HYDERABAD'S JOURNEY TO ZERO-EMISSIONS

A Roadmap for Fleet Electrification

REPORT

MARCH 2025

ABOUT

Natural Resources Defense Council (NRDC): With over 50 years of experience, the Natural Resources Defense Council (NRDC) combines the power of more than three million members and online supporters with the expertise of over 700 scientists, lawyers, and policy experts to drive climate and clean energy action, protect nature, and promote healthy people and thriving communities. NRDC works in the United States, China, India, and key geographies to advance environmental solutions. In India, NRDC partners with leading organizations issues related to clean energy access, energy efficiency, cooling, climate resilience and clean transportation. For over 10 years, NRDC has also worked with government officials at the national, state, and city level partnering with local groups and businesses to combine scientific research and policy acumen to implement impactful climate solutions.

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About the **Administrative Staff College of India (ASCI)**

Established in 1956, as an initiative of the Government of India and Industry, the Administrative Staff College of India (ASCI), Hyderabad, has pioneered post-experience management training, leadership development and capacity building in India. ASCI equips practicing managers from public sector such as civil servants, administrators, government officers (ministries and state departments), PSU officers and others, with skills to synthesize managerial theory and practice; and respond to the ever-increasing complexity of managerial issues confronting government, policy makers and industrial enterprises. Beyond training/ capacity building, ASCI also undertakes research and consulting for the above stakeholders on policy, implementation, assessment, pilots and more. ASCI has various centres of excellence in managerial and techno-managerial disciplines, with one such being Centre for Energy Studies (CES). ASCI has contributed towards nation building and CES has contributed immensely in the Energy and Power sector with work areas including Power Sector Reforms (Generation, Transmission, Distribution), Administrative Reforms in the Power Sector, Regulatory Affairs and Tariff Analysis, Clean Energy (Solar, Biomass, Green Hydrogen and more), Energy Conservation and Resource Efficiency (Industries, MSMEs, Buildings and more), E-Mobility and related infrastructure as well as other seminal areas.

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Acknowledgments

The partners would like to thank government officials, business leaders and stakeholders for sharing their valuable inputs on fleet electrification roadmap for decarbonizing road transport in Greater Hyderabad Municipal Corporation (GHMC). We would also like to thank our esteemed peer reviewers: Gopalakrishnan VC (Director Automotive, Government of Telangana), Sharif Qamar (Associate Director, The Energy and Resources Institute), Chinmaya Acharya, Laurie Geller, Charlotte Steiner and Ritika Kapoor (NRDC).

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Abbreviations

ASCI	Administrative Staff College of India
CAGR	Compound Annual Growth Rate
CAPEX	Capital Expenditure
CNG	Compressed Natural Gas
CO	Carbon Monoxide
CO2	Carbon Dioxide
CPO	Charge Point Operator
DPR	Detailed Project Report
EV	Electric Vehicle
GHG	Greenhouse Gas
GHMC	Greater Hyderabad Municipal Corporation
GSDP	Gross State Domestic Product
GST	Goods and Services Tax
HC	Hydrocarbons
ICE	Internal Combustion Engine
INR	Indian Rupee
kWh	Kilowatt Hour
LPG	Liquid Petroleum Gas
LTV	Loan-to-Value
OEM	Original equipment manufacturers
OPEX	Operational Expenditure
PCS	Public Charging Station
SGST	State Goods and Services Tax
TCO	Total Cost of Ownership
TGREDCO	Telangana State Renewable Energy Development Corporation Limited
TMV	Telangana Mobility Valley
VPL	Vehicular Pollution Load
ZEV	Zero Emission Vehicle

Foreword

The Government of Telangana is steadfast in its commitment to fostering sustainable development while driving economic progress. As the state capital, Hyderabad stands as a beacon of growth and innovation, playing a pivotal role in shaping Telangana's clean transportation landscape. Recognizing the need to address rising emissions and align with our climate goals, the electrification of commercial fleets emerges as a transformative opportunity to transition to cleaner, greener urban mobility.

Hyderabad, as a rapidly growing urban center, stands at the crossroads of balancing economic growth with sustainability. With over 7 million personal vehicles currently on its roads and annual growth averaging 10.84%, the city's transport sector contributes significantly to emissions. Recognizing the urgency to address these challenges, the Government of Telangana has taken a proactive stance in advancing clean mobility solutions, exemplified by its pioneering Electric Vehicle and Energy Storage Policy 2020-2030 and initiatives under Telangana Mobility Valley (TMV).

The *"Hyderabad's Journey to Zero-Emissions: A Roadmap for Fleet Electrification"* is a comprehensive document that builds on this vision, offering an actionable pathway for transitioning fleets to electric vehicles. Developed by NRDC and ASCI in collaboration with Telangana Mobility Valley, the roadmap combines extensive data analysis, stakeholder consultations, and global best practices. It outlines ambitious electrification targets for high-mileage sectors such as e-commerce and ride-sharing while addressing the unique challenges of charging infrastructure, cost dynamics, and technology readiness. The roadmap also highlights the potential to reduce emissions and improve public health outcomes, reinforcing the importance of fleet electrification for Hyderabad's sustainability goals.

Telangana's leadership in clean transportation is a cornerstone of its broader climate agenda, aiming to achieve net-zero emissions while driving economic growth and job creation. With the TMV initiative targeting INR 50,000 crore in investments and over 400,000 jobs, fleet electrification represents a critical opportunity to position Telangana as a global leader in sustainable mobility.

This roadmap is not just a guide for Hyderabad but a model for other cities aiming to transition to cleaner, greener transportation systems. I commend the teams at NRDC, ASCI, and Telangana Mobility Valley for their dedication to advancing this important work and for providing a robust framework to align with the state's net-zero vision. Together, we can pave the way for a more sustainable future.

Sri Jayesh Ranjan, IAS
Special Chief Secretary
Department of Information Technology, Electronics & Communications (ITE&C) and Department of Industries & Commerce

1. Introduction

Telangana is at a critical juncture in its efforts to transition to cleaner and more sustainable transportation solutions. Urban centers in Telangana have experienced remarkable growth in both population and economic activity, resulting in heightened mobility and a greater demand for goods and services. This surge has naturally led to increased vehicular movement and the associated emissions. The energy sector of Telangana has been a significant contributor to the state's overall emissions, making up approximately 85% of the total emissions, with the transport sector accounting for about 23% of this share.[1]

In the broader context of India's vehicle market, it's significant to note that while India is the world's third-largest market for light-duty vehicles, the state of Telangana holds a noteworthy share, accounting for 6% of India's three-wheeler sales, 5% of passenger vehicle sales, and 4% of two-wheeler sales.[2] Telangana has experienced a tremendous growth rate in motor vehicles in the last ten years with the total count escalating from 7.1 million in 2014 to 15.4 million in 2023. This represents an annual growth rate of 9 percent, significantly outpacing the national average of 3.32 percent.[3] Notably, during the 2022-23 fiscal year, approximately one million new vehicles were introduced within the state.[4] Urban centers hold a significant share of the existing vehicle population in Telangana, with Hyderabad, as the state's capital, accounting for 51% of registered vehicles in 2023.[5] If we look at Hyderabad alone, city had a mere 2.5 million vehicles, at the time of formation of Telangana. This number has consistently grown and now the number of personal vehicles stands at roughly 7 million, with more than 5 million being two-wheelers and approximately 1.3 million being four-wheelers.[6] High vehicle density in urban centers makes them vulnerable to vehicular pollution, highlighting the urgent need for measures to control vehicular emissions.

The State of Telangana holds a noteworthy share, accounting for

6% OF INDIA'S THREE-WHEELER SALES

5% OF PASSENGER VEHICLE SALES

4% OF TWO-WHEELER SALES

Over the years Telangana has established itself as a hub for innovation, technology, and industrial growth. The state of Telangana acknowledges that the decarbonization of the transportation sector is a fundamental element in attaining its climate objectives. With this background, the Telangana State Electric Vehicle and Energy Storage Policy, 2020-2030 was launched in September 2020[7], underlining the state's commitment to a more sustainable and eco-friendly transportation system. To complement this further, the state is at the forefront of fostering a robust ecosystem of institutions dedicated to propelling sustainable and collaborative mobility solutions. Anchored by institutions like T-Works (Telangana Works), T-Hub (Technology Hub), We-Hub (Women Entrepreneurs Hub), TASK (Telangana Academy for Skill and Knowledge), and TSIC (Telangana State Innovation Cell), the state has positioned itself as a pioneering hub for cutting-edge initiatives in the field of mobility. Further the state launched India's first mobility focused cluster, the Telangana Mobility Valley (TMV), positioning the state as a hub for sustainable mobility manufacturing, research, skilling, and policy development.

While the supply side ecosystem is well established, the state is looking to accelerate the adoption of electric vehicles (EV) further. As of September 2024, Telangana had a 4.3% share of the total cumulative EVs sold in the country.[8] To expedite EV adoption in Telangana, the state is focusing on a strategic mix of policies that target both demand and supply sides of the market. On the demand side, fleet electrification is a priority, particularly for high-mileage sectors such as e-commerce and ridesharing, which have rapidly expanded over the past decade, leading to significant emissions. Electrifying vehicle fleets presents a transformative opportunity to significantly reduce emissions and aligns with national climate commitments. Given that commercial fleets typically cover extensive distances each day, which directly impacts both emissions and operational costs, the shift to EVs offers substantial benefits for fleet operators. Telangana aims to establish clear goals and timelines that drive urgency and encourage collaboration between public and private sectors. On the supply side, a combination of regulatory and market-based mechanisms is essential to simulate

During the 2022-23 fiscal year, approximately one million new vehicles were introduced within the state.

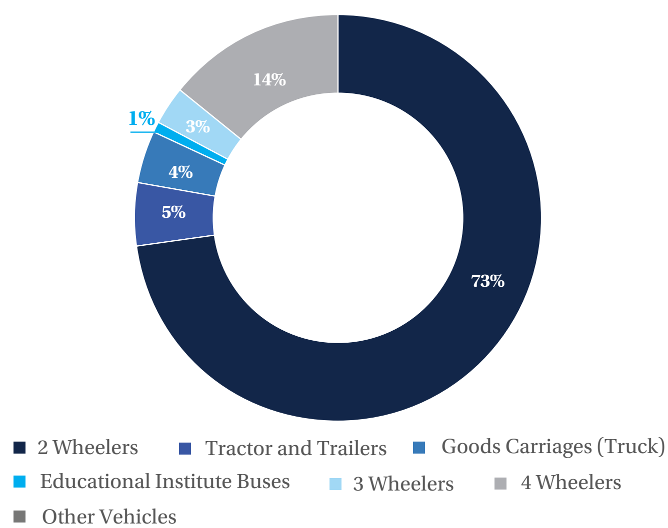
industry growth. Global best practices, such as phasing out internal combustion engine (ICE) vehicles, setting ambitious zero emission vehicle (ZEV) targets, and integrating EVs into carbon markets and Environmental, Social, and Governance (ESG) frameworks, are being considered to incentivize manufacturers toward electrification.

To advance Telangana's transportation decarbonization objectives, the Natural Resources Defense Council (NRDC), Administrative Staff College of India (ASCI), and Telangana Mobility Valley (TMV) collaborated to develop a comprehensive fleet electrification roadmap for the Greater Hyderabad Municipal Corporation (GHMC). This effort involved analyzing vehicle growth trends across various categories within the GHMC area, gathering primary and secondary data on commercial fleet use cases, and establishing a robust methodology to assess fleet growth and propose targets for transitioning GHMC fleets to 100% electric. The NRDC and ASCI teams conducted extensive research and engaged in multiple discussions with industry stakeholders, including e-commerce and ride-sharing companies, original equipment manufacturers (OEMs), and charging infrastructure providers. These consultations provided valuable insights into proposed fleet electrification targets and the measures needed to strengthen both demand- and supply-side efforts. By leveraging collective expertise, the project aims to develop a scalable and sustainable pathway for fleet electrification in Telangana, contributing to a cleaner and greener future. The resulting roadmap not only supports Telangana's decarbonization goals but also offers a comprehensive model that can be replicated by other states to accelerate the transition to electric mobility.

1.1 Vehicular Composition in Telangana

Telangana is experiencing a rapid increase in vehicle numbers, with significant growth observed in both private and commercial vehicles across urban and rural areas. Similar to other Indian states, two-wheelers dominate Telangana's vehicle stock, accounting for 12.1 million units, or 73% of the total as shown in Figure 1. This is followed by four-wheelers, which make up 14% of the overall vehicle stock in the state.[9]

Figure 1: Vehicular Composition in Telangana as on 31st May 2024

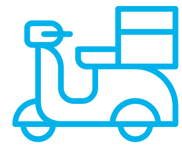


Source: Transport Department, Government of Telangana

Image credit: shutterstock

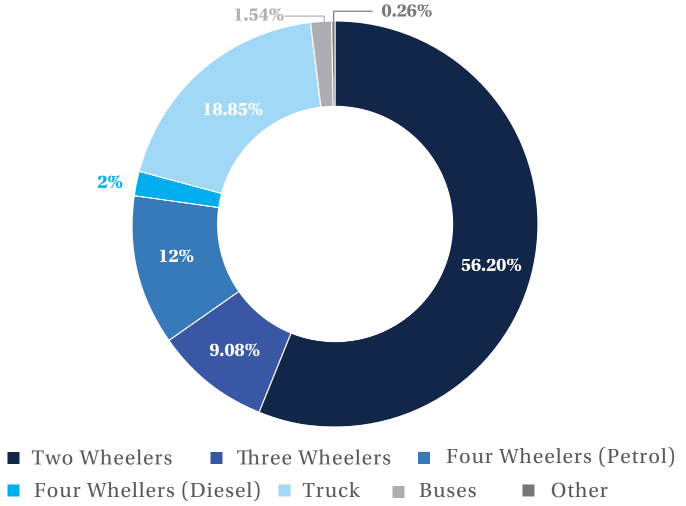
1.2 Emissions from Telangana's Road Transport Sector

The increasing use of vehicles in Telangana has significantly contributed to rising greenhouse gas (GHG) emissions, with the transport sector accounting for approximately 19.55% of the state's total GHG emissions.[10] Between 2014 and 2018, GHG emissions from the energy sector surged by 52%, growing from 37.23 Mt CO2e to 56.70 Mt CO2e.[11] As shown in Figure 2, Within the transport sector, emissions have also escalated sharply, with two-wheelers contributing the largest share at 56.2%, followed by trucks at 18.85% and four-wheelers at 14%.[12] These numbers underscore the urgent need for targeted interventions to mitigate emissions from the transport sector.



