



CITY ROADMAP FOR E-MOBILITY: MADRID

DEMONSTRATION PROJECT: E-BUS CHARGING INFRASTRUCTURE



PROJECT PARTNERS



ABOUT

This document describes the roadmap to achieve full electrification of EMT by the end of 2033

TITLE

City Roadmap for E-mobility: Hamburg
 Demonstration project: Intermodal travel chains with e-micro vehicles

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DISCLAIMER

The views expressed in this publication are the sole responsibility of the authors named and do not necessarily reflect the views of the European Commission.

LAYOUT

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All the pictures are provided by the SOL+ partners

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City Roadmap for E-mobility: Madrid

Demonstration project: E-bus charging infrastructure

Spain, Madrid – E-bus charging infrastructure

May 2024



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Executive Summary

The urban mobility context in Madrid is dynamic, with a population of approximately 3.3 million residents and extensive transportation networks. EMT Madrid, the city's primary bus operator, manages a significant fleet of buses and ancillary services crucial for the city's operations. Madrid has implemented various regulations and incentives to promote electric mobility, aligning with sustainability strategies such as Madrid360 and the new Sustainable Urban Mobility Plan.

The vision for Madrid's transportation system includes a transition to electric mobility to combat climate change and improve air quality. EMT Madrid aims to achieve full electrification of its fleet by 2033, with intermediate targets set for 2025 and 2027. Madrid's overarching sustainability strategies outline objectives such as increasing electric vehicle adoption, expanding charging infrastructure, promoting sustainable mobility solutions, and reducing emissions.

EMT Madrid's electrification roadmap outlines strategic initiatives focused on fleet renewal, charging infrastructure development, financial planning, operational optimization, and workforce development. The phased approach involves systematically replacing conventional buses (diesel fleet has been already phased out last December 2022) with electric models, investing in charging infrastructure, collaborating with public and private partners, optimizing operations, and providing workforce training.

To achieve the electrification goals, Madrid requires collaboration and resources from public and private entities. Government agencies can provide regulatory support, funding, and access to data, while industry partners can offer expertise, technology, and investment. Further studies are needed to assess feasibility, market dynamics, and funding sources for larger investments in electric mobility infrastructure and technology.



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List of Abbreviations

CNG	Compressed Natural Gas
EMT	Empresa Municipal de Transportes
EV	Electric Vehicle
LEZ	Low Emission Zone
PTO	Public Transport Operator
SUMP	Sustainable Urban Mobility Plan
TEN-T	Trans European Transport Network



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1. Background – Where are we now?

1.1. Urban mobility context in selected city

The city of Madrid, with a population of approximately 3.3 million inhabitants, thrives within a vibrant urban landscape, and the dynamics of urban mobility are pivotal to the city's function and sustainability.

It is the second most populated Functional Urban Area in the European Union, accounting 7% of Spain's total population, with 7 million at regional level, and it plays a key role in the country's economy (12,7% of the country's total GDP, up to almost 20% at metropolitan level).

With a total surface of 605.77 km², the municipality of Madrid accounts 13 million daily trips, including all means of transport. The municipality also hosts the Madrid Adolfo Suarez Barajas Airport, which is the 1st airport in Spain and the 5th in Europe in number of passengers (60,2 million passengers in 2023). With more than 10 million tourists at city level, and 7.84 million tourists at regional level (2023 figures), tourism is steadily growing too.

The city belongs to 2 TEN-T corridors, the Mediterranean and Atlantic and therefore it is an important logistic and transport hub (i.e. Mercamadrid, the main wholesale market of the city, provides daily food for more than 12 million people, with a radius of influence up to 400 km).

Urban passenger and freight transport networks in Madrid are extensive, with over 2,800 kilometers of roads, 294 kilometers of metro lines, and 207 kilometers of commuter rail lines crisscrossing the city, in the region there are more than 40 different public transport operators, covering an annual demand of 1,606 million trips (2023 not consolidated figures).

EMT Madrid, partner in SOLUTIONS Plus and the PTO owned by the city, manages the bus transport service in the municipality of Madrid, being the only bus operator of the City, and the largest mobility company in Spain in its sector. EMT Madrid also manages 28 parking facilities of the city and 1 mobility hub (about 12,602 parking lots and 223 charging points for electric vehicles, standard, fast and ultrafast charging), as well as the tow trucks service (80 tow trucks), the public e-bikesharing system (Bicimad, with 7,500 e-bikes and 611 bike stations), and the Casa de Campo cable car. EMT also has a Consultancy department which provides technical assistance to Madrid City Council on sustainable urban mobility matters as well as to other transport operators around the world.

