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Contents

.....0

Preface 3

Summary.....5

Key Findings.....22

Country Reports 25

1. Austria* 25
2. Wallonia 31
3. Catalonia 39
4. Chile.....65
5. European Parliament.....80
6. France.....87
7. Germany.....103
8. Greece 112
9. Japan 124
10. Luxembourg 131
11. Netherlands 144
12. Norway.....158
13. Poland 167
14. Portugal.....175
15. Spain.....186
16. Sweden.....206
17. Switzerland.....227
18. United Kingdom.....232
19. United States of America 241

Preface[1]

Sustainable urban mobility is one of the major challenges facing contemporary societies, bringing together environmental objectives, technological innovation, economic development and quality of life. As cities face increasing demands for accessibility, efficiency and sustainability, transforming urban mobility requires a combination of new technologies and infrastructure, changes in public policies, urban planning and citizens' travel behavior.

The EPTA Annual Report 2026, “Sustainable Urban Mobility: Policies, Implementation and Societal Impact”, examines how different countries and regions address these challenges, highlighting policy developments, practical experiences and emerging priorities. It is the result of a joint effort by members of the European Parliamentary Technology Assessment (EPTA) Network, which supports evidence-informed policymaking at the intersection of science, technology and society.

The report serves as a follow-up upon earlier EPTA work on mobility. The 2026 publication revisits the subject from a broader perspective, reflecting developments in sustainable transport, technological innovation, environmental policy and societal expectations.

To provide a common framework for the contributions, participating institutions were invited to respond to five questions addressing:

1. Policy frameworks: The main legislative, policy and strategic frameworks governing sustainable urban mobility.
2. Implementation: The measures introduced in recent years and the modes of transport they address.
3. Impact: Available evidence regarding changes in mobility patterns, citizens' behavior and urban quality of life.
4. Participation: The involvement of citizens and stakeholders in planning, implementing and evaluating sustainable mobility policies.
5. Future priorities: The principal challenges and policy priorities for advancing sustainable urban mobility.

The report adopts a primarily descriptive rather than systematically comparative approach. It does not seek to rank countries or assess their performance against a uniform set of criteria. Instead, it brings together different experiences, interpretations and policy approaches, recognizing that sustainable mobility is shaped by diverse institutional arrangements, geographical conditions, technological capacities and societal needs.

[1] The country and regional contributions presented in this report reflect the analyses, interpretations and opinions of their respective authors. They do not necessarily represent the official positions or views of the authors' affiliated institutions, the respective national or regional parliaments, the Hellenic Parliament or the European Parliamentary Technology Assessment (EPTA) Network. Responsibility for the content of each contribution rests with its author(s). Its inclusion in this publication does not imply institutional endorsement.

The collection of 19 contributions offers an overview of current developments while providing an opportunity to identify common concerns, distinctive initiatives and emerging policy directions.

The Hellenic Parliament, holding the EPTA Presidency for 2026, coordinated this collective exercise, with the support of its Directorate of Studies[2]. We want to express our sincere appreciation to all participating institutions and authors for their valuable contributions, cooperation and commitment to sharing knowledge and experience.

The report will be presented and discussed at the EPTA Annual Conference in Athens on 2 November 2026, providing a forum for parliamentarians, researchers and experts to exchange perspectives on the policies, technologies and societal choices shaping the future of sustainable urban mobility.

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Summary

a. Austria

Sustainable mobility is governed by binding EU Law, national strategy and city-level plans. The strategical anchor is the Mobilitäts Masterplan 2030, the climate action framework for Austria to become climate neutral by 2040 by "avoid and shift and improve" first, then shift to eco-mobility and finally improve efficiency. At federal level BMIMI ministry is the competent authority (for MMP 2030, TEN-T compliance and SUMP contact point), supported by federal agencies, while at regional level Länder governments and city administrations implement their own plans.

A sustainable mobility plan must secure access in all population groups. Nationwide flat-rate annual pass and network extensions, cycle-highway projects, station-based e-car, bike and scooter sharing, restriction for older N- category commercial vehicles, subsidies for charging stations and programs for emission free bases and heavy vehicles, and, the renewed strategy for automated mobility, support sustainable mobility measures.

