

INVESTOR BRIEF

E-MOBILITY FINANCING IN BRAZIL, ECUADOR, AND INDIA

TAP-TUMI e-Bus Mission Pitch Training
23-25 April 2025



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This document has been prepared as part of ICLEI's Transformative Actions Program (TAP) activities in the TUMI e-Bus Mission. The TAP supports TUMI's finance work by identifying and supporting promising, financeable e-bus projects from the Mission's Network Cities.

LEAD AUTHOR

André Almeida da Vila (ICLEI World Secretariat)

CONTRIBUTORS

ICLEI

Ana Cristina Martins (ICLEI South America)
Amar Kulkarni (ICLEI South Asia)
Arun Thakur (ICLEI South Asia)
Dhyey Malkan (ICLEI South Asia)
Tala Qadooheh (ICLEI World Secretariat)
Yougal Tak (ICLEI South Asia)

Local government officials

Rafael Murta (City of Belo Horizonte)
Thiago Tartaglia (City of Belo Horizonte)
Victor Macedo (City of Fortaleza)
Francisca Dalila Menezes (City of Fortaleza)
Antonio Chamorro (Quito Municipality)
Berenice Cubides (Cuenca Municipality)
Pablo Carvallo (Cuenca Municipality)

EDITORS

Tu-My Tran (ICLEI World Secretariat)
Ana María Cruz (ICLEI World Secretariat)
Katya Garg (ICLEI South Asia)
Leticia Borges (ICLEI South America)
Varsha Parmar (ICLEI South Asia)
Victor Lopes (ICLEI South America)
Vijay Saini (ICLEI South Asia)

DESIGN

André Almeida da Vila
(ICLEI World Secretariat)

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About TUMI

TUMI E-Bus Mission City Network is a learning network for cities in the global south committed to **accelerating the transition to electric bus fleets** in the public transportation system. Through the network, members benefit from shared knowledge and resources related to the transition to electric buses, including exclusive trainings, dialogues and more. The network, which started with an initial group of more than 50 cities, continues to grow. By 2025, our goal is to inspire more than **100** cities to become part of the network

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About ICLEI

ICLEI – Local Governments for Sustainability is a global network of over 2,500 local and regional governments committed to sustainable urban development. Active in over 130 countries, we influence sustainability policies and drive local action for low-carbon, nature-based, equitable, resilient and circular development. Our network and team of experts work together to provide access to knowledge, partnerships and training to generate systemic change for urban sustainability.

ICLEI's Sustainable Mobility program empowers cities to transform their transportation systems through integrated, people-centered solutions that reduce emissions while enhancing quality of life. Our program bridges the gap between mobility policy and practical implementation, helping cities achieve their sustainability goals through policy development and global expertise.

About TAP

The **Transformative Actions Program (TAP)**, led by ICLEI – Local Governments for Sustainability, is a global initiative that aims to help sub-national governments and local businesses turn sustainable infrastructure ideas into investment-ready projects. TAP aims to accelerate the financing of sustainable infrastructure projects in cities and regions by connecting them with potential investors and project preparation facilities, as well as offering personalized support for project development.

EXECUTIVE SUMMARY

This Investor Briefing has been prepared for the Pitch Training Events taking place from April 23–25, 2025, under the TUMI E-Bus Mission. It outlines the investment rationale and opportunities for electric bus (e-bus) projects in Brazil, Ecuador, and India—three countries marked by high public transport demand, improving cost competitiveness, and growing policy momentum for decarbonisation. The briefing is designed to support participating cities, investors, and partners by providing the financial and operational context for engaging with seven featured early-stage e-bus projects: Fortaleza, Belo Horizonte, Cuenca, Quito, Shimla, Rajkot, and Udaipur. It explores the business case, financing landscape, deployment models, and current market opportunities—offering essential background to inform project-specific dialogue and investment decisions.

Key Highlights

- **Large and growing market demand:** India targets 50,000 e-buses by 2030; Latin America's e-bus fleet doubled between 2020–2023.
- **Strong policy alignment:** Each country has adopted national and subnational policies to support electrification, including mandates, tax incentives, and financing schemes.
- **Diverse financing models:** Projects use a mix of Gross Cost Contracts, concessional public loans, leasing, and blended finance to mitigate risks and reduce upfront costs.
- **Active investor interest:** Development banks, public finance institutions, and private investors are already participating through loans, guarantees, and green bonds.
- **City-level project pipeline:** The briefing presents seven early-stage e-bus projects ready for technical assistance and co-investment, offering entry points for financiers.

Document Structure

- 1. Market Context & Investment Case:** Summarises the main trends and drivers behind e-bus investment across the three countries.
- 2. Barriers & Financing Models:** Identifies common barriers and outlines the financial models and instruments addressing them, including: key deployment barriers, business/commercial models, financial de-risking tools, and country-specific financing opportunities.
- 3. City-Level Project Briefs:** Presents a curated set of early-stage e-bus initiatives with essential data for investor consideration.

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1 INTRODUCTION

This Investor Brief has been produced in preparation for the TAP-TUMI Pitch Training Events which are taking place between April 23–25, 2025 across three countries with cities participating in the TUMI E-Bus Mission: Brazil, Ecuador, and India. These closed-door sessions were designed to support city officials in strengthening their ability to present financeable e-bus projects to potential investors and development finance institutions.

Organized by ICLEI as part of its Sustainable Mobility and Transformative Actions Program (TAP) activities within the framework of the Transformative Urban Mobility Initiative (TUMI) E-Bus Mission, the events brought together seven cities actively advancing the electrification of their bus fleets. The cities featured in this briefing—Belo Horizonte and Fortaleza in Brazil; Cuenca and Quito in Ecuador; and Rajkot, Udaipur, and Shimla in India—have participated in the TUMI E-Bus Mission and received support for their e-bus projects in advancing towards investment readiness.

This document serves a dual purpose. First, it is a reference for jury members, showcasing key project details and investment conditions in each participating city, outlining their procurement models, financing structures, expected returns, risks, and transformative impacts. Second, it serves as a resource to cities and investors on the e-bus landscape in these three countries, providing a summary of the market conditions, main policies, potential business models and financial instruments.

While the Pitch Training events are not designed as direct matchmaking platforms, they aim to prepare cities to engage more effectively with investors in future settings. The projects presented here reflect a strong commitment to decarbonizing public transport and improving urban mobility through scalable, replicable, and inclusive approaches.

By showcasing market conditions, project readiness, and financing strategies, this briefing helps build a shared understanding between cities and potential financiers—laying the groundwork for future investment in sustainable public transport.



Figure 1. Map highlighting the TUMI e-Bus mission cities which submitted a project to TAP

2 THE E-BUS INVESTMENT CASE IN LATIN AMERICA & INDIA

Latin America and India have emerged as hotspots for e-bus deployment, driven by a convergence of policy ambition, urban transport demand, and operational efficiency. In India, the number of e-buses is set to grow to 50,000 by 2030, backed by national and state-level initiatives. In Latin America, the number of e-buses more than doubled between 2020 and 2023 and is expected to reach 25,000 by 2030⁵, with significant activity in countries like Brazil, Colombia, Chile, and Ecuador.

While e-buses present a strong investment case globally, the rationale is particularly compelling in Brazil, Ecuador, and India, where national and local governments have taken concrete steps to electrify public transport fleets, reduce emissions, and align with global climate finance frameworks. The investment case for e-buses in these countries is underpinned by a set of key drivers:

Lower Operational Costs

E-buses can significantly reduce the total cost of ownership (TCO) over their lifetime. This stems from lower fuel and maintenance costs, fewer moving parts, and longer operational lifespans. While savings depend on country-specific variables like fleet size, grid costs, and import duties, e-buses have generally demonstrated to be cost-competitive across countries.

BRAZIL: While upfront costs for battery e-buses with depot charging are approximately 113% higher than standard diesel buses, operation and maintenance (O&M) ones are 48% lower, resulting in a 9% lower TCO over a 10-year period⁹.

INDIA: E-buses achieve a TCO 30% lower than diesel buses⁴, due to low electricity tariffs, bulk tenders, and tax exemptions. India's 2022 Grand Challenge secured 5,450 e-buses at per-km rates 23–27% cheaper than diesel⁶.

Emissions Reductions

Replacing diesel buses with electric ones yields major reductions in both **greenhouse gases** and **local air pollutants**, such as NO_x and PM. E-buses can avoid up to 60 CO₂ emissions per year¹¹, especially when replacing diesel buses and in countries with clean electricity grids. This is particularly impactful in:

BRAZIL, with an 89% renewable grid and transport making up 44% of energy-related emissions.

ECUADOR, where the grid is 83% renewable and transport accounts for 42% of energy-related emissions.

INDIA, where urban air pollution is a major concern: 35 of the 50 most polluted cities in the world are in India, with transport a key contributor¹⁰.

Demand for Public Transport & New Buses

Public transport demand is a key driver for e-bus adoption across all three countries. In **Latin America**, demand is well-established, with public transport accounting for 68% of all passenger travel¹². The investment opportunity lies in renewing aging bus fleets to improve efficiency and reduce emissions.

BRAZIL: 31% of daily trips are made by bus, but the average fleet age has reached 6,45 years¹.

ECUADOR: approximately 60% of the population relies on public transport, with a fleet averaging 15.8 years⁷.

INDIA: Fast-growing urban population and motorisation are driving demand for fleet expansion. The public transport market is projected to grow from USD 22.5 billion in 2023 to USD 43.4 billion by 2030⁸. The need to scale transit systems while ensuring long-term sustainability presents a compelling opportunity for e-bus investment.

Policy Incentives & Alignment

National and local governments in Brazil, Ecuador, and India have established strong policy frameworks that support the transition to electric buses. These policies align e-bus deployment with broader decarbonisation, industrial development, and urban mobility goals, providing a long-term signal to investors.

BRAZIL: The 2023 Growth Acceleration Program (PAC *Seleções*) earmarked over BRL 10 billion to finance 2,300 e-buses across 61 cities. Complementary policies such as New Industry Brazil promote low-emission industry development, including domestic e-bus manufacturing. At the city level, major urban centres like São Paulo, Rio de Janeiro, and Curitiba have adopted clear electrification targets and climate plans, anchoring demand.

ECUADOR: The Organic Law of Electric Competitiveness (2024) mandates that all new public transport vehicles be zero-emission by 2030. The National Electromobility Strategy (2021) sets a long-term goal of 40,000 e-buses by 2040. A comprehensive incentive package supports implementation, including full tax exemptions (0% VAT, 0% ICE, and 0% import duties) for electric buses and related infrastructure.

INDIA: Since 2013, successive programmes like the National Electric Mobility Mission Plan, FAME-I and II, and the PM-eBus Sewa Scheme (2023) have provided viability gap funding and policy clarity. The government targets 50,000 e-buses by 2030, as outlined in the National Electric Bus Program (2022), with deployment driven by public-private partnerships and Gross Cost Contracts (GCCs).