Given that commercial fleets typically cover extensive distances each day, which directly impacts both emissions and operational costs, the shift to EVs offers substantial benefits for fleet operators.

Figure 2: Segment Wise Vehicular GHG Emissions.



Source: Transport Department, Government of Telangana

1.3 Telangana's Efforts to Decarbonize Road Transport

Telangana has taken significant strides to foster a robust ecosystem for electric mobility, including support for the manufacturing and sales of EVs, through its Telangana State Electric Vehicle and Energy Storage Policy, 2020-2030.[13] The policy offers a comprehensive range of incentives to promote the manufacturing of EVs, energy storage systems, and their components, as well as to accelerate EV adoption. Initially, it provided fiscal benefits such as 100% exemptions on road tax and registration fees for electric two-wheelers, three-wheelers, four-wheelers, light commercial vehicles, shared transport, and public transport, which were available until the targeted vehicle numbers were achieved. Recently, the state government extended these exemptions for an additional two years, now valid until December 31, 2026.[14]

To further promote EV adoption, the policy and enabling regulations include:

- Upfront incentives for retrofitting three-wheelers, encouraging their transition to electric.
- Provision of battery-operated feeder shuttle services at Hyderabad Metro stations, significantly enhancing last-mile connectivity for urban commuters.
- Dedicated preferential parking spaces equipped with EV charging infrastructure to ease adoption.
- Introduction of a special power tariff category for EV charging stations.
- Amendments to building by-laws to mandate provisions for charging infrastructure in urban development projects.

The Telangana government has designated Telangana Renewable Energy Development Corporation Limited (TGREDCO) as the nodal agency to promote electric mobility initiatives and develop supporting infrastructure.[15] This approach ensures a focused and coordinated effort in achieving the state's decarbonization objectives.

Telangana Mobility Valley (TMV): A Game-Changer for E-Mobility

At the core of Telangana's strategy is the ambitious Telangana Mobility Valley (TMV) initiative, which is poised to establish the state as India's leading mobility hub. Key highlights include:

- Aiming to attract INR 50,000 crore in investments by 2030 and generate 4 lakh jobs over the next five years.
- Supporting over 23 EV startups in Hyderabad through innovation hubs and industry-academia collaborations.
- Establishing centers of excellence for hands-on training to build a skilled workforce for the EV sector.
- Securing INR 8,000 crore in investments to date and committing to set up 800 EV charging stations across the state.
- Allocating 1,600 acres of industrial land for the manufacturing of EVs, energy storage systems, and electronic components.

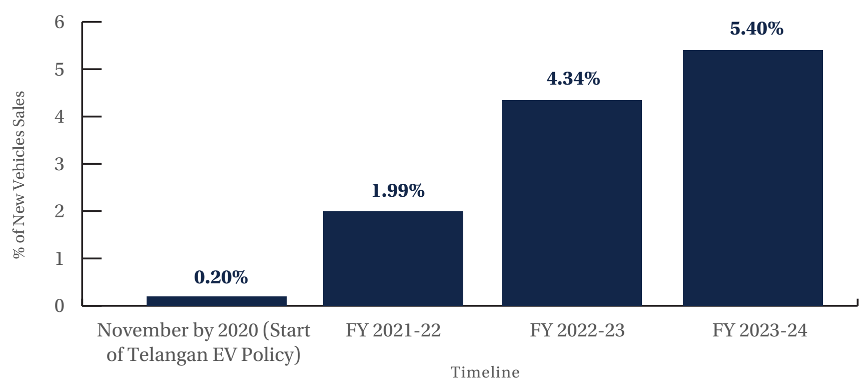
To further accelerate EV adoption, the proposed Telangana's revised EV policy is exploring several new measures. These include incentives for electric tractors and trucks, aimed at driving electrification in the agricultural and logistics sectors, and the expansion of the three-wheeler retrofitting initiative to facilitate faster transitions to electric mobility. The policy also proposes dedicated budgetary allocations for EV charging hubs to ensure the development of robust infrastructure, alongside the establishment of state-level EV penetration goals and commercial fleet electrification targets to promote widespread adoption of electric vehicles across sectors.

1.4 Growth of EV Penetration

EV penetration in Telangana has increased from a modest 0.2% in 2020 to 5.4% by the end of FY 2023-24.

The state of Telangana has experienced remarkable growth in EV penetration, rising from a modest 0.20% at the inception of its EV policy in 2020 to an impressive 5.40% by the end of FY 2023-24.[16] As observed in Figure 3, this significant progress is a direct result of the state government's targeted policy initiatives, which include incentives to reduce the high upfront costs of EVs and measures to lower operational expenses. These efforts, as outlined in the previous section, have played a crucial role in making EVs more accessible and financially viable for consumers, driving widespread adoption across the state.

Figure 3: Growth of EV Penetration in Telangana



Source: Transport Department, Government of Telangana

2. Electrifying Fleets in Greater Hyderabad Municipal Corporation

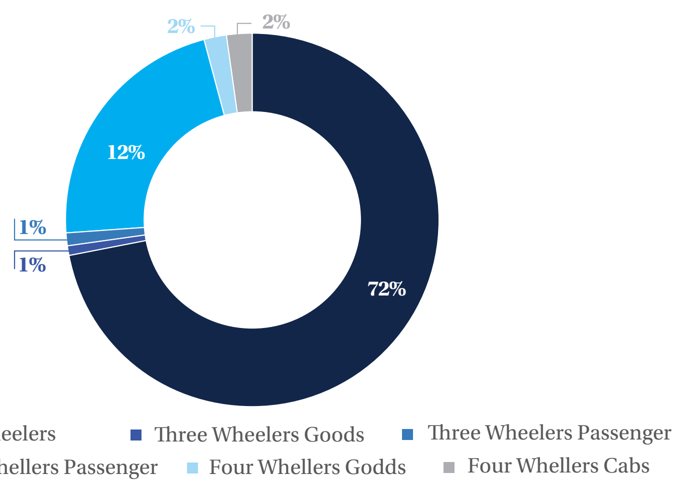
To develop the roadmap for electrification of vehicle fleets in Hyderabad, NRDC and partners analyzed the patterns of vehicular growth, the current EV ecosystem, and identified the most suitable fleets for electrification, taking into account both the techno-commercial aspects and the specific requirements of various use cases. The roadmap, detailed in Section 4 suggests annual targets for electrifying different vehicle types and outlines actionable steps to help Hyderabad transition its transportation system towards cleaner mobility.

2.1 Vehicle Growth and Need to Set EV Penetration Targets for Greater Hyderabad Municipal Corporation

Over the years, vehicle stock in the GHMC region have experienced rapid growth, expanding from 2.5 million in 2014 to 7 million vehicles in 2024[17], reflecting a compound annual growth rate (CAGR) of 10.84%. According to Figure 4, in the financial year 2023-24, two-wheelers dominated sales, accounting for 72%, followed by four-wheeler passenger vehicles at 22%. In comparison, four-wheeler goods, vehicles and cabs each contributed only 2%.[18] For this exercise, the L5M and L5N segments are considered within the three-wheeler vehicle category, while only the N1 and N21 segments are taken into account for four-wheeler goods vehicles.[i]

GHMC region have experienced rapid growth, expanding from 2.5 million in 2014 to 7 million vehicles in 2024.

Figure 4: Share of Vehicle Sales Across Vehicle Types in GHMC (FY 2023-24)



Source: Transport Department, Government of Telangana

Over the decade from FY 2013-14 to FY 2023-24, three-wheeler goods vehicles recorded the highest growth with a CAGR of 10.51%, while four-wheeler cabs also saw a steady rise in sales. In contrast, sales of three-wheeler passenger vehicles declined, primarily due to regulatory restrictions on

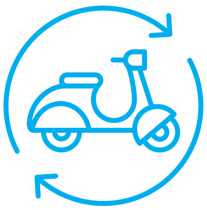
i L5M - Three wheeled passenger rickshaw with maximum speed exceeding 25kmph.
L5N – Three wheeled goods carrier with permissible GVW of 1500 kgs.
N1 category vehicle is motor vehicle with a GVW of up to 3.5 tons that is used to transport goods.
N2[1] category vehicle is motor vehicle with a permissible GVW that exceeds 3.5 tons but does not exceed 7.5 tons and is used for transporting goods.

permits within the GHMC region. Stakeholder consultations further underscored the significant impact of these restrictions on the demand for three-wheeler passenger vehicles, shaping the region's vehicle sales trends. The table below provides a comparison of the CAGR in vehicle sales across vehicle segments over the last ten financial years.

Table 1: CAGR in Last 10 Financial Years for different vehicle types (FY 2013-14 to FY 2023-24)

Vehicular Segment	Two-Wheelers	Three-Wheelers Goods	Three-Wheelers Passenger	Four-Wheelers Passenger	Four-Wheelers Goods	Four-Wheelers Cabs
CAGR	4.43	10.51	-5.72	6.95	7.08	9.98

Source: Transport Department, Government of Telangana



Two-wheelers contribute

56%

of the total vehicular pollution load.

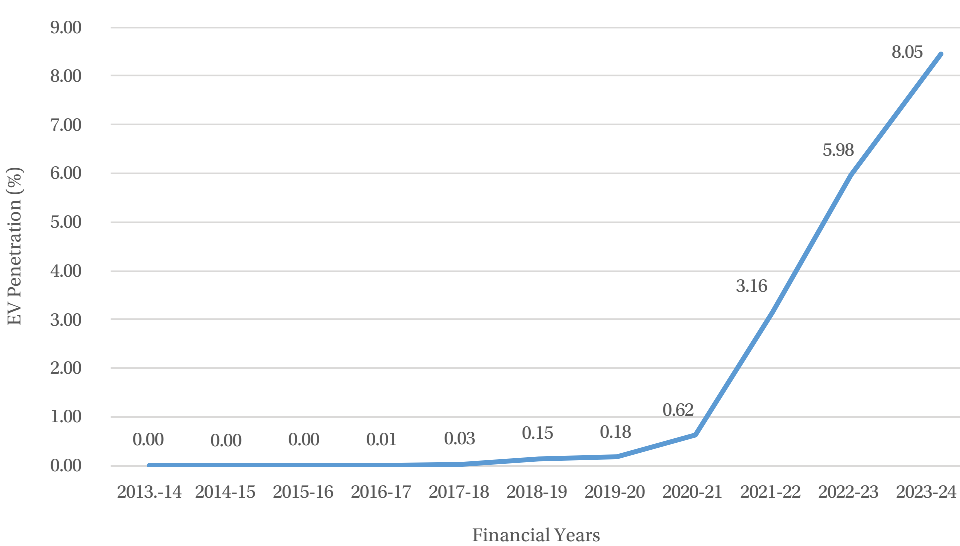
With the number of vehicles on the road rapidly increasing, the twin cities of Hyderabad and Secunderabad alone account for vehicular pollution load (VPL) of 1500 tons per day. Notably, two-wheelers contribute 56% of the total VPL.[19] With approximately 5.6 million two-wheelers and 1.4 million four-wheelers in the GHMC's vehicle stock,[20] there is an urgent need for setting ambitious EV penetration targets.

2.2 Uptake of Electric Vehicles in Greater Hyderabad Municipal Corporation – A Segment Wise Analysis

When new technologies emerge, they often gain traction first in Tier-1 cities (those with population of 1 million or more), and EVs are no exception. These urban centers benefit from greater awareness, higher purchasing power, and better access to charging infrastructure and after-sales services compared to smaller cities and towns. As a result, urban areas in Telangana accounted for 70.6% of all registered EVs in the first half of 2024, with Hyderabad leading EV sales.[21]

In the GHMC region, EV penetration rate has grown steadily, increasing from 0.62% at the launch of Telangana's EV policy in 2020 to 8.05% in the 2023-24 financial year—a figure that is 3 percentage points higher than the state average.[22] This strong growth positions Hyderabad as a strategic leader in driving transportation electrification efforts across Telangana. The figure below shows the year-on-year growth of EV penetration rate in the GHMC area.