There is a shift toward environmentally friendly modes, with car use and emissions falling within cities, but safety of vulnerable road users remains a key concern.

Stakeholders' participation in planning, in Vienna, has a participatory, integrated design, but in the regions needs and expectations are captured through surveys.

Carbon pricing and Social Climate Fund are key instruments and TEN-T obligation to adopt a SUMP across the country is the driver. Transport is the main source of emission, governance is fragmented, data sharing is restricted holding back integrated planning, and a binding legal framework for joint mobility planning across municipalities also lacks.

b. Belgium

Belgium's contribution focuses on multimodal mobility information systems as behavioral policy instruments to encourage sustainable mobility and modal shift. Despite strong public support for sustainable mobility policies, Belgium lacks a national multimodal information platform. A fragmented landscape of local and transport operator-led systems has emerged, with different levels of functionality, public uptake and long-term sustainability and these systems are increasingly used to influence behavior rather than impose regulation.

Namur's Intelligent Transport System provides traffic conditions, public transport information, cycling infrastructure and parking availability, but significant technical malfunctions have limited its operation. Antwerp's Slim naar Antwerpen offers a more comprehensive and operational model, integrating public transport, walking, cycling, shared mobility and private cars into a real-time journey planner. Its algorithm prioritizes sustainable transport modes, proposing car journeys only when public transport takes significantly longer. Other initiatives, including the

Smart Mobility Planner and Brussels' Floya, demonstrate the difficulties of maintaining such services, particularly regarding funding and operational costs.

The deployment of these systems forms part of mobility management policies implemented by local public authorities and, in some cases, national authorities. Mobility is viewed as consumer behavior within a market offering different transport options and anticipating that users would make the right choice. The effectiveness of these systems in achieving modal shift remains uncertain. While they provide information on alternative transport options, information alone is insufficient to change established mobility habits. Moreover, systems that accommodate private cars risk reinforcing car dependence rather than reducing it. Public platforms also face strong competition from established private applications, particularly Google Maps and Waze, as well as from public transport operators' own applications, limiting their attractiveness and uptake.

The main challenges concern fragmented governance, competition between platforms, high maintenance costs and dependence on European funding. Long-term sustainability requires stronger institutional coordination, stable financing and a clearer strategic positioning of public information systems. Technological innovation must be accompanied by an understanding of mobility behavior, urban planning constraints and everyday travel routines. Multimodal information can support sustainable mobility, but only as part of broader, integrated policies addressing structural barriers to behavioral change.

c. Catalonia

Catalan mobility policy lies on European Law, shaped by climate and transport objectives. Sustainable mobility framework is structured as a hierarchical planning system from the Catalan Mobility Act that establishes a cross-sector system. It is implemented through the National Mobility Guidelines that define criteria, objectives and areas of action, along with programming, evaluation, monitoring and participation, complemented by a financial framework. Urban Mobility Plans (SUMPs equivalent) support actions on public transport, walking, cycling, road safety, parking, logistics, accessibility and public space. Barcelona's 36 municipalities run such plans, are assessed by the competent authority and are subjected to public information. There are demand-specific instruments to manage concentrated mobility (workplaces, schools, industrial sites etc.) like the Company Travel Plan and the School Mobility Plans.

A broad package of measures is implemented addressing public / private transport, personal and commercial mobility that combines infrastructure with traffic management, new technologies, clean vehicles, land-use and behavior – oriented mobility.

Fare reduction is the most visible measure. Bicycle Action Program promotes cycling and public space reallocation that enables vulnerable road users, along with air-quality and climate policy. Shared mobility is also promoted. Freight transport shifts towards rail – road – port connections and urban logistics promote electrification of fleets.

Public transport and cycling use are rising, road safety has improved and environmental monitoring shows improvement in air-quality.

Stakeholders' participation is organized in multi-level, sector-specific and monitoring processes for co-designing, implementing and evaluating plans and measures, granting universal accessibility.