The convergence of strong policy commitment, growing public transport demand, and improving cost-efficiency has created a robust pipeline of e-bus projects across Brazil, Ecuador, and India. The table below presents a comparative snapshot of e-bus targets, existing deployments, and pipeline projections, offering a high-level overview of the current market landscape and investment opportunities in each country.

Table 1: Country Comparison – E-Bus Landscape

Country	E-Bus Targets (source)	Operating e-buses	E-bus pipeline	Main policies
Brazil	No national targets. São Paulo: 50% e-bus fleet by 2028 (Ordinance 16,802, 2018) Rio de Janeiro: 20% of e-bus fleet by 2030 (Decree 46,081, 2019) Curitiba: 33% of e-bus fleet by 2030 (Climate Adaptation & Mitigation Plan, 2020)	902 e-buses operating (2025)	10,999 by 2030	<ul style="list-style-type: none"> • Growth Acceleration Program – <i>PAC Seleções</i> • New Industry Brazil • BDNES's credit lines: FINAME and <i>Novo Fundo Clima</i> • City-led policies
Ecuador	2030: all new vehicles must be zero-emission (Organic Law of Electric Competitiveness, 2024) 2040: 40,000 e-buses (National Electromobility Strategy, 2021)	106 e-buses operating (2025)	1,741 by 2030	<ul style="list-style-type: none"> • National Electromobility Strategy (2021) • Law of Electric Competitiveness (2024) • Tax exemptions
India	2030: 50,000 e-buses (National Electric Bus Program, 2022)	Approx. 11,000 (2025)	Approx. 59,000 by 2030 ¹	<ul style="list-style-type: none"> • FAME II and PM-eBus Sewa schemes • State-level EV policies • National Electric Mobility Mission Plan 2020

Sources: E-Bus Radar Platform (2025), C40 Cities (2023), Care Ratings (2025).

¹ Including e-bus sanctioned by previous schemes and future e-bus acquisitions through PM E-DRIVE scheme and PM e-Bus Sewa–Payment Security Mechanism.

3 BARRIERS & FINANCING FOR E-BUS PROJECTS

The large-scale adoption of e-buses in emerging economies requires tailored financing structures and delivery models. This chapter outlines the main barriers to e-bus project financing and details innovative business models, financial instruments, and country-specific mechanisms that help make these projects financeable.

a) Key Barriers & Solutions

Despite a strong investment case, the scale-up and financing of e-bus projects across Brazil, Ecuador, and India faces a set of recurring barriers. Addressing these barriers through targeted financial instruments and project structuring is key to unlocking investment and accelerating implementation.

High Upfront Costs & Access to Capital

E-buses typically cost 2–3 times more than upfront diesel counterparts²⁶. Local governments and operators often lack the capital and debt capacity to pay for these investments.

Mitigation Strategies: Financing models such as concessional loans, blended finance, and leasing convert large CAPEX into manageable OPEX. For example, Ecuador combined a Clean Technology Fund concessional loan with local financing to procure e-buses in Guayaquil, reducing investment barriers and enabling viability²⁸.

Operational risks

Operators face risks around battery life, range limitations, unfamiliar technology, and the need for new maintenance skills.

Mitigation Strategies: Long-term warranties, maintenance contracts, and driver/mechanic training can de-risk operations. In Brazil, São Paulo's pilot programs require OEMs to handle maintenance and offer performance guarantees, enabling smoother technology adoption.¹⁶

Infrastructure & Power Supply

Charging depots require space, high-voltage connections, and grid upgrades. Peak load management and energy reliability must be planned in advance.

Mitigation Strategies: Strategic planning, utility partnerships, and off-peak charging reduce disruption and costs. In India, utility-led investment in substations under the Green Urban Mobility Initiative ensures depots are power-ready before large-scale deployment begins.

b) Financial & Business Models for e-Bus Projects

To overcome these barriers, cities and transit agencies are adopting innovative business and financing models that align capital availability, risk-sharing, and operational responsibilities. The following models represent some of the most relevant approaches in Brazil, Ecuador, and India.

Gross Cost Contract Model (GCC)

In a GCC model, a public transport authority contracts a private operator (often a bus company or manufacturer – OEM) to provide bus service for a fixed fee, usually per kilometer of operation. The authority retains fare revenue risk, while the operator assumes ownership and operation of the e-buses.

Asset ownership: The e-buses (and typically charging equipment) are supplied and owned by the private operator/OEM.

Operations & Maintenance: The operator manages all daily operations, maintenance, and fleet performance. The authority defines service levels and performance standards.

OPEX Funding & Payments: The authority pays the operator a service fee – usually a rate per km or per bus-month – to cover operating costs and capital cost recovery. The authority uses fare revenues and public subsidies to make these payments.

Financing & Subsidies: The private operator finances e-bus procurement via equity, debt, or OEM financing, taking on the investment risk. Public support often underpins the model – e.g. India's FAME-II scheme provides upfront subsidies covering up to 40% of e-bus cost for agencies opting for GCC¹⁷.

Examples: The GCC model has been widely adopted in India through the recent FAME-II and PM e-Bus Sewa Scheme. In Latin America, similar gross-cost approaches are used in some bus concessions, and are being explored to make e-buses viable without passing costs to users. São Paulo's "partial subvention model" also uses city-backed concessional loans to subsidise private operator investments and accelerate electrification¹⁶.

Concessional Finance for Public Ownership

In this model, access to low-cost financing or grants reduces investment costs, enabling a public entity to purchase buses upfront and operate them directly. Concessional capital, used as a first-loss tranche, can also facilitate blended finance by lowering risks and reducing the cost of private capital.

Asset ownership: The transit authority or government owns the e-buses, charging infrastructure, and depots. The buses may be operated by a contracted operator, but ownership remains public.

Operations & Maintenance: O&M can be handled by the transit authority or contracted out via a management contract. In both cases, the public sector bears performance and maintenance risk on the assets.

OPEX Funding: Operations are funded through farebox revenue, complemented by public subsidies to cover viability gaps. This is especially important where fare recovery is low.

Concessional Finance for Public Ownership	<p>Financing & Subsidies: Upfront capital is provided by concessional loans, grants, or public capital allocations. This lowers the cost of borrowing and facilitates long-term repayment.</p> <p>Examples: In India, outright purchase under public ownership was the model used during the FAME-I program, with cities receiving subsidies that reduced investment costs. In Ecuador, the development bank CFN on-lent IDB climate funds to finance e-bus acquisition in Guayaquil¹⁸.</p>
Leasing Model	<p>Under this model, a leasing company or OEM finances and owns the e-buses and leases them to the transit agency or private operator. This helps avoid large upfront costs and spreads payments over time. Several variations exist (bus leasing, battery leasing, or lease-to-own).</p> <p>Asset Ownership: A leasing company or manufacturer retains ownership and leases them to the transit authority or to an operating company. The lessee gets the right to use the buses for a term, without owning them outright.</p> <p>Operations & Maintenance: The operator (public agency or private firm) runs the services. Maintenance may be handled by the lessee or included in the lease contract, especially when the lessor is the OEM, allowing to reduce operational risks.</p> <p>OPEX Funding & Payments: The lessee operator or agency makes periodic lease payments to the lessor. Payments are funded from fare revenues, subsidies, or PPP service payments. The approach aligns costs with cash flow over the vehicle's service life.</p> <p>Financing & Capital Flows: The leasing company finances the bus purchase, often using a mix of debt and equity. They recuperate this investment via the lease charges. Because lessors have asset collateral and can pool risks, they might obtain financing more cheaply.</p> <p>Experiences: Leasing models are gaining traction where transit agencies prefer an OPEX-based solution. In India, leasing-like models have been used in the Grand Challenge tenders, where OEMs provide buses at a per-kilometre rate¹⁹. A proposed central e-bus financing facility aims to scale this model by aggregating concessional and private capital and leasing buses to state transport undertakings.</p>

c) Financial Instruments to Enhance Financeability

To scale these business models, supportive financial mechanisms are being deployed to reduce investment risks and improve financeability:

Bulk Procurement and Demand Aggregation: Combining e-bus orders across cities or agencies can drastically cut unit costs and attract better financing terms. Such joint procurement not only lowers capital and operating costs but also gives investors confidence through large, standardized contracts. **Example:** India's "Grand Challenge" (demand aggregation program via CESL) pooled demand for 5,450 e-buses in multiple cities, achieving economies of scale.¹⁹

Payment Security Mechanisms (PSM): A major risk in PPP models (like GCC or leases) is that transit agencies may delay or default on payments to the operator/lessor. Payment security mechanisms guarantee the cash flows. **Example:** India recently announced a PSM for e-bus contracts under the PM e-Bus Sewa Scheme, which may include an escrow account or letter of credit to assure payment.²⁷

Viability Gap Funding (VGF) and Subsidies: VGF is a form of capital or operating grant to close the viability gap of a project that is socially beneficial but financially marginal. Both upfront and ongoing subsidies are being used for e-buses. **Example:** India's PM e-Bus Sewa scheme, for example, provides operational VGF on a per-km basis²⁷. In Latin America, many e-bus schemes rely on existing subsidy frameworks for diesel buses being extended or enhanced for electric.

Blended Finance Structures: Blended finance involves mixing concessional funds or credit enhancement mechanisms (first-loss tranches, partial guarantees, etc.) with commercial capital to achieve an attractive overall financing package. **Example:** In Ecuador, the financing of Guayaquil's e-buses combined the World Bank's Clean Technology Fund money with local bank loans and operator equity.¹⁸

Revenue-enhancing mechanisms: The financial viability of e-bus projects can be strengthened through a mix of ancillary revenue streams. While farebox revenue remains the primary income source, additional revenue can be generated through mechanisms such as carbon credits and results-based climate finance. In certain contexts, further opportunities exist through land value capture, commercial development around terminals and depots, and advertising or sponsorship initiatives.

d) Key Examples of Financing Opportunities

	National opportunities	Multilateral Development Banks and Development Finance Institutions
Brazil	<p>Novo PAC Seleções: Under the New Growth Acceleration Program, the <i>PAC Seleções</i> has allocated BRL 10.6 bi to finance the acquisition of 2,296 electric buses.</p> <p>BNDES's credit lines (<i>Finame, Finem, Fundo Clima, REFROTA</i>) The bank can provide substantial loans for municipalities with adequate debt capacity and private operators. However, requirement for a commercial bank as fiduciary agent creates a barrier to access.</p>	<p>KfW's Sustainable Climate Protection Program – Mobility: Up to €100 mi in loans and €15 mi in grants for sustainable urban mobility, such as e-bus projects. Funds are allocated through existing BNDES lines.¹⁵</p> <p>eMotion: Led by AFD with GIZ, Proparco, and CAF, will provide USD 850 mi for e-mobility in 10 Latin American countries, incl. Brazil.²⁰</p>

Brazil

State and Regional Banks: Institutions such as the Development Bank of Minas Gerais and the Regional Development Bank of the Far South provide green financing options to municipalities for e-bus procurement.

