Report | September 2026

Movement of People and Goods

Assessing Urban Transport in the City of Erode

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Cover image: CEEW. A typical urban street in Erode with diverse transport modes and pedestrians navigating shared road space.

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Organisation: The Council on Energy, Environment and Water (CEEW)—a homegrown institution with headquarters in New Delhi—is among the world's leading climate think tanks. The Council uses data, integrated analysis, and strategic outreach to support public policy, transform markets, shape technology, and nudge behaviour. It addresses pressing regional and global challenges through an integrated and internationally focused approach. The Council prides itself on the independence of its high-quality research and strives to impact sustainable development at scale.

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Passengers waiting at an informal roadside stop
shared by buses and shared autos.

Image: CEEW

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Date:16.06.2026

FOREWORD

Erode is a rapidly growing urban centre and an important hub for trade, industry, agriculture, and regional mobility in Tamil Nadu. As our city continues to expand and economic activity grows, ensuring safe, efficient, inclusive, and sustainable mobility has become a priority for the Erode City Municipal Corporation.

Transport is central to the functioning of our city. It enables access to livelihoods, education, healthcare, and economic opportunities, while facilitating the movement of goods that support Erode's commercial and industrial activities. At the same time, increasing travel demand, vehicle ownership, freight movement, and changing mobility needs are placing greater pressure on urban infrastructure and public services. Understanding these dynamics is essential for planning a mobility system that can meet the needs of a growing city.

I am pleased to present this report, **"Movement of People and Goods: Assessing Urban Transport in the City of Erode"**, prepared by the Council on Energy, Environment and Water (CEEW) under the India–UK Partnering for Accelerated Climate Transition (UK PACT) programme. The report provides a comprehensive assessment of mobility patterns across Erode, covering travel demand, public transport, intermediate public transport, freight movement, accessibility, inclusion, and urban mobility behaviour.

As cities increasingly seek to balance economic growth with sustainability and quality of life, local governments require reliable data and analytical tools to support informed decision-making. This report is an important step towards strengthening Erode's capacity for evidence-based mobility planning and integrated urban development. The findings will directly inform future updates to the Comprehensive Mobility Plan, Master Plan, and other mobility-related initiatives, while supporting the development of resilient, inclusive, and sustainable urban mobility solutions for the city.

I appreciate the efforts of CEEW, UK PACT, and all stakeholders who contributed to this important initiative. I am confident that this report will serve as a valuable resource for policymakers, planners, and practitioners working towards a more efficient, accessible, and sustainable mobility system for Erode, while also offering useful lessons for other growing cities across India.

Arpit
Commissioner
Erode City Municipal Corporation

Private autos as first-and last-mile connections to bus trips.

Image: CEEW

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The Council on Energy, Environment and Water (CEEW)—**a homegrown institution** with headquarters in New Delhi—is among the **world's leading climate think tanks**. The Council uses **data, integrated analysis, and strategic outreach** to support public policy, transform markets, shape technology, and nudge behaviour. It addresses pressing regional and global challenges through an integrated and internationally focused approach. The Council prides itself on the **independence** of its high-quality research and strives to **impact sustainable development at scale**.

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2011 | National Water Resources Framework
2014 | 175 GW renewables target
2015 | International Solar Alliance
2016 | PM *Ujjwala Yojana*
2017 | *Saubhagya Scheme*
2019 | India Cooling Action Plan
2021 | Net Zero by 2070
2022 | *Mission LiFE*
2022 | *National Bioenergy Programme*
2022 | E-waste (Management) Rules
2023 | G20 Green Development Pact
2023 | *National Green Hydrogen Mission*
2024 | Green Steel Taxonomy
2024 | *PM Surya Ghar Yojana*
2025 | *National Critical Mineral Mission*
2025 | Rajya Sabha Guidelines on Crop Residue Burning
2025 | India's Carbon Credit Trading Scheme (CCTS)
2025 | IFSCA's Framework for Transition Bonds
2026 | Disaster Risk Index for 16th Finance Commission
2026 | India's NDC 3.0
2026 | India's Scenarios towards Viksit Bharat and Net Zero

STATE
2022 | *Rajasthan Organic Farming Mission*
2022 | *Jharkhand State Solar Policy*
2022 | *Uttar Pradesh Vidyut Sakhi programme*
2023 | *Rajasthan Renewable Energy Policy and Green Hydrogen Policy, 2023*
2023 | *Uttarakhand Solar Policy*
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2025 | *Maharashtra Climate Action Plan 2.0*
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2026 | Gujarat Integrated Renewable Energy Policy and Green Hydrogen Policy
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Net Zero Roadmaps (BH, GJ, TN, UK)
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140+ Heat Action Plans (GJ, MH, OD, TN)
Treated Used Water Reuse Plans (MH, UP)
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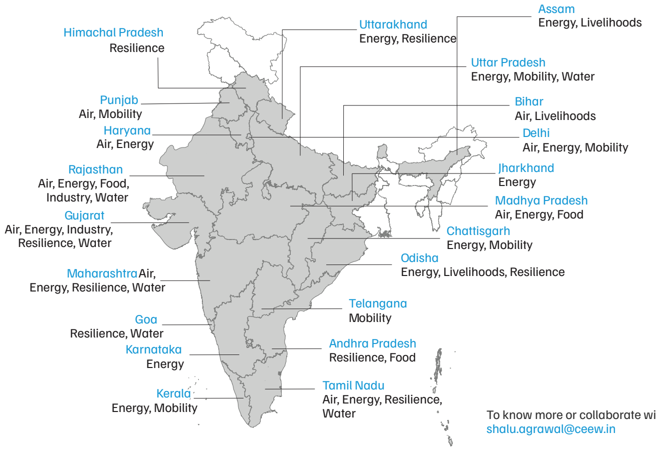

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Different modes of transport occupying the same streets in Erode.

Image: CEEW

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Executive summary

The UK Government and the Government of Tamil Nadu (GoTN) are collaborating under the *UK Partnering for Accelerating Climate Transitions* (UK PACT) programme to support climate-resilient urban transitions in Tamil Nadu. Under this partnership, the *Climate-Resilient, Sustainable and Inclusive Urban Mobility in Erode* initiative focuses on strengthening Erode's long-term sustainable development trajectory by systemically integrating climate recommendations into urban planning, governance, and mobility systems through data-driven, institutionally grounded, and financially viable pathways.

Initial engagements, such as the kick-off meeting held at the District Collectorate on 2 May 2025, brought together municipal authorities, state agencies, and civil society stakeholders, discussing key structural challenges defining Erode's mobility system. The momentum generated at the city level was then consolidated at the state level through an inception roundtable on 22 August 2025, which strengthened coordination and aligned direction across institutions. The main outcomes included the formalisation of collaboration through a series of letters exchanged between the Tamil Nadu Green Climate Company (TNGCC) and the UK government; high-level engagement between senior state officials, UK representatives, and technical partners; and focused discussions on the roles of digital tools, data-driven decision-making and planning, and climate finance in enabling climate-smart urban mobility in Tier-2 cities.

These deliberations aimed to present Erode as a potential model that might be scaled up for low-carbon and inclusive urban mobility transitions across similar cities in Tamil Nadu. The *Movement of People and Goods* report is accordingly conceptualised as a data-driven and strategic framework to establish a contemporary baseline of travel patterns of people and goods in Erode.

Image: CEEW

Shared autos informally lined up near the Central Bus Station, Erode, without dedicated wayfinding signage.

Positioning and scope of the *Movement of People and Goods* report

The *Movement of People and Goods (MPG)* report was needed, as Erode's most recent comprehensive mobility assessment—the *Comprehensive Mobility Plan* (CMP) by Tamil Nadu Urban Infrastructure Financial Services Limited (TNUIFSL)—was prepared in 2015, and thus no longer reflects current travel realities. Over the past decade, Erode has witnessed major changes in land use, economic activity, travel behaviours, vehicle ownership, and freight movement. The MPG report establishes a contemporary, data-driven baseline for the movement of people and goods within, into, and through Erode today, across public transport, intermediate public transport (IPT), and urban freight systems.

This study captures Erode's changing travel patterns, freight dynamics, and emerging mobility realities.

The report builds on earlier project outputs, including the *Gap Assessment Report* by the Institute for Transportation and Development Policy (ITDP) India (2025), which diagnosed policy, planning, and data gaps in Erode's mobility ecosystem; the *Budget Assessment Note* by the Council on Energy, Environment and Water (2025), which mapped climate mitigation as well as gender equality, disability and social inclusion-aligned (GEDSI) services and expenditures; and *the Public Transport and Pedestrian Infrastructure Assessment or People Near Transit* (PNT) Analysis for Erode by ITDP India (2025), which evaluated access to public transport, the condition of bus stops, and pedestrian infrastructure in the city.

This report is organised as a consolidated yet modular assessment, comprising self-contained chapters that can be read independently while following a uniform analytical approach. The study adopted a mixed-methods approach, combining primary surveys, stakeholder consultations, and analysis of secondary datasets. The primary surveys examined demand patterns, operational realities, user perceptions, barriers, and expectations. As a whole, this report provides a grounded, evidence-based understanding of Erode's current mobility system. Its findings will directly guide subsequent phases of the UK PACT project by identifying interventions and actionable pathways towards realising more resilient, inclusive, and sustainable mobility in Erode through evidence-based decision-making.

Key findings

The findings presented in this section draw on primary surveys across multiple transport segments. Together, these findings establish a baseline understanding of existing mobility patterns, operational challenges, user perceptions, and infrastructure gaps, while highlighting opportunities for building a more connected, inclusive, and sustainable urban mobility system.

1. Baselining travel patterns

Corridor traffic has grown 32 per cent in a decade, driven by peri-urban expansion. Traffic volumes in Erode's major cordon corridors increased between 2015 and 2025, with the sharpest growth along the Erode–Vellode, Erode–Kongampalayam, and Erode–Modakurichi routes.

Most trips are city-bound with peri-urban linkages. Our analysis of origin-destination patterns reveals a city-centric travel pattern, with most trips concentrated in the urban core and extending along key corridors towards growth areas such as Perundurai, Pallipalayam, Thindal, and the Bhavani Bypass Road.

Two- and three-wheelers dominate short intra-city trips, while freight clusters on industrial routes. Two- and three-wheelers account for around 60 per cent of intra-city personal and work travel, while four-wheelers serve both citywide and peri-urban travel. Freight traffic is mainly concentrated on industrial and intercity routes, such as Erode–Salem and Erode–Perundurai/Tiruppur.

Travel peaks sharply at commute hours, reflecting a local, activity-driven demand pattern. Across corridors, traffic exhibits clear peak travel periods (8:00–10:00 a.m. and 5:00–7:00 p.m.), likely owing to work- and education-related travel. Overall, travel demand remains largely local, frequent, and activity-driven, possibly due to Erode's compact urban form and mixed land use.

2. Erode's public transport system: The regulated capacity spine

Bus travel is dominated by work and education trips, pointing to a peak-hour, fixed-route usage pattern. Our public transport user survey shows that medium- and long-distance commuter trips make up most bus travel rather than short local trips. Around 70 per cent of bus trips are made to access work and education, suggesting a peak-hour, fixed-route usage pattern.

Women depend on buses for care, social, and shopping trips that demand flexible, off-peak service. As these trips are often more dispersed throughout the day and involve shorter intra-city stops, they require flexible, frequent services beyond peak commuting periods, underscoring the need for public transport systems that accommodate diverse daily mobility patterns efficiently (Nikore and Ollivier 2022).

Bus trips average around 31 km one way with travel times exceeding 50 minutes; however, fares remain low at approximately INR 28 per trip. Bus stops are accessed mainly by walking or through personal two-wheelers, with limited use of intermediate modes. Access and waiting times average about 10 minutes each, indicating that most of the total travel-time burden is driven by the journey itself.

Passenger challenges centre on service quality and safety, with accessibility remaining a concern for persons with disabilities. These include vehicle condition, bus stop infrastructure, route coverage, schedule rigidity, lack of digital payments, and night-time safety. Perceptions of accessibility among persons with disabilities are mixed, pointing to the need for universal design, inclusive service planning, and staff sensitisation.

For a typical bus user, one third of total travel time is spent accessing and waiting for services.

Perceptions of electric buses are strongly positive, but willingness to pay for service improvements remains limited. Passengers are mainly motivated to choose electric buses because they expect greater safety, accessibility, comfort, and environmental benefits. The most frequently cited factor was improved safety (19 per cent), indicating that respondents strongly associate electric buses with a safer travel experience.

3. Intermediate public transport (IPT): The adaptive connectivity layer

IPT is a daily necessity travel mode operating along key corridors, with most trips combined with walking. Demand is concentrated along routes such as the central bus station–Vaikalmedu and PS Park–Thindal, with around 40 per cent of users making two or more IPT trips per day. Shared autos and tempos are accessed informally via fixed stands and street hailing, and 82 per cent of IPT trips involve walking, underscoring the importance of improving pedestrian access and last-mile integration.

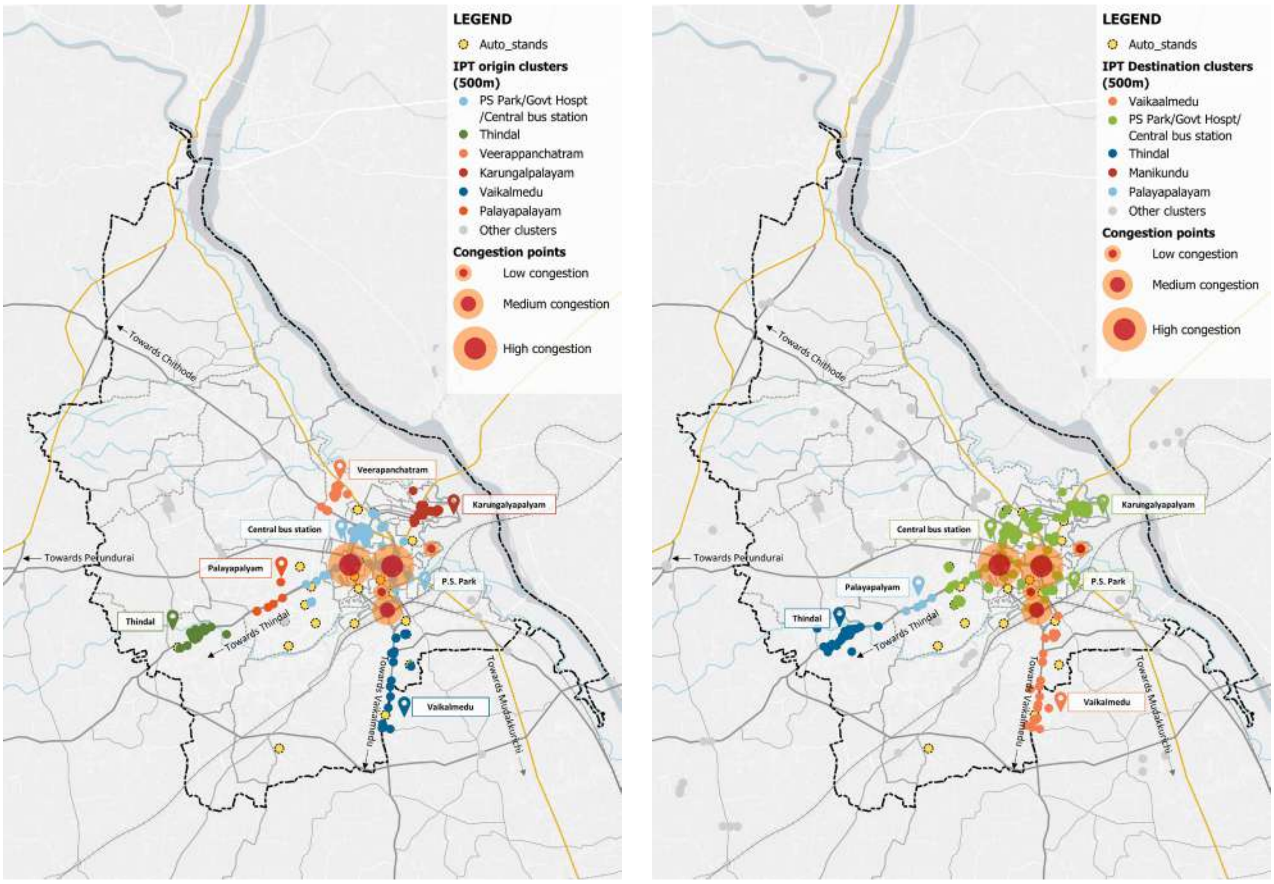
Waiting times and safety concerns disproportionately burden women passengers, many of whom avoid evening travel entirely. Long waiting times, ride search time, and the need to walk to auto stands inflate total travel time and reduce reliability. More than half of the women passengers surveyed avoided travel after 7 p.m. altogether. Overall, safety emerges as a decisive factor for women choosing IPT.

On the supply side, operators are financially stressed and spend nearly half their working hours idle. Operators work an average of 8.7 hours per day but lose nearly half that time to fragmented demand and competition with buses and other autos for passengers. Nearly half reported financial stress driven by low earnings, competition, and maintenance costs, particularly among those operating petrol and LPG vehicles.

The shift to electric autos is held back by financial risk, not technology access. Willingness to transition is shaped primarily by upfront costs, access to finance, and ease of battery replacement — not range anxiety or charging infrastructure.

IPT is oversupplied in the urban core and absent in peripheral areas, pushing outer zones toward private vehicles. Operators reported congestion in the core city around PS Park, the government hospital, and major commercial areas, while peripheral zones such as Chithode, Veerappanchatram, and Perundurai remain underserved (Figure ES1). This limits IPT availability in industrial and peripheral areas, increasing dependence upon private vehicles.

Figure ES1. Congestion points identified by the IPT operators overlapped with commuters' origin and destination points



(a) (b)

Source: Authors' analysis using CEEW primary surveys.

4. Freight: The commodity distribution and economic circulatory vein

Freight exhibits a dual structure: corridor-facing, transboundary flows dominated by medium- and heavy-duty vehicles (MHDVs), while light commercial vehicles (LCVs) contribute to dense, high-frequency intra-urban traffic. While MHDVs serve intercity and highway corridors, they have nearly twice as many daily toll crossings as LCVs. Freight composition closely mirrors local economic activity, which is dominated by textiles, apparel, food-processing inputs and products, agriculture, construction materials, and light industrial goods.

Informal, low-speed freight, such as bullock carts, remains a livelihood reality for some households. Bullock carts continue to serve high-frequency short trips of around 3 km, highlighting that the transition to motorised freight is far from complete across all segments.

Operationally, freight is constrained by costs, congestion, and infrastructure gaps, with electrification barriers varying by vehicle segment. High operating costs, toll charges, congestion, poor road quality, and weather-related delays, with traffic management and infrastructure maintenance, emerge as the highest-priority areas for intervention. While most operators remain cautious about electrification, the main barriers vary by segment: LCV operators face tactical risks related to downtime and maintenance, while MHDV operators face strategic risks linked to technology maturity, vehicle availability, and corridor-scale charging readiness.

Common challenges across transport systems

In a nutshell, the findings show crucial gaps in connectivity, infrastructure, reliability, and coordination of services across Erode's mobility system. Some immediate operational improvements and medium-term institutional and infrastructure measures are required to address this. The following action items outline priority interventions for the Erode City Municipal Corporation (ECMC), along with measures requiring coordination with relevant state agencies.

Recommendations

Erode City Municipal Corporation (ECMC)

1. **Formalise IPT as Erode's first-/last-mile network**

   Notify, demarcate, and enforce designated IPT pick-up and drop-off locations, supported by standard wayfinding signage at major transit nodes, including PS Park, the central bus station, the government hospital, Thindal (Vellalar College stretch), and Karungalpalayam.

2. **Improve pedestrian access and safety; implement universal design at transit nodes**

   Undertake targeted improvements to pedestrian infrastructure, including lighting, ramps, tactile paving, shaded waiting areas, and obstruction-free walking paths for the government hospital bus stop and the central bus station area.

   Reallocate kerb and footpath space through surface markings, traffic signage, and bollard installation at PS Park and Thindal to minimise conflicts between pedestrians, buses, and shared autos.

3. **Strengthen IPT–PT integration through information and predictability**

   Provide static route maps and QR-enabled passenger information displays within buses and at bus stops located near PS Park, the central bus station, and the government hospital, supplemented with high-contrast physical maps to enhance accessibility.

   Supply basic digital information through QR codes and signboards showing shared-auto routes, pick-up and drop-off locations, and approximate waiting times along the PS Park–Thindal and the central bus station–Karungalpalayam corridors.

4. **Reduce congestion in busy institutional and commercial areas**

   Notify and enforce designated stopping locations for shared autos at a minimum distance of 150 m from bus stops near the government hospital, Thindal (around Vellalar College and the temple), and the central bus station for uninterrupted operations and smooth passenger movement.

   Implement location- and time-based regulation of roadside parking and street vending at PS Park and along hospital access roads. Demarcate parking zones and allocated vending areas to maintain clear pedestrian paths and effective carriageway capacity.

5. **Regulate bullock cart operations near high-traffic areas**

   Issue municipal orders specifying permitted routes and time windows for bullock cart movement near Gani Market and other inner-city market streets.

   Phase in restrictions on arterial and high-traffic roads, including Chennimalai Road, Sankari Road, and core-city market roads, with advance notice and gradual enforcement.

6. **Manage freight congestion and decongest core markets**

   Ensure systematic traffic management on freight-intensive corridors and junctions through targeted road maintenance, signal optimisation, and kerbside control, particularly along Chennimalai Road, Arachalur–Kangeyam Road, and Sankari Road, and at PS Park, Bullfight Circle, Solar Junction, Swastik Circle, and Surampatti Four Road. For example, peak-period signal plans can prioritise public and light motorised transport, while off-peak and night-time signal settings can be adjusted to allow heavy vehicles to clear major junctions, such as Solar Junction and Swastik Circle, more efficiently.

   Notify, demarcate, and strictly enforce time-bound loading/unloading bays and no-parking zones along the Old Bus Stand–Gani Market (Mettur Road and Brough Road) route, the VOC Park Road–Karungalpalayam stretch, and Kongampalayam Lorry Stand, including adjoining access streets. For instance, clearly marked, time-shared loading bays can be reserved for freight vehicles at night and used for short-term parking by commuters during the day to prevent double-parking and kerbside blockages.

   > Freight movement and roadside activity contribute to congestion at key corridors, junctions, and market areas.

   Regulate kerbside commercial activity and freight movements in core market areas at Gani Market, along the VOC Park Road corridor, and in the Non-Gazetted Government Officers' (NGGO) Colony, and progressively shift freight operations to designated outer-city market yards along wider arterial roads, with phased implementation and adequate transition time to ensure compliance without undue disruption of livelihoods.

ECMC, in coordination with state agencies

1. **Support the regulation and integration of private bus services**

   Map and integrate private bus services within the public transport planning framework by establishing a centralised database of routes, schedules, and fleet details to enable evidence-based route rationalisation and the reduction of service overlaps.

   Support monitoring of fleet standards by maintaining transparent records on fleet age, vehicle condition, and renewal cycles for the Tamil Nadu State Transport Corporation (TNSTC) and by sharing operational benchmarks with the state transport department to enable fleet age monitoring and phased retirement policies for private buses.

2. **Pilot service upgrades for TNSTC bus operations within approved fare and policy frameworks**

   Pilot targeted improvements in TNSTC-operated services, such as enhanced vehicle cleanliness, improved onboard comfort, and staff behaviour training. Coordinate with the ECMC on stop-level upgrades, such as shelters, lighting, etc.

3. **Improve emission and vehicle fitness compliance through stringent enforcement**

   Enable the state transport department and regional transport offices (RTOs) to undertake joint enforcement actions in coordination with the ECMC, such as periodic emissions and vehicle fitness checks, targeted ‘pollution under control’ (PUC) drives, and compliance monitoring of older freight vehicles, with a particular focus on high-demand corridors, cordon points, and congested urban nodes.

   Flag national highway 544 (NH-544, the Chithode–Bhavani Bypass Road), state highway 83A (SH-83A), NH-381, SH-96, the State Industries Promotion Corporation of Tamil Nadu (SIPCOT)–Perundurai Road, Thindal–Vijayamangalam stretch, and Chithode Junction as priority corridors for targeted PUC drives and fitness enforcement.

   Facilitate PUC and fitness check camps on the municipal land near the Old Bus Stand–Gani Market corridor, VOC Park Road, and the Perundurai Road entry point near SIPCOT for last-mile freight vehicles.

Mixed traffic conditions outside Government Hospital, Erode.

Image: CEEW

1. Context and objectives

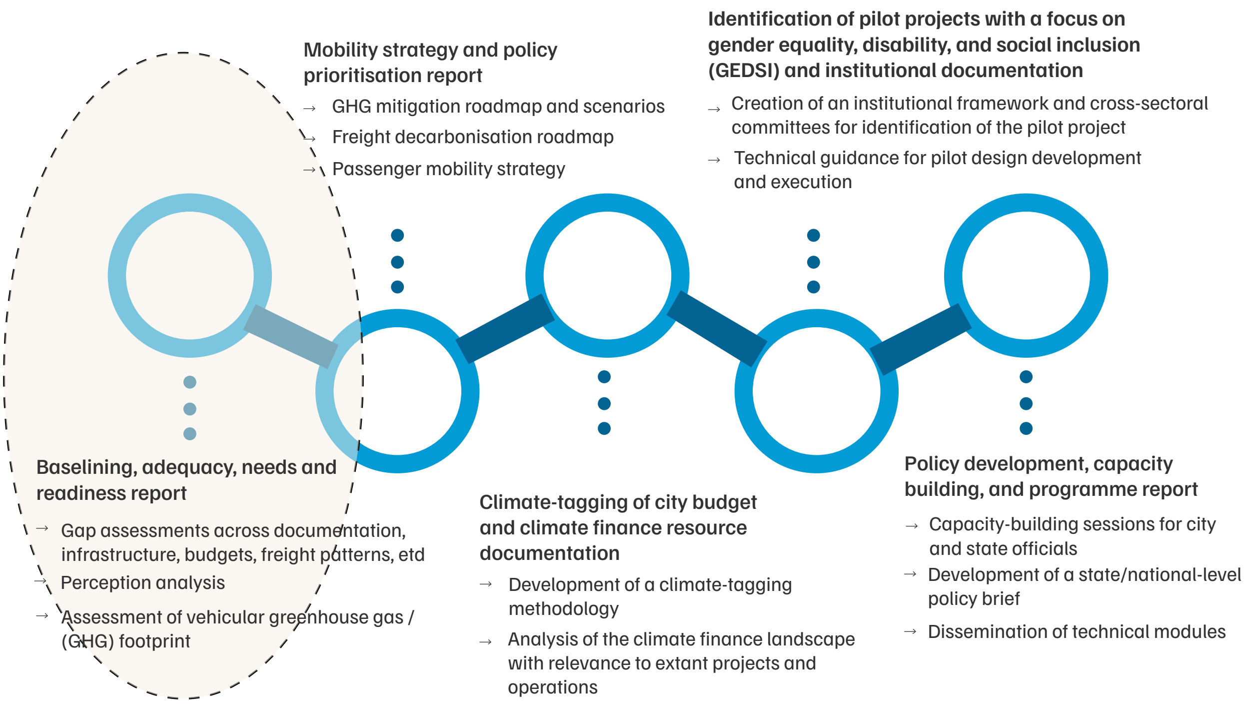
The governments of the United Kingdom (UK) and Tamil Nadu (GoTN) are collaborating under the *UK Partnering for Accelerating Climate Transitions* (UK PACT) initiative. This initiative is spearheaded by a consortium consisting of the Arup Group as lead delivery partner and the Council on Energy, Environment and Water (CEEW), together with the Institution for Transformation and Development Policy (ITDP) India, as the implementing partners.

This report is a part of the project titled *Climate-resilient, Sustainable and Inclusive Urban Mobility in Erode,* which intends to support the city's sustainable development trajectory by better integrating climate change considerations into long-term urban planning, governance, and mobility infrastructure. By incorporating innovative data-driven policies and financing models, the project aims to increase Erode's resilience in the face of climate impacts while promoting sustainable urban mobility.

1.1 Project overview

The project assesses the city's mobility landscape by identifying current challenges – including gaps in planning, policy, infrastructure, and financing – and developing targeted, data-driven interventions to address them. Over 18 months (February 2025 to December 2026), the project will undertake structured research and planning to deliver a set of actionable outputs for the city (Figure 1).

Figure 1. Roadmap to a climate-resilient, sustainable and inclusive urban mobility system in Erode



Source: Inception Report, Erode Mobility Project UK PACT, Council on Energy, Environment and Water (CEEW) and ITDP India.

The green-highlighted stage in the roadmap (Figure 1) shows the work currently underway, including a gap assessment, budget assessment, green-tagging analysis, user and operator perception studies, and the development of a greenhouse gas (GHG) calculator toolkit. Together, these activities will help establish a baseline for Erode's mobility systems, clarify current needs, and assess the city's readiness for sustainable and climate-responsive transport planning.

1.2 Report organisation and structure

Our report on the *Movement of People and Goods (MPG)*, as the name implies, serves as an analytical entry point for the project and establishes a ground-level understanding of how mobility functions in the city at present. This report examines the movement of people and goods – while capturing user perceptions and expectations, levels of service, accessibility, travel behaviours, preferences, and use cases – across

- public transit/transport, intermediate public transport (IPT), and private and commercial vehicles (two-wheelers [2Ws] and four-wheelers [4Ws]);
- light commercial vehicle (LCV) freight and medium and heavy-duty vehicle (MHDV) flows.

The data, information, interpretation, and insights we present in this report are drawn from primary surveys, official statistics, and stakeholder feedback. This report is organised as a consolidated assessment of the MPG in Erode and is comprised of interlinked chapters that describe how mobility functions in Erode. Each chapter focuses on a specific dimension, while maintaining a shared analytical logic, data framework, and interpretive lens. These chapters are intentionally self-contained, allowing them to be read independently by sector-specific stakeholders. At the same time, they are structured around a set of core constructs: who moves; how movement is organised; and what challenges, status-quo perceptions, barriers, and expectations are peculiar to various user groups.

We begin by establishing the context and analytical foundations, including the city's physical, geospatial, and mobility characteristics (Chapter 2), followed by a description of the data sources and methods (Chapter 3). Since it has been nearly a decade since the last Comprehensive Mobility Plan (CMP) was released by the Erode City Municipal Corporation (ECMC), any examination of user perceptions, needs, and expectations for the current road transport system requires establishing baselines for existing travel demands, patterns, and vehicles in use, which are presented in Chapter 4.

Subsequent chapters examine public transport (Chapter 5), IPT (Chapter 6), and freight (Chapter 7) sub-networks, each with its own demand characteristics, operational realities, use cases, and barriers to creating a sustainable and climate-resilient urban mobility system.

Chapter 8 translates the empirical findings of the MPG report into actionable implications for climate-resilient urban planning and mobility. This concluding chapter shifts from mode-specific diagnosis to system-level synthesis, focusing on the implications of these findings for institutions, infrastructure, planning, and policy. The findings we present here will feed directly into the broader project framework, providing evidence-based recommendations and pathways for Erode's transition towards a more resilient, inclusive, and low-carbon mobility.

This study translates mobility diagnostics into integrated actions across infrastructure, governance, planning, and institutional systems.

Passengers boarding a shared auto near Government Headquarters Hospital, EVN Road, Erode.

Dense commercial activity and informal street use shape mobility conditions in Erode's market corridors.

2. Erode: City context

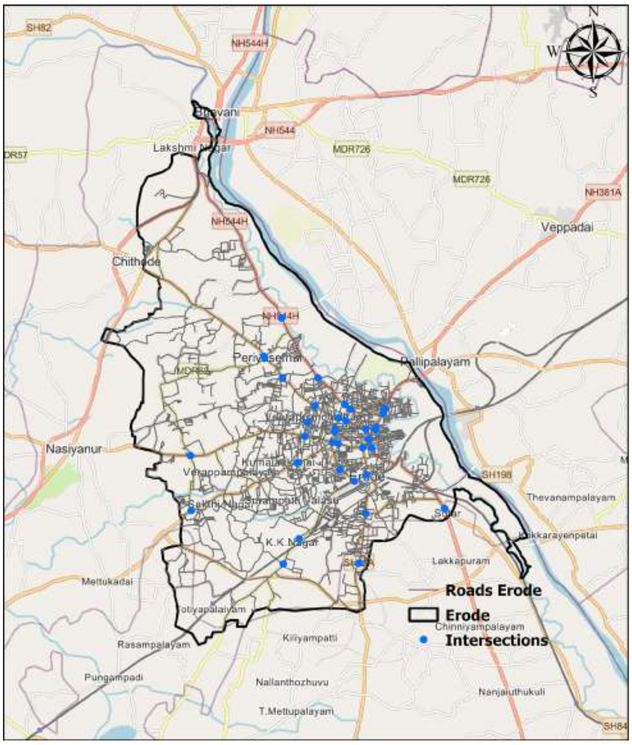
This chapter delineates the context for this project by exploring the linkages between Erode's expanding urban and mobility landscapes over the past decade (2014-2024), as well as changes in land cover and air quality trends from 2017.

2.1 Physical and geo-spatio-temporal specifics

Urbanisation and changes in land-use patterns are rapidly transforming cities across India. As an industrial and commercial hub, Erode too has witnessed substantial landscape changes in recent years (2017-2024). These changes have mainly been driven by the expansion of built-up areas and rapid transformation in land-cover dynamics.

Figure 2 shows the road network and traffic intersections of Erode. The majority of these are located in the central and eastern regions. Most urban features are also situated in the central and eastern portion too, with the majority of vegetation concentrated along the western peripheries. The land use and land cover (LULC) visualisation portrays changes in four major aspects – water, built-up areas, green areas, and barren lands – as analysed and mapped using ESRI Sentinel-2 between 2017 and 2024 (Annexure Figure A2).

Figure 2. Road network and traffic intersections are concentrated in central and eastern Erode



Source: Authors' analysis using secondary data obtained from Erode City Municipal Corporation (ECMC).

Figure A2 (see Annexure) presents the LULC changes between 2017 and 2024, along with the corresponding transition. Some new small water bodies, mainly ponds and lakes, have formed near Ellapalayam. The increase in built-up areas observed likely resulted from the conversion of existing green areas to barren land. Generally, the overall transition appears to involve converting green areas to barren land, and then the corresponding conversion of barren land to built-up areas. However, it is indeed essential to identify each class's contribution to the formation of the built-up area over the years. Figure A3 (Annexure) shows the regions experiencing the most built-up transition within the city.

Figure 3 presents the percentage areas of the individual classes (Figure 3a) and the contribution of each to the built-up area (Figure 3b). Figure 3a shows that green cover has decreased by 26.5 per cent, indicating that open and vegetated land has declined over time. This has directly contributed to a 9.7 per cent increase in the built-up area. Barren land has also been reduced by 9.5 per cent, mostly due to being transformed into built-up (urban) areas. Figure 3b shows the sources of newly added built-up areas in Erode. Most of the addition was on land that was already built-up, meaning that existing urban areas became denser. A good portion also came from the conversion of green areas, reflecting a loss of vegetation. A smaller share, around 1.3 sq km, came from barren lands. Overall, Erode has seen a clear shift towards more urban land between 2017 and 2024, with the core city areas becoming denser rather than the periphery spreading outwards.

Figure 3a. Change in land use and land cover (LULC) in sq km through 2017–24

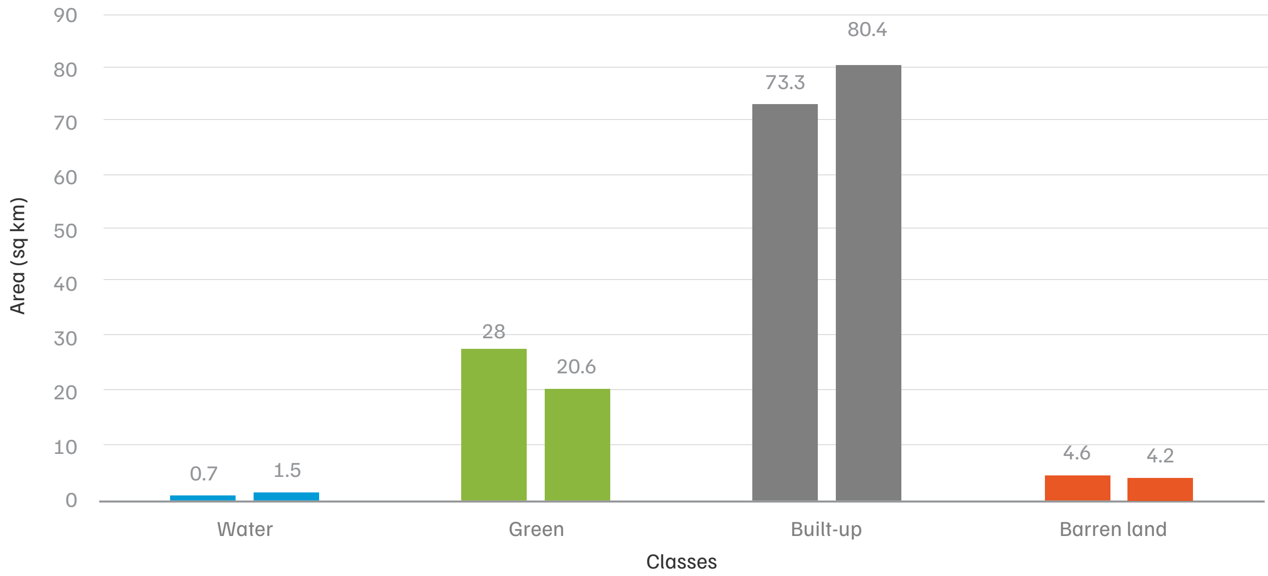
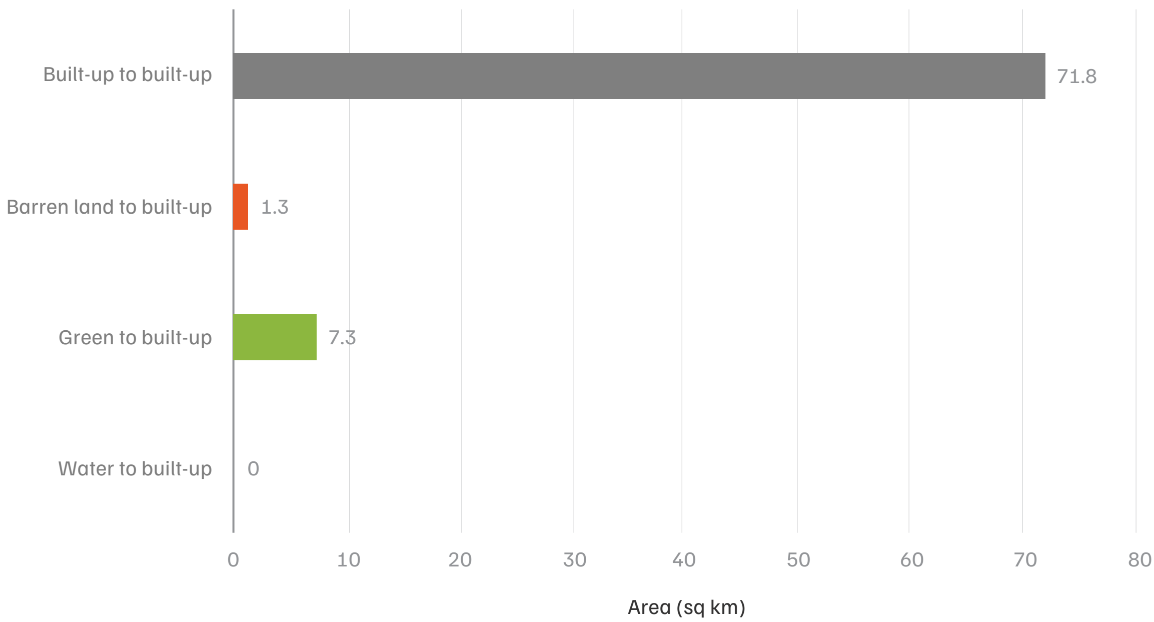


Figure 3b. Contribution of individual classes to increase of built-up area (2017–24)



Source: Authors' analysis using ESRI Sentinel-2 land use and land cover (LULC) data.

On examining air quality levels, global high air pollutants (GHAP) data from 2019 to 2022 (Annexure Figure A10) show rising PM2.5 levels in central–eastern Erode, particularly where road intersections are dense. Kalaignar Nagar, SBI Colony, and Vairapalayam show comparatively higher levels. These areas also overlap with the active land conversion zones shown in Figure 3, suggesting that vehicle traffic and construction activity could be the main contributors.

Takeaways from the near-decadal geospatial evolution

Urban growth in Indian Tier-2 cities tends to come from a mix of internal densification and outward spread that often goes beyond planned boundaries, and Erode fits this description well. Being a city anchored in textile manufacturing, agro-processing, and trade, its spatial changes do not follow any single, predictable pattern, whether concentric ring expansion, edge growth, or leapfrog development. Instead, growth has been corridor-specific and node-driven, concentrated around particular neighbourhoods and activity centres. This uneven growth carries real consequences for how people move around the city, how much pollution they are exposed to, and how prepared the city is for climate-related pressures.

What the satellite-based indices collectively show is that the city's built-up area has grown considerably, fed mainly by the loss of green areas and the further thickening of existing urban zones. Vegetation cover and health have both deteriorated, as NDVI and GNDVI values suggest. A handful of new water bodies have appeared, nudging moisture levels upwards in a few small pockets, but the broader landscape remains moderately dry. Urban densification, particularly in the city core, has been the dominant force shaping land-cover change.

On the air quality side, conditions have worsened across the board. The $PM_{2.5}$, NO_2, and CO levels have all grown (detailed in Annexure), most visibly in central–eastern Erode, where road networks are dense and urban activity is concentrated. Aerosol loading follows a seasonal rhythm, with levels in industrial Erode West peaking in the summer and levels in the congested, urban Erode East peaking in the winter.

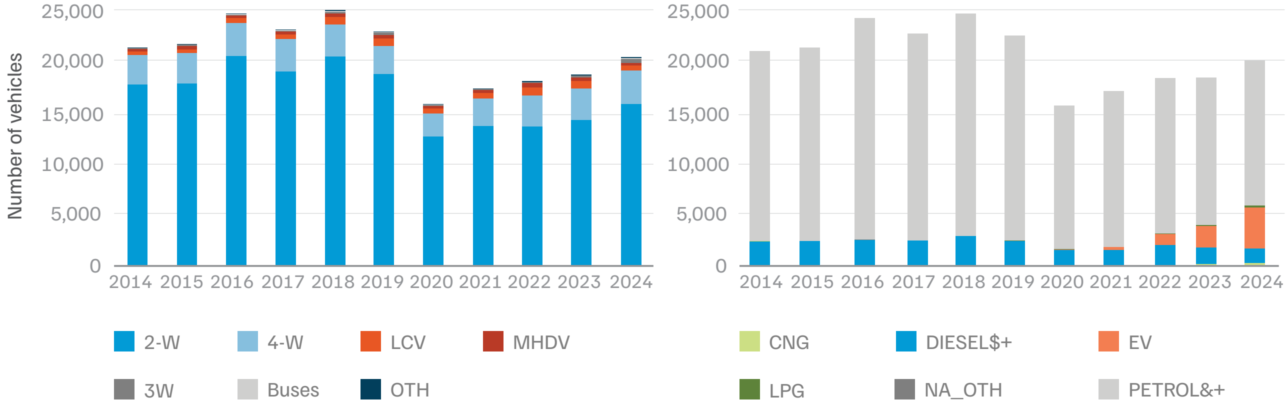
2.2 Vehicle registrations and in-use stock

Erode's mobility landscape has expanded steadily over the past two decades, shaped by rising travel demand, economic growth, and urban development. Average annual vehicle registrations increased from about 19,000 vehicles during 2004–2013 to nearly 21,000 vehicles during 2014–2023 (MoRTH n.d.), marking a 10 per cent rise in yearly additions across Erode East and West (TN-33 and TN-86).

This growth has been driven largely by private motorisation. Between 2014 and 2024, regional transport office (RTO) records indicate that around 2.3 lakh vehicles were registered within ECMC limits, of which 2-Ws account for nearly 80 per cent, followed by 4-Ws at around 15 per cent (Figure 4a). Public and shared modes, including three-wheelers (3-Ws), buses, LCVs, and MHDVs, together form only a small fraction of the total fleet (TNUIFSL 2015), underscoring the city's dependence on personal vehicles for daily travel.