Challenges still remain, regarding emissions, air pollution and noise, while car dependence in urban outskirts is still high. Fragmented cycling and walking networks, road safety, accessibility gaps, integrated policies on transport, land use and services, new technologies and funding, remain to be addressed.

d. Chile

Chile's sustainable urban mobility has a multi-layered legal architecture, combining transport regulation, climate and energy targets, urban planning, financing and mode-specific rules, coordinated under several ministries and implemented in metropolitan and regional areas.

National Sustainable Mobility Strategy provides a long-term roadmap that frames electromobility within active mobility, energy efficiency and sustainable use of urban space. National Electromobility Strategy sets a clear fleet transition with parallel deployment of charging infrastructure. National Urban Development Policy governs equity, spatial integration and sustainable urban planning. Complementary regulations provide for active mobility and universal accessibility, giving road space and safety to cycling modes and pedestrianization.

Recent developments in urban transport combine large-scale bus electrification and supporting charging infrastructure, expansion of mass and rail transit with 60% of electricity coming from RES, integrated fareand the redesign of urban space in favor of cyclists and pedestrians. All these are being managed through intelligent transport systems, including real time trip details' sharing and on-board bus surveillance systems.

A shift on mobility patterns and demand is measured towards cycling that has doubled since 2014, public transport has risen 37% since 2022 but, on the other hand, private car use continues to rise. Air pollution decreases, road safety increases. Service quality improves with new technologies and electrification generating economic efficiency due to reduced fleet maintenance costs.

Stakeholders' participation, built on legal framework, combine permanent advisory bodies, project-level environmental consultation and ad-hoc participatory processes, in all levels of administration, extending to scientific and technical community.

The challenge has shifted from accelerating electrification and sustainable mobility to decentralize the benefits, secure enabling infrastructure, advance equity and resilience and manage to sustain progress. Integrate approach, that combines climate resilience, public health

objectives, landscape design to enable civil recreation and protection will strengthen the transition.

e. European Parliament

STOA overview provides on EU-wide policies, stats, trends and EP positions as EU's role is indirectly and is exercised though funding, technical guidance and legislation.

Sustainable and Smart Mobility Strategy sets the vision for transport transformation with 82 initiatives and EU Urban Mobility Framework targets cities and urban areas, while TEN-T Regulation introduces 431 urban nodes that are required to implement a SUMP – with deadline for submission on the end of 2027 – and Alternative Fuels Infrastructure Regulation provides for recharging and refueling infrastructure. Substantial funding is available through various EU financial instruments.

Public transport expands, bus fleets are renewed with almost 60% zero-emission vehicles, though the overall fleet remains diesel. The pandemic increase in cycling and walking continued and so has shared mobility. Low-emission zones have spread, but congestion charges remain limited. Electrification and public charging infrastructure have raised and intelligent transport systems are being wider implemented.

Though there is a positive shift in mobility modes, there are no statistical series, but congestion also seem to fall. Inclusiveness is promoted and Europeans are aware of the needed changes but their willingness lies in a number of factors like cost, speed, safety etc. SUMPs require public participation in all stages of implementation.

Though the dependence on private cars persists, EU calls for affordable and accessible transport and stronger transport investments. Persistent problems are identified in digital mobility services and this calls for interoperability, data sharing and security, as well as transport authorities' coordination. In addition, mobility cannot be separated from energy, housing and digital policy.

a. France

The cornerstone of French mobility strategy is the Mobility Guidance Law ("loi d'orientation des mobilités", or LOM), passed in 2019 and brought about a paradigm shift in French public transportation policy, namely the "right to mobility", especially by using public transit. In addition, it supports active mobility and low-emission mobility zones (ZFE-m) and it incorporates European goals for the electrification of vehicles and the speed-up of charging infrastructure. The Climate and Resilience Law though did not significantly modify the framework of France's transportation decarbonization policy, yet demonstrates a change in the approach, since factors such as social acceptability, air quality, and land-use planning. Several measures are designed to promote public transportation, carpooling, and intermodal transport and it introduces provisions aimed at limiting the need for travelling. The third version of the French National Low-Carbon Strategy,

finalised and made public in 2026, reflects France's heightened ambitions for reducing CO2 emissions. It calls for a 26% reduction in the transportation sector's emissions by 2030 and near-neutrality by 2050, though this remains a difficult to reach goal. The Regional Spatial Planning, Sustainable Development, and Territorial Equality Scheme integrates mobility policy into a more comprehensive spatial planning. At the metropolitan level, the Local Mobility Plan is the primary planning tool and it must be consistent with the general rules of the relevant Regional Spatial Planning, Sustainable Development, and Territorial Equality Scheme, outlining a variety of strategies, rules, and initiatives intended to lower GHG emissions associated with transportation while preventing air and noise pollution and protecting biodiversity.