Nowadays (March 2024), EMT employs 10,045 employees. Its fleet accounts 2,100 buses (with 4,097 km network), 11,032 bus stops and are available to travel in 223 routes across Madrid. Since December 2022 all the fleet is 100% green according to the European Clean Vehicles Directive (electric and CNG).

Yearly, the EMT's buses are travelling more than 106 million kilometres and carrying 454 million passengers (2023 figures), 365 days a year, and 24 hours a day, becoming a critical infrastructure of the urban ecosystem and therefore, playing an important role on the normal functioning of the city.



1.2. Current Policy Framework and Market Readiness for deployment of e- mobility

The framework for electric mobility in the city of Madrid encompasses a range of regulations, incentives, and infrastructure initiatives aimed at promoting the adoption of electric vehicles (EVs) and facilitating their integration into the urban transportation system. Here's an overview:

- **Regulatory Measures:** Madrid has implemented various regulatory measures to incentivize the use of electric vehicles and reduce emissions. These include low-emission zones (LEZs) in the city center where only zero-emission vehicles or those meeting certain emission standards are allowed to enter, thereby discouraging the use of traditional fossil fuel vehicles. Additionally, Madrid has established preferential parking spaces and access privileges for electric vehicles, making it more convenient for EV owners to navigate the city. These regulatory measures are included within the Sustainability Strategy Madrid 360 (2019), the Roadmap towards Climate Neutrality (2021) and the Sustainable Urban Mobility Plan (July 2022) which aims to reduce private car usage by 23% and increase public transport ridership by 20% by the end of the decade.
- **Incentives and Subsidies:** The city offers financial incentives and subsidies to encourage the purchase of electric vehicles (so called Plan Cambia360). These incentives may include tax breaks, grants, or subsidies for EV purchases, as well as discounts on vehicle registration fees or toll exemptions for electric vehicle owners. Furthermore, Madrid may provide incentives for the installation of charging infrastructure at residential and commercial properties, further incentivizing the adoption of EVs.
- **Charging Infrastructure:** Madrid has been actively expanding its network of electric vehicle charging infrastructure to support the growing number of EVs on its roads. This includes the installation of public charging stations throughout the city, including fast-charging stations, to ensure convenient access for EV owners. Madrid may also require new residential and commercial developments to incorporate charging infrastructure as part of their building codes or planning regulations.
- **Public Transport Electrification:** In addition to promoting electric passenger vehicles, Madrid is also investing in electrifying its public transport fleet. This may involve transitioning buses, taxis, and other forms of public transport to electric or hybrid propulsion systems, thereby reducing emissions and improving air quality in the city. In particular, the case of EMT Madrid, the bus operator, SOLUTIONS Plus partner, with an ambitious electrification strategy.
- **Awareness and Education:** Madrid conducts public awareness campaigns and educational initiatives to inform residents about the benefits of electric mobility and how they can participate in the transition to electric vehicles. These efforts may include workshops, informational materials, and outreach programs to engage residents, businesses, and other stakeholders.

Concurrently, ambitious transport projects are underway, including the extension of metro lines, the expansion of bicycle lanes, the implementation of low-emission zones in the city center and also some urban regeneration projects such as Madrid Nuevo Norte or the urban developments of the southwest of the city. These efforts are guided by the aforementioned local policies and plans.



Understanding these nuances is essential for envisioning the future of Madrid's mobility landscape, where scenarios on transport demand, growth, and modal distribution offer insights into shaping a more resilient and livable urban environment. Madrid anticipates a significant increase in demand for sustainable transport modes, with projections indicating a 30% increase in public transport ridership and a doubling of bicycle trips by 2030. These projections, coupled with ongoing initiatives and policy frameworks, underscore Madrid's commitment to fostering a sustainable, efficient, and inclusive urban mobility system for its residents and visitors alike, which includes, obviously, electrification.