Between 2014 and 2024, Erode's vehicle stock was overwhelmingly dominated by petrol-based vehicles, which accounted for nearly 86 per cent of all registrations, followed by diesel vehicles at around 10 per cent (Figure 4b). This pattern indicates longstanding preferences shaped by vehicle availability, cost, and local travel needs.

Figure 4. Vehicle registration in Erode city (TN-33 and TN-86) by (a) vehicle category and (b) fuel type shows greater reliance on private 2-W and 4-W vehicles and petrol



Source: VAHAN dashboard.

Note: Petrol&+, Diesel &+, and NA_OTH represent petrol or hybrid vehicles, diesel or hybrid vehicles, and not applicable or others, respectively.

Within this landscape, the adoption of electric vehicles (EVs) represents a notable shift, though they account for only a small share of the total fleet. Yearly EV registrations rose sharply from just 44 vehicles in 2020 to 4,090 vehicles in 2024 (MoRTH n.d.), signalling strong traction in recent years. While the scale of EV adoption remains modest relative to the broader petrol-driven fleet, the pace of growth suggests that a market transition is already underway – one that could accelerate as infrastructure, accessibility, and market options continue to expand.

In this chapter, we described Erode's evolving urban footprint, road network structure, and the broad trends in LULC changes, spatial transformation, and growth of vehicle registrations in the city. Building on this, in Chapter 3 we shall explain the primary data collection and analytical approaches used to generate the MPG evidence base, including how we made a concerted effort to overcome data gaps and data acquisition challenges.

Informal, low-speed freight such as bullock carts operating alongside motorised local traffic.

CEEW team in discussion with auto drivers in Erode, understanding their daily operational realities.

3. Data collection and analytical methods

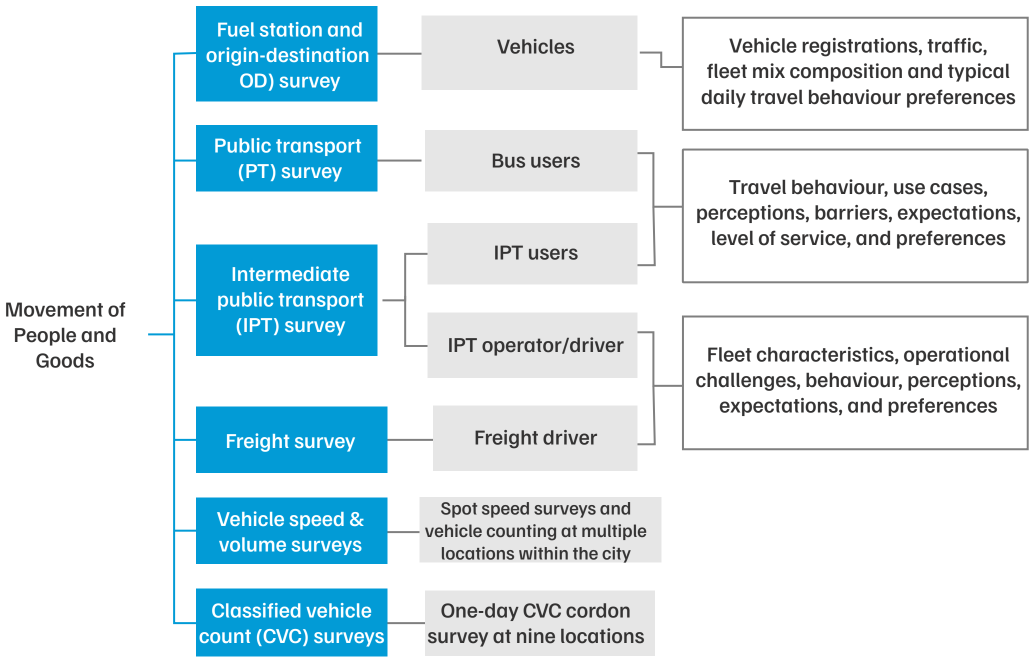
We collected data through structured surveys of public transport users, intermediate public transport (IPT) users and operators, freight drivers, and vehicles at fuel stations (Figure 5). We adopted a mixed-methods approach, combining primary surveys, secondary datasets, and geospatial analysis.

3.1 Overview of primary data collection

We employed a convenience and purposive sampling strategy to balance statistical validity with the ground realities of Erode's urban planning and mobility systems. The survey design ensured a statistically adequate sample size to support city-level analysis at a 95 per cent confidence level with a 5 per cent margin of error (n ≥ 385), calculated using Cochran's sample size formula and applied consistently across survey streams. The distribution of samples across surveys, as illustrated in Figure 5, reflects an integrated approach to capturing the movement patterns of both people and goods.

While the achieved sample is sufficient to describe overall MPG within the city, the use of non-probability sampling may introduce selection bias. To account for such limitations, we conducted surveys at major transit points, auto stands, markets, freight hubs, fuel stations, and high-footfall activity centres, such as the central bus station, Panner Selvam (PS) Park, and VO Chidambaraner (VOC) Park, ensuring coverage across key corridors, time periods, and trip purposes. This allowed for the inclusion of diverse user and operator groups within the practical constraints of data acquisition challenges, elucidated in the forthcoming.

Figure 5. Primary surveys capturing movement patterns of people and goods



Source: Authors' compilation based on primary surveys conducted in Erode.

3.2 Survey administration and sampling strategy

All survey questionnaires were administered in both Tamil and English. Primary data collection undertaken as part of the *MPG* study adhered to established ethical research practices involving human subjects, with emphasis on informed consent, full disclosure, privacy, and data confidentiality. Before administering any survey instrument, enumerators clearly explained the purpose of the study, the type of information being collected, and the voluntary nature of participation. To ensure data quality and confidentiality, surveys were administered using a secure mobile-based application, equipped with validation checks, skip logic, multiple-choice questions, and geo-temporal tagging; manual data handling was minimised.

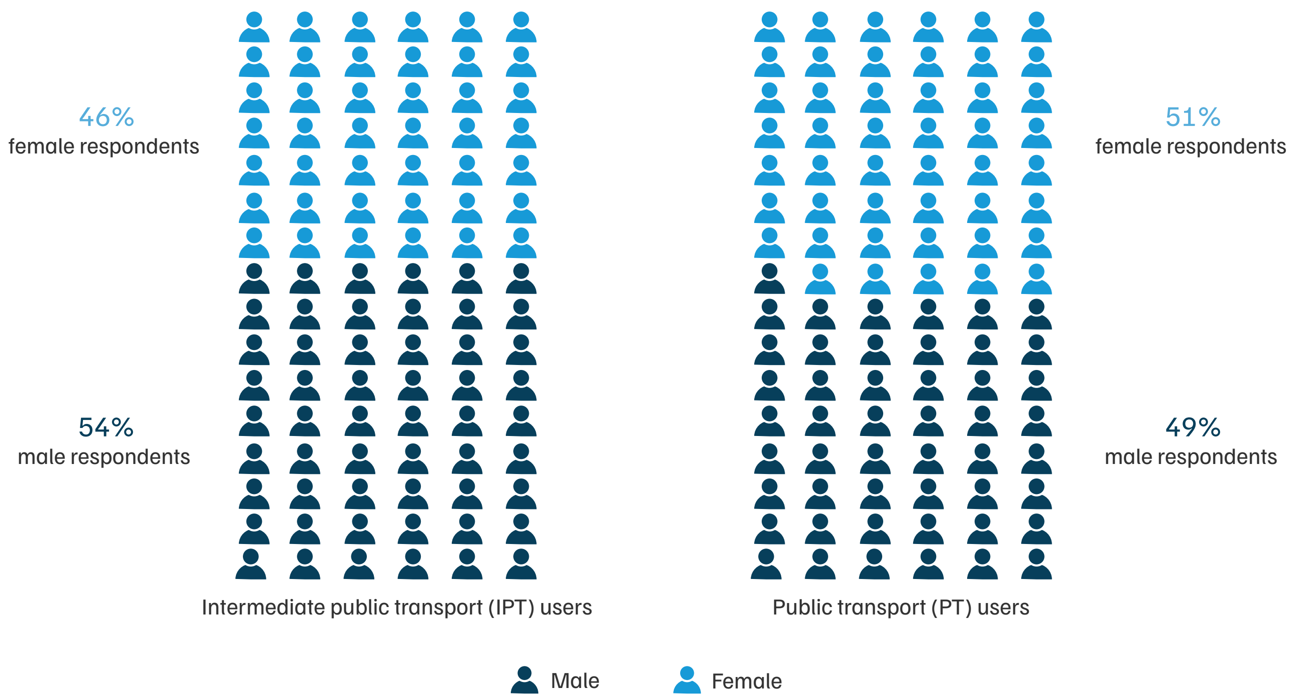
Data collection in the field was undertaken by a reputed professional vendor with a demonstrated track record of undertaking large-scale transport, mobility, and infrastructure studies for national agencies such as the Ministry of Road Transport and Highways (MoRTH), as well as for major metropolitan regions, including Bengaluru, Chennai, and Delhi. The vendor's prior experience with complex, multi-modal surveys and technology-enabled data collection ensured adherence to quality assurance protocols, consistency in field execution, and reliability of the collected data. The above suite of measures for survey administration, response collection, validation, quality control, and secure storage ensured best practices were implemented throughout the data pipeline.

For the fuel station and origin–destination (OD) survey, minimum sample sizes for each vehicle segment and fuel type were estimated using registration data obtained from the VAHAN dashboard across relevant RTOs (Erode East [TN-33], Erode West [TN-86], and Perundurai [TN-56]) (MoRTH n.d.). For user surveys, sampling proportions were aligned with gender distributions drawn from the *Census 2011,* with nearly equal ratios of male and female respondents (approximately 50 per cent each) guiding field deployment (Directorate of Census Operations 2011). The final achieved sample for these surveys closely mirrored these proportions (Figure 6).

For auto and freight drivers, no centralised or reliable database exists; therefore, sample targets were set to exceed Cochran's minimum threshold, resulting in a sample of more than 500 auto operators and over 1,000 freight drivers, including representation from both LCV and MHDV segments.

Importantly, a gender equality, disability, and social inclusion (GEDSI) lens informed the survey design and implementation, including (i) deliberate inclusion of women, older persons, and persons with disabilities in respondent recruitment and (ii) questions to capture gender- and mobility-linked barriers, such as safety, affordability, and physical accessibility. The study applied a targeted inclusion approach for priority groups whose mobility experiences are often under-captured in general user surveys. Where subgroup sample sizes were small – particularly for persons with disabilities and female operators – findings are reported as indicative and used to inform targeted follow-on consultations. Freight sample also captured the under-represented, economically weaker sections (EWS) of the society – such as bullock-cart drivers, constituting roughly 5 per cent of the freight sample. Additional sample descriptives and breakdown by key strata are presented in the following chapters. Survey questionnaires in English are included in the Annexure.

Figure 6. Nearly equal split in the gender composition of respondents across user surveys



Source: Field survey conducted by CEEW.

Note: Each vertical stacked bar represents 100% of the respondents, divided into male and female proportions. The IPT user survey (n = 1,193) covered 54% male and 46% female respondents, while the public transport (bus) user survey (n = 1,360) covered 49% male and 51% female respondents.

Generalisability limitations and data collection challenges

The 2011 *Census* (Directorate of Census Operations 2011) is regularly used as the most recent, officially recognised demographic baseline. However, the absence of comprehensive household, socio-economic, user, and operator registries creates structural data limitations. Consequently, we employed purposive and convenience sampling methods.

Beyond demographic data, comprehensive and up-to-date registries of households, transport users, operators, and service providers are largely unavailable. The issue is especially noticeable in intermediate PT and urban freight. Their operations tend to be informal, fragmented, and unregistered and even unregulated in some cases. As a result, we deemed probabilistic sampling approaches, such as stratified and/or random sampling, infeasible.

We also encountered procedural challenges that shaped data availability, final sample size selection, as well as field execution. Securing permissions for primary surveys required coordination with the ECMC as well as negotiations with multiple private and semi-private stakeholders. Due to location and time constraints vis-à-vis permissions, uniform sampling was difficult; field strategies had to be updated accordingly.

The lack of a centralised transport or mobility data repository at the ECMC was another challenge. Mobility-relevant information – such as traffic counts, road inventories, parking data, enforcement records, or service-level indicators, if any – was dispersed across departments and agencies, often outdated, sometimes partially or entirely absent. The city's Master Plan GIS layers are yet to receive formal approval, limiting their usage as an official reference for land-use and zoning analysis.

The most recent comprehensive mobility plan (CMP) for Erode dates back to 2015 by TNUIFSL, predating significant changes in vehicle ownership and freight activity, land-use intensification, and emerging climate and air-quality priorities. While the CMP provides useful historical context, it cannot be treated as a definitive representation of current mobility conditions, as is explained in the next chapter, on baselining travel patterns. For this reason, we did not consider probabilistic sampling. We must also emphasise that most, if not all, of the limitations emerging from sampling or selection bias were intrinsic and unavoidable in a study that seeks to balance comprehensiveness, granularity, complexity, and resource constraints.

The combination of purposive site selection, multi-location sampling, and triangulation across data sources ensures that the findings are reasonably representative of prevailing mobility conditions and user experiences. The findings should apply to similar Tier-2 cities, even though they cannot be applied to every user group or region. These limitations imply, however, that the findings of the MPG report should be interpreted as functionally representative and heuristically complete.

A descriptive, diagnostic, or prognostic perspective best characterises our study, rather than a predictive, statistically exhaustive, or exact one. Importantly, the role, utility, and value of this MPG report lie in its ability to straddle micro-, meso-, and macro-level views of the mobility system's structure and performance.

Nevertheless, within these constraints, our study yields a statistically valid and analytically robust sample for system-level diagnosis. The achieved sample size and spatial spread are sufficient to capture meaningful variation across user groups, vehicle segments, trip purposes, and operating contexts within Erode. The analysis is designed to capture patterns, constraints, and system behaviour of the movement of people and goods, rather than to produce citywide estimates with census-level precision.

Average traffic in Erode has grown 1.8 times faster than planned road expansion as per the last mobility plan.

Image: CEEW

4. Baselining travel patterns

We sought to understand the travel pattern of the people in the Erode City Municipal Corporation (ECMC) jurisdiction. The existing literature suggests several methods, but mainly: (i) secondary literature and (ii) fuel station/parking lot surveys. As mentioned in previous chapters, the existing comprehensive mobility plan (CMP) is over a decade old (TNUIFSL 2015). Therefore, a new primary study was needed to understand the on-road vehicle stock profile (Goel 2016; Guttikunda 2025).

We conducted the survey (n = ~6,000) across multiple locations throughout the city (Figure 7), including the central bus station, bus stops, auto stands, parking lots, Panner Selvam (PS) Park, Erode Railway Station, the government hospital, and along the city's major arterial roads. The survey samples included two-wheelers (2-Ws), three-wheelers (3-Ws), four-wheelers (4-Ws), buses, light commercial vehicles (LCVs), and medium and heavy-duty vehicles (MHDVs). These sample types encompass vehicles for personal use, public and shared mobility options, commercial transport modalities, and freight activities.

We recorded the survey data under two major heads: (i) vehicle characteristics and (ii) travel patterns. The vehicle characteristics include vehicle make, model, manufacturer, registration year, fuel type, occupancy, ownership status, and intended purpose. The travel pattern includes origin and destination locations, trip type, trip distance, travel time, and a trip distribution matrix.

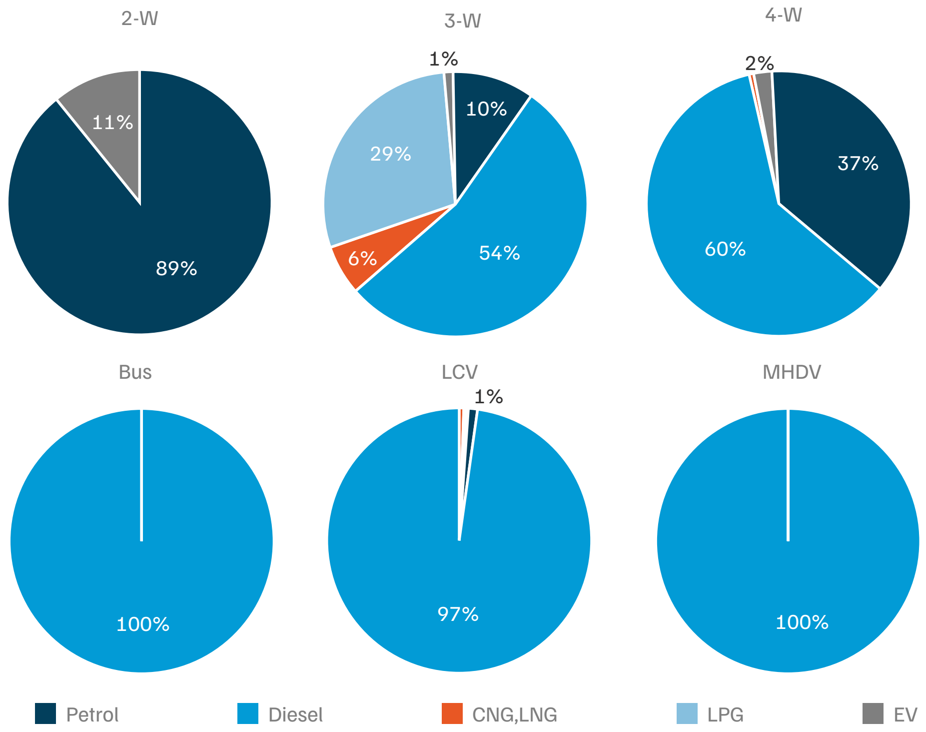
Figure 7. Locations of surveys conducted (N~6000 samples) at transit stops, commercial markets, and parking lots

Source: Field survey conducted by CEEW.

The survey recorded vehicle number plates as well as registration details at the regional transport office (RTO), which helped verify the accuracy of the collected data. This information was also used for data quality checks. According to our survey, 98 per cent of the vehicles are registered in the state of Tamil Nadu, and 55 per cent are registered in Erode district (47 per cent ECMC + 8 per cent Perundurai).

The distribution of fuel types across vehicle categories reveals the conventional fuels – diesel and petrol – are still dominant (Figure 8). Petrol makes up the larger share of the market for 2-Ws (89 per cent), whereas diesel dominates 4-Ws, freight and public transport, accounting for 60 per cent of 4-Ws, 97 per cent of LCVs, full MHDVs, and buses. EVs represent a small proportion, primarily in the 4-W and 2-W segments. CNG usage was noted in 3-Ws (6 per cent), and 1 per cent in LCVs, whereas LPG is largely concentrated in 3-Ws (29 per cent).

Figure 8. Heavy-duty vehicles are diesel-dominant

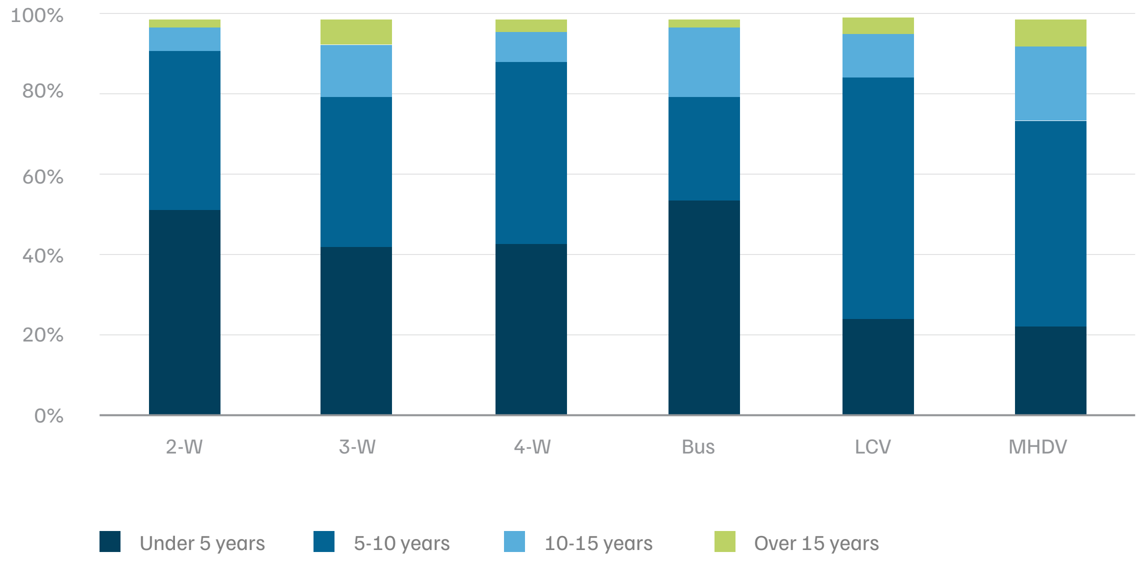


Source: Field survey conducted by CEEW.

*Abbreviations: Two-wheelers (2-Ws); three-wheelers (3-Ws); four-wheelers (4-Ws); light commercial vehicles (LCVs); medium and heavy-duty vehicles (MHDVs); compressed natural gas (CNG); liquid natural gas (LNG); liquid petroleum gas (LPG); electric vehicle (EV)

Our survey further reveals that most of the vehicles are middle-aged, with 5- to 10-year-old vehicles making up the largest share across categories, except for buses (Figure 9). Around 20 per cent of the stock in 3-Ws and buses is over 10 years old, underscoring the need for a fleet replacement for both intermediate public transport (IPT) and public transport proper. Overall, 14 per cent of the vehicles are over 10 years old, of which 50 per cent are diesel-based trucks.

Figure 9. Approximately 73% of the vehicles older than 10 years are diesel-based



Source: Field survey conducted by CEEW.

Note: n = 5,835, consisting of 2-Ws (1,832), 3-Ws (158), 4-Ws (1,417), buses (333), LCVs (1,276), and MHDVs (819)

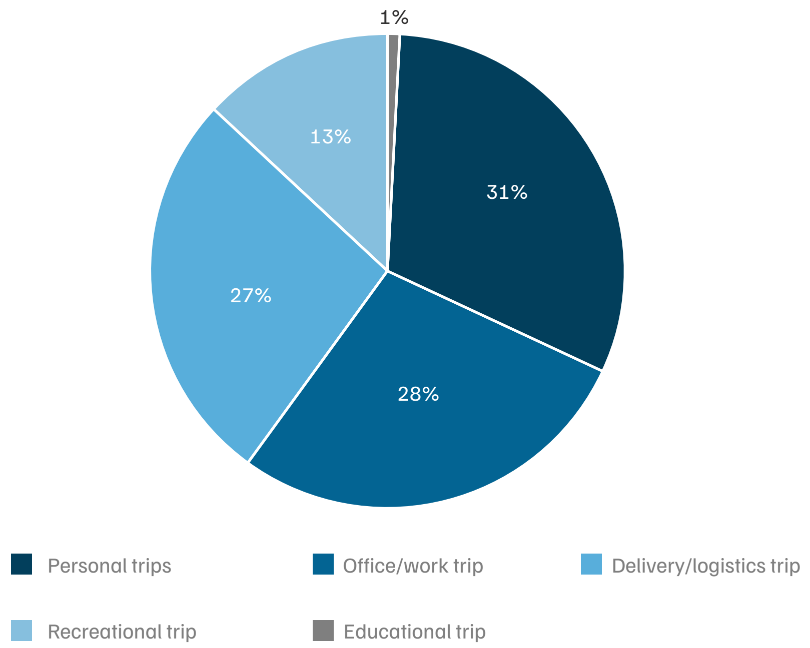
We observed that 2-Ws and 4-Ws are predominantly privately owned, indicating that they are primarily used for personal and household travel. In contrast, commercial and freight-oriented vehicles are mostly company-owned or operator-managed. Rental usage is notable for LCVs and 3-Ws, highlighting their roles in flexible and short-term commercial operations. Second-hand ownership is relatively limited overall, but is more frequent for 2-Ws and 4-Ws.

We recorded vehicle characteristics and usage patterns across various vehicle types, highlighting usage intensity and travel behaviour (refer to Table A1 in the Annexure). The average age of vehicles is higher in the commercial and freight segment than for private vehicles. The average age of private 2-Ws was six years, while that of shared 3-Ws was eight years. LCVs and MHDVs also exhibit a higher mean age of eight to nine years, with relatively high standard deviations, indicating a heterogeneous mix of new and older vehicles.

In assessing travel behaviour, we examined travel patterns for the various vehicle types. Most 2-Ws travel about 32–45 km/day, while 4-Ws travel around 57–75 km/day. However, variation in usage pattern is lower for personal 4-Ws and higher for commercial cars (such as taxis and ride-hailing vehicles like Uber). Buses recorded substantially a higher variation in average daily distance (168–232 km) due to intra-city and intercity movements. Overall, the consistently higher standard deviations observed for the commercial, shared, and freight categories underscore their greater heterogeneity of operating conditions as compared to personal vehicles.

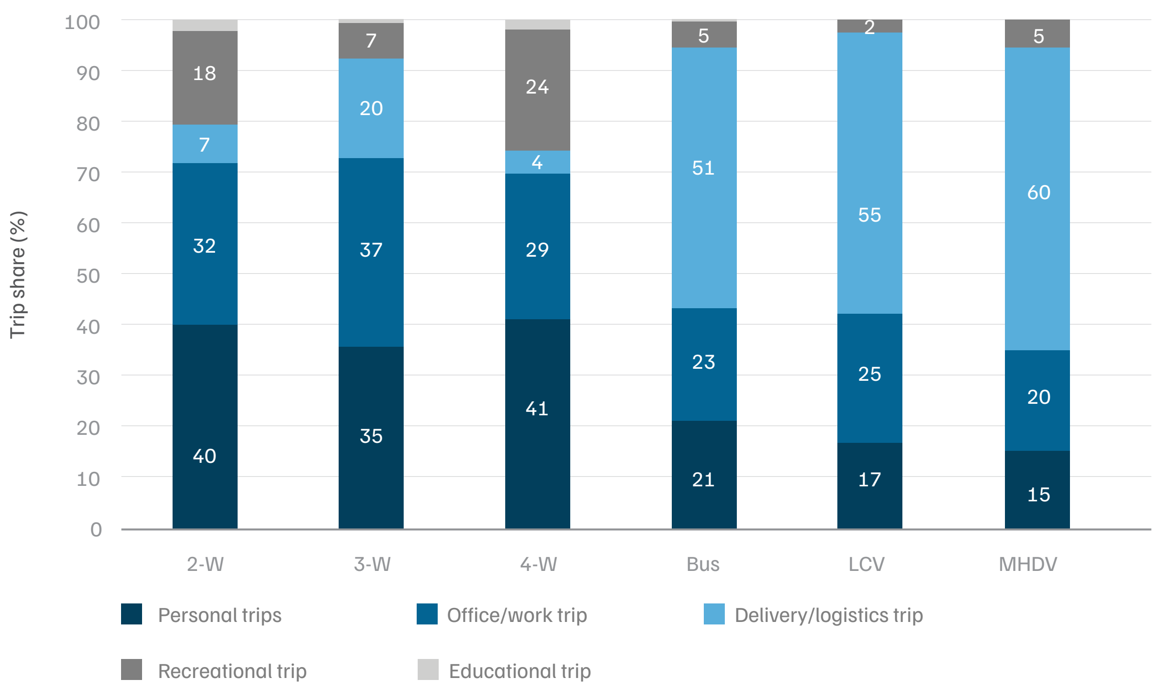
4.1 Travel patterns within Erode city

Figure 10. Around 60% of the trips are regular daily trips (personal and work)



Source: Field survey conducted by CEEW.

Figure 11. Private vehicles (2-W and 4-W) and IPT are majorly used for work and personal trips

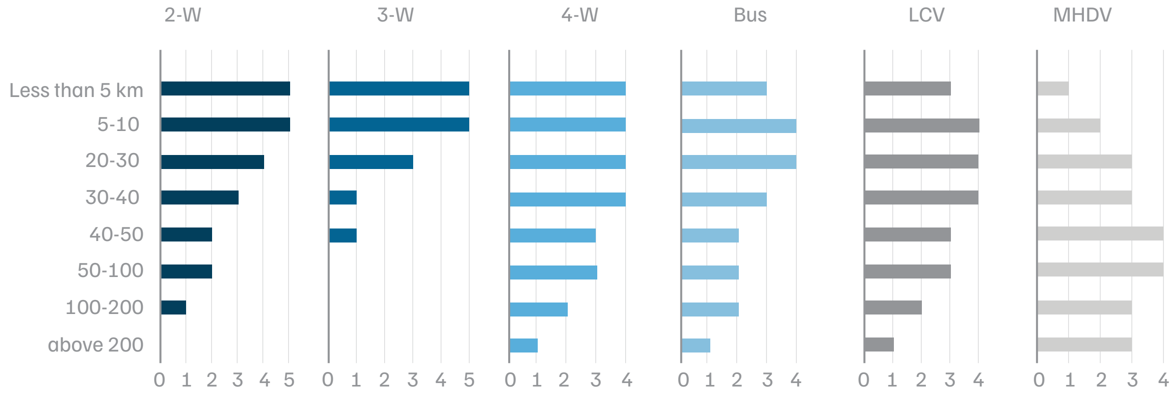


Source: Field survey conducted by CEEW.

Note: In the case of 3-Ws and buses, delivery/logistics trips include transit stops and ride-hailing areas

We found that 2-Ws and 4-Ws are mainly used for personal and work-related travel, accounting for nearly two-thirds of usage (Figures 10 and 11). Meanwhile, 3-Ws show more balanced usage across work-related trips, personal trips, and transit stops. Approximately 50 per cent of bus trips are intermediate trips to auto stands and ride-hailing areas. In contrast, LCVs and MHDVs are primarily oriented towards delivery services. Recreational trips mainly use 2-Ws, 3-Ws, or 4-Ws, rather than buses.

Figure 12. Our survey found that two-wheelers and three-wheelers are mostly used for short trips, while MHDVs and buses dominate longer-distance travel

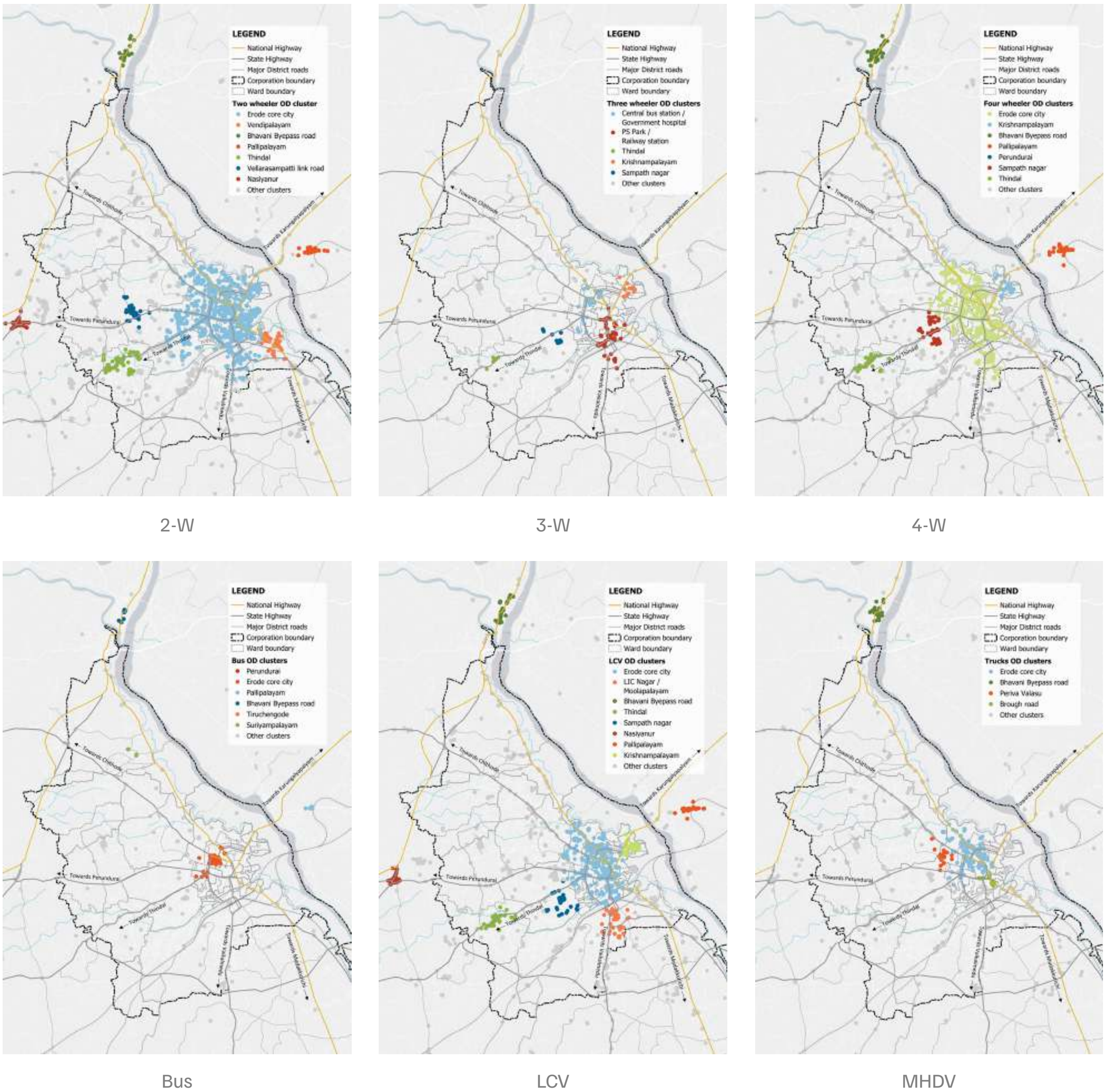


Source: Field survey conducted by CEEW.

Note: n = 5,835, consisting of 2-Ws (1,832), 3-Ws (158), 4-Ws (1,417), buses (333), LCVs (1,276), and MHDVs (819)

Figure 12 maps the weekly distance-wise travel profiles of the various vehicle types. Notably, 2-Ws and 3-Ws are mainly used for short-distance travel, mostly under 10 km, and there is a steady decline in trips beyond 30 km. This reflects their key role in local and neighbourhood-level mobility. In contrast, 4-Ws exhibit a more even distribution across short and medium distances, extending into longer trip ranges, indicating their use for both intra-city and peri-urban travel. In contrast, buses, LCVs, and MHDVs display a clear shift towards medium and long-distance travel, with limited activity in the shortest distance bands and higher intensity beyond 40–50 km. This pattern highlights that freight and intercity movement account for most longer-distance travel, while smaller vehicles primarily serve local access and daily mobility needs.

Figure 13. Origin-destination (OD) clusters by vehicle type



Source: Authors' analysis from field survey conducted by CEEW.

Based on the survey data, we mapped the origins and destinations across various vehicle types to analyse their category-wise travel patterns (Figure 13). The spatial distribution of 2-W origin–destination (OD) clusters reveals a strong concentration of trips within the Erode core city area. Dense clusters within the municipal boundary indicate highly localised movement. At the periphery, distinct OD clusters emerge along key transport corridors and growth nodes, such as Vendipalayam, Bhavani Bypass Road, Pallipalayam, Thindal, Villarasampatti Link Road, and Nasiyanur, highlighting the role of arterial roads and highway connections in shaping 2-W travel beyond the city core. These peripheral clusters are closely aligned with major arterial roads and highways, suggesting commuter travel and peri-urban links rather than dispersed rural travel. This, in turn, indicates that 2-Ws support city-centric mobility (older areas of Erode), while also facilitating travel along corridors towards nearby towns and industrial/residential hubs.

Our analysis revealed that 4-W OD clusters are densely concentrated within the core Erode city area. Peripheral clusters also emerge along key corridors and growth centres along the major arterial roads, such as Krishnampalayam, Bhavani Bypass Road, Pallipalayam, Perundurai, Sampath Nagar, and Thindal. The travel pattern suggests that 4-Ws serve as a critical mode of transport for both citywide circulation and regional connectivity.

Similarly, 3-W OD clusters are highly concentrated around key activity hubs within the core Erode city area. This highlights their role as short-distance, demand-responsive public transport. The most prominent clusters are located around the central bus station, the government hospital, the railway station, and PS Park. Secondary clusters emerge along approach corridors and peripheral neighbourhoods, such as Thindal, Krishnampalayam, and Sampath Nagar, suggesting 3-Ws also provide feeder and last-mile connectivity from residential areas to the city centre. They are, thus, critical connectors between high-demand urban nodes and the surrounding neighbourhoods, acting as last-mile and intermediate public transport within the city.

For buses, the OD clusters reveal a centralised transit pattern, with the core of Erode city forming the primary transit hub. Beyond the central core are satellite clusters that facilitate regional connectivity, such as Perundurai to the west, Tiruchengode to the south-east, and Pallipalayam across the river to the east. Smaller clusters, such as Bhavani Bypass Road and Suriyampalyam, suggest emerging and specialised transit points.

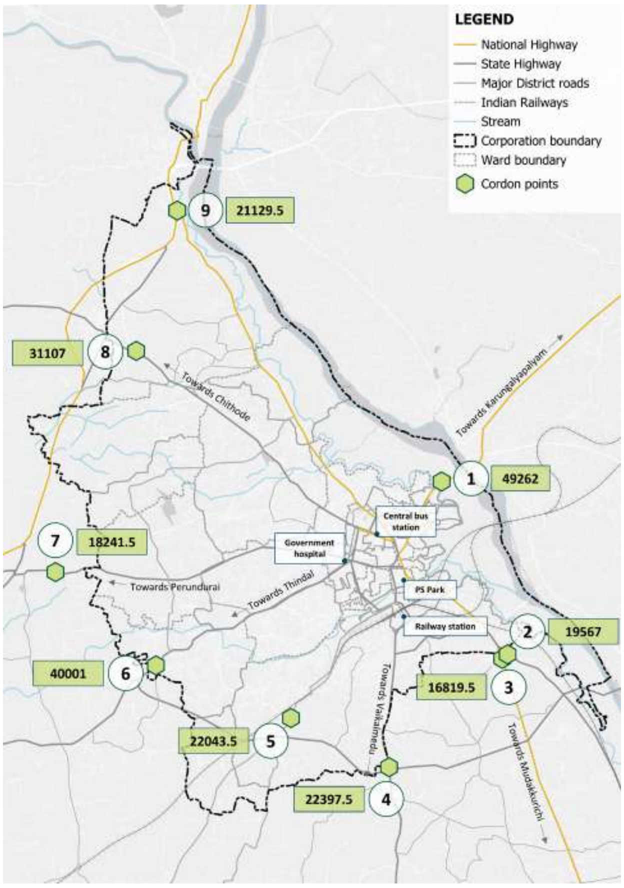
LCV OD clusters are widely dispersed in the old city area, near the commercial and industrial clusters. We also observed clusters along key corridors, such as Bhavani Bypass Road in the north and Pallipalayam to the east, which connect to Salem. LIC Nagar is near the railway station in the south and Thindal in the south-west, which connects to Perundurai in the west. MHDV OD clusters are found in the old city centre, Brough Road, and Periya Valasu. The vehicle segment is concentrated within the Erode core city, with MHDVs being more widely scattered inside the Erode boundary.

Travel demand is led by short two-wheeler trips, alongside long-distance bus travel and regional freight movement.

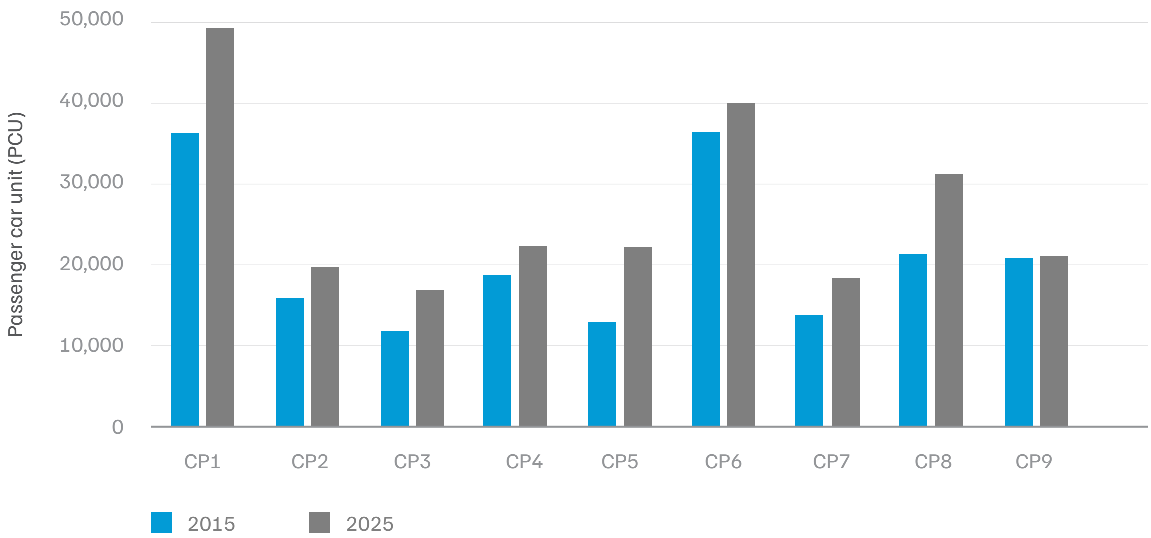
Female students and women accessing TNSTC bus services for their daily journeys, with 73% of women's bus trips made for education, work, and care-related activities.

4.2 Traffic volume at Erode's cordon junctions

Figure 14. A 32% increase in traffic volume (per passenger car unit) was noted between 2015 and 2025



No	Route name	PCU (2015)	PCU (2025)
1	Erode to Salem	36,012	49,262
2	Erode to Ganapathipalayam	15,856	19,567
3	Erode to Modakurichi	11,819	16,820
4	Erode to Avalpoondurai	18,671	22,398
5	Erode to Vellode	12,770	22,044
6	Erode to Mettukadai	36,189	40,001
7	Erode to Nasiyanur	13,739	18,242
8	Erode to Kongampalayam	21,249	31,107
9	Kalingarayanpalayam to Perumalmalai	20,793	21,130



Source: Authors' analysis of routes and PCU data from the last Comprehensive Mobility Plan (TNUIFSL).

Note: CP stands for Cordon Point

Between 2015 and 2025, traffic volumes across the nine monitored corridors around Erode increased by an overall average of 31 per cent, indicating a strong growth in regional mobility and corridor-level demand (Figure 14). The highest growth was observed cordon point CP5 (Erode–Vellore), where volumes rose from 12,770 to 22,044 passenger car units (PCU), reflecting a substantial 73 per cent increase. This road is also connected to PS Park, which is directly connected to the core Erode city area.

Similarly, CP8 (Erode–Kongampalayam) and CP3 (Erode–Modakurichi) recorded increases of 46 per cent and 42 per cent, respectively. This suggests rapid expansion of peri-urban settlements and consequently more commuting along these main axes. Major regional connectors such as CP1 (Erode–Salem) and CP7 (Erode–Nasiyanur) also show robust growth, of 37 per cent and 33 per cent respectively, which is consistent with rising intercity travel, freight movement, and economic integration with neighbouring urban centres. In contrast, relatively moderate growth was seen in CP6 (Erode–Mettukadai) at 10.5 per cent and CP9 (Kalingarayanpalayam–Perumalmalai) at just 1.6 per cent. This may be due to limited development and constrained economic activity on the northern side of the ECMC. The observed increase can be attributed to urban expansion, population growth, rising vehicle ownership, and increased freight movement, all of which have led to increased commuter and commercial traffic on major routes.

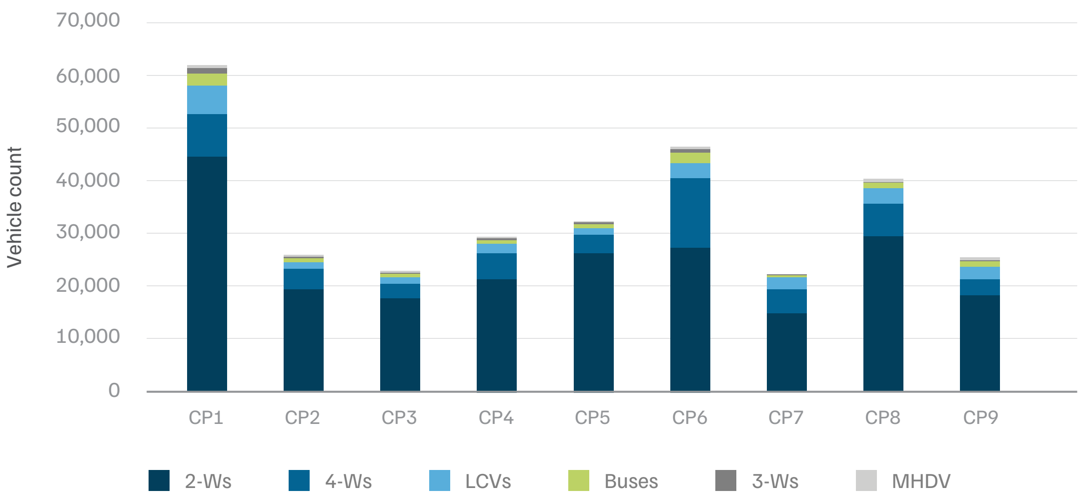
The classified vehicle count (CVC) across the nine cordon points indicates that 2-Ws are the dominant vehicle category, followed by 4-Ws, in the everyday (Figure 15). This suggests that the regional mobility corridors are popular for commuter as well as intercity travel.