Ecuador

Banco de Desarrollo del Ecuador (BDE): Concessional loans to municipalities for sustainable transport projects, including e-bus procurement. For instance, BDE has agreements with Quito to finance e-buses.

Corporación Financiera Nacional (CFN)'s Financing Electric Mobility line: Lines for e-vehicle financing, including e-buses and charging infrastructure. Exclusive to private companies. E.g. CFN financed the acquisition of 20 electric buses in Guayaquil with a loan of USD 7.6 million.¹⁸

IDB: In collaboration with the World Bank's Clean Technology Fund (CTF), support for financing of electric buses in Ecuador through CFN.¹⁸

India

PM e-Bus Sewa Scheme: Launched in 2023, this scheme aims to deploy 10,000 electric buses across 169 cities with a total outlay of over INR 57,000 crore (approximately USD 7 billion). It includes a Payment Security Mechanism (PSM) valued at INR 3,435 crore to ensure timely payments to operators.

FAME-III: Upcoming program to continue support for e-bus roll-out.

ADB & AIIB: ADB and AIIB have provided USD 100 million in co-financing to JBM Ecolife Mobility for supplying and operating electric buses across multiple Indian states under the GCC model.¹³

KfW's Sustainable Urban Mobility

Support: Financial support for sustainable urban mobility projects in India, including the procurement of electric buses and development of associated infrastructure.

GCF-funded "India E-Mobility financing Program":

A USD 1.5 billion blended finance platform managed by Macquarie, with USD 200 million from the Green Climate Fund (GCF), to scale investment in electric mobility in India, including e-buses, EV infrastructure, and related supply chains.²⁵



4 PROJECT BRIEFS

The Project Briefs provide a snapshot of each city participating in the TAP–TUMI Pitch Training Events in April 2025. These briefs highlight early-stage e-bus initiatives from Brazil, Ecuador, and India, offering investors and finance partners a clear entry point to understand each project’s context, scope, and readiness.

City Profile and Context

To support investment assessments, this section presents basic information about each city, including population, economic indicators, relevant policies, and financial positioning. Where possible, data such as GDP, per capita income, credit rating, and debt eligibility are included to offer an initial understanding of the investment environment. Much of the information has been drawn from the [City Profiles](#) prepared by the ICLEI for the TUMI e-Bus Mission (see References).

Urban Mobility System and E-Bus Vision

This section outlines the structure and characteristics of the city's public transport system, with a focus on the current bus fleet, operational modelsⁱ, and modal share. It also details the city's electrification goals and relevant policies, plans, or programs guiding the transition to e-mobility.

Project Snapshot

Each brief concludes with a description of the e-mobility project itself, including scope, ownership, costs, and financing status. It also highlights key elements such as the business model, expected returns, risk mitigation strategies, and potential sources of funding. A final section presents the transformative impact of the project—environmental, social, and economic—as well as its scalability, replicability, and innovation potential.

These briefs aim to support jury members during the Pitch Training events and serve as a reference for future engagement with financiers.

ⁱ The operational models are based on the typology proposed by the ZEBRA initiative (Dalberg, P4G, Zebra, 2020):

Model A: Vertically integrated, private operator in BRT/integrated system	Model B: Divided responsibilities in BRT/ integrated system	Model C: Large, more formal private operator in traditional service	Model D: Small, informal, private operator in in traditional service	Model E: Government-run system
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Belo Horizonte, Brazil

Diversifying the Energetic Matrix of Belo Horizonte



City Snapshot

Belo Horizonte is the capital of the State of Minas Gerais and the sixth most populous city in Brazil, with approximately 2.3 million residents. Covering an area of 331 km², the city boasts a diverse geography, featuring both hills and lowlands that have influenced its urban development. Recently, Belo Horizonte has emerged as a prominent hub for commerce, services, and high-tech industries.



Population

Population:
2.32 million
(2022)

Metro. Pop.:
5.73 million
(2022)



Main documents

Belo Horizonte Mobility Plan (2017): 40% of bus fleet electrified by 2030
GHG Emission Reduction Plan (2020): Reduction of 1.9 M tCO₂e by 2040



Economy

Currency: BRL
GDP: € 15.95 billion (2022)

GDP per capita:
€ 6,302
(2022)



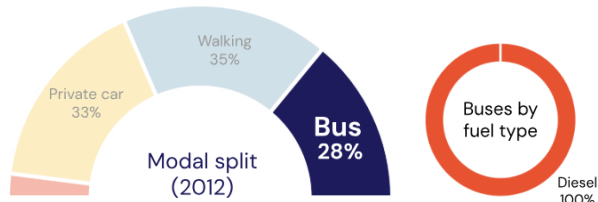
Fiscal & Finance

City debt capacity rating: A+
Eligible to obtain federal guarantees and international debt? Yes

City annual revenue (2024):
€ 2.6 billion

Municipal Policy for Addressing the Climate Emergency (2024): Guidelines for reduction of pollutant emissions

Bus system in Belo Horizonte



Number of passengers: 947,000/day
Number of buses: 3,049
Number of routes: 298 + 26 suppl.
BRT corridors: 7 corridors
Municipal terminals: 7
Bus depots: 34



Standard fare: R\$ 5.75
Effective average fare: R\$ 3.78



Total GHG emissions:
4,052,790 tCO₂e

Road transport:
1,672,491 tCO₂eq

Main operators: Four consortia (34 companies) operating under the supervision of the municipal Mobility Superintendency (SUMOB)

System subsidies:
R\$ 750 million (€ 112.8 M) per year

Operation models

Model A – Integrated BRT system

- BRT system – MOVE: Operated by 4 consortia (34 companies) with fare integration with feeder system.
- O&M: SUMOB operates and maintains BRT stations in the municipality; external company hired by the State Govt does O&M in the Metro Region.

Model C – Feeder-trunk system

- Operated by the 4 consortia through 20-year concession contracts (2008–2028).
- O&M: Terminals maintained by SUMOB via external contracts.

Model D – Supplementary Transport System

- Minibuses that connect non-central neighborhoods
- Autonomous operators regulated by SUMOB.
- No fare integration, but transport card can be used.

Project Name
Diversifying the Energetic Matrix of Belo Horizonte

Project Objective
Decarbonize the fleet and provide quieter, more accessible, and more efficient transport in areas with the highest concentration of people and pollutants.

Implementing agency
Superintendency of Mobility of the Municipality of Belo Horizonte (SUMOB)

Total cost
R\$ 380 M (approx. € 57.18 M) +
R\$ 317 M (€ 47.7 M) for first phase

Project Stage
Transaction/Procurement

Financing status
Seeking finance

TAP Status
Approved to TAP

Support requested
Technical assistance for business model, financing for expansion

Project Scope	
<input checked="" type="checkbox"/> Acquisition of e-buses	Acquisition of 200 e-buses (100 already secured for phase 1), 6.5% of total bus fleet
<input checked="" type="checkbox"/> Charging & Electric infrastructure	52 electric chargers (turnkey) incl. distribution system (27 already secured in phase 1); Electric infra. and supporting equipment, including PV panels.
<input checked="" type="checkbox"/> Training	Training for O&M

Cost structure:

Acquisition of 100 e-buses + 27 chargers	Acquisition of 100 e-buses	25 chargers	Electric Infra.	Studies & project	Training	O&M costs (1 year)
R\$ 317 M Secured	R\$ 350 M (92%)	R\$ 15 M (4%)	R\$ 4 M (1%)	R\$ 4 M (1%)	R\$ 1 M (0%)	R\$ 6 M (2%)

- Capital expenditures
- Operational expenditures

Business Model & Financial rationale

- Procurement & Operation
- Phases 1 & 2 ("e-Bus Lab"): Public procurement for e-buses and charging infrastructure; e-buses lent to operators under a comodato regime.
 - Future expansion: After demonstration, new concession contract (2028) will require operators to acquire and operate electric fleet

- Expected Returns & Revenues
- Operational savings:
- 25% lower costs vs. diesel buses
 - 10% lower total cost of ownership (TCO) over 10 years
- Revenue potential:
- No expected increase in fare revenue
 - O&M funded by fares, with govt. subventions
 - Non-fare sources: Advertising, EV charging stations, carbon credits

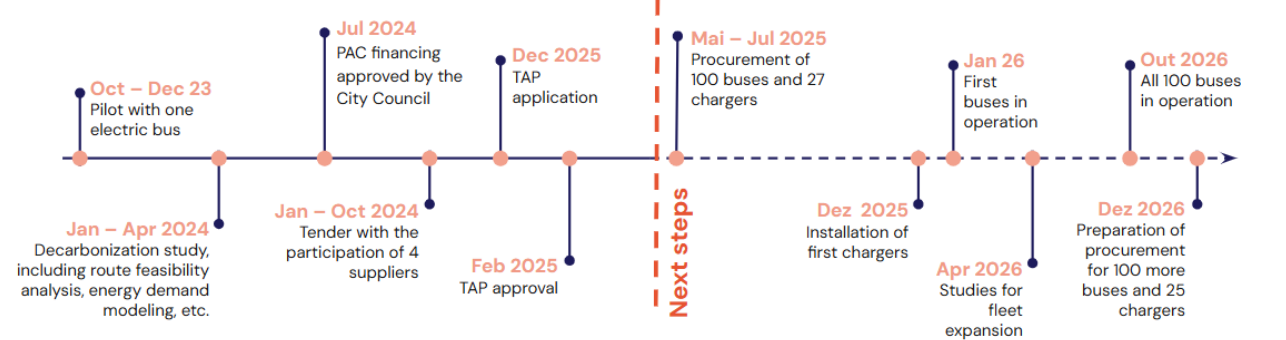
- Potential financing sources
- Phase 1:
- R\$ 317 M BNDES loan (PAC Seleções program)
- Phase 2:
- BNDES credit lines (Finame Baixo Carbono, Finem Mobilidade Urbana)
 - Development Finance Institutions (AFD, KfW, etc): Loans, guarantees, technical assistance
 - Good debt capacity rating gives space for new loans
- Future expansion
- Opportunity: PPPs via new concession contracts in 2028 (gross-cost contract)

Key Risks & Mitigation Strategies

Risk	Mitigation
Stakeholder/Contractor Risk: Operators are unwilling to adopt e-buses due to operational complexity, upfront cost, or uncertainty.	Phases 1 and 2 are intended as an “e-bus lab” to demonstrate that e-buses are more cost-effective in the long-term
Infrastructure Risk: City-wide infrastructure may not be reliable to supply electricity to e-buses.	Collaborate with utility providers to assess and upgrade the grid capacity, implement smart grid and energy storage solutions, optimize charging infrastructure, and integrate renewable energy sources
Financial & Currency Risk: High upfront CAPEX required for e-buses may be aggravated by currency fluctuations, with insufficient capacity to cover these costs.	Identification of new financing sources and instruments, partnerships with private companies, and exploration of fiscal incentives and subsidies

Vulnerability: ■ High ■ Medium ■ Low

Timeline & Milestones



Transformative Impact & Benefits

Environmental & Climate Benefits	Social and Economic Benefits & Just Transition	Expansion & Innovation
Emissions avoided annually: •23,600 tCO2e (4% of 2040 target) Reduced noise and air pollution PV panels and drainage for enhanced climate resilience Lower fossil fuel dependence, more resilience against market fluctuations	380,000 inhabitants benefiting from improved air quality and accessibility 60% of bus users are women, and 33% are Black Improved air quality, fewer respiratory diseases and public health savings More accessible public transport with inclusive infrastructure. Job creation and training in O&M, with programs supporting women and youth employment.	Scalability: “E-Bus Lab” to demonstrate viability of scaling up e-bus acquisition via concession contracts. Replicability: Model for Brazilian cities, integrating policies & cross-sector collaboration. Innovation: Use of solar photovoltaic panels for charging infrastructure to enhance resilience

Direct beneficiaries: 138,894 daily passengers in selected routes

Contact

To request the contact details of the project leads, please contact us at tap@iclei.org or ecomobility@iclei.org.