Expanding on the framework for electric mobility in Madrid involves not only government initiatives but also private sector involvement, leveraging the city's particularities, and aligning with national policies and international commitments, such as:

- **Private Sector Initiatives:** Alongside government efforts, the private sector plays a crucial role in promoting electric mobility in Madrid. This includes automotive manufacturers, charging infrastructure providers, energy companies, and mobility service providers. Automakers may introduce incentives such as discounts, financing options, or trade-in programs to encourage the purchase of electric vehicles. Charging infrastructure companies may invest in the deployment of charging stations, both public and private, to expand the charging network across the city. Energy companies may offer specialized tariffs or incentives for EV charging, such as off-peak charging rates. Additionally, mobility service providers may integrate electric vehicles into their fleets, offering electric car-sharing or ride-hailing services to consumers.
- **City Particularities:** Madrid's unique characteristics, such as its dense urban core and surrounding suburban areas, influence the adoption and deployment of electric mobility solutions. The city's compact layout and high population density make it well-suited for electric vehicles, especially for short-distance commutes and urban deliveries. Moreover, Madrid's climate, with hot summers and mild winters, provides favorable conditions for electric vehicle battery performance. However, the city's hilly terrain may pose challenges for electric vehicles with limited range, requiring strategic placement of charging infrastructure, particularly in elevated areas.
- **National Policies and International Commitments:** Madrid's electric mobility framework is aligned with national policies and international commitments, including Spain's National Energy and Climate Plan (NECP), National Urban Mobility Plans (NUMPs), and commitments under the Paris Agreement. Spain's NECP sets targets for reducing greenhouse gas emissions and increasing the share of renewable energy, which directly support the transition to electric mobility. Madrid's NUMPs outline strategies for sustainable urban mobility, including measures to promote electric vehicles, enhance public transport, and improve cycling infrastructure. Furthermore, Madrid's initiatives contribute to Spain's Nationally Determined Contributions (NDCs) under the Paris Agreement, which aim to mitigate climate change by reducing emissions from the transport sector.

Last but not least, EMT Madrid, as the local PTO owned by the city, is subject to the different regulatory frameworks defined by the city, and some specific goals are specified in its own EMT Strategic Plan 2021-2025, as indicated in the next chapters.



1.3. Main obstacles and barriers

Despite progress, several obstacles remain to the widespread adoption of electric mobility in Madrid. These include, among others:

- Upfront costs and affordability barriers associated with electric vehicle purchase, range anxiety due to limited charging infrastructure, and grid capacity constraints. These aspects are even more crucial when talking about e-buses.
- Challenges related to battery technology, such as charging times and energy density, may hinder the adoption of electric vehicles for long-distance travel or commercial applications. Batteries are the most expensive component of an e-bus.
- Regulatory complexities, including permitting processes for charging infrastructure installation and interoperability standards, also pose challenges for stakeholders in the electric mobility ecosystem. These complexities are crucial for scaling up processes.

Addressing these obstacles requires a collaborative approach involving government, industry, and civil society stakeholders to implement supportive policies, invest in infrastructure, and foster innovation in electric mobility technology.

By overcoming these challenges, Madrid (and EMT Madrid in particular) can accelerate the transition to electric mobility, reduce emissions, and build a more sustainable and resilient urban transportation system for the future.

2. Approach – Methodology

The main aim of this Madrid and EMT Madrid electrification roadmap represents a strategic blueprint for the transition to electric mobility within the city's public transportation system.

However, and beyond the general figures and context about Madrid municipality, mainly focus on EMT Madrid, which can play a key role in helping the city improving air quality, and fostering sustainability by electrifying a significant portion of the city's public transport fleet.

Therefore, the scope of the roadmap encompasses only the geographical area within Madrid municipality targeting the only types of vehicles operated by EMT Madrid: buses and minibuses.

The electrification roadmap basically follows what it is stated within **EMT Madrid Strategic Plan 2021-2025**, for which a rigorous methodology was employed, incorporating robust procedures for data collection, stakeholder engagement, analysis, and technical assessments. Data collection efforts involved gathering comprehensive information on existing fleet operations, energy consumption, emissions profiles, infrastructure requirements, and passenger demographics. Stakeholder engagement was a crucial aspect of the roadmap development process, involving different consultations with different stakeholders such as government agencies or industry experts, amongst others..



The analysis phase of the roadmap included thorough technical assessments to evaluate the feasibility and viability of electrification solutions for different vehicle types and operational scenarios. This involved assessing factors such as vehicle performance, range capabilities, charging infrastructure requirements, cost-effectiveness, and environmental impacts. Safety considerations were paramount throughout the process, with stringent evaluations conducted to ensure that electric vehicles meet rigorous safety standards and regulatory requirements.

Moreover, gender equality and other social aspects are integrated into the roadmap development process, with a focus on promoting inclusive and equitable access to electric mobility solutions. This included considerations for accessibility, affordability, and the social implications of electrification initiatives, particularly for marginalized communities or vulnerable populations.