Freight activity is largely represented by LCVs and MHDVs. While LCVs are partially concentrated in CP1 (5,422), CP8 (2,878), and CP6 (2,822), MHDV traffic is highest along CP8 (5,538), CP9 (5,522), and CP1 (5,525). CP1 and CP9 are on the Erode–Salem route, the latter being a major urban and industrial centre nearby. CP8 is near industrial land and leads to Kongampalayam, which is also one of the major routes to Mysuru. CP6 is a route to Perundurai and Tiruppur, one of the major industrial corridors.

Bus volumes are higher near CP1 (2,260) and CP6 (2,083), which connect to nearby urban centres such as Salem and Perundurai.

Meanwhile, 3-Ws volumes are low at the cordon points, which is consistent with short-distance passenger and goods movement. Overall, the distribution highlights mixed traffic composition, with 2-Ws coexisting throughout with corridor-specific concentrations of public transport and freight vehicles.

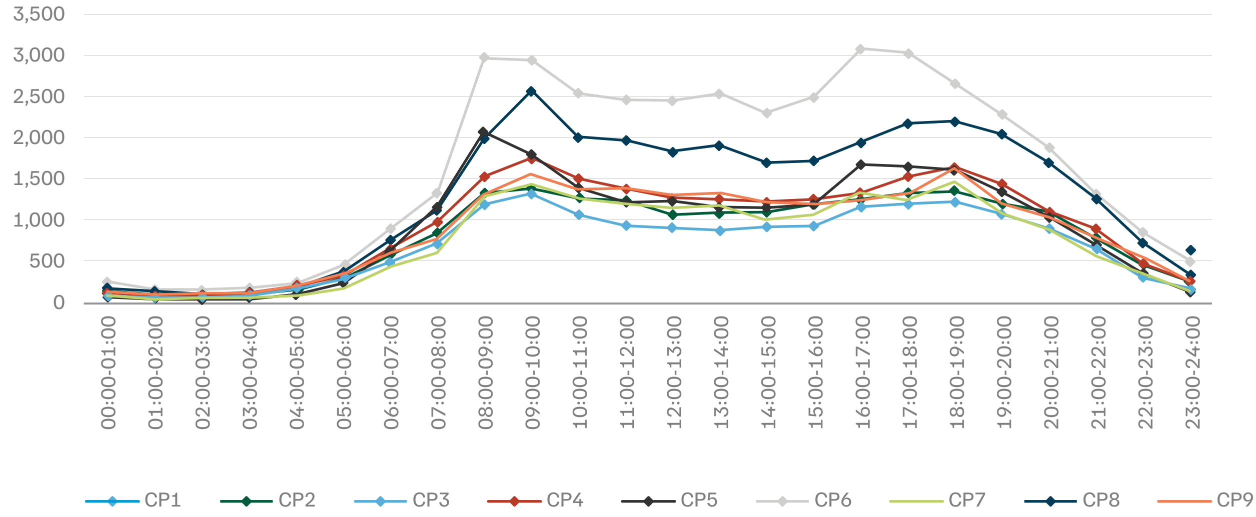
Figure 15. Proportion of two-wheelers and four-wheelers is high on all the major regional corridors of Erode



Source: Authors' analysis using CEEW primary surveys.

Traffic volumes are low during the late-night and early-morning hours (midnight to 5:00 a.m.), with mostly 200–300 PCU/hour at the cordon points (Figure 16). The traffic flow begins to rise from 6:00 a.m., coinciding with work- and school-related travel between 8:00 and 10:00 a.m. Following the morning peak, traffic levels remain elevated throughout the midday and afternoon hours, mainly consisting of passenger vehicles, such as private 4-Ws, buses, and 3-Ws. The second peak occurs during 5:00–7:00 p.m., reflecting homeward trips. After 8:00 p.m., traffic volumes gradually decline on all corridors, returning to low levels by late night.

Figure 16. Bi-modal peaks along traffic corridors reflect morning and evening commuter and commercial traffic



Source: Authors' analysis using CEEW primary surveys.

What can we gather from the vehicle stock evolution, fleet composition, and baseline travel patterns?

Erode's mobility landscape has grown steadily in the last decade, showing the combined effects of population growth, economic activity, and spatial transformation.

- Average annual vehicle additions increased from approximately 19,000 vehicles during 2004–2013 to nearly 21,000 vehicles during 2014–2023 across Erode East and Erode West (TN-33 and TN-86) (MoRTH n.d.), representing a 10 per cent rise in yearly inflows into the city's vehicle stock, mainly from rising private vehicle ownership. The fact that public and shared vehicle stock make up only 20 per cent of the total suggests an imbalance and asymmetry in the utilisation of existing road capacity, skewing the city's mobility patterns towards individualised private transport (2-Ws and 4-Ws), overtaking all other modes. Consequently, the city's key junctions and corridors are prone to congestion and vulnerable to traffic externalities.

- Despite fossil fuel-powered vehicles dominating the fleets, EVs represent a clear inflexion point. Annual EV registrations increased from just 44 vehicles in 2020 to 4,090 vehicles in 2024 (MoRTH n.d.), indicating a rapid acceleration over a short period. Although EVs – which are mostly electric 2-Ws (e2-Ws) – remain a small fraction of the overall vehicle stock, this trajectory indicates an early scaling phase. However, the juxtaposition of rapid EV growth with continued dominance of private motorisation underscores a critical planning challenge. Though electrification can reduce emissions, without parallel shifts towards public transport, shared mobility, and demand management, it will be akin to treating the symptom without addressing the systemic and compounding adversarial effects of traffic externalities.

- Erode's travel demand profile reveals that its daily mobility needs are predominantly local, frequent, and purpose-driven, shaped by its compact urban form, mixed land use, and strong linkage between residential areas and employment, education, and commercial hubs. The travel demand baseline indicates that most trips are of short to medium distance and intra-city, with traffic peaks during the morning and evening hours corresponding to work, education, and other regular commutes.

- The dominance of short trips explains the importance of 2-Ws and intermediate modes for everyday mobility, particularly in the absence of a high-capacity, citywide public transport network. This is consistent with the vehicle registration trends we observed, which highlight that growth in travel demand has been accommodated by private and on-demand transport, in the absence of scheduled, well-planned, and reliable public transport. As a result, even modest increases in trip volumes exert disproportionate stress on road capacity, junction performance, and kerbside management.

Encroached kerb spaces from parking and roadside activities limit safe movement for pedestrians and cyclists.

Accessing public transport without formal waiting infrastructure, with average waiting time for buses increased from 3 minutes (CMP) to 10 minutes today.

Image: CEEW

5. Erode's public transport system: The regulated capacity spine

In urban areas, the public transport system forms the backbone of mobility. Efficient and effective public transport enables citizens to access better employment opportunities, economic growth, social inclusion, and environmental sustainability. In Erode, the transport system encompasses a range of services, including public transport, intercity and intra-city bus services, shared services, and intermediate public transport (IPT), each catering to different travel needs.

Erode's public transport network is extensive. It is managed by the Tamil Nadu State Transport Corporation (TNSTC) and private bus operators, with around 30–35 per cent of daily trips relying on public transport and non-motorised modes (on foot or bicycle). However, despite comprising the majority of the overall modal split (TNUIFSL 2015; CEEW and ITDP India 2025), with rising vehicle ownership and limited rights of way, Erode's public transport system is challenged and requires targeted efforts to achieve sustainability.

While public transport remains important for cities, as highlighted in the *Tamil Nadu State Action Plan on Climate Change* (TNSAPCC) 2.0, Erode's mobility pattern is witnessing a shift towards private vehicles, particularly 2-Ws, which account for nearly 80 per cent of all vehicle registrations. Regional connectivity is supported through a vast network of intra-city and intercity bus services, providing access to work and other economic activities. However, users have been opting for alternative modes of transport due to the absence of a dedicated city bus system (TNUIFSL 2015).

For people who rely on buses, affordability remains the defining factor. The *Zero Ticket Bus Travel* scheme has been transformative for women, effectively reducing daily travel costs to zero on state-operated buses, enhancing both mobility and economic participation (Tamil Nadu State Planning Commission 2022).

In alignment with other initiatives, the *Tamil Nadu Climate Change Mission* (TNCCM) also positions public transport as a key component of the state's emissions reduction strategy, encouraging a shift away from private vehicles and linking enhancements of the public transport system to broader climate and socially beneficial objectives. In this chapter, we offer an evidence-based assessment of Erode's public transport system, examining user characteristics and perceptions, service gaps, and opportunities to enhance the system.

Overview of the existing public transport system in Erode

As a growing Tier-2 city, Erode's bus network connects residential neighbourhoods, commercial centres, employment hubs, and neighbouring towns, supported by a fleet strength of 821 buses (Department of Statistics and Economics 2024). With a high fleet utilisation rate of around 95 per cent and nearly 7.60 lakh passengers travelling daily (Department of Statistics and Economics 2024), the numbers availing public transport are impressive already. Yet, despite this sizable fleet, only 16 per cent of buses operate as city bus services (ITDP India 2025). This service gap is also highlighted in Erode's comprehensive mobility plan, or CMP (TNUIFSL 2015), which recommends expanding the fleet to meet projected demand.

Figure 17. Spatial distribution of bus stops in Erode shows concentration in the central core and along arterial roads

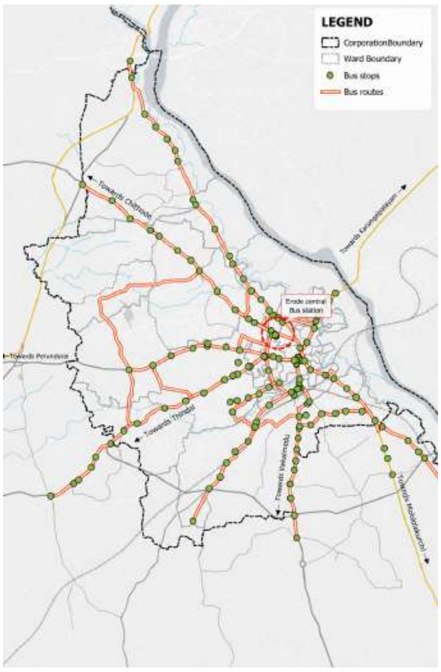
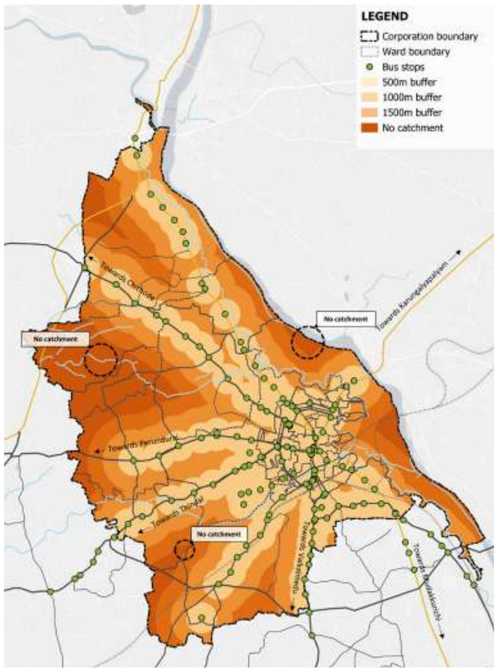


Figure 18. Bus stop catchment areas, with 500-m buffer zones, reveal large lacunae



Source: Authors' analysis.

The spatial distribution of bus stops within Erode city, as shown in Figure 17, shows a network of 177 locations along primary movement corridors from a central hub. The bus routes trace the arterial roads, extending from the city's core towards areas such as Perundurai, Chithode, and Thindal. In the core city, the bus network remains confined to the major roads – this is the most strongly served zone, housing the central bus station, government hospital, and Panner Selvam (PS) Park, and users benefit from bus stops in relative proximity, with shorter walking distances.

In the peripheral areas, however, public transport coverage between arterial roads remains limited, leaving many users underserved, as identified in ITDP India's *Gap Assessment Report* (2025). This gap is captured by the bus stop catchment map (Figure 18), which shows a dense concentration of bus stops within the core city; but coverage declines significantly towards the northern and western peripheries. These peripheral areas thus constitute low or very-low catchment zones, with some locations lying entirely outside the 500 m walkable radius.

ITDP India's (2025) 'people near transit' (PNT) analysis indicates that around 44 per cent of Erode's population falls within a five-minute walking distance of a bus stop, reflecting a moderate level of access to the bus network. However, only about 15 per cent of the population is within a frequent transit area, suggesting buses are accessible to a relatively limited share of residents.

A view of KNK Road Junction, Erode, in a growing city with evolving travel patterns and mobility needs.

Public transport users' survey

To obtain data-driven insights into Erode's public transport system, we conducted a user survey. We designed the survey to capture diverse user experiences and travel demand patterns and to identify gaps and opportunities for improvements, thus gaining a comprehensive understanding of the city's mobility profile. A gender equality, disability, and social inclusion (GEDSI) lens informed the survey design, with deliberate inclusion of priority groups such as women, older persons, and persons with disabilities (PwDs). In total, we surveyed 1,360 public transport users in and around the central bus station in Erode, building a strong foundation to understand how effectively the system addresses the city's mobility needs.

5.1 Public transport user: Findings

In this section, we summarise the findings from a significant sample (n = ~1,360) of public transport users in Erode. We explain in detail the demographic and socio-economic characteristics of the users and their travel behaviours – the type of bus services availed, the number of trips undertaken, and the expenditure incurred. Further, we explore why users choose buses over other modes of transport, the challenges they face during their travels, and potential improvements to bus services. In the final section, we discuss users' views on electric buses and the factors that may promote a shift away from conventional buses. Taken together, these insights provide a comprehensive understanding of Erode's public transport user profile.

> Intracity buses carry the largest share of passengers (39%), with 7 in every 10 bus trips occurring within Erode.

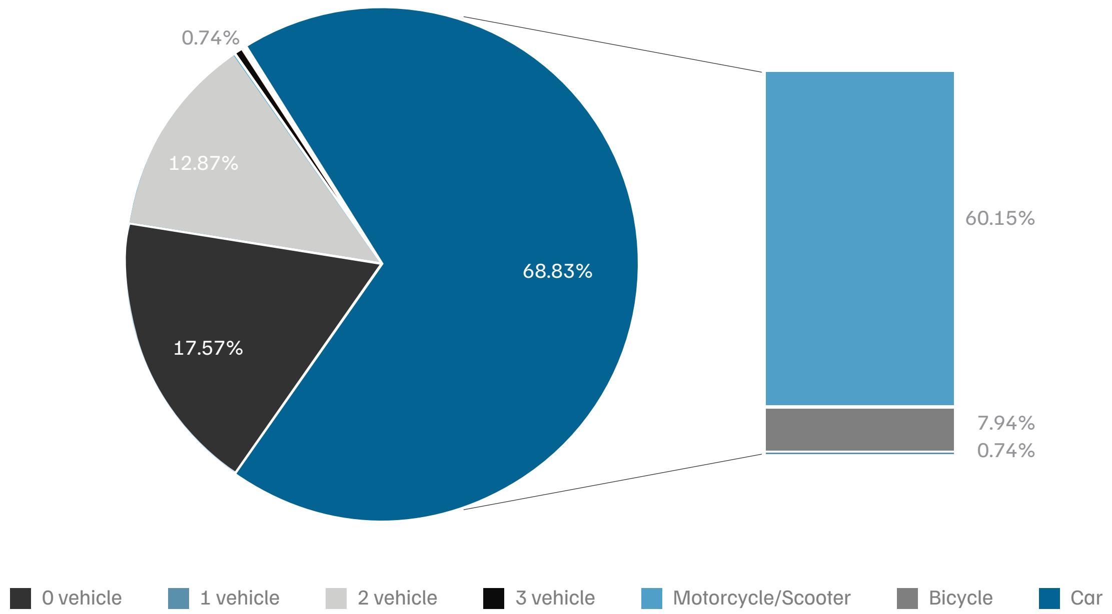
The profile of Erode's surveyed public transport users highlights a predominantly young and working-age group

The demographic profile of the survey sample reveals a balanced gender distribution (51 per cent female and 49 per cent male) and a predominantly young population, with more than half of the respondents aged between 15 and 29 years (53 per cent). Educational levels are relatively high, with 24 per cent having completed senior secondary education and 40 per cent holding undergraduate, diploma, or polytechnic qualifications. Our analysis of the trip purposes shows that over one-third of the respondents (35 per cent) use public transport to further their education.

A substantial proportion, around 66 per cent, belong to low-income households, earning less than INR 25,000 per month. In contrast, higher income groups have minimal representation (0.7 per cent) among public transport users.

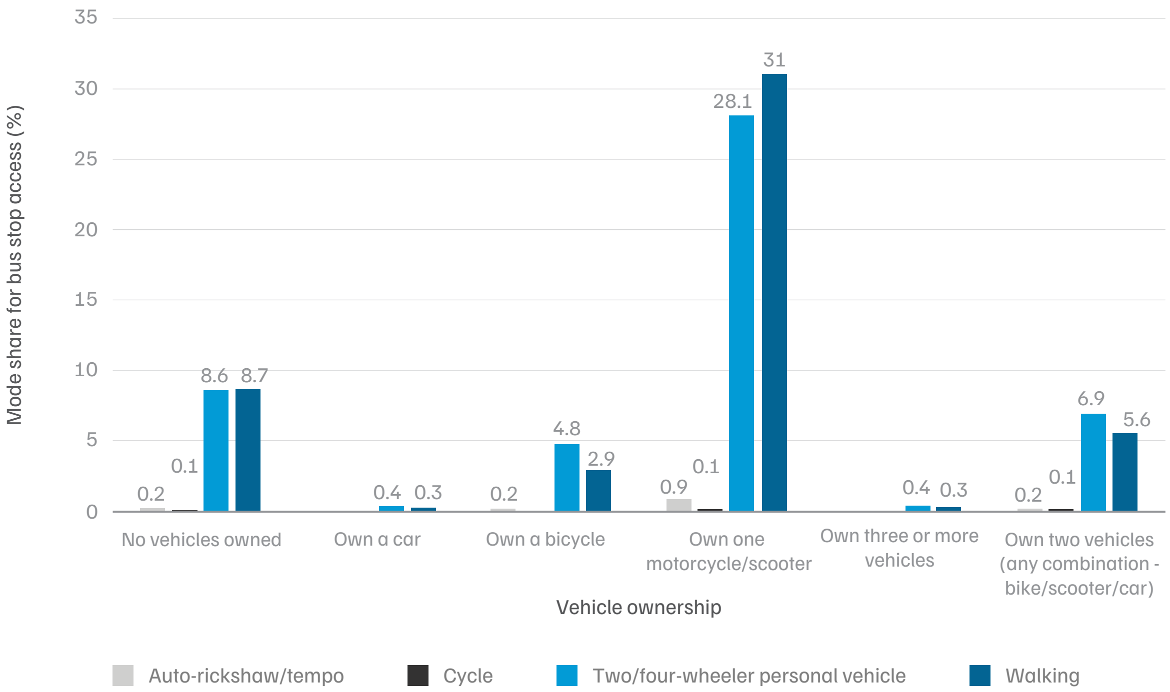
Overall, the survey sample represents around 76 per cent of Erode's residents. A summary of these details is provided in Table A2 (refer Annexure).

Figure 19. Single-vehicle households dominate the distribution of vehicle ownership amongst surveyed public transport users



Source: Field survey conducted by CEEW.

Figure 20. For households that own a motorised two-wheeler, walking and use of personal vehicles are equally common to access the nearest bus stop



Source: Field survey conducted by CEEW.

Household vehicle ownership plays a decisive role in commuters' mode of accessing bus stops

The sample indicates that vehicle ownership is heavily skewed towards households with a single 2-W (Figure 19). Around 60 per cent of households own a 2-W, while 18 per cent have no private vehicle. Car ownership remains limited, and only 8 per cent of respondents own a bicycle. Additionally, 13 per cent of households own two vehicles in some combination (2- and 4-W). Personal mobility in most households is thus largely dependent on a single 2-W, while all other categories combined form less than one-third of total vehicle ownership.

About 28 per cent of households use a 2-W, while 31 per cent walk to the nearest bus stop or boarding point (Figure 20). This indicates a flexible approach, based on distance and convenience. For some respondents, the bus stops are in greater proximity and eminently walkable, while others use a 2-W for convenience and speed, especially when the bus stop is farther away or if they need to carry goods. In households without any private vehicle, walking remains the predominant mode of accessing bus stops. Taken together, walking and 2-Ws account for around 49 per cent each, showing that both modes are dominant across households.

Travel patterns highlight longer trips and marginally higher waiting times at bus stops

Table 1. Travel time, distance, and cost profile for public transport users

Variables	All (n = 1,360)	Females (n = 689)	Males (n = 671)
	Mean (μ) ± standard deviation (σ)		
One-way travel time (minutes)	51.4 ± 47.9	52.8 ± 47.8	50 ± 47.9
One-way travel distance* (km)	30.7 ± 26.5	32.1 ± 27	29.4 ± 26
Cost per trip* (INR)	28 ± 22.2	28.9 ± 22.6	27 ± 21.8
Time to reach bus stop or boarding point (minutes)	9.9 ± 3.7	10.1 ± 3.8	9.7 ± 3.7
Waiting time (minutes)	9.5 ± 4.8	9.6 ± 4.9	9.4 ± 4.8

Source: Field survey conducted by CEEW.

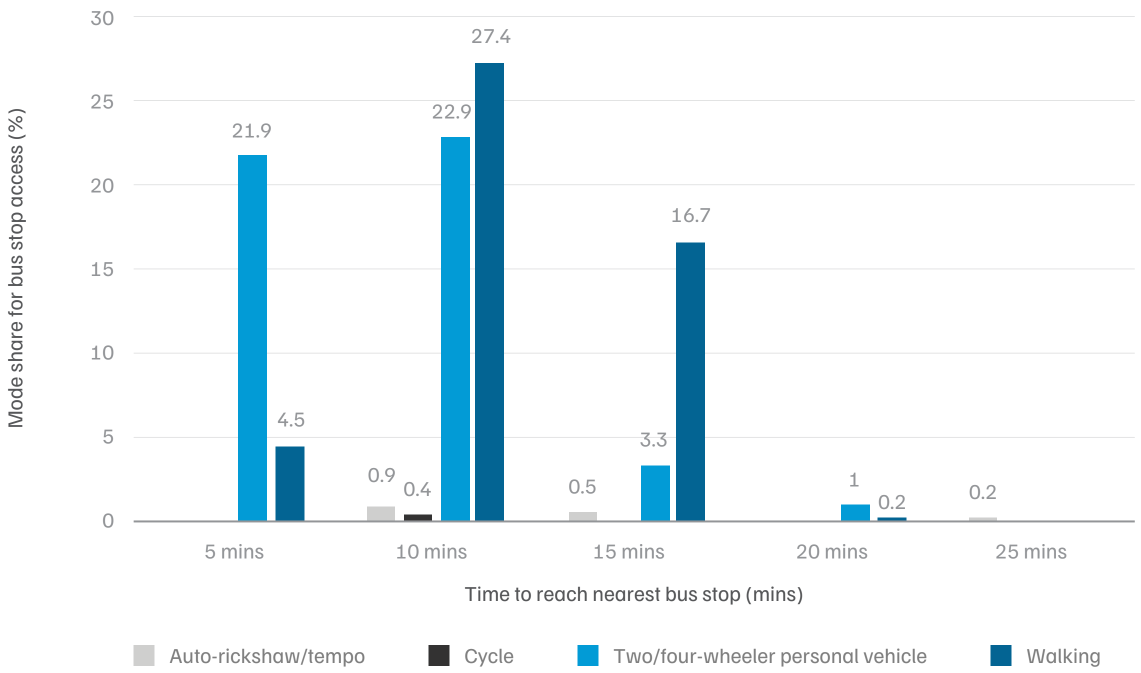
Note: *To avoid distortion of mean and standard deviation values, extreme outliers in travel distance were not considered, as these values were reported by only one or two respondents. These cases were rare and not representative of typical travel patterns on public transport in the city

The relatively longer one-way travel time (51.4 minutes on average) and an average travel distance of about 31 km suggest that many users opt for buses for medium- to long-distance trips rather than for shorter local trips (Table 1). Despite the longer trips, the average fare of INR 28 highlights the affordability of bus services even over long distances. Access and waiting times are moderate, at approximately 10 minutes each, suggesting that compared to the long main journey, the approach to the bus stop and the waiting time contribute only minor inconveniences.

Women reported a slightly higher waiting time; however, these minor differences likely reflect a combination of factors – including behavioural preferences such as selecting safer or familiar boarding points rather than structural inequalities – as well as potential structural factors such as stop locations, frequency of service, or lighting conditions.

Walking and personal vehicles dominate access to bus stops, highlighting a limited reliance on intermediate modes

Figure 21. Around 49% of users choose to walk to the nearest bus stop or boarding point



Source: Field survey conducted by CEEW.

Walking emerges as the predominant mode for moderate access times, peaking at 10 minutes (28 per cent) and continuing to be significant at 15 minutes (17 per cent), indicating a general willingness to walk up to 15 minutes to reach the nearest bus stop (Figure 21). In contrast, personal vehicles dominate for those experiencing shorter travel times (5–10 minutes) to the bus stop, though their use declines sharply beyond this range. Auto-rickshaws, tempos, and bicycles contribute minimally across all intervals, together accounting for less than 1 per cent, suggesting limited reliance on these modes. Access drops across all modes at 20 minutes, suggesting that longer access times act as a deterrent to the use of public transport.

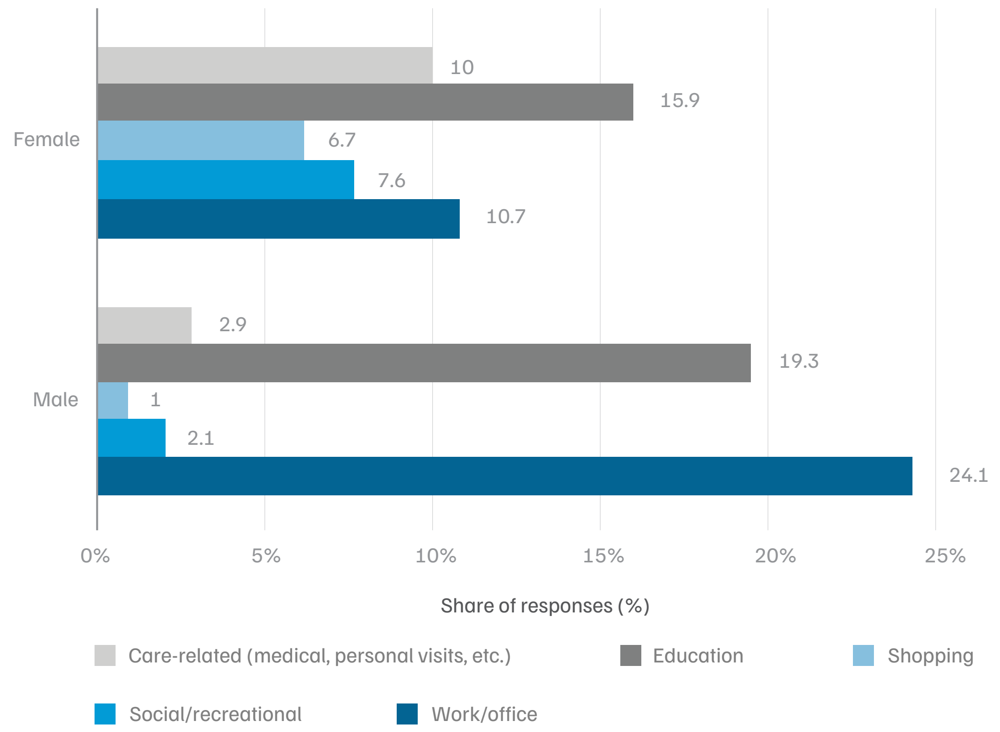
Gender differences across the options to reach the nearest bus stop are marginal. However, from our bus stop audits across 30 locations, around 36 per cent of users reported difficulty of access, highlighting consistent shortcomings in accessibility and comfort and underscoring the need for infrastructure improvements (ITDP India 2025).

Low-income households exhibit strong reliance on two-wheelers for daily mobility

Households earning less than INR 25,000 per month account for the largest share of respondents, showing a high prevalence of single 2-W ownership, reflecting its role as a functional necessity rather than a discretionary asset. When considering the number of trips users make per day, the largest share of commuters taking two trips per day, which is typically a work or educational trip, comes from households with single vehicle ownership (65 per cent), as a single vehicle might have limited flexibility in meeting the mobility needs of all members. A considerable share of households without any private vehicles make two trips per day, indicating a substantial dependence on buses for captive users, with 16 per cent relying on them for daily trips.

The relatively low proportion of users making one trip per day across all categories highlights that most bus users are routine commuters.

Figure 22. Segregation of trip purpose per gender shows more women use buses for shopping, social, and care-related travel



Source: Field survey conducted by CEEW.

Note: n = 1,360, consisting of 689 female and 671 male users

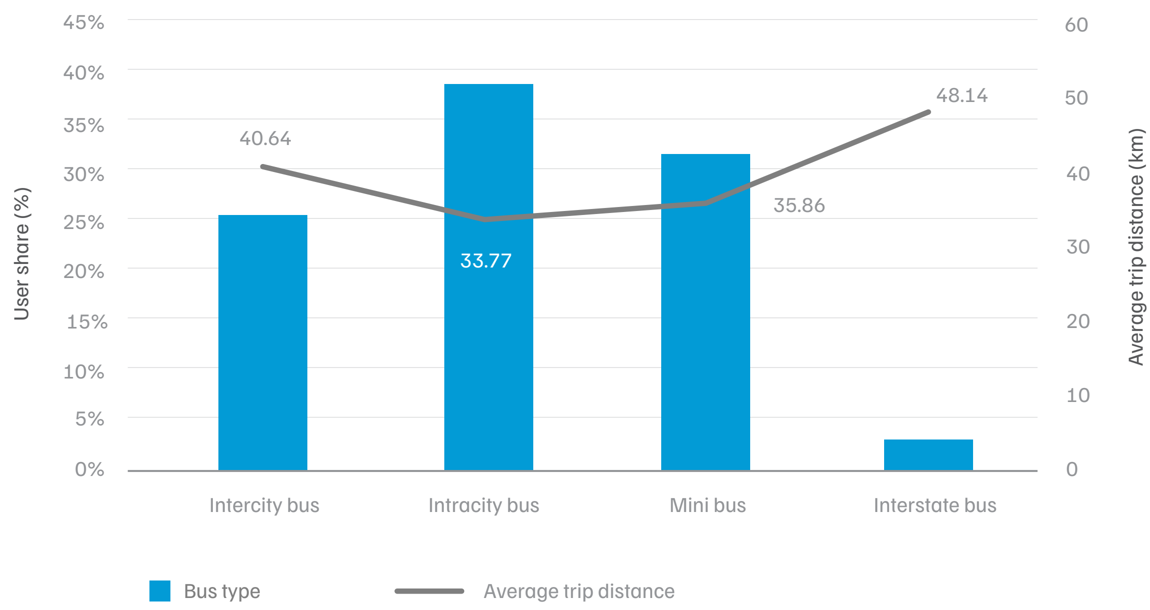
Both men and women use buses for educational and work trips; however, women also rely on buses for shopping, social, and care-related travel

Education is the leading purpose behind bus trips, being more than one-third of all trips (35 per cent), with males having slightly higher representation than females (Figure 22). Work or office trips follow closely, also making up 35 per cent of trips, where the pattern is notably gendered – nearly a quarter of male users travel for work, compared to just 11 per cent of female users.

In contrast, non-work-related trips – particularly care-related, social, and recreational trips – are predominantly undertaken by females (18 per cent), versus only 5 per cent being undertaken by males. This pattern emphasises that for women, bus travel supports a broader range of daily responsibilities and activities, extending beyond education and employment (Nikore and Ollivier 2022).

Privately operated mini buses function as a parallel service to the intra-city bus network

Figure 23. Share of bus users across different service types, along with their corresponding average one-way trip distances

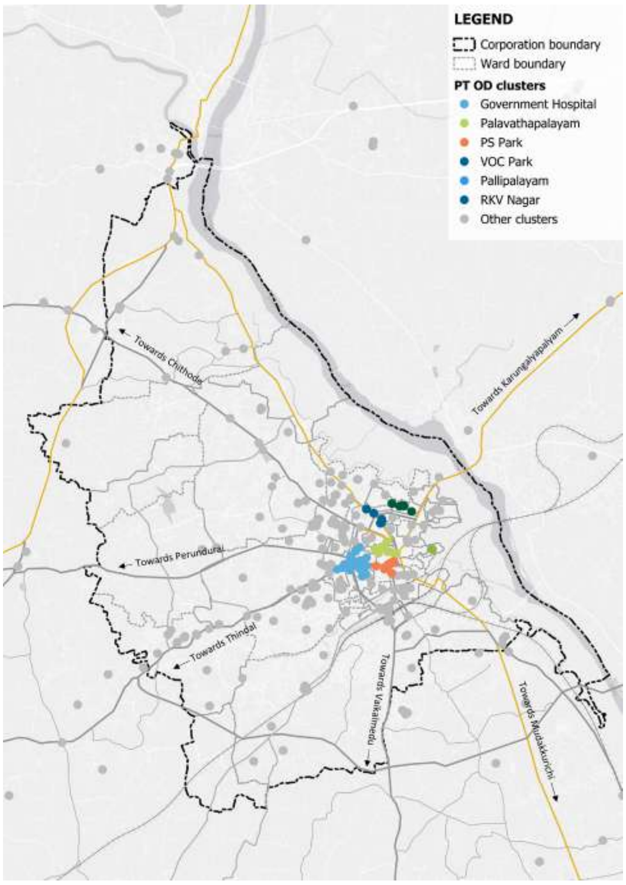


Source: Field survey conducted by CEEW.

Figure 23 indicates that the largest share of bus users (39 per cent) uses intra-city buses, but with an average one-way trip distance of 34 km, suggesting that commuters prefer buses to travel across multiple parts of the city rather than for short local trips (Figure 25). Minibuses/omnibuses, which operate as private services, display a comparable pattern, with an average distance of 36 km. This implies that private buses operate in parallel with the public bus system, serving similar corridors.

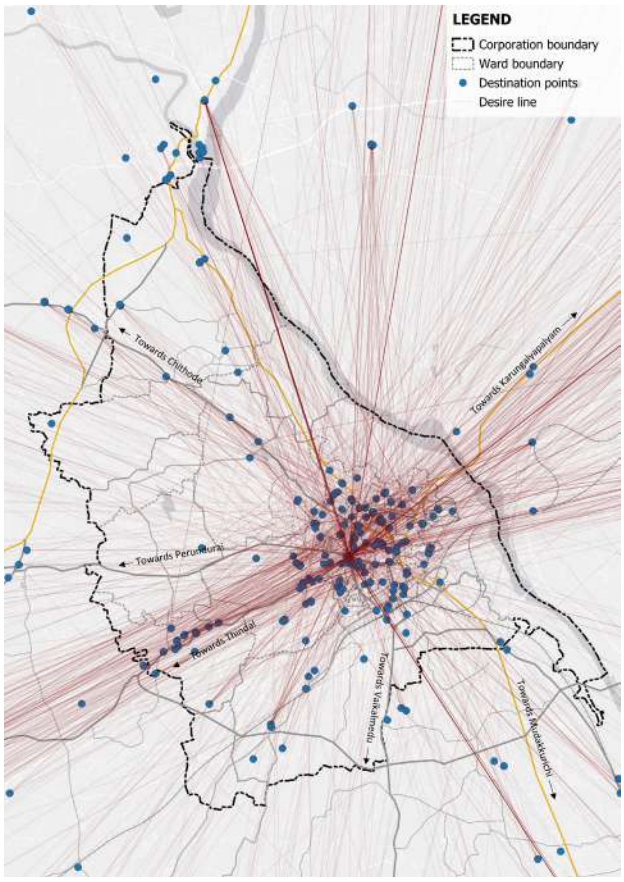
The desire line diagram (Figure 25) shows that most trips are directed towards the central wards, which hold a concentration of major commercial, institutional, and employment hubs. While trip origins are dispersed across peripheral areas such as Chithode, Perundurai, and Thindal, travellers largely funnel into the core city. Limited lateral connectivity in the peripheral wards – such as ward numbers 14 (Ellapalayam), 15 (Gangapuram), 62 (Periyasemur), 88 (Suriyampalyam), and 44 (Muthumpalayam) – further suggests that the public transport network is primarily structured to serve a core-bound demand.

Figure 24. Public transport users' origin–destination clusters



Source: Field survey conducted by CEEW.

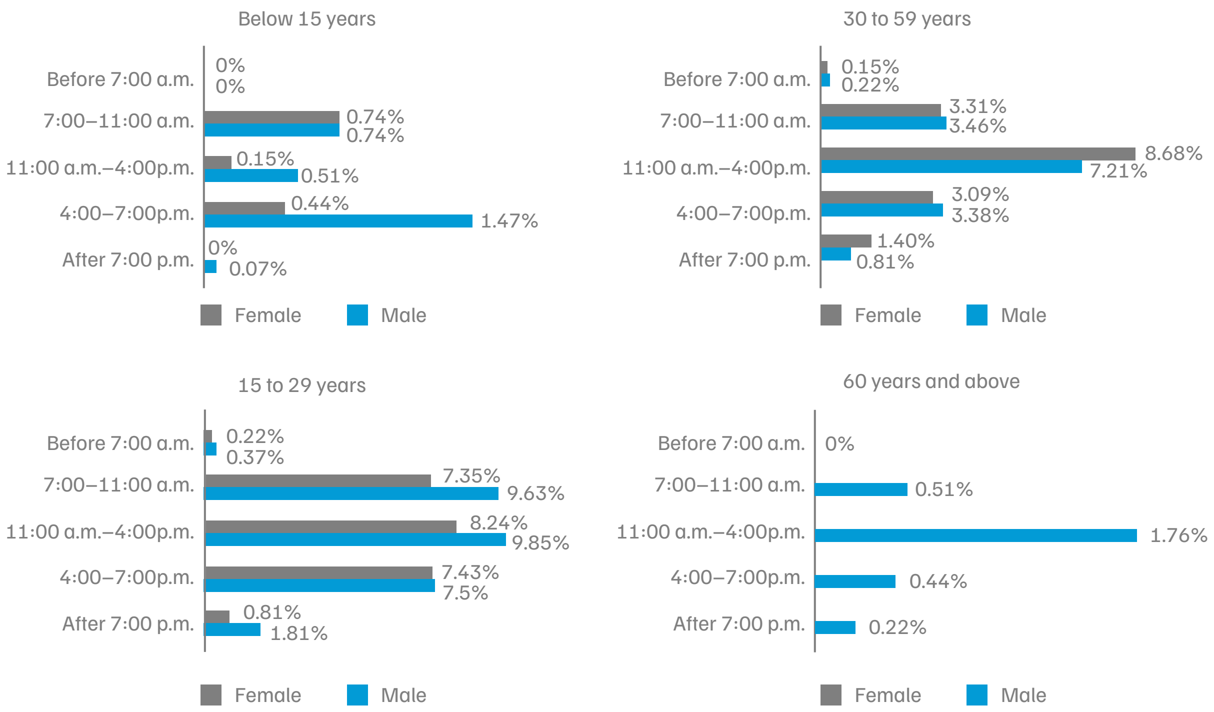
Figure 25. Public transport users' desire lines, with destination points



Source: Field survey conducted by CEEW.

Young and working-age people dominate daytime public transport usage, with minimal early-morning and late-evening trips

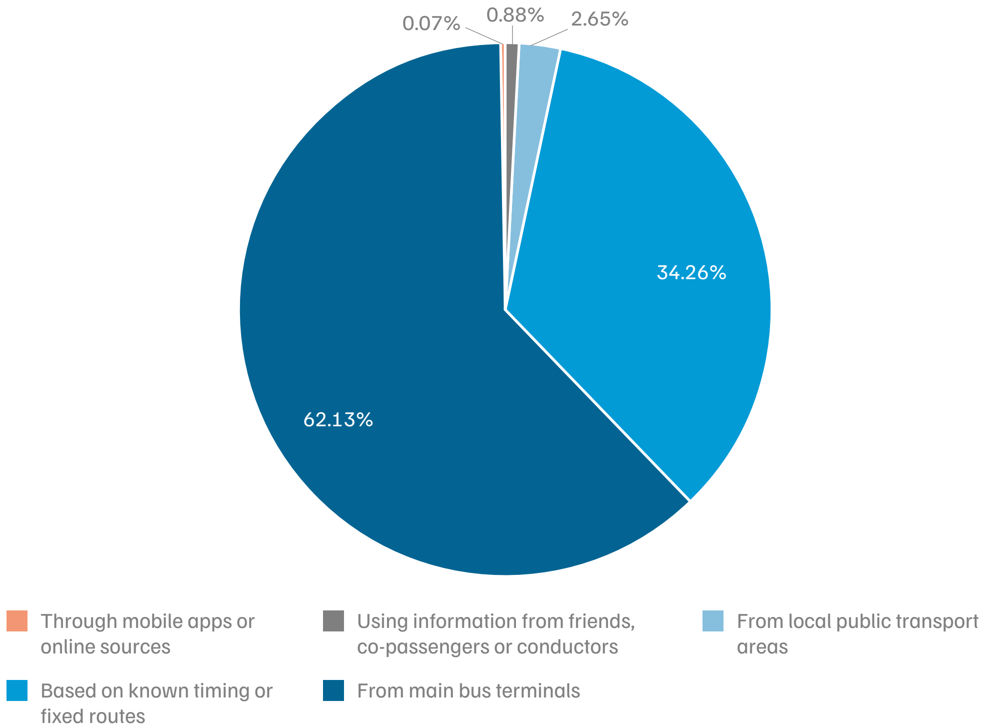
Figure 26. A majority of the users travel during the daytime



Source: Field survey conducted by CEEW.

Our survey showed that the majority of trips take place during the day, with the 11:00 a.m. to 4:00 p.m. period recording the highest participation (42 per cent) across all age groups and genders (Figure 26). The 15–29 years and 30–59 years age groups dominated trips throughout the day, reflecting the influence of work, education, and midday activities on travel needs. Very few trips occurred during the early morning (before 7:00 a.m.) and late evening (after 7:00 p.m.), likely reflecting limited off-peak travel needs. Older adults (60 years and above) showed moderate activity, primarily during daytime periods, while children below 15 years contributed minimally across the day. Collectively, we saw a strong concentration of travel during standard daytime hours, driven mainly by young and working-age adults.

Figure 27. About 62% of commuters depend overwhelmingly on the main bus terminals and fixed schedules, rather than using digital resources to locate and access buses



Source: Field survey conducted by CEEW.

A large majority (62 per cent) rely on main bus terminals, with both women (30 per cent) and men (33 per cent) showing similar high reliance on the bus station to get a bus (Figure 27). Another significant share of users relies on fixed or known routes, reflecting a system where predictable, routine-based travel dominates.

Public transport experience: Motive, ratings, challenges, and improvements

This section presents users' reasons for choosing public transport, their service ratings, key challenges faced, and priority areas for improvement.

Convenience and accessibility are the dominant drivers for choosing public transport

As depicted in Table A3 (refer to the Annexure), the availability of buses is the primary reason for choosing public transport (21 per cent), followed by lower cost than other modes (14 per cent) and faster travel time (13 per cent), suggesting the importance of affordability and efficiency strongly influences passengers' mode choice.

Gender differences are modest: Women place slightly greater emphasis on better connectivity to key locations and ease of availability, while men show a marginally higher preference for lower cost (15 per cent) and faster travel time. Only a small share of users relies on buses due to a lack of personal vehicles or the absence of suitable alternatives, suggesting that most commuters choose public transport by preference rather than necessity. Practical factors such as luggage space (6 per cent) and comfort during long trips (4 per cent) motivate only a small segment of users, but their satisfaction ratings remain slightly above average.