Figure 5: Growth of EV Penetration Rate in GHMC

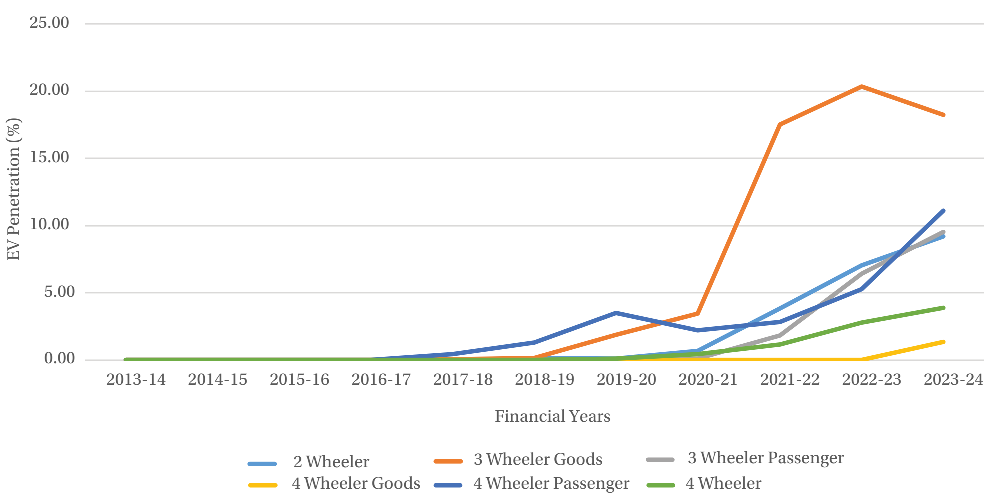


Source: Transport Department, Government of Telangana

As observed in Figure 6, electric three-wheeler goods vehicles represent the segment with the highest EV penetration with 20% during FY 2022-23. The relatively higher EV penetration of electric three-wheeler can be attributed to the widespread presence of many logistics' companies and growth of e-commerce. The segment with the second highest EV penetration is electric four-wheeler cabs, achieving nearly 11% EV penetration, with some key fleet operators playing a significant role. Electric four-wheeler goods vehicles show the lowest EV penetration due to their high upfront cost and limited vehicle model availability. While the adoption of electric two-wheelers saw rapid growth between 2020 and 2023, maintaining the second-highest EV penetration among all vehicle categories for an extended period, the penetration rate saw a dip due to the withdrawal of demand side incentives. However, with the recent decision to reinstate these incentives, penetration in the two-wheeler category is expected to rise once again.

Electric three-wheeler goods vehicles represent the segment with the highest EV penetration with 20% during FY 2022-23.

Figure 6: Segment-Wise EV Penetration in GHMC



Source: Transport Department, Government of Telangana

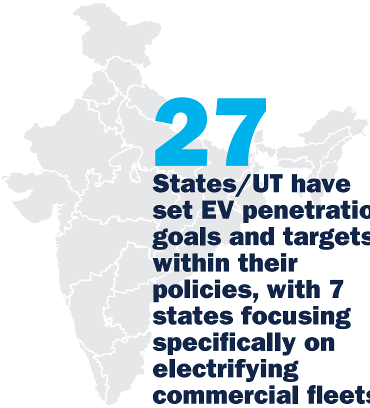
2.3 Commercial Vehicles to Lead Electrification Efforts

Commercial vehicles, due to their higher daily usage compared to personal vehicles, are uniquely positioned to lead electrification efforts. Their extended operational hours make them ideal candidates for transitioning to electric mobility, as EVs offer significantly lower operational costs compared to ICE vehicles. The savings from reduced fuel and maintenance costs can offset the higher upfront purchase cost, providing long-term financial benefits for fleet operators and driver partners.

Beyond financial advantages, electrification also brings health benefits for driver-partners. Prolonged operation of ICE vehicles, which involves constant gear shifting and exposure to engine vibrations and harmful emissions like CO and NOx, often lead to physical strain and health issues. Electric vehicles, with their simpler drivetrains and absence of manual transmissions, provide a smoother and less stressful driving experience, reducing physical fatigue and enhancing drivers' well-being. Additionally, the lack of tailpipe emissions in EVs minimizes air pollution, lowering the risk of respiratory ailments and contributing to a healthier environment for both drivers and communities.

Image credit: shutterstock

2.4 Goals to Decarbonize Road Transport and Electrify Fleets in Other Indian States



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States/UT have set EV penetration goals and targets within their policies, with 7 states focusing specifically on electrifying commercial fleets.

Twenty-nine Indian states and Union Territories have made significant strides toward vehicle electrification. Among them, 27 states have implemented EV policies, while two remain in the draft stage. These policies encompass a mix of fiscal and non-fiscal measures, including upfront subsidies, tax exemptions, and the development of charging infrastructure, aimed at fostering a robust EV ecosystem.

Notably, 27 states/UT have set EV penetration goals within their policies, with 7 states focusing specifically on electrifying commercial fleets. Delhi has taken an additional step by notifying the Delhi Motor Vehicle Aggregator and Delivery Service Provider Scheme (2023), which establishes specific targets for the electrification of its commercial fleet services.

Refer to the Annexure 7.1 for a detailed breakdown of goals under various state EV policies. Additionally, Table 2 lists seven states and one Union Territory that have launched dedicated initiatives to electrify fleet services as part of their EV policies, further accelerating India's transition to clean mobility.

Table 2: Goals for Fleet Electrification Under State EV Policies

States	Goals
Delhi[23]	All delivery service providers expected to convert 50% of their fleet operating in Delhi to electric by 31 March 2023 and 100% by 31 March 2025. *"Delhi is the only city to implement the targets in the form of mandates with the notification of the Delhi Motor Vehicle Aggregator and Delivery Service Provider Scheme, 2023"* Delhi Motor Vehicle Aggregator and Delivery Service Provider Scheme targets for the adoption of 100% EVs in new fleet by 2028[24]
Assam[25]	Phase out all fossil fuel based commercial fleets and logistics vehicles in all cities by 2030
Chhattisgarh[26]	All Aggregator service providers to mandatorily have at least 30% EVs in their fleets by 2027
Madhya Pradesh[27]	Two Wheeler - Achieving 100% of all new registrations in the commercial fleet by 2030. Three Wheeler - Achieving 80% of all new registrations by 2030 in both passenger and freight segments.
Maharashtra[28]	25% electrification targeted for fleet aggregators and last-mile delivery vehicles by 2025 in targeted cities (Mumbai, Pune, Nagpur, Nashik, Aurangabad and Amravati)
Goa[29]	New commercial 2Ws to be only electric beyond 31st December 2025, beyond 2030 only electric 2Ws to be sold in Goa
Karnataka[30]	E-commerce and delivery companies across the State will be encouraged to replace their fleet of two wheelers/three wheelers to clean mobility vehicles in a phased manner with an intention to achieve 100% clean mobility by 2030.

While Karnataka and Maharashtra have concentrated their efforts on electrification in major cities, Delhi distinguishes itself as the only Union Territory/state to target electrification of ride sharing and e-commerce fleet by launching the Delhi Motor Vehicle Aggregator and Delivery Service Provider Scheme, 2023.[31] This policy adopts a phased and structured approach, with segmented targets across various vehicle types, ensuring a systematic and progressive transition to fleet electrification.

Case Study: Delhi

Delhi has emerged as a frontrunner in the implementation of vehicle electrification targets, particularly within the commercial sector. In 2023, the government introduced its groundbreaking Aggregator Policy, aimed at accelerating the transition to EVs for commercial use. This ambitious policy outlines a clear roadmap for the full electrification of the city's new fleets, in the commercial vehicle category, by 2028, marking a significant step toward reducing carbon emissions and promoting sustainable urban mobility.

Table 3: EV Targets under Delhi Motor Vehicle Aggregator and Delivery Service Provider Scheme

Timeline starting from October 2023	Two-Wheeler Cabs	Two-Wheeler Goods Vehicle	Three-Wheeler Auto Rickshaws	Three-Wheeler Goods Vehicles	Four-Wheeler Passenger Vehicles	Four-Wheeler Goods Vehicles
6 Months	100%	10%	10%	10%	5%	5%
1 Year		25%	25%	25%	15%	15%
2 Year		50%	50%	50%	25%	25%
3 Year		75%	75%	75%	50%	50%
4 Year		100%	100%	100%	75%	75%
5 Year					100%	100%

Image credit: freepik

3. Methodology and Analysis for the Fleet Electrification Roadmap

The development of a comprehensive fleet electrification roadmap for Telangana followed a structured, collaborative approach involving stakeholder engagement, bilateral discussions, and rigorous analysis.

Credit: ASCI

First Open Discussion with Industry Stakeholders on the Need and Challenges in Fleet Electrification

Fleet operators highlighted the importance of supply-side interventions for OEMs and the development of EV charging infrastructure to achieve the proposed targets.

The process began with a stakeholder consultation in November 2023, bringing together fleet aggregators, OEMs, charge point operators (CPOs), policymakers, and other key stakeholders. This meeting provided valuable insights into the challenges, opportunities, and requirements for fleet electrification. Based on these initial inputs, the NRDC-ASCI team conducted targeted bilateral discussions with OEMs, CPOs, fleet operators, and policymakers to refine the understanding of sector-specific challenges and formulate actionable strategies. This enabled the team to draft aggregator-specific adoption targets and state-level EV goals, ensuring a tailored and practical roadmap.

3.1 Process and Timeline for the Fleet Electrification Roadmap Development

The roadmap development began with an analysis of vehicle sales data obtained from the Transport Department of Telangana. Researchers assessed growth patterns for both conventional vehicles and EVs in the GHMC region, segmenting the data by vehicle types. This helped to identify the current landscape and project future vehicle demand.

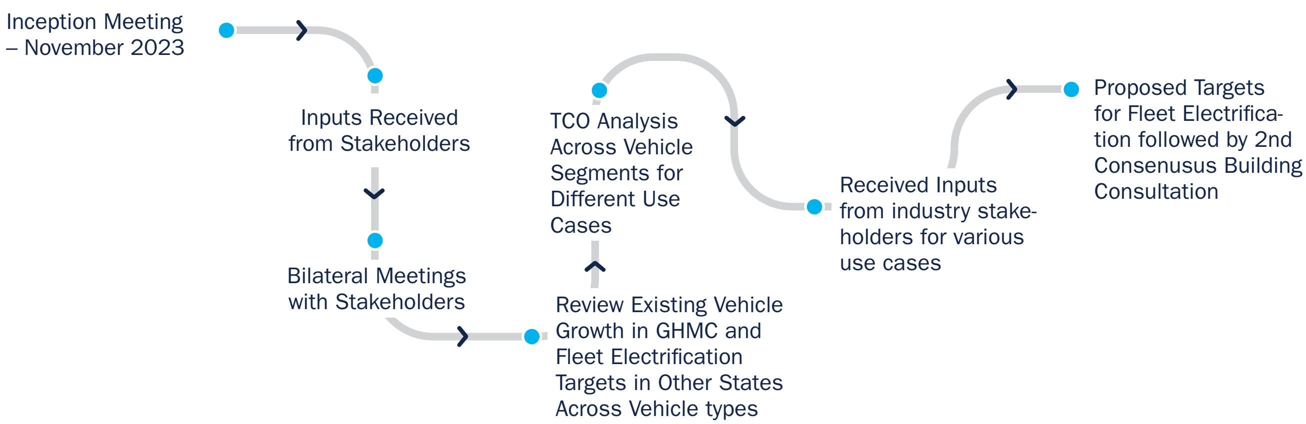
To evaluate the economic feasibility of EV adoption, a Total Cost of Ownership (TCO) analysis was conducted for each vehicle type, incorporating on-ground scenarios and relevant factors such as operating costs, incentives, and policy impacts. The analysis was enhanced with industry inputs, ensuring accuracy and comprehensiveness. The detailed TCO breakdown is provided in Annexure 7.2.

Based on these insights, EV penetration goals for new vehicle sales and fleet electrification targets for newly onboarded vehicles were formulated. These targets were informed by EV penetration rates from the past two financial years of GHMC region and tailored to reflect realistic yet ambitious adoption trajectories.

Second Open Discussion with Industry Stakeholders on the Proposed Targets for Fleet Electrification in Hyderabad

In October 2024, the proposed targets were shared with stakeholders during a second workshop, where feedback was gathered to assess their feasibility and potential impacts. The fleet operators highlighted the importance of supply-side interventions for OEMs and the development of EV charging infrastructure to achieve the proposed targets. This iterative process, as outlined in Figure 7, ensured the roadmap was grounded in data, aligned with industry realities, and supported by stakeholder consensus.

Figure 7: Methodology for the Fleet Electrification Roadmap



3.2 Total Cost of Ownership (TCO) – A Scenario of Various Segments and Use Cases

EVs generally have higher upfront costs than ICE vehicles, but their significantly lower operational costs offer substantial economic advantages. To evaluate these benefits, a TCO analysis was conducted across various vehicle segments and use cases in Telangana. The TCO includes both capital (CAPEX) and operational (OPEX) costs, calculated on a per-kilometer basis over a standard 10-year holding period for all vehicle types.

EVs generally have higher upfront costs than ICE vehicles, but their significantly lower operational costs offer substantial economic advantages.

Assumptions for TCO Analysis

1. **Battery Replacement Costs:**
   - **Personal Use Cases:** One battery replacement is assumed after 5 years, with a cost of INR 7,000 per kWh.
   - **Commercial Use Cases:** Two battery replacements are assumed over 10 years, with costs declining to INR 8,500 per kWh for the first replacement and INR 6,500 per kWh for the second. These costs reflect the projected reduction in battery prices, validated through stakeholder consultations.