Measures mainly aim at reinforce public transport. Recent initiatives include the development of tram networks across various urban areas, the modernization of metro and suburban rail systems, and the creation of multimodal interchange hubs, additional to the electrification of the bus fleet. Hydrogen and biofuels use on buses and heavy-duty vehicles is also being encouraged. Successive National Cycling and Walking Plans have been financed for the construction of thousands of kilometers of cycling infrastructure, along with financial support for the purchase of conventional and electric bicycles and behavioral courses. Metropolitan areas construct safe cycling zones and create secure bicycle parking at railway stations. Major pedestrian zones have been created and shared mobility is encouraged through regulations and financial incentives. Some local authorities have set up measures going further than the minimum requirements imposed by the national legislation with ZFE-m zones or even create new restricted zones. Digital technologies include integrated ticketing systems, contactless bank card payments and Mobility-as-a-Service (MaaS) platforms.

Available data show positive trends in terms of modal shift and air quality, but also highlight obstacles to implementation, notably in terms of societal acceptance. Car use has dropped with public transport and active mobility rising. Micromobility though have mostly replaced trips previously performed by metro, rail or walking, rather than by private car. Despite the reduction of road capacity allocated to cars, traffic congestion has not increased overall. The national development of cycling delivers lower GHG emissions and improved public health. Due to the restrictions imposed on older diesel vehicles emissions are significantly lower. Though measures regarding cycling have become more popular, road restrictions face critism.

France has put in place a multi-level participatory framework for sustainable urban mobility. The Environment Code and the Mobility Orientation Law provide formal procedures, such as public debates organized by the National Commission for Public Debate and public inquiries, with continual and close communication between local authorities and stakeholders. Metropolitan authorities have implemented participatory measures when drawing city-center redevelopments, introducing new traffic restrictions, etc. Consultations usually include online platforms, neighborhood meetings, citizens' panels or ad hoc committees.

France identifies five main priorities for advancing sustainable urban mobility: accelerating transport decarbonization, ensuring socially and economically sustainable electrification, strengthening active mobility, improving public acceptance of Low-Emission Mobility Zones and promoting technology neutrality. Transport remains the country's largest source of GHG emissions, requiring faster reductions to meet national climate targets. Key challenges include the affordability of electric vehicles, unequal access to charging infrastructure, fragmented cycling networks and concerns about the social and economic effects of mobility restrictions. Future policies are expected to emphasise financial support for households and businesses, improved cycling infrastructure and safety, greater flexibility for local authorities and a diversified approach to low-emission technologies.

b. Germany

Germany's sustainable urban mobility implements the 4V mobility principle, Vermeiden (avoid) – Verlagern (shift) – Verträglich gestalten (design for sustainability) – Vernetzen (connect). Multi-level governance poses some drawbacks on the implementation, though.

The amended traffic law leaves significant space for local authorities to consider local traffic including climate, environment, health and urban development aspects. National Cycling Plan and Federal Walking Strategy manage cycling and walking as main mobility modes. Funding is central and provides for cycling and public transport infrastructure. Lander level responsibility on public transport poses some barriers to EU and federal requirements. Municipal level is the main area for implementing sustainable mobility schemes that include parking and street management, cycling and walking and in several cases, those are combined with air quality or noise.

Flat monthly fare gained vast popularity, while cycling in big cities increased significantly, yet this increase remains uneven in smaller cities. Walking has increased and it has been integrated in an urban experience of low traffic, greener and safer streets. Demand management schemes and street-space redistribution has been used but has created conflicts with private car use mode. In addition, shared mobility and micromobility has expanded.