Table 2. Mean user ratings of their perceptions of public transport services do not vary significantly between the sexes

Variables	All (n = 1,360)	Females (n = 689)	Males (n = 671)
	Mean (μ) ± standard deviation (σ)		
Affordability	5.5 ± 2.7	5.5 ± 2.8	5.6 ± 2.6
Availability	5.5 ± 2.7	5.5 ± 2.8	5.5 ± 2.7
Comfort	5.6 ± 2.7	5.6 ± 2.7	5.6 ± 2.7
Luggage space	5.7 ± 2.7	5.8 ± 2.7	5.6 ± 2.7
Safety (during travel/at bus stops)	5.6 ± 2.7	5.6 ± 2.8	5.5 ± 2.6
Schedule reliability	5.6 ± 2.7	5.6 ± 2.8	5.5 ± 2.7
Seating space	5.5 ± 2.7	5.5 ± 2.8	5.5 ± 2.7
Service in bad weather	5.5 ± 2.7	5.5 ± 2.8	5.5 ± 2.6
Travel time	5.6 ± 2.7	5.6 ± 2.8	5.5 ± 2.7
Waiting time	5.7 ± 2.7	5.6 ± 2.7	5.8 ± 2.7

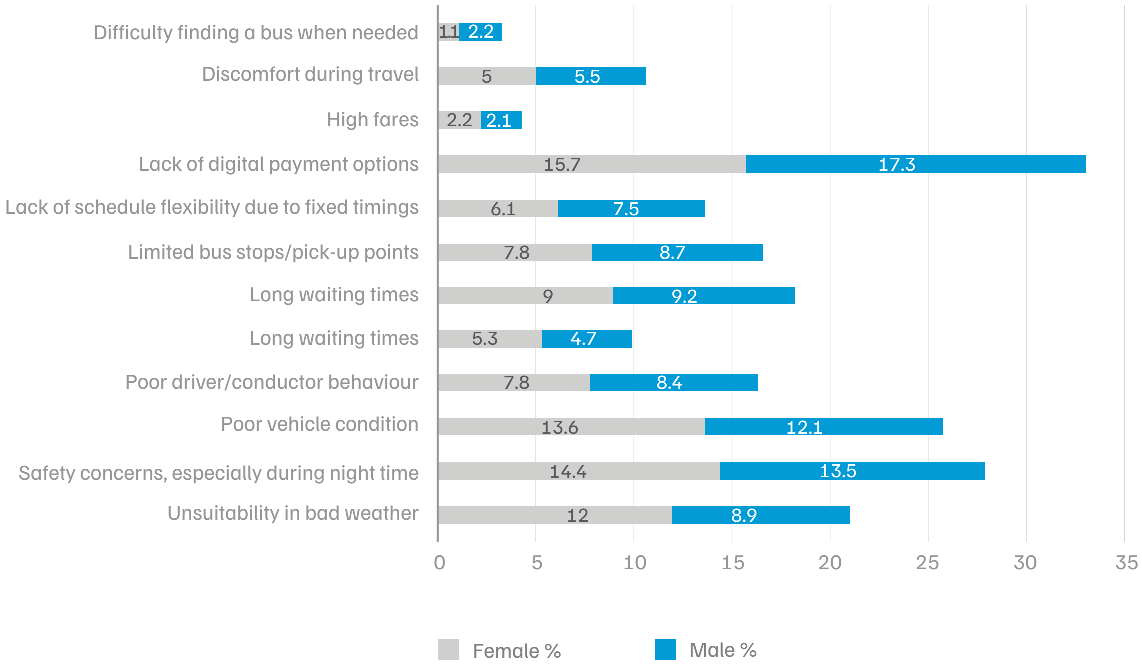
Source: Field survey conducted by CEEW.

Note: Scores on a scale of 1–10, 10 being the highest rating

The mean user ratings of public transport services show minimal variation between males and females, highlighting similar perceptions of public transport quality across user groups (Table 2). Women assigned higher ratings to comfort, safety, and reliable schedules, whereas men provided slightly higher ratings for affordability and shorter waiting times. An analysis of variance (ANOVA) test showed no statistically significant gender-specific differences across service attributes ($p > 0.05$), however.

Accessibility, challenges, and equity

Figure 28. Lack of digital payment options, night-time safety concerns, followed by poor vehicle conditions emerged as the key public transport challenges across genders.



Source: Field survey conducted by CEEW.

The major challenges reported by users related more to operational limitations and quality of service than to availability or affordability of bus services. The most frequently mentioned issue was the lack of digital payment options (17 per cent), suggesting a growing gap between user expectations and the system's current level of technological integration (Figure 28).

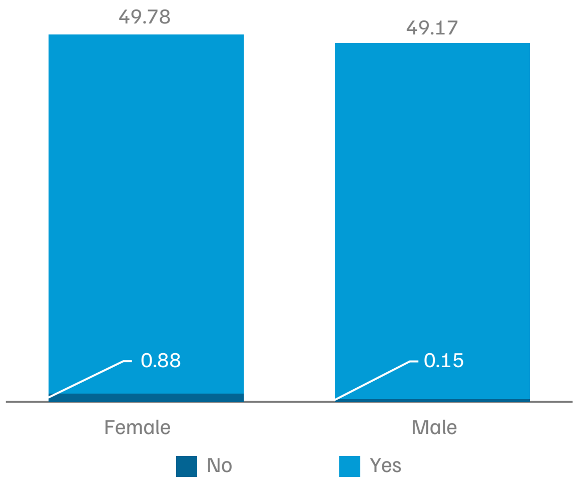
Concerns about poor vehicle condition and safety during night travel (14 per cent), both of which highlight shortcomings in service quality, were the next in line. Notably, around 20 per cent of the bus fleet is over 10 years old, which likely contributes to the first of these issues. This concern was also reflected in ITDP India's (2025) assessment, where around 34 per cent of respondents indicated the need for a new bus fleet with improved suspension.

Operational constraints such as limited route coverage, insufficient bus stops or pick-up points, and lack of flexibility in schedules indicated that the rigidity of the current network affects a sizable share of commuters. Earlier findings (Figure 25) had highlighted that bus stops are largely concentrated along major roads and within the core city, reinforcing access challenges. It was also observed that high fares (2 per cent) and difficulty in finding a bus (2 per cent) were amongst the least-reported issues. This aligns with our findings that availability and cost are not major deterrents for most users.

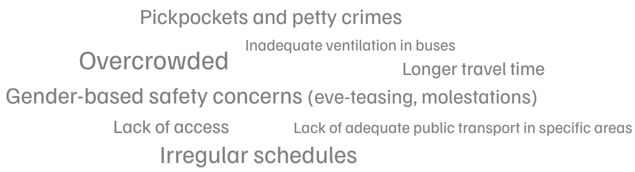
With willingness to use public transport at night strong across genders, only a small group of users cited safety risks and service shortcomings

Figure 29. The gender difference in willingness to take public transport at night was minimal

(a) Share of responses (yes/no) by gender



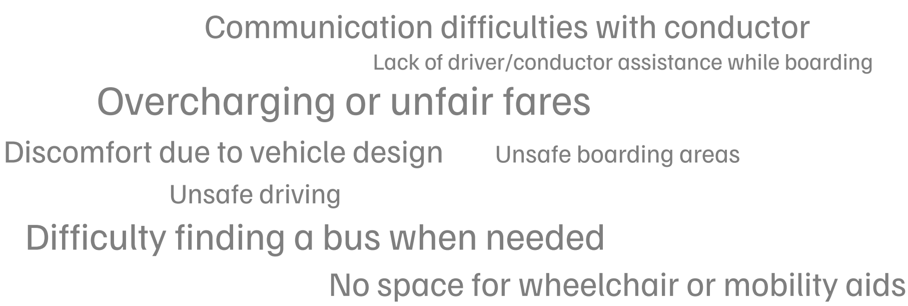
(b) Overcrowding was the biggest reasons to avoid public transport at night



Source: Field survey conducted by CEEW.

Both women and men showed a strong willingness to use public transport at night, with nearly half of each group expressing readiness to travel (Figure 29a). Only a very small share reported reluctance (0.8 per cent) amongst women (though more than the 0.15 per cent amongst men), suggesting while night-time bus travel is broadly acceptable to most users, concerns around its use remain. The willingness to use buses indicates user reliance on public transport when adequate services and safe access conditions are available.

Figure 30. Persons with disabilities most often cited lack of access and unfair fares as reasons to avoid public transport

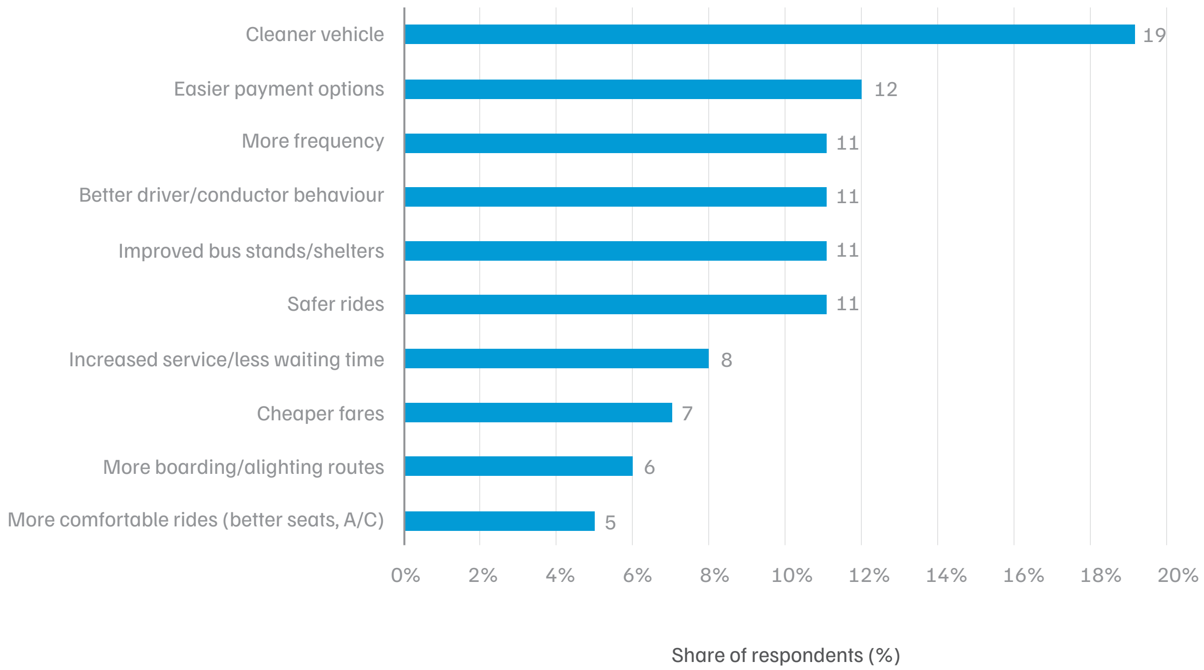


Source: Field survey conducted by CEEW.

Amongst the 79 respondents identified as PwDs (based on functional difficulties), perceptions of accessibility of Erode's public transport system were almost evenly split, suggesting that while certain features support accessibility (such as reserved seating and staff assistance), a substantial share of users continue to face access barriers. The reasons provided included a combination of physical, operational, and behavioural challenges (Figure 30), highlighting both the design limitations of the system and the quality of services.

Cleanliness is the topmost improvement demanded, followed by easier payment options

Figure 31. Cleaner buses, easier payment options, and better service quality were the top user-identified improvements

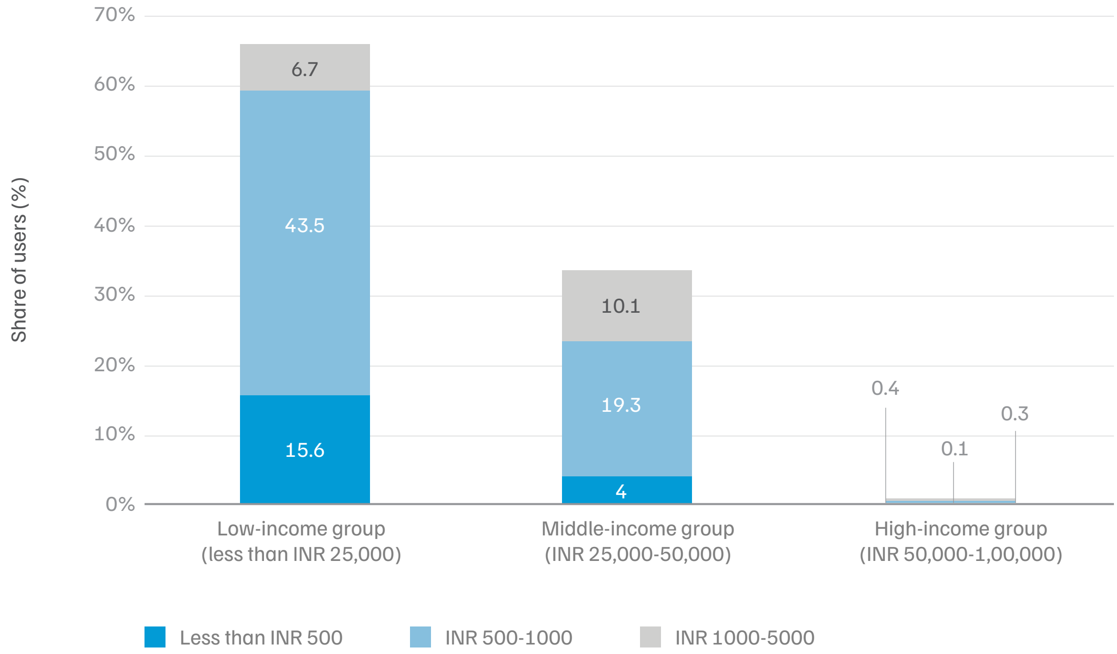


Source: Field survey conducted by CEEW.

The improvement priorities (Figure 31) highlighted concerns with service quality and safety. The most frequently stated need was for cleaner buses (19 per cent), indicating that maintenance standards are a major concern for users, reinforcing earlier user-reported challenges (Figure 28) related to poor vehicle condition. This was followed by a preference for easier payment options, reiterating the earlier response highlighting the lack of digital payment facilities. A cluster of other improvements were cited – including higher service frequency, better driver/conductor behaviour, improved bus shelters, and safer rides (each at 11 per cent) – reflecting the need for critical improvements in both operational efficiency and user experience.

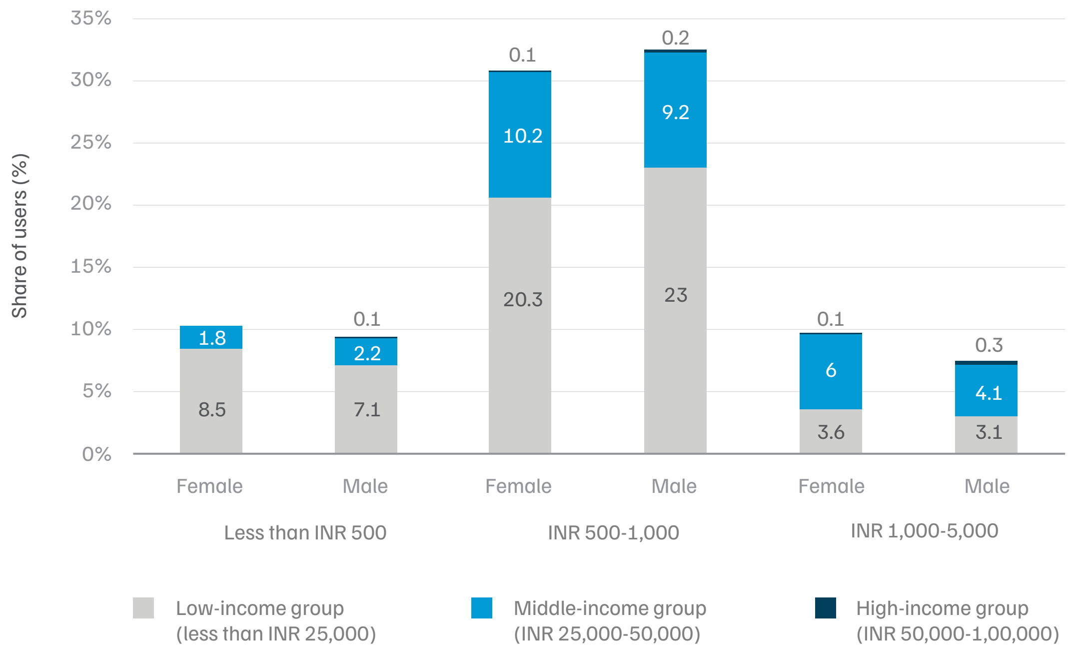
Younger respondents and those from lower-income households incur moderate expenditure (INR 500–1,000) on bus travel

Figure 32. Monthly travel expenditure by household income shows mostly moderate spending across all groups



Source: Field survey conducted by CEEW.

Figure 33. Distribution of monthly bus expenditure across gender and income categories showed scant difference between genders



Source: Field survey conducted by CEEW.

Public transport is widely viewed as an affordable mode of travel, particularly amongst the lower-income groups, who rely on it for their everyday travel. Low-income households (less than INR 25,000 per month) form the largest share (44 per cent) of public transport users, spending INR 500–1,000 monthly. Most middle-income households (INR 25,000–50,000 per month) fall within the moderate transport expenditure range, reflecting similar travel cost patterns across income brackets.

In the lowest-spending category (less than INR 500), women have slightly higher (8.5 per cent) representation, which could reflect shorter travel distances, fewer paid trips, or other mobility constraints (Figure 33). The group spending INR 500–1,000 group is the largest, dominated by men (23 per cent) from the lower income group, showing regular commutes incur a moderate monthly travel cost.

Respondents aged 15–29 years formed the largest share of users (36 per cent) in the INR 500–1,000 monthly spending group, revealing that younger commuters are most likely to incur moderate and routine bus travel expenses. On average, the respondents spent INR 28 per trip across all bus services (Table 1). With nearly 89 per cent of the respondents making two trips per day, their daily travel expenditure amounted to INR 56.

The willingness to pay for improved public transport services was extremely low amongst respondents, with 92 per cent unwilling to pay anything extra. Only a small minority (7 per cent) were open to paying INR 1–5 more, and perhaps they were primarily from lower-income households; however, willingness to spend more dropped sharply for higher amounts.

Perceptions and willingness to shift towards electric PT

This subsection examines users' perceptions of electric PT and their willingness to shift from existing modes to electric PT services.

Table 3. Mean user ratings of electric bus services largely revealed positive perceptions

Variables	All (n = 1,360)	Females (n = 689)	Males (n = 671)
	Mean (μ) ± standard deviation (σ)		
E-buses are cheaper	5.6 ± 2.2	5.7 ± 2.1	5.5 ± 2.2
E-buses are comfortable	5.6 ± 2.1	5.6 ± 2.1	5.5 ± 2.1
E-buses are quieter	6.1 ± 1.7	6.2 ± 1.7	6.1 ± 1.7
E-buses are safer	5.7 ± 2.1	5.7 ± 2.1	5.6 ± 2.1
E-buses are schedule adherent	5.6 ± 2.1	5.6 ± 2.1	5.5 ± 2.2
E-buses will improve Erode air quality	6.1 ± 1.8	6.1 ± 1.8	6.2 ± 1.8
E-buses will have better behaved driver and conductor	5.6 ± 2.2	5.7 ± 2.3	5.5 ± 2.2
E-buses will improve Erode's image/position as a cleaner city	6.1 ± 1.9	6 ± 1.9	6.2 ± 1.9

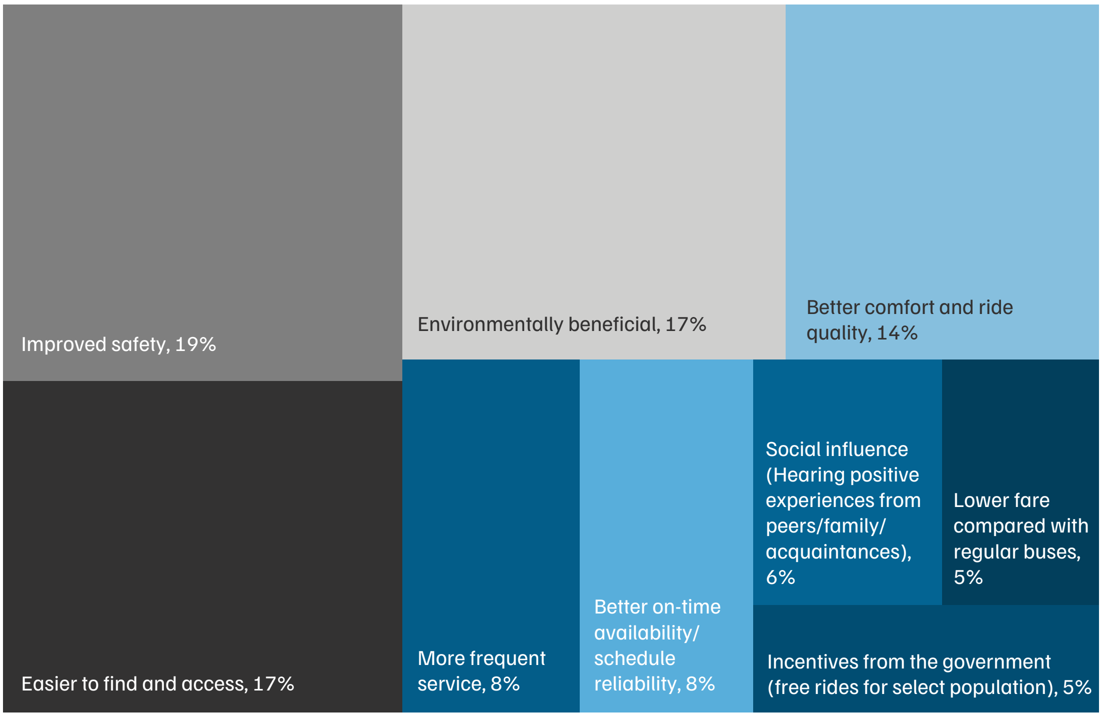
Source: Field survey conducted by CEEW.

Note: On a scale of 1–10, 10 being the highest

User perceptions of electric buses were consistently positive across all evaluated service attributes, indicating a generally favourable but moderately strong level of confidence in e-bus performance. The highest-rated advantages were noise reduction, environmental benefits, and the city's image (Table 3). Safety and comfort perceptions also scored higher, showing that respondents expect electric buses will provide a smoother, safer ride than existing services.

An ANOVA test revealed no statistically significant differences in how different user groups perceived the potential benefits of e-buses, with all *p*-values above 0.05. This also suggests that a shift to e-buses is likely to be well received across diverse user groups.

Figure 34. Motivators for choosing e-buses were led by safety, followed by environmental benefits, accessibility, and comfort/ride quality



Source: Field survey conducted by CEEW.

Users are mainly motivated to choose e-buses because they expect greater safety, accessibility, comfort, and environmental benefits. The most frequently cited factor was improved safety (19 per cent), indicating that respondents strongly associate electric buses with a safer travel experience (Figure 34). A smaller share of the respondents was motivated by incentives and lower fares, indicating that while affordability and government benefits are appreciated, they are not the primary drivers of preference.

5.2 Discussion

The public transport system plays a key role in shaping daily mobility patterns in Erode, supporting a wide range of users who depend on buses for work, education, and other purposes. Our survey provided crucial insights into how users interact with the existing bus network, revealing both its strengths and the constraints that shape their overall travel experience.

Across demographic groups, public transport emerges as a critical mobility resource, particularly for young and low-income households that rely on the system for diurnal peak-time travel. However, despite the presence of a large bus fleet and high utilisation rates, the system is unable to meet the city's diverse and growing mobility needs.

Our findings demonstrate that buses remain the primary mode for medium to long-distance travel, especially amongst captive users. However, the geographic concentration of bus stops and the absence of a dedicated city bus service leave many peripheral neighbourhoods underserved. Desire line mapping of a travel funnel towards the city centre further shows the core is the dominant attractor, whereas cross movements between the peripheral areas remain limited.

> Service quality, safety, and accessibility emerged as shared concerns across different public transport user groups.

Gender-based disparities in user experience are not evident, suggesting that the system delivers broadly equal access, though not necessarily high-quality access, as service ratings hover around the midpoint. The latter shows that comfort, reliability, and other attributes do not consistently meet user expectations.

In terms of methods used to locate buses, more than 62 per cent of users rely on access to bus terminals or knowledge of fixed routes. Meanwhile, the lack of digital ticketing features amongst the top challenges reported.

Since no user group reports resistance to e-buses, electrification presents an opportunity to reposition Erode's public transport system as cleaner and more user-friendly, provided it is accompanied by other enhancements to service quality. This chapter brings together these insights to analyse how effectively the current system meets user expectations and to identify the improvements needed to strengthen the PT system in Erode.

Spatial and service design constraints shape the travel patterns of respondents, with the system being geared towards long-distance trips rather than local movement

The emerging trip patterns suggest that Erode's public transport network continues to function primarily as a long-distance system rather than one that supports short, intra-city trips. Only 16 per cent of the total fleet operates as city buses, creating a mismatch between travel demand and service availability. The spatial distribution of bus stops, along with the desire line mapping and OD clusters, show that most of the movements are towards the central wards. Limited lateral movement between peripheral areas further highlights gaps in connectivity, suggesting the need to introduce additional bus stops to strengthen lateral linkages across the city.

As a result, many bus users undertake only/mostly longer trips, averaging around 31 km one-way, with a travel time of over 50 minutes, indicating that buses are primarily used for medium to long-distance mobility. This reliance on public transport for longer trips is substantiated by ITDP India's (2025) assessment, which reported that nearly 50 per cent of respondents use public transport for medium to long-distance trips.

Private bus services also ply along the same corridors, reinforcing the long-distance travel pattern. Tracking and integrating these services within the TNSTC's planning and monitoring systems could produce better route coverage, improved co-ordination, and efficient fleet size management.

Access and wait times remain a challenge, while reliance on walking and two-wheelers to reach bus stops reveals gaps in last-mile connectivity

While distances to bus stops generally fall within a manageable range – around 43.5 per cent of the city's population is within a five-minute walking distance of a bus stop (ITDP India 2025) – walking and 2-Ws account for nearly 49 per cent each of the access modes. This underscores the need for improved footpath infrastructure and safer pedestrian environments to support walking as the primary access mode. The limited use of intermediate modes such as auto-rickshaws or other shared vehicles indicates that first- and last -mile connectivity are lacking.

The average waiting time–of around 10 minutes, combined with access time–increases the total travel time significantly. For a typical user, access and waiting time account for 20 minutes and contribute to almost one-third of their total travel time.

Service quality perceptions are broadly consistent across genders, reflecting shared experiences

Across all user groups, the most common concerns related to poor vehicle condition, lack of digital payment options, and limited route coverage. In addition, issues such as a lack of schedule flexibility, limited bus stops, and limited route coverage also emerge as barriers. These challenges suggest that while availability and affordability are not major barriers, service quality and reliability continue to shape how people experience and perceive the system.

Navigation and access to bus stops are largely guided by the users' familiarity with the public transport system, reflecting the limited availability of adequate information

A large share of users relies on the main bus stations to board, with a similar level of dependence observed amongst both women and men. In parallel, many respondents also rely on fixed or familiar routes, indicating that travel behaviour is shaped by predictability and routine rather than dynamic or real-time information. Findings from ITDP India's (2025) assessment highlighted the limited availability of basic identification at bus stops, such as stop names, route maps, bus numbers, and real-time information. Together, these findings suggest that the Erode's public transport system remains difficult to navigate without prior knowledge, where gaps in basic bus stop information constrain ease of access.

Users express strong support for e-buses, largely due to perceptions of greater safety, comfort, and environmental benefits

Survey responses indicated a positive outlook towards electric buses, often linking them with reduced noise, improved air quality, and an enhanced image for the city. Safety and comfort stand out as the most influential factors, suggesting that people place a higher value on qualitative upgrades, particularly in a context where over 20 per cent of the existing bus fleet is over 10 years old. However, willingness to pay for improvements is extremely low. Even though users prioritise improvements such as cleaner vehicles and easier payment options, around 92 per cent of the users reported unwillingness to pay more; amongst those willing to contribute, the acceptable increase for better services is limited to about INR 5.

5.3 Recommendations

To enhance the efficiency, accessibility and user experience of public transport in Erode, a set of targeted recommendations has been identified based on existing service gaps and emerging mobility needs. These recommendations focus on improving service quality, strengthening operational systems, enhancing passenger convenience and supporting long-term sustainability through digital integration and institutional improvements.

Improving service quality and digital integration

Improving Erode's public transport requires strengthening service quality and operational efficiency. This includes the phased introduction of newer buses with improved seating, ventilation, and dedicated luggage space, alongside regular maintenance cycles to enhance vehicle condition.

A visible QR code–based compliant redressal mechanism should be installed at bus stops and inside buses to address issues related to driver or conductor behaviour.

Digital integration should be prioritised through the introduction of cashless ticketing options, such as UPI- or QR-based payments, supported by portable ticketing devices for conductors in government-run buses. Real-time passenger information systems linked to a mobile application should provide live tracking, expected arrival times, and route information.

These systems should be supported by digital display boards and multilingual signage at major stops and terminals. Drivers and conductors should be able to access regular training programmes, covering safety protocols and assistance for PwDs.

Strengthen first and last mile connectivity to buses and pedestrian infrastructure

Improving access to bus services requires stronger integration with intermediate public transport (IOT) and better pedestrian infrastructure. Auto-rickshaws and other modes of IPT should be formalised as first- and last-mile connectors, with designated pick-up and drop-off zones near bus stops to enable seamless transfers.

Pedestrian infrastructure around bus stops must be upgraded to establish continuous obstruction-free footpaths, safe and well-marked crossings, adequate lighting, and universal accessibility features for the safe and access for all users.

Strengthening regulation and integration of private bus services

Better coordination between public and private bus operators is necessary to improve overall system efficiency and reduce service overlaps. Establishing a centralised database of private bus routes, schedules, and fleet details can support better route rationalisation and help minimise service overlaps.

A mechanism to monitor fleet age should also be introduced, along with phased restrictions on buses exceeding defined age limits, to improve safety, reliability, and environmental performance.

Phased service upgrades and financial sustainability

Service improvements should be introduced in a phased manner to ensure financial viability and public acceptance. Pilot initiatives such as cleaner vehicles, improved shelters and enhanced lighting at bus stops can be initiated. User response to modest fare revisions may be assessed before scaling up improvements across the network.

Strategic deployment of electric buses

Electric bus deployment should strategically prioritise high-demand corridors to maximise operational impact. Priority should be given to long-distance, intra-city routes connecting peripheral areas such as Perundurai, Chithode, and Thindal. The transition should be supported by mandatory training on EV safety protocols and inclusive service delivery practices.

> The transition to e-buses requires not just electrification, but improved safety, accessibility, and passenger experience.

Mainstreaming gender quality, disability, and social inclusion (GEDSI)

All improvements to Erode's public transport should be guided by concepts of universal design and inclusive mobility. Buses and bus stops should incorporate features such as low floors and/or boarding aids, audio announcements, tactile guidance, and accessible infrastructure at major terminals to improve ease of access. Night-time safety should be enhanced through adequate lighting, CCTV surveillance, panic buttons, and emergency response systems at major bus stops to support safer and more secure travel conditions for all users.

Passenger boarding a TNSTC bus from an informal roadside stop.

Organised IPT parking and waiting areas can improve passenger access and reduce roadside congestion.

6. Intermediate public transport: The adaptive connectivity layer

Erode's mobility ecosystem is heavily shaped by IPT, primarily shared autos, which currently serve as the city's de facto public transport system in the absence of a formal intra-city bus network. In the city, IPT primarily consists of auto-rickshaws and tempos operating across the local planning area, together forming an estimated fleet of nearly 5,000 vehicles (TNUIFSL 2015). These services provide short-distance, flexible mobility that facilitates first- and last-mile connectivity beyond buses and personal vehicles, making IPT one of the most visible transport options available to residents. This dependence showcases the need for systematic assessment of user behaviours, travel patterns, waiting and access times, safety perceptions, and affordability constraints.

The importance of IPT today and its growing role in future mobility planning

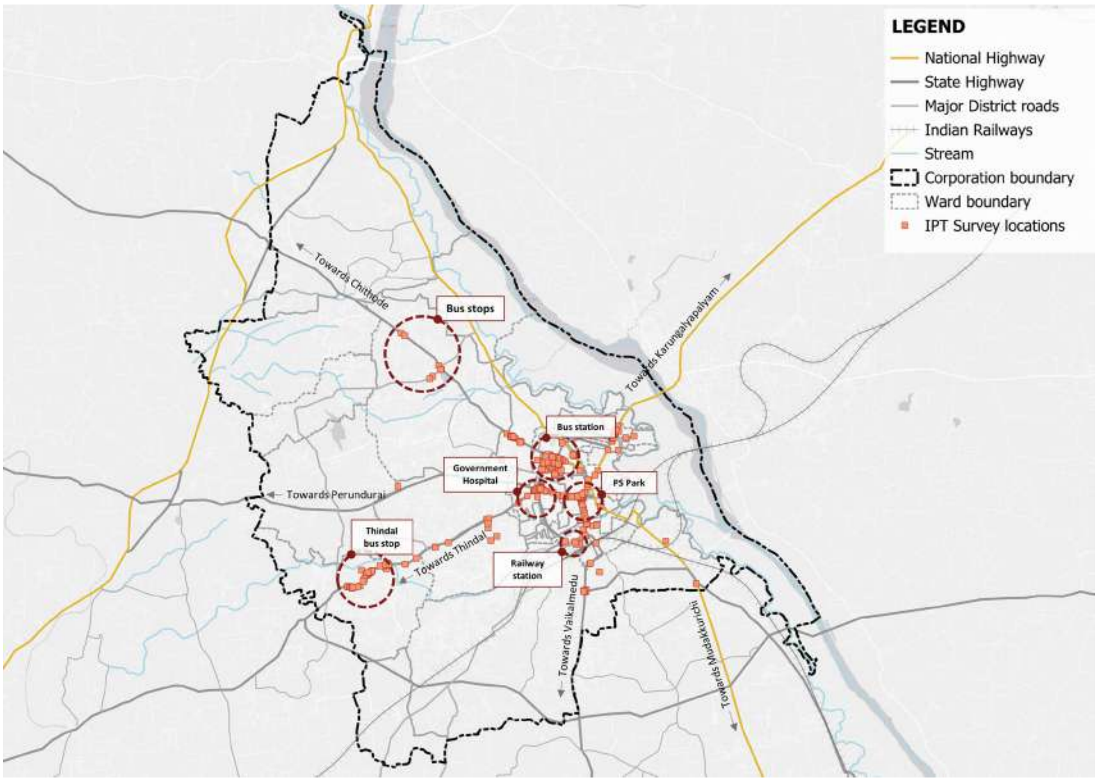
IPT matters because it fills accessibility gaps that neither private vehicles nor fixed-route buses consistently serve. With 30–35 per cent of daily trips in Erode relying on public and non-motorised modes of transport, IPT is a crucial bridge, offering door-to-door and first- and last-mile connectivity across both the dense urban core and peri-urban localities (TNUIFSL 2015; CEEW and ITDP India 2025). For households without private vehicles, IPT remains the primary means of accessing work, education, healthcare, and markets. Recent mobility planning efforts have increasingly recognised IPT as part of a transition to a more equitable, inclusive, and sustainable transport system. Stakeholder consultations under the *UK Partnering for Accelerated Climate Transitions (PACT)* programme have highlighted the potential of shared autos and minibuses to strengthen connectivity and ease congestion while ensuring that mobility solutions remain affordable and socially responsive (CEEW and ITDP India 2025). These directions align with the commitments laid out in India's *Long-Term Low-Emission Development Strategy* (MoEFCC 2022) and the *Tamil Nadu State Action Plan on Climate Change 2.0 (TNSCCC 2.0)*, both of which emphasise low-emission, people-centred transport systems (TNSCCC 2021).

To develop an evidence-driven position on how IPT currently functions in the city, the Council on Energy, Environment and Water (CEEW) has – as part of the UK PACT consortium – conducted multiple primary surveys over the past few months. In the IPT user survey (CEEW 2025), respondents were asked about their preferred modes of transport, frequency of usage, typical travel and waiting times, access conditions, trip purposes, and origin–destination (OD) patterns, including first- and last-mile connectivity. We also asked users to rate key IPT service attributes – such as availability, safety, comfort, affordability, and reliability (on a scale of 1 to 10) – to identify service strengths and gaps. We also sought their reports on the barriers they faced, the improvements they would prefer, their reasons for choosing IPT, and their views on electric autos (e-autos), as well as the latter's affordability and their own willingness to pay more for these identified improvements and shifts to more sustainable modes of transport.

Simultaneously, we undertook an IPT operators' survey to examine vehicle characteristics and operational patterns, including work hours, idle time, distance travelled, number of trips, empty trips, and maintenance. We also asked the operators about the main barriers affecting their work and the improvements they would prioritise to achieve income stability and better working conditions. Further, we explored the drivers' readiness to transition to e-autos. We gathered operators' ratings (on a scale of 1 to 10) of the performance and features of an electric three-wheeler (3-W), as well as their motivations and willingness to shift to e-autos and the barriers they anticipated.

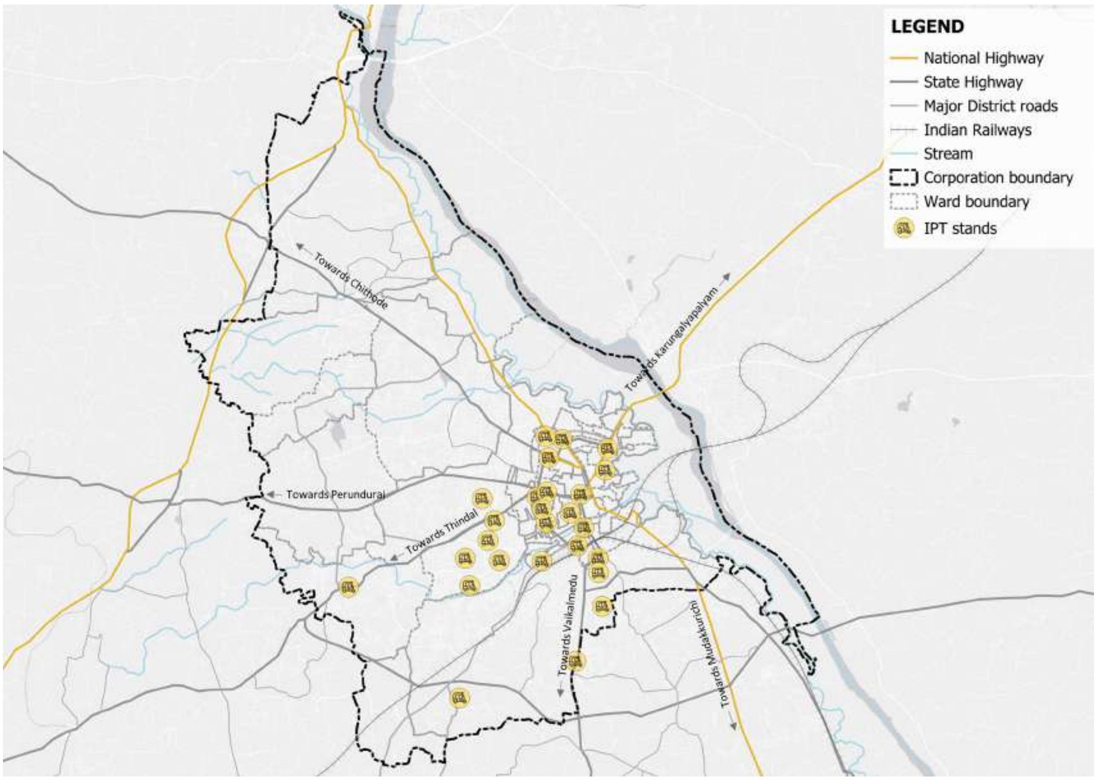
Overall, the surveys examined travel demand patterns, user characteristics, operational realities, and gender-specific mobility concerns amongst both IPT passengers and operators. The IPT users' survey covered 1,193 respondents across the city. The spatial distribution of survey locations is shown in Figure 35. Similarly, the IPT operators' survey captured operational conditions, earnings, and working patterns across major IPT stands, illustrated in Figure 36.

Figure 35. Intermediate public transport (IPT) user survey locations within Erode city



Source: Field survey conducted by CEEW.

Figure 36. Major IPT stands



Source: Field survey conducted by CEEW.

6.1 Intermediate public transport (IPT) user: Findings

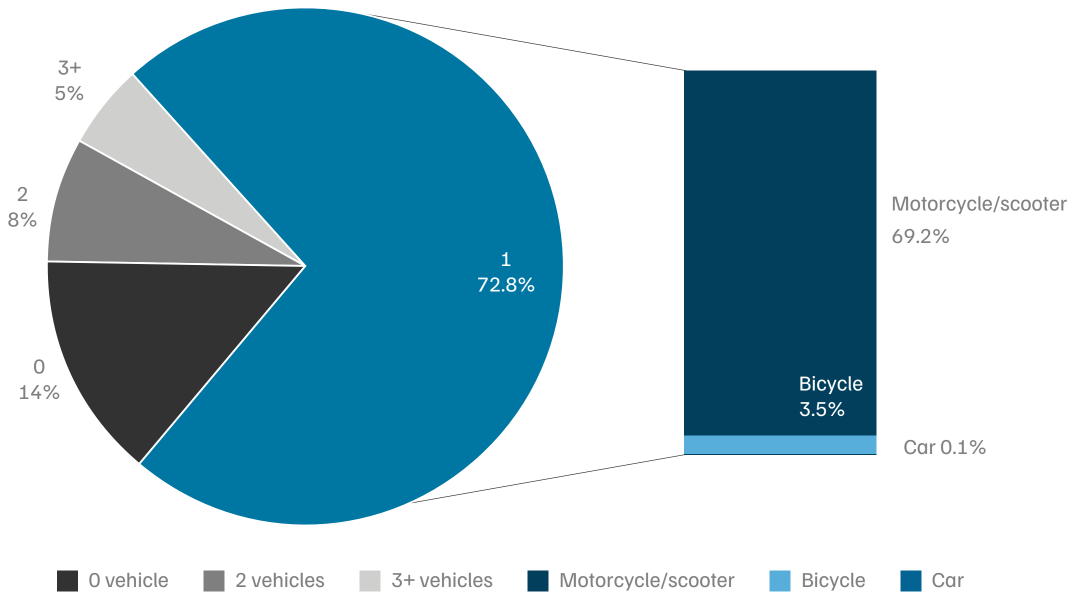
In this section, we present the findings from the IPT users' survey (n = ~1,193). We begin by outlining the characteristics of the survey sample and the travel and expenditure patterns of users, thereby helping establish the role of IPT in meeting routine mobility needs across the city. This is followed by examining users' overall experience with IPT, including what motivates them to choose these services, the challenges they face, and the improvements they expect. Finally, we conclude with users' perspectives on and willingness to try emerging options such as e-autos. Using our findings, we aim to shed light on user profiles and behaviours, lived experiences and future expectations, offering a clear and holistic understanding of the passenger needs of IPT users in Erode.

The profile of IPT users highlights a core demographic of working-age, low- to middle-income residents

The sample consists of 54 per cent men and 46 per cent women, with more than half of the respondents falling within the 30–59 years age group. Education levels vary, though most users had completed primary or middle school and about one-fourth held a college-level qualification. Nearly 71 per cent of the respondents belonged to households earning less than INR 25,000 per month. Notably, 94 per cent of the respondents resided within Erode, indicating that the survey provides strong local representation of day-to-day mobility needs within the city. These characteristics are summarised in Table A4 (refer to the Annexure).