Mapping roles and responsibilities for the roadmap implementation was also a critical step in ensuring effective coordination and oversight of activities. This involved the establishment of working groups comprising representatives from relevant stakeholders, tasked with organizing and overseeing various implementation activities. These working groups were responsible for monitoring progress, addressing challenges, and ensuring alignment with overarching sustainability goals and objectives.

Overall, the EMT Madrid electrification roadmap represents a comprehensive and collaborative effort to drive the transition to electric mobility within the city's public transportation sector.

3. The Roadmap – Where are we going?

3.1 Vision

EMT Madrid's vision within its roadmap towards electrification embodies a bold commitment to leading the transition towards sustainable urban mobility while prioritizing the well-being of Madrid's residents and the health of its environment. As one of the largest public transport operators in Madrid, EMT Madrid envisions a future where its fleet of vehicles is fully electrified, contributing to a cleaner, quieter, and more livable city for all.

At the core of EMT Madrid's vision is the recognition that electrification represents a transformative opportunity to address pressing environmental challenges, improve air quality, and reduce carbon emissions. By electrifying its fleet of buses, minibuses, and specialized vehicles, EMT Madrid aims to play a central role in Madrid's efforts to combat climate change and create a more sustainable transportation system.

EMT Madrid's vision extends beyond simply adopting electric vehicles; it encompasses a holistic approach to electrification that integrates seamlessly with broader mobility strategies and urban planning initiatives. This includes investing in charging infrastructure, optimizing route planning and scheduling, and leveraging innovative technologies to enhance the efficiency and effectiveness of its operations.



Furthermore, EMT Madrid's vision emphasizes the importance of equity and inclusivity, ensuring that the benefits of electrification are accessible to all residents, regardless of income level or geographic location. The wide spread and dense EMT Madrid services (99.8 % of Madrid city population have a EMT bus stop less than 15 minutes walking distance), with a 100% accessible fleet and bus stops, helps reducing disparities in access to safe, comfortable and affordable transportation options.

Central to EMT Madrid's vision is a commitment to continuous innovation and collaboration. By partnering with industry leaders, research institutions, and local stakeholders, EMT Madrid aims to harness the latest advancements in electric mobility technology and best practices to drive forward its electrification agenda. Through open dialogue and knowledge-sharing (either via research and innovations projects, or different international and European networks), EMT Madrid seeks to foster a culture of innovation and excellence that propels Madrid towards a sustainable and prosperous future.

In summary, EMT Madrid's vision within its electrification roadmap reflects a bold and ambitious commitment to leading the transition towards sustainable urban mobility. By embracing electrification as a catalyst for change, EMT Madrid aims to create a cleaner, greener, and more equitable transportation system that enhances the quality of life for all residents of Madrid.

3.2 Objectives

Before getting into the specific objectives of EMT Madrid, it is important to remark which are the main objectives included within the different regulatory frameworks that apply in the city of Madrid, mostly derived from Madrid360 Sustainability Strategy but also in the new SUMP Madrid360 approved in July 2022. These are:

1. Increasing Electric Vehicle Adoption:

- Objective: Madrid360 aims to accelerate the adoption of electric vehicles (EVs) to reduce emissions and improve air quality in the city.
- Target: By 2030, Madrid aims to achieve a target of 25% of all new vehicle registrations being electric or low-emission vehicles.
- Figures: Madrid's SUMP includes specific measures to promote EV adoption, such as subsidies and tax incentives for EV purchases, with a target of increasing the number of registered EVs to 500,000 by 2030.

2. Expanding Charging Infrastructure:

- Objective: Madrid360 seeks to expand the city's electric vehicle charging infrastructure to meet the growing demand for EV charging.
- Target: By 2025, Madrid aims to triple the number of public charging stations to 6,000, with a focus on installing fast-charging stations in key locations.
- Figures: The new SUMP outlines plans to invest €50 million in expanding charging infrastructure, including the installation of charging points in residential areas, public parking facilities, and along major transport corridors.



3. Promoting Sustainable Mobility Solutions:

- Objective: Madrid360 promotes a holistic approach to sustainable mobility, including electric bicycles, scooters, and shared mobility services.
- Target: Madrid aims to increase the share of electric bicycles and scooters in the city's overall modal split to 15% by 2030.
- Figures: The SUMP includes initiatives to expand bike-sharing and scooter-sharing programs, with a target of reaching 3 million annual trips by 2030.

