and conventional ICEVs could reshape the industry landscape. EVs eliminate the need for ICEV-specific components, including traditional powertrains, and drive demand for new, technologically intensive components such as batteries, motors, power electronics, and advanced control systems. This shift exposes value chain actors, including OEMs and auto-component manufacturers (ACMs), to business disruption, operational realignment, and potential revenue volatility.

Figure 6: Projected automotive industry revenue and DVA %



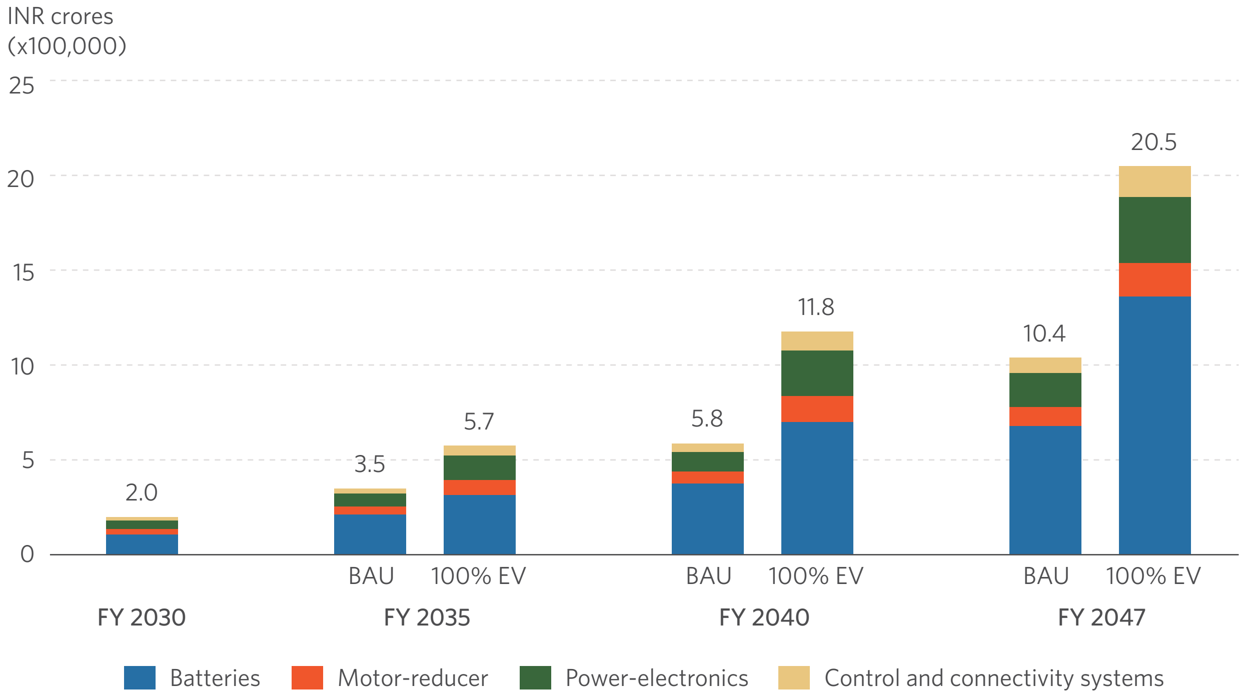
Source: *CPI analysis*

While component obsolescence poses near-term risks, the transition also offers India an opportunity to strengthen its role in emerging global EV value chains. Some key effects of this technological shift on OEMs and ACMs under CPI's EV transition scenarios are as follows:

- Under the 100% EV scenario, the automotive industry revenue from domestic vehicle sales can grow at a CAGR of 5.6% between 2026 and 2047 to reach INR 31 lakh crore (USD 372 billion) by 2047 in present value terms (nominal numbers in 2047 likely to be significantly higher due to inflation and forex impacts). Figure 6 shows industry projected domestic revenue and DVA levels.

- Under 100% EV adoption, the automotive industry's cumulative revenue from domestic vehicle sales between 2031 and 2047 could increase by INR 57 lakh crore (USD 683 billion), primarily because EVs currently have higher upfront costs than ICEVs.
- The additional revenue in the 100% scenario could grow from less than 1% in 2031 to about 27% by 2047, highlighting the scale of business opportunity accompanying an 100% EV adoption scenario.
- Major EV component categories (batteries, motors, power electronics, connectivity and control systems) could see a total market size of INR 10.4 lakh crore (USD 124 billion) in the BAU scenario and INR 20.5 lakh crore (USD 245 billion) in 2047 in the 100% EV scenario. Figure 7 shows the market potential across key EV component categories until 2047 under both BAU and 100% EV scenarios.

Figure 7: Market potential of key EV component categories



Source: *CPI Analysis*

CRITICAL ROLE OF COMPONENT LOCALIZATION IN REVENUE

India's ability to fully capture the economic gains from the EV transition will hinge on strengthening DVA in EV manufacturing from its current level of 30–40% toward levels achieved in ICEV manufacturing. Import dependencies for critical raw materials, limited economies of scale, and insufficient capital investment impede the deeper localization of EV components. However, accelerating domestic manufacturing capacity is critical to sustaining long-term competitiveness and profitability.

Sensitivity analysis reveals that a 15% increase in component localization (i.e., from 85% to 100% by 2047) could create an additional revenue opportunity of INR 22.4 lakh crore to

INR 44 lakh crore (USD 268 billion to USD 524 billion) between 2031 and 2047 in the BAU and 100% EV scenarios, respectively. This represents 20% of the components' cumulative projected market potential between 2031 and 2047, underscoring the vital need for a more robust domestic manufacturing ecosystem. Greater localization would not only expand industry revenues but also reduce upfront vehicle costs and narrow the price differential with ICEVs, accelerating EV adoption at scale.

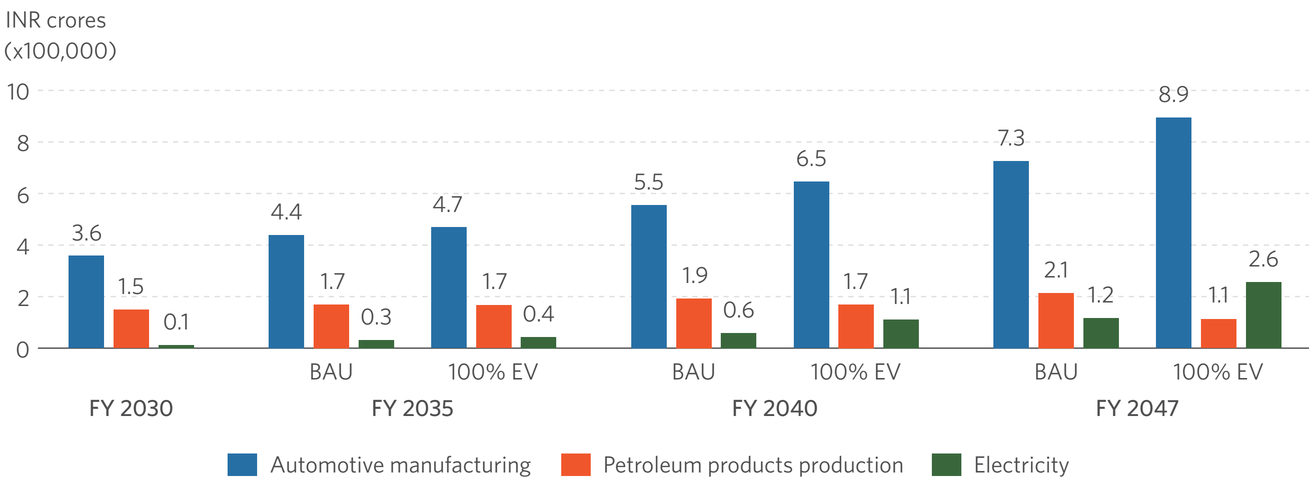
As global markets move toward electrified transport, the Indian automotive industry is poised to capture significant export opportunities. Currently, India's shares in global exports of vehicles and components stand at just 1% and 2%, respectively (NITI Aayog 2026). India's major export markets for passenger cars, including Saudi Arabia, South Africa, and Mexico, have chartered their EV transition plans, offering a potential opportunity for India-made EVs to tap these growing markets. Indian 2W manufacturers have a strong presence in African markets, creating a substantial export opportunity for India.

Focused efforts to enhance DVA can accelerate EV adoption by reducing EV costs, boosting the Indian automotive industry's overall revenue, and securing the country's position in the competitive global landscape by tapping export markets.

3.2 IMPACT ON THE NATIONAL ECONOMY

According to the Annual Survey of Industries 2023-24, motor-vehicle manufacturing recorded a GVA of INR 2.24 lakh crore (USD 26.8 billion) in 2023-24, increasing from INR 1.1 lakh crore (USD 12.7 billion) in 2020-21 (ASI 2025). Correspondingly, its share in aggregate factory GVA grew from 6.54% to 9.11% over the same period, highlighting the sector's expanding role in driving industrial growth and economic momentum. In addition, the automotive industry's deep linkages with upstream and downstream sectors, including oil and gas, steel and other metals, mean that the EV transition will have economy-wide implications. Figure 8 provides a summary of the projected GVA across automotive manufacturing, petroleum products production, and electricity generation and distribution.

Figure 8: Projected GVA across major industries under BAU and 100% EV scenarios



Source: *CPI analysis*

While the EV transition will redistribute outputs across the automotive value chain and related industries, it can have net positive economic gains and shape India's future industrial growth:

INCREASED NET GVA IN AUTOMOTIVE MANUFACTURING

A 100% EV transition could see a cumulative increase in automotive manufacturing GVA of INR 13.5 lakh crore (USD 162 billion) between 2031 and 2047, 15% more than the BAU trajectory. While ICEV manufacturing GVA could drop by INR 26.8 lakh crore (USD 320 billion) under the 100% EV scenario, this would be more than offset by an INR 40.3 lakh crore (USD 482 billion) increase in EV manufacturing GVA.

INCREASED TAX REVENUE FROM VEHICLE SALES

The automotive sector generated GST revenues of INR 3.37 lakh crore (USD 40 billion) in 2025. In September 2025, the government rationalized automobile GST, setting the rate for most ICEVs at 18% (40% for mid- and large-sized sports utility vehicles), while continuing to cap GST on EVs at 5% to incentivize adoption. If the concessional GST rate for EVs is phased out by 2030, upon achieving a 30% EV share in new vehicle sales, GST collections from new vehicle sales under a 100% EV adoption scenario would increase by INR 4.5 lakh crore (USD 54 billion) between 2031 and 2047.

REDUCED OIL IMPORT BILL AND GVA FROM PETROLEUM PRODUCT PRODUCTION

EV adoption is expected to alter conventional fuel demand patterns, with implications for the oil and gas industry. The transport sector accounts for 87% of total diesel demand and nearly 100% of petrol demand, with near-complete dependence on fossil fuels (PPAC 2025). In 2025, India consumed 91.4 million metric tons (MMT) of high-speed diesel and 40 MMT of petrol, with a CAGR of 7.7% and 2.8%, respectively, over the last ten years (PPAC 2025).

CPI estimates that under the 100% EV scenario, cumulative demand for gasoline, diesel, and CNG could fall by 750 MMT between 2031 and 2047, an 18% drop compared to the BAU scenario. Assuming unchanged demand from other sectors, this contraction would reduce refinery output and associated value addition in the oil and gas industry. The GVA from petroleum product production could drop by 16% from the BAU scenario between 2031 and 2047, amounting to an estimated INR 5.2 lakh crore (USD 62 billion). Transition planning for the oil and gas sector will be required to manage structural adjustment risks and safeguard economic stability.

REDUCED EXCHEQUER REVENUE FROM THE SALE OF FUELS

The EV transition implies a rebalancing of fiscal revenues from fossil fuel–linked taxes toward electricity-driven value creation, necessitating tax reforms to maintain fiscal resilience while advancing decarbonization.

Crude oil and LNG imports contribute to India's central exchequer through customs duty, and fuel retail sales contribute to the central and state exchequers through excise duty and value-added tax (VAT). In 2025, crude oil and petroleum product imports and sales yielded INR 15,500 crore (USD 1.9 billion) through customs duty and National Calamity Contingent Duty (NCCD), INR 2.7 lakh crore (USD 32.5 billion) through excise duty collection and INR 3 lakh crore (USD 36 billion) to state exchequers through VAT collections (PPAC 2025).

Under the 100% EV scenario, cumulative customs duty from 2031 to 2047 could drop by INR 5,533 crore (USD 661 million), excise duty revenue by INR 17.7 lakh crore (USD 212 billion), and VAT collections by INR 26 lakh crore (USD 312 billion) (41% reduction). On the other hand, increased EV charging could increase demand for electricity generation and distribution. GVA from electricity generation and distribution in the 100% EV scenario could increase by INR 9 lakh crore (USD 108 billion) between 2031 and 2047.

INCREASING IMPORT BILLS FROM EV COMPONENTS

While EV adoption could reduce India's oil and gas imports, low localization of EV component manufacturing in the initial years would increase imports of critical items such as battery cells and sub-components, electronic components, semiconductors, rare-earth magnets, and other critical minerals.

Under a 100% EV adoption scenario, the cumulative import bill for EV components[5] between 2031 and 2047 could increase by INR 9.2 lakh crore (USD 110 billion), even with ambitious localization efforts to achieve 100% DVA across key component categories by 2047. Under a conservative localization trajectory, wherein the localization of key component categories reaches 70-90% by 2047, the additional import burden could widen substantially to INR 30.7 lakh crore (USD 367 billion) with 100% EV adoption. These estimates highlight the need for localization efforts to avoid shifting import bills from oil and gas to EV components.

The government of India currently levies concessional customs duty on certain battery cell components, electronics, and semiconductor components to support the development of domestic EV manufacturing at this early stage. Assuming the concessional duties are discontinued from 2031 under the BAU scenario and continue until 2047, the government could generate an additional INR 86,053 crore (USD 10 billion) in customs duty and cess[6] between 2031 and 2047. Figure 9 provides a snapshot of the economic impact figures under the 100% EV scenario, compared to the BAU scenario.

5 Our analysis only evaluates import of key EV components including battery packs, electric motor reducer, power electronics and connectivity and control systems. The analysis does not take into account import of critical raw material for manufacturing EV components.

6 A cess in India is an additional, specific-purpose tax levied by the central government over and above the base tax liability.

Figure 9: Impact on economy under 100% EV scenario compared to BAU scenario (FY 2031 to FY 2047)

Change in GVA

- ↑ 15% increase in automotive manufacturing GVA: INR 13.5 lakh crore (USD 162 billion)
- ↓ 16% decrease in GVA from petroleum products production: INR 5 lakh crore (USD 62 billion)
- ↑ 92% increase in GVA from electricity generation and distribution: INR 9 lakh crore (USD 108 billion)

Import reduction → FOREX spending to be averted

- ↓ Decrease in crude oil import: 1085 MMT / USD 683 billion
- ↓ Decrease in LNG import: 631 MMT /USD 349 billion
- ↑ Increase in auto component imports: INR 9.2 lakh crores (USD 110 billion)

Revenue impact

- ↑ Increase in customs duty on auto component imports: INR 86,503 crores (USD 10.3 billion)
- ↓ Decrease in customs duty on crude and LNG imports: INR 5,533 crore (USD 661 million)
- ↓ Decrease in excise duty collection from fuel sales: INR 17.7 lakh crores (USD 212 billion)
- ↓ Decrease in VAT collection from fuel sales – INR 26.1 lakh crores (USD 312 billion)
- ↑ Increase in GST collection on sale of vehicles – INR 4.5 lakh crores (USD 54 billion)

Source: *CPI analysis*

The above analysis demonstrates that a 100% EV transition can materially reorient India's industrial structure and macroeconomic profile, yielding higher automotive GVA and substantial reductions in fossil fuel use. These gains, however, are intertwined with a critical social dimension, including the imperative to manage transition pressures on workers in ICE-linked segments. The EV transition could also result in a significant drop in fiscal revenues from fossil-fuel–linked taxes and value added by the oil and gas industry, necessitating calibrated transition planning and forward-looking tax reforms to sustain government revenues while supporting long-term decarbonization goals. A strong focus on enhancing the DVA, with corresponding investments, is crucial to avoid an increase in import bills for EV components. On the other hand, EV adoption contributes to positive externalities by reducing environmental pollution and improving air quality.