Around 70 per cent of the households rely on a single two-wheeler, underscoring the need for IPT as a complementary option

Figure 37. Nearly 70% of Erode households own at least one two-wheeler

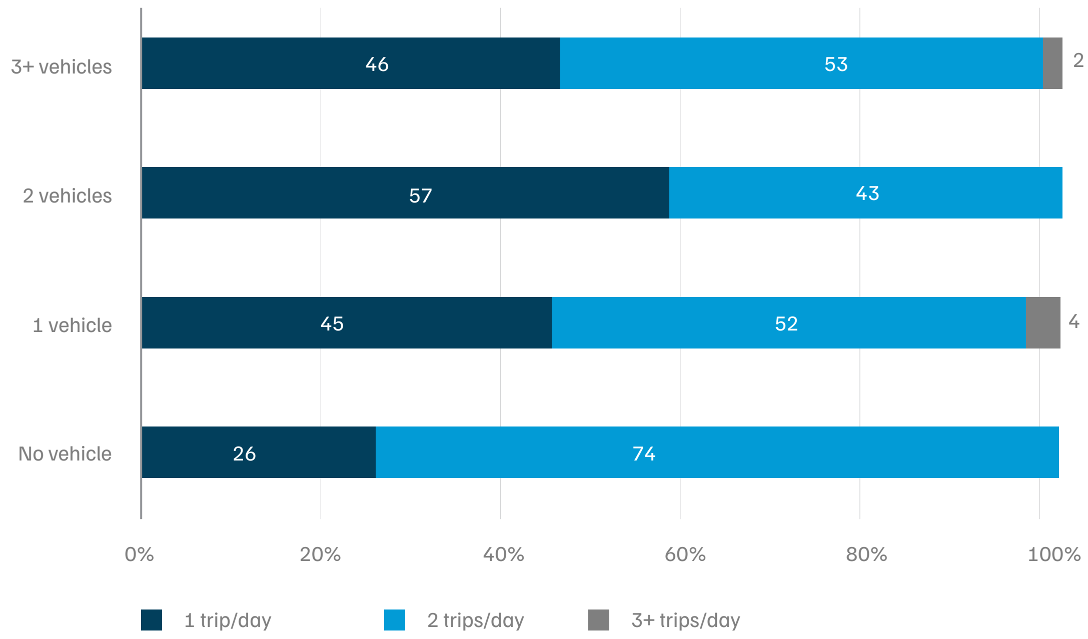


Source: Field survey conducted by CEEW.

As shown in Figure 37, nearly 70 per cent of surveyed households own at least one two-wheeler (2-W), while ownership of cars or multiple vehicles remains relatively low. Respondents with no private vehicle (14 per cent), together with those owning only a single vehicle (73 per cent), make up almost 87 per cent of the sample. This indicates that most households rely on a single 2-W for their personal mobility; yet it does not always meet the requirements of all household members or support all types of trips, such as travelling with children or older persons, carrying goods, or making long-distance journeys. In such a context, IPT likely serves as an important complementary mode of everyday and occasional mobility across the city.

High daily use of IPT by vehicle-owning households shows that private transport is unable to meet the full range of mobility needs

Figure 38. At least 40% of the respondents (n = 470/1193) take two or more trips a day, regardless of the number of household vehicles owned

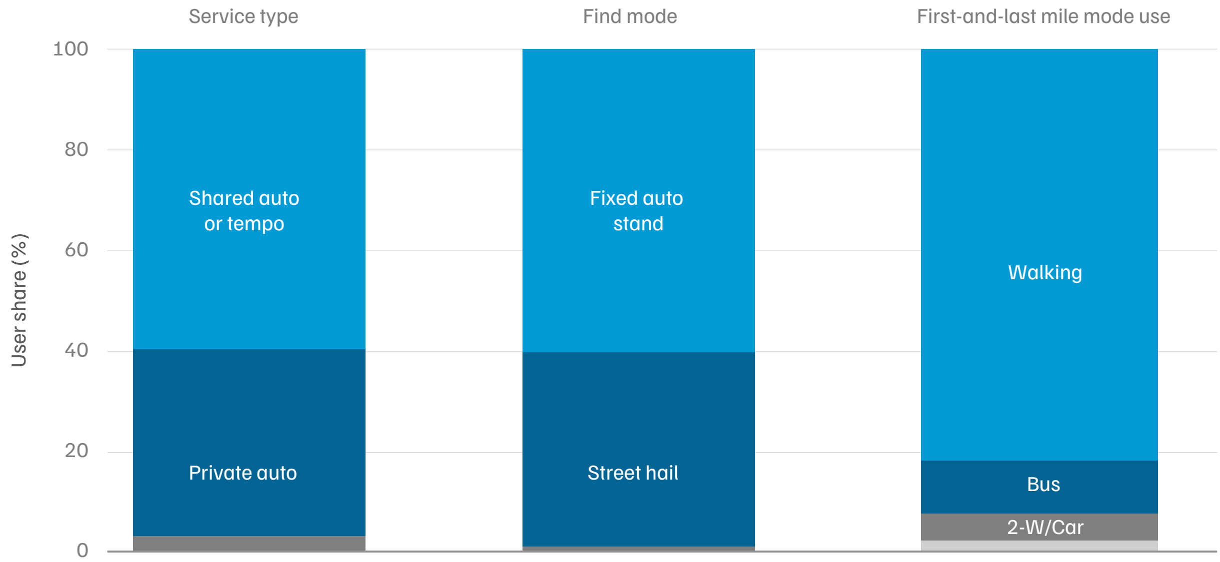


Source: Field survey conducted by CEEW.

Autos and tempos are embedded in everyday mobility across the city. At least 40 per cent of the respondents (470 of 1,193) use IPT for two or more trips per day, showing that IPT is used consistently rather than occasionally (Figure 38). This reliance is highest amongst households without private vehicles, where nearly 74 per cent use IPT two or more times daily. However, even households that own private vehicles continue to rely on IPT, confirming that a single 2-W often cannot meet all household travel needs, especially when members travel at different times or for different purposes (Figures 41 and 42).

Usage patterns in the city

Figure 39. Shared autos dominate IPT use, with most trips combined with walking for last-mile access

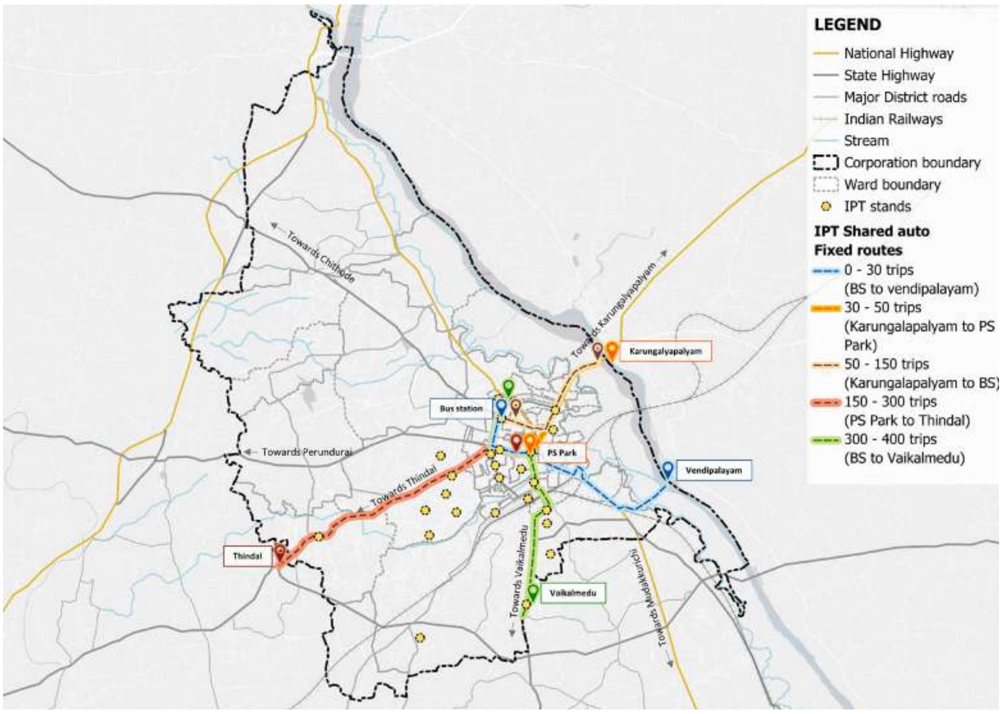


Source: Field survey conducted by CEEW.

A majority of users (59 per cent) prefer shared autos or tempos, while 38 per cent rely on private autos. Riders usually access IPT via fixed stands (60 per cent) or street hailing (39 per cent), highlighting a system built around local knowledge rather than formal digital platforms (Figure 39). The fact that 82 per cent of users combine IPT with walking highlights the importance of pedestrian access in completing these trips. High-demand corridors – such as the one from the central bus station to Vaikalmedu and Panner Selvam (PS) Park to Thindal – serve as the key mobility routes within the city (Figure 40).

Travel timings reflect other behavioural influences: Women and older adults concentrate their trips during daytime hours, with no women reporting travel after 7:00 p.m., unlike men, who continue to travel later into the evening (Figure 41). Trip purpose data further reinforces the centrality of IPT: 55 per cent of trips are work-related, while nearly one-third support essential everyday needs such as shopping, schooling, and medical visits (Figure 42).

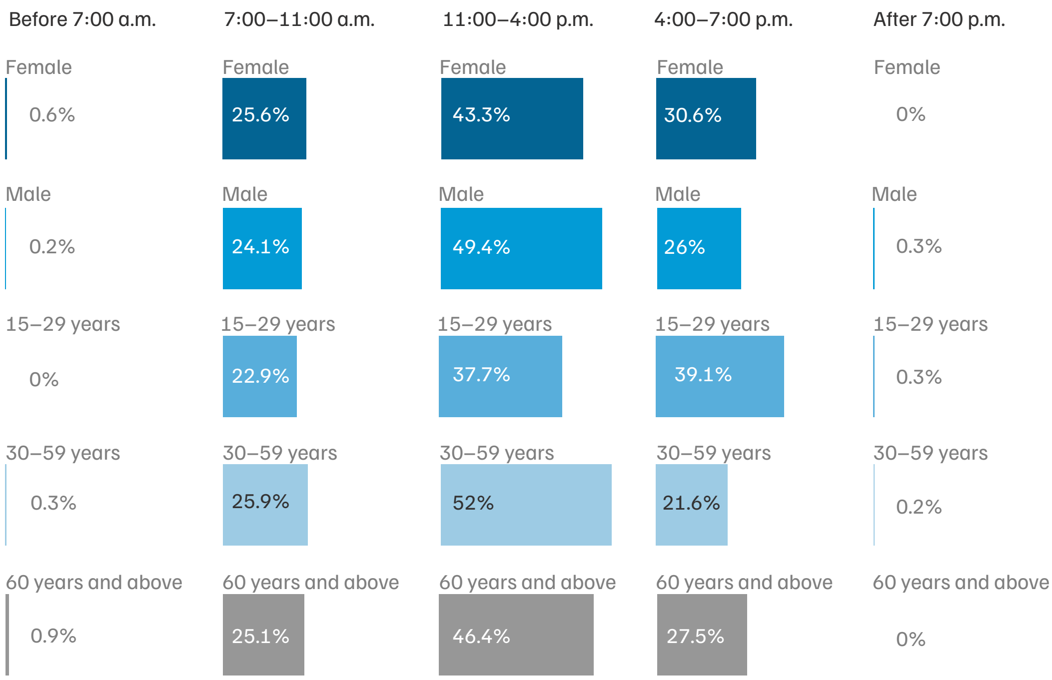
Figure 40. Key intermediate public transport (IPT) stands and shared-auto fixed routes in Erode



Source: Field survey conducted by CEEW.

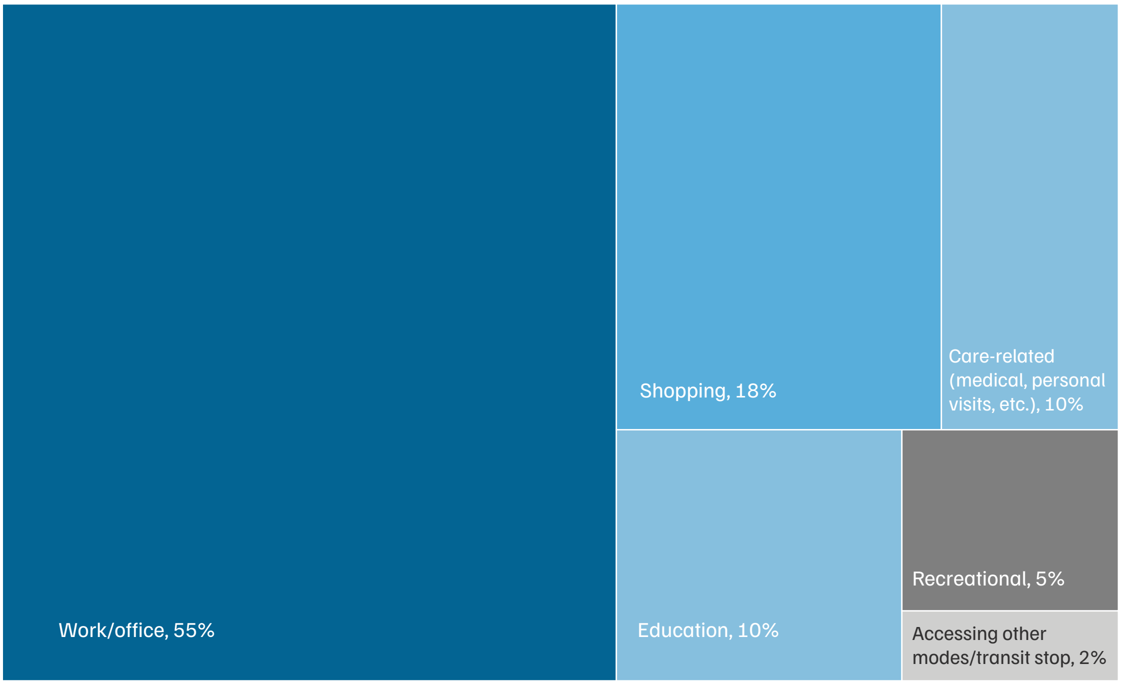
Note: We estimated the number of trips per stretch by analysing the origin and destination points collected from the IPT user survey

Figure 41. Usual travel hours vary across age and gender, with women and older adults preferring travel during safer daytime hours, avoiding late evenings



Source: Field survey conducted by CEEW.

Figure 42. Work dominates the purposive dimension of trips using intermediate public transport (IPT), but one-third of trips serve non-work needs, such as shopping, education, and transit access



Source: Field survey conducted by CEEW.

Long waits, search durations, and walk-to-stand requirements significantly add to total travel time, reducing convenience and safety, more so for women

Table 4. Travel time, distance, and cost profile of IPT users

Variables	All (n = 1,193)	Females (n = 543)	Males (n = 650)
	Mean (μ) ± standard deviation (σ)		
One-way travel time (minutes)	11.7 ± 4.2	11.5 ± 4.2	11.8 ± 4.2
One-way travel distance (km)	4 ± 2.2	4 ± 2.2	4.1 ± 2.1
Cost per trip* (INR)	71.8 ± 88	72.9 ± 87.6	70.9 ± 88.4
Time to reach auto-rickshaw pick-up point (minutes)	9.1 ± 4.4	8.8 ± 4.7	9.3 ± 4.2
Time spent searching for/finding an auto-rickshaw (minutes)	8.9 ± 5.1	9.7 ± 5	8.4 ± 5
Waiting time (minutes)	11.5 ± 5.2	12.1 ± 6.4	10.8 ± 3.8

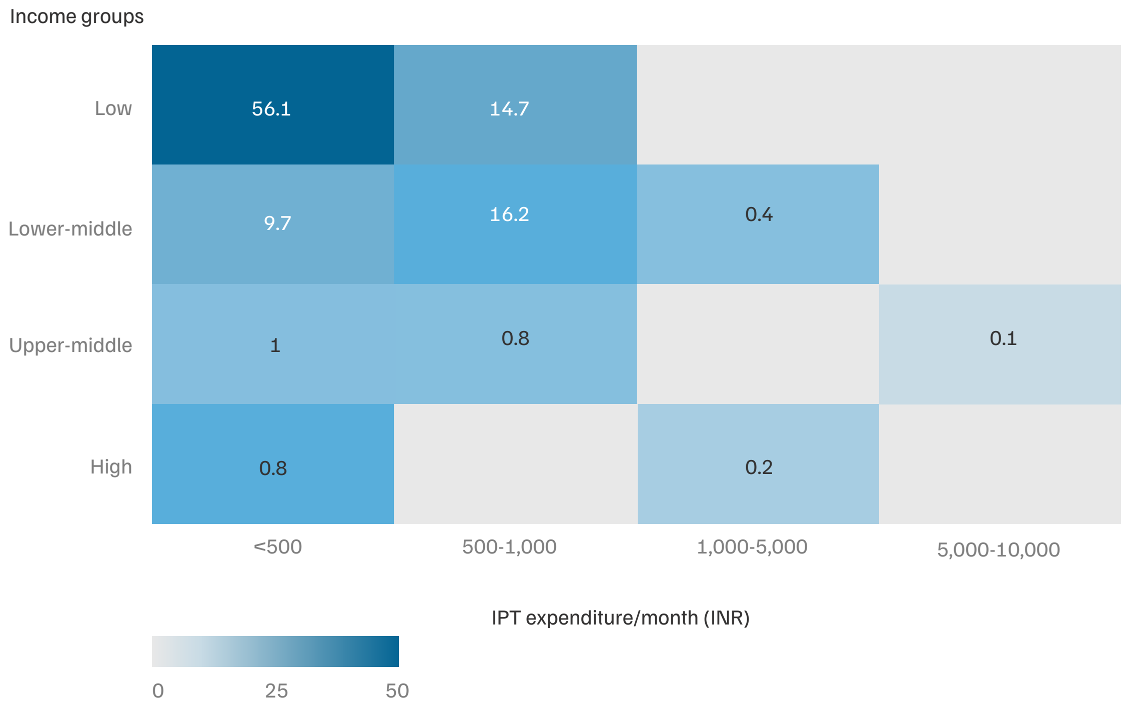
Source: Field survey conducted by CEEW.

*Note: The high variability in travel cost may be attributed to instances of overcharging and non-standard fare quotations.

While an average IPT trip lasts around 12 minutes, users spend nearly the same amount of time walking, searching, and waiting, increasing the overall effort involved in using IPT (Table 4). Women report longer waiting and searching times, along with slightly higher costs per trip, suggesting that convenience and safety considerations influence decisions.

Monthly expenditure patterns mirror household income in a way that most low-income users spend less than INR 500 per month on IPT, while higher-income brackets spend more (also see Figure 43). A *chi*-square test also confirmed a statistically significant association between household income and monthly IPT expenditure (χ^2 test, $p < 0.05$), indicating that spending patterns differ with rising income levels. The absence of high-income respondents from the lowest expenditure bands highlights that IPT remains a cost-sensitive mobility option relied upon by those with limited transport alternatives.

Figure 43. Intermediate public transport (IPT) remains a low-cost mobility option, with its primary user base concentrated amongst low- and lower middle-income households



Source: Field survey conducted by CEEW.

*Note: All values show the percentage share of respondents within the respective heatmap blocks. Income groups are based on monthly household income: low (< INR 25,000), lower-middle (INR 25,000–50,000), upper-middle (INR 50,000–1,00,000), high (INR 1,00,000–1,50,000, and above INR 1,50,000). Expenditure categories represent monthly spending on auto-rickshaw/tempo travel in INR

IPT experience: Motivation, ratings, challenges, and improvement needs

This subsection aims to capture IPT users' motivations, service ratings, key challenges, and priority areas for improvement across different trip purposes.

Users rely on IPT every day because it is convenient and affordable, yet their service ratings reflect issues with comfort, safety, and reliability

Users choose IPT due to practical rationales rather than a strong preference. As shown in Table A5 (refer to the Annexure), easy availability (23.5 per cent), lower fares (16.4 per cent), and improved access to public transport proper (13.4 per cent) are the most prominent motivations for using auto-rickshaws and tempos, followed by time savings. Women cite availability and safer rides slightly more often than men, while men more frequently emphasise quick access to other PT. These patterns suggest that IPT plays a complementary rather than discretionary role in mobility, bridging gaps that private vehicles and formal public transport are unable to meet at present.

Service perception data again establishes this interpretation. On a scale of 1 to 10 (10 being the highest rating), users give moderate ratings across all key IPT service parameters, indicating neither strong satisfaction nor strong dissatisfaction (Table 5). Women consistently rate IPT higher than men across every parameter, particularly in terms of affordability, safety, and travel time, implying a higher dependence on service predictability and comfort in everyday travel. Despite these differences, the overall pattern remains consistent: Travel time and safety are the lowest-rated attributes across both genders, confirming that reliability and security are the biggest service gaps.

Table 5. Mean user ratings of key service perceptions for intermediate public transport (IPT) suggest stronger reliance on it by women

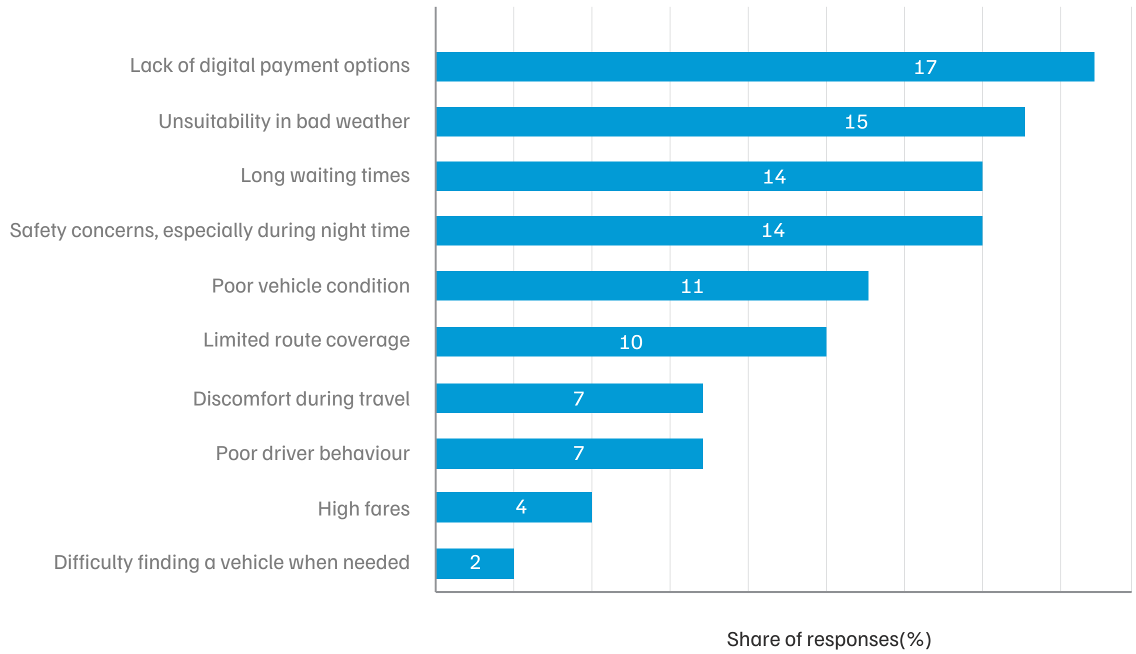
Parameters	Mean (μ) ± standard deviation (σ)		
	Females	Males	Total
Affordability	4.2 ± 2.4	3.5 ± 2.3	3.8 ± 2.3
Availability	4 ± 2.4	3.5 ± 2.1	3.8 ± 2.2
Comfort	4.3 ± 2.4	3.9 ± 2.2	4.1 ± 2.3
Luggage space	4.7 ± 2.5	4.5 ± 2.4	4.6 ± 2.5
Safety (during travel or at stops)	4.2 ± 2.4	3.7 ± 2.1	3.9 ± 2.2
Schedule reliability	4.4 ± 2.3	3.9 ± 2.2	4.2 ± 2.2
Seating space	4.4 ± 2.4	4 ± 2.2	4.2 ± 2.3
Travel time	4 ± 2.3	3.5 ± 2.2	3.7 ± 2.2
Service in bad weather	4.4 ± 2.4	4 ± 2.7	4.2 ± 2.3
Waiting time	4.1 ± 2.3	3.7 ± 2.2	3.9 ± 2.2

Source: Field survey conducted by CEEW.

Note: n = 1,193, consisting of 543 female and 650 male users. Ratings are on a scale of 1–10, with 10 being the highest rating.

Accessibility, challenges and equity

Figure 44. Service reliability, operational efficiency, and lack of digital access are the biggest pain points for travel on intermediate public transport (IPT)



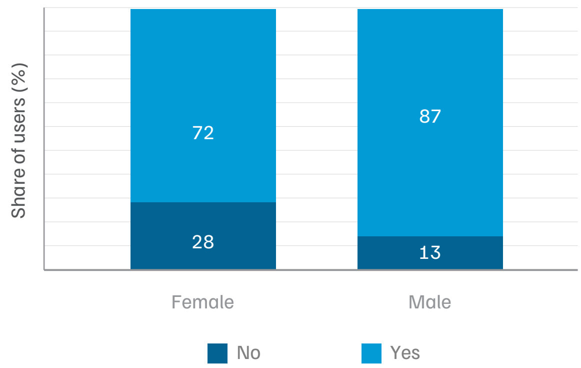
Source: Field survey conducted by CEEW.

Users frequently encounter challenges of reliability and access, which affect not only comfort during travel, but also limit who is able to travel confidently and independently. As shown in Figure 44, the most commonly reported issues include the absence of digital payment options (17 per cent), vulnerability to bad weather (15 per cent), and long waiting times (14 per cent), followed by safety concerns at night (14 per cent) and poor vehicle condition (11 per cent). These challenges amplify the access burden already associated with walking to stands and searching for rides, especially during peak demand hours.

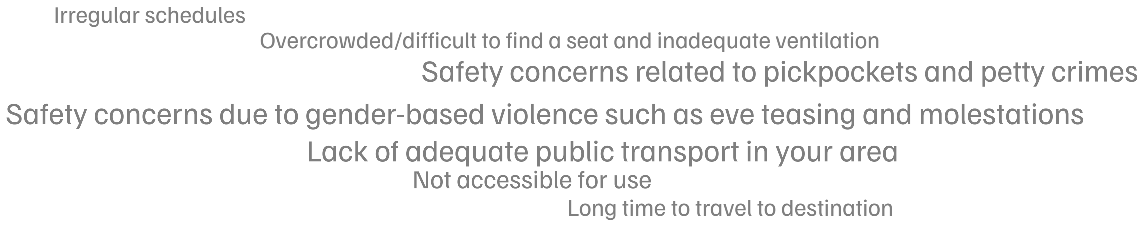
Operational inefficiencies and safety concerns disproportionately affect women, low-income households, and persons with disabilities

Figure 45. Preference for taking intermediate public transport (IPT) at night is impacted by user gender

(a) Share of responses by gender on willingness to travel at night suggests women are more hesitant to avail of IPT services at night



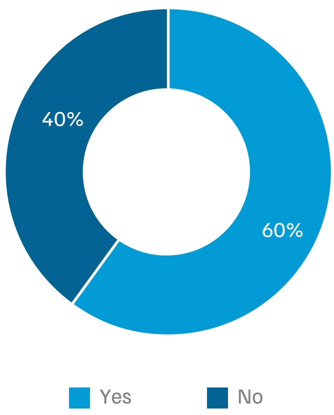
(b) The preponderant reason for avoiding IPT at night remains safety covering concerns ranging from petty crimes to gender-based violence.



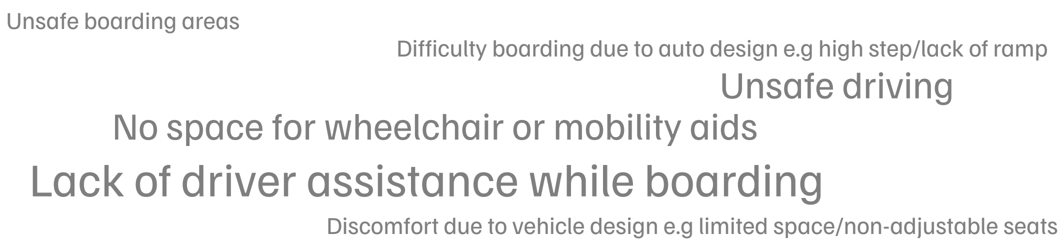
Source: Field survey conducted by CEEW.

Figure 46. Are IPT services in Erode easily accessible by persons with disabilities (PwDs)?

(a) Share of responses (yes/no)



(b) Lack of assistance to board is the biggest access barrier to IPT services for PwDs



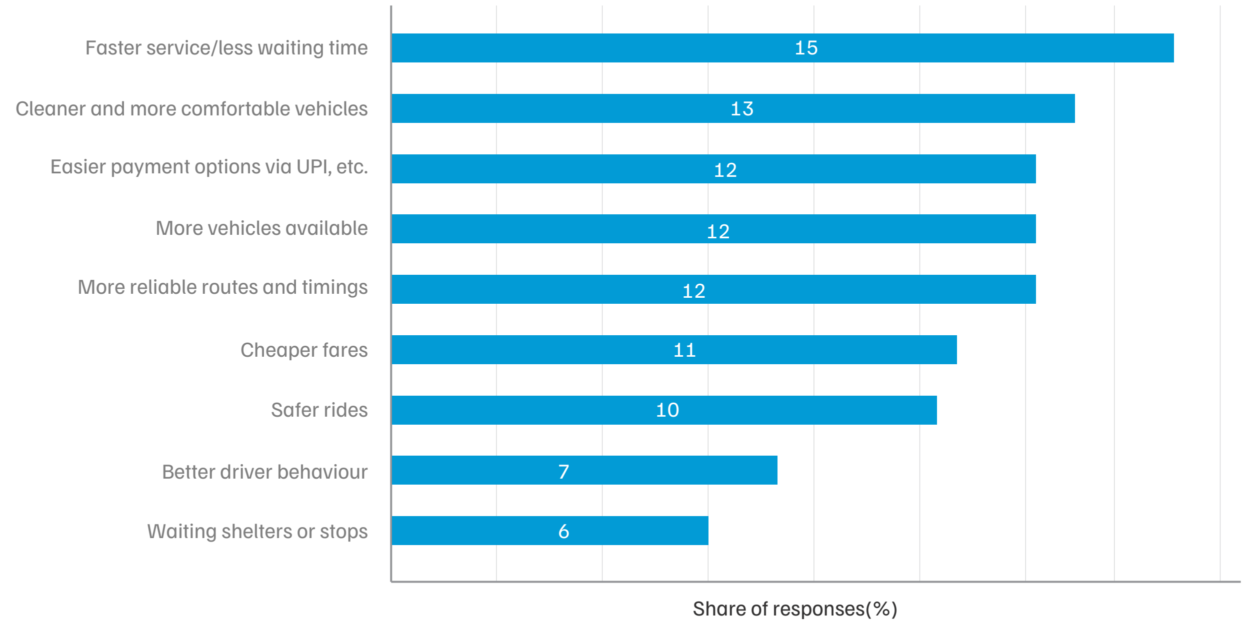
Source: Field survey conducted by CEEW.

Safety concerns strongly influence people's choices while travelling. As seen in Figure 45, only 72 per cent of women are comfortable using IPT at night, compared with 87 per cent of men, reflecting a pronounced gender difference in perceptions of safety. Amongst respondents who avoid night-time travel, over half reported fear of pickpocketing, petty crime, or harassment as the main deterrent. These concerns are shared across genders, but have greater implications for women, who already report longer waiting and searching times, increasing the risk of facing uncomfortable events in public spaces.

Similarly, accessibility barriers are also significant for PwDs. As illustrated in Figure 46, 40 per cent of the respondents who reported a disability (n = 10; indicative) reported that IPT services are not easily accessible. They cited lack of driver assistance during boarding, vehicle design limitations, and insufficient space or support features as the primary barriers, compromising independent and safe access. Although ramps exist along nearly 58 per cent of footpaths, they are mainly built for vehicles and are not useful for PwDs (ITDP India 2025). Lower visibility of persons with disabilities and other priority users in public spaces should be interpreted as "suppressed demand", not lower need (ITDP India 2025), strengthening the case for prioritisation of universal design, among other service-delivery improvements necessary in the IPT sector.

Women's greater willingness to financially support service improvements supports the prioritisation of gender-sensitive upgrades

Figure 47. Faster/more frequent services, comfort, and digital payments emerge as top improvement demands



Source: Field survey conducted by CEEW.

Users had direct expectations about improvements in IPT services. As shown in Figure 47, the majority of requests cluster around shorter waiting times (15 per cent), cleaner and more comfortable vehicles (13 per cent), and better route and schedule reliability (12 per cent). Safety and affordability also remain important for more than 1 in 10 respondents, indicating that enhanced comfort and predictability should not come at the expense of feeling safe or keeping travel affordable.

Despite a clear appetite for better services, willingness to pay more remains limited and skewed. Survey findings show that 81 per cent of users are not willing to pay anything extra for improved IPT services. Amongst the minority who are willing to pay, most would pay only an extra INR 1–5 per trip, and this group is concentrated in households earning below INR 25,000 per month. According to the survey, 20.1 per cent of women are willing to pay something extra, compared with 17.5 per cent of men; but most women fall within the 'INR 1–10 per trip' willingness band, while men make up most of the very small group willing to pay more than INR 20 per trip. This shows that women place greater value on improvements that boost reliability, comfort, and perceived safety, consistent with their higher service ratings for IPT (Table 5), yet remain highly affordability-conscious, especially for daily travel.

User perceptions of e-autos: Acceptance remains moderate, with a willingness to shift led by expectations of convenience, affordability, and service reliability

Table 6. Mean user ratings reflecting their perceptions of key electric services in the intermediate public transport sector suggest electric vehicles are not viewed as inherently superior

Parameters	Total (n = 1,193)	Female (n = 543)	Male (n = 650)
	Mean (μ) ± standard deviation (σ)		
Affordability	3.6 ± 2.1	3.7 ± 2.1	3.5 ± 2.1
Accessibility	3.8 ± 2.2	4 ± 2.2	3.7 ± 2.2
Comfort	3.8 ± 2.1	3.9 ± 2.2	3.7 ± 2
Convenience (parking, route flexibility, etc.)	3.7 ± 2	3.9 ± 2.2	3.6 ± 1.9
Driver behaviour	3.7 ± 2.2	3.8 ± 2.4	3.6 ± 2.1
Environmental friendliness	3.4 ± 2.2	3.3 ± 2.3	3.4 ± 2.1
Reliability	3.7 ± 2.1	3.8 ± 2.1	3.6 ± 2
Safety	3.7 ± 2.1	3.8 ± 2.1	3.7 ± 2.1
Speed	3.6 ± 2.1	3.8 ± 2.1	3.4 ± 2

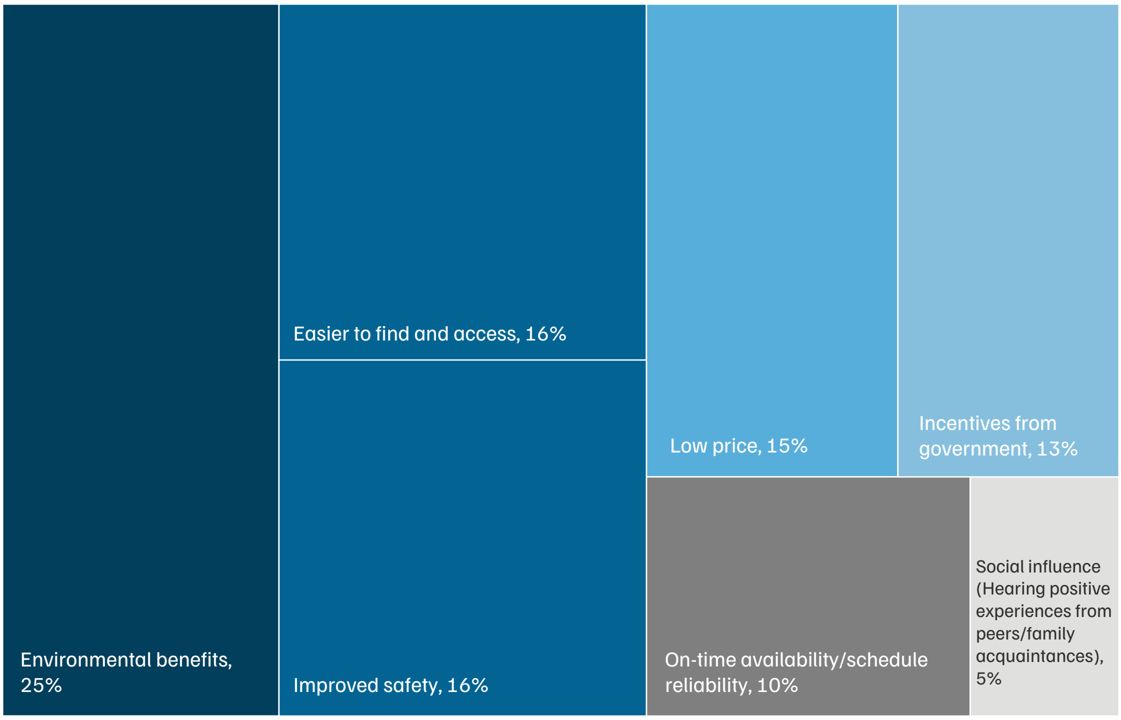
Source: Field survey conducted by CEEW.

Note: n = 1,193, consisting of 543 female and 650 male users. Ratings are on a scale of 1–10, with 10 being the highest rating.

Survey responses indicate that users do not view e-autos as being inherently superior to conventional petrol auto-rickshaws or those fuelled by compressed natural gas (CNG); rather, their interest in e-autos depends on whether they match the same levels of convenience and availability as their conventional counterparts.

As shown in Table 6, mean perception scores for electric IPT cluster around 3.5–4.0 on a 10-point scale, indicating a moderate assessment of affordability, comfort, reliability, and service quality. While female users consistently rated electric IPT slightly higher than male users across all parameters, consistent with trends observed in Table 5 for regular autos, the overall scores remain modest for both genders. This suggests that the perceived advantages of e-autos have not yet translated into strong confidence in their everyday performance.

Figure 48. Environmental benefits, accessibility, and safety emerge as the strongest motivators for choosing e-autos over regular petrol/CNG autos



Source: Field survey conducted by CEEW.

Users considered e-autos as a viable alternative only in terms of the same attributes they most valued in regular IPT vehicles. As illustrated in Figure 48, the leading motivators after the obvious environmental benefits (25 per cent) were ease of access (16 per cent) and improved safety (16 per cent), which together constituted more than half of all responses. Secondary motivators included government incentives (13 per cent), lower cost (15 per cent), and reliability of routes and schedules (10 per cent), indicating an expectation of both service quality and financial value. Notably, social influence (5 per cent) plays a minimal role, implying that technology adoption is currently shaped more by practical considerations than peer behaviour or trends.

6.2 Intermediate public transport operator: Findings

This section presents findings from the survey of operators we conducted in Erode (n = ~587). It examined the auto and tempo drivers' ecosystem in a structured manner, beginning with operator demographics and driving experience, followed by fleet composition and day-to-day operational characteristics, and ending with economic and efficiency indicators derived from their working conditions. The following subsections build a consolidated picture of who the IPT operators are, the vehicles they rely on, how they navigate demand across the city, and how these factors influence their earnings and livelihood security.

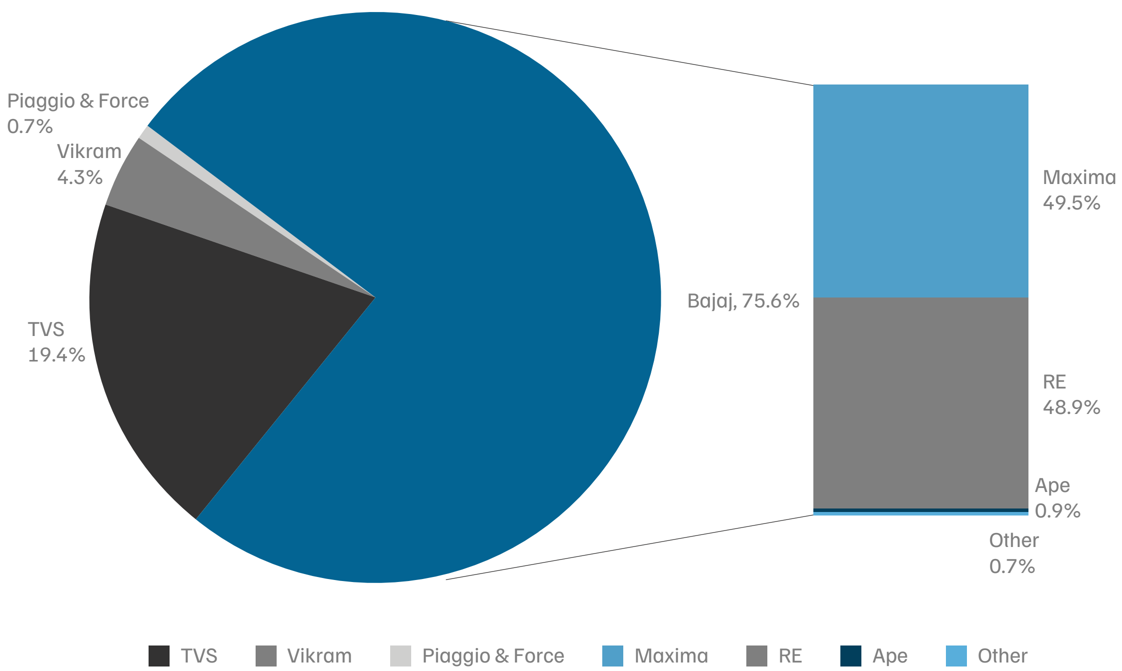
IPT in Erode is mostly run by experienced, middle-aged male drivers, for whom driving is the main (and often the only) source of livelihood

Most of the people operating auto-rickshaws and tempos in Erode share a similar profile. As Table A6 (refer to the Annexure) shows, the sector is dominated by middle-aged drivers (83 per cent of the respondents were aged 30–59 years) and almost all the operators were men (99 per cent). Over 8 in 10 had studied only up to primary or middle school, and 9 per cent had never attended school, suggesting that this work provides an important livelihood when other job options may be limited.

Driving is not a temporary or short-term occupation for most operators. Almost 9 in 10 had been driving for more than five years, and nearly half had over a decade of experience, suggesting familiarity with routes, demand patterns, and city commuters' profiles. At the same time, the work is tied closely to household income and financial responsibility. Around 82 per cent owned the vehicle they drove. For the 87 per cent who did not have a second job, driving was the main source of income for their families. Most operators also belonged to homes with around four members and two earning members. An overwhelming majority were locals, with 93 per cent living in Erode permanently.

The IPT fleet in Erode is highly uniform and largely LPG-based, operated for long hours but with low efficiency (due to high idle times and empty trips)

Figure 49. Bajaj leads as the top-selling model in Erode's intermediate public transport fleet, accounting for over three-quarters of all autos, with TVS forming most of the remaining share

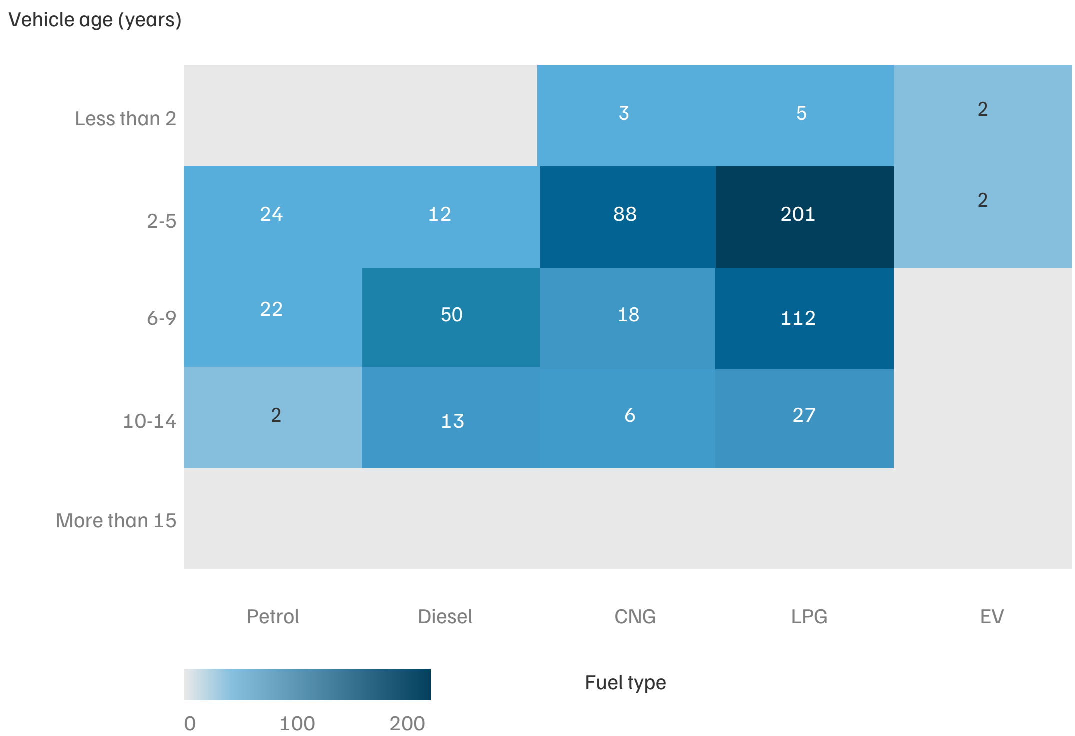


Source: Field survey conducted by CEEW.