2. **Vehicle Holding Period:**
   - A 10-year holding period is assumed for most vehicle categories.
   - For four-wheeler cabs in the aggregator segment, an additional TCO analysis was conducted with a 4-year holding period, based on inputs from the fleet operators.

3. **Road Tax Structure:** The Government of Telangana imposes a road tax on commercial vehicles, either as a one-time lifetime tax or as a quarterly tax, depending on the vehicle type.[32,33]
   - **Two Wheelers** – Lifetime tax for personal as well as commercial use case.
   - **Three Wheelers** – Both passenger and goods vehicles are exempted from lifetime and quarterly taxes.
   - **Four Wheelers** – A lifetime tax is applicable for personal and commercial passenger vehicles, while a quarterly tax is applicable for four-wheeler goods vehicles.

   Additionally, a green tax is levied on four-wheeler commercial passenger and goods vehicles that continue to operate after seven years of operations.[34]

These assumptions ensure that the TCO analysis reflects both real-world usage patterns and economic trends. More details on the assumptions and factors considered for analysis could be found in Annexure 7.2. The following sub-sections provide an overview of TCO analysis across vehicle types.

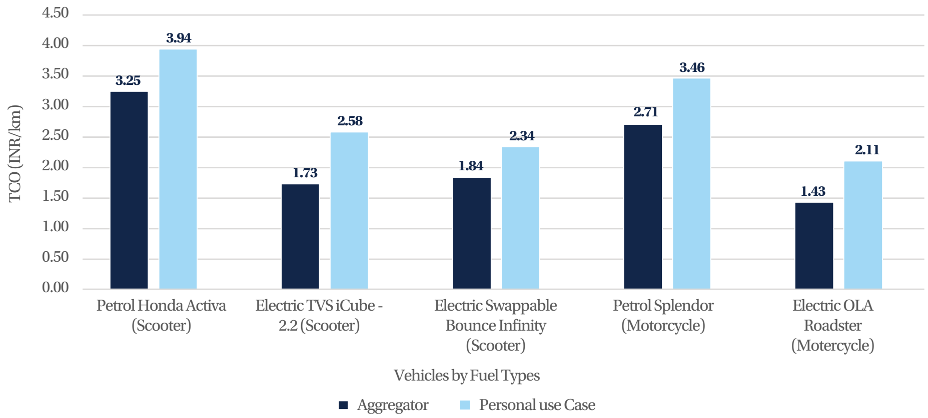
Electric scooters have a TCO of INR 1.73 per kilometer, which is still lower than all other scooters, costing approximately 53% of their petrol-powered counterparts.

3.2.1 Two Wheelers (Aggregator and Personal)

As previously noted, two-wheelers constitute the largest share of the vehicular fleet in Telangana, accounting for 73% of the total vehicles, and are responsible for 56.2% of vehicle pollution load.[35] For the aggregator use case, electric two-wheeler motorcycles have emerged as the most economical option, with a TCO of INR 1.43 per kilometer. However, due to the limited availability of electric motorcycle models, electric scooters are the most commonly used alternative. These electric scooters have a TCO of INR 1.73 per kilometer, which is still lower than all other scooters, costing approximately 53% of their petrol-powered counterparts.

In personal use cases, electric motorcycles also stand out as the most cost-effective choice. Within the scooter category, electric scooters with swappable batteries are more affordable than those with fixed batteries. This is particularly advantageous for personal users, who generally drive shorter daily distances compared to commercial vehicle users. Additionally, electric scooters with swappable batteries reduce the upfront purchase cost by nearly 50%, making them a more financially accessible and practical option for personal ownership compared to a standard electric scooter.

Figure 8: Estimated Total Cost of Ownership for Two-Wheeler Segment Across Aggregator and Personal Use Cases



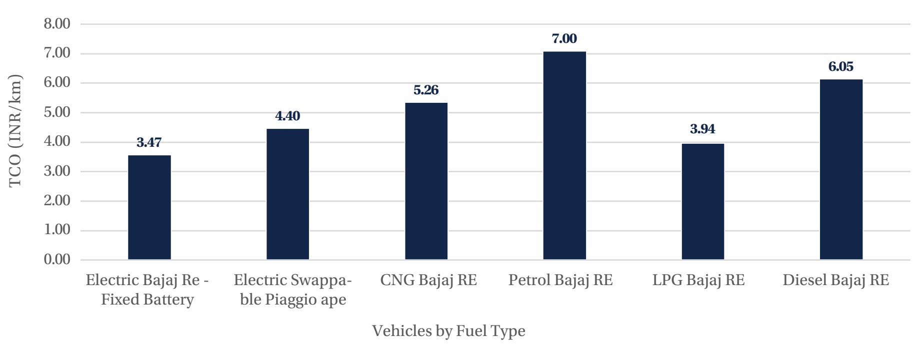
Note: For the aggregator and personal use cases, daily travel distances of 80 km and 35 km are assumed, respectively.

Electric three-wheelers with fixed batteries present the most cost-effective form of three-wheeler, outperforming liquid petroleum gas (LPG) and compressed natural gas (CNG) models with a difference of INR 0.47 and INR 1.79 per kilometer, respectively.

3.2.2 Three Wheelers (Passenger Auto-rickshaws)

As shown in Figure 9, the passenger electric three-wheelers with fixed batteries present the most cost-effective form of three-wheeler, outperforming liquid petroleum gas (LPG) and compressed natural gas (CNG) models with a difference of INR 0.47 and INR 1.79 per kilometer, respectively. By comparison, petrol and diesel models are significantly more expensive to operate. Additionally, electric three-wheelers with swappable batteries have lower upfront investment costs and TCO than ICE counterparts, making them an affordable choice even as compared to CNG models.

Figure 9: Estimated Total Cost of Ownership for Three-Wheeler Passenger Segment

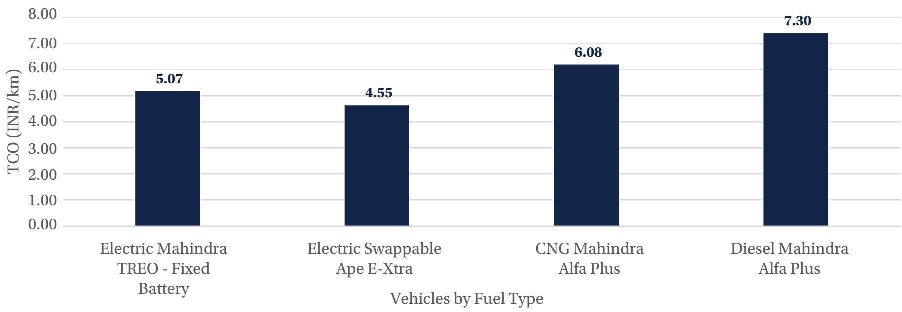


Electric three-wheelers with swappable batteries in the goods segment offer the most cost-effective solution, presenting the lowest TCO of INR 4.55 per kilometer along with the lowest upfront purchase cost.

3.2.3 Three Wheelers (Goods vehicles)

As shown in Figure 10, the three-wheeler goods segment has experienced the fastest adoption of EVs, driven by favorable cost economics. The TCO per kilometer for electric three-wheelers goods segment is significantly lower as compared to three-wheeler goods segment ICE vehicles, while the upfront cost of the electric variant with fixed battery is approximately INR 70,000 more than the CNG variant. Furthermore, electric three-wheelers with swappable batteries in the goods segment offer the most cost-effective solution, presenting the lowest TCO of INR 4.55 per kilometer along with the lowest upfront purchase cost.

Figure 10: Total Cost of Ownership for Three-Wheeler Goods Segment



For the passenger and goods segment of three wheelers use, daily travel distances of 110 km and 90 km are assumed, respectively.

Image credit: Sun Mobility

3.2.4 Four-Wheeler Aggregator Use Case

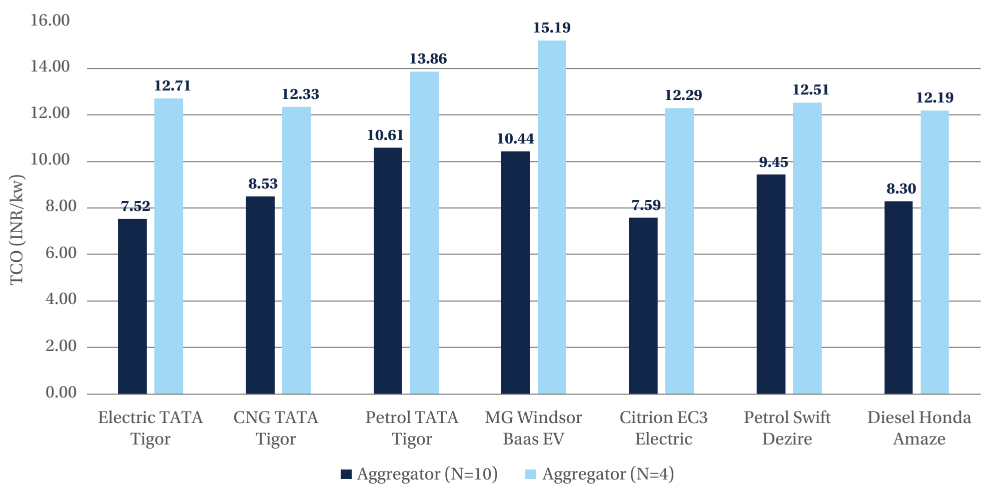
Stakeholder consultations with fleet operators revealed that for battery-operated four-wheelers, vehicles are typically replaced after four years of use. This preference stems from two key factors: firstly, the vehicles clock approximately 2 lakh kilometers within this period, which is the useful life of the first battery in mobility applications. Secondly, in the case of first-generation EVs, replacing batteries through OEMs was not a viable option, although ongoing pilots are testing solutions to address this challenge.

To reflect these operational realities, the TCO analysis for the four-wheeler cab segment was conducted for two vehicle holding periods: 4 years and 10 years. The analysis revealed that the TCO difference between EVs and ICE vehicles is minimal in both scenarios, with EVs facing challenges due to their significantly higher upfront costs—often INR 4 lakhs or more than ICE vehicles. CNG remains the preferred fuel option for commercial operations due to its cost-effectiveness.

When comparing EVs to CNG vehicles, the least expensive electric four-wheeler (Citrion EC3) demonstrates only a slight cost advantage: INR 0.04/km cheaper over 4 years and INR 0.94/km cheaper over 10 years. However, the lack of purchase incentives at both national and state levels remains a significant barrier, preventing EVs from achieving a more competitive TCO and wider adoption in this segment. However, with the state reinforcing road and registration tax exemption for EVs, the TCO advantage is expected to improve further by almost 5%.[36]

When comparing EVs to CNG vehicles, the least expensive electric four-wheeler (Citrion EC3) demonstrates only a slight cost advantage: INR 0.04/km cheaper over 4 years and INR 0.94/km cheaper over 10 years.

Figure 11: Estimated Total Cost of Ownership for Four-Wheeler Cabs



N = Vehicle holding period in years.
For the four-wheeler cabs segment, daily travel distance of 180 km is assumed.
For the calculation of TCO, zero battery changes were considered when N = 4 and two battery changes when N = 10.

Image credit: shutterstock

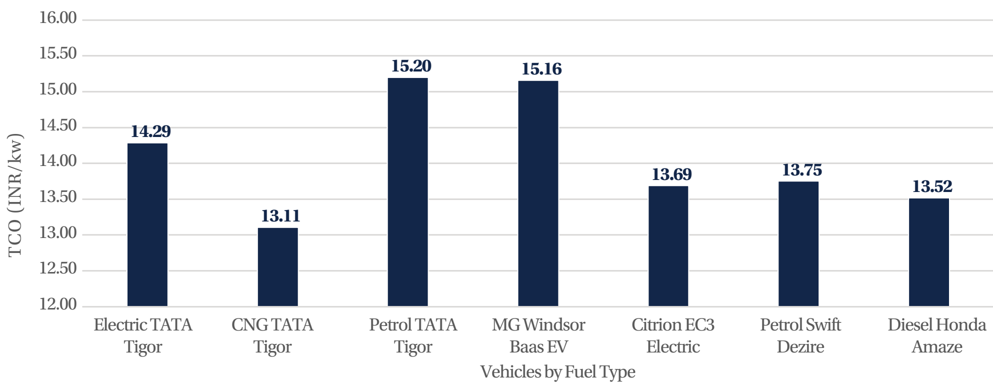
3.2.5 Four-Wheelers (Personal Cars)

In personal use cases, electric four-wheelers currently lack significant financial advantages for owners. With relatively low daily driving distances, the savings in operating costs are not enough to offset the higher upfront purchase costs of EVs.

Additionally, the limited availability of vehicle models in the electric four-wheeler segment has been a barrier to adoption. However, this challenge appears to be improving, with OEMs showcasing a diverse range of products at the recently concluded Bharat Mobility Expo in January 2025, signaling increased options for consumers in the near future. [37]

However, targeted incentives, such as upfront subsidies and road tax waivers, can significantly lower the TCO, making electric four-wheelers a more viable and attractive choice for personal users. These measures have the potential to bridge the financial gap and encourage wider adoption in the personal vehicle segment. From Figure 12, it is evident that the TCO of the least expensive EV (Citrion EC3) model is still INR 0.58/km more than that of the CNG model.