Measures taken have shown positive shift for air-quality and improved mobility for all incomes and a modest acceptance for restrictions, where these measures were applied under careful planning and a permanent manner.

Participatory practices are used but usually at the early stages of planning, creating cases of conflict at later stages, when remained narrow. In cases like cycling though, a bottom-up mobilization has been reinforced and led to agenda-setting and even law-shaping. Inclusivity is also a matter to consider, as well as the cases where participation is late or symbolic. A challenge is also to mobilize undecided or opposing groups.

Mobility policy making is a significant agenda. The reform that gives municipalities more space remains to be tested on its actual use by the local governments, that need to establish long-term capacities. There is a need for integration of pricing and services and a shift from single actions e.g. cycling to a broader neighborhood redesign. Fairness is also a matter, with policies that need to combine costs and benefits, on financial, social and technical terms. Alignment of levels of government, strengthened local capacity, converted experiments, trials and legal reforms to practice are the main challenges towards sustainable mobility.

c. Greece

Sustainable urban mobility in Greece is shaped through a multi-level system of policies in which European strategies, national legislation and local planning policies interact. At national level law 4784/2021 incorporates SUMPs into Hellenic legal order. Sustainable mobility is directly linked to spatial planning – providing for compact cities, reduction of environmental harmful mobility modes, connection of land use and transport, as well as national climate law regarding GHG emissions, electromobility and energy transition. Universal accessibility is the basic principle of mobility planning and urban design. Key tool is the National Accessibility Plan with Emphasis on Climate Change that provides for urban regeneration – with pedestrian networks, public transport, public spaces and transport infrastructure – that create cities for all citizens to move autonomously, safely and in a clean environment, defining a single planning framework for all municipalities. The integration of cycling infrastructure into urban planning and building regulation constitutes a further positive step and is incorporated along with smart transport systems, reduced emission schemes and electromobility to an integrated approach.

Major cycling routes have been designed, both in metropolitan and suburban Athens to encourage a shift from private car use to intermodal means of mobility with improved connectivity between modes and different use districts, enabling residential, working and recreational areas to be accessed sustainable. Greece also participates in the Eurovelo network.

Electrification is progressing rapidly, with incentives and subsidies to a vast number of uses, parallel to public transport fleet upgrades. In addition, public charging stations are expanding throughout the country.

Data collection is based on systematic exploitation of information from spatial and accessibility planning, digital transformation of cities and the urban resilience plans. The combined use of this collection enables a holistic understanding of the interaction between the factors that interact with sustainable mobility to support further transformation.

Participatory mechanisms are used to identify travel behavior and raise social acceptance of measures and include initiatives in all levels of governance. European Mobility Week nationwide, municipal awareness campaigns, townhall consultations, are the most common instruments.

Key challenges lie on the institutionalization and operational activation of recently developed strategic frameworks, particularly the National Walking Strategy that introduces a comprehensive approach for promoting walking and incorporating it into urban planning and transport policies and the National Accessibility Plan that provides for a universally accessible built environment with equal mobility opportunities. Operational policies need framework, funding, governance and monitoring to fulfil the country's sustainable mobility agenda.

d. Japan

In Japan the Basic Act on Transportation Policy sets the policies that address local communities, networks growth, infrastructure and digital transformation. Sustainable urban transportation is specifically addressed under the need of supporting local public transportation. Measures facilitate new services, broader access and integration of transportation modes. Trains are used as the main means for shifting from private to public mobility e.g. Utsunomiya Light Rail that was "a total design approach", ensuring a unified design for all relevant attributes (routes, station, transit etc.), serves as a recent example of better mobility in all aspects of working, family and social life and in sustainability also, by reducing time consuming modes. The scheme also included vast stakeholders' participation, from residents to companies, attending special events, forums etc.