Most IPT vehicles in Erode are of similar make, fuel type, and age. As the fleet distribution (Figure 49) shows, Bajaj leads as the top-selling model for autos, making up more than three-quarters of all vehicles. It is followed by TVS; other brands hold only a marginal share. Liquid petroleum gas (LPG) remains the overwhelming choice of fuel (59 per cent of the fleet), far ahead of CNG (20 per cent), diesel (13 per cent), petrol (8 per cent), and electric (1 per cent). Figure 50 shows that most vehicles are two to nine years old, especially LPG autos, indicating a 'mature' to ageing fleet with minimal EV penetration.

Despite operating nearly 9 hours daily, auto drivers spend half their time waiting or searching for passengers.

Figure 50. Most auto-rickshaws in Erode (313/587) are LPG-fuelled and aged 2–9 years



Source: Field survey conducted by CEEW.

Note: All values show number of responses within the respective heatmap blocks.

Drivers spend long hours on the road, but high idle times and empty trips impact efficiency

Table 7. Vehicle performance and operating patterns by ownership type

Variables	All (n = 587)	Owned (n = 482)	Rented (n = 102)	Leased (n = 3)
	Mean (μ) ± standard deviation (σ)			
Mileage (km/l or km/kg)	20.7 ± 11.2	20.9 ± 12.3	20.2 ± 2.6	17.3 ± 1.1
Vehicle age (years)	5.6 ± 2	5.6 ± 1.9	5.9 ± 2.6	6 ± 2.6
Average daily fuel used (litres)	2.9 ± 1	2.9 ± 0.9	3.1 ± 1.1	4.3 ± 2.9
Work hours per day	8.7 ± 1.7	8.7 ± 4.7	8.6 ± 1.3	12 ± 0
Idle hours per day	4.4 ± 1.5	4.4 ± 1.5	4.4 ± 1.4	5.7 ± 0.8
Daily distance travelled (km)	53.9 ± 16.8	83.4 ± 13.6	67.5 ± 7.7	68.3 ± 16.3
Total trips per day	7.4 ± 1.9	7.3 ± 1.9	7.7 ± 2	8.7 ± 4.2
Empty trips per day	2.4 ± 1.2	2.4 ± 1.2	3.2 ± 1.1	4 ± 2
Average occupancy per trip	2.6 ± 0.6	2.5 ± 0.5	3.6 ± 0.7	3.3 ± 1.5

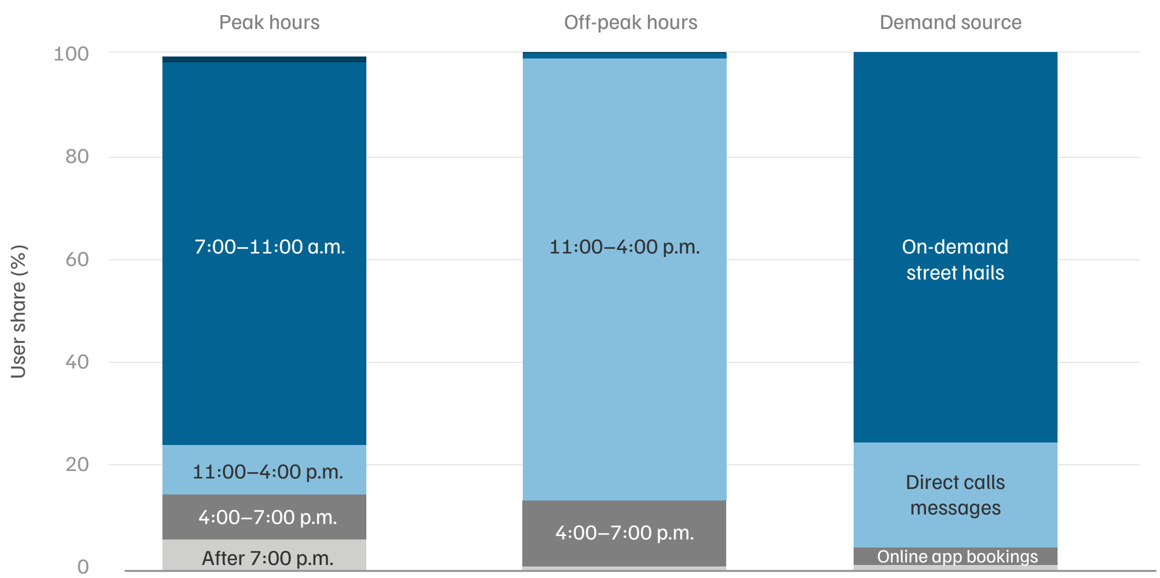
Source: Field survey conducted by CEEW.

Despite working around 8.7 hours per day, operators spend about 4.4 hours idle, often just waiting for passengers or relocating to find demand – this holds true across ownership models (Table 7). However, the very small 'leased' segment (1 per cent), though limited in sample size, shows signs of the highest work pressure: 12 hours of driving, 5.7 idle hours, 4 empty trips per day, and the highest daily fuel use (4.3 l) alongside the lowest mileage (17.3 km/l).

On average, each vehicle in the surveyed fleet covers roughly 54 km daily, makes about 7–8 trips, and experiences 2–3 empty trips per day, meaning nearly one in three trips does not earn revenue. Average occupancy stands at 2.6 passengers per trip, higher than the 2.1–2.3 average anticipated in Erode's *Master Plan 2041* (Erode Local Planning Authority 2024). This suggests that IPT is compensating for unmet public transport demand, but in a way that still leaves drivers to grapple with uneven earning opportunities.

Passenger demand is high but irregular, with operations relying almost entirely on street-hail trips

Figure 51. Passenger demand peaks between 7:00 and 11:00 a.m. and drops sharply by midday. Around 75% of trips arise out of informal street hailing rather than structured booking channels

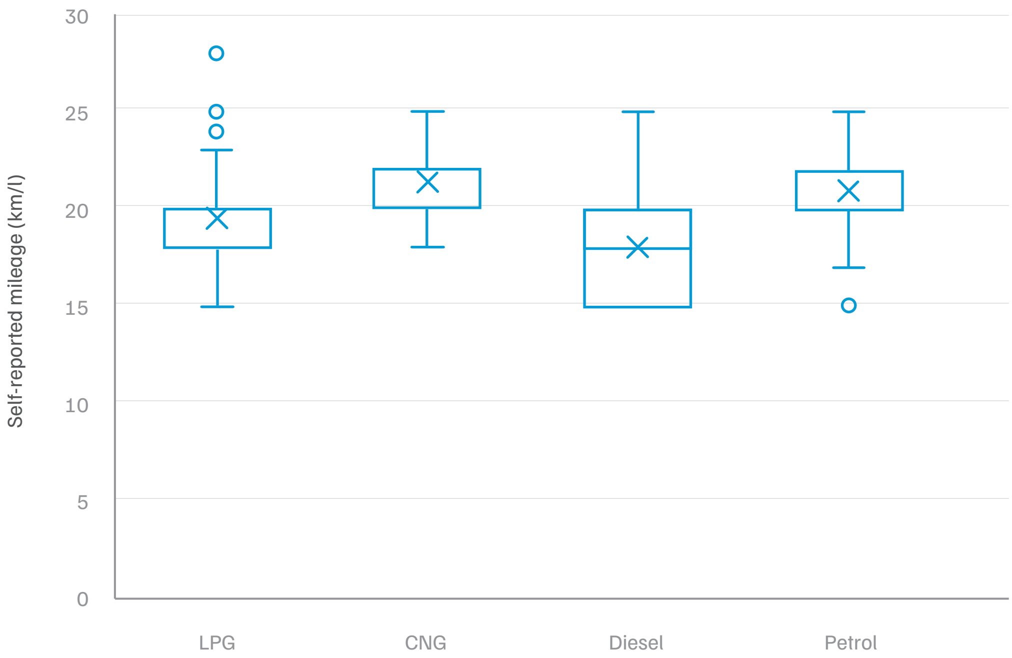


Source: Field survey conducted by CEEW.

Most operators report their highest passenger loads between 7:00–11:00 a.m., followed by a sharp downturn during 11:00 a.m.–4:00 p.m., when 85 per cent report fewer passengers (Figure 51). The system remains almost fully informal: 75 per cent of rides come from street hails, 20 per cent from direct calls or messages, and less than 5 per cent from app-based or stand-based bookings, showing very low digital integration. This unpredictability contributes to longer idle hours, empty trips, and fluctuating income. These inefficiencies in fleet utilisation and passenger flow ultimately shape the economic outcomes for operators, which we examine further in the next subsection.

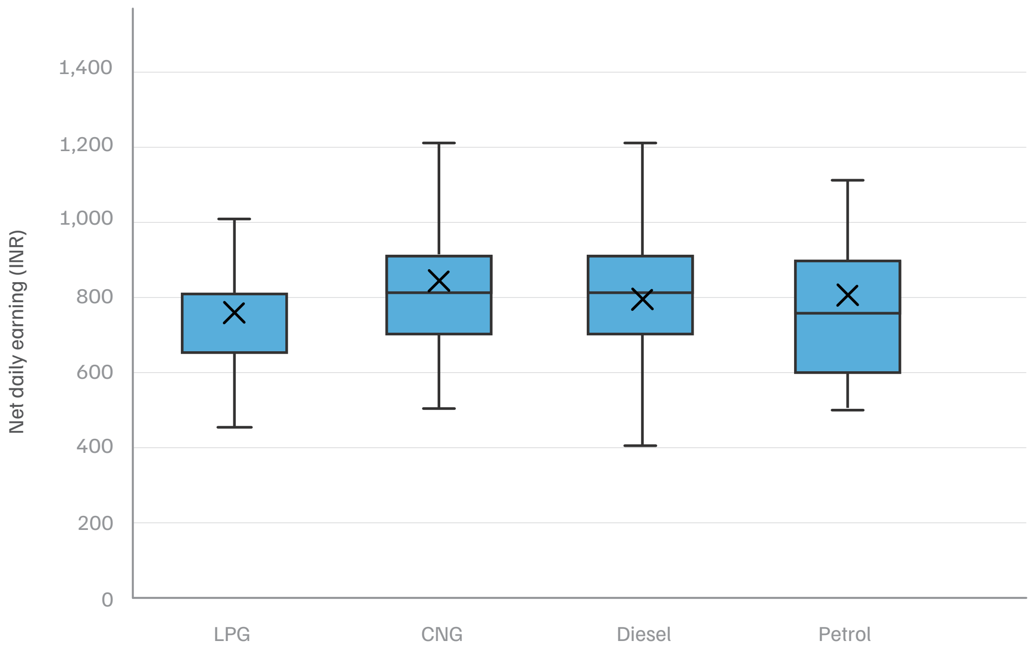
For auto-rickshaw drivers, income is driven less by hours on the road and more by mileage, fuel use, and maintenance efficiency

Figure 52. Mileage across fuel types



Source: Field survey conducted by CEEW.

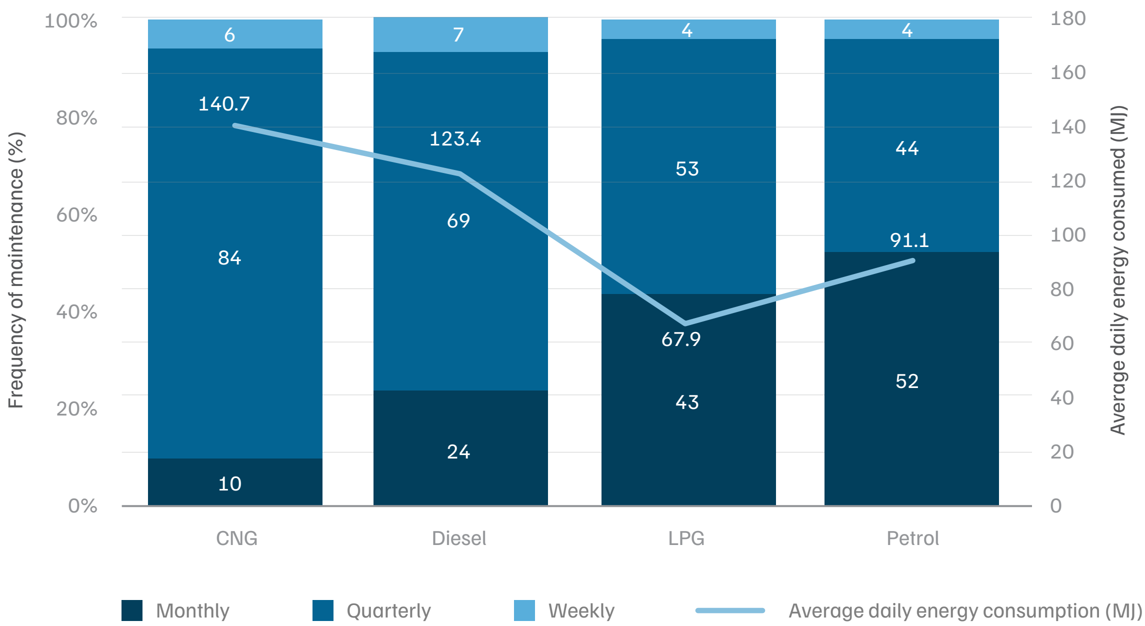
Figure 53. Net daily earnings across fuel types



Source: Field survey conducted by CEEW.

Across the sample, daily earnings varied by fuel type in a pattern that mirrors mileage performance rather than work hours or trip volume (Figures 52 and 53). Auto drivers using CNG and petrol, who report the highest mileage values, also have the highest average daily earnings, whereas LPG and diesel autos, which report comparatively lower mileage, align with relatively lower earnings.

Figure 54. Nearly half of the LPG auto drivers (173/393) perform monthly maintenance, with petrol and LPG autos reporting lower average daily energy consumption



Source: Field survey conducted by CEEW.

Note: Daily fuel usage was self-reported by operators, CNG in km and petrol, diesel, and LPG in l. For cross-fuel comparison, values were converted to megajoules (MJ) using standard heat-value conversion factors from the World Nuclear Association (n.d.).

This pattern becomes clearer when energy use per day and servicing frequency are viewed together (Figure 54). While CNG and diesel autos are largely serviced on a quarterly basis (84 per cent and 69 per cent of them, respectively), nearly half the LPG and petrol auto-rickshaw drivers reported opting for monthly servicing. Since LPG is a newer option in the city, the higher monthly servicing may partly reflect drivers still finding an optimal maintenance routine.

Interestingly, maintenance patterns show that both the oldest fuel in the IPT market (diesel) and the newest entrant (CNG) require the least frequent servicing. With diesel being a more prominent and established fuel type amongst three-wheelers (3-Ws), it could potentially indicate a complete knowledge behaviour amongst drivers, having a clear sense of when servicing is needed. However, CNG, as a more recent fuel type and relatively low-maintenance option, appears to have built early confidence amongst drivers.

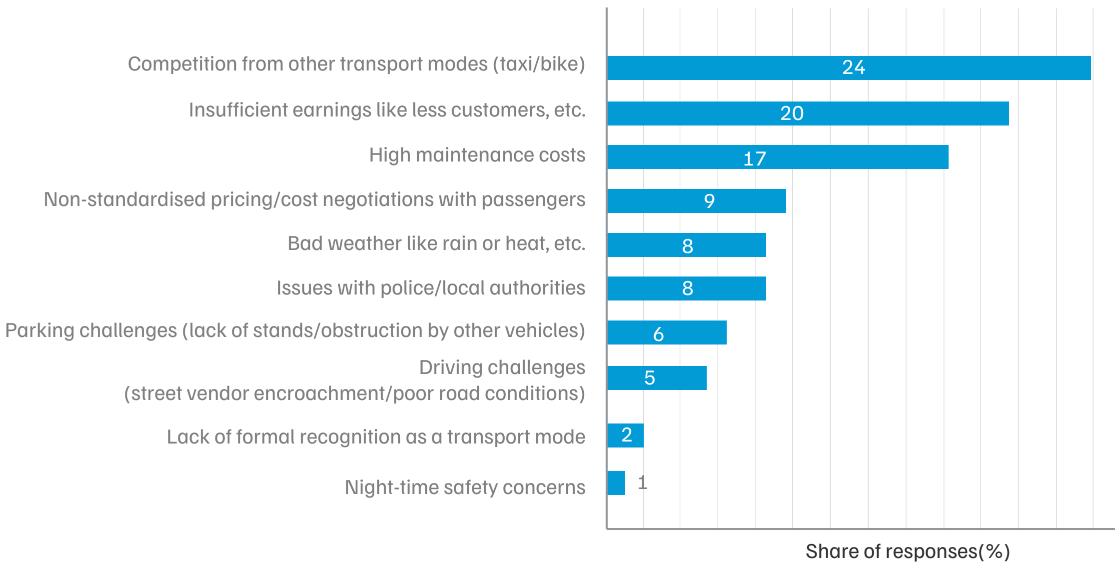
Daily energy use also varies across fuel types. CNG auto-rickshaws have the highest average daily energy consumption, at 140.6 megajoules (MJ), followed by diesel at 123.4 MJ. Petrol autos consume 91.1 MJ per day, while LPG autos have the lowest daily energy use at 67.9 MJ.

Although our survey did not measure maintenance quality directly, these patterns suggest a logical operational cycle. Less frequent maintenance may be associated with higher energy use over time, while more regular maintenance being associated with lower daily energy consumption. Since earnings depend on efficiency rather than effort, the conditions that create delays, empty trips, and long waits become critical. The next subsection examines these operational challenges and the improvements that drivers hope for.

Drivers highlight systemic barriers, including competing modes of transport, low earnings, and high maintenance costs

The most common challenges reported by operators (Figure 55) were competition from other modes of transport (24 per cent), insufficient customer demand and earnings (20 per cent), and high maintenance costs (17 per cent). Other concerns include non-standardised pricing and fare negotiations (9 per cent), parking and stand-related issues (6 per cent), and contentious interactions with police or authorities (8 per cent). Bad weather, such as rain or heat (8 per cent), and poor road or driving conditions (5 per cent) add to physical stress, while a lack of formal recognition (2 per cent) and night-time safety concerns (1 per cent) point to wider regulatory gaps. Overall, these barriers reinforce earlier evidence showing that drivers work long hours but still struggle with income unpredictability.

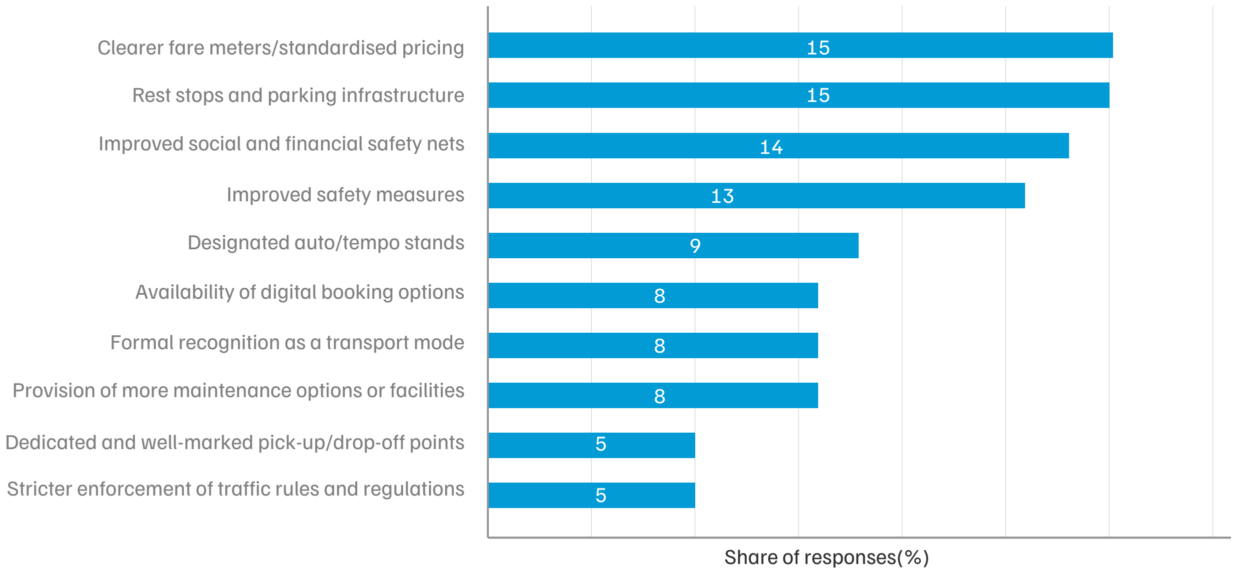
Figure 55. Nearly half the operators (819/1,761 responses) reported struggling against competition from other modes of transport, low earnings, and high maintenance costs, underscoring persistent economic pressure in the sector



Source: Field survey conducted by CEEW.

Operators want improvements of earnings, safety, and standard working conditions

Figure 56. Over half the operators (1,004/1,761 responses) prioritised standardised fares, rest stops with toilets and drinking water, greater safety, and overall social and financial security



Source: Field survey conducted by CEEW.

When asked about the improvements they would desire (Figure 56), over 50 per cent of the operators prioritised standardised fares, rest stops with toilets and drinking water, greater safety, and social and financial security. Some also spoke of designated auto stands (9 per cent), maintenance facilities (8 per cent), and digital booking options (8 per cent). Overall, this shows that drivers seek dignity, predictability, and safety in their daily operations.

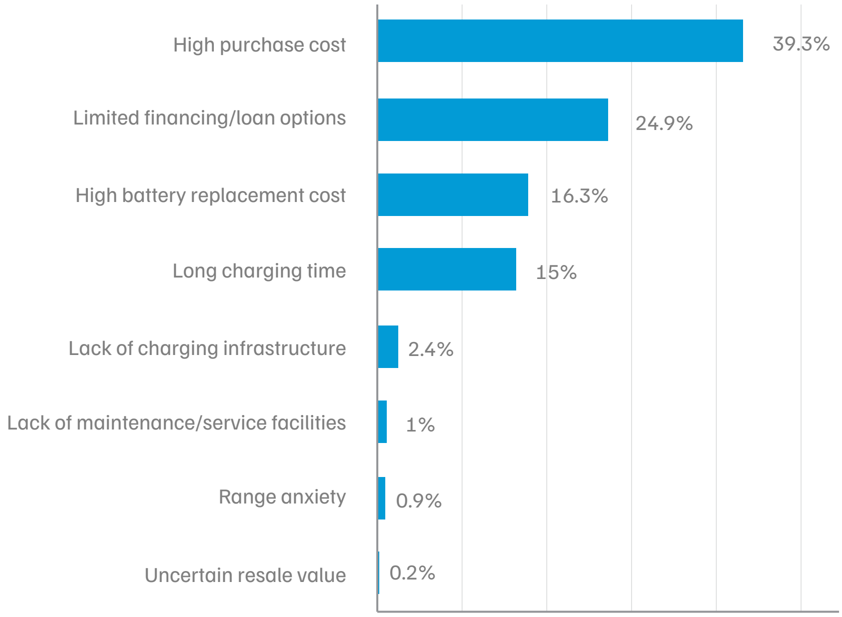
These day-to-day priorities should directly shape plans for the future of IPT in Erode. In this context, with 81 per cent of users willing to shift to using e-autos, depending on availability, it becomes important to assess operators' willingness as well.

Though there is openness towards e-autos, operators are still uncertain about relying on them for daily operations

Across all surveyed drivers, perception scores for e-autos ranged between 3.5 and 4.5 on a 10-point scale (refer to Table A7 in the Annexure), indicating a cautious, neutral outlook rather than a confident, positive one. Operators who rent their vehicles tended to assign slightly higher ratings for performance, comfort, and reliability to e-autos, compared to those who own their autos – which suggests owners are more concerned about the long-term financial and maintenance commitments of EVs. On charging speed, charger accessibility, and range, scores ranged from 4.8 to 5, indicating interest but not full trust that the technology can support day-to-day operations.

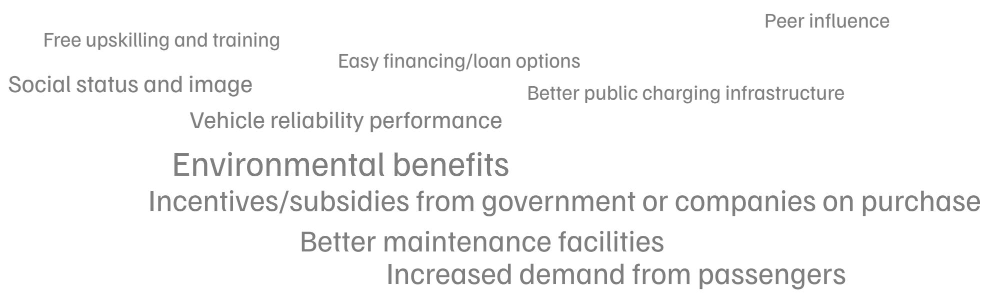
Though cost is seen as the biggest barrier amongst operators, environmental benefits and financial support through incentives or subsidies emerge as prominent shift motivators

Figure 57. Cost is the foremost barrier preventing operators from shifting to e-autos



Source: Field survey conducted by CEEW.

Figure 58. Environmental benefits have the edge among motivators for transitioning to e-autos



Source: Field survey conducted by CEEW.

On concerns around shifting to e-autos, drivers highlighted high purchase cost (39 per cent), fewer financing options (25 per cent), and high battery replacement cost (16 per cent) as the three main barriers to adoption (Figure 57). Operational limitations, such as long charging time (15 per cent), exist too; but concerns about charging infrastructure (2.4 per cent), range anxiety (0.9 per cent), and maintenance facilities (1 per cent) were far less common. This establishes that reluctance stems more from the attached financial risk than from doubts about vehicle capability.

The top motivations for considering an e-auto were environmental benefits (14 per cent), incentives or subsidies (12.4 per cent), and better maintenance facilities (12 per cent), followed closely by increased passenger demand (11 per cent) and vehicle reliability and performance (10 per cent) (Figure 58). Social factors, such as status or peer influence, ranked lower but featured in the list as well, implying that some operators may take decisions based on image rather than economic practicality. Supportive financing and guaranteed maintenance services also emerged as one of the triggers to adopt EVs than simply offering a cleaner technology.

6.3 Discussion

The city's mobility system is impacted by structural deficits in public transport, a lack of integration between buses and IPT, poor non-motorised transport (NMT) infrastructure despite a 33 per cent walking and cycling share, and highly constrained municipal financial capacity to support green mobility investments (ITDP India 2025; CEEW 2025). Additionally, 90 per cent of bus users in Erode have reported the absence of multimodal integration within 500 m of transit stops (ITDP India 2025).

These systemic constraints interact closely with the lived realities of IPT users and operators, reinforcing the need for coordinated, multimodal, and financially viable reforms. At the same time, service unreliability affects users and operators differently, even though it stems from the same issue. The long waiting times faced by users can be linked to the long idle time reported by drivers (refer Figures 53 and 63). Even as passengers cannot easily find an auto, drivers are simultaneously on the road without securing passengers. This can be linked to citywide service gaps highlighted in the *Gap Assessment Report* (ITDP India 2025), including weak modal integration, haphazard IPT operations, and limited bus–IPT connectivity. Overall, both groups are open to change, but only if the future IPT ecosystem protects affordability for users and livelihoods for operators at the same time.

Safety is a decisive factor shaping women's mobility, across both users and operators

More than half of the IPT users avoid night travel due to fear of harassment, petty crime, and pickpocketing. In practice, no female IPT users reported travelling after 7:00 p.m., compared with a small share of men who did. These concerns are magnified by unpredictability of services. Women spend more time waiting and searching for autos than men, which exposes them to public spaces longer, increasing the sense of risk. Even amongst the small survey pool of female operators (n = 3), two out of three cited night-time driving as unsafe and asked for better safety measures.

Safety, therefore, is not just a social add-on; it is an access constraint, shaping time of travel, route/stop choices, and willingness to work during night hours. As most users combine auto trips with walking, our findings corroborate the gaps identified in the *Gap Assessment Report* (ITDP India 2025), such as poor lighting, inadequate pedestrian infrastructure, and unsafe transfer spaces, which disproportionately affect women. *Public transport and pedestrian infrastructure assessment report* (ITDP India 2025) likewise identify safety as a key action area across groups. This becomes more critical when IPT serves as the main modality to access bus stops and other public facilities. For Erode's mobility system to be gender-inclusive, safety has to be built into future service improvements and predictability.

Women users value service improvements in IPT more than men, but are less willing to pay extra for e-autos

Survey responses show that women are generally positive towards the idea of improved mobility services and rate the importance of IPT quality higher than men across most parameters. This is reflected in their willingness to pay for better services: 20.1 per cent of women, compared with 17.5 per cent of men, are open to paying extra for general IPT improvements. However, this does not extend to e-autos: only 14.2 per cent of women are willing to pay extra for e-autos, compared with 20.6 per cent of men, despite women assigning higher perception scores to e-autos. This pattern suggests that perceived improvements alone may not offset concerns about fare increases and uncertainty about service availability/reliability under an electrified model.

IPT accounts for only 5 per cent of total trips, despite a fleet of nearly 5,000 autos, largely because fare levels remain high and operations remain informal (TNUIFSL 2015; ITDP India 2025). Considering the apprehension and risk associated with any new technology adoption, the reason for even a small fare increase to face resistance from users, especially women, is clear: Their priority remains affordability and predictability of daily travel. Any electrification strategy will have to meet these conditions to see uptake amongst female users.

Willingness to shift to e-autos is similar amongst operators across extant fuel types

Our survey responses show that operators are not resistant to e-autos per se; their hesitation stems from the financial risk rather than unwillingness to adopt new technology. Across operators of auto-rickshaws using the more conventional fuel types, the most common answers were “Maybe” and “Depending on cost, incentives, and support”, which signals conditional openness rather than outright refusal. For instance, amongst LPG-fuelled auto-rickshaw drivers, 315 selected “Maybe”, compared to only 20 who said “Yes”; similar patterns appear amongst CNG and diesel operators.

The strongest barriers to EV adoption that we identified in the survey are overwhelmingly economic, with high purchase cost reported by 39 per cent of drivers, limited access to financing or loan options by 25 per cent, and battery replacement cost by 16 per cent. Charging access, maintenance facilities, or driving range concerns appear in the data, but they rank much lower than the financial barriers, indicating that the primary hesitation is economic rather than technological. Even within the very small sample of female operators *(n = 3),* none said “No” to shifting to an e-auto in the next three years; indeed, two out of three said they would consider switching if affordability and support systems improved, which bears out that reducing risk increases openness to the shift.

This is consistent with the citywide electrification challenges documented in the *Gap Assessment Report* (ITDP India 2025), which found that both the bus system and the IPT sector lag in EV adoption because of issues related to cost, charging infrastructure, and maintenance ecosystems. Overall, electrification will only advance if ownership becomes economically secure, supported by predictable running costs, accessible finance, and reliable charging and maintenance systems.

Operators’ reports of low earnings can be linked to vehicle inefficiencies – a hypothesis backed up by the strong demand for better aftermarket service

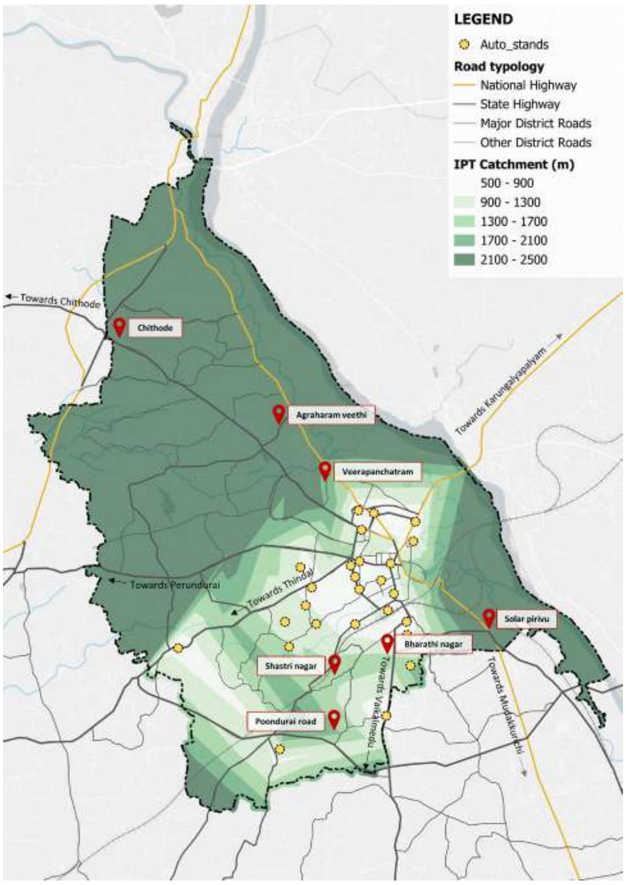
Drivers put in an average of 8.7 working hours per day, yet more than 4 of those hours are spent idle, searching or waiting for passengers rather than earning. This means income is not determined by effort but by how efficiently a vehicle converts time and fuel into revenue. The survey data showed that drivers tend to report optimistic mileage figures; when mileage is recalculated using their own responses on daily distance travelled and fuel consumed, performance drops sharply. For example, diesel auto-rickshaws average around 16.6 km/l and petrol around 13 km/l – lower than the claimed average mileages. LPG and petrol auto-rickshaws, the backbone of Erode’s fleet, are particularly affected, resulting in higher running costs and lower daily earnings. It is, therefore, unsurprising that drivers repeatedly mention high maintenance costs and low earnings together as major challenges.

> Auto driver earnings depend more on mileage, fuel costs, and maintenance efficiency than hours spent on the road.

The *Gap Assessment Report* (ITDP India 2025) also noted that informal, unorganised IPT operations and haphazard parking practices contribute to congestion and systemic inefficiencies, increasing idle time for drivers while reducing service reliability for users. Amongst women operators (n = 3), two out of three specifically asked for better maintenance facilities, recognising that when vehicles run efficiently and breakdowns are rare, earnings stabilise; when vehicles are fuel-intensive and frequently out of service, long working hours do not translate into income.

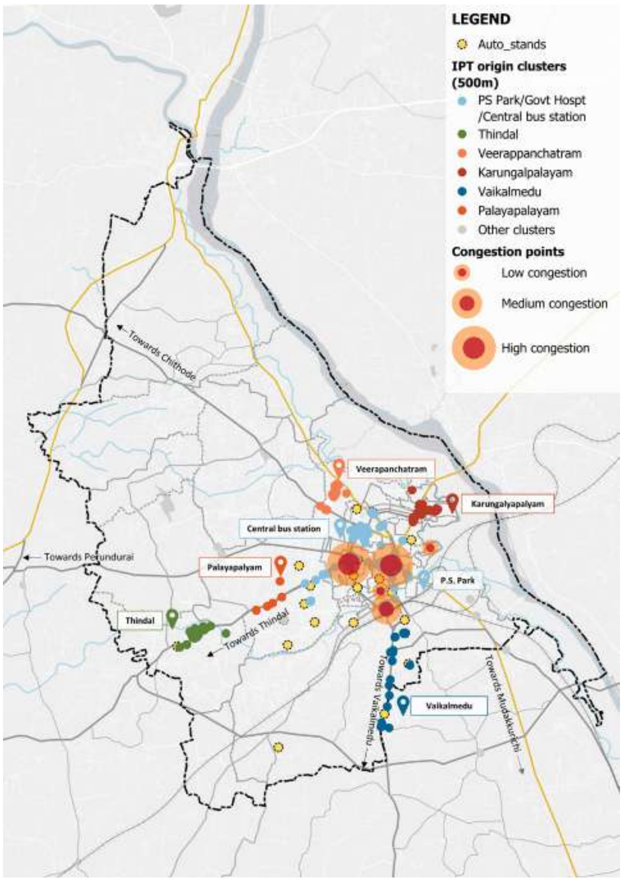
Drivers report congestion where demand is concentrated, while users in peripheral areas struggle with poor connectivity

Figure 59. Service gaps in Erode's intermediate public transport (IPT) network



Source: Field survey conducted by CEEW.

Figure 60. Congestion points identified by the intermediate public transport (IPT) operators overlap with commuters' origin points



Source: Field survey conducted by CEEW.

The core city, which has the major points of interest – such as the central bus station, government hospital and PS Park – shows strong IPT coverage, with well-distributed auto-rickshaw stands. Nearly 70 per cent of trips originate from these areas (Figure 59). In contrast, according to the land use and land cover (LULC) map of Erode (see Figure A2), the peripheral areas (towards Chithode and Perundurai), especially the north and north-eastern regions, are predominantly industrial and commercial, with significantly larger block sizes and poor road networks, limiting the provision of IPT services.

According to IPT operators, the most congested areas are found along the roads in the core city, especially near PS Park, the government hospital, and the surrounding commercial areas. These locations serve as key convergence points for intra-city traffic, resulting in bottlenecks (Figure 60). The roads leading to Thindal, Karungalpalayam, and Veerappanchatram, which act as the primary mobility spines for regional movement, show medium to high congestion levels.

When compared to the map of IPT origin points for users, it is evident that these clusters coincide with the congestion hotspots, demonstrating dependency on IPT at key points within the core city. It also highlights that the IPT network is concentrated in the core city, with poor coverage in the peripheral regions. Overall, the demand-driven nature of IPT intersects with highly congested roads in Erode, in turn aggravating core-city traffic.

6.4 Recommendations

Leverage digital platforms and improve infrastructure to integrate IPT services with the existing public transport network

Despite 21 per cent of users explicitly demanding stronger public transport–IPT integration (ITDP India 2025), current planning frameworks continue to treat IPT as a competitor rather than a first- and last-mile complement (ITDP India 2025). A light digital layer, combined with improved interchange design, could offer a low-cost pathway to integration. The Chennai Unified Metropolitan Transport Authority has adopted a similar model, demonstrating that multimodal trip planning can be enabled without displacing informal operations. Route visibility, waiting-time estimates, stand locations, and optional e-payments can improve predictability for users and demand visibility for drivers. Parallel physical integration of shared auto-rickshaw routes with bus stops, terminals, and high-demand corridors is essential to enable seamless transfers.

Prioritise gender-centric and inclusive infrastructure with active involvement of local bodies

Safety and access deficits – such as poor lighting, a weak NMT infrastructure, and encroached footpaths – continue to undermine IPT access (ITDP India 2025). Boosting street lighting, visibility, police presence, and helpline signage at IPT nodes and along pedestrian links, particularly after 6:00 p.m., is critical.

Service reforms should include refusal-free rides and fair pricing norms. These can be operationalised through fare chart displays; complaint-based enforcement through the regional transport office (RTO), Department of Transport, and traffic police; and linking permit renewals to mandatory driver training. Accessible stands and vehicle designs to support PwDs and older passengers, including ramps, low floors, and designated waiting areas, must be standardised.

Build a financially safe route for electrification

With green expenditure at only 0.5 per cent of total spending (CEEW 2025), electrification will require state-level financing, pooled credit, and external funding. Reducing upfront risk with targeted financing schemes, low-interest loans, and scrappage-linked subsidies can lower entry barriers for drivers. Charging infrastructure can be added at IPT stands and high-demand nodes to minimise interruptions during peak hours. Further, free EV skill training and maintenance support, including partnerships with manufacturers and local workshops, can be offered.

Improve the reliability of services

Fragmented terminal infrastructure and weak interchange design reduce service reliability (ITDP India 2025). Aligning supply with peak demand on high-traffic shared-auto corridors can lower waiting times. Clearly demarcated IPT stands and pick-up/drop-off points at key origin points – e.g., the Central Bus Station, PS Park, Vaikalmedu, markets, and the Government Hospital – can reduce search times and idle times for both users and operators, respectively.

In addition, strengthening IPT service coverage of underserved peripheral corridors, particularly industrial and commercial areas such as Chithode and Perundurai, has been identified as a priority in the *Gap Assessment Report* (ITDP India 2025). To implement this, identified stands, permit-linked incentives, and demand-based routing are crucial.

Piloting digital queue systems and optional digital payments can further enhance accessibility and efficiency of the IPT network.

Strengthen economic security and working conditions for operators

Mobility reforms must safeguard livelihoods in a city heavily reliant on informal transport. Standardised fare guidance can reduce negotiations and income volatility, benefitting both users and operators. Expanded maintenance support and discounted spare-parts programmes – particularly for LPG and diesel operators, who face high operating costs – can improve economic resilience.

In addition, provision of shaded rest areas, toilets, and drinking water at major IPT hubs will address basic welfare needs while formalising IPT as an essential urban service.

Auto-rickshaws parked along Brough Road, Erode.

Goods vehicles form the backbone of Erode's commodity movement, linking industries, markets, and regional corridors.

Image: CEEW

7. Freight: The commodity distribution and economic circulatory vein

Erode is a prominent trading centre for diverse commodities, ranging from agricultural goods to processed textiles. This is largely attributable to the presence of the State Industries Promotion Corporation of Tamil Nadu (SIPCOT), with its 150 industrial units and about two dozen trucks that make close to 100 trips daily, transporting commodities to Coimbatore, Salem, and Chennai (Erode Local Planning Authority 2024). National Highway (NH) 544 fortifies Erode's status as a pivotal regional logistics hub that facilitates substantial freight transit and permits expedited supply chains via medium- and heavy-duty vehicles (MHDVs) carrying goods to transhipment hubs on the periphery of the city, while light commercial vehicles (LCVs) handle the last-mile delivery. Erode's freight network sits on the Salem–Coimbatore industrial corridor. Sangagiri anchors warehousing to the north, while Coimbatore drives downstream demand to the west.

Freight movement within and via Erode deploys a dual network of LCVs for intra-city needs and MHDVs for intercity commodity transport. Erode thus operates as an important processing, aggregation, and redistribution node for goods moving across micro, small, and medium enterprises (MSMEs), wholesale markets, and regional logistic hubs. MHDVs predominantly facilitate intercity and corridor-oriented movements, establishing connections between Sangagiri's logistics parks, highway-adjacent warehouses, textile and agricultural processing facilities, and extensive supply chains, while LCVs cater to high-frequency, short-haul trips to and from the commercial areas in the core city, such as Gani Market.

Owing to its strategic location between Salem and Coimbatore, direct access to NH 544 and multiple state highways, and proximity to logistics clusters, Erode has historically channelled MSME-driven freight activity. These enterprises typically operate with limited storage capacity, just-in-time replenishment, and informal contracting, resulting in fragmented consignments, multiple daily trips, and a strong dependence on flexible LCV operations. As a result, freight movement in Erode is characterised by goods vehicles sharing road space with passenger traffic for most of the day.

This encapsulates the position of Erode as a logistics hub and the demand drivers of its road freight operations. To obtain a granular picture of operations, vehicle vintage, duty cycles, perceptions and challenges faced by stakeholders, and their stated position with respect to a transition to electric vehicles (EVs), we surveyed approximately 1,600–1,540 LCV and MHDV drivers and 57 bullock-cart drivers. For this, we administered a structured questionnaire to respondents at key points of interest, such as commercial market areas, fuel stations, parking lots, and logistical hubs.

> Freight movement operates through a dual system, with LCVs enabling city logistics and MHDVs supporting regional trade.

The bullock cart sub-sample was added later to respond to an inquiry from the former chief city planner, requesting the number of bullock carts currently plying within the jurisdiction of the Erode City Municipal Corporation (ECMC). Considering their unique profile, unless otherwise specified, the insights we present here pertain to only the LCV and MHDV drivers. Findings related to bullock carts are referenced selectively, only where they add contextual value or are directly relevant to the broader freight thematics.

7.1 Sample descriptives

Table A8 (refer to the Annexure) summarises the sample breakdown by select criteria.

Most LCV and MHDV drivers had at least middle-level schooling, with just over half having completed middle school and about one-fifth having reached the senior secondary level. Nearly one-fifth had only primary education, however, while a smaller but non-negligible share of the respondents had no formal schooling. Amongst the bullock-cart operators *(n = 57)*, middle-school education dominated, followed by primary-level schooling; interestingly, very few claimed no formal education.