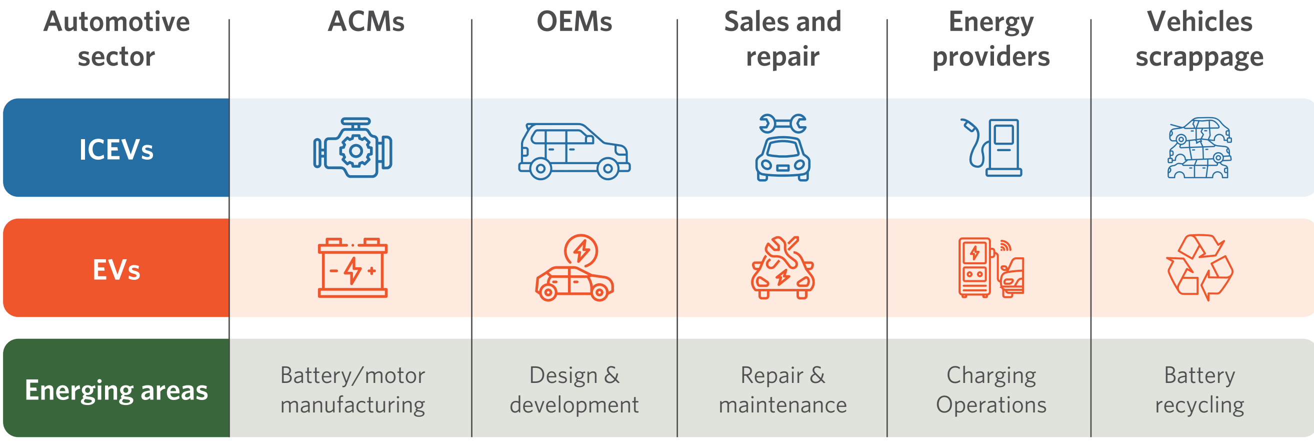
The following sections assess the social and environmental implications of the transition, focusing on changes in employment across the value chain and the potential for large reductions in tailpipe and greenhouse gas emissions.

3.3 IMPACT ON EMPLOYMENT

The automotive value chain is the third-largest employer in India's manufacturing sector, supporting 30 million direct and indirect jobs (PIB 2026a Feb). Direct employment, estimated at 4.2 million, comes from upstream activities including vehicle manufacturing, auto-component production, raw material supply, and allied industries. The remaining workforce is in downstream activities, including service, repair, dealerships and logistics (Sharma et al. 2025). This distribution highlights the sector's role in creating skilled and semi-skilled jobs.

As EV adoption accelerates, new value chain actors are reshaping employment dynamics across the automotive ecosystem. Figure 10 shows the emerging players, including EV startups, battery and component manufacturers, charging network developers, and recycling firms that are creating new jobs in EV component manufacturing, software, infrastructure development and services. In vehicle assembly, companies that operate exclusively in the electric mobility space hold a significant share of the light EV market. Production in other segments continues to be led by established OEMs, leveraging their existing manufacturing strengths and supply chains to scale EV offerings alongside their ICE portfolios.

Figure 10: Overview of emerging automotive value chain actors



Source: *CPI*

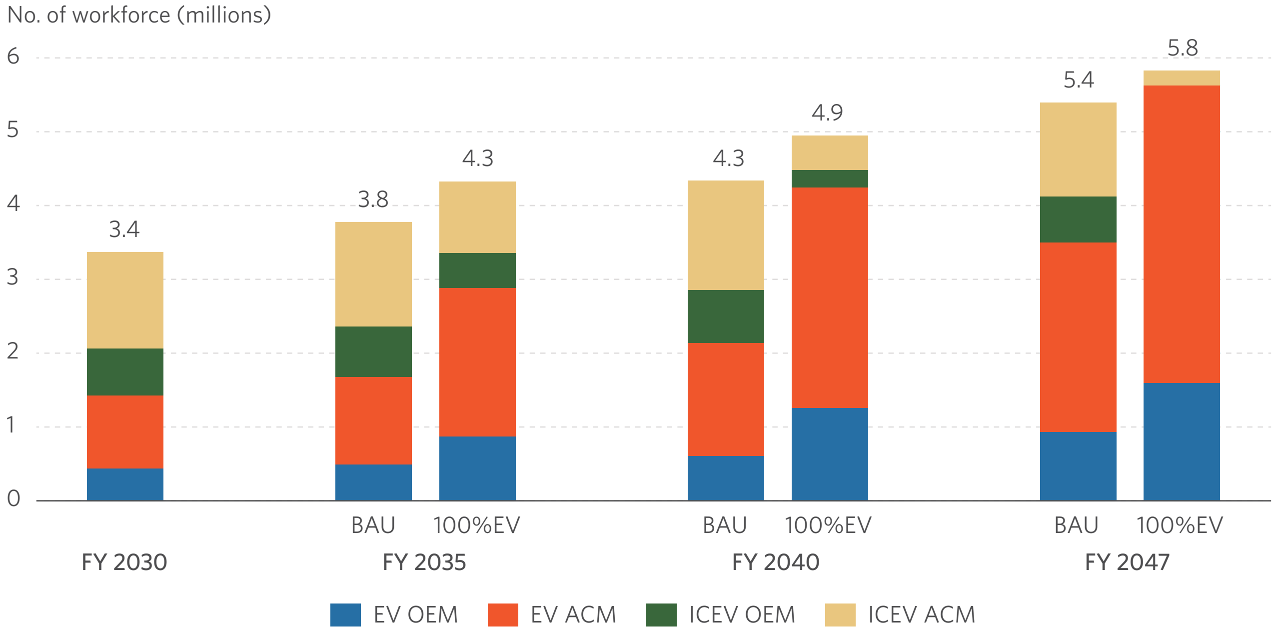
The increasing importance of advanced design and product development for electric drivetrains has increased the share of research and development (R&D) to account for nearly one-fifth of EV OEM manufacturing roles, and reduced the share of employees engaged in assembly operations in India (CPI 2026). This focus, coupled with nascent demand for EVs and the outsourcing of key assembled components such as batteries, has resulted in lower workforce productivity than ICEV OEMs, measured by the number of vehicles produced per employee.

Payroll data shows that mature ICEV OEMs have productivity levels up to 22 times higher than those of EV OEMs, reflecting decades of production system optimization and highly synchronized assembly operations. However, as EV manufacturing scales, greater platform standardization, in-house component sub-assembly, and learning-curve efficiencies can raise productivity. To capture this evolution, our projections incorporate gradual convergence toward ICEV OEM productivity levels, along with the localization of EV component manufacturing, to provide a robust basis for long-term employment estimates. Based on these assumptions, CPI's employment projections across automotive value chain actors highlight the following trends:[7]

1. **Vehicle electrification will shift the composition of the automotive workforce rather than contract it.** Indeed, overall jobs in vehicle assembly (OEM) and component manufacturing (ACM) in India can increase to 3.4 million in 2030 and to 5.4-5.8 million by 2047 under BAU and 100% EV scenarios. ICEV manufacturing jobs will decline as sales of these vehicles fall, though ACM jobs will persist to meet replacement demand for key components. Figure 11 illustrates that the expansion of EVspecific ACM can more than offset the losses in ICEV manufacturing.

7 Our projections are based on highly conservative multipliers to factor in abundant caution in the estimates, informed by consultations with value chain players. There can be some reduction in workforce due to automation of processes which is not factored in this study. As with all projections, actual outcomes can differ as market activity, automation, component localization, and productivity improvements materialize.

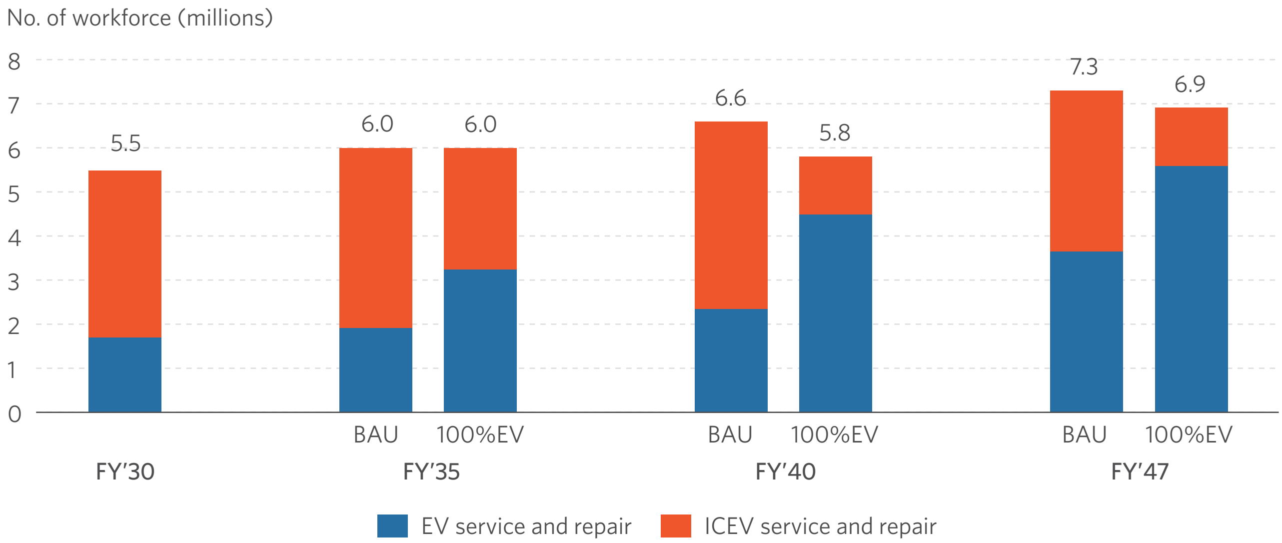
Figure 11: Projected employment in vehicle and component manufacturing



Source: *CPI & Deloitte Analysis*

2. **100% EV penetration may reduce and formalize service and repair roles.** Figure 12 shows that EV service employment is projected to increase to nearly 1.7 million by 2030 and up to 5.6 million by 2047 under the 100% EV scenario. However, this scenario could see ICEV service jobs decline from 3.8 million to 1.3 million, requiring targeted skilling support. As EVs have fewer moving parts, employment for vehicle service and repair is likely to decline overall and shift toward more organized, higher-skill services.

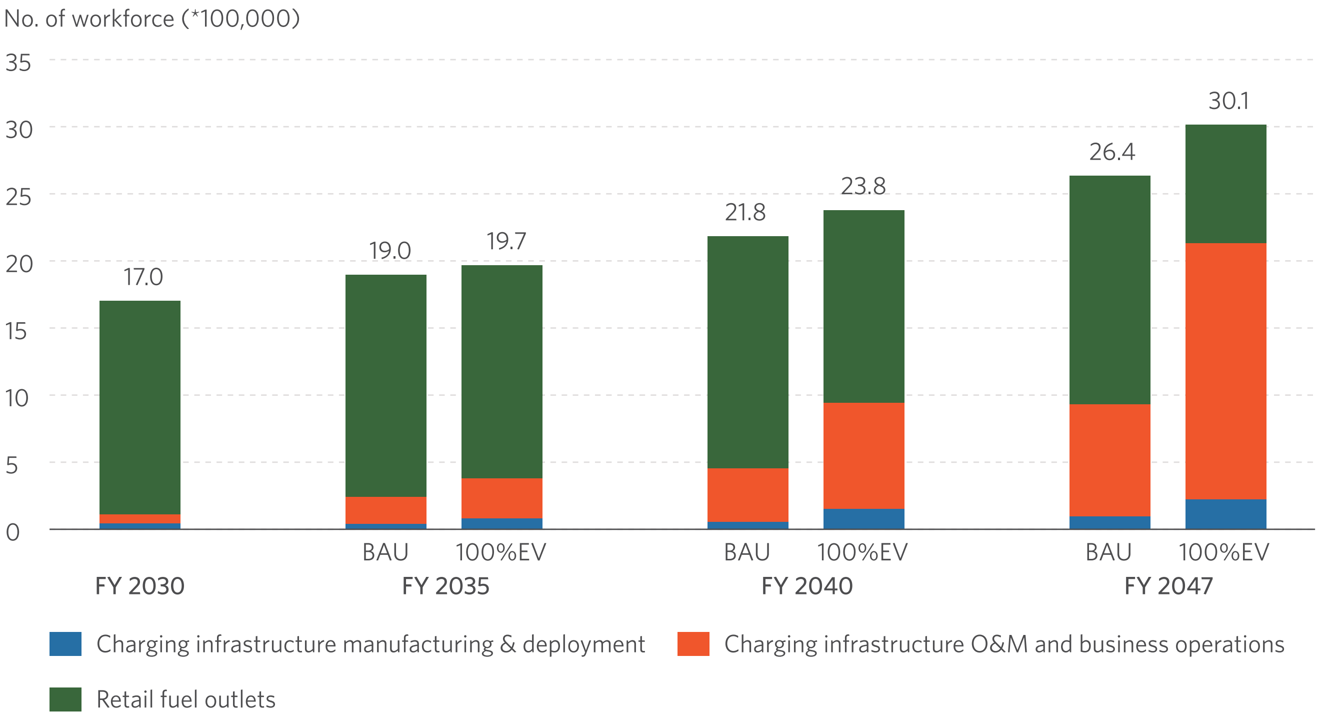
Figure 12: Projected employment in vehicle service and repair



Source: *CPI & Deloitte Analysis*

3. **Employment in refueling infrastructure will grow substantially, driven by the expansion of EV charging networks.** Total jobs in ICEV and EV refueling infrastructure could increase from 1.7 million in 2030 to 2.6 and 3 million by 2047 under the BAU and 100% EV scenarios, respectively (see Figure 13). Within these totals, jobs in charging infrastructure manufacturing and deployment have a projected rise from 40,000 in 2030 to 0.1- 0.2 million by 2047. EV infrastructure expansion could also create additional employment in charging infrastructure operations and maintenance, as well as in IT and platform services, and in business operations, increasing to an estimated 0.8 -1.9 million jobs by 2047. By contrast, employment at retail fuel outlets is projected to decline from million in 2030 to around 0.9 million by 2047, supported by residual ICEV fuel demand, which will prevent a complete phaseout of these jobs.

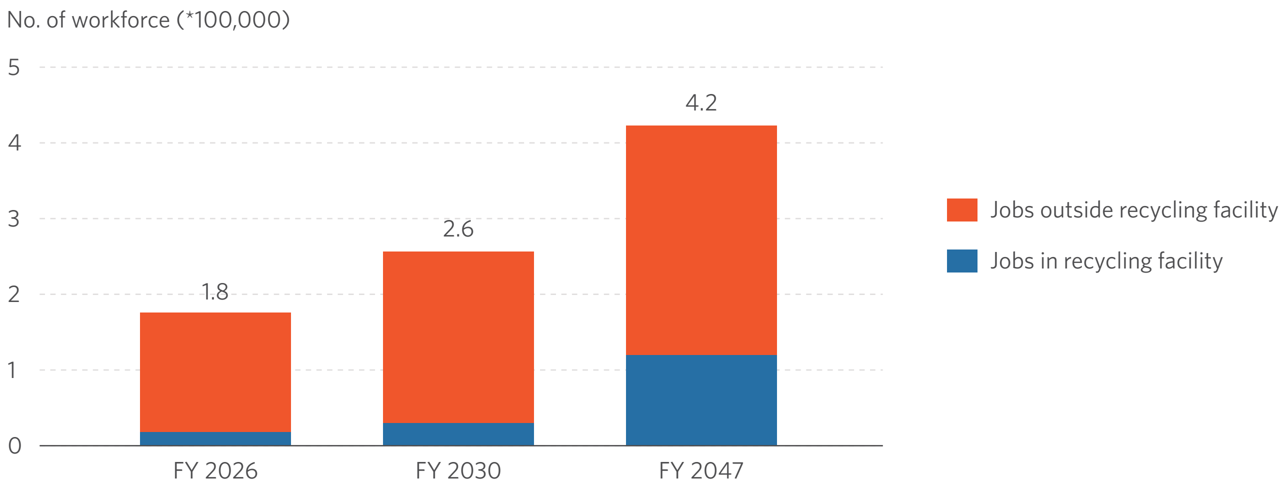
Figure 13: Projected employment in refueling infrastructure



Source: *CPI & Deloitte Analysis*

4. **Employment in EV battery recycling is expected to grow modestly.** Figure 14 highlights that total jobs in battery recycling could increase from 175,727 in 2026 to around 256,000 by 2030 and to 423,129 by 2047. End-of-life battery volumes are expected to rise after 2035, with a shift toward formal recycling and second-life applications. Most employment is expected to arise outside recycling facilities in collection, pre-processing and semi-formal dismantling. The sector will not be a large employer unless collection systems, regulatory enforcement, implementation of extended producer responsibility, and infrastructure investment scale up substantially.