Fortaleza, Brazil

Pilot project for the electrification of the bus fleet



City Snapshot

Fortaleza, the capital of Ceará in northeastern Brazil, is the state's largest city, with an area of 313 km² and a population of approximately 2.5 million (2022), making it the fourth most populous city in the country. As of 2021, Fortaleza's GDP was R\$73.4 billion (€ 11.9 billion), positioning it as the largest economy in Brazil's Northeast and the eleventh largest nationwide.



Population

City:
2.5 million

Metro Area:
3.9 million



Economy

Currency: BRL
GDP: € 11.9 billion

GDP per capita:
€ 4,407



Fiscal & Finance

City debt capacity rating: C

Eligible to obtain federal guarantees and international debt? No

City annual revenue (2024):
€ 2.4 billion



Main documents

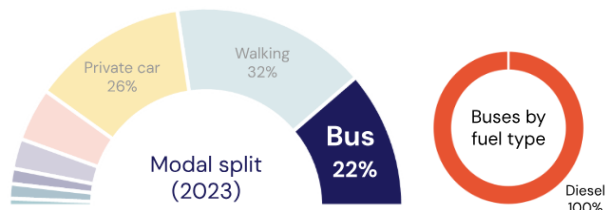
Local Climate Action Plan:
100% bus fleet electrified by 2050, 10% by 2030

Ordinance no. 11,390 (2023):
Sustainable Urban Mobility Policy (PASFOR)

Ordinance no. 10,586 (2017): Low Carbon Urban Dev. Policy

Ordinance Bill no. 328 (2023): Approves loan from BNDES for e-bus acquisition

Bus system in Fortaleza



Number of passengers: 620,000/day

Number of buses: 1,734

Number of routes: 338

BRT corridors: 2 corridors

Exclusive bus lanes: 119 km

Bus depots: 13



Standard ticket price: R\$ 4.50

Average cost per bus trip: R\$ 7.27



Total GHG emissions:

4,523,015 tCO₂e

Road transport:

2,687,561 tCO₂eq

Transit Agency: Urban Transport Company of Fortaleza (ETUFOR), Municipal-owned

System subsidies: R\$ 250 million (€ 37.7 M) per year, 247% growth since 2022

Operation models

Model C – Integrated Transport System

- Operated by **5 consortia** (10 private companies) with fare integration.
- Infrastructure Management:** Socicam manages terminals and BRT stations, another private company handles 5,400 bus stops under a concession contract.

Model D – Supplementary Transport System

- Regulated vans** operate to cover service gaps where the regular bus system is insufficient.
- Fares** must be equal to the single fare of the Integrated System.

Project Name
Pilot Project for the Electrification of the Public Transport Fleet in Fortaleza

Project Objective
Pilot the electrification of Fortaleza's bus fleet with 19 e-buses, reducing emissions and operational costs, while setting the stage for future fleet expansion.

Implementing agency
Municipal Department for Public Services Conservation

Total cost
R\$ 52.12 M (€ 8.5 million)

Project Stage
Feasibility

Financing status
Seeking finance

TAP Status
Approved to TAP

Support requested
Technical assistance for feasibility studies, financing (long-term)

Project Scope

<input checked="" type="checkbox"/> Acquisition of e-buses	Acquisition of 19 e-buses, standard 12m, to be deployed on 2 BRT corridors
<input checked="" type="checkbox"/> Charging & Electric infrastructure	10 electric chargers, incl. distribution system; Electric infrastructure & supporting equipment
<input checked="" type="checkbox"/> Terminals & Depot facilities	3 terminals (Papicu, A. Bezerra, and Messejana)

Cost structure:

Acquisition of 19 e-buses	10 electric chargers	Electric infrastructure	Studies & project	Training	O&M costs (1 year)
R\$ 45.6 million (87%)	R\$ 3 million (6%)	R\$ 500,000 (1%)	R\$ 1 million (2%)	R\$ 500,000 (1%)	R\$ 1.52 million (3%)

- Capital expenditures
- Operational expenditures

Business Model & Financial rationale

Procurement & Operation

- Public procurement for e-buses and charging infrastructure for pilot phase.
- Pilot phase: E-buses lent to operators under a *comodato* regime.
- Future expansion: Acquisitions via Gross Cost model in new concession contracts (2027).

Expected Returns & Revenues

Operational savings:

- 58% lower operational costs vs. diesel buses
- 10% lower total cost of ownership over 10 years.

Revenue potential:

- Fare revenue significant, but not yet estimated
- Non-fare sources: Terminal leases, advertising, parking concession

Potential financing sources

Pilot phase:

- Negotiating R\$50M loan with BNDES (PAC Seleções program); R\$2.52M counterpart
- Challenge:** Fortaleza requires national government approval due to credit rating

Future financing options

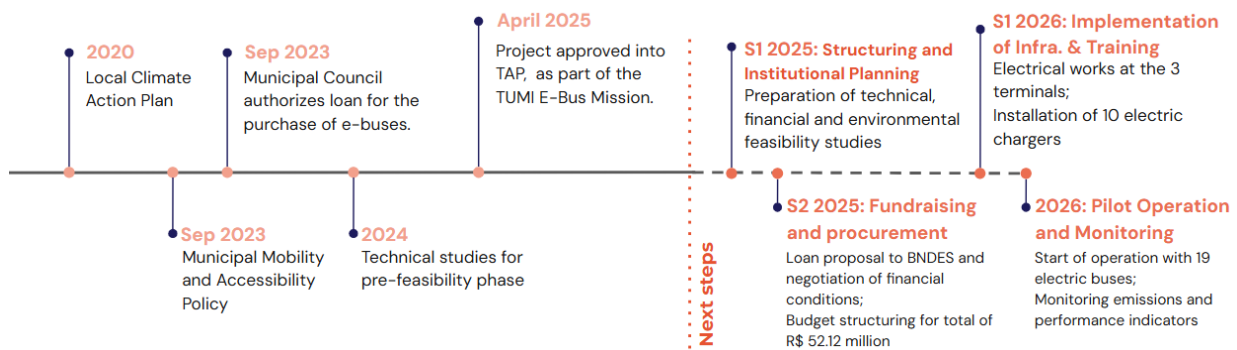
- BNDES credit lines (Finame, Finem, Fundo Clima, REFROTA)
- Concessional financing: KfW (min. ticket EUR 50M) and AFD's eMotion (technical assistance grants, loans for implementation)
- Gross Contract Model acquisitions by private bus operators under new concession contracts (2027)

Key Risks & Mitigation Strategies

Risk	Mitigation
Stakeholder Risk: Lack of commitment from public transport operators	Continuous coordination, financial/regulatory incentives, and formal institutional agreements.
Financial & Funding Risk: High upfront investment, limited fiscal capacity, and reliance on external funding.	Diversification of financial sources, credit rating improvement, creation of a preventive maintenance fund
Political Risk: Electoral cycle, administration changes and de-prioritization of e-bus initiatives	New administration took office in January 2025 and has shown a reinforced commitment to sustainable mobility

Vulnerability: High Medium Low

Timeline & Milestones



Transformative Impact & Benefits

Environmental & Climate Benefits	Social and Economic Benefits & Just Transition	Expansion & Innovation
Emissions avoided annually: <ul style="list-style-type: none">• 1,591.88 tCO2e• 10,621.56 kg NOx• 132.66 kg PM2.5 Reduced noise pollution	Improved air quality , fewer respiratory diseases and public health savings	Scalability: Charging infrastructure ready to double fleet in 5 years
Lower fossil fuel dependence, enhanced resilience	More accessible public transport with inclusive infrastructure.	Replicability: Model for Brazilian cities, integrating policies & cross-sector collaboration.
	More thermal comfort with air-conditioned buses.	Innovation: Planned fleet management using big data and AI for route optimization and resource efficiency.
	Job creation and training in O&M, with programs supporting women and youth employment.	
Total number of people impacted: 250,000		

Contact

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Cuenca, Ecuador

Efficient Electric Public Transport Corridors for Cuenca



City Snapshot

Cuenca, located in the south of Ecuador and the capital of Azuay Province, is the country's third-largest city. Crossed by four rivers, it connects several urban and rural parishes, all served by public transport. In 1999, its historic center was recognized as a UNESCO World Heritage Site.



Population

Urban:
361,524

Cuenca
Canton Pop.:
596,101



Economy

Currency: USD
GDP: € 3.08
billion (2023)

GDP per capita:
€ 6,950 (2022)



Fiscal & Finance

City debt capacity
rating: Not found
Eligible to obtain
international debt?
Yes

City annual
revenue (2024):
€ 220.3 million



Main documents

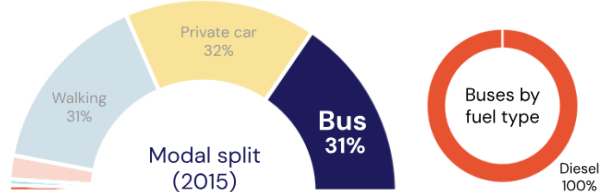
[Cuenca Climate Action Plan \(upcoming\)](#)

[E-Cuenca Electromobility Plan \(2023\)](#): 10% of bus fleet electrified and 8 charging stations by 2030

[Ordinance on Bus Service Quality \(2018\)](#): Plan for renewing the bus fleet

[Cuenca Mobility and Public Space Plan \(2015–2025\)](#)

Bus system in Cuenca



Number of passengers.....	300,000/day
Number of buses.....	567
Number of routes.....	105
Exclusive bus lanes.....	10 km
Bus stops.....	3,200
Bus depots.....	3



Standard ticket price: \$0.34



Total GHG emissions:

1,500,133 tCO₂eq

Road transport:

825,073 tCO₂eq

Main operators: Seven private operators part of the Chamber of Urban Transport of Cuenca (CTC)

Regulator: Decentralized Autonomous Municipal Government of Cuenca (GAD Cuenca)

System subsidies:
USD 3.5 million/year

Operation models

Model C – Large, formal private operators in a non-integrated system

- Operated by **seven private transport companies**, associated with the CTC, under concession from the municipality.
- **Fleet management:** Private operators are responsible for acquiring, maintaining, and operating the buses.
- Oversight: Planning and regulation by GAD Cuenca through the Municipal Company for Mobility and Transport (EMOV EP).
- System structure: The network includes trunk lines (north–south) and non-trunked feeder lines (radial)

Project Name
Efficient Electric Public Transport
Corridors

Project Objective
Strengthen existing technological capabilities through ITS platforms to improve traffic and transport management, aiming to reduce public transport travel times.