Figure 12: Total Cost of Ownership for Four-Wheeler Personal Use Case



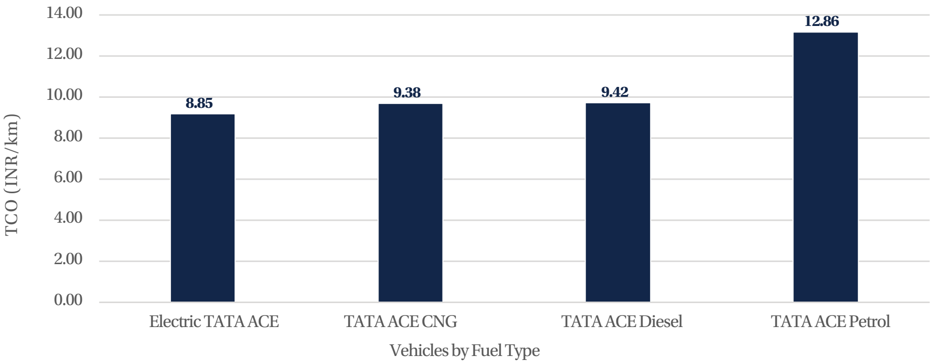
Electric four-wheelers in the goods segment present a relatively favorable case, as observed in Figure 13, TCO of electric four-wheeler goods is at least INR 0.53/km lower than its ICE counterparts.

3.2.6 Four-Wheelers (Goods Vehicles)

Electric four-wheelers in the goods segment present a relatively favorable case, as observed in Figure 13, TCO of electric four-wheeler goods is at least INR 0.53/km lower than its ICE counterparts. However, the electric four-wheeler market in the goods segment is still in its nascent stage, and the limited availability of affordable EV models in the market creates a major barrier to adoption. Additionally, the lack of competition in the market results in significantly higher upfront costs for these vehicles.

That said, the situation shows promise, as OEMs recently showcased a range of new electric goods vehicle models at the Bharat Mobility Expo in January 2025, indicating that increased model availability could address this challenge and accelerate adoption in the near future.[38]

Figure 13: Estimated Total Cost of Ownership for Four-Wheeler Goods Segment Vehicles



For the personal use and goods segment of four-wheelers, daily travel distances of 60 km and 140 km are assumed, respectively.

3.3. Impact of Road Tax Waiver on Upfront Costs and Total Cost of Ownership

As highlighted in Section 1.3, the Government of Telangana has extended the waiver on road tax and registration fees for EVs for an additional two years, valid until December 31, 2026.[39] This road tax exemption significantly impacts the upfront cost of EVs, with reductions ranging from 9% for two-wheelers to 13-18% for four-wheelers, depending on the vehicle's cost.[40]

Table 4: Lifetime Tax Structure in State of Telangana

<table>
<tr><th>Vehicle Type</th><th colspan="4">Percentage of Ex-Showroom Cost as Road Tax</th></tr>
<tr><td rowspan="2">Two-Wheeler</td><td colspan="2">Cost does not exceed INR. 50,000</td><td colspan="2">Cost exceeds INR.50,000</td></tr>
<tr><td colspan="2">9%</td><td colspan="2">12%</td></tr>
<tr><td rowspan="2">Four-Wheeler Passenger (Personal & Aggregator)</td><td>Cost does not exceed INR. 5 Lakhs</td><td>Cost between 5 Lakhs and 10 Lakhs</td><td>Cost between 10 Lakhs and 20 Lakhs</td><td>Cost exceeds 20 Lakhs</td></tr>
<tr><td>13%</td><td>14%</td><td>17%</td><td>18%</td></tr>
</table>

Source: Transport Department, Government of Telangana

The registration fee is fixed at INR 300 for two-wheelers and INR 600 for three and four-wheelers, both of which are also waived for EV registrations.[41]

Our analysis reveals that the waiver on road tax and registration fees for electric vehicles (EVs) can significantly enhance the TCO for both two-wheelers and four-wheelers, depending on the use cases and vehicle types. Specifically, for two-wheeler aggregators, the improvement in TCO ranges from 1.5% to 4%, while for personal two-wheelers, it ranges from 2.3% to 5.4%. For four-wheeler aggregators in the passenger segment, the TCO improves by 2.7% to 4.9%, while for personal four-wheelers, it varies from 5.1% to 6.8%. In the four-wheeler goods category, the TCO improves by 1.2%.

4. EV Penetration Goals and Fleet Electrification Targets for Greater Hyderabad Municipal Corporation

This roadmap proposes (i) setting fleet electrification targets and (ii) establishing EV penetration goals within the GHMC region. The fleet electrification targets are specifically aimed at fleet aggregators, who could ensure that a certain percentage of vehicles newly onboarding onto their platforms are electric. These targets are designed to be ambitious, given that commercial fleet vehicles typically accumulate higher daily mileage, making electrification more cost-effective and economically viable. Meanwhile, the EV penetration goals are focused on encouraging a higher percentage of new vehicle sales to be electric, also taking into account personal vehicles. EV penetration targets can serve as a foundation for broader policy regulations, including the implementation of quotas for the registration of ICE vehicles.

4.1 Targets for Fleet Electrification

The EV adoption trends in the past two financial years show that three-wheeler goods vehicles are leading the way in EV transition, followed by two-wheelers. The proposed commercial fleet electrification targets for the GHMC region are based on a thorough TCO analysis, current EV penetration rates across vehicle categories, and extensive input from industry stakeholders. These targets aim to accelerate the electrification of fleets while considering the unique operational and economic dynamics of different vehicle segments. The below-mentioned targets are only applicable for vehicles that are newly onboarded onto the aggregator platforms and they are not applicable to the vehicles that already exist on these platforms.

The roadmap outlines a phased approach to fleet electrification across various vehicle categories, with the following proposed timelines:

- **Two-Wheelers:** *Onboarding of Only EVs Post March 31st, 2029*. After March 31st, 2029, only electric two-wheelers could be permitted to be newly onboarded onto aggregator platforms. This target aligns with the growing adoption and cost competitiveness of electric two-wheelers in the market.
- **Three-Wheelers (Passenger Segment):** *Onboarding of Only EVs Post March 31st, 2030*. From March 31st, 2030, onwards, only electric three-wheelers in the passenger segment could be eligible for onboarding onto aggregator platforms. This timeline provides a structured approach for transitioning the passenger segment towards electric mobility.
- **Three-Wheelers (Goods Segment):** *Onboarding of Only EVs Post March 31st, 2029*. After March 31st, 2029, only electric three-wheelers in the goods segment could be allowed for onboarding onto aggregator platforms. The timeline for this segment is set earlier due to the high rate of EV adoption and operational viability of electric goods three-wheelers.
- **Four-Wheelers (Passenger Segment):** *Onboarding of Only EVs Post March 31st, 2032*. From March 31st, 2032, only electric four-wheelers in the passenger segment could be onboarded onto aggregator platforms. This target ensures alignment with the larger goal of transitioning to a fully electric passenger vehicle fleet.

- **Four-Wheelers (Goods Segment):** *Onboarding of Only EVs Post March 31st, 2032*. Similarly, beginning March 31st, 2032, only electric four-wheelers in the goods segment could be eligible for onboarding onto aggregator platforms, marking the final stage of electrification in the commercial vehicle fleet.

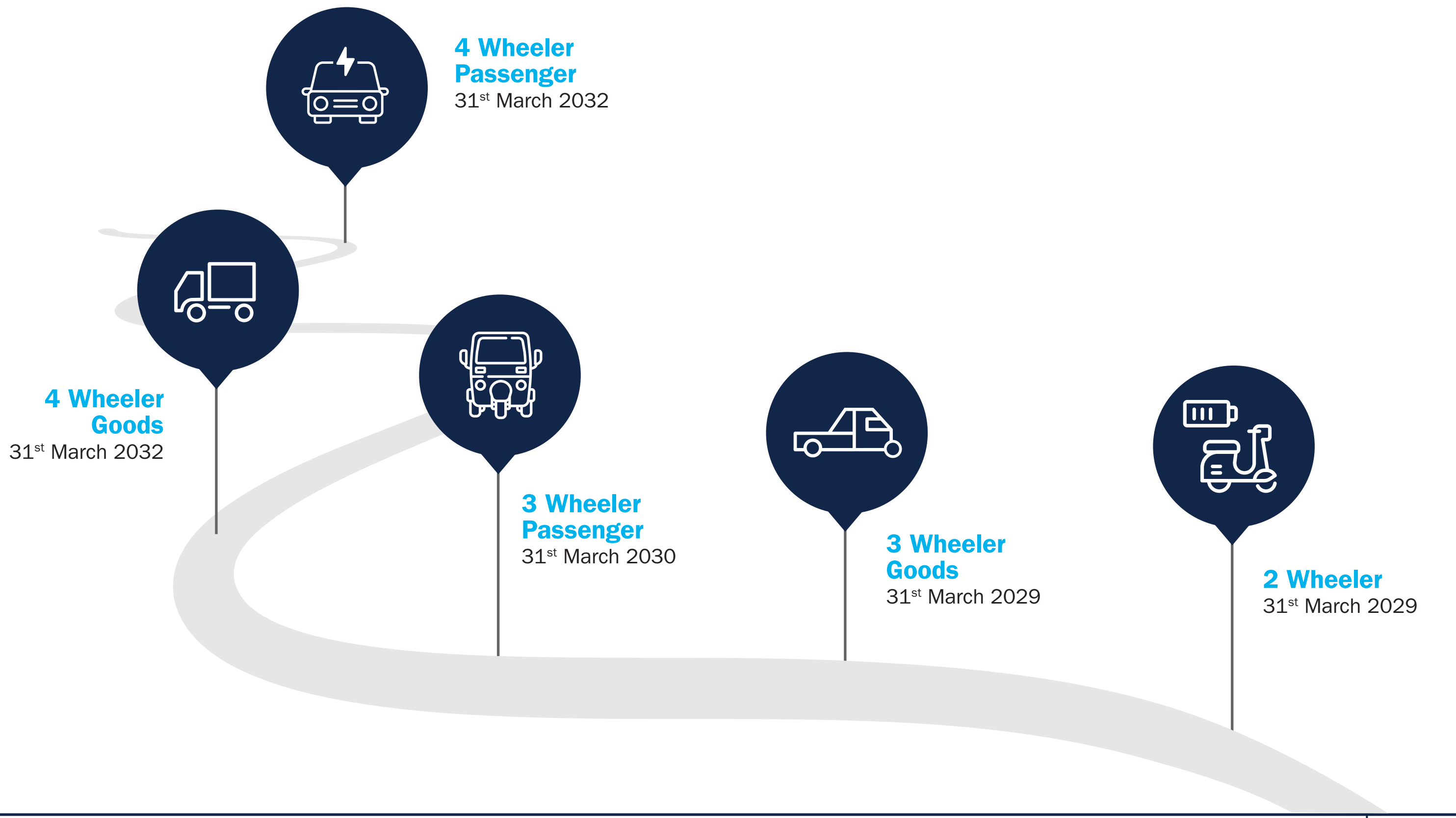
The Table 5 outlines the year-wise targets for aggregators, detailing the specific milestones for each vehicle category from 2025 to 2032. These targets are designed to guide the gradual transition towards a fully electric fleet, with clear benchmarks for each year.

Table 5: Proposed Year on Year Fleet Electrification Targets for Aggregators in GHMC

Target Year	Duration	EVs as a percentage of new vehicles to be onboarded on the Aggregator Platform				
		Two-wheeler for Commercial Use	Three-Wheeler Passenger (Auto Rickshaws)	Three-Wheeler Goods	Four-wheeler Passenger	Four-Wheeler Goods
EV Penetration in FY 2022-23		*7.03%*	*6.40%*	*20.30%*	*2.97%*	*0.00%*
EV Penetration in FY 2023-24		*9.22%*	*9.50%*	*18.30%*	*4.75%*	*1.43%*
31-Mar-26	1 year	20%	15%	30%	7%	7%
31-Mar-27	2 years	35%	30%	50%	15%	15%
31-Mar-28	3 years	60%	60%	80%	25%	30%
31-Mar-29	4 years	100%	85%	100%	40%	50%
31-Mar-30	5 years		100%		60%	70%
31-Mar-31	6 years				80%	90%
31-Mar-32	7 years				100%	100%

TCO is favorable for the transition of two- and three-wheeler segments to EVs in the near future, which is a key factor driving the ambitious targets for these vehicle categories. However, the limited availability of comparable and affordable EV models in the four-wheeler (passenger and goods) segment remains a significant barrier to electrification in this category.