Figure 14: Projected employment in battery recycling



Source: *Deloitte Analysis*

Vehicle electrification will reconfigure workforce composition across manufacturing, service and repair, and refueling infrastructure. Capturing net employment gains from the EV transition will require proactive skilling strategies and policy support that enable labor mobility from vulnerable ICEV-linked segments toward emerging opportunities in EV manufacturing, charging infrastructure, servicing, and battery recycling. Simultaneously, increased localization of EV component production will be essential to anchor these new jobs domestically and maximize long-term value creation.

3.4 ENVIRONMENTAL IMPACT

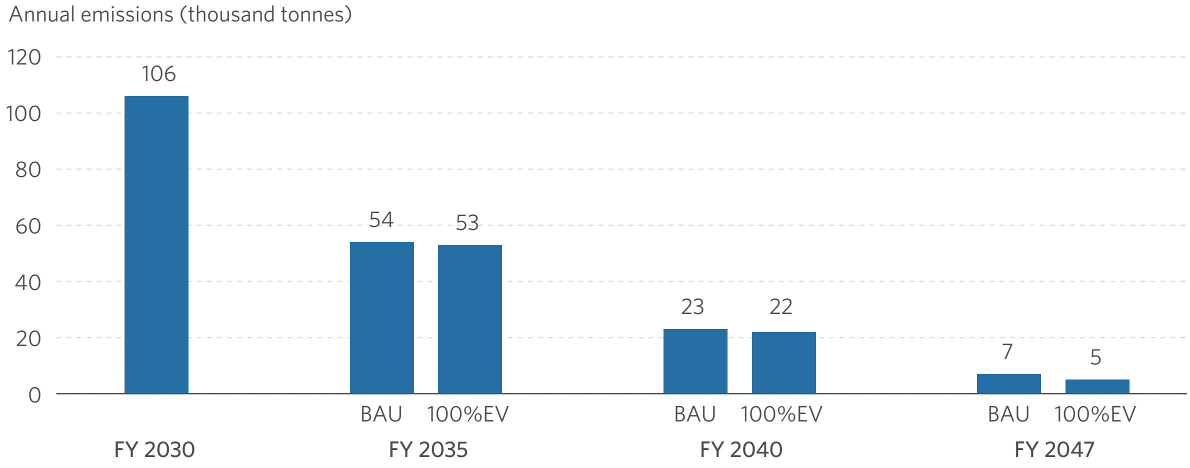
The EV transition offers a critical pathway to reduce air pollution and advance India's decarbonization goals. Prioritizing the electrification of trucks and tractors can deliver significant improvements in air quality and health benefits.

Indian cities grapple with persistent severe air pollution. India ranks among the world's most polluted countries with several of its cities among the ten most polluted cities globally (IQAir 2024). Particulate matter (PM) concentrations in many urban areas are several times above World Health Organization guidelines (Kawano et al. 2025). Road transport is a major contributor to this issue, accounting for a significant share of urban air pollutants and around 12% of India's energy-related CO_2 emissions (IEA 2022). Air pollutants, including carbon monoxide (CO), hydrocarbons (HC), nitrogen oxides (NO_X), and PM, contribute to respiratory illnesses, cardiovascular diseases, and premature mortality. To understand how EV adoption could impact air quality, CPI estimated tailpipe emissions[8] from on-road vehicles through 2047. Emissions estimation for 2025 is based on Automotive Research Association of India (ARAI) Type 1 approval limits (ARAI 2021). Those for 2026-2047 are based on assumptions detailed in Annexure 7.1.

8 Our estimation does not account for emission intensity of the electricity grid in the emission estimations. We assume that all vehicles in the total stock of a particular year will be used for an average annual distance or will be operational for average annual hours (for tractors) which can lead to higher estimation of tailpipe emissions.

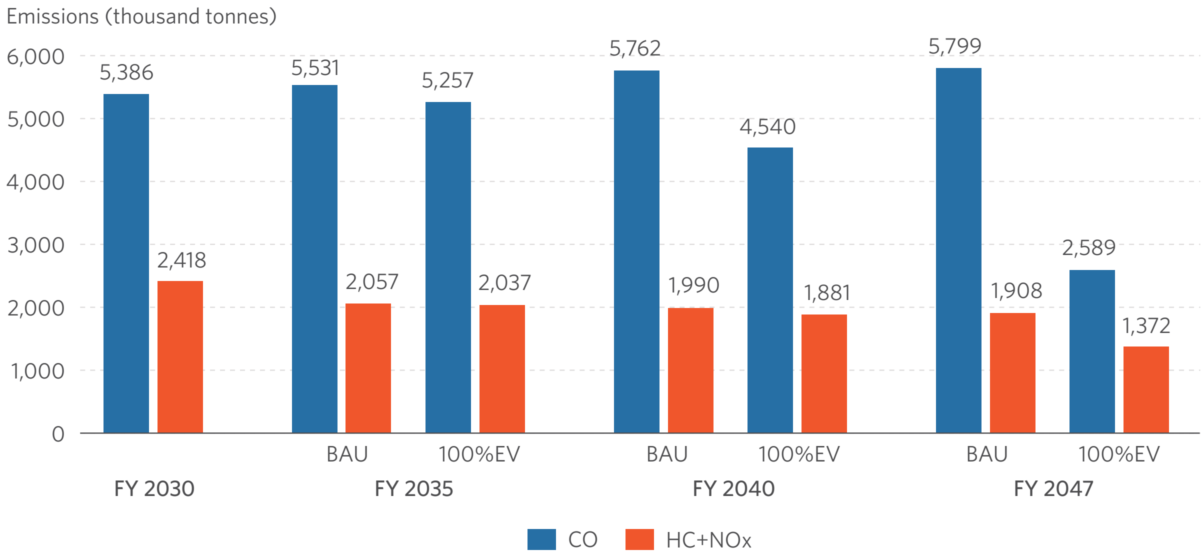
The 100% EV adoption scenario sees significantly lower local air pollutants than the BAU pathway, with benefits increasing over time. A 100% EV scenario would reduce ICEV stock by 40% by 2040 and by 80% by 2047 compared to BAU. This results in annual CO emissions from on-road vehicles declining from 2030 to over 50% by 2047. Annual HC and NO_X,[9] and PM emissions could be reduced by around 28%, reflecting the elimination of tailpipe combustion emissions (see Figure 15 and Figure 16). Notably, trucks and tractors currently contribute to 42% of CO, 77% of HC and NO_X, and 87% of PM emissions from vehicles, making their electrification a key opportunity for air quality gains.

Figure 15: Projected annual PM emissions under each scenario



Source: *CPI Analysis*

Figure 16: Projected annual CO, HC, and NOx emissions under both scenarios

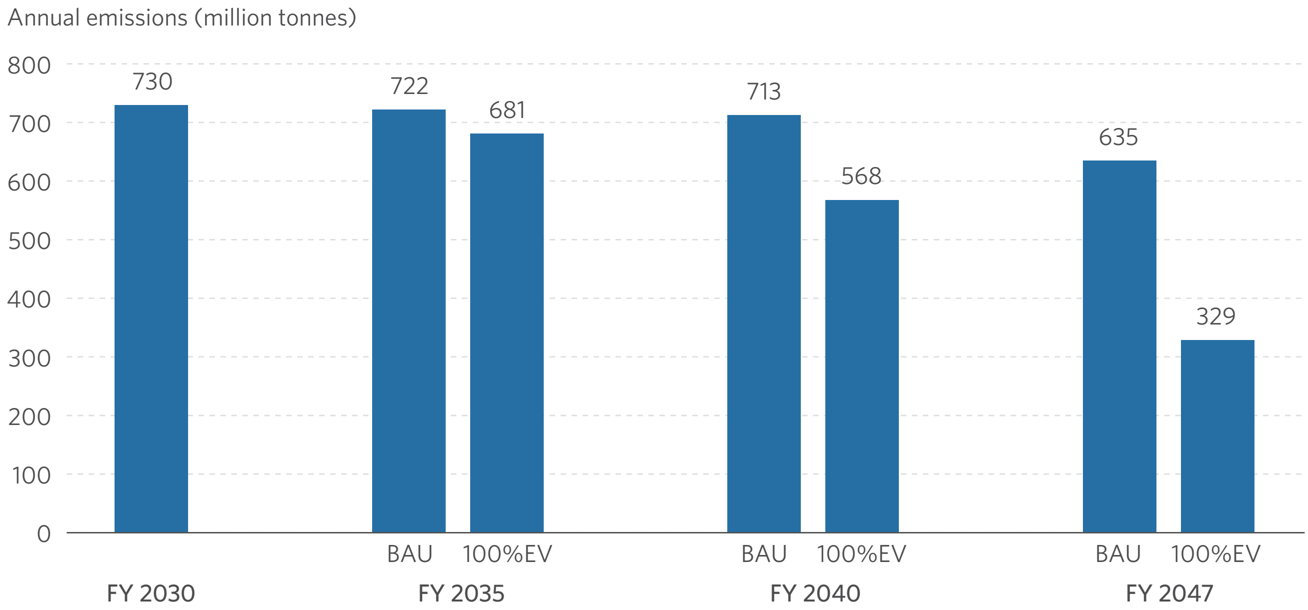


Source: *CPI Analysis*

9 ARAI emission guidelines provide a combined emission factor for HC and NOx for different vehicle segments, hence our estimations show a combined value for these pollutants.

EV adoption is also a critical lever for decarbonizing India's transport sector and advancing national climate targets. Figure 17 shows that achieving 100% EV adoption could deliver significant climate mitigation benefits, reducing CO_2 emissions by 48% in 2047. CO2 emissions would peak by 2030 and fall by 55% by 2047 under this scenario. Even by 2040, annual emissions would be around 20% lower than under BAU, highlighting the early impact of accelerated electrification. Cumulatively, 100% EV adoption could avoid up to 2.3 billion tonnes of CO2 between 2031 and 2047, compared to BAU.

Figure 17: Projected annual CO2 emission under both scenarios



Source: CPI Analysis

The above assessment shows that a 100% EV transition could deliver substantial benefits from new jobs to significant reductions in CO_2 and local pollutants. Achieving these outcomes depends on whether the ecosystem can support rapid, sustained, and scalable electrification. This requires timely expansion of charging infrastructure, adequate reinforcement and decarbonization of the power system, and sufficient manufacturing and skilling capacity. The next section examines the readiness of these pillars, identifies key infrastructure gaps, and estimates the investments needed to close them by 2047.

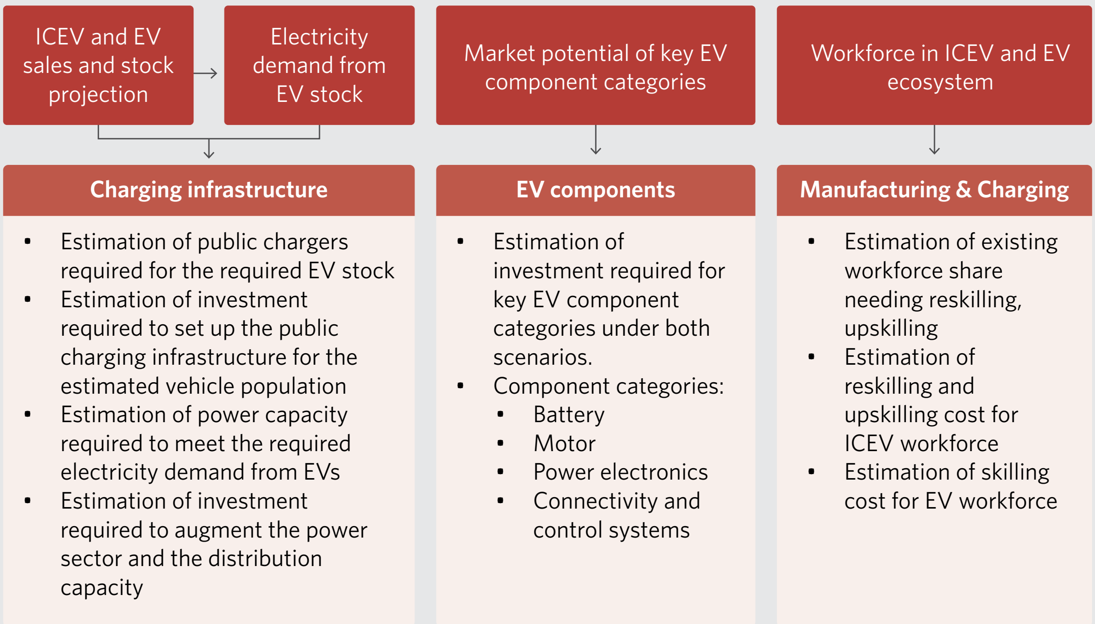
4. ECOSYSTEM READINESS AND REQUIRED INVESTMENT

Achieving 100% EV adoption by 2047 requires coordinated transformation, not just in the automotive sector but across the broader ecosystem. Moreover, a key lever for India to become a global EV manufacturer is a skilled workforce. Surging EV demand requires value chain actors, including OEMs, ACMs, electricity generation companies (GENCOs), distribution companies (DISCOMS), and EV charging point operators (CPOs), to invest substantial capital in upgrading their infrastructure and in workforce reskilling and upskilling. This section dives into ecosystem readiness, the existing investment landscape, and the capital required for a systemic shift to clean mobility.

Box 3. Methodology for ecosystem readiness and investment requirements

The analysis builds on the datasets generated in the sections 2 and 3 to estimate the enabling infrastructure and system-wide investments needed for the transition. The analysis is carried out using current market prices, without accounting for inflation or depreciation of the INR against USD over time. Figure 18 outlines the methodology adopted to estimate the investment required to establish charging infrastructure, enhance manufacturing capacity, build renewable energy capacity to meet increased electricity requirements, and fund workforce reskilling and upskilling. Further details are provided in Annexure 7.1.

Figure 18: Methodology for estimating investment required for ecosystem readiness



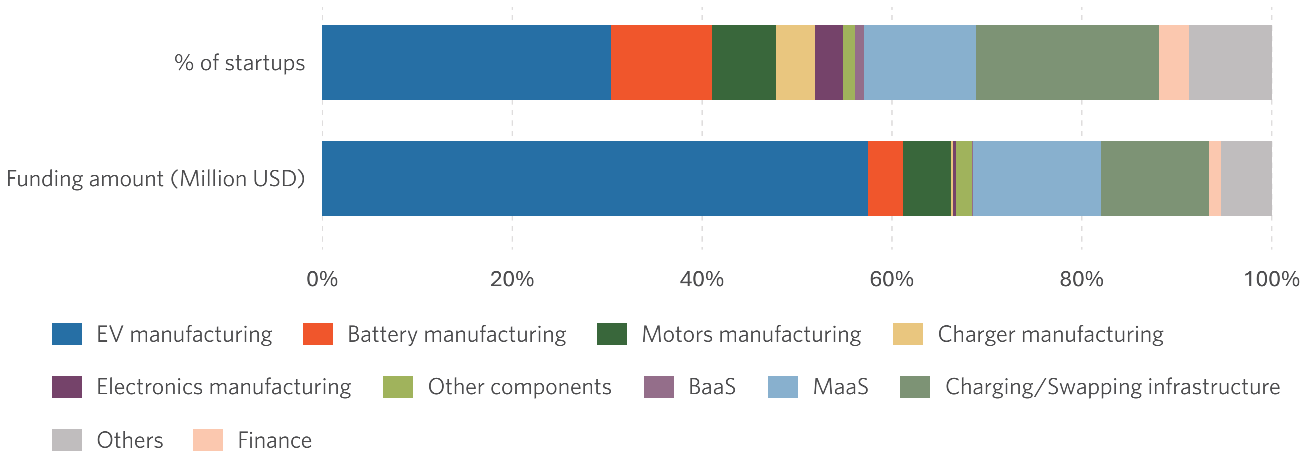
4.1 CHARGING INFRASTRUCTURE AND DISCOMS

Limited charging infrastructure hinders EV adoption, while a robust network of fuel stations supports the ICEV ecosystem. India currently has roughly one public charger for every 200 light-duty EVs, significantly below the benchmark of 1:40 (CII 2023).

The projected EV stock will require between 1.7 million public chargers under the BAU scenario and 3.8 million under the 100% EV scenario by 2047, requiring a CAGR of 16% to 22% from 2030 to 2047. Developing a long-term roadmap for urban planning and allied infrastructure development will be essential, particularly to ensure land availability for charging station deployment.

Scaling the charging network nationwide will take coordinated planning and significant capital deployment. Cumulative investment requirements for charging infrastructure are estimated to be INR 1.7 lakh crore (USD 20 billion) under BAU and INR 4.4 lakh crore (USD 53 billion) under the 100% EV scenario. Investment needs to grow at a CAGR of 26.5% between 2030 and 2047 under the 100% EV scenario. The Indian e-mobility ecosystem is witnessing the emergence and growth of several startups offering innovative products and mobility-as-a-service, thereby enabling increased adoption of EVs in the market. CPI carried out an analysis of investments in 312 electric mobility startups from the Tracxn database (shown in Figure 19), which have cumulatively attracted investment of USD 8.8 billion between CY 2021 and CY 2025.