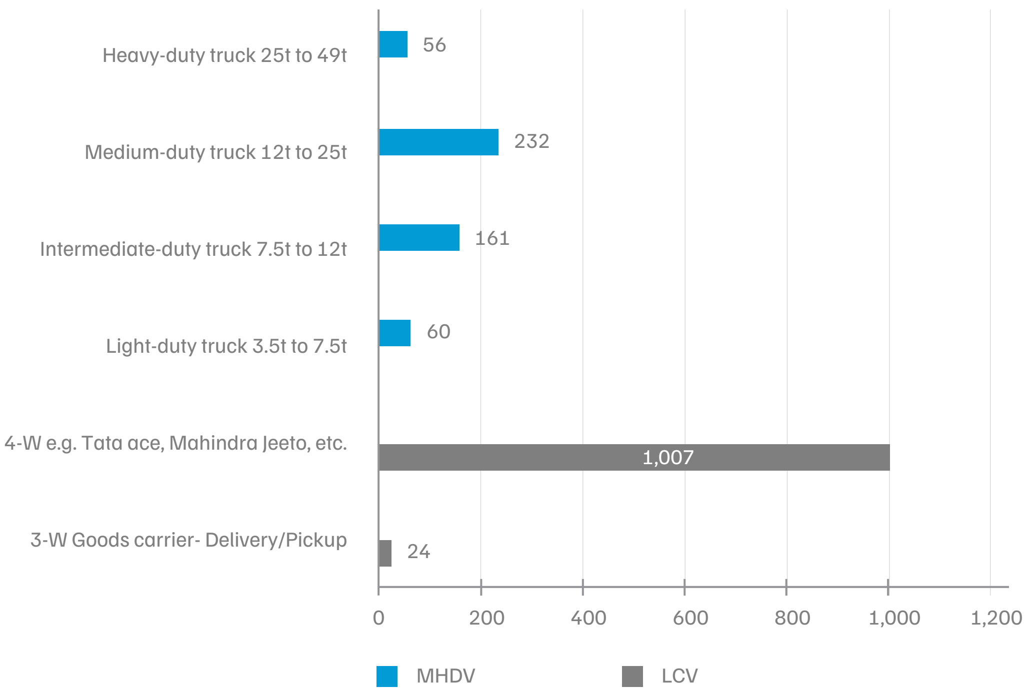
The LCV and MHDV workforce is overwhelmingly concentrated in the 30–59 years age group, with younger drivers (15–29 years) forming a smaller share and very few aged above 60 years. Bullock cart operators showed a broader age spread, with a substantial presence of older operators aged 60 and above, alongside the dominant 30–59 years group.

A little over half of the LCV and MHDV drivers reside within the city, though a sizeable fraction of the respondents were non-residents. Bullock cart operators were predominantly city residents.

LCV and MHDV drivers were largely experienced hands, with most reporting 3–10 years of driving experience and over one-fifth having more than a decade of experience. Bullock cart operators displayed similarly high experience levels, with the majority having over five years' experience.

The LCV and MHDV fleet (*n* = 1,540) remains overwhelmingly fossil-fuelled, as noted earlier as well, with diesel dominating (98 per cent), followed by petrol (0.9 per cent) and then compressed natural gas or liquefied natural gas (CNG/LNG) (0.6 per cent). Only one electric vehicle (EV) was identified in the sample and was included for the sake of completeness; as such, it has no bearing whatsoever on the analytical insights and results.

Figure 61. Freight vehicle sample breakdown by vehicle type and segment



Source: Field survey conducted by CEEW.

Note: The breakdown is with respect to the 1,540 LCV and MHDV samples

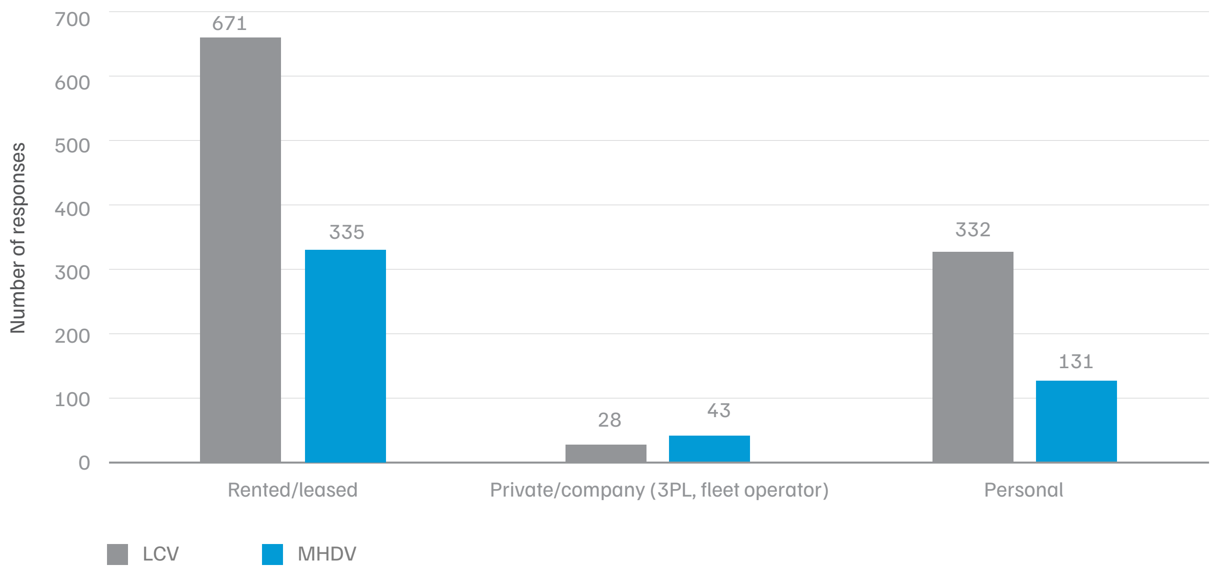
Figure 61 presents a sample breakdown by vehicle class and tonnage (t). The sample is understandably strongly skewed towards LCVs, both by design and as reflective of their dominant role in the ECMC's urban and peri-urban freight operations.

Within the MHDV segment, the distribution spans a broad range of tonnage classes, capturing diverse operational profiles. Medium-duty trucks (MDTs, 12–25 t) have the largest share amongst heavier vehicles, followed by intermediate-duty trucks (7.5–12 t). Heavy-duty trucks (HDTs) above 25 t are present, but limited in number, consistent with expectations for a city-focused survey; such vehicles are typically concentrated on highways and peripheral logistics hubs. Overall, the survey sample composition naturally follows the sampling strategy – convenience and purposive, as detailed in the **survey administration and sampling approach.**

Holding, vintage, and ownership patterns

Figure 62 depicts the ownership structure of the freight vehicle survey sample, highlighting differences between LCV and MHDV operations in Erode. Rented or leased vehicles dominate both segments, particularly LCVs, indicating the prevalence of flexible, asset-light operating models that are aligned with MSME-driven and contract-based freight movement. Personal ownership also remains significant, however, especially amongst LCV operators. These are the small owner–operators engaged in local distribution and short-haul trips. Company-owned or fleet-operated vehicles form a relatively small share of the sample, more visible in the MHDV segment. Almost 74 per cent of the bullock carts were personally owned, with the rest having been rented/leased.

Figure 62. Survey sample breakdown by ownership underscores the informal and fragmented nature of freight operations in Erode, with implications for regulation, financing, and electrification



Source: Field survey conducted by CEEW.

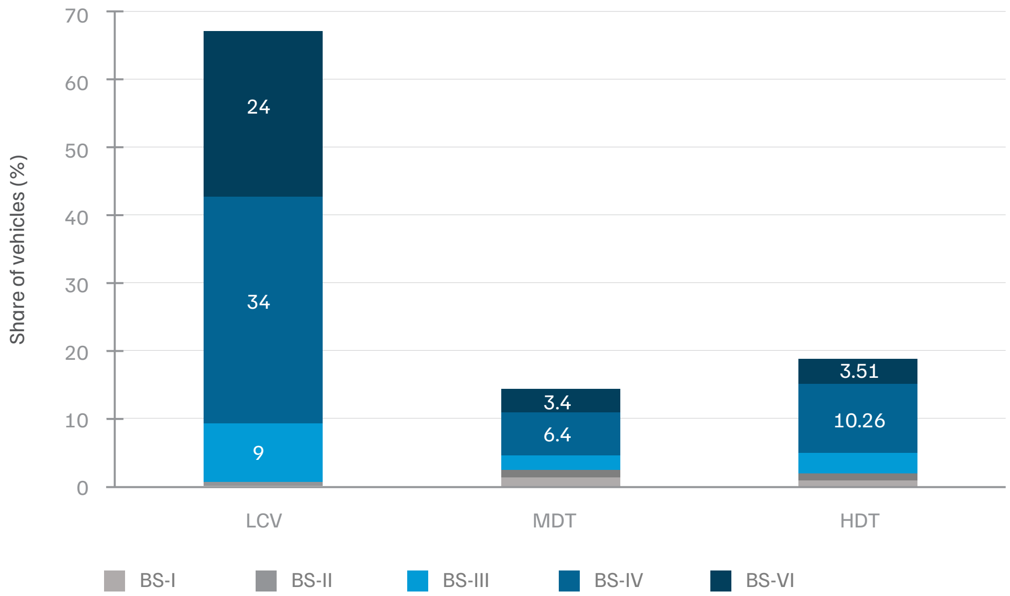
Note: This breakdown covers only the 1,540 LCV and MHDV samples. 3PL stands for third-party logistics providers.

Table A9 (refer to the Annexure) summarises average household and vehicle characteristics across the surveyed vehicle categories. Household size is broadly similar for LCV and MHDV drivers, averaging four members, while bullock cart operators report slightly larger households on average. Across all motorised freight segments, households typically have around two earning members. Bullock cart households report a slightly higher number of earning members.

Vehicle age and usage vary across motorised segments. LCVs in the sample are comparatively newer, while MDTs and HDTs are older, on average. Correspondingly, odometer readings increase with vehicle size, with MDTs and HDTs exhibiting substantially higher cumulative kilometres travelled than LCVs.

Figure 63 shows the composition of the surveyed freight vehicle sample (LCVs and MHDVs combined) in terms of Bharat Stage (BS) emissions standards. Across all vehicle classes plying in, via, or through Erode, BS-VI vehicles constitute only one-third of the sample, indicating limited penetration of the latest emission norms amongst the operating freight vehicles captured in the survey. Amongst the LCVs, BS-IV vehicles formed the largest share, followed by BS-VI vehicles, while a non-trivial proportion of the sample were pre-BS-IV vehicles (BS-I to BS-III). For MDTs and HDTs, the share of BS-VI vehicles was even smaller, with BS-IV vehicles dominating the sample again. The continued prevalence of BS-IV and pre-BS-IV freight vehicles, which on average are 10 years old, indicates a slow fleet turnover, compliance gaps, and lax enforcement.

Figure 63. Only a third of the freight vehicles (LCVs and MHDVs) plying in, via, or through Erode are BS-VI-compliant



Source: Field survey conducted by CEEW.

7.2 Key performance indicators (KPIs)

This section examines commodity composition, travel patterns, vehicle registration trends, and the spatial distribution of freight activity within Erode.

Commodities transported

The broad composition of categories and subcategories we observed in the freight survey (refer to Figure A14 in the Annexure) closely mirrors the district-level MSME activity structure (Ministry of MSME 2016). As shown in Figure A14a, agriculture and allied products, apparel and textiles, food and beverages (F&B), construction materials, and light industrial goods dominate both LCV and MHDV movements within Erode city. This aligns strongly with the district-wide MSME statistics, where textiles (22 per cent), apparel (18 per cent), food processing (18 per cent), and leather/tanneries (5 per cent) account for the majority of registered units, according to the Ministry of MSME (2016).

The LCV-heavy fleet for apparel, food, e-commerce, and mixed consumer goods is consistent with the fragmented pattern of freight traffic, characterised by high trip frequency, limited storage capacity, and just-in-time logistics. Conversely, MHDV movements show a higher concentration in the agriculture, construction materials, and industrial goods sectors, reflecting upstream and corridor-facing supply chains linked to Sangagiri, Tirupur, Salem, and Coimbatore. Importantly, no major MSME-intensive activity group at the district level is absent from the freight survey sample. The commodity profile captured through the survey provides a representative snapshot of how district-level MSME activity translates into commodity flows, supporting system-level inferences on freight movement.

Figure A14b compares the commodity composition of freight movements by vehicle class by subcategories. There is a noticeable overlap in the types of goods transported by both LCVs and MHDVs. Nevertheless, the distribution of volumes across commodities differs markedly by vehicle type: LCVs are more dispersed within the city, undertaking intra-city movements from origin points or transhipment nodes to points of sale, whereas MHDVs are primarily used for bulk consignments, in line with intercity/interregional corridor traffic. The presence of empty trips in both categories is indicative of operational inefficiencies and underutilisation of assets, across vehicle classes. Therefore, any freight policy must account for these nuanced differences to enable effective greenhouse gas (GHG) mitigation. This will be addressed more comprehensively in the upcoming freight decarbonisation road map report to be released in Q2 by the Council on Energy, Environment and Water (CEEW 2026).

Trips, distances, and duty cycles

Table A10 (refer to the Annexure) summarises key economic, duty-cycle, and operational parameters. Motorised vehicles, i.e., LCVs and MHDVs, differ considerably in size and function, while bullock carts constitute a separate, low-speed, low-income segment.

Net daily earnings rise with vehicle size across motorised freight, from INR 1,370 for LCVs to INR 1,814 for heavy-duty trucks, while average operational hours remain similar, at around nine hours per day. Bullock cart operators report substantially lower daily earnings and shorter working hours, reflecting a fundamentally different operating model. Bullock carts are mainly utilised for high-frequency trips over very short distances.

Idle time and load/unload durations increase with vehicle size, with MDTs and HDTs spending considerably more non-driving time at loading points and rest stops. Rest stops are more frequent and longer for vehicles with a higher gross vehicle weight, consistent with highway and/or major arterial roadway movements. Meanwhile, bullock carts operate entirely outside the tolled network and are confined to city streets.

These various differences reinforce the need for segment-specific policies, infrastructure, and transition strategies, rather than blanket interventions. Understanding this split is also important because it shapes where congestion occurs, who is exposed to urban pollution, and how negative externalities of traffic are distributed.

Freight spatial profile

Table 8. Breakdown of surveyed freight vehicles by RTO-zone registration

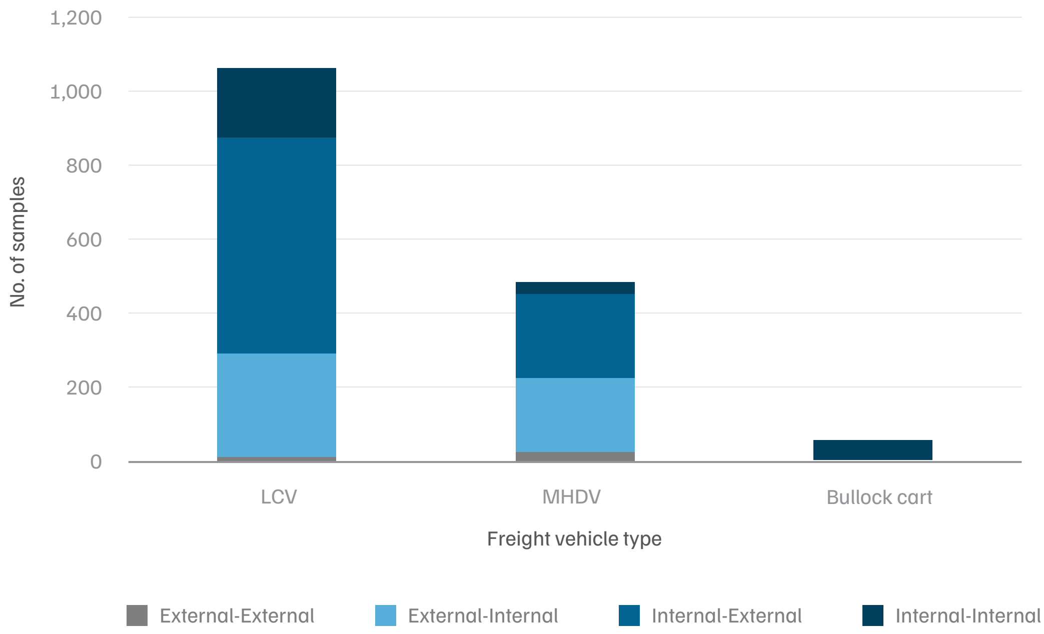
Regional transport office (zone)	Light commercial vehicles (*n*)	LCVs (% of total)	Medium and heavy-duty vehicles (*n*)	MHDVs (% of total)
Erode	507	32.92	157	10.19
Salem	269	17.47	109	7.08
Coimbatore	108	7.01	52	3.38
Missing/Non-Tamil Nadu	29	1.88	42	2.73
Madurai	26	1.69	21	1.36
Vellore	26	1.69	17	1.10
Tiruchirappalli	21	1.36	21	1.36
Chennai North	11	0.71	19	1.23
Tirunelveli	12	0.78	17	1.10
Villupuram	17	1.10	9	0.58
Chennai South	14	0.91	7	0.45
Thanjavur	12	0.78	5	0.32
Virudhunagar	8	0.52	4	0.26
	1060	**69**	**480**	**31**

Source: Field survey conducted by CEEW.

Before examining freight movements spatially, we derived the registration specifics of the surveyed vehicles for each RTO zone (Table 8). A majority of the surveyed freight vehicles (approximately 57 per cent) were not registered at Erode East or West RTOs, TN-33 or TN-86 respectively. LCVs show a stronger local orientation, with roughly one-third registered in Erode and a notable share registered in neighbouring zones such as Salem and Coimbatore. In contrast, MHDVs exhibit a relatively dispersed registration pattern, with a larger proportion originating from multiple other districts across Tamil Nadu and a non-trivial share registered outside the state. This dispersion is consistent with longer-haul and corridor-based freight operations (Figure 64).

The registration profiles signal that freight traffic in Erode is comprised of a mix of locally registered vehicles and through-traffic from regional and interregional networks. Therefore, our further spatial inferences are based on observed operating patterns rather than registration origin. Our analysis focuses on where different types of freight vehicles circulate: the extent to which they operate within city limits versus on peripheral and corridor networks.

Figure 64. Around 80% of the freight movement is transboundary



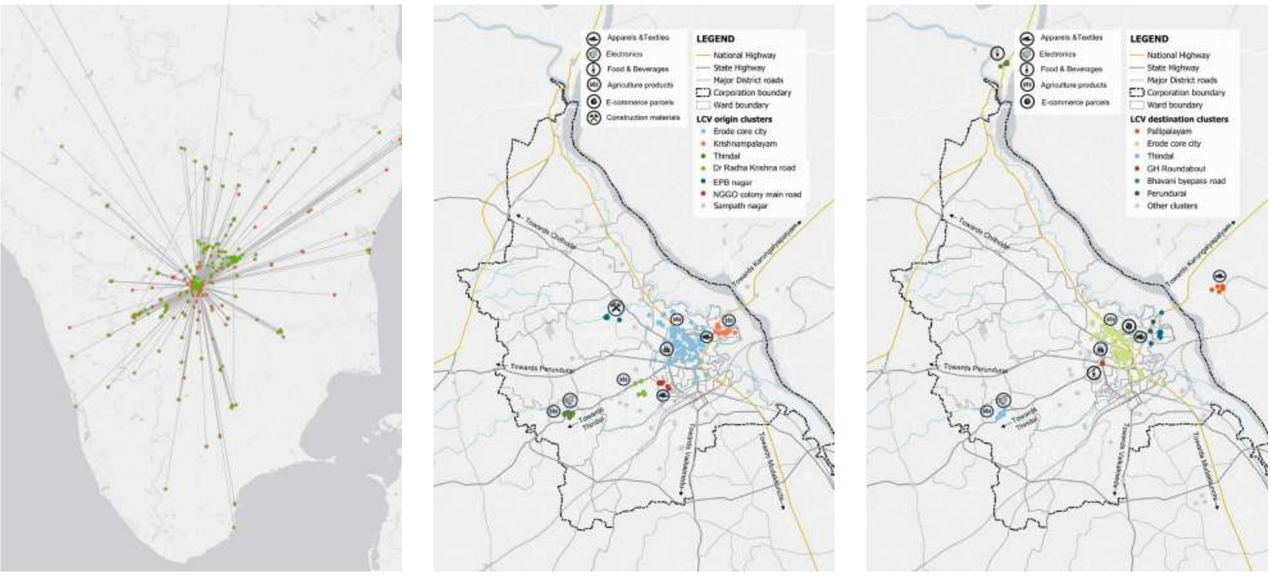
Source: Field survey conducted by CEEW.

The trip pattern indicates a clear dominance of transboundary trips by LCVs and MHDVs. These transboundary trips represent Erode's strong linkage with regional supply chains and peri-urban freight activities. In the transboundary category, internal–external trips – suggesting goods are being exported from one city to other cities and areas – hold a major share (Figure 64). The origin–destination (OD) clusters for such trips suggest that LCVs are used primarily for intra-state movement and to nearby neighbouring states, travelling an average distance of ~80 km, whereas MHDVs are preferred for long-haul interstate trips, with an average distance ~200 km.

Amongst LCVs, approximately 70 per cent of the vehicles are used to move agricultural and allied products, apparel and textiles, as well as F&B freight, with origin locations within the city boundaries. The key clusters within the Erode boundary include the old city area, which hosts agricultural markets along with metal and textile industries. Park Road supports multiple industries, such as cement, textiles, and metals. The Non-Gazetted Government Officers' (NGGO) Colony is primarily dominated by apparel and textiles units. Dr Radha Krishna Road, on the other hand, hosts agriculture and allied product units. Thindal supports a diverse range of industries, including agriculture, textiles, food processing, and electronics. EPB (Erode Public Block) Nagar, meanwhile, is mostly populated by construction-related industries. Beyond the city boundary, significant origin points are linked to regional industrial and commercial centres, such as Tirupur, Salem, Bengaluru, and Madurai.

LCV destination patterns (Figure 65) largely mirror these origin clusters within the city, indicating dense and short-haul back-and-forth movement. Apart from the old city area and Thindal, Palayam is a major destination cluster for textile products. Additional destination clusters include the General Hospital (GH) Roundabout and Bhavani Bypass Road, both of which are dominated by movement of F&B commodities. Outside the city boundary, major destination clusters extend to nearby small cities, urban centres, and industrial hubs, such as Perundurai, Sangagiri, Tiruchengode, Dharapuram, Anthiyur, Mettur, Rasipuram, and Salem. This highlights the role of LCVs in short and medium-distance regional supply chains.

Figure 65. Light commercial vehicles (LCVs) mainly transport agricultural products, textiles, and food and beverages through intra-state movement



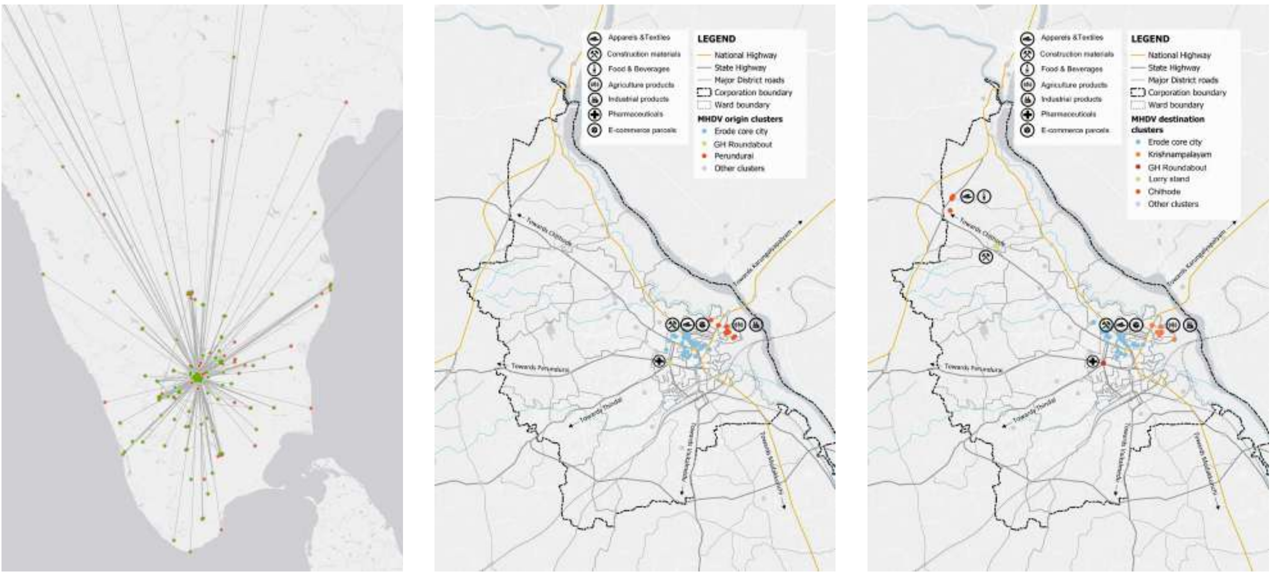
(a) (b) (c)

Source: Authors' analysis using CEEW primary surveys.

Meanwhile, 60 per cent of the MHDVs transport agricultural and allied products, as well as apparel and textiles. Apart from these, they also transport construction materials, e-commerce parcels, F&B items, and industrial goods. The majority of the vehicles travel along major highways and arterial roads in their interstate movements. Therefore, compared to LCVs, they exhibit fewer OD clusters inside the city. In addition, MHDV origin clusters show a clear spatial segregation of activities across the city. The GH Roundabout is characterised by healthcare- and pharmaceutical-related movements. Perundurai supports agricultural and allied products, and also hosts a significant number of timber, steel, and glass industries, requiring movement of industrial goods and machinery. The core city emerges as a key hub for textiles, apparel, as well as e-commerce parcels and courier services.

The MHDV destination pattern (Figure 66) exhibits a similar typology to the origin clusters, with the core city serving as a major destination for apparel and textile goods, e-commerce parcels, courier deliveries, and construction and building materials. The clustering of MHDV destinations around the lorry stand is largely associated with the transportation of construction and building materials, such as glass and timber. Chithode shows notable clustering related to apparel and textiles, as well as F&B activities, as it houses a significant number of oil mills. Apart from the city boundary clusters, the other cluster includes Salem, Tiruppur, and Madurai. Compared to LCVs, the MHDVs' origin and destination points are more dispersed, spanning multiple states, producing a wider spatial footprint that represents more diverse regional linkages along these corridors.

Figure 66. Agricultural products and textiles are the major commodities transported by the MHDVs

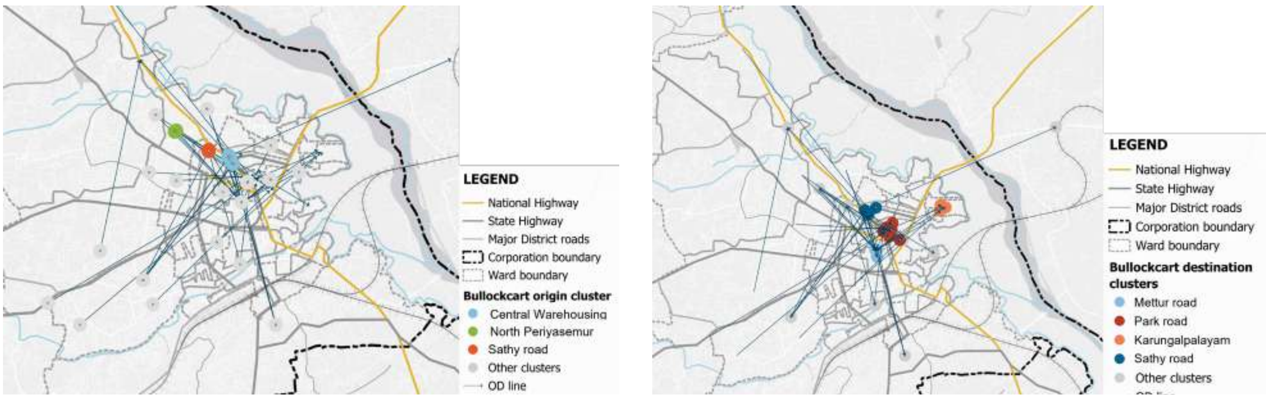


(a) (b) (c)

Source: Authors' analysis using CEEW primary surveys.

In Erode, bullock carts are used to transport goods from the periphery to the city centre, a distance of approximately 3 km. Our survey reveals that these are mainly used to transport apparel and textile commodities from areas such as the Central Warehouse, North Periyasemur, and Sathy Road to destination clusters, including Mettur Road, Park Road, and Karungalpalayam. They move inside the city boundary near the main market area.

Figure 67. Bullock carts transfer goods from the periphery of the city to the core commercial core markets



(a) Origin clusters (b) Destination clusters

Source: Authors' analysis using CEEW primary surveys.

7.3 Status quo perceptions, challenges, and improvement priorities

This section presents current user perceptions of the system, key challenges experienced, and priority areas identified for improvement.

Perception ratings

The perception scores are tightly clustered (≈5.0–5.6) across LCVs, MDTs, and HDTs, indicating that the respondents describe what is arguably a shared operating environment (refer to Table A11 in the Annexure). The pairwise Kruskal–Wallis non-parametric group means comparison test indicates that most perceived operating conditions do not differ meaningfully across vehicle classes. However, a small subset of dimensions shows statistically significant differences, all of which consistently distinguish LCVs from heavier vehicles (MDTs and HDTs).

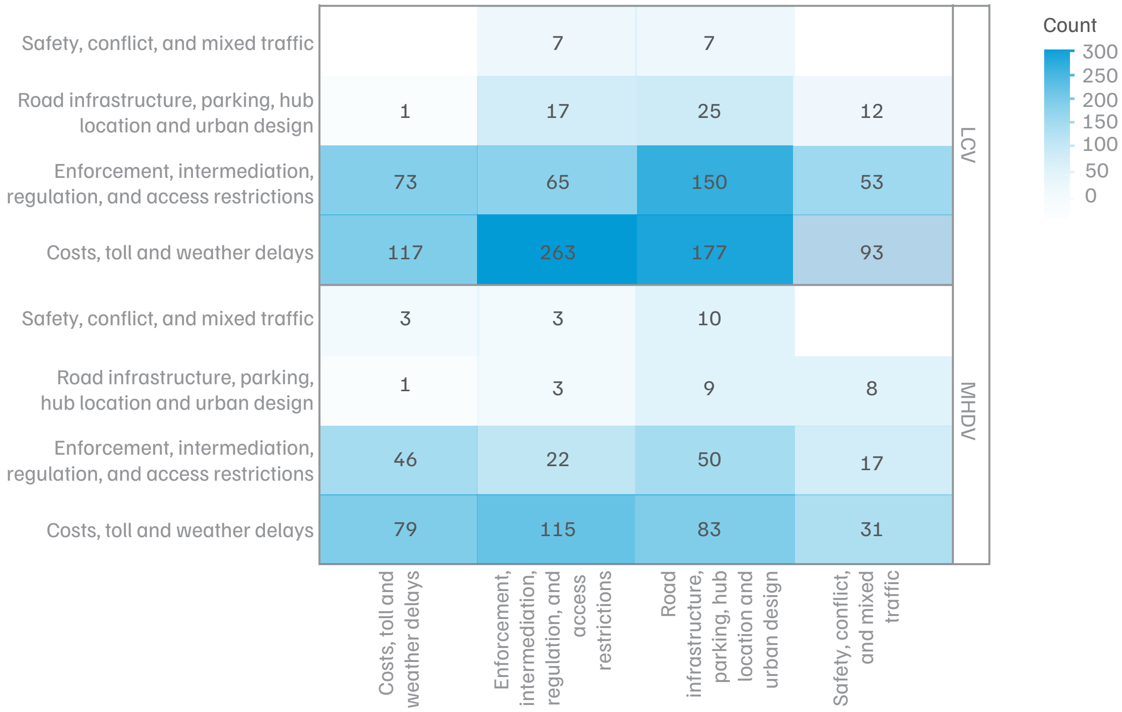
The only comparatively visible separations are on accessibility (LCV 5.24 vs MDT/HDT ≈4.69), suggesting that heavier vehicles experience somewhat greater access restrictions, and on income satisfaction (HDT 4.88 vs LCV/MDT >5.2), pointing to slightly lower perceived satisfaction with earnings amongst HDTs. Other dimensions – reliability, efficiency, adequacy of infrastructure, and regulatory support – obtained broadly similar scores across segments.

Accessibility emerges as the most robust differentiator, with both MDT and HDT operators reporting significantly lower accessibility than LCV operators ($p < 0.01$). Regulatory support also differs significantly, with MDT and HDT operators reporting lower perceived support relative to LCVs ($p < 0.01$). This points to a heavier regulatory and compliance burden for larger vehicles, including permits, checks, and enforcement interactions, which appear less pertinent for LCV operations embedded in local distribution. On the economic side, income satisfaction and income stability are significantly lower for HDT operators compared to LCVs ($p < 0.05$), indicating greater exposure to payment delays, demand volatility, and cost risks for long-haul and bulk-oriented freight. Finally, perceived safety differs between LCVs and heavier vehicles, with both MDT and HDT operators reporting lower safety ratings than LCVs ($p < 0.05$).

> Perceptions of accessibility were significantly lower among HDT and MDT operators as compared to LCV operators.

Bullock cart operators, however, diverge meaningfully on several dimensions. Their highly localised, slow-speed operations involve limited exposure to structured transport infrastructure and tolls, and they often face less, or even no, enforcement compared to LCVs and MHDVs. As a result, they report higher levels of reliability, comfort, accessibility, and regulatory support. At the same time, lower scores on social recognition point to the informal and unregulated nature of this mode.

Figure 68. Major difficulties faced by freight drivers and operators reveal systemic rather than episodic issues



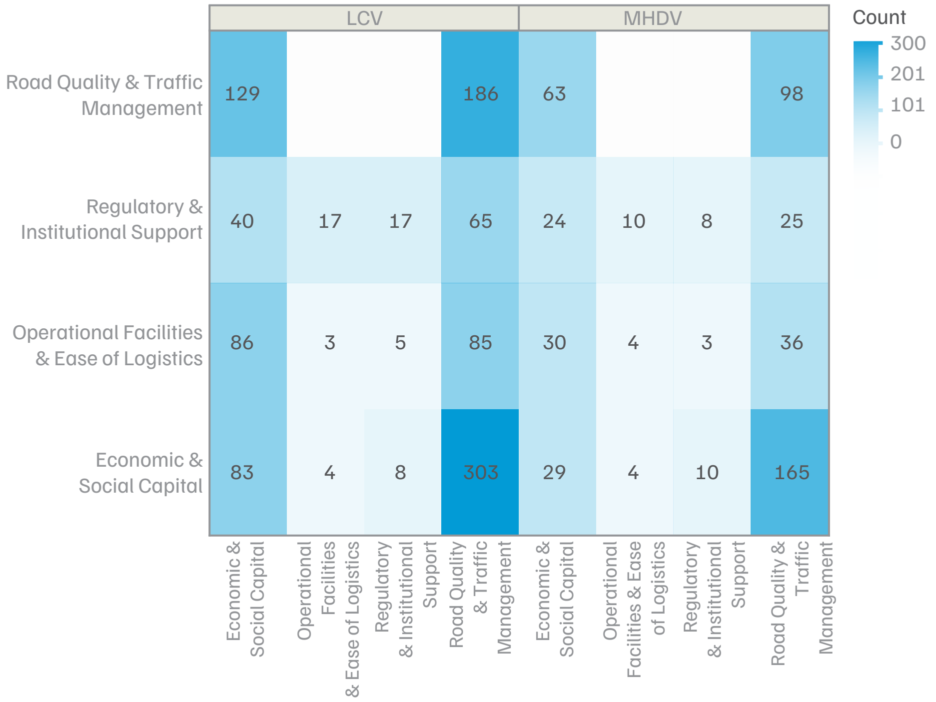
Source: Authors' analysis using CEEW primary surveys.

Note: n = 1,540, consisting of 1,031 LCV and 509 MHDV samples

For both LCV and MHDV operators, costs, tolls, and weather-related delays emerge as the most dominant class of difficulty, indicating that freight efficiency is highly sensitive to external operating conditions rather than just vehicle or firm-level choices (Figure 68). This points to sustained exposure to congestion and unpredictable travel times that disproportionately affect time-sensitive and low-margin operations. A second, closely linked layer of difficulty that was reported relates to enforcement, intermediation, regulation, and access restrictions, particularly for LCVs. These daily obstacles for freight vehicles in cities include permits, entry rules, policing, and unofficial brokers. This suggest the presence of orderly (in terms of their intensity and as understood from the perspective of regulations), complex rules with inconsistent enforcement, adding costs, time dilation, uncertainties, and overheads, as well as a need to improve infrastructure (in terms of road conditions, parking access, convenience of hub locations, and overall urban design).

Expectations

Figure 69. Road quality and traffic management together make up the top improvement priority for operators of LCVs and MHDVs



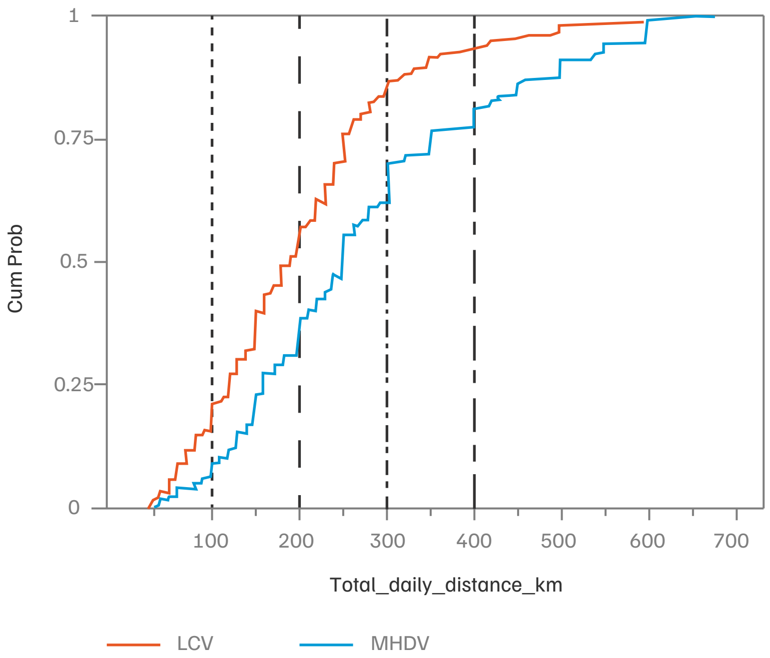
Source: Authors' analysis using CEEW primary surveys.

Note: n = 1,540, consisting of 1,031 LCV and 509 MHDV samples

The heatmap in Figure 69 highlights distinct constraints and improvement priorities for LCV and MHDV operations. For LCVs, improvement priorities are tightly centred on road quality and traffic management, reflecting their continuous exposure to congestion, poor surface conditions, and constrained kerbside access within the urban core. Economic and social issues are present, but secondary. In contrast, MHDV operations reflect a more layered set of concerns. While infrastructure issues remain relevant, there is a stronger, more consistent emphasis on access to finance, reliability of payments, and broader economic stability. This indicates that for larger vehicles, operational performance is shaped by a combination of road conditions and corridor-level performance (delays, tolls, free-flow speeds, etc.). The key takeaway from Figure 69 is that LCVs are constrained more by the static nature of the urban form, on one hand, and dynamic operational realities on the other, whereas MHDVs face economic, technological, market, financial, and corridor-level constraints that tend to impact them over extended durations, further underscoring the importance of differentiated policy interventions.

7.4 Electrification: Potential, adoption barriers, and transition catalysts

Figure 70. The CDF plot suggests that, In the range of 200–250 km, half of the LCV and MHDV freight can be electrified readily



Source: Authors' analysis.

Figure 70 depicts the cumulative distribution function (CDF) of average daily distance travelled to profile and screen the fleet and operations to quickly gauge the feasibility of electrification. Around half of the LCVs travel 200 km or less, which is reasonably within the range that current eLCV model offerings can cover (EVreporter 2024) without additional stops for midday or opportunity charging. Nearly three-quarters of MHDVs' daily travel distance remains under 350 km per day. Since this exceeds the nominal range of many current eMHDV offerings (Euler Motors 2025), a substantial portion of operations can be electrified only if en-route or destination-based fast-charging facilities are added. The tail end of the distribution curve represents long-haul operations, electrifying which would require bigger batteries or longer-range models, opportunity charging, and/or battery swapping.

Despite the (conditional) feasibility indicated by the daily travel distances of LCVs and MDVs, willingness to shift to EVs remains very limited, highlighting a wide chasm between technical feasibility and behavioural readiness. A large majority of respondents expressed outright reluctance (overall 1,178/1,540; LCV drivers 857/1,040 and MHDVs drivers 321/480), with only a small share showing willingness (4–6% of LCV drivers; 2% of MHDV drivers). A slightly larger share of both LCV drivers (141/1,060) and MHDV drivers (122/480) expressed conditional willingness to adopt EVs, contingent upon adequate purchase subsidies, a strong charging network, and a supportive policy environment overall.

The heatmaps in Figures A15 and A16 (refer to the Annexure) further disaggregate the major barriers to EV adoption by vehicle class. Figure A15 shows that battery reliability and warranty concerns dominate across the overall sample, consistently appearing alongside service ecosystem readiness and issues related to upfront costs, together suggesting system-level risk perception. In effect, though technical feasibility exists, weak trust in the supporting ecosystem is limiting EV adoption. Figure A16 dissects these barriers and reveals how risk perceptions differ between LCVs and MHDVs. Amongst LCV drivers, responses cluster strongly around battery reliability and warranty, service ecosystem readiness, and upfront costs. This points to a largely operational risk lens, with purchase decisions are shaped by concerns over downtime, ease of repair, warranty credibility, and immediate financial exposure. Charging constraints and range anxiety appear less prominent, consistent with the shorter duty cycles and electrification feasibility of LCVs.

For MHDV drivers, while battery reliability remains important, the emphasis shifts towards strategic technology assurances. Concerns are more evenly distributed across market offerings, charging availability, and ecosystem readiness, indicating uncertainty about whether current EV truck options are sufficiently mature, scalable, and supportive of long-haul or corridor-based operations. Compared to LCVs, the MHDV respondents exhibited less focus on upfront costs alone and had more concerns around system completeness and technology readiness at scale.

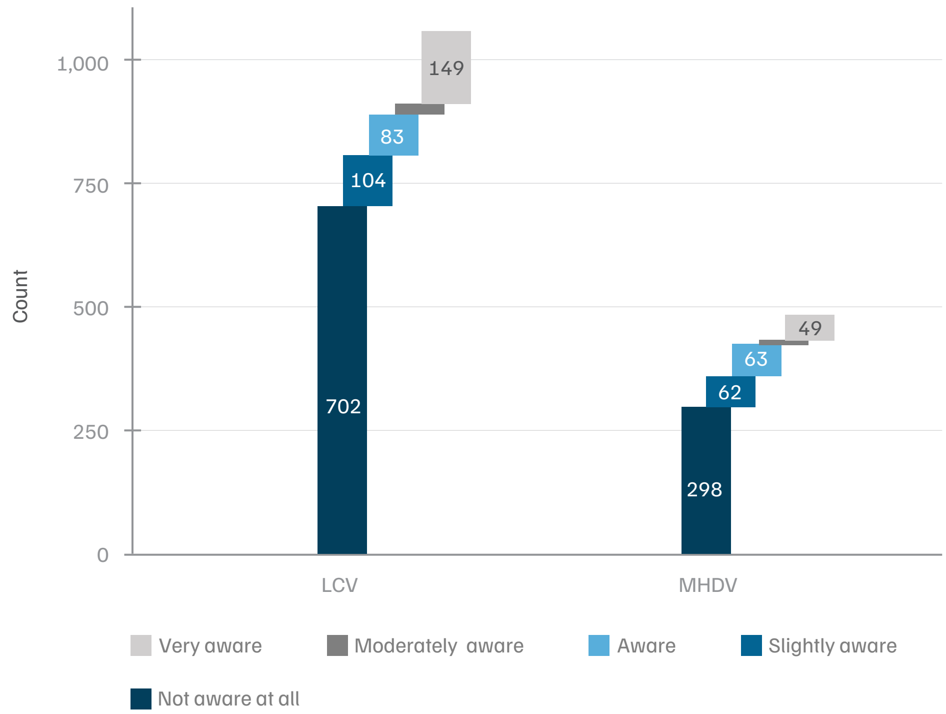
In the pooled LCV–MHDV sample, battery reliability and warranty emerged as the dominant first-order concern, one that co-occurs most strongly with other barriers. The highest intensities appeared where battery reliability intersected with service ecosystem readiness and upfront costs, indicating that respondents were not worried about batteries as a technical component per se, but rather post-purchase concerns: who fixes failures, who bears the risks, availability of spare parts, ease of maintenance, servicing, and repairs, as well as battery warranties. Conversely, range anxiety and charging time concerns appear weakly coupled with other concerns and rarely dominated in isolation. This suggests that daily operability constraints are largely understood and internalised by operators, whereas post-purchase risk exposure and entry barriers remain high.