Implementing agency
Municipal Government of Cuenca (GAD Cuenca)

Total cost
USD 5.65 million (€ 4.97 million)

Project Stage
Concept/Scoping

Financing status
Seeking finance

TAP Status
Approved to TAP

Support requested
Technical assistance, feasibility studies, financing for implementation

Project Scope	
<input checked="" type="checkbox"/> ITS and smart infrastructure	Expansion and optimization of the existing SCATS intelligent traffic signal system infrastructure (incl. hardware and software) in selected corridors for pilot testing.
<input checked="" type="checkbox"/> Integration with e-bus project	The corridors fall within the “Low Emission Historical Centre” project area, supporting improved flow of the e-buses to be deployed.

Cost structure:

Technical studies	Training	Sensors & cameras infra.:	Smart traffic signal control:	Communi- cation infra.:	Software	Predictive analysis:	O&M costs
\$300,000 (5.31%)	\$100,000 (1.77%)	\$750,000 (13.27%)	\$1,000,000 (17.70%)	\$3,000,000 (53.10%)	\$300,000 (5.31%)	\$200,000 (3.54%)	Not estimated

- Capital expenditures – Hardware
- Capital expenditures – Software
- Operational expenditures

Business Model &
Financial rationale

- Procurement & Operation
- Public procurement of ITS infrastructure.
 - Operation by GAD Cuenca, with data shared with private bus companies.
 - Pilot phase: Implementation of smart corridors with ITS systems.
 - Integration with “Low-Emissions Historical Center” project with KfW, which provided roadmap for bus fleet electrification and financing for first e-bus acquisitions.
 - Future expansion through scalable regulatory and technical models.

- Expected Returns & Revenues
- Operational savings:
- USD 4.5 million in operational savings from traffic optimization and PT improvement
- Revenue potential:
- Fare revenue: Expected growth with better service.
 - Carbon credit sales.
 - Vehicle Registration Fees.

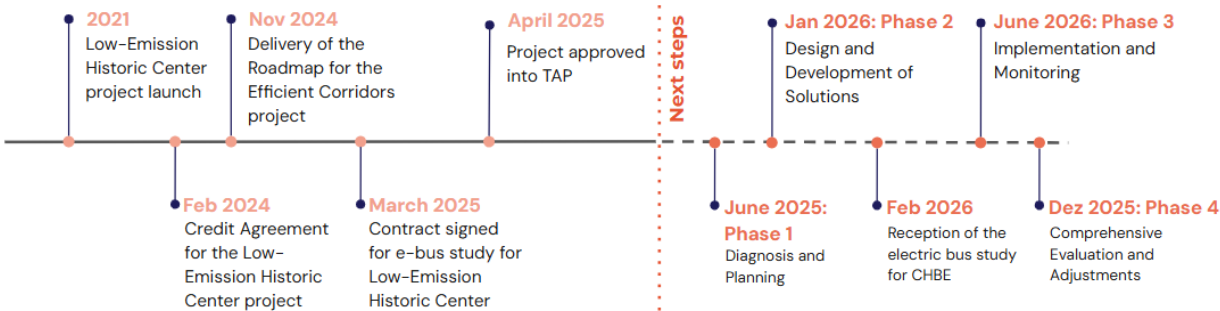
- Potential financing sources
- Pilot corridors implementation
- BDE’s CREDIBDE program
 - Special improvement contributions: fees from benefitting property owners in the area
 - Sale of data to third-party companies
 - Continuous support from KfW
- Technical studies
- Lincoln Institute of Land Policy: studies for land-value capture
 - Previous technical studies from GCAP, LEDS LAC, and KfW (Roadmap for efficient electric public transport corridors)

Key Risks & Mitigation Strategies

Risk	Mitigation
Insufficient or inaccurate data on traffic and existing infrastructure	Implement real-time data collection technologies, such as sensors and traffic cameras, to complement existing data
Failures in the pilot corridors or poor performance of the solutions	Identify and analyze the underlying causes, such as technological limitations, operational issues, or non-compliance with routes. Implement immediate adjustments based on specific diagnostics.
Willingness from operators to interconnect systems	Engage operators early, demonstrate mutual benefits, and offer technical support. Use pilot projects and incentives to build trust and encourage integration.

Vulnerability: High Medium Low

Timeline & Milestones



Transformative Impact & Benefits

Environmental & Climate Benefits	Social and Economic Benefits & Just Transition	Expansion & Innovation
<p>Emissions reduction annually:</p> <ul style="list-style-type: none">CO₂: 15%PM 2.5: 10%PM 10: 20% <p>Reduced air and noise pollution</p> <p>Enhanced climate resilience through smarter infrastructure and lower fossil fuel dependence</p>	<p>Improved air quality for 600,000 inhabitants</p> <p>USD 4.5 million/year in avoided economic losses due to reduced PT waiting times: 3-min reduction in average trip time and 25% increase in bus operational speed</p> <p>60% of beneficiaries will be women</p> <p>10% reduction in respiratory diseases</p> <p>25% increase in user satisfaction</p> <p>Job creation in intelligent transport systems O&M</p> <p>Skills training for youth and women to support the e-mobility just transition</p>	<p>Scalability: ITS infrastructure to be scaled across Cuenca and support future e-bus fleet</p> <p>Replicability: Benchmark model for mid-sized Latin American cities integrating smart mobility and sustainability</p> <p>Innovation: Use of ITS for real-time data, AI, and automation for traffic and route optimization.</p>

Total number of direct beneficiaries: 300,000 daily bus passengers

Contact

To request the contact details of the project leads, please contact us at tap@iclei.org or ecomobility@iclei.org.

Quito, Ecuador

Metropolitan Strategy for Electric Public Transport: Ecovía Fleet Renewal



City Snapshot

Quito, Ecuador’s capital, is situated at 2,850 meters above sea level and boasts a population of around 2.9 million. In recent decades, urban growth extending towards the eastern peri-urban zones and valleys has changed travelling patterns, requiring comprehensive mobility planning to address the evolving transportation needs of the city’s residents and visitors.



Population

City:

2.68 million

Quito Metro:

2.87 million



Economy

Currency: USD

GDP: € 24.1 billion (2023)

GDP per capita: € 8,177 (2023)



Fiscal & Finance

City debt capacity rating: Not found

Eligible to obtain international debt? Yes

City annual revenue (2024): € 817.7 million



Main documents

Climate Action Plan (2020):

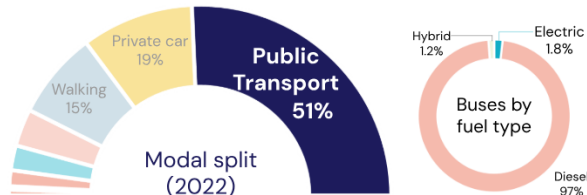
64% of trips using public transport, 100% of e- bus fleet by 2050

Plan for the Restructuring PT Routes (2020): Integration of public transport systems

Master Plan for Sustainable Mobility 2022 – 2042:

100% e-bus fleet by 2050, reduce transport emissions, expand BRT and transport integration

Bus system in Quito



Number of passengers..... 745,000/day

Number of buses.....3,354

Number of routes.....245

BRT corridors.....88 km

Bus stops.....6,000

Bus depots.....155

Electric trolleybuses.....60



Standard ticket price: \$0.35

Average daily deficit per bus: \$74.16



Total GHG emissions:

7.6 million tCO₂eq

Road transport:

3.01 million tCO₂eq

Main operators: Metropolitan Public Passenger Company (EPMTPQ) (Municipal-owned), private companies

System subsidies:

USD 50 million/year for BRT services (Trólebus and Ecovía) (total not found)

Operation models

Model A – Metrobus-Q BRT system

- **Four BRT corridors**, two operated by EPMTPQ and two by private operators under gross cost contracts.
- **Fleet management:** Each operator is responsible for acquiring, maintaining, and operating the buses.
- **Infrastructure:** EPMTPQ maintains terminals and stops.
- **City oversight:** Planning and regulation by the municipal Mobility Department.
- Fare integration being implemented by mid-2025.

Model B – Conventional & Integrated Bus System

- Operation by private operators under contracts that define operational parameters.
- **Fleet & Infrastructure:** Private operators acquire and maintain buses, as well as stops, which are municipal property.
- **Regulation:** Fares are set by the Metropolitan Council, and the Mobility Department oversees planning and regulation.

Project Snapshot

Project Name

Metropolitan Strategy for Electric Public Transport: Ecovía Fleet Renewal

Project Objective

Decarbonize Quito's public transport sector by introducing articulated e-buses, with chargers and solar supply, piloting the fleet renewal on the Ecovía Corridor.

Implementing agency

Department of Mobility, Quito Metropolitan District

Total cost

USD 46.63 million (€ 41.15 million)

Project Stage

Feasibility

Financing status

Seeking finance

TAP Status

Not yet submitted

Support requested Technical assistance, feasibility studies, financing for implementation

Project Scope

<input checked="" type="checkbox"/> Acquisition of e-buses	Acquisition of 60 articulated e-buses to be deployed on the Ecovía BRT corridor
<input checked="" type="checkbox"/> Charging & Electric infrastructure	30 electric chargers, incl. electric infrastructure & supporting equipment
<input checked="" type="checkbox"/> Solar power plant	2.02 MW photovoltaic power station to supply e-buses

Business Model & Financial rationale

Procurement & Operation

- Public procurement of e-buses and infrastructure through Department of Mobility
- Import tax exemptions for e-bus acquisition
- Buses to be operated and maintained by the municipally-owned EPMPQ on Ecovía corridor
- Future expansion to privately-operated corridors and conventional routes

Expected Returns & Revenues

Operational savings:

- 54% lower operational costs vs. diesel buses
- Reduced expenditures with self supply of solar energy

Revenue potential:

- Fare revenue: Not yet estimated, expected to grow with improved service;
- Carbon credit sales: \$ 200,000/year
- Potential sale of solar energy surplus

Potential financing sources

E-buses on Ecovía Corridor

- BDE's CREDIBDE program
- GIZ's *MoVer Ciudades*: technical assistance
- Inter-American Development Bank & Clean Technology Fund: financing support for e-buses through CFN

Future expansion

- National Financial Corporation (CFN): financing lines for e-buses for private operators
- Private commercial banks
- Technical assistance: Project preparation facilities, incl. C40 CFF, Gap Fund, ITDP, etc.