Figure 19: Summary of major EV startups and investments CY 2021- CY2025

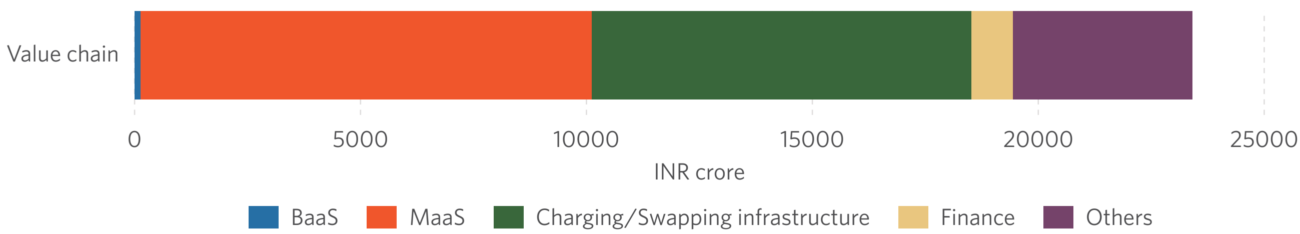


Source: *Tracxn, CPI analysis*

Among these startups, ecosystem-enabling startups, such as those engaged in charging infrastructure, mobility-as-a-service, battery-as-a-service, and EV financing businesses, have attracted USD 2.8 billion, accounting for 32% of the total sectoral investment. The details of investments for these enabling startups is shown in Figure 20. While this signals growing investor confidence, the capital mobilized is modest relative to infrastructure needs.[10]

10 Our analysis of actual investments in the ecosystem is limited to startups, considering their significance in the Indian e-mobility landscape. The investment numbers do not reflect total investments in the ecosystem during the period (CY 2021-2025).

Figure 20: Investment in E-mobility ecosystem startups in India

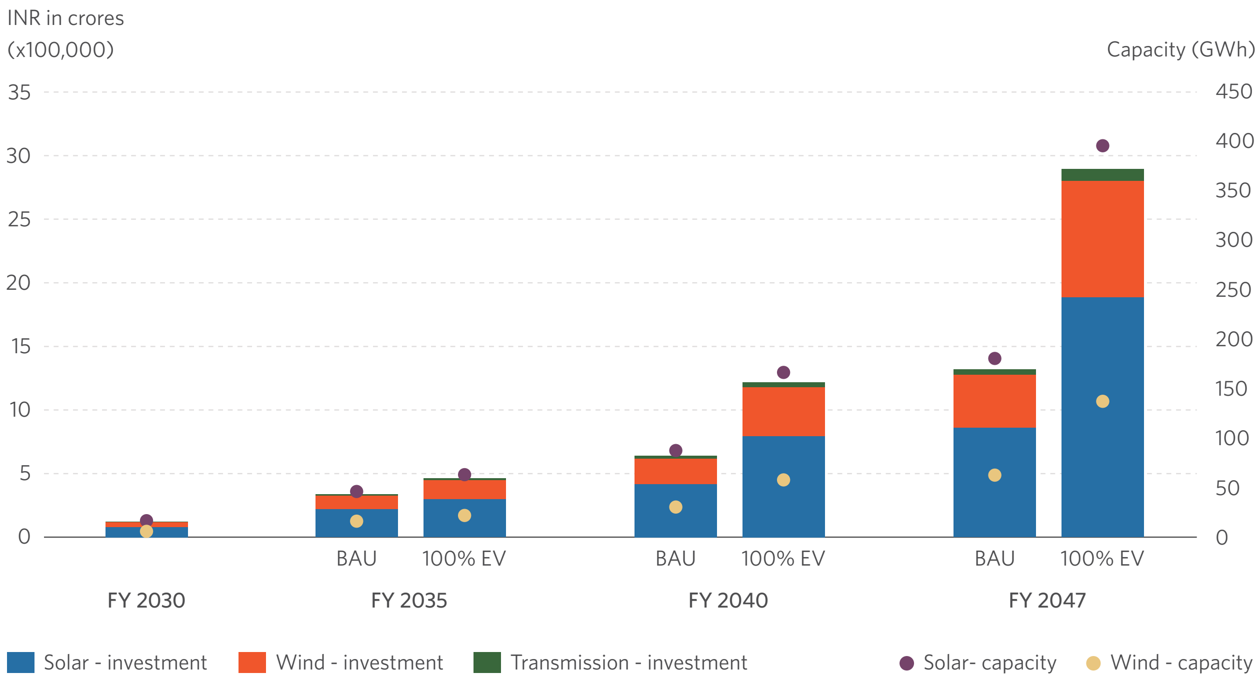


Source: *Tracxn, CPI analysis*

Building a nationwide charging network will take tight coordination among CPOs, municipal corporations, state governments, and DISCOMs. High capital expenditure is required for land acquisition, grid connectivity, and hardware. Additionally, power utilities will need to augment their capacity to meet the increased demand from EV charging.

EV adoption will necessitate expanded renewable power generation and transmission capacity. CPI analysis indicates that meeting electricity demand for India's projected EV stock by 2047 would require an additional 243 GW of installed power generation capacity under BAU and 533 GW under a 100% EV scenario. Assuming that this demand would be met entirely by renewable energy (solar and wind), this could entail cumulative investment by 2047 of INR 13 lakh crore (USD 158 billion) under BAU and INR 29 lakh crore (USD 345 billion) with 100% EVs (see Figure 21).[11] In addition, expanding distribution and transmission infrastructure could require INR 41,600 crore (USD 5 billion) under BAU and INR 1 lakh crore (USD 11 billion) for the 100% EV scenario.

Figure 21: Power generation capacity and investment required for EV charging



Source: *CPI analysis*

11 Our analysis of actual investments in the ecosystem is limited to startups, considering their significance in the Indian e-mobility landscape. The investment numbers do not reflect total investments in the ecosystem during the period (CY 2021-2025).

With charging infrastructure in the EV ecosystem performing the vital role that conventional fueling stations play in the ICEV ecosystem, there is a clear need to mobilize finance at the broader ecosystem level. Additionally, a long-term roadmap and urban planning strategy are essential to address the availability of land parcels, especially given India's growing population and expansion of other infrastructure.

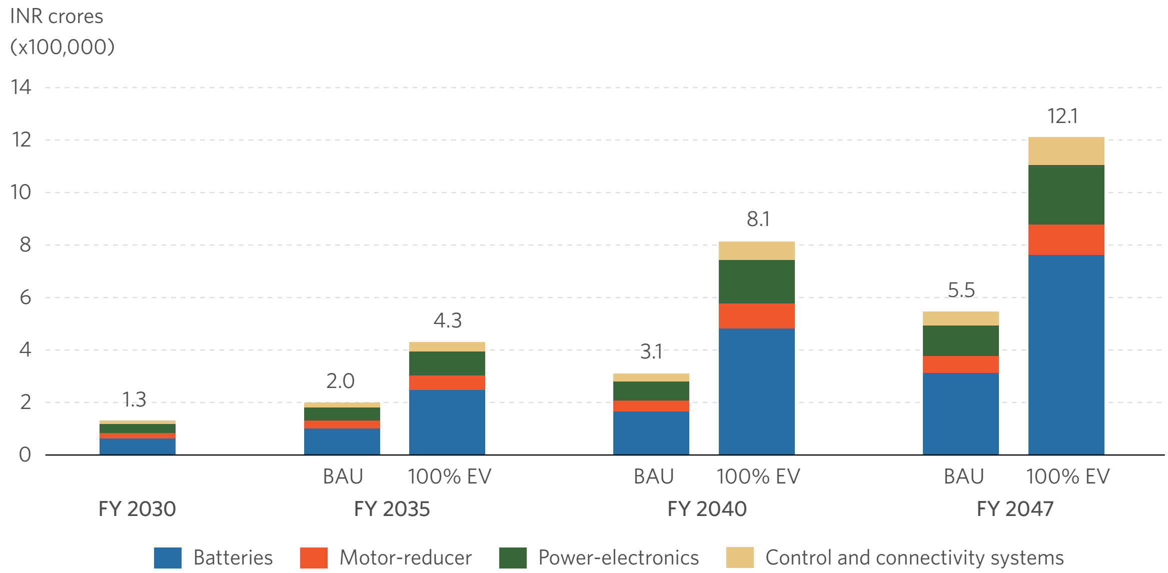
4.2 MANUFACTURING READINESS

Empowering domestic manufacturing is key to achieving India's EV transition goals. The country's automotive industry transformed dramatically in recent decades, with several leading global manufacturers setting up in India. Today, India is viewed as a crucial manufacturing hub for both domestic vehicles and emerging markets in South Asia and Africa. However, India's share in global automotive exports is just 1%, primarily because developed economies had a several-decade head start in terms of technology and access to global markets and trade. India's ACM industry accounts for just 3% of the global auto-component trade. The nascent, evolving nature of EV technology offers India a key opportunity to become a global automotive manufacturing leader.

Boosting domestic EV manufacturing requires OEMs to revamp their model mix, restructure their operations, and revisit their long-term strategies and R&D focus. ACMs must diversify toward EV-relevant technologies to avoid becoming redundant. This process requires manufacturing enterprises to infuse large sums of capital into their businesses in a phased manner.

Our analysis indicates that by 2047, major EV component categories could cumulatively require INR 5.5 lakh crore (USD 65 billion) under BAU and INR 12.1 lakh crore (USD 145 billion) under the 100% EV scenario. Battery manufacturing accounts for about 57-63% of this investment, given the capital-intensive nature of advanced-chemistry cell and battery production. With batteries accounting for about 40% of EVs' total cost, it becomes crucial to facilitate public and private capital for the sector.

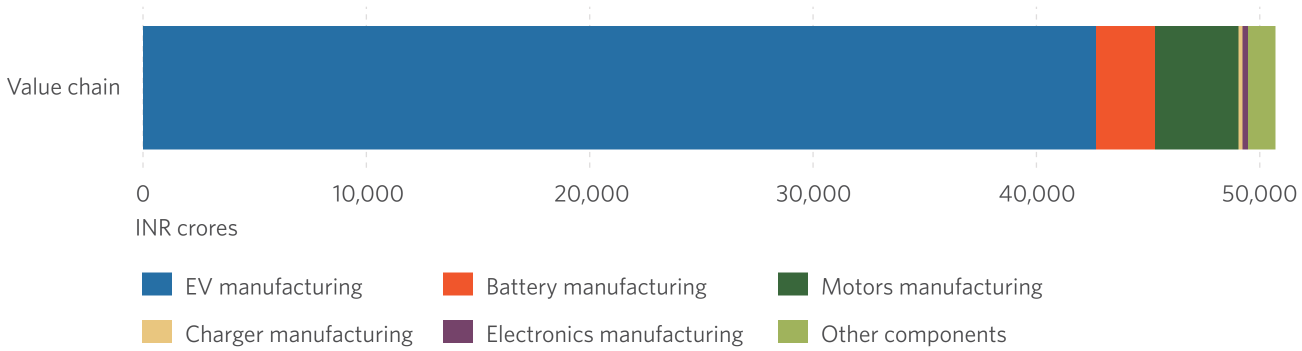
Figure 22: Investment required for key EV component categories



Source: *CPI analysis*

CPI's analysis of major investments across 312 startups in India revealed cumulative investment of USD 8.8 billion (INR 73,629 crore) between CY 2021 and CY 2025 (see Figure 19). EV manufacturers, which accounted for 30% of startups analyzed, attracted about 58% of these investments, at USD 5.1 billion (INR 42,780 crore).[12]

Figure 23: Investment in manufacturing startups over the last 5 years



Source: *Tracxn, CPI analysis*

Scaling EV adoption requires more capital for mature and growth-stage startups that can deliver products quickly. OEMs are central to the EV transition through their deep-tech research, innovative product design, and market access. However, the entire manufacturing ecosystem must scale, including smaller ACM companies. According to CPI analysis, EV component manufacturing could require an investment of INR 12 lakh crore (USD 145 billion) by 2047 under the 100% EV scenario.

However, the analysis of investments in startups revealed that component manufacturing startups, including batteries, motors, chargers, and electronics, attracted a cumulative investment of USD 965 million (INR 8,074 crore) over the last five years, accounting for just 11% of the total investment, despite accounting 26% of the total startups under analysis. EV manufacturing startups accounted for 68% of growth and late-stage funding rounds by number. In comparison, batteries and other component manufacturing startups accounted for just 32%, indicating lower participation in upstream value chain actors. This highlights that the consumer-facing segment, i.e., EV OEMs, has attracted more investments, rather than the upstream value chain, which is vital for scaling up manufacturing.

Among the component manufacturing startups, growth- and late-stage funding rounds accounted for just 12% of total rounds. In comparison, early-stage funding accounted for 78%, highlighting the limited presence of component manufacturing startups scaling up their manufacturing and expanding their market presence. For the domestic automotive manufacturing industry to achieve scale and accelerate EV adoption, more EV ACM startups must progress from early- to growth-stage with mobilization of private capital to boost India's upstream EV manufacturing capacity. Mobilizing R&D finance and developing regional clusters

12 Our analysis of actual investments in the ecosystem is limited to startups, considering their significance in the Indian e-mobility landscape. The investment numbers do not reflect the total actual investments in the ecosystem during the same period (CY 2021-2025).

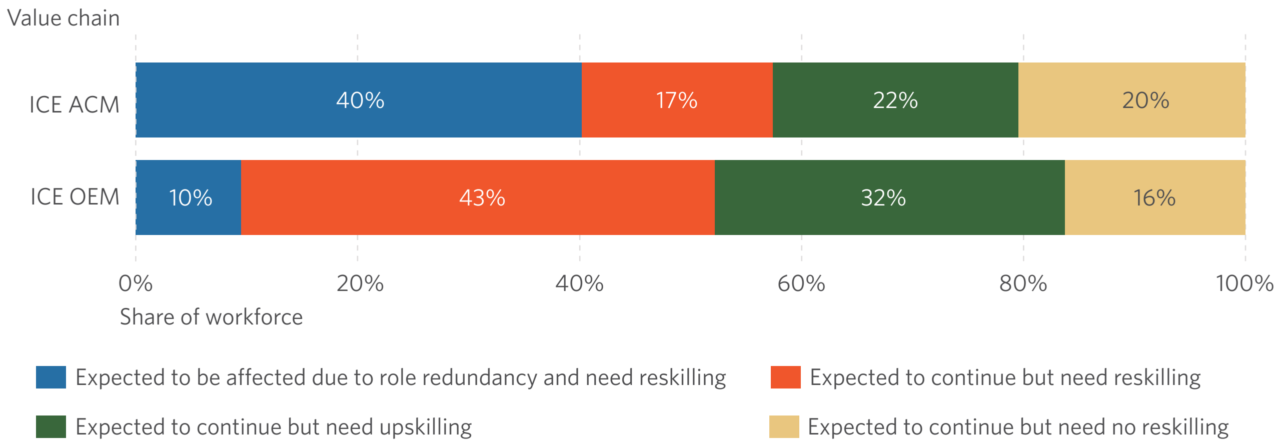
can foster innovation and enable the growth of upstream micro, small, and medium enterprises, which make up most ACMs.

4.3 SKILL DEVELOPMENT

With EVs set to transform the automotive industry's employment landscape, skilling is a crucial aspect to address. CPI paper "Outlook of Future Mobility Jobs Market in India with EV Transition" (2026) explores demand for specialized and technical roles in the EV value chain.

Figure 24 summarizes CPI's analysis of how the ICE OEM and ACM workforce may be affected by the EV transition and the corresponding reskilling and upskilling requirements. Around 10% of the ICE OEM workforce, primarily in core powertrain-related activities, could become redundant. In comparison, nearly 40% of the ACM workforce may face role displacement due to the concentration of ICE value addition in these segments. This affected workforce will need reskilling to be absorbed into the emerging EV manufacturing ecosystem. However, a large share of OEM and ACM workers could remain employed in the EV value chain with some degree of reskilling or upskilling. Only a small portion of roles are likely to continue without significant changes in skill requirements.