The main challenge is the maintenance of urban transportation planning along with development schemes. In a declining population trend, there is a need for a system of transport that enables easy access for all citizens to welfare, medical and residential facilities.

e. Luxembourg

Sustainable mobility planning in Luxembourg is implemented by combining national strategies, spatial-planning instruments and municipal plans. National Mobility Plan 2035 sets out an integrated approach to accommodate the estimated 40% increase in daily trips by increasing public transport and active mobility, efficiently use infrastructure and mobilize all actors. Spatial planning is directly connected with sustainable mobility. City of Luxembourg's Mobility Plan, for example, aims for 51% share of trips on public transport and active modes.

Luxembourg most notably measure is the fare-free public transport. As it was already highly subsidized, it now promotes social equality and gives a marketing "*nation branding*". The overall aim is a shift in transport behavior. Congestion charge or low-emission zones are not applied, but several measures that facilitate public transport and active modes, like park-and-ride facilities, priority lanes, mobility hubs, calming traffic and corporate mobility planning, are used.

Though public transport increased, road traffic has not been reduced significantly, though emissions have fallen. With residential locations outside the main employment districts in the city center of Luxembourg and a large number of cross-border employees, door-to- door

commuting remains important for complex trip chains. The fare-free policy mainly addresses social groups without private cars (youngsters, students, low-income, etc.).

Inclusiveness in participation mechanisms is an important factor that needs to be institutionalized. National Mobility Plan 2035 was broadly presented in ten regional meetings, across the country, accessible to a broad number of actors. Citizens' participation was also incorporated in the city of Luxembourg's mobility plan, in combination with experts and other stakeholders. Participation volume should not be equated with representativeness, though. Participation is also incorporated in spatial planning, especially useful when applied on the early stages of a project. Policies regarding carbon neutrality and climate change linked to transport transition, incorporated citizens' recommendations. Employers, schools and transport operators are also consulted due to their share of peak-period demand.

Due to the rising demand, infrastructure construction needs to be accelerated, raising questions about finance, approvals, land use and public acceptance. Multimodal mobility remains the commitment, with a combination of measures needed to improve public transport and active mobility services regarding quality and accessibility. Limited space has to be fairly allocated. Cross-border regions' infrastructure and mobility also affect Luxembourg's mobility planning. In addition, environmental objectives remain to be reached, yet car commuting and freight flows have not sufficiently reduced. Electrification of the fleet will support these goals. More systematic and transparent monitoring is also a useful tool.

f. Netherlands

In the Netherlands urbanization and mobility demand are putting increasing pressure on urban space, while cities need to maintain accessibility and quality of life. Dutch Municipalities look at mobility from a "broad prosperity perspective" through living environment attributes (space, climate, pollution), accessibility and inclusivity, health and safety.

Climate Act serves as the legal foundation and along with the Climate Agreement, measures for cleaner, smarter and different mobility are anticipated. The framework provides for zero-emission zones, electric vehicles, cycling infrastructure, shared mobility and public transport. On regional level, the execution of multi-year programmes covers public transport, road safety and sustainable mobility, namely cycling infrastructure, transport capacity and behavioral measures (workplace travel schemes). On local level, municipalities draw SUMPs and their 2050 vision is the need for sharper choices in urban planning to face space scarcity and investments to make public transport more attractive than private cars.

The Netherlands has a distinctive spatial planning system, a polycentric network of closely spaced cities linked by rail and highway. Biking is a long-ago sustainable mode of transport. E-bikes helped expand the use of cycling along with a long-distance, high-velocity cycling lanes, connecting cities and villages. Public transport, though remaining busy and electrified, faces increasing costs. Car

use remains high, especially in rural areas and restrictions or subsidies are not considered as persuasive enough for citizens to abandon this habit. Subsidies for electric cars do exist. Shared mobility plays a minor role.

Sustainability measures have not shown significant modal shift. Disincentives in car use seem to work better than investing in public transport, where it seems that those that benefit are the current users. Road traffic produces most of the emissions that lead to air-pollution but a reduction is anticipated due to fleet electrification. Thus, the cheaper way of moving with an electric vehicle has increased car use which means more traffic and less road safety. E-bikes, being popular among youngsters, increased frequency and severity of accidents, so posing restriction measures became a necessity.