Figure 13: Proposed Target Dates for Aggregators to Onboard only EVs Under Different Vehicle Types for GHMC



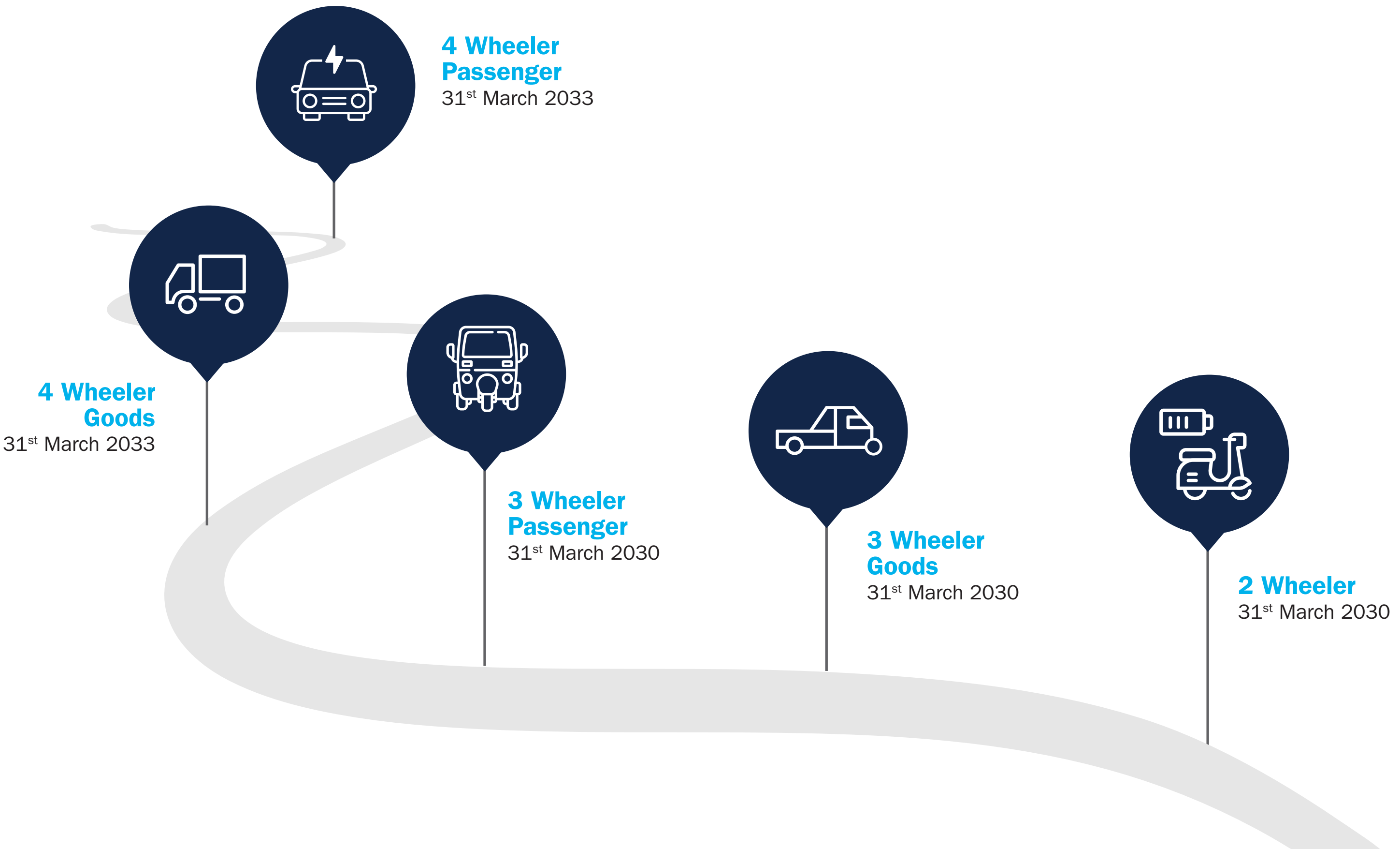
4.2 Goals for EV Penetration

As highlighted earlier, setting an EV penetration goal is crucial for states to provide long-term strategic direction for both the industry and the people at large. Telangana has already taken a strategic step in building the supply-side ecosystem for EVs and is now at a critical juncture to define and set an EV penetration goal for the state. These proposed goals, which encompasses both commercial and personal vehicles, provide a buffer on top of fleet electrification targets. It could serve as a complementary measure to the fleet electrification targets, offering a broader framework for achieving full adoption across all vehicle categories.

The proposed EV penetration goal is as follows:

- **Two-Wheelers**: Starting after March 31st, 2030, 100% of new two-wheeler sales in the GHMC region could be electric. This aligns with the growing adoption of electric two-wheelers and their increasing affordability, making them a key focus for early electrification.
- **Three-Wheelers (Passenger and Goods Segments)**: Similarly, after March 31st, 2030, all new three-wheeler sales, both in the passenger and goods segments, could be electric. This target takes into account the already favorable TCO for electric three-wheelers and their strong market potential in both passenger and commercial use cases.
- **Four-Wheelers (Passenger Segment and Goods Segment)**: Given the current challenges with TCO for personal use and goods segment of four-wheelers, the goal for 100% electric sales in both segments could be set for March 31st, 2033. This timeline provides space for necessary infrastructure, market maturity and scaling of EV technology in the commercial sector to support EV adoption in these segments.

Figure 14: Proposed EV Penetration Goals across Vehicle Segments for GHMC



5. Perspective from Fleet Operators

The NRDC, ASCI, and Telangana Mobility Valley, under the aegis of Industries and Commerce Department, Government of Telangana, organized several rounds of stakeholder consultations to gather insights and feedback from key industry players on the proposed fleet electrification targets. This approach ensured that the process was inclusive and reflected the perspectives of stakeholders across the entire value chain. These consultations, which included input from over 50 stakeholder organizations (For detailed list of stakeholders, refer to annexure 7.3.), identified several challenges and provided valuable recommendations for accelerating the transition from ICE vehicles to EVs.

The following section lists the key challenges faced by fleet operators in the GHMC region in the electrification of their fleets.

5.1 Challenges for Fleet Electrification

1. **Lack of Control over Vehicle Ownership** - Fleet aggregators highlighted that they do not own the vehicles on their platforms; instead, these are either owned by driver-partners or leased from third parties, with the aggregators serving purely as intermediaries. This makes it challenging for them to mandate the adoption of EVs, as driver-partners typically work on a part-time basis and may lack the incentives to switch to electric vehicles. The high upfront cost of EVs creates a significant financial burden, which could lead to driver-partners leaving the platform if they are required to purchase EVs. This, in turn, may result in a reduction in fleet size and negatively impact service quality.

2. **Limited Availability of Affordable EV models** – The adoption of EVs among driver-partners is hindered by the limited availability of affordable models across various vehicle categories. While electric scooters dominate the two wheeler market, they are primarily designed for goods transportation. The availability of electric motorcycle models in the market remain scarce for passenger mobility.

   Electric four-wheelers are similarly cost-prohibitive, with the most affordable EV models priced 1.5 to 2 times higher than their ICE counterparts, making them less accessible to a larger segment of potential buyers. The available EV models in the market are typically more expensive, with two-wheelers costing up to 40% more and four-wheelers up to 80% more compared to their ICE counterparts.

   These cost disparities create a barrier for driver-partners who are interested in transitioning to EVs.

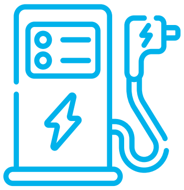
3. **High Cost of Financing** – The higher purchase cost of EVs results in significantly higher down payments compared to ICE vehicles, even with the same Loan-to-Value ratio. Additionally, uncertainties regarding EV battery life and the immaturity of secondary and resale markets contribute to higher interest rates for EV loans. With petrol two-wheelers having an 80% financing penetration rate compared to only 40-45% for electric two-wheelers, financing remains a significant challenge.[42] Many driver-partners also

The available EV models in the market are typically more expensive, with two-wheelers costing up to 40% more and four-wheelers up to 80% more compared to their ICE counterparts.

struggle with maintaining a reasonable credit history, making access to affordable financing difficult.

4. **Mature Secondary Market for ICE Vehicles** – The secondary market for ICE vehicles is well-established, and many driver-partners purchase secondhand ICE vehicles at lower prices. In contrast, EVs have a limited secondhand market, particularly because EV batteries generally have a warranty of only 5 years,[43] while ICE vehicles can be used for up to 15 years. The lack of clarity on the resale value of EVs, combined with the absence of a developed secondary market for EVs, makes them less attractive for driver-partners compared to ICE vehicles.

5. **Inadequate Public Charging Networks –** As of October 2024, there were approximately 204 public charging stations (PCS) in Hyderbad. [44] The limited charging infrastructure is a significant barrier, particularly for fleet operators who depend on high-utilization vehicles. Long charging times and insufficient fast-charging options can reduce vehicle availability, impacting daily earnings. In sectors like ride-hailing and goods delivery, where vehicles are in constant use, the current charging infrastructure is insufficient to meet demand.

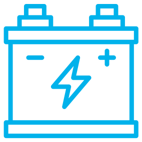


As of October 2024, there were approximately 204 public Charging Stations (PCS) in Hyderabd.

6. **High Cost of EV Charging at PCS** – Charging costs at public stations currently range between INR 15 to 22 per kWh, which adds to the operating costs for fleet operators.[45] If fleet operators are required to invest in their own charging infrastructure, this would involve significant upfront costs, further delaying the adoption of EVs across fleets.

7. **Insufficient Network of Service Centers for EVs –** Most driver-partners prefer visiting local mechanics for maintenance due to lower service charges compared to authorized service centers. However, local mechanics often lack the expertise required to repair EVs, which forces drivers to go to authorized service centers. The cost and longer wait time for repair at these centers reduce vehicle uptime, which negatively impacts the earnings of driver-partners.

8. **Limited Battery Swap Models and Infrastructure for EVs –** Battery swapping presents a convenient solution for reducing downtime, allowing drivers to swap depleted batteries in minutes rather than waiting for hours to charge them. However, battery swap models are limited in the 2W and 3W segments, and the necessary infrastructure for battery swapping is insufficient. This lack of infrastructure limits the convenience and operational efficiency of EVs for fleet operators.



The cost of EV batteries accounts for 50% to 60% of the total vehicle cost, making EVs less affordable for fleet operators. Moreover, financing options for battery replacements have not yet evolved to support driver-partners, further compounding the challenge.

9. **High Battery Replacement Cost –** As EV adoption increases, so does the need for battery replacements. The limited availability of batteries, along with high demand and supply chain disruptions, often leads to long waiting periods for battery procurement. The cost of EV batteries accounts for 50% to 60% of the total vehicle cost, making EVs less affordable for fleet operators.[46] Moreover, financing options for battery replacements have not yet evolved to support driver-partners, further compounding the challenge.

10. **Permit Challenge with Three-Wheeler Passenger Auto Rickshaw** - In the GHMC region, permits for operating traditional ICE auto-rickshaws are expensive, often bought from the secondary market at inflated prices. In contrast, there is no permit requirement for electric auto-rickshaws, which has caused unrest among existing ICE auto-rickshaw drivers. The potential over-supply of electric auto-rickshaws, without regulation, could lead to congestion and loss of livelihoods for ICE auto-rickshaw drivers. The absence of permit requirements for e-auto-rickshaws could increase vehicle density on the roads and contribute to operational challenges.

5.2 Recommendations to Accelerate Fleet Electrification

After reviewing the challenges and gathering feedback from fleet operators during stakeholder consultations, we have developed the following key recommendations to create a holistic ecosystem that facilitates fleet electrification in GHMC. These recommendations have been refined through further inputs from industry stakeholders and the state government to ensure they effectively address the needs of all parties involved.

Lifetime Road Tax Waiver: Our analysis shows that a lifetime road tax waiver could reduce the TCO for EVs by almost 6.8%, while the upfront cost could decrease by 12% to 16%.[47] Industry stakeholders have emphasized that this waiver would significantly reduce the price gap between EVs and their ICE counterparts in similar categories. In response to growing requests from the EV industry, the Government of Telangana has exempted lifetime road tax and registration fees for EVs until December 31, 2026.[48]

Our analysis shows that a lifetime road tax waiver could reduce the TCO for EVs by almost 6.8%, while the upfront cost could decrease by 12% to 16%.

SGST Waiver for Commercial EVs and Battery Replacement: Given that the Goods and Services Tax (GST) on EVs and batteries is set at 5%, with 2.5% allocated as State GST (SGST),a waiver of SGST for commercial EVs and on EV battery replacements would significantly lower the upfront costs.[49] This would make EVs more affordable and competitive with ICE vehicles, while also providing greater financial predictability, thereby reducing the TCO. Such measures would encourage wider adoption of EVs in the commercial sector.

Strategic Expansion of EV Charging Network: A robust EV charging network spread across the GHMC region is essential to support larger uptake of EVs. There are 150 wards in GHMC region, and the state government could start by setting up at least 10 small EV charging stations in each ward, with 3 to 5 chargers in each PCS. The mix of Level 1(up to 7kW AC or 12kW DC), Level 2 (up to 22kW) and Level 3 chargers (50kW to 250kW) can be selected based on factors such as vehicle movement, public transit points, public parking spaces, high density of e-commerce and ride-hailing businesses, and so on. After undertaking a detailed assessment of these factors and grid availability, the government could strategically plan to set up mega-charging hubs that can charge around 100-120 EVs at any given instance.

The government could identify suitable land parcels and provide grid infrastructure such that it creates a plug-and-play arrangement for CPOs to set up PCS. Presently, the low tension (LT) category power load limit for EV charging stations in Telangana is only 50 kW.[50] This leads to significant investment by the CPOs for upstream grid upgradation to set up PCS. In October 2024, Gujarat increased the power load limit to 150 kW for LT category, which will benefit the development of EV charging infrastructure by reducing the wait time for grid upgradation.[51] Telangana could consider increasing the LT power load limit to 150 kW for the category of EV charging.

Telangana could consider increasing the LT power load limit to 150 kW for the category of EV charging.

Pradhan Mantri Electric Drive Revolution in Innovative Vehicle Enhancement (PM E-DRIVE) scheme offers incentives to set up charging infrastructure in key Indian cities and along the highways.[52] The state government could target to avail the incentives under PM E-DRIVE for establishing charging stations by submitting the necessary detailed project report at the earliest.