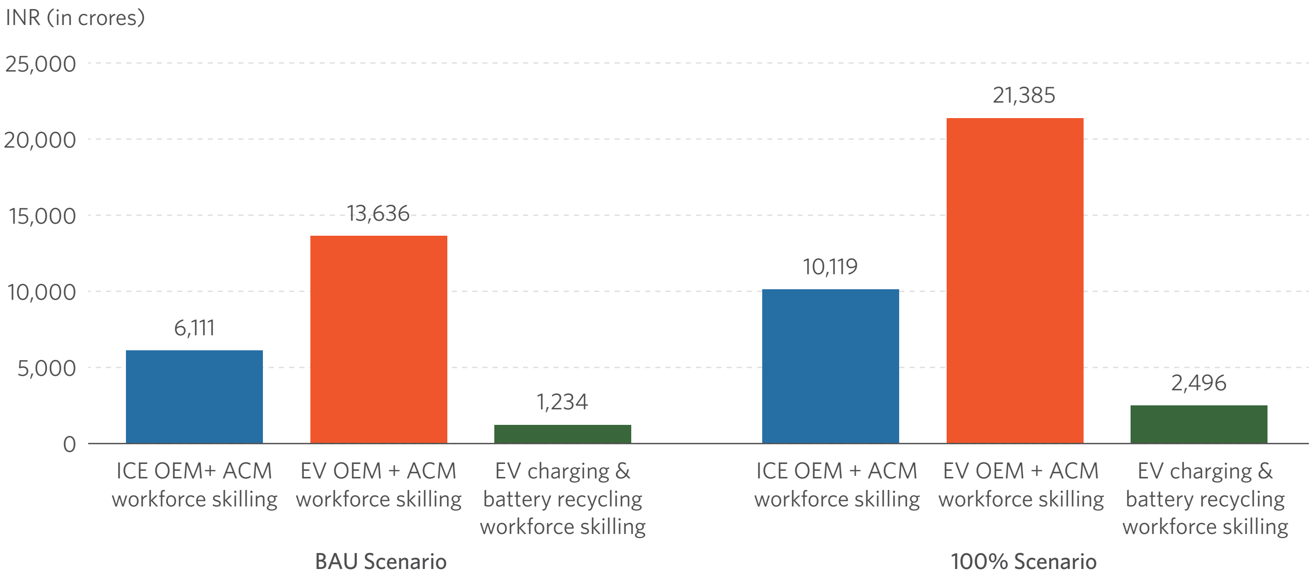
Figure 24: Share of ICE workforce requiring skill development for EV transition



Source: *CPI & Deloitte analysis*

CPI analysis indicates skill development costs of INR 33,999 crore (USD 4.1 billion) under the 100% EV scenario, 62% higher than the BAU. Figure 25 shows that around 30% of the skilling expenditure will be required to retrain and upskill existing ICE workers transitioning to the EV ecosystem. The largest share of investment need is expected for skilling EV ACM workers, with a smaller share needed for workforce development in emerging segments such as charging infrastructure and battery recycling.

Figure 25: Cumulative skill development cost for projected ICEV and EV workforce (2026-2047)



Source: *CPI analysis*

Both individual efforts and industry-led initiatives are needed to help ICEV workers upskill and transition into overlapping roles in EVs. However, state-led efforts will be vital to reskill those in roles that could become redundant due to EVs. Reskilling could require INR 6,115 crore (USD 0.73 billion) under BAU, accounting for 30% of the total skilling expenditure and INR 5,395 crore (USD 0.64 billion) under the 100% EV scenario (16%).

Table 4 provides a summary of major investments and expenditure requirements as per CPI's analysis under both scenarios. The cumulative investment required across value chain segments ranges from INR 20.4 lakh crores under the BAU scenario to 45.5 lakh crores under the 100% scenario.

Table 4: Cumulative investment and skilling cost for EV Transition between 2026 & 2047 (INR lakh crore)

Detail	BAU scenario	100% EV scenario
	Investment	
EV component manufacturing	5.5	12.1
Charging infrastructure	1.7	4.4
Power capacity augmentation and distribution	13.2	28.9
Total investment required	20.4	45.5
	Expenditure	
Skill development cost	0.2	0.3
Total	**20.6**	**45.7**

Source: *CPI Analysis*

4.4 COST-BENEFIT ANALYSIS

The following points highlight the costs and benefits of a 100% EV transition relative to the BAU scenario over the 17 years from 2031 to 2047.

- **Substantial import bill savings can compensate for the decreased revenue to the exchequer.** Fiscal pressure could arise from reduced excise/VAT collections from fuel sales of INR 43.8 lakh crores (USD 524 billion), a decrease in customs duty collection from oil and gas imports of INR 5533 crore (USD 661 million), and an increased import bill from EV components of INR 9.2 lakh crore (USD 110 billion). However, these are projected to be offset by gains from reduced oil imports and increased tax collection. The largest benefit could be the avertion of an oil and natural gas import bill of INR 86.3 lakh crore (USD 1031 billion), which would reduce exposure to global price volatility, improve the current account balance, and strengthen energy security. In addition, higher GST collection from vehicle sales of INR 4.6 lakh crore (USD 55 billion) could further cushion fiscal losses.
- **GVA from the automotive industry and power sector is projected to exceed the potential reduction in GVA from petroleum products production.** Increased GVA from the automotive industry of INR 13.5 lakh crore (USD 162 billion) and the power sector of INR 9 lakh crore (USD 108 billion) reflects the significance of domestic value creation and cascading effect on allied industries. These gains could exceed the potential contraction in GVA petroleum products production of INR 5.2 lakh crores (USD 62 billion).
- **Ambitious EV adoption has a positive social impact of increasing employment opportunities.** Although the EV transition is generally attributed to workforce reductions driven by decreased component demand, CPI analysis indicates that 100% EV adoption would increase total jobs. Apart from the manufacturing industry, newer value chain segments such as charging infrastructure deployment and operation, and battery recycling, offer fresh avenues for employment.
- **Significant positive externalities of reduced vehicular pollution and improved air quality levels accompany ambitious EV adoption.** Our analysis indicates a net reduction in vehicular pollution levels under the 100% EV scenario, with annual CO emissions declining by 55%, HC+NOx and PM emissions declining by about 28%, and CO_2 emissions reducing by about 48% by 2047.
- Table A11 in the Annexure provides a summary of CPI's estimates of key economic and fiscal figures, highlighting the costs and benefits of a 100% EV scenario relative to the BAU scenario. Overall, the analysis suggests that electrification not only mitigates external energy dependence but also catalyzes domestic economic activity, with macroeconomic, energy security and environmental benefits decisively offsetting transition-related costs.

Realizing the projected benefits will require substantial upfront investments across the value chain, as highlighted in the previous sections. Capital will be required for manufacturing capacity, charging infrastructure, grid augmentation, and skilling initiatives, led by coordinated efforts from industry and ecosystem stakeholders. Sustained policy support, backed by fiscal incentives, regulatory clarity, and long-term demand signals, will be critical to de-risk investments and fully unlock the macroeconomic and energy security gains of complete EV adoption.

5. POLICY LANDSCAPE AND FINANCING PATHWAYS

An enabling policy environment is crucial to attracting strategic investments and channeling private capital across the EV ecosystem. This section provides an overview of the existing global and Indian policy landscape to identify where policy support can create a more favorable investment climate. It also outlines potential financing pathways to mobilize capital by analyzing the existing investment landscape.

5.1 POLICY AND REGULATORY LANDSCAPE

India's central and state governments have deployed fiscal and non-fiscal measures to accelerate EV adoption over the past decade. Flagship initiatives, including the FAME and PM E-DRIVE schemes, have boosted EV uptake by incentivizing purchases and funding charging infrastructure (PIB 2026b Feb). On the supply side, India has implemented the PLI Scheme for the Automobile and Auto-Component Industry and the PLI Scheme for Advanced Chemistry Cell Battery Storage. These schemes to incentivize domestic manufacturing aim to reduce import dependence across the EV value chain. Between 2019 and 2025, the Government of India allocated INR 71,546 crore (USD 9 billion) for different schemes to strengthen the EV ecosystem (BEE 2025; PIB 2026b Feb), detailed in Table A10 in the Annexure.

Many state governments supplement these efforts through subnational EV policies. While these measures have reduced upfront costs and stimulated early adoption in a price-sensitive market, policy design is largely driven by incentives. The next phase requires securing a supply chain with clearer long-term signals and alignment between departments.

5.1.1 GLOBAL POLICY LANDSCAPE

Leading EV markets have set transport electrification targets supported by policy frameworks to accelerate EV adoption and domestic manufacturing. China and the US have deployed large-scale demand grants, targeted manufacturing finance, and charging programs, signaling an end-to-end approach as summarized in Table 5. At the same time, high-income markets like Norway have relied heavily on tax exemptions and on the deployment of robust charging infrastructure.

Table 5: Summary of policy measures adopted in China, the US, and Norway

Policy measure	China	US	Norway
Purchase subsidy and tax deductions/ exemptions	USD 28 billion for EV subsidies and tax incentives Exempted purchase tax of up to USD 4,170 for EVs until 2025	Tax credit up to USD 7,500 for new EVs and up to USD 4,000 for used vehicles.	Exemption of 25% VAT (capped) for the purchase of an EV Exempted registration tax, VAT, emission tax, road tax and tolls, purchase/ import tax
Other benefits	Exempted/reduced parking fees in public parking lots	Access to bus lanes	Lower parking fees Access to bus lanes

Policy measure	China	US	Norway
Supply-side incentives	EV production mandates through credits	USD 3 billion credit subsidy to support loans for EV OEMs 50% coverage of factory retooling costs for transitioning to EV production	
R&D support	Special funds for innovation and demo projects	USD 3 billion for advanced battery technology R&D	
Charging infrastructure deployment	Subsidies for local governments for charging infrastructure deployment	USD 7.5 billion for EV charger deployment 30% tax credit (capped at USD 100,000) for charging property	USD 31.5 million for charging infra development

Source: *OECD 2022; Oxford Institute of Energy Studies 2023; ICCT 2025*

Experiences from the leading EV markets shown in Table 5 highlight the value of targeted public funding for battery and EV R&D, which has enabled rapid technology maturation. Factory retooling support in the US has also helped legacy manufacturers to transition to EVs. Similar support could also reduce operational risks and smooth India's industrial transformation. In addition, graduated production and sales mandates for OEMs linked to a credit system, such as China's New Energy Vehicle credit system, can help to align industry behavior with electrification goals (ICCT 2018). Sustained public investment in a robust national charging network is also essential to strengthen investor confidence and crowd in private capital to support India's ambition of building a globally competitive EV ecosystem.

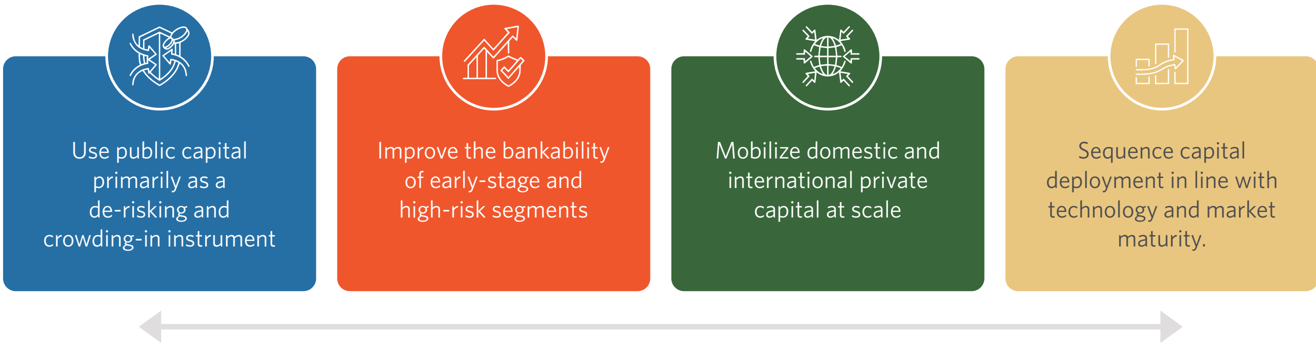
India has already accelerated its EV transition through demand- and supply-side policies. To sustain this momentum, the country could strengthen its policy framework by incorporating global best practices that support innovation, link manufacturing incentives to performance, and strengthen regulatory signals. Adapting these approaches to India's context could help unlock the next phase of EV growth.

5.2 FINANCING PATHWAYS

India's EV transition requires structural reconfiguration of the transport, power, and industrial systems. As outlined in previous chapters, cumulative investment requirements between 2031 and 2047 range from INR 20.4 lakh crore (USD 243 billion) under BAU to INR 45.5 lakh crore (USD 544 billion) under a 100% EV transition. Capital needs are concentrated in power generation expansion, EV and battery manufacturing, charging infrastructure deployment, strengthening the distribution network, and workforce development.

Given the scale of investment required, traditional budgetary allocations and fragmented schemes may not be sufficient. Public finance must be strategically deployed to unlock relatively larger volumes of private capital. The financing architecture for India's EV transition therefore could be designed for the four strategic priorities, as shown in Figure 26.

Figure 26: Suggested strategic priorities for the financing architecture of India's EV Transition



A coordinated, phased financing strategy would be essential to move from notional capital requirements to a continuous pipeline of investable, well-structured projects.

EV AND BATTERY MANUFACTURING

Battery cell plants, advanced chemistry facilities, drivetrain components, and power electronics are capital-intensive, long-gestation assets with high strategic value for India's EV manufacturing base. Developing these industries requires significant upfront capital, credible offtake visibility, and long-term policy and regulatory stability.

Financing would require a diversified capital structure combining project finance of up to 15-20-year tenors; strategic equity participation, including joint ventures with global technology leaders; production-linked incentives tied to localization and DVA milestones; concessional debt from development finance institutions; partial credit guarantees; and export credit agency support for critical equipment imports.

China's experience demonstrates the impact of combining financial instruments with industrial policy. Municipal demand aggregation, particularly for e-buses, preferential land and infrastructure provision, and coordinated supply chain investment, has reduced perceived risks and accelerated domestic capacity expansion. The key lesson is that fiscal incentives alone may not be sufficient. They would need to be complemented by demand guarantees, predictable standards, and stronger institutional coordination across the value chain.

CHARGING INFRASTRUCTURE

Charging infrastructure typically involves lower per-site capital expenditure but high early-stage utilization risk, especially outside large urban centers and along intercity corridors. Financing structures need to distinguish between commercially viable, high-utilization locations and socially necessary but initially non-viable corridors such as national and state highways. The latter will require viability gap funding and formula-based central grants. These may be complemented by city-level public-private partnership (PPP) concessions, green bonds issued by charging network operators, and long-term depot charging contracts anchored by fleet operators.

The US National Electric Vehicle Infrastructure program, a USD 5 billion federal initiative (FY 2022-2026) under the Bipartisan Infrastructure Law, designed to create an interconnected 500,000-charger network, demonstrates how corridor-based grants, standardized technical requirements, and coordinated procurement can reduce early-stage investment risk and catalyze private participation once demand grows (DOE 2024). In India, a similar corridor-based investment model, implemented through state-level PPP frameworks and supported by standardized tariff structures and interoperability norms, could accelerate coverage while limiting stranded-asset risk.

POWER GENERATION AND DISTRIBUTION NETWORK UPGRADES

Power generation capacity expansion and grid reinforcement represent a large share of investment needs and carry comparatively lower risk where cost recovery and regulatory frameworks are robust. Financing for these segments can be supported through concessional loans, utility-issued green bonds, regulatory asset-based–linked tariff mechanisms, and blended finance facilities for smart grids, managed charging, and storage pilots. Creating dedicated EV infrastructure windows within existing financial institutions could streamline access to long-term capital and risk mitigation instruments.

Regulatory clarity on tariff structures is the critical determinant of investor appetite in grid assets. Where certainty exists surrounding time-of-use pricing, demand charges, and pass-through of prudent Capex, utilities can access lower-cost capital and sequence investments ahead of demand, enabling the EV ecosystem to scale without compromising reliability.

SKILL DEVELOPMENT AND WORKFORCE TRANSITION

While modest in absolute terms, investments in skills and workforce transition are foundational to the viability of the EV ecosystem. The transition will require technicians, battery specialists, charging infrastructure engineers, grid and demand management professionals, and circular economy and recycling specialists. Financing mechanisms for skilling can include results-based funding tied to certified outcomes, corporate social responsibility (CSR) and industry co-financing, state skill mission grants, apprenticeship-linked employer contributions, and outcome-based workforce bonds. Over time, as EV markets deepen and revenue pools expand, financial responsibility for skills development should shift toward industry, with public funds focusing on inclusion, regional equity, and support for workers in at-risk ICEV segments.