Cost structure:

60 e-buses	Maintenance equipment	Backup power generator	Workshops & depots:	Substation Rio Coca	Substation P. Beatario	Solar plant 2.02 MW	O&M costs
\$37.5 M (80.4%)	\$400,000 (0.86%)	\$800,000 (1.72%)	\$3,78 M (8.11%)	\$900,927 (1.93%)	\$629,372 (1.35%)	\$2.63 M (5.63%)	Not estimated

- Capital expenditures – Rolling stock
- Capital expenditures – Civil infrastructure
- Capital expenditures – Electric infrastructure

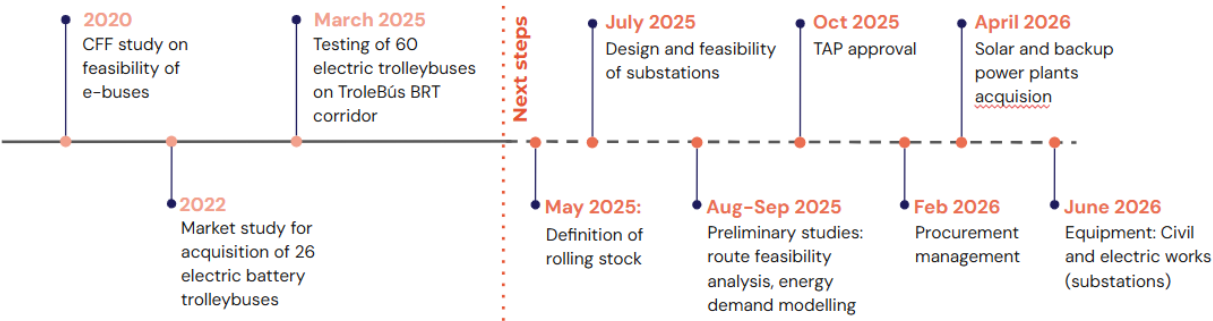
- Capital expenditures – Photovoltaic
- Operational expenditures

Key Risks & Mitigation Strategies

Risk	Mitigation
Financial risk: Insufficient or uncoordinated financing.	Leverage TUMI's technical support to pursue financing from national development banks, and international financial institutions. Securing municipality's guarantees to improve access to credit for private operators for future expansion.
Climate & Operational Risk: Power outages due to droughts, along with grid and infrastructure bottlenecks, may disrupt e-bus charging	Construction of solar and backup electric generators. Ensure power supply to e-bus charging is considered a priority, with national government ensuring reliable power supply.
Procurement risk: Delays or complications in procurement of e- buses.	Using existing feasibility and market studies to refine technical specs and engage known suppliers early in the process.

Vulnerability: High Medium Low

Timeline & Milestones



Transformative Impact & Benefits

Environmental & Climate Benefits	Social and Economic Benefits & Just Transition	Expansion & Innovation
<p>Emissions reduction on Ecovía corridor:</p> <ul style="list-style-type: none">• CO₂: 95%• PM 2.5: 100%• SO₂: 100%• NO_x: 100% <p>Emissions avoided annually (Ecovía & Trollebus BRT): 8,000 tCO₂e</p> <p>Full transition to reduce PM 2.5 by 1.2% citywide.</p> <p>Reduced air and noise pollution</p>	<p>Reduced incidence of respiratory diseases</p> <p>More accessible and efficient transport, especially for lower-income communities</p> <p>Increase of 95% bus availability and 90% of bus reliability on Ecovía</p> <p>More comfort and safety for women, with buses equipped with security cams</p> <p>Incentives to hiring women and vulnerable communities for O&M</p> <p>Reduced dependence on price-volatile imported fossil fuels</p>	<p>Scalability: Ecovía is the second BRT corridor to receive e-buses, after TroleBús. Future expansion into privately-operated corridors and routes.</p> <p>Replicability: Model for other cities in Latin America operating BRT systems.</p> <p>Innovation: Solar-powered charging infrastructure, integrated fare and operational system.</p>

Total number of direct beneficiaries: 200,000 Ecovía bus passengers

Contact

To request the contact details of the project leads, please contact us at tap@iclei.org or ecomobility@iclei.org.

Rajkot, India

Solar-Powered Bus Depot and Charging Stations for Electric Public Transport



City Snapshot

Rajkot is the fourth most populous city in the Indian state of Gujarat, located in the Saurashtra region. It vitally serves as the district’s industrial hub, known for its thriving manufacturing, metal, and automobile industries. Rajkot’s rapid growth is fueled by its rising urbanization, resourceful residential development, and robust industrial sector.



Population

2,045,682
(est. 2021)



Economy

Currency: INR
GDP: € 13.1 billion
(2022, est.)

Income per capita: € 2,569
(Gujarat State, 2022)



Fiscal & Finance

City debt capacity rating: AA (2024)

Eligible to obtain international debt? No

City annual revenue (2024): € 96.1 million
(Rajkot Municipal Corporation)



Main documents

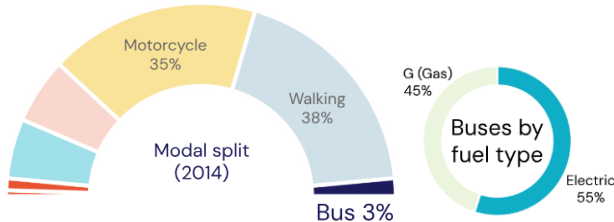
Gujarat State EV Policy (2021): Targets e-vehicle use and manufacturing.

PM’s e-Bus Sewa Scheme (2023): Acquisition of e-buses with national government subsidies.

Rajkot Climate Resilient City Action Plan (2024):

Shift 10% of passengers from private to public transport with 244 additional e-buses by 2030.

Bus system in Rajkot



Number of passengers.....	25,000/day
Number of buses.....	224 (0% diesel)
Number of routes.....	79 (1 BRTS)
Bus queue shelters.....	648
Bus depots.....	3
E-buses (chargers).....	124 (38)



Standard ticket price: INR 5 – 35
(based on ticket type)



Total GHG emissions:

2.615 million tCO₂e

Road transport:

0.55 million tCO₂eq

Main Operators : Project Management Institute (PMI) (e-bus fleet), Vishvam Agency, Narayani Agency

Regulator: Rajkot Rajpath Limited (RRL) – municipal

System subsidies: INR 200 M (€ 2.1 M) annual deficit covered by RMC and INR 174 M (€ 1.8 M) covered by subsidies from CM Urban Bus Scheme (State)

Operation model

Model B – Gross Cost Contract (GCC) model

- **Rajkot Rajpath Limited (RRL)**, a public company established as a SPV and owned by the Rajkot Municipal Corporation (RMC), oversees bus services of the conventional CNG bus fleet, operated by Private Agency Operators. Fares, routing and scheduling are under the RRL’s responsibility.
- **PMI Electro Mobility** is responsible for supplying, operating, and maintaining the e-bus fleet under a Gross Cost Contract with the RRL, which pays INR 53.90 per-km fee.
- All BRT routes are operated by PMI’s e-bus services.
- **Ownership:** The RRL retains ownership of the infrastructure, and is responsible for maintenance of stops, lanes, and depots.

Project Name
Solar-Powered Bus Depot and Charging Stations for Electric Public Transport

Project Objective
Establish solar-powered charging infrastructure that supports the expansion of electric buses and intermediate public transport (IPT) vehicles

Implementing agency
Rajkot Municipal Corporation (RMC)

Total cost
INR 330 million (€ 3.4 million) (+ INR 290 million to be secured for e-buses via PM e-Bus Sewa Scheme)

Project Stage
Pre-feasibility

Financing status
Seeking finance

TAP Status
Approved to TAP

Support requested
Technical assistance, connection with project preparation facilities (PPF), and financing for implementation.

Project Scope	
<input checked="" type="checkbox"/> Charging & Depot facilities	Solar-powered depot and opportunity chargers for e-buses and private e-vehicles (mainly IPT), integrated with 100 new e-buses under PM e-Bus Sewa Scheme
<input checked="" type="checkbox"/> Supporting infrastructure	Power connection (DISCOM), Transformers and Cables
<input checked="" type="checkbox"/> Operational planning	Preparation of Standard Operating Procedures for depot

Cost structure:

100 new e-buses	Power connection (DISCOM)	Transformer & Cables	Civil Work + Fire System	Solar Panels	10 chargers- 240 kW	O&M costs
INR 297 million (PM e-Bus Sewa Scheme)	INR 21.5 M (6.2%)	INR 6 M (1.7%)	INR 84.5 M (24.3%)	INR 220 M (63.4%)	INR 15 M (4.3%)	Not estimated

- Capital expenditures
- Operational expenditures

Business Model & Financial rationale

Procurement & Operation

- Procurement: Additional 100 e-buses are being procured under the PM e-Bus Sewa Scheme through the central procurement agency, Convergence Energy Services Limited (CESL).
- Solar-powered depot and opportunity charging stations to be procured by RMC.
- Solar-powered bus depots and opportunity charging stations: to be procured and owned by RMC, O&M potentially by external partner.

Expected Returns & Revenues

Operational savings:

- 30% lower O&M compared to diesel buses
- Up to 50% reduction in electricity costs through solar-powered charging

Revenue potential:

- Fare revenue: Increase expected (to be estimated)
- Non-fare revenue: Fees from private EV use of charging stations; Advertising and commercial space leasing

Potential financing sources

Financing under discussion

- INR 178 million to be secured from National Govt. through PM e-bus Sewa Scheme
- INR 59 million to be secured from PM e-bus Sewa Scheme (e-bus, chargers)
- INR 59 million to be secured from RMC for depot (not solar powered)

Future financing options

- CM Urban Bus Scheme: Reduces O&M through VGF funding of INR 30 per/km (already in place)
- Gujarat EV Policy: Subsidies for charging infra.
- Faster Adoption & Manufacturing of EV in India (FAME-III, upcoming): Subsidies for chargers

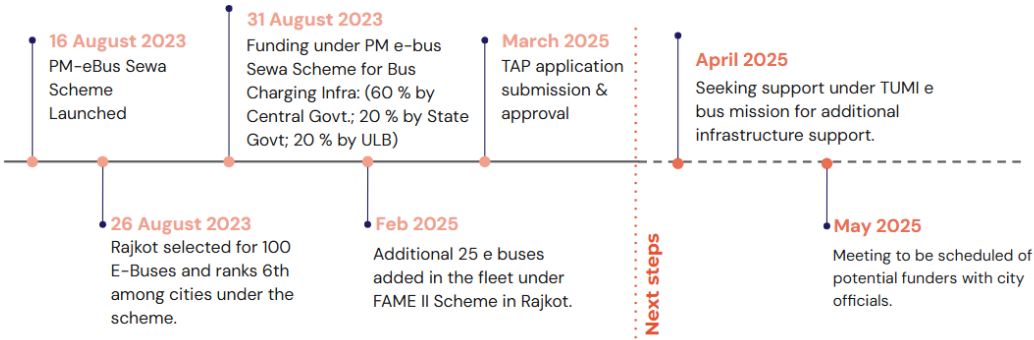
* This budget is preliminary and may be subject to adjustments.