Vehicle Scrappage Incentives: The aggregators pointed out that most of the driver partners were using either second-hand or even third-hand ICE vehicles because they are comparatively less expensive.

Telangana's Registered Vehicle Scrapping Policy (notified on 30 September 2024) has a provision to waive the outstanding green tax and outstanding penalty payable, for vehicles with more than 8 years of service for transport vehicles and over 15 years for non-transport vehicles, if these vehicles are scrapped within 2 years of policy notification. The scrapping policy also has motor vehicle tax concession against certificate of deposit, ranging from INR 1000 to INR 50,000, based upon the vehicle type and vehicle age, along with 10% tax concession on quarterly/yearly tax on transport vehicles and tractors until 8 years from the date of registration.[53]

However, this provision could be enforced by linking the incentives to be availed only when an electric vehicle is purchased after scrapping an old ICE vehicle. Additionally, reducing the 15-year threshold for scrapping based on vehicle condition and emissions could fast-track the transition to EVs and help phase out older, more polluting vehicles.

The scrapping policy also has motor vehicle tax concession against certificate of deposit, ranging from INR 1000 to INR 50,000, based upon the vehicle type and vehicle age, along with 10% tax concession on quarterly/yearly tax on transport vehicles and tractors until 8 years from the date of registration.

Strengthening EV Adoption with Supply Side Policies: Fleet operators in cities are grappling with issues such as lack of affordable EV models in the market, high upfront cost of EVs, longer wait times for EV purchases since demand exceeds the supply, lack of financing options and inadequate charging infrastructure. Evidence shows that that demand incentives alone cannot translate into widespread EV adoption.[54] Supply-side measures such as zero-emission vehicles (ZEV) mandates or sales targets—imposed on vehicle manufacturers to promote the sales and production of ZEVs, would complement fleet electrification targets in boosting EV purchases. Supply side measures could provide market certainty, lead to improvement in ZEV model availability and affordability, result in systematic development of supporting infrastructure and attract more investments for ZEV manufacturing in the state. The state government could explore implementing sales-based ZEV targets for manufacturers selling vehicles in GHMC.

Supply side measures could provide market certainty, lead to improvement in ZEV model availability and affordability, result in systematic development of supporting infrastructure and attract more investments for ZEV manufacturing in the state.

Increasing EV Service Centres: Industry stakeholders emphasized the need for establishing a greater number of EV service centres in the city. The government could consider mandating vehicle manufacturers to set up minimum number of service centres in the city proportionate to their EV sales, ensuring accessible and efficient after-sales support.

Upskilling of Technicians: As a key pillar of Telangana Mobility Valley (TMV), the government could establish skill development centres across the state to create a robust after-sales repair ecosystem. Partnering with EV manufacturers, these centres would focus on upskilling mechanics and training technicians, enhancing the availability of skilled professionals while strengthening the state's EV manufacturing ecosystem.

Targeted Awareness Campaigns: To raise awareness about the benefits of EVs, various organizations in partnership with government bodies could organize campaigns that include product demonstrations along with briefing on various financing mechanisms and available EV options for driver partners. Given below is the example of an EV awareness campaign by Zomato aligning with the Delhi Motor Vehicle Aggregator and Delivery Service Provider Scheme, 2023.[55]

Case Study 2: Zomato EV Bazaar

Zomato has set a company goal to achieve 100% electric deliveries by 2030. Aligning with this goal, Zomato organized an EV Bazaar in September 2024, in New Delhi, to raise awareness and encourage delivery partners to switch from petrol-based motorcycles. Over 1000 delivery partners from Zomato and Blinkit participated.

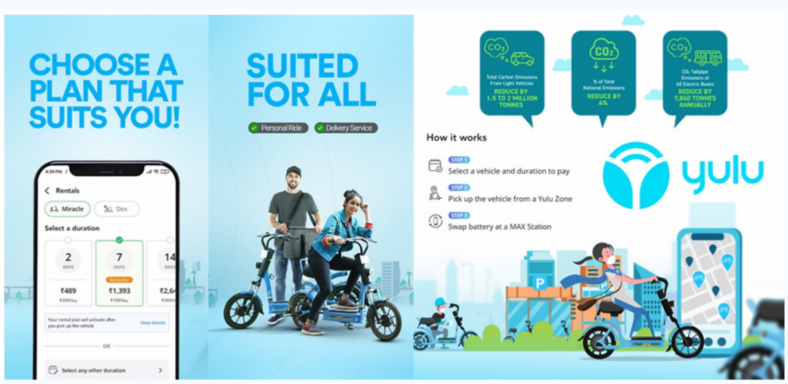
Key industry stakeholders, including EV two-wheeler manufacturers, fleet operators, charge point providers, and financing experts, participated in the event. Companies such as Quantum Energy, Kinetic Green, Bounce Infinity, Lectrix, Hero, TVS, Ola, Ampere, Battfit, Alt Mobility, Yulu, Zypp, Kadam Mobility, and Mooving Urban Technologies were present to share insights.

Promoting Vehicle Lease Models: Vehicle leasing business models have proven to be effective in cutting down EV upfront costs. Monthly or annual subscriptions allow driver partners to operate without any initial investment. Additionally, offering a wider range of vehicle options in various vehicle types can significantly accelerate the penetration of EVs in commercial fleets.

Several startups, including Yulu, Hala Mobility, and eMatrixmile, offer various rental and leasing models in the two-wheeler segment, while players such as Alt Mobility and Euler provide options for three-wheeler goods vehicles. Given below is the example of an electric micro mobility vehicle leasing company (YULU) operational in Bengaluru, Mumbai and NCR.[56]

Case Study 3: YULU

Yulu employs Micro Mobility Vehicles (MMVs) such as electric bikes and scooters, available to rent through a user-friendly mobile app. Their dock-less vehicles can be rented on a pay-per-use basis. Users can reserve a ride using the iOS or Android app, and the smart bikes can be unlocked with QR codes.



Yulu currently has a fleet of over 10,000 electric vehicles and more than 3 million users, making it one of India's largest bicycle-sharing and electric scooter-sharing.

Periodic Assessment of Progress and Targets: Industry experts recommend conducting annual reviews of electrification targets and evaluating EV penetration across all vehicle segments in the GHMC region. Periodic assessments will help identify challenges, refine strategies, and introduce additional initiatives as needed. Adjustments to targets can be made at regular intervals to ensure continued progress toward electrification goals.

6. Conclusion

Accelerating EV adoption is imperative for achieving fleet electrification and advancing Telangana's clean mobility goals. Despite commendable efforts by the state government, EV penetration in GHMC remains at just 8.02% as of FY 2023-24. Key challenges—such as the limited availability of affordable EV models, high upfront costs, long wait times, and inadequate charging infrastructure—continue to hinder widespread adoption. While demand-side incentives have played a role in stimulating interest, evidence suggests that they alone are insufficient for driving large-scale EV transition.

To bridge this gap, a strategic shift toward supply-side policies is crucial. Implementing measures such as ZEV sales-based targets, emissions regulations, and performance-based standards can significantly enhance EV availability, affordability, and supporting infrastructure. These policies will not only accelerate fleet electrification but also position Telangana as a leader in India's sustainable mobility revolution. With continued collaboration between the government, industry stakeholders, and institutions like NRDC and ASCI, Telangana can establish a robust EV ecosystem that drives economic growth, attracts investments, and sets a benchmark for other states in advancing clean transportation.

7. Annexure

7.1 Electrification Goals Under State EV Policies

Table 6: Details of Electrification Goals Under State EV Policies

State	Policy Name	Description
Delhi[57]	Delhi Electric Vehicles Policy, 2020	• 25% of all new vehicle registrations to be Battery Electric Vehicles (BEVs) by 2024 • All delivery service providers expected to convert 50% of their fleet operating in Delhi to electric by 31 March 2023 and 100% by 31 March 2025 • Induction of 1000 e-buses by 2020
Uttar Pradesh[58]	Uttar Pradesh Electric Vehicle Manufacturing and Mobility Policy 2022	• 100% transition of public transportation to EV in major cities (Lucknow) by 2030 • 100% transition of Govt vehicles (for official use) to EV by 2030
Chandigarh[59]	Chandigarh Electric Vehicle Policy 2022	• EVs contribute to 70% of new vehicle registrations by the end of policy period (2027)
Punjab[60]	Punjab Electric Vehicle Policy 2022	• 25% of annual vehicle registrations to be EVs in the last year of policy (2025) • Replace 25% of e-buses in 3 years (2025)
Rajasthan[61]	Rajasthan Electric Vehicle Policy 2022	• 15% EV share in new 2Wheeler registrations • 30% EV share in new 3 Wheeler registrations • 5% EV share in new 4 Wheeler registrations • Manufacturing target of 35 lakh units per year in 5 years (2027)
Himachal Pradesh[62]	Himachal Pradesh Electric Vehicle Policy 2022	• BEVs contribute to 15% of new vehicle registrations by 2025
Bihar[63]	Bihar Electric Vehicle Policy 2023	• 15% of new vehicles purchased and registered in Bihar are EVs by 2028
Assam[64]	Electric Vehicle Policy of Assam, 2021	• BEVs to contribute to 25% of all new vehicle registrations by 2026 • 100% of public transport bus fleet to be converted to e-buses by 2030 • All Govt. vehicles to be converted to EVs by 2030. After 2025, only EV will be allowed for purchase. • Phase out all fossil fuel based commercial fleets and logistics vehicles in all cities by 2030
Meghalaya[65]	Meghalaya Electric Vehicle Policy 2021	• 15% EVs in state by 2025
Tripura[66]	Tripura Electric Vehicle Policy 2022	• 10% of 2W, 3W, 4W and buses to be EVs during policy period (2027), ~60,000 vehicles
West Bengal[67]	West Bengal Electric Vehicle Policy 2021	• 10 lakh EVs combined across all vehicle segments during policy period (2026)
Jharkhand[68]	Jharkhand Electric Vehicle Policy 2022	• 10% share of EVs in new vehicle registrations by 2027 • All vehicles: 10%, 2W: 10%, 3W: 20%, 4W: 10%

State	Policy Name	Description
Chhattisgarh[69]	Chhattisgarh Electric Vehicle Policy 2022	• 15% share of EVs in all new vehicle registrations by 2027 • All Aggregator service providers to mandatorily have at least 30% EVs in their fleets
Odisha[70]	Odisha Electric Vehicle Policy 2020	• 20% of BEV adoption in all vehicle registrations by 2025 • E-Buses to constitute at least 50% of all new stage carriages procured for city buses in 5 years (2025)
Gujarat[71]	Gujarat State Electric Vehicle Policy 2021	• Support purchase of 2 lakh EVs by 2025
Madhya Pradesh[72]	Madhya Pradesh Electric Vehicle Policy 2019	• Two Wheeler - Achieving 40% of all new registrations by 2030. • Four Wheeler - Achieving 15% of all new registrations by 2030. • Bus - Achieving 40% of all new registrations by 2030. • 80% of all forms of State government vehicles (2W, 3W and 4W) including vehicles under Government Corporations, Boards and Government Ambulances, etc. will be procured in the form of electric vehicles by 2030.
Ladakh[73]	Ladakh Electric Vehicle and Allied Infrastructure Policy, 2022	• Policy targets for the vehicle segment (E-2 Wheeler, E-3 wheeler, Car, Bus, E-4 wheeler) is 116 (ceiling for early bird) and 509 (2023-2027).
Andhra Pradesh[74]	Electric Mobility Policy 2024-29	• Register minimum 2 lakh new E-2W by 2029 • Register minimum 10,000 new E-3W by 2029 • Register minimum 20.000 new 4W BEV by 2029 • 100% electrification of APSRTC fleet
Maharashtra[75]	Maharashtra Electric Vehicle Policy 2021	• BEVs contribute to 10% of new vehicle registrations by 2025 • 25% electrification of public transport in Mumbai, Pune, Nagpur, Nashik, Aurangabad and Amravati • 25% electrification of fleet operators, fleet aggregators and last-mile delivery vehicles by 2025 in Mumbai, Pune, Nagpur, Nashik, Aurangabad and Amravati • Transition of 15% of Maharashtra State Road Transport Corporation's (MSRTC) existing bus fleet to electric
Goa[76]	Goa Electric Mobility Promotion Policy-2021	• 30% of annual vehicles registered in Goa would be EVs from 2025 • 50% of all ferries to be converted to electric by 2025 • All 2Ws involved in commercial activity operating in Goa shall switch to complete electric by 31 December 2025 • Beyond 31st December 2030, all the 2Ws sold in the state of Goa to be 100% electric • E-buses to constitute at least 50% of all new stage- carriage buses (i.e., for all public transport vehicles with 15 seats or more) procured for the city fleet including for last mile connectivity, with target induction of 500 pure e-buses by 2025 • Specific areas to be identified like – Panjim Smart City, Heritage Zones, Tourist Zones, Airport and Railway stations etc. which will move towards 100% mandatory electric vehicles by 2025

State	Policy Name	Description
Haryana[77]	Haryana Electric Vehicle Policy 2022	• 100% of bus fleets owned by Haryana STU to convert to e-buses or fuel cell vehicles or other non-fossil-fuel-based based technologies by 2030 • First phase – convert 10% of existing buses in 2 years (2024) • Second phase - 50% electrification of buses by 2026 ; Third phase - 100% by 2030 • All forms of Govt vehicles, including vehicles under Govt Corporations, Boards and Govt Ambulances etc. will be converted to EVs - 50% by 2026 and 100% by 2030
Karnataka[78]	Karnataka Clean Mobility Policy 2025-2030	• E-commerce and delivery companies across the State will be encouraged to replace their fleet of two wheelers/three wheelers to clean mobility vehicles in a phased manner with an intention to achieve 100% clean mobility by 2030.
Kerala[79]	Kerala EV Policy 2019	• Pilot fleet of 200000 e-2Ws, 50,000 e3Ws, 1000 goods carrier, 3000 buses, 100 ferry boats by 2020 • 1 million EVs on the road by 2022
Manipur[80]	Manipur Electric Mobility Policy 2022	• Facilitate adoption of at least 20 % EVs in State by 2026
Tamil Nadu[81]	Tamil Nadu Electric Vehicle Policy 2023	• Increase the share of e-buses to 30% of the fleet by 2030
Uttarakhand	Uttarakhand EV policy 2023 (Draft)	• 25% of all new vehicle registrations by 2028 as electric vehicle across vehicle segment
Andaman and Nicobar Island[82]	Andaman and Nicobar Island EV Policy 2022 (Draft)	• 3000 Electric Two Wheelers by 2026 • 300 Electric Three Wheelers by 2026 • 970 Electric 4 Wheelers (LMV) by 2026 • 30 Electric Buses by 2026

7.2 Total Cost of Ownership

The estimate of TCO involves various calculations that incorporate both Capital Expenditures (CAPEX) and Operational Expenditures (OPEX) factors. CAPEX includes the purchase cost, insurance, interest rates (in case of financing), and the vehicle's resale value. These values are calculated for CAPEX per kilometer. OPEX includes maintenance and fuel charges, which are calculated on a per kilometer basis. The sum of these two values indicates the TCO/km.