4. Reducing Emissions and Improving Air Quality:

- Objective: Madrid360 aims to reduce greenhouse gas emissions and improve air quality by transitioning to electric mobility.
- Target: Madrid aims to reduce CO2 emissions from the transport sector by 50% by 2030 compared to 2015 levels.
- Figures: The SUMP outlines specific measures to reduce emissions, including the phasing out of diesel buses in favor of electric or low-emission alternatives, with a target of electrifying 100% of the bus fleet by 2030.

5. Enhancing Energy Efficiency and Resilience:

- Objective: Madrid360 seeks to enhance energy efficiency and resilience in the transportation sector through the adoption of electric vehicles.
- Target: Madrid aims to increase the share of renewable energy in the transportation sector to 30% by 2030.
- Figures: The SUMP includes plans to promote the use of renewable energy for charging electric vehicles, such as solar-powered charging stations and incentives for EV owners to charge during off-peak hours when renewable energy generation is high.

In addition to the cities' objectives, **EMT Madrid** has the following electrification ones:

- Reaching **full decarbonization by 2033** (may include Hydrogen as well)
- With the **intermediate goal of electrifying one quarter of its fleet by 2025** (horizon of the current Strategic plan) **and one third by 2027** (meaning a total of almost 667 e- buses over 2,100).
- Today the electrification ratio is around 13.1% (276 e-buses over 2,100).
- It is important to remark that, to achieve the electrification goals by the end of 2025, EMT Strategic Plan 2021-2025 ensures a historic investment by Madrid City Council of **more than 1 billion euros** to undertake a real technological transformation.

3.3 Timeline

EMT Madrid has a clear timeline for the electrification of the company up to 2027 (up to 2033 is still to be determined).

Fuel	2023	2024	2025	2026	2027
Diesel					
CNG	1.744	1.661	1.561	1.451	1.351
Hybrid	17				
Hydrogen	10	10	10	20	20
Electric	276	429	529	629	729
Total	2.100	2.100	2.100	2.100	2.100
% fleet electrification	13,1%	20,4%	25,2%	30,0%	34,7%

Table 1: Evolution of the composition of EMT's buses fleet at the end of the year (units)

With the following total investment:

	2021	2022	2023	2024	2025	TOTAL
Acquisition of buses	112.132.900	108.584.200	81.403.900	116.284.200	116.284.200	534.689.400
Construction	200.000	17.692.900	45.155.800	52.655.800	16.050.000	131.754.500
Technical installations	4.124.744	29.523.188	50.675.800	55.255.800	18.650.000	158.229.532
Rest of investments	25.362.310	59.719.861	45.038.420	23.000.495	24.064.208	177.185.292
TOTAL INVESTMENTS	141.819.954	215.520.148	222.273.920	247.196.295	175.048.408	1.001.858.724

Table 2: Forecasted investment up to 2025 (Horizon of the current EMT Strategic Plan)

4. Implementation plan – How do we get there?

To achieve the targets, EMT Madrid will have to encompass strategic initiatives, investment plans, and operational enhancements focused on **transitioning its entire fleet to electric vehicles (EVs) within the specified timeframe**, with the intermediate goal of 2025 as it is set in its Strategic Plan 2021-2025:

- One of the key pillars of EMT Madrid's electrification strategy is a phased approach to fleet renewal and expansion. By systematically replacing aging conventional buses with electric models



and prioritizing the acquisition of electric vehicles in all new vehicle procurements, EMT Madrid aims to steadily increase the share of electric buses within its fleet over the coming years. This may imply the purchase of around 100/150 e-buses each year, depending on the available funding.

- In parallel, EMT Madrid is investing in the development and deployment of charging infrastructure to support the electrification of its fleet. This includes the installation of charging stations at bus depots, as EMT Madrid only considers overnight charging and not opportunity charging. In addition to that, it is fundamental to ensure the reliability and availability of charging facilities to support the operational needs of its electric bus fleet.
- Moreover, EMT Madrid is actively collaborating with public and private partners to leverage funding opportunities, seeking financial support from government agencies, European funding programs (such as Next Generation funds), participating in grant programs, and exploring innovative financing mechanisms to offset the upfront costs associated with electrification. By accessing external funding sources, EMT Madrid aims to accelerate the pace of fleet electrification and maximize the efficiency of its investment in electric mobility.
- Implementing measures to optimize the efficiency and performance of its electric bus operations. This includes leveraging data analytics and telematics systems to monitor vehicle performance, optimize charging schedules by the use of smart charging softwares, and identify opportunities for energy savings (i.e. by installing photovoltaic panels). By continuously refining its operations and maintenance practices, EMT Madrid aims to maximize the reliability and uptime of its electric bus fleet while minimizing operational costs.
- Furthermore, EMT Madrid is prioritizing workforce training and development to ensure that its employees are equipped with the knowledge and skills required to operate and maintain electric buses effectively. This includes providing training on electric vehicle technology, safety protocols, and maintenance procedures to empower staff to adapt to the transition to electric mobility seamlessly.