Key Risks & Mitigation Strategies

Risk	Mitigation
Climate Risk: Infrastructure (depot, chargers) may be vulnerable to flooding, heatwaves, and other extreme weather events.	The project integrates climate-resilient infrastructure design for flooding and high temperatures. Solar-powered charging stations will reduce dependency on vulnerable grid energy supply. Available social infra. plots and strategic site selection can avoid high-risk zones.
Financial Risk: Upfront CAPEX for infrastructure and vehicles may limit fundability; dependency on sustained subsidy support.	Subsidies under FAME-II, PM e-Bus Sewa, and the CM Urban Bus Scheme reduce financial burden. The PM e-Bus Sewa Scheme is supported by central govt, (60%), the city (20%), and state funding structures (20%).
Political Risk: Shifts in political leadership or priorities could reduce support for e-mobility.	Project is embedded in municipal plans (Low-Carbon Mobility Plan, CRCAP). Received multi-level support from state and central stakeholders and political leaders.

Vulnerability: ■ High ■ Medium ■ Low

Timeline & Milestones



Transformative Impact & Benefits

Environmental & Climate Benefits	Social and Economic Benefits & Just Transition	Expansion & Innovation
<p>Emissions avoided annually: 43,000 tCO2 (e-bus fleet)</p> <p>Air quality improvement, from expanded e-bus fleet and renewable energy use.</p> <p>Reduce reliance on fossil fuels by using solar-powered chargers, eliminating residual emissions and contributing to mitigation targets and greater resilience.</p> <p>Reduced Urban Heat Island Effect</p>	<p>Higher public transport accessibility: Semi-low-floor buses improve accessibility for women, elderly, differently abled.</p> <p>Training and upskill for Gender: inclusive employment</p> <p>Public Health: Reduced respiratory diseases</p> <p>Affordability & Inclusivity: Reduced fares for vulnerable groups, connection to peripheral areas.</p>	<p>Scalability & Replicability: The solar-powered charging model can be replicated in other Indian cities acquiring e-buses , promoting energy-efficient and sustainable urban transport.</p> <p>Technological Innovation: Integration of real-time passenger information systems, solar-integrated charging, unified energy interface for smart grid charging.</p>

Total number of beneficiaries: 25,000+ ridership from new buses and intermediate public transport

Contact

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Shimla, India

Electrifying Mobility for a Cleaner Future



City Snapshot

Shimla is the capital and largest city of the State of Himachal Pradesh, located in northern India. Situated in the Himalayan mountain ranges at an average elevation of 2,207 meters, the city is a popular tourist destination. Shimla's development and mobility are shaped by its hilly terrain and steep slopes, which present relevant challenges and constraints.



Population

Municipal:
169,578

District Pop:
814,010



Economy

Currency: INR
GDP: € 24.1 billion (Himachal Pradesh)
Income per capita: € 2,493 (Himachal Pradesh)



Fiscal & Finance

City debt capacity rating: BBB (2017)
Eligible to obtain international debt? Yes, through Himachal Pradesh Govt.
City annual revenue (2024): € 4.5 billion (Himachal Pradesh)



Main documents

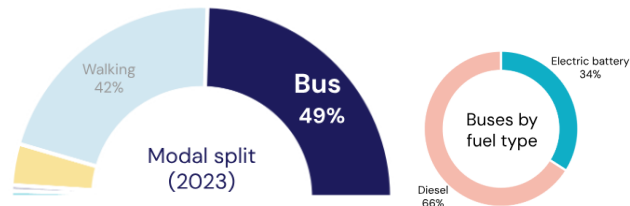
Himachal Pradesh Electric Vehicle Policy (2022):

15% of electric vehicles in all new vehicle registrations by 2025

State Action Plan on Climate Change 2021-2030 (2022)

Low-Carbon Action Plan for Urban Freight (2022)

Bus system in Shimla



Number of passengers..... 75,397/day

Number of buses...198 (HRTC) + 121 (private)

Number of routes.....49

Bus stops.....65

Bus depots.....3

E-buses (chargers).....68 (23)



Standard ticket price: Rs 10

Average net loss per km: Rs 25



Total GHG emissions:

222,637 tCO₂e

Road transport:
82,376 tCO₂eq

Diesel buses:
4,077 tCO₂eq

Main Operator: Himachal Road Transport Corporation (HRTC) – State-Govt. owned

System subsidies: Rs 7.2 billion (€ 76.4 M) per year

Operation model

Model E – Government-run system

- **Himachal Road Transport Corporation (HRTC):** A state-govt. entity, HRTC owns, operates, and maintains majority of buses in Shimla, including procurement and registration of new buses
- **Infrastructure:** The Public Works Department builds and maintains bus stops and shelters
- **Funding:** State Govt. grants and budget allocations to HRTC + revenues from fares and advertising

Model D – Private operators

- Private operators obtain permits from Shimla's Regional Transport Office, allowing them to own, operate, and maintain buses on designated city routes.
- Transport Office issues permits and collects fees from operators.

Project Name
Electrifying Mobility for a Cleaner Future

Project Objective
Transition Shimla and Himachal Pradesh’s bus fleet to electric vehicles to reduce emissions and protect the region’s ecosystems.

Implementing agency
Himachal Road Transport Corporation (HRTC)

Total cost
INR 5.12 billion (€ 53.54 million)

Project Stage **TAP Status**
Concept/Scoping **Screened – under revision**

Financing status
INR 3.15 billion (€ 32.9 million) – 61.5% secured from State Govt. for acquisition of 327 buses ;
INR 1.97 billion (€ 20.6 million) – 38.5% still needed

Support requested Financing for 130 e-buses, 93 charging stations, supporting infrastructure

Project Scope

<input checked="" type="checkbox"/> Terminals & Depot facilities	Acquisition of additional 130 e-buses in Shimla (327 e-buses already secured for Himachal Pradesh)
<input checked="" type="checkbox"/> Bus shelters	33 charging stations, incl. civil works and electrification

Cost structure:

Acquisition of 327 e-buses	Acquisition of 130 e-buses	33 charging stations	Additional infrastructure & technical studies	O&M costs (1 year)
INR 3.15 billion (61.5%) – Secured	INR 1.31 billion (25.6%)	INR 420 M (8.2%)	INR 240 M (4.7%)	INR 80.79 million
<div><div></div> Capital expenditures</div> <div><div></div> Operational expenditures</div>				

Business Model & Financial rationale

Procurement & Operation

- Tendering process for 327 e-buses approved by the State Government and started by HRTC.
- Outright Purchase Model: All e-buses will be owned and operated by HRTC.
- EV infrastructure to be developed through public-private partnerships.

Expected Returns & Revenues

- Operational savings:**
- INR 210 million (€22.72 M) from fuel savings.
 - 7% lower total cost of ownership over 10 years without subsidy and 22% with subsidy from the government.

- Revenue potential:**
- Fare revenue not yet estimated
 - Non-fare sources from EV charging stations, including commercial leases, advertising, parking fees.

Potential financing sources

- E-buses:**
- INR 3.15 billion grant from State Government (financed by NABARD)
 - Grants and budget from the State government to cover HRTC operations

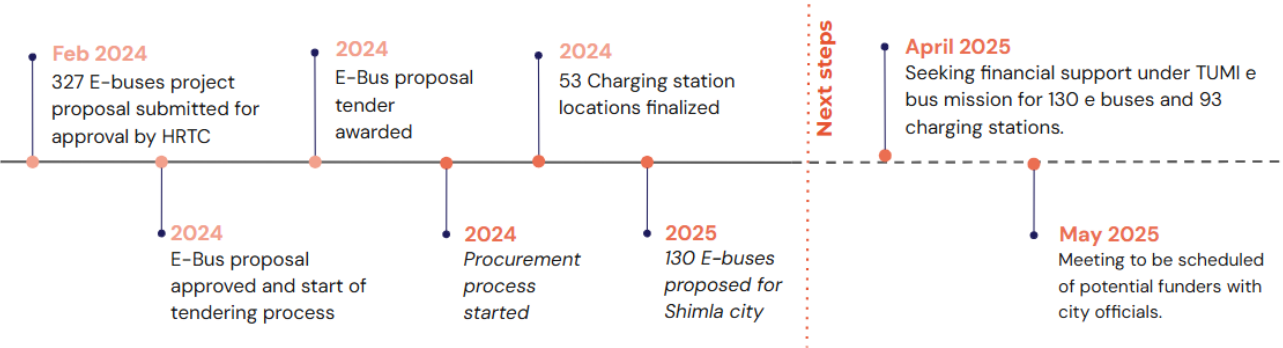
- Future financing options**
- Faster Adoption & Manufacturing of EV in India (FAME-III, upcoming): Subsidies to purchase e-buses, chargers
 - National Electric Bus Program: Bulk tenders for e-buses led by CESL
 - GCF (India E-Mobility Financing Programme) and AIIB (GreenCell Electric Bus Financing project)

Key Risks & Mitigation Strategies

Risk	Mitigation
Stakeholder Risk: Limited availability of suitable land for charging stations and bus depots, especially in eco-sensitive zones.	Utilize existing govt.-owned land and integrate charging stations into public infrastructure, such as parking lots and transport hubs.
Financial Risk: High upfront costs of EVs and charging infrastructure may limit investment from both the public and private sectors.	Leverage government subsidies, low-interest loans, and PPPs to reduce financial barriers. Explore CSR funding from private companies to support infrastructure development.
Political Risk: Shifts in political leadership or policy priorities may affect funding & regulatory support	Align the project with long-term state and national EV policies and build bipartisan support, ensuring continuity across administrations.

Vulnerability: High Medium Low

Timeline & Milestones



Transformative Impact & Benefits

Environmental & Climate Benefits	Social and Economic Benefits & Just Transition	Expansion & Innovation
<p>Emissions avoided annually:</p> <ul style="list-style-type: none">3596.94 tCO₂e (130 buses)75.805 kgCO₂e per bus per day (100 km/50 pax)1,690 PM_{2.5} <p>Lower fossil fuel dependence, enhanced resilience</p> <p>Adaptation: More reliable transport during extreme weather events</p>	<p>Gender-inclusive employment & training in driving, maintenance, operations.</p> <p>Higher public transport accessibility, benefitting vulnerable groups (especially due to topographical challenges).</p> <p>Continuation of concessional and reduced fares</p> <p>307,404 people benefitting from better air quality, fewer respiratory diseases and enhanced public health, particularly in eco-sensitive zones</p>	<p>Scalability: Development of e-bus manufacturing hub in the state will allow for scaled deployments</p> <p>Replicability: Innovative features can serve as benchmark for other Indian cities</p> <p>Innovation: Use of renewable energy for charging stations, battery recycling and end-of-life management</p>

Total number of beneficiaries: Not estimated.