5.2.1 RISK MITIGATION AND BLENDED FINANCE

Given the scale of capital required, public finance must play a catalytic role, absorbing specific risks and unlocking private investment, rather than acting as the primary funding source. Five de-risking tools spanning finance and policy are particularly relevant to India's EV transition:

- **Partial credit guarantees** to reduce lender exposure on early-stage or first-of-a-kind projects
- **First-loss or subordinated capital tranches** that improve risk–return profiles for senior investors
- **Demand aggregation mechanisms,** particularly for municipal and public fleet electrification
- **Stable regulatory frameworks,** including clear tariff structures, interoperability standards, and EV component recycling rules
- **Long-term policy visibility** that reduces policy risk premia

Well-designed blended finance structures can significantly enhance leverage ratios by using concessional public capital to absorb technology, demand, or policy risks. In the early stages of market development, realistic leverage targets may be on the order of 1:4 (public to private); as technologies and business models mature, these ratios could increase to 1:6 or higher, reducing the fiscal burden of the EV transition (IFC 2020).

5.2.2 LESSONS FOR INDIA'S INSTITUTIONAL ARCHITECTURE

INTERNATIONAL MODELS

International experience underscores that the design of financing instruments, rather than capital availability alone, determines the speed and quality of the EV transition.

- **China** has relied on an industrial scaling model that combines fiscal incentives, municipal procurement mandates, and coordinated supply chain and infrastructure investment, reducing investment risk and enabling globally competitive EV and battery manufacturing.
- **Norway** has followed a demand-led approach, using strong tax exemptions, VAT waivers, and non-monetary incentives to shift consumer behavior and accelerate EV uptake.
- **The US** has adopted a hybrid model, combining direct infrastructure grants through initiatives including the National Electric Vehicle Infrastructure program, tax credits under the Inflation Reduction Act, and federal loan guarantees to reduce capital costs and crowd in private finance.

Across these models, a common lesson emerges: financing instruments must be tailored to the maturity, risk profile, and public-good characteristics of each market segment and supported by stable, long-term policy signals. Simply replicating instruments without adapting them to India's institutional context, fiscal space, and development priorities would limit their effectiveness.

LESSONS FOR INDIA

India would require an institutional architecture that systematically develops EV investment pipelines, aligns incentives, and coordinates central, state, and financial sector actors. Mobilizing capital at the scale required cannot rely on fragmented schemes or isolated line ministry initiatives. A coordinated architecture could include the following elements:

- A national-level body responsible for maintaining an EV investment gap registry, packaging and standardizing bankable projects, and coordinating engagement with MDBs and development finance institutions.
- A green mobility financing window within existing public finance institutions, such as the Power Finance Corporation, Rural Electrification Corporation, and Small Industries Development Bank of India, to provide long-tenor loans, guarantees, and blended finance instruments.
- Empowered state-level EV cells to streamline land access, distribution approvals, and charging PPP frameworks for charging infrastructure.

Clear institutional mandates and coordination are essential to avoid duplication, reduce transaction costs, and ensure that policy signals translate into a steady pipeline of financeable projects. Without such architecture, even generous incentives may fail to convert into timely and adequate capital flows.

STRATEGIC DEPLOYMENT OF PUBLIC FINANCE

To mobilize the estimated INR 45.5 lakh crore (USD 544 billion) required for a 100% EV transition, public finance should be linked to leverage targets and priority segments. Public capital should be strategically deployed to areas where network effects and demonstration impacts are strongest, including:

- EV component and battery manufacturing capacity,
- Electricity grid reinforcement,
- National highway and freight corridor charging infrastructure, and
- Electrifying public and municipal fleets.

Robust monitoring and evaluation systems will be vital to refining financing strategies. Key performance indicators could track:

- Private capital mobilized per unit of public support,
- Utilization rates of public charging infrastructure,
- DVA in EV and component manufacturing,
- The share of renewable energy in EV charging,
- Deployment of skilled workers across the value chain, and
- Trends in the cost of capital for EV projects.

Transparent reporting against these indicators would enable policymakers to adjust instruments, improve targeting, and maintain investor confidence over time.

6. RECOMMENDATIONS

By anchoring electric mobility in a strategy of technological capability and resource security, India is charting a path toward its vision of a self-reliant, sustainable economy. The country's current policy framework has catalyzed significant progress in the EV ecosystem. Scaling EV adoption will now require coordinated action across demand creation, industrial capacity building, and energy system readiness. CPI recommends a sequenced approach that couples near-term market activation, skilling, and transition support[13] with medium to long-term measures on industrial policy, infrastructure, grid strengthening, and institutional coordination.

Figure 27 outlines the short-term measures for the next five years and Figure 28 presents medium- to long-term measures for policymakers, industry stakeholders, skill development institutes, and financing institutes to sustain the transition across the mobility ecosystem and enable systemic upgrades beyond the automotive industry.

Figure 27: Short-term recommendations to support transition to EVs

INDIGENIZATION OF EV COMPONENT MANUFACTURING

- Lower entry thresholds for production-linked incentives for components and batteries to broaden startup participation and boost investment in component manufacturing.

WORKFORCE SKILLING FOR EV READINESS

- Align training with needs across key EV domains to build a pool of skilled workers.
- Existing schemes can incorporate incentives or mandates for public agencies and industry partners to establish training centers for workforce development.

BOOSTING R&D

- Scale dedicated R&D funding for areas such as advanced cell chemistry and powertrain electronics to strengthen competitiveness and reduce import dependence.
- Industry–academia partnerships can co-fund applied research and advanced training to accelerate innovation and workforce readiness.

ENABLING FINANCE FOR TRANSITION SUPPORT AND GRID UPGRADES

- Transition finance windows such as the CPI's proposed 'Automotive Component Technology Upgradation Financing Facility' can provide smaller ICEV ACMs with concessional capital, technical assistance, and risk-sharing tools to move into EV value chains.
- Distribution grids in clusters with high power demand can be strengthened by leveraging exisiting schemes such as funds from the Revamped Distribution Sector Scheme for preventing network bottlenecks to ensure reliable power supply as EV penetration grows.

INCENTIVIZING HEAVY DUTY VEHICLE ELECTRIFICATION

- Purchase subsidies for e-trucks and e-tractors, which account for disproportionately large share of emissions and fuel consumption, can bolster demand and help reap the benefits of electrification earlier.

Source: *CPI*

13 CPI. 2025. Roadmap for an Automotive Component Technology Upgradation Financing Facility (AC-TUFF). Available online: https://www.climatepolicyinitiative.org/publication/roadmap-foran-automotive-component-technology-upgradation-financing-facility

Figure 28: Medium- to long-term recommendations to sustain the EV transition

SUPPLY-SIDE MANDATES TO GUIDE OEM INVESTMENTS

- Adopt progressively stringent, segment-specific OEM mandates to provide market certainty, enabling OEMs to plan capacity expansion and technology investments, thereby accelerating growth and value creation.

MOBILIZING FINANCE FOR INFRASTRUCTURE UPGRADES

- Institutionalize access to viability gap funding to de-risk early-stage charging infrastructure investments—especially in low-utilization and peri-urban areas—helping to crowd in private capital.

COORDINATED EV FINANCING ARCHITECTURE

- Deploy public finance strategically through blended finance, concessional lending, and credit guarantees to crowd in private investment, while establishing dedicated financing windows and standardized project pipelines to support EV manufacturing, charging infrastructure, and grid upgrades.

WORKFORCE AND INSTITUTIONAL CAPACITY BUILDING

- Deploying dedicated transition support for ICEV component manufacturers, including subsidized training and on-site upskilling support can foster EV relevant capbilities.
- OEMs and ACMs can be encouraged to allocate CSR budgets to EV-related skilling and institutional capacity building for the service and repair ecosystem, helping to establish a sustained workforce transition mechanism.

MANAGING TRANSITION FOR OIL AND GAS

- Develop a transition strategy for the oil and gas sector to sustain public revenues, maintain fiscal stability, and support long-term decarbonization.

Source: *CPI*

The above recommendations can create enabling conditions for sustained EV adoption in India. Aligning policy, industry capability, and ecosystem preparedness can position the country to achieve a 100% EV transition while maximizing economic gains, job creation, and long-term energy security.

7. ANNEXURE

7.1 DETAILED METHODOLOGY USED FOR ANALYSIS

This section details the methodology and factors used to estimate different aspects of the analysis presented in this report. Table A1 summarizes the methodology adopted, assumptions, and data sources used.

Table A1: Assumptions, detailed methodology, and sources for the estimation of results

Description	Methodology / Assumptions	Sources
Projection of vehicle sales until 2047	• Historical vehicle sales data from Vahan Dashboard (2003–25) was used to estimate vehicle stock via survival functions. • Historical vehicle ownership (excluding tractors) was derived from historical population and estimated stock. • The study assumed 20 years as the maximum age of vehicles in the on-road stock for all vehicle segments except LCVs and MHCVs (20 years until 2026 and then 15 yrs from FY2031) and tractors (23 years). • Future ownership (2026–47) was projected using the Gompertz function, factoring saturation levels and Reserve Bank of India's targeted per-capita GDP levels by 2048 for India to become a developed nation. • Parameters of the Gompertz function were calibrated with historical vehicle ownership numbers. Table A3 shows the values of the different parameters chosen for the projections. • Vehicle stock was calculated from projected ownership and population, and sales (2026–47) were back-calculated using survival functions, shown in Table A2. • Tractor sales were estimated using historical data and growth rates from a computable general equilibrium model, considering food demand, cropping intensity, and available agricultural land. • E-rickshaw sales were projected until 2047 based on the CAGR of the e-3W sales projected under the two scenarios.	Arora et al. 2011; CEEW 2022; Guttikunda 2024; United Nation 2024; RTO 2025; MoRTH 2025;RBI 2023
Rationale for EV penetration under 100% EV Scenario	**Assumptions considered to set targets:** • Five-year targets are set to maximize EV share growth between 2030 and 2040, followed by a gradual plateau through 2047. • Buses, trucks, and tractors will electrify at a slower pace compared to passenger vehicles and e-LCVs. • Similar battery capacities and charging requirements will enable e-LCVs and e-cars to follow comparable adoption trajectories. • Low-emission zone policies in Indian cities will accelerate the adoption of e-cars, e-LCVs, and e-MHCVs. • State road transport undertakings will drive public bus electrification through 2035. • Institutional and private intercity buses will lead e-bus adoption beyond 2035.	
Benchmarking of EV transition in India for 100% EV scenario with other emerging EV markets	• In the absence of 100% electrification targets for vehicle segments, the study models two trajectories for China and Vietnam using CAGR to identify the year when each vehicle segment could achieve 100% EV penetration. • A BAU trajectory was estimated for 100% electrification based only on existing EV growth rates. • A policy trajectory was estimated for 100% electrification based on stated intermediary or 100% targets for vehicle electrification and existing EV growth rates. • The study sets 100% electrification targets for India (as shown in Table A4.) 2Ws and 3Ws by 2040, reflecting their rapid adoption and aligning with China's trajectory, 4Ws and LCVs are kept closer to Vietnam's policy trajectory and larger vehicle segments are kept for 100% electrification by 2047 due to their low existing penetration levels.	CPI analysis; ICCT 2022a; World Bank 2024

Description	Methodology / Assumptions	Sources
Estimation of charging infrastructure	• The existing EVs per charger ratio in India and Confederation of Indian Industries recommended 40 EVs per charger by 2030 was used to estimate cumulative and annual public chargers to be deployed by 2047 for e-3W, e-4W and e-LCV stock. • For e-trucks, e-buses, and e-tractors, China's existing ratio of one charger per 10 EVs was used to estimate cumulative and annual public chargers to be deployed from 2030 to 2047. • Our analysis excluded public charger estimation for e-2Ws and e-rickshaws, considering their dependence on home or captive charging. • The types of chargers required for public charging were determined with reference to the latest Ministry of Power guidelines. • The analysis adopts assumptions on the type of chargers for different vehicle segments. For e-tractors, the charger type assumption is taken from the ICCT report. • The estimated number of public chargers was distributed between different types of charging technology based on Table A5.	CII 2023; IEA 2024b; Ministry of Power 2024; NITI Aayog 2021; ICCT 2022b
Estimation of market potential	**Projection of vehicle and component costs** • Ex-showroom vehicle prices were taken from open-source data websites and OEM websites. • Vehicle price was broken down into major EV components. • Current and future breakdown of EV and ICEV component costs for vehicle segments was considered from various research and industry studies as shown in Table A6. • Combined component costs were mapped with the share of material costs of each vehicle segment derived from the financial statements of leading OEMs. • A similar exercise was done to estimate ICEV component costs. • Price changes in EV cost structures were analyzed through 2035 from previous studies to make long-term assumptions for component cost reductions as shown in Table A7. • Market potential is estimated by multiplying the projected prices with EV sales volumes. • Replacement demand of batteries once the battery completes its lifespan in an EV was also accounted for market potential of batteries. • All the component costs were summed annually to derive the ex-showroom price of EVs from 2026 to 2047. • For ICEV components, prices were assumed to remain constant considering maturity of technology **Note:** All estimations are in current value/price terms, without considering the effect of inflation and INR depreciation (1 USD= 83.67 INR).	ACMA 2021; ICCT 2021a; ICCT 2023; ICCT 2024
Maintenance and repair costs for EVs and ICEVs	• Annual maintenance and repair costs for EVs and ICEVs (excluding tractors) were estimated using maintenance cost factors (INR/km) for each fuel mix from recent reports. • Annual distance traveled by each vehicle segment taken from the publicly accessible IESS Version 3.0 model. • Maintenance cost = maintenance cost factors*annual distance traveled	CEEW 2025; ICCT 2022b; NITI Aayog 2023
Estimation of fuel demand	• Annual fuel demand for all fuel mixes was estimated using the annual distance traveled and fuel efficiency (i.e., kilometers traveled per liter/kg or kWh of fuel/energy required) for each vehicle category. • Historical fuel efficiency for vehicle categories is collected from automotive information websites and research papers. • Annual improvements in fuel efficiency for ICEVs until 2047 was taken from published studies. • Annual improvements in energy efficiency for EVs from 2026 to 2035 were sourced from research papers. • The study assumed 50% improvement between 2035 to 2047 foreseeing a saturation in battery technology improvement. • Annual fuel demand is estimated as: $\text{Annual fuel demand= Vehicle stock} * \frac{\text{Annual distance travelled}}{\text{verage fuel efficiency}}$ • For diesel tractors, annual operational hours and diesel consumption per hour were multiplied by the annual diesel tractor stock to derive the annual diesel demand.	Bikewale 2025; Cardekho 2025; Zigwheels 2025; ICCT 2021; ICCT 2023;ICCT 2022b; IESS 2023; WRI 2024; WRI 2025

Description	Methodology / Assumptions	Sources
Estimation of change in GVA from automotive industry, oil and gas industry (petroleum products production) and power sector	**Automotive GVA:** ▪ Estimate industry revenue (OEM revenue, ACM revenue) • OEM revenue: Sales volume * (Sales price-Dealer margin) • ACM revenue: Market potential = Sales volume * Component price ▪ GVA % taken from Annual Survey of Industries 2023-2024 • OEM GVA: OEM revenue * GVA % (GVA% considered depending on NIC code for different vehicle segments) ▪ ACM GVA: Market potential * Localization % * GVA % **Oil and gas GVA(petroleum products production) / Excise duty/ VAT from fuel sales:** ▪ Total fuel consumption is estimated based on the vehicle stock volume ▪ Current fuel prices and breakup considered from PPAC. • Price charged to dealers (excluding excise duty and VAT) -> considered as refinery output value • Excise duty, Dealers' commission, VAT ▪ Refinery output: Price charged to dealers * Fuel consumption ▪ GVA % considered from ASI 2023-2024 (Manufacture of petroleum products) ▪ Oil and gas GVA: Refinery output* GVA% **Power sector** ▪ Total electricity required estimated using the vehicle stock volume, charger efficiency, Transmission &Distribution losses ▪ Prices of electricity cost considered from Power Finance Corporation's state-wise data ▪ GVA% considered from National Account Statistics for both generation and distribution **Note:** GVA% was considered constant throughout the period of analysis. All economic estimations in this report are presented in current value/price terms, without considering the effect of inflation and INR depreciation (1 USD= 83.67 INR).	
Estimation of change in revenue for exchequer	**Oil and gas Customs duty/ Excise duty/ VAT:** ▪ Excise duty and VAT estimated by multiplying the fuel consumption and the corresponding % of VAT and Excise duty (refer previous row) ▪ Change in imports of crude oil and natural gas is estimated based on change in fuel consumption (MMT) ▪ Customs duty impact is estimated by multiplying the change in imports with the average customs duty per MMT. **Note:** GVA% considered constant throughout the period of analysis. All economic estimations in this report are in current value/price terms, without considering the effect of inflation and INR depreciation (1 USD= 83.67 INR).	
Estimation of change in EV import bill	▪ Import bill from EV components is estimated by multiplying component market potential with share of imports (considering assumed localization % for different years) ▪ Impact on foreign exchange outflow estimated by using constant USD to INR exchange rate (1 USD= 83.67 INR). ▪ Effective customs duty for major sub-components is collected from government data base to estimate the average effective customs duty on each key EV component categories. ▪ Total effective customs duty (Basic customs duty + surcharge) is calculated by multiplying the effective customs duty against the import bill.	Central Board Of Indirect Taxes & Customs (CBIC)
Projection of jobs for OEMs	▪ Current employment in ICEV and EV OEMs was derived from OEM payrolls. ▪ Employee headcount was projected using average vehicles produced per employee annually for ICEV and EV OEM workforce. ▪ For EV OEMs, productivity was assumed to increase from current levels to that of ICEV OEMs in future with platform standardization and assembly operations optimization. Table A8. shows the productivity factors for both ICEV and EV OEMs.	Vaahan 2025, Primary Survey with OEMs
Projection of ACM and service and repair jobs	▪ The workforce for ACM and service and repair was estimated using employment multipliers for each vehicle segment on the estimated OEM workforce, derived from primary survey and interviews with stakeholders (Table A9). ▪ For jobs in ACMs, localization of components in EVs was assumed to increase from 40-50% in 2025 to 70% in 2030 and 100% by 2047. A localization multiplier of 1.67 is multiplied for 2030 and 2 for 2047 to the preliminary workforce estimated for OEMs in the previous step.	CPI-Deloitte analysis