7.3.1 Two-Wheelers (Aggregators & Personal)

Table 7: Details of Assumption and Figures used for TCO calculation of Two Wheelers

Parameters	Honda Activa 125CC	TVS iQube 3.4 kWh	Bounce Infinity Ei	Hero Splendor Plus	OLA Roadster 3.5 kWh
Fuel Type	**Petrol Scooter**	**EV Scooter**	**EV Swappable**	**Petrol Motorcycle**	**EV Motorcycle**
Purchase Incentive (INR)	NA	10,000	NA		10,000
Per Year Insurance (INR)	4055	7050	4200	5500	8000
Interest Rate (%)	11.00%	12.00%	12.00%	11.00%	12.00%
Resale Rate (%) - Aggregator	15.00%	15.00%	15.00%	15.00%	15.00%
Resale Rate (%) - Personal	20.00%	20.00%	20.00%	20.00%	20.00%
Equity	20%				
Loan Repayment Duration	3 Years				

Parameters	Honda Activa 125CC	TVS iQube 3.4 kWh	Bounce Infinity Ei	Hero Splendor Plus	OLA Roadster 3.5 kWh
Fuel Type	**Petrol Scooter**	**EV Scooter**	**EV Swappable**	**Petrol Motorcycle**	**EV Motorcycle**
CAPEX/km (INR) - Aggregator	**0.54**	**0.82**	**0.39**	**0.59**	**0.64**
CAPEX/km (INR) - Personal	**1.19**	**1.84**	**0.87**	**1.30**	**1.48**
Annual Maintenance (INR) - Aggregator	7500	3750	4125	7000	3500
Annual Maintenance (INR) - Personal	3750	1875	2062.5	3500	1750
Mileage (km/l, km/kWh)	44.625	28.98	31.32	58.4	37.44
Fuel Charges (INR/l, INR/kWh)	107	18	40	107	18
OPEX/km (INR) - Aggregator	**2.71**	**0.91**	**1.45**	**2.12**	**0.78**
OPEX/km (INR) - Personal	**2.75**	**0.74**	**1.47**	**2.17**	**0.63**
Average TCO/km (INR) - Aggregator	**3.25**	**1.73**	**1.84**	**2.71**	**1.43**
Average TCO/km (INR) - Personal	**3.94**	**2.58**	**2.34**	**3.46**	**2.11**

7.2.2 Three-Wheelers (Passenger Auto-Rickshaw & Goods Vehicles)

Table 8: Details of Assumption and Figures used for TCO calculation of Three Wheelers

	Passenger Auto Rickshaws						Three – Wheelers Goods Vehicles			
Parameters	**Bajaj RE E-TEC 9.0**	**Electric Swappable Piaggio Ape**	**CNG Bajaj RE**	**Petrol Bajaj RE**	**LPG Bajaj RE**	**Diesel Bajaj RE**	**Mahindra TREO ZOR DV (Fixed Battery)**	**Piaggio Ape E-Xtra (Swappable Battery)**	**Mahindra Alfa Plus CNG**	**Mahindra Alfa Plus (Diesel)**
Fuel	**EV**	**EV Swappable**	**CNG**	**Petrol**	**LPG**	**Diesel**	**EV**	**EV Swappable**	**CNG**	**Diesel**
Purchase Incentive (INR)	25,000	0	NA				25,000	NA		
Interest Rate (%)	20.00%	20.00%	14.00%	14.00%	14.00%	14.00%	20.00%	20.00%	14.00%	14.00%
Resale Rate (%)	12.00%	9.00%	15.00%	15.00%	15.00%	15.00%	12.00%	9.00%	15.00%	15.00%
Equity	10%						20%			
Loan Repayment Duration	3 Years						3 Years			
Interest Rate	20.00%	20.00%	14.00%	14.00%	14.00%	14.00%	20.00%	20.00%	14.00%	14.00%
CAPEX/km (INR)	**1.35**	**0.90**	**0.95**	**0.92**	**0.94**	**0.99**	**1.71**	**1.25**	**1.38**	**1.31**
Annual Maintenance (INR)	12375	13612.5	26400	24750	25000	25740	14000	15400	28000	26000
Mileage (km/l, km/kWh)	15	11.33	26.2	20.1	28	22.4	8.22	12.82	25.09	19.11

	Passenger Auto Rickshaws						Three – Wheelers Goods Vehicles			
Parameters	**Bajaj RE E-TEC 9.0**	**Electric Swappable Piaggio Ape**	**CNG Bajaj RE**	**Petrol Bajaj RE**	**LPG Bajaj RE**	**Diesel Bajaj RE**	**Mahindra TREO ZOR DV (Fixed Battery)**	**Piaggio Ape E-Xtra (Swappable Battery)**	**Mahindra Alfa Plus CNG**	**Mahindra Alfa Plus (Diesel)**
Fuel	**EV**	**EV Swappable**	**CNG**	**Petrol**	**LPG**	**Diesel**	**EV**	**EV Swappable**	**CNG**	**Diesel**
Fuel Charges (INR/l, INR/kWh)	20	35	92	107	62.8	96	20	35	92	96
OPEX/km (INR)	**2.11**	**3.50**	**4.31**	**6.07**	**3.00**	**5.07**	**3.36**	**3.30**	**4.70**	**5.99**
Average TCO/km (INR)	**3.47**	**4.40**	**5.26**	**7.00**	**3.94**	**6.05**	**5.07**	**4.55**	**6.08**	**7.30**

7.2.3 Four-Wheelers (Aggregator, Personal & Goods Vehicles)

Table 9: Details of Assumption and Figures used for TCO calculation of Four Wheelers

	Four-Wheelers Passenger Segment							Four-Wheelers Goods Segment			
Parameters	**Electric TATA Tigor**	**MG Windsor Baas EV**	**Citrion EC3**	**CNG TATA Tigor**	**Petrol TATA Tigor**	**Petrol Swift Dzire**	**Diesel Honda Amaze**	**Tata Ace EV**	**Tata Ace Gold CNG**	**Tata Ace Gold Diesel**	**Tata Ace Gold Petrol**
Fuel	**EV**	**EV BaaS**	**EV**	**CNG**	**Petrol**	**Petrol**	**Diesel**	**EV**	**CNG**	**Diesel**	**Petrol**
Purchase Incentive (INR)	0	0	NA					0	NA		
Interest Rate (%) - Aggregator	14.00%	14.00%	14.00%	12.00%	12.00%	12.00%	12.00%	12.00%	11.00%	11.00%	11.00%
Interest Rate (%) - Personal	12.00%	12.00%	12.00%	11.00%	11.00%	11.00%	11.00%	NA			
Resale Rate (%) - Aggregator	10.00%	10.00%	10.00%	10.00%	15.00%	15.00%	15.00%	10.00%	15.00%	15.00%	15.00%
Resale Rate (%) - Personal	15.00%	15.00%	15.00%	20.00%	20.00%	20.00%	20.00%	NA			
Equity - Aggregator	20%							20%			
Equity - Personal	30%							NA			
Loan Repayment Duration - Aggregator	4 Years							4 Years			
Loan Repayment Duration - Personal	5 Years							NA			
CAPEX/km (INR) – Aggregator, N=10	**3.94**	**3.16**	**3.67**	**2.57**	**2.20**	**2.08**	**2.63**	**3.90**	**2.24**	**2.19**	**1.77**

	Four-Wheelers Passenger Segment							Four-Wheelers Goods Segment			
Parameters	**Electric TATA Tigor**	**MG Windsor Baas EV**	**Citrion EC3**	**CNG TATA Tigor**	**Petrol TATA Tigor**	**Petrol Swift Dzire**	**Diesel Honda Amaze**	**Tata Ace EV**	**Tata Ace Gold CNG**	**Tata Ace Gold Diesel**	**Tata Ace Gold Petrol**
Fuel	**EV**	**EV BaaS**	**EV**	**CNG**	**Petrol**	**Petrol**	**Diesel**	**EV**	**CNG**	**Diesel**	**Petrol**
CAPEX/ km (INR) – Aggregator, N=4	**9.85**	**7.91**	**9.18**	**6.37**	**5.45**	**5.15**	**6.52**	**NA**			
CAPEX/ km (INR) – Personal	**11.23**	**9.01**	**10.15**	**7.14**	**6.25**	**5.93**	**7.51**	**NA**			
Annual Maintenance (INR) - Aggregator	27000	27000	27000	54000	48600	54000	54000				
Annual Maintenance (INR) - Personal	9000.00	9000.00	9000	18000.00	16200.00	18000.00	18000.00	21000	45000	45000	40500
Mileage (km/l, km/ kWh)	8.48	6.10	7.67	18.54	14.25	16.81	20.55	5.42	14.98	15.40	10.50
Fuel Charges (INR/l, INR/ kWh)	20	20	20	92	107	107	96	20	92	96	107
OPEX/ km (INR) - Aggregator, N=10	**3.58**	**7.28**	**3.92**	**5.96**	**8.41**	**7.37**	**5.67**	**4.95**	**7.14**	**7.23**	**11.09**
OPEX/ km (INR) - Aggregator, N=4	**2.86**	**7.28**	**3.11**	**5.96**	**8.41**	**7.37**	**5.67**	**NA**			
OPEX/km (INR) – Personal	**3.05**	**6.14**	**3.54**	**5.96**	**8.95**	**7.82**	**6.01**	**NA**			
Average TCO/km (INR) - Aggregator, N=10	**7.52**	**10.44**	**7.59**	**8.53**	**10.61**	**9.45**	**8.30**	**8.85**	**9.38**	**9.42**	**12.86**
Average TCO/km (INR) - Aggregator, N=4	**12.71**	**15.19**	**12.29**	**12.33**	**13.86**	**12.51**	**12.19**	**NA**			
Average TCO/km (INR) – Personal	**14.29**	**15.16**	**13.69**	**13.11**	**15.20**	**13.75**	**13.52**	**NA**			

7.3 List of Stakeholders Consulted for this Study

Industry Stakeholders	
Altigreen	Mahindra Logistics
Amazon	MoEVing
Ather Energy	Montra - TI Clean Mobility- Murugappa
Benelli India	OHM
Bijiliride	OLA Cabs
Bolt.Earth	OLA Electric
Bud-e	Piaggio
Energy Efficiency Services Limited (EESL)	Porter
Ennovi	RACE Energy
Entoo Logistics	Rap Eco
Envirosmart	Rapido
E Ride	RBML
EvZip	Revfin
Fortum	SIDBI
Fyn Mobility	Sinnovance
Gayam Motor Works (GMW)	Statiq
Greaves Electric Mobility	Sun Mobility
Hala Mobility	Swiggy
Telangana Gig and Platform Workers Union (TGPWU)	TATA Power
International Copper Association India	TUV Rheinland
Jio-bp	TVS
Joulepoint	Uber
KETO Motors	Yulu
Lithium Urban Technologies	Zepto
Log9	Zero21
Magenta Mobility	Zomato
Mahindra Last Mile Mobility	Zypp

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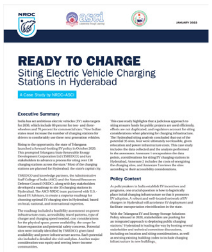

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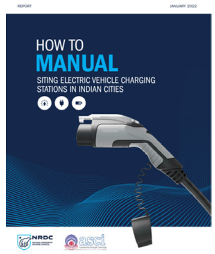

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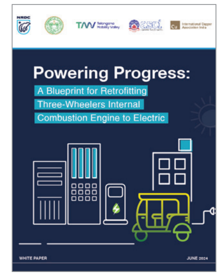

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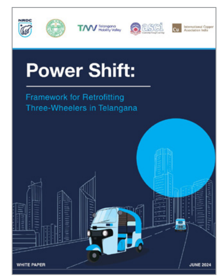

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