Overall, risk perceptions of and willingness to adopt EVs differed between LCV drivers and MHDV drivers, based on operational exposure, use cases, and the supporting ecosystem. These factors collectively allude to network dependencies, which are system-driven (e.g., market and technological platform maturity) for MHDVs and event-driven (e.g., breakdowns, warranty denial, service delays) in the case of LCVs.

After methodically examining the broad contours of EV adoption, the next logical step was to explore which avenues and modalities might catalyse EV penetration in the road freight segment. Insights gleaned from Figure 70, Figure A15, and Figure A16 reasonably posit that technical feasibility is not the defining constraint. The question of how these barriers can be overcome warrants a multi-pronged inquiry, involving one or more of these possible levers: subsidies, charging infrastructure rollout, awareness and training, (re)skilling, and regulatory support.

These matrices are, at best, apt for a freight-focused EV transition study. For the purposes of this report – and considering that the share of electric freight (LCVs and MHDVs) is negligible to non-existent, that EVs have a dominating role in supporting the ecosystem to catalyse the transition, and that the majority of freight drivers are unwilling to transition to EVs immediately – we limit our subsequent analysis to the respondents' awareness of EV training opportunities and allied information channels.

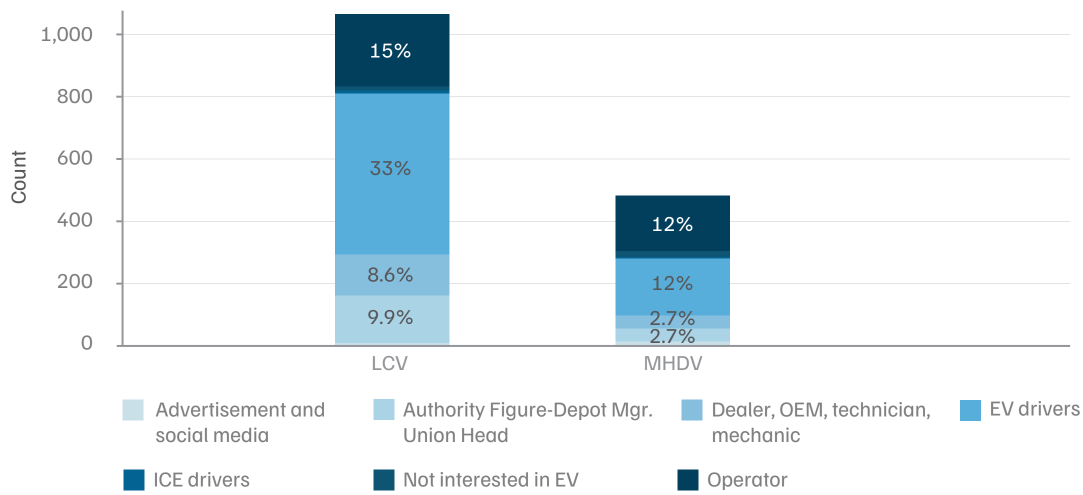
Figure 71. Across freight segments, awareness of EV training and capacity-building is very low



Source: Field survey conducted by CEEW.

Figure 71 highlights the awareness deficit around EV training opportunities. The LCV drivers' lack of awareness was overwhelming: 702 out of 1,060 respondents reported being unaware of any EV training opportunities. Even when including those who are only slightly aware, close to three-quarters of LCV drivers were in the low-awareness category. The majority of MHDV respondents (65 per cent) also reported no awareness of EV training opportunities, with only a limited share reporting moderate or high awareness. Therefore, structured, formal, and visible training pathways have reached only a tiny fraction of the freight drivers' workforce.

Figure 72. Current drivers (peer effect) (45%) and operators (27%) of electric vehicles (EVs) are vital information channels to support the EV transition



Source: Field survey conducted by CEEW.

Opinion formation around EV adoption is concentrated amongst actors with direct operational proximity and occupational hierarchy, as depicted in Figure 72. EV drivers are the influence most cited by both LCV drivers (33.4 %) and MHDV drivers (12%) surveyed, revealing that peer experience is the dominant reference point for EV-related opinions. Operators of EVs form the second most influential group, according to 15 per cent of LCV and ~12 per cent of MHDV respondents. Together, EV drivers and operators are cited as the main influence by nearly 50 per cent of LCV drivers and about 20 per cent of MHDV drivers, indicating that influence is concentrated amongst those who are intricately linked to daily EV operations and decision-making. Advertising, social media, and formal authorities' channels seem to play a negligible role in shaping operator views, each accounting for less than 1 per cent of the responses. Dealers, original equipment managers, technicians, and mechanics have a modest but visible role, having been cited by roughly 9 per cent of the LCV and 12 per cent of the MHDV drivers, suggesting again that trust in new technology is intertwined with day-to-day operations and overall performance.

7.5 Discussion

Data, results, and analysis from our primary survey clearly depict a dual structure of road freight movement. Corridor-facing, transboundary flows are dominated by MHDVs, while LCVs show a dense, high-frequency, intra-urban traffic distribution. This can be attributed mainly to Erode's position within the Salem–Coimbatore industrial corridor and the presence of MSME clusters and SIPCOT within in the city.

LCV movements are spatially concentrated within the core city, with dense OD clusters around the Gani Market, Mettur Road–Brough Road, VO Chidambaraner (VOC) Park Road, Karungalpalayam, Thindal, and EPB Nagar, reflecting short-haul, high-frequency intra-urban distribution (II and IE trips). In contrast, there are fewer MHDV OD clusters within city limits; notably, they are found along NH-544 (Chithode–Bhavani Bypass Road), SH-83A, NH-381, and the SIPCOT–Perundurai corridor. Therefore, it appears that LCV movements are shaped by access and congestion within the city, while MHDVs are exposed to permits, enforcement, tolls, duty-cycle variance, and, consequently, income uncertainty. The spatial evidence adds further weight to these observations. A substantial majority of the trips are transboundary. Approximately 80 per cent of the freight trips are internal–external (IE) or external–external (EE), in alignment with Erode's role as a through-node and redistribution point.

> Four out of five freight trips cross city boundaries, with non-Erode vehicles contributing to Erode's dynamic and mixed traffic.

While a considerable share of both LCV and MHDV operations falls within the daily distance ranges compatible with the technical and performative capabilities of currently available EV equivalents, willingness to transition remains extremely low due to elevated risk perceptions.

7.6 Recommendations

Prioritise performance management of current road assets to fix underlying freight inefficiencies

Both LCV and MHDV drivers repeatedly identified cost and time delays as their primary difficulty. Such delays can be linked to congestion on sub-arterial and major district roads carrying high-volume traffic to important urban roads (such as Chennimalai, Arachalur–Kangeyam, and Sankari Road) and major collector junctions (such as PS Park, Bullfight Circle, Solar Circle, Swastik Circle, and Surampatti Four Road). It is worth highlighting that the respondents also cited second-order difficulties, such as enforcement and kerbside regulations.

The ECMC should focus on optimising and maintaining existing roads through routine maintenance. In parallel, there is a need to manage competing demands on limited road space. Commercial corridors, in particular, require clearer rules for loading, unloading, and short-term parking. Simple measures, including (but not limited to) designated loading/unloading windows, clearer demarcation, and time-based access, can ease pressure without a major influx of capital.

The ECMC can also prioritise road maintenance and congestion management at key locations with high freight activity already observed in the survey sample: the Old Bus Stand–Gani Market corridor (including Mettur Road and Brough Road); the VOC Park Road–Karungalpalayam stretch; and the Erode lorry parking stand in Kongampalayam and its adjoining feeder streets. For instance, they might consider introducing distinctly marked, time-shared loading bays for freight operations during night hours and for short-term parking during the day.

At freight aggregation points within city limits, including markets, industrial clusters, and lorry stands, the ECMC can improve driving conditions and increase average travel speeds by managing kerbside space, providing designated times and locations for loading/unloading and parking, as well as reducing obstructions such as encroachments and unregulated bullock carts sharing space with mixed traffic. Such measures reduce stop–start delays and mitigate their compounding effect on localised pollution.

Address the laxity in compliance with emission norms through stringent enforcement

The low prevalence of BS-VI in the operating fleet points to an enforcement and compliance gap. Survey results indicate that almost two-thirds of freight vehicles plying in or through Erode are pre–BS-VI and have an average vintage of close to a decade. This requires periodic, stringent checks of emissions compliance, fitness, and maintenance, while providing alternative compliance pathways, including scrappage support, verified retrofits where legally permissible, and targeted incentives for cleaner replacements. It must be noted that pollution under control (PUC) checks and punitive enforcement for non-compliant vehicles rest with the state. However, the ECMC can still influence compliance outcomes in certain aspects, discussed below.

Several inner-city locations offer direct leverage for addressing non-compliance amongst LCVs, which dominate last-mile freight activity. These include the Old Bus Stand–Gani Market corridor via Mettur Road and Brough Road, the VOC Park Road–Karungalpalayam stretch, and NGGO Colony, along with the adjoining textile clusters. Survey responses indicate that a significant share of MHDV/T movement accessing Erode originates from, or traverses, the Neelambur–Mecheri (NH-544H) corridor linking Coimbatore and Sekkarapatti, with intermediate connections via Avinashi, Perundurai, and Chithode along NH-381 and SH-96. In addition, SH-83A – connecting Pollachi, Udumalaipettai, Dharapuram, Kangeyam, and Uthukuli with Erode – emerges as another prominent approach corridor feeding freight into Erode. The Chithode Junction and Bhavani Bypass Road interface, handling NH-544 traffic from the Salem–Sangagiri direction; Perundurai Road entry near SIPCOT along the Ingur–Perundurai stretch; and Thindal–Vijayamangalam are other notable stretches mentioned in the survey responses. The State Pollution Control Board and the Department of Transport may independently undertake PUC audits, roadside emission checks, or targeted enforcement drives in these areas. The municipal authorities can also go beyond coordination efforts alone and take the initiative to flag these survey-identified corridors to the Tamil Nadu Pollution Control Board (TNPCB) and the Department of Transport as priority stretches for periodic compliance checks. This would also help the ECMC in aligning its own traffic management measures with state-led enforcement actions.

Establish regulatory clarity on bullock cart operations and follow through with enforcement

Bullock carts require separate treatment as a governance issue. Even though they are not officially recognised as being part of the freight segment because non-motorised, their continuing operations suggest a demand for ultra-low-cost, short-distance goods movement near markets and highlight the dependence of economically vulnerable groups on such activities for their livelihoods.

The ECMC may choose to explicitly prohibit or phase out bullock carts from core urban areas, arterial roads, and high-traffic market streets where safety risks, congestion, and exposure impacts are most acute. Where a full or phased ban is politically or administratively infeasible, the city can instead opt for their containment, confining bullock cart operations to specified roads and time windows to limit conflict with motorised traffic while preserving essential livelihoods. The ECMC can also formalise bullock cart operations through voluntary self-registration and/or permits, offering it as a limited-time zero-cost option and moving to charge a small fee over time. If combined with upward economic mobility measures, such as workforce formalisation and skill development access, the ECMC can balance safety, regulation, and social safety net.

Materially lower the perceived risk of adopting new vehicle technologies

While daily distance profiles indicate that nearly half of Erode's freight operations could be electrified with current offerings on the EV market, operators' willingness to adopt them remains very low: Only 6 per cent of LCV drivers and 8 per cent of MHDV drivers surveyed were keen. This indicates that the respondents did not evaluate EVs solely in terms of their technological capabilities. Across the pooled sample, battery reliability emerged as the dominant first-order concern because it is tightly coupled with the supporting ecosystem. Significantly, this unwillingness can be better understood as a reaction to persistent day-to-day tactical difficulties and uncertainties surrounding system-level preparedness, rather than an outright rejection.

In this context, the ECMC is well-positioned to project confidence in the adoption of the new technologies. This can begin with the city's own fleets being electrified, enabling a visible, low-risk demonstration of a supportive environment for freight EVs within the city limits at least. This can include, for example, pilot applications in waste collection and other urban freight operations in the remit of the ECMC.

In parallel, the ECMC can support time-bound, city-backed, risk mitigation for early EV deployments, ensuring that initial adopters are not disproportionately exposed to failure. Even signalling that secondary markets, retrofitting, or repurposing options are being developed can alleviate adoption anxiety.

Simultaneously, the ECMC may consider institutionalising peer-to-peer learning loops among freight operators and drivers by formally documenting and disseminating evidence of performance from city-supported pilots, including vehicle uptime, maintenance events, service response times, and cost variability. Survey evidence shows that freight operators place the greatest trust in their peers' experience and observed performance, making such information significantly more influential than generic awareness campaigns.

These measures can help reposition electrification as a manageable transition within a progressively stabilised road freight landscape, as well as in the overall transport and infrastructure network.

Image: CEEW

Erode City Municipal Corporation (ECMC) headquarters, Brough Road, Erode.

8. Implications for climate-resilient urban planning and mobility

This *Movement of People and Goods* (MPG) report provides a set of standalone diagnostics across public, private, and shared transport modes – as well as a system-level narrative. Despite its limitations, as outlined in Chapter 3, our report has significant value in highlighting data gaps and informing future data collection, planning, and intervention design.

Chapters 4–7 provided granular diagnostics across private travel, public transport, intermediate public transport (IPT), and freight, with each chapter culminating in contextual and specific recommendations informed by primary survey observations and secondary data. Collectively, these chapters presented an overarching picture of Erode's mobility system – one shaped by rapid motorisation; a heavy dependence on private modes of travel; fragmented services; limited or, in some cases, absent intra-city penetration of public transport; first- and last-mile connectivity dependent on an unorganised and/or unregulated IPT sector; and embedded urban freight activity linked to district-level freight patterns, as well as spillover from regional and interregional freight demand.

Our findings must, however, be read in the context of Erode's current institutional baseline. The city's last comprehensive mobility planning (CMP) exercise dates back to 2015 (TNUIFSL 2015). Since then, there has been no systematic, periodic collection of data on travel demand – or even routine traffic counts (including in-use vehicle stock), assessments of freight patterns, perception surveys, or municipality-level monitoring. Thus, most mobility and transport infrastructure decisions have been reactive and episodic.

Rather than reiterating our mode-wise findings and recommendations, in this chapter, we synthesise the cross-cutting implications for the Erode City Municipal Corporation (ECMC) and pertinent state agencies and offer our recommendations. The central emphasis of this concluding chapter is on the macro levers and meso gears, so to speak. These macro levers include institutional architecture, budgeting, governance, and data systems, while the meso gears include street management, node redesign, operational improvements, and enforcement protocols. In the following sections, we connect the empirical evidence we have obtained to practical implications for the ECMC, broadly categorising these into five dimensions of the issue: institutional; infrastructural; urban planning and mobility; gender equality, disability, and social inclusion (GEDSI); and policymaking.

8.1 Institutional capacity, financing, and governance

At present, the ECMC does not have a dedicated traffic or mobility unit within the municipal structure. Its integrated command and control centre (ICCC), while operational, is functionally limited to oversight of LED street-lighting and solid waste management; it does not currently handle traffic operations, congestion monitoring, or freight-related analytics.

The town planning section, merged with the engineering department, manages land use and planning, but it is not positioned to translate mobility data into information and analytics that might support decision-making, indicating a structural separation between planning processes and transport system diagnostics. Meanwhile, the CMP prepared for the extended local planning area provides a long-term strategic framework (TNUIFSL 2015), but it predates many recent shifts in travel behaviour and has not been updated or adopted as an actionable work programme within the core municipal functions.

From a governance perspective, the directorate of municipal administration remains the overarching coordinating authority for municipal functions, including planning, revenue, and public works. However, its current mode of operation reflects the more traditional focus on service delivery, rather than proactive governance and system management. Public functions such as engineering, revenue, and planning are structured around the provision of assets and ensuring compliance; limited resources have been earmarked for transport system management, performance monitoring, or cross-department coordination. While e-governance systems such as the Urban Tree Information System provide citizen services and basic administrative functions, these platforms have not yet been extended to support mobility analytics that might integrate transport data with infrastructure and service outcomes.

Financial mechanisms for mobility planning and implementation by the ECMC are similarly constrained. Urban local bodies in Tamil Nadu operate within defined fiscal envelopes shaped by state transfers, own-tax revenues, and conditional grant programmes. While Erode is a beneficiary of the *Tamil Nadu Sustainable Urban Development Project* (TNSUDP), mobility functions have not yet been deeply embedded within the reforms it engenders. Under the TNSUDP's urban governance component, Erode has received allocations to strengthen organisational capacity and planning support; however, further efforts are needed to ensure that budget heads, budgeting norms, and performance indicators explicitly recognise mobility outcomes alongside other urban services, such as water supply, sanitation, and solid waste management.

Institutional fragmentation also impacts inter-agency coordination in Erode. Road assets, traffic engineering, and enforcement span multiple agencies, including the state highways department, the traffic police, and the municipal engineering branch, without joint operating protocols or shared accountability metrics to define how they may work together. This produces decision-making in silos, with mobility issues being addressed in an ad hoc fashion, rather than being consistently and periodically analysed.

Addressing these gaps will require institutional redesign. We recommend

- the establishment of a dedicated mobility cell or unit with cross-functional mandates,
- the integration of the ICCC and Geographic Information System (GIS) platforms into a unified architecture for managing mobility data, and
- the incorporation of mobility indicators into budgeting and annual public disclosures.

8.2 Infrastructure

Given the need for institutional redesign, this section highlights the infrastructural implications emerging from the assessment, including data and technology gaps, local urban planning and mobility challenges, and location-specific suggestions.

Data and technology challenges and potential solutions

We recommend that the ECMC leverage *Smart City* initiatives and investments, using its assets to generate mobility-relevant data. However, systematising and integrating these assets into routine ECMC workflows and responsibilities is a binding constraint – and has proved difficult in the past. For instance, the recent technological investments intended to expand CCTV coverage and automatic number plate recognition (ANPR) cameras remain underutilised. As of 2019, 11 locations within the ECMC boundary were equipped with CCTV and ANPR cameras, with 15 more such installations planned (*The Hindu* 2019). In another example, GIS tagging of road assets is ongoing but not yet integrated into traffic data streams.

The examples imply that ECMC and *Smart Cities Mission* have basic equipment in place to collect raw mobility data, but they lack the capacity to deliver. Most of these are key points of interest – the railway station, the central bus station, Mettur Road, and Chithode, for instance feature bottlenecks highlighted throughout this report: congestion, insufficient non-motorised transport (NMT) infrastructure, and enforcement and encroachment challenges. Furthermore, multiple motorised modes – public transport, IPT, freight, and private two- and four-wheelers (2-/4-Ws) compete for right of way in the absence of spatial and physical demarcations, adequate supporting facilities, signage, or designated pick-up/drop-off areas. These gaps materially constrain the city's ability to diagnose problems early, evaluate whether past actions have improved conditions, and prioritise interventions accordingly.

The priority should be to reconfigure ICCC workflows so that CCTV and ANPR feeds are periodically sampled and converted into simple indicators: peak-hour volume indices, average speeds, directional flows, freight time windows, safety incidents, and repeat congestion locations.

Further, ANPR data can be linked to real-time movement using the official vehicle registration portal (VAHAN) and to vehicle fitness records, enabling automated flagging and targeted enforcement, subject to data integration protocols. The regional transport office (RTO) and traffic police can thereby detect non-compliant vehicles without as much human intervention and without having to stop and inspect vehicles on an ad-hoc basis.

Even low-frequency analysis (e.g., one week per quarter), which can be conducted in-house and remotely, would materially improve ECMC's situational awareness compared to the current limited-use baseline. Road attributes – such as carriageway width, surface condition, junction geometry, parking availability, and encroachment status – could be monitored and overlaid with mobility metrics. Such linkages would allow the ECMC to move from prioritising maintenance to implementing targeted, analytically informed and geospatially rooted interventions at stressed locations.

Urban planning and mobility projects at the local level

Urban planning controls in Erode continue to rely on assumptions embedded in the 2015 CMP and the city master plan. In the absence of an updated CMP, however, the ECMC can still adopt interim mobility-responsive planning measures under its existing statutory powers, such as managing building permissions and regulating parking provision. Smaller projects can be implemented directly with ECMC approval, while larger developments will call for coordination with the state directorate of town and country planning (DTCP).

Such measures can be applied with particular success to commercial, mixed-use, warehousing, and institutional developments that generate significant passenger or freight movement. Development approvals for such land uses explicitly require the assessment of access conditions, loading and unloading arrangements, and interface with surrounding street networks, rather than treating traffic impacts as externalities to be managed *post facto.* Movement diagnostics generated by the MPG – such as the identification of key boarding and alighting points; entry/exit cordons; hourly traffic peaks; and user perceptions, expectations, and challenges – could be used to inform local street design. For example, streets with high IPT and pedestrian usage should prioritise footpath continuity, crossing safety, and kerb discipline, while streets with sustained freight activity should be assessed for pavement strength, turning radii, and clearly designated and signposted loading/unloading bays.

Location-specific augmentations

In addition to documenting the major difficulties experienced by and improvement priorities identified by different user groups across modes of transport, our study findings–when read alongside the *Gap Assessment Report* (ITDP India 2025)–generate location-specific intelligence that can be utilised by the ECMC.

Cluster-based assessments of IPT–public transport interface conditions reveal that several gaps in access, safety, and pedestrian comfort have arisen from sub-optimal street management, informal parking practices, and weak wayfinding infrastructure around key bus stops and activity nodes. Let us consider five locations that recur prominently in the primary survey: Panner Selvam (PS) Park, the government hospital, the central bus station, Thindal, and Karungalpalayam (refer to Figure A13 in the Annexure). These locations represent high-demand activity nodes, with overlapping or underserved IPT routes, high pedestrian volumes, and sub-optimal interaction with public transport. Furthermore, these locations capture travel behaviour across diverse use cases and archetypes, ranging from key interchange points (the Central Bus Station), to mixed residential–commercial corridors (in Thindal and Karungalpalayam, for instance), to essential public health services (represented by the Government Hospital).

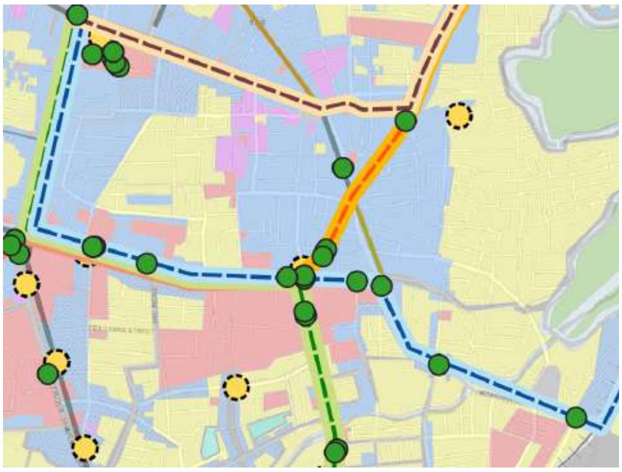
Designated pick-up/drop-off zones, wayfinding signage, and rationalisation of informal parking are amongst the near-term, high-impact, and low-cost interventions that fall within the ECMC's statutory authority. Tables 9 through 13 document these locations in detail, demonstrating how micro-scale street interventions, informed by MPG diagnostics, can materially improve first- and last-mile connectivity and encourage shifts from private transport to non-motorised, shared, and public modes.

The performance of each location has already been assessed, and level-of-service (LoS) scores have been assigned for positioning, navigation, and timing (refer *Public transport and pedestrian infrastructure report*, ITDP India 2025 for more information). In addition, our assessment considers ease of access indicators, including multimodal integration within 500 m of transit stops; availability of continuous and usable footpaths between IPT drop-off points and bus stops; the absence of physical encroachments that restrict pedestrian movement; as well as safety and essential facilities indicators, such as adequate lighting, safe waiting environments with good visibility, and functional shelters. We evaluated performance across these parameters on a percentage-based scale, ranging from poor to good (ITDP India 2025), to inform targeted, location-specific interventions.

Outside the Erode Corporation Office.

Panner Selvam (P.S.) Park Junction

Ward no. 147, Erode City Municipal Corporation (ECMC)



Source: Field photographs and survey by CEEW; secondary data from Erode City Municipal Corporation (ECMC).

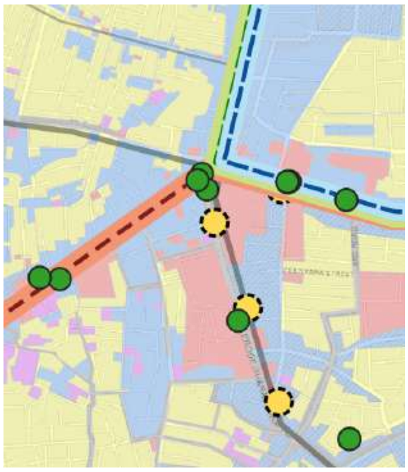
Table 9. Cluster-based recommendations and implications for the P.S. Park Junction

Level of service (LoS) ratings of bus stop infrastructure	Existing conditions and infrastructure	Recommendations	Implications
LoS: B **Ease of access: 0%** **Safety and essential facilities: 50%**	• Four shared-auto routes overlap • Multiple bus stops present, including one near the ECMC office • Informal auto stand ~150 m from the bus stop • Largely residential and institutional space • Pedestrian activity hindered by informal parking of 2-Ws, street vendors, and autos near the junction	• Introduce clear wayfinding signage to the nearest bus stop • Regulate informal parking; create space for designated drop-off; existing footpath space near the ECMC office can be better utilised	• Would improve first- and last-mile access, allowing IPT to act as a feeder to buses rather than as a competing mode • Addresses the access gap flagged by the LoS score without capital-intensive investments • Would improve pedestrian comfort and reduce conflict at a high-demand residential–institutional node

Source: Authors' analysis; LoS ratings adapted from ITDP India.

Government Hospital

Ward no. 114 and 134, Erode City Municipal Corporation (ECMC)



Source: Field photographs and survey by CEEW; secondary data from Erode City Municipal Corporation (ECMC).

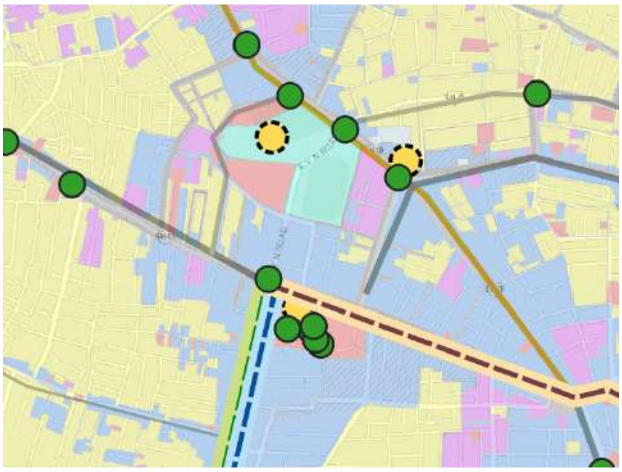
Table 10. Cluster-based recommendations and implications for the Government Hospital, Erode

Level of service (LoS) ratings of bus stop infrastructure	Existing conditions and infrastructure	Recommendations	Implications
LoS: C **Ease of access: 0%**	• Three shared-auto routes overlap • No formal auto-rickshaw stand near the hospital • Buses (intra-city Tamil Nadu State Transport Corporation [TNSTC] and private mofussil buses) queue behind shared/normal auto-rickshaws at designated bus stands • Bus stops located within 100 m of hospital entrance • High pedestrian activity, including older users and caregivers	• Establish a dedicated auto drop-off zone at least 150 m away from bus stops • Introduce universal accessibility features, such as ramps and tactile paving • Introduce signage guiding passengers to the auto-rickshaw stands to improve last-mile connectivity • Improve wayfinding signage to the nearest bus stop • Strengthen pedestrian access between hospital entrances and transit points	• Would enhance access for vulnerable groups, such as persons with disabilities (PwDs), older persons, etc. • Should improve operational efficiency and reduce conflicts and emissions from idling • Would signpost the hospital as a well-integrated multimodal node rather than a congestion hotspot

Source: Authors' analysis; LoS ratings adapted from ITDP India.

Central Bus Station

Ward no. 135, Erode City Municipal Corporation (ECMC)



Source: Field photographs and survey by CEEW; secondary data from Erode City Municipal Corporation (ECMC).

Table 11. Cluster-based recommendations and implications for the Central Bus Station

Level of service (LoS) ratings of bus stop infrastructure	Existing conditions and infrastructure	Recommendations	Implications
Not assessed under the *Public transport and pedestrian infrastructure report* (ITDP India 2025)	• Major pick-up and end node for shared auto-rickshaws • Three shared-auto routes overlap • Dense commercial surroundings • Informal auto-rickshaw stands at least 100 m from the central bus station	• Introduce clear signage at the entry and exit points of the bus station directing towards auto-rickshaw stands for last-mile transfer	Strengthens integration between IPT and the city's primary transport hub

Source: Authors' analysis.

Thindal

Ward no. 92, Thindal (Keel)

IPT stands   Bus stops

Source: Image from Google Earth; field survey by CEEW and secondary data from Erode City Municipal Corporation (ECMC).

Table 12. Cluster-based recommendations and implications for Thindal

Level of service (LoS) ratings of bus stop infrastructure	Existing conditions and infrastructure	Recommendations	Implications
LoS: C **Ease of access: 0%** **Safety and essential facilities: 25%**	• One shared-auto route (Panner Selvam Park to Thindal) • Educational, religious, and commercial activities • Bus stand opposite Vellalar College for Women • Presence of informal auto-rickshaw boarding points along the Erode–Perundurai road • Bus stops overlap with shared-auto drop-off points near the college and a temple	• Establish a dedicated auto-rickshaw drop-off point at least 150 m from the bus stops • Introduce clear wayfinding signage to the nearest bus stop	• Addresses low LoS performance on both access and safety • Would improve connectivity and congestion near institutional nodes • Would encourage shared mobility over private 2-Ws (scooters/bikes) amongst students and commuters

Source: Authors' analysis; LoS ratings adapted from ITDP India.

Karungalpalayam

Ward no. 140, Erode City Municipal Corporation (ECMC)

Source: Field photographs and survey by CEEW; secondary data from Erode City Municipal Corporation (ECMC).

Table 13. Cluster-based recommendations and implications for Karungalpalayam

Level of service (LoS) ratings of bus stop infrastructure	Existing conditions and infrastructure	Recommendations	Implications
LoS: C **Ease of access: 0%**	• Two fixed shared-auto routes emerge from P.S. Park and the central bus station • Predominantly a residential area, with few pockets of commercial zones within the core city • Presence of bus stops (for intra and intercity services) close to the residential area • No designated or informal auto-rickshaw stands near the bus stops	• Establish a dedicated auto-rickshaw drop-off point at least 150 m away from the bus stops • Introduce clear wayfinding signage linking to nearest transit points (for IPT as well as buses)	• Would strengthen last-mile access to residential areas through multimodal integration • Should reduce dependence on private 2-Ws and 4-Ws to access transit stops

Source: Authors' analysis; LoS ratings adapted from ITDP India.

8.3 Gender equality, disability, and social inclusion (GEDSI) considerations

Across our analyses of public transport and IPT, we found critical mobility constraints for women, low-income users, and informal-sector workers , as safety, lighting, service predictability, and the quality of waiting and transfer environments shape when and how individuals in these groups commute. Amongst the surveyed IPT users and operators, safety concerns influence travel timing and work decisions, particularly for women. These findings underline that GEDSI must be treated as an indispensable lens for all ECMC planning, procurement, implementation, and monitoring of mobility interventions, rather than merely a bureaucratic add-on.

Following the user and operator surveys, we gathered additional qualitative inputs by convening a city-level GEDSI meeting with ECMC officials, bullock cart operators, and IPT drivers (including a few women as well as men). We used these discussions to corroborate the patterns that emerged from the surveys and uncovered practical constraints to governance and delivery that affect inclusion outcomes on the ground, such as poor waiting environments, limited visibility and enforcement at key locations, and informal practices that shape access to services and livelihoods.

> Erode has the resources, but lacks updated evidence, continuous monitoring, and institutionalised decision-making to guide mobility planning.

At present, GEDSI is not consistently embedded in routine municipal processes – mobility planning, street management, or infrastructure provisioning. While equity may be attained to an extent through welfare provisions, effectiveness is not routinely examined through the municipal project cycle. ECMC officials flagged recurring coordination gaps across relevant agencies (electricity, traffic enforcement, and highways) and underuse of the disaggregated datasets available with government departments. Stakeholders have also highlighted delivery constraints: unreliability of contractor readiness to implement inclusion requirements, monitoring that fails to consistently focus on usability outcomes, and grievance systems constrained by limited capacity. Together, these insights point to the need for clear process gates, accountability tools, and operational follow-through.

The ECMC, we recommend, should adopt a GEDSI-responsive mechanism across the following dimensions.

1. **Procurement:** Mandatory GEDSI clauses and a checklist for tenders and requests for proposals (RFPs) should be introduced, which includes universal design and safety requirements, consultations with priority groups, service and operational expectations informed by GEDSI values (such as for staff conduct and assistance protocols), and reporting aligned with inclusion outcomes

2. **Design sign-off:** A mandatory must-pass GEDSI compliance checklist should be established before commissioning, which informs standards and implementation for lighting, safe waiting areas, accessible boarding conditions, safe crossings, information dissemination and signage, and basic amenities at stops, stands, and terminals and along access routes.

3. **Post-implementation follow-up:** Short GEDSI audits should be mandated by establishing a structured user feedback loop linked to corrective actions and contractor performance reviews.

Night-time safety should be improved by implementing a bundled package at major stops, stands, and transfer points. It should include adequate lighting and clear sightlines; stop/stand design that supports safe waiting and reduces uncertainty, such as marked bays and organised queuing/boarding; staff/enforcement presence; operational measures that reduce waiting time by improving predictability and waiting conditions; and a functional grievance-and-response loop with defined timelines.

These insights should directly feed into the ECMC's procurement templates, design sign-off criteria, monitoring processes, and stand/route management activities. The project's continued engagement also intends to explicitly include PwDs, older persons, caregivers, women users, informal operators (including bullock cart operators), and IPT drivers to ensure the tools stay anchored in lived experience and reflect the full range of GEDSI needs.

8.4 Policy-making

Municipal action in Erode should focus on areas the city can directly manage, easily implement, and readily act upon. This domain encompasses street use, access regulations, coordination of enforcement processes, and prioritisation of infrastructure – all of which have a direct effect on system-wide performance. The city's ability to address operational stress in real time relies on these levers, which enable targeted access and demand management through administrative decisions and inter-agency coordination. For policy areas beyond the domain of the municipal authority – such as vehicle transition incentives, scrappage schemes, or fuel standards – the ECMC's role shall be to consolidate evidence and articulate specific, bounded policy requests to state agencies. Our MPG report could serve as the empirical starting point for such engagement.

A more fundamental gap lies in how mobility decisions are currently evaluated. For instance, the implications of greenhouse gas (GHG) emissions are rarely considered in routine planning processes, and CMPs and master plans rarely incorporate them as explicit metrics. As a result, investment and policy choices are made without a clear understanding of their climate trade-offs. Establishing a city-level emissions baseline is therefore a necessary first step for monitoring and shaping future decisions.

To address this gap, the proposed road transport GHG calculator, an upcoming output under the *UK Partnering for Accelerated Climate Transitions* (PACT) project, represents a practical and scalable tool for the ECMC. While not a substitute for a full emissions inventory or traditional source apportionment, the calculator would enable the ECMC to estimate the order of magnitude of the city's transport-related GHG emissions, test alternative mobility scenarios, and screen and compare the emissions implications of prospective interventions. Integrating such assessments into routine decision-making would allow the ECMC to align its urban planning strategy and mobility plans to the city's broader climate objectives.

Understanding how Erode moves is the first step towards transformation; its success depends on establishing a dynamic mobility system that continuously measures, learns, and adapts to change.

Acronyms

2-/3-/4-W	two/three/four-wheelers
2AT	two-axle trucks
3AT	three-axle trucks
3W-P	three-wheeler private
3W-S	three-wheeler shared
4W-C	four-wheeler commercial
ADT	average daily traffic
ANOVA	analysis of variance
ANPR	automatic number plate recognition
AOD	aerosol optical depth
AQI	air quality index
BS norms	Bharath Stage norms
CDF	cumulative distribution function
CJV	car/jeep/van
CNG	compressed natural gas
CMP	Comprehensive Mobility Plan
CO	carbon monoxide
CMDA	Chennai Metropolitan Development Authority
CVC	classified volume count
ECMC	Erode City Municipal Corporation
e/f 2,3,4W	Electric/fossil fuelled- diesel, petrol, or natural gas
EV	electric vehicle
FuSS	fuel station user survey
GEDSI	gender equality, disability, and social inclusion
GHAP	global high air pollutant
GHG	greenhouse gas
GoTN	Government of Tamil Nadu
GVW	Gross Vehicle Weight
GNDVI	green normalised difference vegetation index
ICCC	Integrated Command and Control Centre
IPT	intermediate public transport
L/M/H CV/GV	light/medium/heavy commercial vehicle/goods vehicle
L/M/H GV	light/medium/heavy goods vehicle
L/M/H MV	light/medium/heavy motor vehicle
L/M/H PV	light/medium/heavy passenger vehicle

L/M/H PV/MV	light/medium/heavy passenger vehicle/motor vehicle
LCV	light commercial vehicle
LNG	liquefied natural gas
LPG	liquefied petroleum gas
LPA Erode	Local Planning Area, Erode
LULC	land use and land cover
MAV	multi-axle vehicle
MAWS	Municipal Administration and Water Supply
MJ	megajoules
MoE	margin of error
MoEFCC	Ministry of Environment, Forests and Climate Change
MoHUA	Ministry of Housing and Urban Affairs
MoRTH	Ministry of Road Transport & Highways
NDBI	normalised difference built-up index
NDMI	normalised difference moisture index
NDVI	normalised difference vegetation index
NHAI	National Highways Authority of India
NIR	near-infrared
NMT	non-motorised transport
NOx	nitrogen oxides
OD	origin–destination
PM2.5	particulate matter-2.5 microns
PNT	people near transit
PUC	pollution under control
PT	public transport
RTO	regional transport office
SD	standard deviation
SIPCOT	State Industrial Promotion Corporation of Tamil Nadu
SWIR	Short-wave infrared
TANGEDCO	Tamil Nadu Generation and Distribution Corporation Limited
TNCCM	Tamil Nadu Climate Change Mission
TNGCC	Tamil Nadu Green Climate Company
TNIDB	Tamil Nadu Infrastructure Development Board
TNPCB	Tamil Nadu Pollution Control Board
TNSAPCC	Tamil Nadu State Action Plan on Climate Change
TNSTC	Tamil Nadu State Transport Corporation
TNSUDP	Tamil Nadu Sustainable Urban Development Project
TNUIFSL	Tamil Nadu Urban Infrastructure Financial Services Limited
TNUFIDCO	Tamil Nadu Urban Finance and Infrastructure Development Corporation
VAHAN	Vahan Parivahan Sewa Dashboard

References

CDM Smith India Pvt. 2015. Erode Comprehensive Mobility Plan. Tamil Nadu Urban Infrastructure Financial Services Ltd (TNUIFSL). https://www.tnurbantree.tn.gov.in/erode/wp-content/uploads/sites/143/2019/12/Erode-City-Mobility-Plan-Final1.pdf

Council on Energy, Environment, and Water (CEEW). 2025. Erode Budget Assessment Note: UK PACT Erode Mobility Project. UK PACT.

Council on Energy, Environment and Water (CEEW) and ITDP India. 2025. Inception Report: UK PACT Erode Mobility Project. UK PACT.

Council on Energy, Environment and Water (CEEW) and ITDP India. 2025. Kick-off Report, UK PACT Erode Mobility Project. UK PACT.

Department of Statistics and Economics. District Statistical Handbook, Erode District 2023-2024. Department of Statistics and Economics. Released January 27, 2025. https://cdn.s3waas.gov.in/s3bca82e41ee7b0833588399b1fcd177c7/uploads/2025/01/2025012713.pdf

Directorate of Census Operations, Tamil Nadu. 2011. District Census Handbook: Erode. Census of India, Ministry of Home Affairs, Government of India. https://cdn.s3waas.gov.in/s3bca82e41ee7b0833588399b1fcd177c7/uploads/2018/06/2018062114.pdf

Erode Local Planning Authority. 2024. Erode Local Planning Area Master Plan 2041. Department of District Town and Country Planning.

Euler Motors. 2025. “Top 10 EV Trucks in India: Check Ton Capacity, Battery, Charging Time and More.” Euler Motors, October 26. https://www.eulermotors.com/te/blogs/best-ev-trucks-in-india

European Space Agency (ESA). n.d.(a). “Sentinel-2.” Accessed May 9, 2025. https://www.esa.int/Applications/Observing_the_Earth/Copernicus/Sentinel-2

European Space Agency (ESA). n.d.(b). “Copernicus Sentinel-5P.” Accessed May 9, 2025. https://www.esa.int/Applications/Observing_the_Earth/Copernicus/Sentinel-5P

EVreporter.com. 2024. “Listing of Electric LCVs in India.” EVreporter.com, October 8. https://evreporter.com/listing-of-small-and-light-electric-4w-commercial-vehicles-in-india/

GEE. n.d. “Global High Air Pollutants (GHAP).” Accessed 2025.

Goel, Rahul, Dinesh Mohan, Sarath K. Guttikunda, and Geetam Tiwari. 2016. “Assessment of Motor Vehicle Use Characteristics in Three Indian Cities.” Transportation Research Part D: Transport and Environment 44: 254–65. https://doi.org/10.1016/j.trd.2015.05.006

Guttikunda, Sarath, Nishadh Kalladath, Vivek Tejaswi, and Rahul Goel. 2025. “Fuel Station Survey (FuSS) to Profile In-Use Vehicle Characteristics.” SIM-air Working Paper Series #56-2025. https://urbanemissions.info/wp-content/uploads/docs/SIM-56-2025.pdf

ITDP India. 2025. Gap Assessment Report: UK PACT Erode Mobility Project. UK PACT.

ITDP India. 2025. Public Transport and Pedestrian Infrastructure Assessment for Erode: Analysing People Near Transit and the Existing Service Quality of Bus Stops and Footpath. UK PACT.

Ministry of Environment, Forest and Climate Change (MoEFCC). 2022. India’s Long-Term Low-Carbon Development Strategy. Government of India. https://moef.gov.in/uploads/2022/11/Indias-LT-LEDS.pdf

Ministry of Micro, Small and Medium Enterprises (MoMSME). 2016. Brief District Industrial Profile Erode District. Government of India. https://dcmsme.gov.in/dips/2016-17/DIP.ERODE.2015.16.pdf

Ministry of Road Transport and Highways (MoRTH). n.d. “VAHAN Parivahan Sewa Dashboard.” Accessed July 22, 2022. https://vahan.parivahan.gov.in/vahan4dashboard/

Nikore, Mitali, and Gerald Ollivier. 2022. “India: Making Public Transport More Women-Friendly.” World Bank Blogs, December 1. https://blogs.worldbank.org/en/endpovertyinsouthasia/india-making-public-transport-more-women-friendly

NASA Earth Observing System (EOS). n.d. “MODIS/Terra+Aqua L3 Value-added Aerosol Optical Depth - NRT.” Accessed May 9, 2025. https://cmr.earthdata.nasa.gov/search/concepts/C1426395436-LANCEMODIS.html

Tamil Nadu State Climate Change Cell (TNSCCC). 2021. Tamil Nadu State Action Plan on Climate Change 2.0. Government of Tamil Nadu. https://moef.gov.in/uploads/2017/09/Tamilnadu-Final-report.pdf

Tamil Nadu State Planning Commission. 2022. A Report on the Zero-Ticket Bus Travel Scheme for Women in State-Owned Bus Transport Corporations-II. https://spc.tn.gov.in/wp-content/uploads/VP-2.pdf

The Hindu. 2019. “Cameras to Capture Number Plates at 11 Places in Erode.” The Hindu, June 12. https://www.thehindu.com/news/cities/Coimbatore/cameras-to-capture-number plates-at-11-places-in-erode/article27891295.ece

U.S. Geological Survey. n.d. “Landsat-8 OLI (Operational Land Imager).” Accessed 2025. https://doi.org/10.5066/F71835S6

World Nuclear Association. n.d. “Heat Values of Various Fuels.” Accessed November 25, 2025. https://world-nuclear.org/information-library/facts-and-figures/heat-values-of-various-fuels

Passengers waiting in informal roadside spaces due to inadequate pedestrian and transit infrastructure.

Image: CEEW

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