Description	Methodology / Assumptions	Sources
	• 2W and 3W create more indirect employment per manufacturing job due to unauthorized and fragmented micro-vendors, outsourced battery pack assembly. • Heavy commercial vehicles show lower indirect ratios due to consolidated suppliers and higher direct labor. • Table 14 shows the different multipliers for estimating jobs for ACM and service and repair. • For 2047, the study assumes a portion of ICEV specific ACM workforce to until be present to cater to the replacement demand for components. • Based on current share of aftermarket in total revenue (15%) for ACMs in India and the price of aftersales components (2-3x of cost for OEM), the study estimates ACM jobs to be present to serve 4% of the ICEV stock in 2047. • For service and repair jobs, the study flatlines the estimated ICEV service and repair workforce in 2040 until 2047 assuming the requirements of the ICEV stock.	
Projection of retail fuel outlet jobs	• Workforce at the retail fuel outlets present in India for last four financial years is estimated based on an average number of manpower at retail fuel outlets in urban (11) and rural (4) areas. • A 71% split was taken based on current reported data to estimate retail fuel outlets in urban settings. • The estimated workforce is divided by the amount of fossil fuel sold annually for the respective financial years to derive an average multiplier of jobs at retail fuel outlets per unit of fuel sold annually. • This multiplier is used to project jobs in retail fuel outlets for the fossil fuel demand of ICEV stock by 2047.	HSSC and EY 2022; PPAC 2025
Projection of jobs for charging infrastructure and battery recycling	**Charging infrastructure** • Jobs per public charger multiplier of 1.1 between 2030 and 2047 was considered to estimate total jobs in public charging infrastructure based on stakeholder insights, considering localization of public charger manufacturing and reduction in jobs due to automation. • Current employment in charging infrastructure related jobs was estimated based on stakeholder interviews. • Share of workforce generated for annual deployment of public charging infrastructure including charger manufacturing, DISCOM network, installation & commissioning was multiplied with localization multiplier and annual public charger demand. • Share of workforce generated for total public charging infrastructure present at a particular year including operations & maintenance, charging station business operations, IT & charging platform services was multiplied with localization multiplier and cumulative public charger demand. **Battery recycling** Estimations of jobs is based on industry assessments and stakeholder engagement by Deloitte.	CPI- Deloitte Insights
Estimation of emissions from ICEVs	• Tailpipe emissions for ICEVs (excluding buses, MHCVs, and tractors) were calculated using projected fuel-wise stock, annual kilometers traveled and PM, NOx, CO (in g/km) and CO2 (kg/l) emission factors. • Emission factors were taken from the Automotive Research Association of India (ARAI's) Indian Emissions Regulations booklet in accordance with the Bharat Stage (BS) norms. • BS VI was assumed to continue from 2024 to 2030, Euro VII was considered for (2031 – 2035) for 4W while for other segments % reduction from BS IV to BS VI stage 1 was considered and it was assumed that there would be no improvement in emission regulations 2035 onwards as further strictness will lead the investments toward ICEV R&D instead of EV. • Vehicle stock was multiplied with the emission factors applicable under different BS norms with the total distance traveled to calculate the total emissions generated. • The emissions for buses, MHCVs, and tractors were calculated using a different methodology due to availability of emission factors in g/kWh. The model calculated power generated by multiplying the annual fuel consumption by the calorific value of diesel (45 MJ/kg) and CNG (52 MJ/kg).	Murugesan et al. 2007; Pujotomo 2018; Al-Kheraif et al. 2021; ARAI 2021; GHG Protocol n.d.

Description	Methodology / Assumptions	Sources
	▪ The power generated by the fuel was used to calculate the brake power, assuming the brake thermal efficiency (BTE) of 29%. ▪ CO2 emissions were estimated as a product of fuel demand and fuel emission factors taken from the GHG Protocol emissions tool (2.26 kg/liter of petrol, 2.68 kg/liter of diesel and 0.0018 kg/l CNG).	
Estimation of investment required for component manufacturing, and chargers	▪ Investment estimated via single-entity model for simplicity. **Auto-components** ▪ A financial review of ACMs and startups was carried out to examine key financial metrics such as return on equity (ROE), return on capital employed (ROCE), and earnings before interests and taxes (EBIT) % ▪ Using the average EBIT %, ROCE %, the investment required was calculated as follows • EBIT=Market potential* EBIT % • Capital employed=EBIT/ ROCE • Investment required= (Capital employed*Share of fixed assets) *(1+Depreciation rate) • Considering the high upfront capital requirement for EV components, the share of fixed assets was assumed at 85% initially and further reduced to 73% by 2047 • A depreciation rate of 7.5% was assumed **Battery:** ▪ Overall EV battery capacity requirement in Gigawatt hours (GWh) was estimated based on the total EV sales estimated earlier and the battery capacity of different vehicle segments. ▪ The required manufacturing capacity was estimated assuming an average production efficiency of 85% initially and gradually increasing to 92% (DoE 2024). ▪ Average investment required for cell and battery manufacturing per GWh was taken from secondary sources. **Charging infrastructure:** ▪ Investment requirements for chargers considering the grid connectivity and infrastructure required are taken from multiple reports and websites. ▪ The investment required for setting up charging infrastructure is estimated by multiplying the total investment per charger and the total number of charging points. **Note:** All estimations are presented in current value/price terms, without considering the effect of inflation and INR depreciation (1 USD= 83.67 INR).	▪ **Auto-components:** CPI analysis of financial statements of select few ACMs/startups ▪ **Battery/Cells:** CEEW 2023; Ola Electric 2024 ▪ **Charging infrastructure:** NITI Aayog 2023; Pulse Energy 2024; Tata Power 2025
Estimation of investment required for power capacity addition	**Power sector – generation** ▪ Electricity demand converted to power demand (GW) ▪ Power demand (GW) = Electricity demand (GWh)/ Total annual hours ▪ Total annual hours = 24*365 = 8760 ▪ Estimated power demand was split into solar and wind at ratio 68:32 (based on 2026 installed capacity) ▪ Capacity utilization factor was considered for solar: 21% and for wind: 29% ▪ Investment required for establishing renewable power capacity Solar: INR 4770/ GW, Wind: NR 6840/GW ▪ CAGR of capital costs between 2030 and 2023 was calculated. (Solar: 1.44%, Wind: 2.65%) ▪ CAGR of capital costs varied for the period 2030-2040 and 2040-2047, based on assumption • 2030-2040: Solar: 0.25%, Wind: 0.5% (mild increase considered as technology development would offset other costs) • 2040-2047: Solar: 0.5%, Wind: 1% (slightly higher cost considered assuming technology saturation and major costs for land acquisition and evacuation) ▪ Investment required for the incremental power demand in 100% EV scenario, compared to BAU scenario • Difference in power demand between 100% EV scenario and BAU scenario estimated (GW) • Investment required: Difference in power demand * Capital cost/ GW	▪ Source: IESS 2047 – ambitious scenario ▪ Source: Draft Renewable Energy Tariff Regulations, 2024 ▪ Source: Grant Thornton - Achieving 500 GW of RE capacity by 2030 ▪ Source: Annual statistics

Description	Methodology / Assumptions	Sources

	Power sector – T&D
	• Electricity demand from EV charging (in GWh) was converted to GW considering annual hours (8760 hours) and distribution load factor
	  • GW transmission demand = GWh charging electricity demand / (distribution load factor*8760)
	  • Distribution load factor assumed: 72%
	  • Peak demand for 2024: 243271 MW, Total electricity consumption 2024: 1540587 GWh
	  • Distribution load factor: Total electricity consumption (GWh)/(Peak demand (MW)*8760*1000)
	• Capital cost per GW of transmission capacity estimated from National electricity Plan
	  • Total investment /Total intra-state transmission capacity addition planned
	  • Approximate: INR 530 crore/ GW
	• Investment required = Transmission demand X capital cost per GW	

Estimation of skilling costs	• EV and ICEV workforce are classified based on NSQF levels • Workforce classified based on expected impact due to EV transition to determine need for reskilling and upskilling • Average cost of skilling for different NSQF levels is determined based on market research and stakeholder interactions. • Total skilling costs estimated by multiplying the average cost of skilling and the workforce requiring reskilling or upskilling.	CPI- Deloitte Insights

Table A2: Projected vehicle stock (in millions) until 2047

Year	2026	2030	2035	2040	2047
2W	166.52	199.28	246.84	293.97	343.92
3W	6.00	7.06	8.54	10.28	12.99
4W	42.03	49.12	59.11	70.79	89.06
Buses	0.82	1.06	1.48	2.06	3.06
LCV	6.96	8.22	10.37	13.10	17.12
MHCV	3.97	4.51	5.34	6.39	8.12
Tractor	10.74	12.76	14.16	15.35	15.98
Total stock	**237**	**282**	**346**	**412**	**490**

Source: *CPI analysis*

Table A3: Values of parameters used in Gompertz function for different vehicle segments

Segment	γ	Θ	α	β
2W	235	0.09	-1.3	-0.00035
3W	11	0.08	-1	-0.00013
4W	75	0.08	-0.98	-0.00013
Buses	4	0.04	-2.1	-0.00019
LCV	14	0.08	-1.5	-0.00020
MHCVs	7	0.08	-1.1	-0.00013

Source: *Singh et al. 2019; CEEW 2025a; CPI analysis based on referenced research papers*

Table A4: 100% electrification timelines for vehicle segments in China, Vietnam and India

Vehicle Segment	Developed Scenarios	Country Targets			
	India 100% EV	China BAU(P*)	China policy trajectory	Vietnam BAU(P)	Vietnam policy trajectory
e-2W	2040	2044	2040 (P)	2034	2050 (P)
e-3W	2040	2032	2030 (P)		2050
e-4W	2045	2026	2035	2028	2050
e-bus	2047	2027	2026 (P)		
e-LCV	2045	2038	2040 (P)		
e-MHCV	2047	2040	2034 (P)		
e-tractors	2047				
*Here, P denotes the projected year in which the country is expected to reach 100% electrification of road transport, based on CAGR trajectory.					

Source: *CPI analysis; ICCT 2022a; World Bank 2024*

Table A5: Type of chargers considered and share of public charging demand to be met by charging technology

Type of Charger	Power Output	Suitability	2W	3W	4W	Bus	LCV	MHCV	Tractor
Light EV AC	<=7 kW	2W, 3W, 4W	100%	100%					100%
Bharat DC-001	<=15 kW	2W,3W, 4W							
Type 2 AC	<=22 kW	3W,4W, LCV			60%		60%		
Combined Charging System/CHAdeMo low	50 kW	4W, LCV, Buses			40%		40%		
Combined Charging System /CHAdeMo_ high	50-250 kW	LCV, Buses, Trucks				100%		80%	
DC high power	250-500 kW	Buses, Trucks						20%	

Source: *CPI; ICCT 2022*

Table A6: Share of cost of different EV components and other costs in EV ex-showroom price

Component	e- 2W	e- 3W	e-4W	e-LCV	e-MHCV, e-Bus & e-Tractor
Battery	35%	29%	31%	29%	35%
Motor-Reducer	12%	11%	8%	7%	7%
Power electronics	16%	14%	13%	13%	13%
Connectivity and control system	2%	4%	5%	5%	4%
Chassis and body parts	13%	14%	20%	19%	15%
Manufacturing cost	12%	16%	11%	13%	11%
OEM Profit margin	5%	7%	8%	8%	10%
Dealer markup	5%	5%	5%	5%	5%
Total	100%	100%	100%	100%	100%

Source: *ACMA 2021; ICCT 2021a; ICCT 2023; ICCT 2024;*

Table A7: Annual price shift assumed in different EV components across segments

Vehicle segments	e-2W and e-3W			
Time frames	2026-2030	2031-2035	2036-2040	2041-2047
Battery	-5.50%	-2.80%	-2.80%	-1.00%
Motor-reducer	-1.50%	-1.50%	-1.50%	-1.50%
Power electronics	-1.50%	-1.50%	-1.50%	-1.50%
Connectivity and control system	0.00%	0.00%	0.00%	0.00%
Chassis and body parts	0.00%	0.00%	0.00%	0.00%
Manufacturing cost	0.00%	0.00%	0.00%	0.00%
OEM profit margin	0.00%	0.00%	0.00%	0.00%
Dealer markup	0.00%	0.00%	0.00%	0.00%
Vehicle segments	e-4W and e-LCV			
Time frames	2026-2030	2031-2035	2036-2040	2041-2047
Battery	-7.00%	-2.80%	-2.80%	-1.00%
Motor-reducer	-2.00%	-2.00%	-2.00%	-2.00%
Power electronics	-2.50%	-1.50%	-1.50%	-1.50%
Connectivity and control system	0.00%	0.00%	0.00%	0.00%
Chassis and body parts	0.00%	0.00%	0.00%	0.00%
Manufacturing cost	0.00%	0.00%	0.00%	0.00%
OEM profit margin	0.00%	0.00%	0.00%	0.00%
Dealer markup	0.00%	0.00%	0.00%	0.00%

Vehicle segments	e-bus, e-MHCV and e-tractors			
Time frames	2026-2030	2031-2035	2036-2040	2041-2047
Battery	-9.00%	-4.00%	-4.00%	-1.00%
Motor-reducer	-5.00%	-2.00%	-2.00%	-2.00%
Power electronics	-1.00%	-1.00%	-1.00%	-1.00%
Connectivity and control system	0.00%	0.00%	0.00%	0.00%
Chassis and body parts	0.00%	0.00%	0.00%	0.00%
Manufacturing cost	0.00%	0.00%	0.00%	0.00%
OEM profit margin	0.00%	0.00%	0.00%	0.00%
Dealer markup	0.00%	0.00%	0.00%	0.00%

Source: *ACMA 2021; ICCT 2021a; ICCT 2023; ICCT 2024; CPI analysis*

Table A8: Workforce productivity considered for estimating ICEV and EV OEM workforce

Vehicle segment	ICEV workforce productivity (2026 to 2047)	EV workforce productivity	
		Current workforce productivity	Year of achieving parity with ICEV productivity
2W	255	33	2040
3W	17	18	Already met at current level
4W	14	8	2045
Buses	1.9	1	2047
Trucks	11	3	2047
Tractors	22	1	2047

Source: *CPI and Deloitte Analysis*

Table A9: Employment multipliers for estimating ACM and service and repair workforce

Vehicle segment	ICEV		EV	
	ACM	Service and repair	ACM	Service and repair
2W	3.0	8.0	1.5	4.5
3W	2.0	7.0	2.0	6.0
4W	2.0	6.0	1.0	3.0
Buses	2.0	5.0	1.0	2.0
Trucks	2.0	6.0	1.0	2.0
Tractors	1.5	3.5	1.0	2.0

Source: *CPI and Deloitte Analysis*

7.2 NATIONAL EV POLICIES IN INDIA

Table A10 summarizes the salient features of the key national policies and schemes supporting EV adoption and manufacturing in India.