4.1. Focus Area 1: Charging infrastructure

As charging infrastructure plays a key role, it is worth to expand a bit which is EMT Madrid approach:

- The experience obtained from these different charging infrastructures together with the SOLUTIONS Plus pilot, has allowed EMT Madrid to set the most optimal and flexible model for the electrification of 100% of the fleet in the following years, which is based on the use of inverted pantographs.

The list of strengths of this technology is remarkably long; however, one of the biggest advantages of inverted pantographs is that they are universal, requiring only a couple of connecting rods to be installed on top of buses. Thus, it enables a full decoupling of charging infrastructure and buses, allowing the implementation of new operating models. The transfer of the pantograph from the



vehicle to the tank represents a significant saving in weight in buses, which translates into better energy consumption. Since the weight of the pantograph is no longer a penalty, they can be designed to be stronger and larger if required.

- EMT Madrid is currently running a pioneering project for the automation of intelligent charging by using inverted pantographs involving in its first phase an investment of more than four million euros and is backed by up to 90% financing from the EU Next Generation funds. One of the objectives pursued with this initiative is having a charging solution to be adapted to all manufacturers, regardless of the manufacturer of the bus or charger. Through this standardization, the solution can be replicated in other operations centres of EMT.
- The Strategic Plan 2021-2025 also includes ambitious infrastructure projects to advance electrification, such as the transformation of its five operation centres (bus depots), including the current facilities of the La Elipa Operations Centre to turn it into a reference centre to house a 100% electric fleet. This facility will have a capacity for up to 318 electric buses and will have a large photovoltaic installation that will be a national benchmark for energy efficiency, as it will be a totally roofed facility. EMT's plans also include the remodeling and adaptation of the Carabanchel, Entrevías and Sanchinarro operations centres to the new operational needs of the municipal company, rigorously following sustainability and efficiency criteria.
- Last but not least, aligned with the decarbonization strategy, EMT is also involved in a project to build a hydrogen plant and the photovoltaic installation that will supply it at the Entrevías Operations Centre, providing green hydrogen for a fleet of ten buses that EMT plans to acquire in the first phase. The project involves the commissioning of the necessary facilities for the production (by using photovoltaic panels), storage and distribution of green hydrogen.

More details can be consulted at the deliverable D5.1 (Scale-Up Concept Note).

5. Conclusion and next steps – What do we need?

In conclusion, the urban mobility context in the city of Madrid reflects its dynamic and vibrant nature, with a significant population and economic activity driving extensive transport networks. EMT Madrid, as a key player in the city's transportation ecosystem, operates a substantial fleet of buses and ancillary services critical to the city's functioning.

While Madrid's policy framework and market readiness for electric mobility are robust, challenges such as upfront costs and infrastructure limitations persist. Overcoming these obstacles requires collaborative efforts among government, industry, and civil society stakeholders to implement supportive policies, invest in infrastructure, and drive innovation in electric mobility technology.



EMT Madrid's electrification roadmap outlines a strategic plan for transitioning its fleet to electric vehicles, with clear objectives, targets, and timelines. However, achieving full electrification by 2033 (with intermediate milestones set for 2025 and 2027) requires harnessing capacities, skills, experience, and resources from both public and private entities. Government agencies can provide regulatory support, funding, and access to data, while industry partners can offer expertise, technology, and investment.

Moving forward, downstream implementation of the roadmap necessitates conducting comprehensive studies to assess feasibility, market dynamics, and funding sources. Beyond the local budget, funding for larger investments can be sourced from various avenues, including national grants, European funding programs, private partnerships, and international collaborations. These funding sources can support detailed feasibility studies and market analyses crucial for informing strategic investments in electric mobility infrastructure and technology.

6. References

- Madrid360 Sustainability Strategy
- Madrid roadmap towards climate neutrality
- Madrid 360 SUMP
- EMT Madrid Strategic Plan 2021-2025
- SOLUTIONS Plus deliverable D5.1 (Scale-Up Concept Note)