Contact

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Udaipur, India

Integrated Mobility Plan for Udaipur



City Snapshot

Udaipur is a historic city in the State of Rajasthan, often referred to as the 'City of Lakes' for its scenic water bodies and heritage architecture. Located in the southern part of the state, it serves as the district's administrative capital and is a major tourist destination. Udaipur's growth has been shaped by its cultural significance, hilly surroundings, and industrial activity.



Population

Municipal:
658,000
(est. 2025)



Economy

Currency: INR
GDP: € 4.1 billion
(Udaipur District)



Fiscal & Finance

City debt capacity rating: BBB+ (2017)
Eligible to obtain international debt? Yes, through Rajasthan State Govt.
City annual revenue (2024): € 49.8 million (UMC)



Main documents

Rajasthan Electric Vehicle Policy (2022):

Targets for e-vehicles

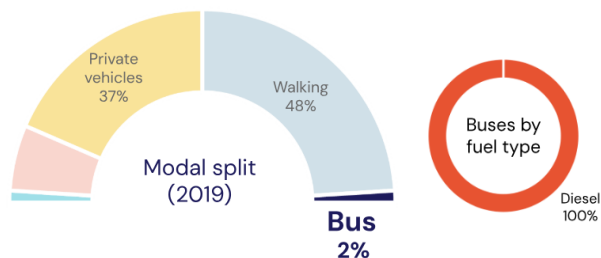
PM's e-Bus Sewa Scheme (2023):

Acquisition of 50 e-buses & chargers for Udaipur by National Govt.

Net-Zero Climate Resilient City Action Plan (2024):

90% e-vehicles, 61% powered by renewable energy by 2070.

Bus system in Udaipur



Number of passengers..... 14,700/day

Number of buses..... 24

Number of routes..... 6

Bus queue shelters..... 100

Bus depots..... 1



Standard ticket price: Rs 5 – 20
(based on distance)



Total GHG emissions:

1.15 million tCO₂e

Road transport:

309,350 tCO₂eq

Main Operator: Mateshwari Urban Transport Solutions Pvt. Ltd (MUTSPL)

Regulator: Udaipur City Transport Service Limited (UCTSL) – State-govt. owned.

System subsidies: Not available, but INR 39–45/km paid to operator by State and UMC

Operation model

Model C – Government-run system

- **UCTSL**, a public company acting as a Special Purpose Vehicle (SPV), manages all bus services.
- **Operations & Maintenance:** A third-party contractor, MUTSPL, is responsible for the procurement, operations, and maintenance of 24 buses and bus infrastructure for a period of seven years, running until June 2028.
- **Concession model:** The system operates under the Viability Gap Funding (VGF) scheme, where the operator is paid INR 39.50 per kilometer for non-air-conditioned buses and INR 45 per kilometer for air-conditioned buses.

Project Name
Integrated Mobility Plan for Udaipur

Project Objective
Strengthen first- and last-mile connectivity by deploying solar-powered infrastructure to support an integrated system of e-autos and public bicycle sharing, enhancing intermediate public transport.

Implementing agency
Udaipur Municipal Corporation (UMC)

Total cost
INR 340 million (approx. € 3.5 million)

Project Stage
Feasibility

Financing status
Seeking finance

TAP Status
Approved to TAP

Support requested
Technical assistance, financing for implementation

Project Scope

<input checked="" type="checkbox"/> Terminals & Depot facilities	1 solar powered bus terminal (240 MW) for 50 buses
<input checked="" type="checkbox"/> Bus shelters	30 solar powered bus queue shelters
<input checked="" type="checkbox"/> Intermediate public transport (last-mile connectivity)	150 e-autos (rickshaws); 400 e-cycles for public bike sharing system, 80 solar powered docking stations

Cost structure:

Solar powered bus depot (50 buses)	400 e-cycles, 80 docking stations	30 solar powered bus queue shelters	150 e-autos	O&M costs (1 year)
INR 250 million (74%)	INR 10 million (3%)	INR 45 million (13%)	INR 35 million (10%)	INR 8.3 million

- Capital expenditures
- Operational expenditures

Business Model & Financial rationale

Procurement & Operation

- Procurement for 50 e-buses and charging infrastructure underway through “PM E-Bus Sewa Scheme”; operations by private company.
- O&M of bus depot and shelters by UCM.
- E-autos will be leased to drivers and overseen by the UCM.
- Public bike sharing system to be operated and maintained by private contractor MyBike.

Expected Returns & Revenues

Operational savings:

- INR 470,000 monthly savings in electricity for e-bus charging due to solar-powered depot
- 75% lower OPEX compared to diesel buses

Revenue potential:

- Fare revenue: E-buses: INR 977 million; E-autos: INR 586 million; E-cycles: INR 78 million
- Non-fare revenue from advertising: INR 371 million

Potential financing sources

E-buses:

- INR 500 million from National Government through PM e-bus Sewa Scheme
- Charging infrastructure financed through Energy Efficiency Services Ltd.

Future financing options

- FAME-III, upcoming: Subsidies for chargers (bus depots), e-autos, e-bikes
- PM E-DRIVE Scheme: Subsidies for e-autos
- Punjab National Bank Green Ride Scheme & Bank of India Star MSME e-Rickshaw Finance: Loans to individual purchase of e-rickshaws

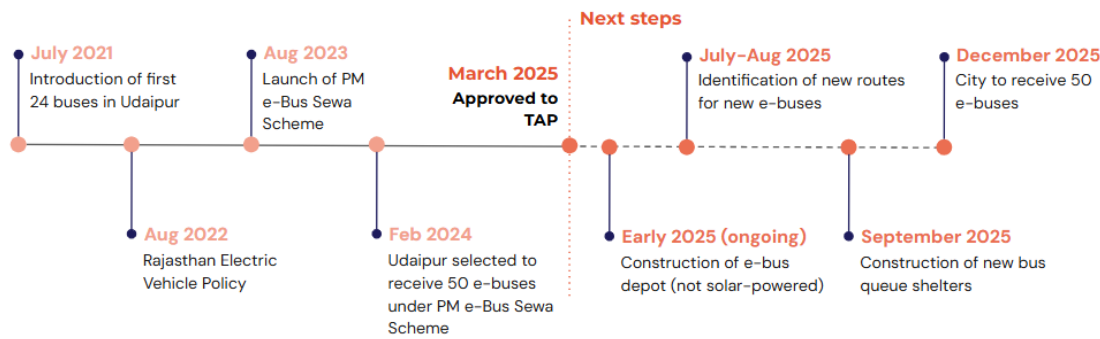
* This budget is preliminary and may be subject to adjustments.

Key Risks & Mitigation Strategies

Risk	Mitigation
Climate Risk: 75% of the total public transport stops are vulnerable to urban heat and 33% to flooding.	The infrastructure will include heat-resilient infrastructure and enhanced drainage systems using nature-based solutions.
Financial & Funding Risk: Costs of operation and maintenance of the infrastructure for the UMC.	A yearly financial reserve will be maintained for emergencies and currency fluctuations, overseen by qualified agencies to ensure timely action.
Political Risk: Shifts in political leadership or policy priorities may affect funding and regulatory support.	Project is aligned with local, State, and National EV strategies. Guarantee dialogue of oppositions in project development to foster trust in case of government change.

Vulnerability: ■ High ■ Medium ■ Low

Timeline & Milestones



Transformative Impact & Benefits

Environmental & Climate Benefits	Social and Economic Benefits & Just Transition	Expansion & Innovation
<p>Emissions avoided annually: 1106.68 tCO2e</p> <p>Air quality improvement, with reduction in PM10, PM2.5, CO, and others</p> <p>Lower fossil fuel dependence, enhanced resilience</p> <p>Reduced Urban Heat Island Effect</p>	<p>40% of beneficiaries are women, youth, or elderly</p> <p>Enhanced sense of safety, especially among women</p> <p>Higher public transport accessibility with universally accessible infra</p> <p>Gender-inclusive employment & training</p> <p>Reduced respiratory and related health impacts.</p>	<p>Scalability: Space for expansion of bus use, integrated with last-mile connectivity</p> <p>Replicability: Other cities in India acquiring e-buses can replicate last-mile connectivity strategies</p> <p>Innovation: Incorporate last-mile connectivity into e-bus project and solar powered depot</p>

Total number of beneficiaries: 260,000 ridership from new buses and intermediate public transport

Contact

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LIST OF ACRONYMS

ADB – Asian Development Bank
AFD – Agence Française de Développement
AIIB – Asian Infrastructure Investment Bank
BDE – Banco de Desarrollo del Ecuador
BNDES – Banco Nacional de Desenvolvimento Econômico e Social
BRL – Brazilian Real
BRT – Bus Rapid Transit
C40 CFF – C40 Cities Finance Facility
CAF – Development Bank of Latin America and the Caribbean (Corporación Andina de Fomento)
CAPEX – Capital Expenditure
CESL – Convergence Energy Services Limited
CFN – Corporación Financiera Nacional
CNG – Compressed Natural Gas
CTC Cuenca – Cámara de Transporte de Cuenca
CTF – Clean Technology Fund
DFI – Development Finance Institution
EMOV EP – Empresa Pública de Movilidad de Cuenca
EPMTQ – Empresa Pública Metropolitana de Transporte de Quito
ETUFOR – Empresa de Transporte Urbano de Fortaleza
EV – Electric Vehicle
FAME – Faster Adoption and Manufacturing of Hybrid and Electric Vehicles
GAD Cuenca – Gobierno Autónomo Descentralizado de Cuenca
GCC – Gross Cost Contract
GDP – Gross Domestic Product
GHG – Greenhouse Gas
GIZ – Deutsche Gesellschaft für Internationale Zusammenarbeit
HRTC – Himachal Road Transport Corporation
IDB – Inter-American Development Bank
INR – Indian Rupee
ITDP – Institute for Transportation and Development Policy
ITS – Intelligent Transport Systems
IPT – Intermediate Public Transport

JICA – Japan International Cooperation Agency
KfW – Kreditanstalt für Wiederaufbau
MDB – Multilateral Development Bank
O&M – Operations and Maintenance
OEM – Original Equipment Manufacturer
OPEX – Operating Expenditure
PAC – Growth Acceleration Program (Programa de Aceleração do Crescimento, Brazil)
PPF – Project Preparation Facility
PPP – Public–Private Partnership
PSM – Payment Security Mechanism
PT – Public Transport
RMC – Rajkot Municipal Corporation
RRL – Rajkot Rajpath Limited
SPV – Special Purpose Vehicle
SUMOB – Superintendência de Mobilidade Urbana de Belo Horizonte
TCO – Total Cost of Ownership
TUMI – Transformative Urban Mobility Initiative
UCTSL – Urban Community Transport Services Ltd (Indore)
UMC – Udaipur Municipal Corporation
USD – United States Dollar
VGF – Viability Gap Funding

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