Table A10: Summary of national policies supporting EV adoption and manufacturing

Policy/Scheme	Year of launch	Budget outlay (INR crore)	Salient features
Demand creation and charging infrastructure deployment			
FAME-I	2015-2019	895	Financial subsidies and purchase incentives to buyers of e-2Ws, e-3Ws, e-4Ws, and e-bus deployment. Incentives for charging infrastructure deployment.
FAME-II	2019-2024	11,500	
Electric Mobility Promotion Scheme	2024	778	Purchase incentives for e-2W and e-3W Later subsumed under PM E-DRIVE
PM E-DRIVE	2024-2028	10,900	Purchase incentives for e-2W, e-3W, e-Trucks, e-buses and e-Ambulances. Support for deployment of EV public charging stations and upgradation of testing agencies.
PM e-Bus Sewa- Payment Security Mechanism Scheme	2024	3,435	• Aims to support deployment of more than 38,000 electric buses. • Provides payment security to e-bus operators in case of default by Public Transport Authorities.
Supply side measures			
Phased Manufacturing Program	Attached to FAME-II and PM E- DRIVE	Non-fiscal	• Promotes domestic manufacturing & increases DVA for EV and charger components. • Schedules for increasing customs duties on imported EV parts to incentivize local sourcing.
PLI Scheme for Automobile and Auto-Component Industry	2021-2026	25,938	• Provides financial incentives to boost domestic manufacturing of 'Advanced Automotive Technology' products including EVs • Minimum 50% DVA required.
PLI Scheme for Advanced Chemistry Cell (ACC) Battery Storage	2021-2026	18,100	• Aims to establish a domestic manufacturing ecosystem for 50 GWh of ACC batteries • Incentivizes ACC production units with minimum 5 GWh capacity and 60% DVA in 5 years
Scheme for Promotion of Manufacturing of Electric Passenger Cars in India	2024	Non-fiscal	• Attract investment from global electric car OEMs new to India. • Reduced 15% customs duty on limited completely built units imports for 5 years
Fuel efficiency standards			
Corporate average fuel economy (CAFE) norms	2017-2037	Non-fiscal	• Set threshold limits for curb weight, fuel consumption and average CO2 emissions for passenger cars and commercial vehicles. • Link a manufacturer's CAFE to the corporate average curb weight of all passenger cars sold in a fiscal year.

Source: *BEE 2025; PIB 2026b*

7.3 COST BENEFIT ASSESSMENT

Table A11 summarises the cost-benefit assessment of 100% EV scenario highlighting the benefits in terms of industry revenue addition and import bill reduction and the costs to the exchequer with EV adoption.

Table A11: Cost-benefit assessment of 100% EV adoption scenario over BAU scenario

Import bill (INR lakh crore)	
EV imports increase	-9.2
Oil and Gas Import bill averted	86.3
Net benefit	**77.1**

Taxes and duties (INR Lakh Crore)	
Decreased customs duty collection from oil and gas imports	-0.06
Net GST increase from EV Sales	4.52
Increased customs duty collection on EV imports	0.86
Decreased excise duty/ VAT collection	-43.82
Net loss	**-38.5**

GVA (INR lakh crore)	
Increase in automotive GVA	13.54
Increase in electricity GVA	9.03
Decrease in petroleum products GVA	-5.17
Net benefit	**17.4**

Incremental skill development cost	**0.13**

Source: *CPI analysis*

8. REFERENCES

1. ACMA. 2021. EV Landscape: Opportunities for India's Auto Component Industry. [accessed 2025 Aug 15]. https://www.acma.in/uploads/otherdocmanager/ACMA_YES_Bank_Report_EV_Landscape_Opportunities_for_Indias_Auto_Component_Industry.pdf
2. Al-Kheraif A, Syed A, Elgorban A. 2021. Experimental assessment of performance, combustion and emission characteristics of diesel engine fuelled by combined non-edible blends with nanoparticles. https://sci-hub.se/https://doi.org/10.1016/j.fuel.2021.120590
3. ARAI. 2021. Indian Emission Regulations. https://www.araiindia.com/pdf/Indian_Emission_Regulation_Booklet.pdf
4. Arora S, Vyas A, Johnson L. 2011. Projections of highway vehicle population, energy demand, and CO2 emissions in India to 2040. [accessed 2025 Aug 15]. https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1477-8947.2011.01341.x
5. ASI. 2025. ASI 2023-2024 Summary Results for Factory Sector. Annual Survey of Industries. https://microdata.gov.in/NADA/index.php/catalog/256/download/3924
6. BEE. 2025. Fuel Efficiency. https://beeindia.gov.in/fuel-efficiency.php
7. Bikewale. 2025. [accessed 2025 Aug 22]. https://www.bikewale.com/new-bike-search/best-scooty-under-1-lakh/
8. Cardekho. 2025. [accessed 2025 Aug 22]. https://www.cardekho.com/india-car-news/here-are-the-top-10-most-fuel-efficient-massmarket-cars-in-india-34407.htm
9. CEEW. 2022. India Transport Energy Outlook. [accessed 2025 Aug 15]. https://www.ceew.in/sites/default/files/ceew-research-transport-energy-use-carbon-emissions-decarbonisation.pdf
10. CEEW. 2023. How can India Indigenise Lithium-Ion Battery Manufacturing? [accessed 2025 Aug 15]. https://www.ceew.in/sites/default/files/how-can-india-scale-lithium-ion-battery-manufacturing-sector-and-supply-chain.pdf
11. CEEW. 2025. What Drives Vehicle Ownership Costs in India? [accessed 2025 Aug 15]. https://www.ceew.in/sites/default/files/cost-of-ownership-for-different-vehicle-segments-fuels-and-powertrains.pdf
12. CII. 2023. Roadmap for Future Mobility 2030: Charging Infrastructure. [accessed 2025 Aug 15]. https://www.cii.in/PublicationDetail.aspx?enc=7mQiKpG2TFOCLOIoNhVrbyHR86aSP7GMM9OqlkWGS4E=
13. CPI. 2026. Outlook of Future Mobility Jobs Market in India with EV Transition. https://www.climatepolicyinitiative.org/wp-content/uploads/2026/01/Outlook-of-Future-Mobility-Jobs-Market-in-India_print.pdf
14. DOE. 2024. National Electric Vehicle Infrastructure (NEVI) Formula Program. https://afdc.energy.gov/laws/12744
15. DoE. 2024. Estimated Cost of EV Batteries 2019-2024. [accessed 2025 Aug 15]. https://www.anl.gov/sites/www/files/2024-08/EV%20Costs%202024%20for%20GPRA%20reporting%20%28August%2019%2C%202024%29.pdf

16. GHG Protocol. n.d. Emission Factors. https://ghgprotocol.org/sites/default/files/2024-05/Emission_Factors_for_Cross_Sector_Tools_V2.0_0.xlsx

17. Guttikunda SK. 2024. Vehicle Stock Numbers and Survival Functions for On-Road Exhaust Emissions Analysis in India: 1993–2018. [accessed 2025 Aug 15]. https://www.mdpi.com/2071-1050/16/15/6298

18. HSSC and EY. 2022. Skill Gap Study for Hydrocarbon Sector – 2025 and 2030. Hydrocarbon Sector Skill Council. https://www.hsscindia.in/public/pdf/Skill-Gap-Study-for-Hydrocarbon-Sector-2025-and-2030.pdf

19. ICCT. 2018. China's New Energy Vehicle Mandate Policy. International Council for Clean Transportation. https://theicct.org/sites/default/files/publications/China-NEV-mandate_ICCT-policy-update_20032018_vF-updated.pdf

20. ICCT. 2021a. Estimating electric two-wheeler costs in India to 2030 and beyond. [accessed 2025 Aug 15]. https://theicct.org/wp-content/uploads/2021/12/E2W-cost-2030-India-jul2021.pdf

21. ICCT. 2021b. Fuel consumption standards for the new two-wheeler fleet in India. https://theicct.org/sites/default/files/publications/fuel-consumption-2w-india-aug2021.pdf

22. ICCT. 2022a. Promoting the development of electric vehicles in Vietnam. [accessed 2025 Dec 23]. https://theicct.org/wp-content/uploads/2022/12/asia-pacific-evs-promoting-development-evs-vietnam-dec22-2.pdf

23. ICCT. 2022b. Incentives for electrifying agricultural tractors in India. [accessed 2025 Aug 15]. https://theicct.org/wp-content/uploads/2022/10/india-hvs-evs-incentives-elec-tractors-India-oct22.pdf

24. ICCT. 2022c. Incentives for electrifying agricultural tractors in India. [accessed 2025 Aug 15]. https://theicct.org/wp-content/uploads/2022/10/india-hvs-evs-incentives-elec-tractors-India-oct22.pdf

25. ICCT. 2023. HEAVY-DUTY TRUCKS IN INDIA: TECHNOLOGY POTENTIAL AND COST-EFFECTIVENESS OF FUEL-EFFICIENCY TECHNOLOGIES IN THE 2025–2030 TIME FRAME. https://theicct.org/wp-content/uploads/2023/06/India-HDT-fuel-efficiency_FINAL.pdf

26. ICCT. 2024. Total cost of ownership parity between battery electric trucks and diesel trucks in India. [accessed 2025 Aug 15]. https://theicct.org/wp-content/uploads/2024/08/ID-183-%E2%80%93-TCO-HDV_report_final.pdf

27. ICCT. 2025. How the Inflation Reduction Act is driving U.S. job growth across the electric vehicle industry. https://theicct.org/wp-content/uploads/2025/04/ID-344-%E2%80%93-IRA-jobs_report_final.pdf

28. IEA. 2022. Transitioning India's Road Transport Sector Realising climate and air quality benefits. International Energy Agency. https://iea.blob.core.windows.net/assets/06ad8de6-52c6-4be3-96fc-2bdc3510617d/TransitioningIndiasRoadTransportSector.pdf

29. IEA. 2024. Global EV Outlook 2024. [accessed 2025 Aug 15]. https://www.iea.org/reports/global-ev-outlook-2024/outlook-for-electric-vehicle-charging-infrastructure

30. IFC. 2020. The Why and How of Blended Finance: Recommendations to Strengthen the Rationale for and Efficient Use of Concessional Resources in Development Finance Institutions' (DFI) Operations. International Finance Corporation, World Bank Group. https://www.ifc.org/content/dam/ifc/doc/mgrt/202011-new-ifc-discussion-paper.pdf

31. IISD. 2025. Indonesian Electric Vehicle Boom: A temporary trend or a long-term vision? https://www.iisd.org/articles/deep-dive/indonesian-electric-vehicle-boom-temporary-trend-or-long-term-vision#:~:text=The%20Indonesian%20government%20has%20set,the%20country's%20largest%20CO2%20contributors

32. IQAir. 2024. 2024 World Air Quality Report: Region & City PM2.5 Ranking. IQAir. https://www.greenpeace.org/static/planet4-chile-stateless/2025/03/edf90b7a-2024_world_air_quality_report_vf.pdf

33. Kawano A et al. 2025. Improved daily PM2.5 estimates in India reveal inequalities in recent enhancement of air quality. 11(4). https://doi.org/10.1126/sciadv.adq1071

34. Ministry of Finance. 2026. Economic Survey 2025-26. https://www.indiabudget.gov.in/economicsurvey/doc/echapter.pdf

35. MoRTH. 2025. [accessed 2025 Dec 15]. https://vahan.parivahan.gov.in/vahan4dashboard/

36. Niti Aayog. 2021. HANDBOOK of ELECTRIC VEHICLE CHARGING INFRASTRUCTURE IMPLEMENTATION. [accessed 2025 Aug 15]. https://niti.gov.in/sites/default/files/2021-08/HandbookforEVChargingInfrastructureImplementation081221.pdf

37. NITI Aayog. 2023. Security Scenarios (IESS) 2047 3.0. https://iess2047.gov.in/_/theme/documents/IESS_v3_one_pagers.pdf

38. OECD. 2022. Norway's evolving incentives for zero-emission vehicles. https://www.oecd.org/en/publications/ipac-policies-in-practice_22632907-en/norway-s-evolving-incentives-for-zero-emission-vehicles_22d2485b-en.html

39. Ola Electric. 2024. Dun_and_bradstreet_Project cost vetting. [accessed 2025 Aug 15]. https://cdn.olaelectric.com/sites/evdp/pages/investor/md/dun_and_bradstreet_project_cost_vetting_report_dated_24_july_2024.pdf

40. Oxford Institute of Energy Studies. 2023. Electric Vehicles. https://chineseclimatepolicy.oxfordenergy.org/book-content/domestic-policies/vehicles/electric-vehicles/

41. PIB. 2023. [accessed 2025 Aug 15]. https://www.pib.gov.in/PressReleasePage.aspx?PRID=1941114

42. PIB. 2025a. [accessed 2025 Nov 13]. https://www.pib.gov.in/www.pib.gov.in/Pressreleaseshare.aspx?PRID=2121826

43. PIB. 2025b. SUBSIDY FOR PROMOTING E-VEHICLES. [accessed 2025 Aug 15]. https://www.pib.gov.in/PressReleasePage.aspx?PRID=2118896

44. PIB. 2025. https://www.pib.gov.in/PressReleasePage.aspx?PRID=2143550&reg=3&lang=2#:~:text=Press%20Release:Press%20Information%20Bureau,by%202030%2C%E2%80%9D%20he%20noted

45. PIB. 2026. https://www.pib.gov.in/PressReleasePage.aspx?PRID=2219990&reg=3&lang=2

46. PIB. 2026a. https://www.pib.gov.in/PressReleasePage.aspx?PRID=2225882&reg=3&lang=2

47. PIB. 2026b. https://www.pib.gov.in/PressReleseDetailm.aspx?PRID=2222608&reg=3&lang=2

48. PPAC. 2025. India's Oil & Gas Ready Reckoner Oil & Gas Industry Information at a Glance FY 2025-26 (H1). Petroleum Planning & Analysis Cell (PPAC). https://ppac.gov.in/download.php?file=rep_studies/1764908553_India_Oil_and_Gas_Ready_Reckoner_FY_2025-26-H1.pdf

49. PPAC. 2026. https://ppac.gov.in/import-export/history

50. PSA. 2026. https://www.psa.gov.in/mission/electric-vehicles/36

51. RBI. 2023. India@100. [accessed 2025 Aug 15]. https://www.rbi.org.in/Scripts/BS_ViewBulletin.aspx?Id=21929

52. Sharma P, Mukherjee A, Kanuri C, Chatterjee S. 2025. A "just" transition in the downstream automotive segment: Evidence from Delhi. WRI India. https://doi.org/10.46830/wriwp.23.00175

53. Singh N, Mishra T, Banerjee R. 2019a. Projection of private vehicle stock in India up to 2050. [accessed 2025 Aug 15]. https://wctrs-society.com/wp-content/uploads/abstracts/mumbai/WCTR2019_Mumbai_641.pdf

54. Singh N, Mishra T, Banerjee R. 2019b. Projection of private vehicle stock in India up to 2050. [accessed 2025 Aug 15]. https://wctrs-society.com/wp-content/uploads/abstracts/mumbai/WCTR2019_Mumbai_641.pdf

55. Telanagana RTO. 2025a. [accessed 2025 Dec 15]. https://www.transport.telangana.gov.in/html/statistics_vehicles.html

56. Telanagana RTO. 2025b. [accessed 2025 Dec 15]. https://www.transport.telangana.gov.in/html/statistics_vehicles.html

57. United Nation. 2024. Data Portal Population Division. [accessed 2025 Aug 15]. https://population.un.org/dataportal/data/indicators/49/locations/356/start/1990/end/2047/table/pivotbylocation?df=6eb9b2a5-0a17-4121-afde-35fbb8099ee8

58. Vaahan. 2025. [accessed 2025 Dec 15]. https://vahan.parivahan.gov.in/vahan4dashboard/

59. WFW. 2025. Driving The Future: How Thai Leadership is Shaping Southeast Asia's EV Revolution. https://www.wfw.com/articles/driving-the-future-how-thai-leadership-is-shaping-southeast-asias-ev-revolution/

60. World Bank. 2024. Recommendations to the National Roadmap and Action Plan for the Electric Mobility Transition. [accessed 2025 Dec 23]. https://documents1.worldbank.org/curated/en/099102224045529146/pdf/P18116512a364c0aa1b15c1f6ff0709730f.pdf

61. WRI. 2024. Pathways to decarbonize India's transport sector: Scenario analysis using the Energy Policy Simulator. https://wri-india.org/sites/default/files/Pathways-to-decarbonize-India%E2%80%99s-transport-sector.pdf

62. WRI. 2025. [accessed 2025 Apr 11]. https://www.wricitiesindia.org/content/tco-evaluator

63. Zigwheels. 2025. [accessed 2025 Aug 22]. https://www.zigwheels.com/newcars/best-mileage-cars

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