Stakeholders' involvement in sustainable urban mobility, cuts across different governance levels and policy domains and varies from consultations, to negotiations and visions. Municipalities and authorities have considerable freedom to design the participation process, in all stages of implementation, with an early involvement considered to be significant. The Dutch National Climate Citizens' Assembly provides an example.

Regarding future challenges, GHG emissions have reduced but will not reach the 2030 target if car use will not be reduced. Spatial planning has to be considered from the perspective of public health. Lack of free spaces and overcrowded lanes increase the risks. New technologies do not seem to solve the problems, yet, Utrecht is the first European city that offers a shared car service with vehicle-to-grid technology (V2G), that addresses the problem of net congestion.

g. Norway

National Transport Plan (2025-2036) is the main tool for all transport modes, covers all the country and is revised every four years. It aims at 100% electrification of vehicles and 20% of bicycle share in urban areas. The main principle is The Zero Growth Target, namely all growth in passenger transport to be absorbed by public transport, cycling and walking. Limits in car traffic do not differentiate fossil fuel vehicles and EVs. Urban Growth Agreements between state, counties and municipalities fund and implement measures for traffic reduction, as well as public transport, cycling and local roads projects.

Norway leads the world in vehicle electrification, with 96% of new passenger-car registrations in 2025 and over 30% electric national fleet. Incentives, like tax and VAT exemptions, reduced tolls, bus lane access and reduced parking fees have been applied but as the target is reached, they are gradually removed. The urban toll rings have been used since 1986, but now traffic management is their main objective with rush-hour and environmentally differentiated tariffs. E-scooters were widely spread, but accidents and complaints led to restriction in fleet numbers, parking and night-time rules. Also, reclassification from bicycles to small vehicles posed alcohol limit, minimum use age, helmet, speed limit etc. Positive effects appeared limited as they mostly replaced walking.

Autonomous mobility is being slowly developed towards a shared public service rather than individual transport, in order to help reducing private car use. Digital mobility services are vastly used, though management remains fragmented.

Electrification contributed to better air quality, though traffic volume has increased. Time-differentiated tolls helped reduce congestion, though they are a politically contested instrument. A negative reversal was calculated on deaths of vulnerable road users, after years of lowest rate in Europe.

A wide range of stakeholders are being consulted in urban development projects, both in physical meetings or on online participation platforms, to explore perspectives and various opinions.

Reconciling climate policy with goals for sustainable urban mobility remains a long-term challenge. Distance based road pricing has been discussed but strong public unacceptance pauses implementation at the moment. Security issues are examined regarding electric vehicles manufacturers that do not have security-policy cooperation with Norway. Risk-reducing measures like diversify suppliers, supply-chain risks, etc. are under public consultation.

h. Poland

In Poland EU legal acts play a significant role in shaping sustainable urban mobility. At national level, legal Acts and strategic documents regulate organization, financing, parking and traffic, extended to regional and local implementation. In the Ministry of Infrastructure, a SUMP Competence Center operates. Currently, a draft Act "*Sustainable Development of Cities and their Functional Areas*" is being elaborated, that gives SUMPs explicit legal basis and defines their role in urban development.

Efforts have focused on strengthening public transport and active mobility and on reducing road transport and relative emissions. Electric fleet and related infrastructure, pedestrian and cycling combined routes, intermodal hubs, digital systems, parking restrictions, clean transport areas and micromobility, are the main instruments that are being applied, though varied across cities.

Data points positive shifts in public transport, active mobility and rolling stock modernization, as well as an increase in non-car trips. City centers and surrounding suburbs differ significant in car use percentage, hybrid and remote work and walking and all year long cycling have pushed the number of total journeys to drop, even though more passengers move.

Participatory process also varies, from passive information sharing to active co-creation of solutions. An example of an NGO's civic participation "*Roundtable for Clean Mobility*" raised issues regarding subsidies for electromobility causing "*electrification of traffic congestion*", emphasizing the need for a shift of financing public transportation schemes.

Challenges are identified in the field of public transport development, especially in suburban car-dependent areas, parallel to urban sprawl in a socially just and equitable manner.

i. Portugal

Sustainable Urban Mobility in Portugal interconnects in Climate Law, Energy / Climate Strategy, EU regulation and national transport law. SUMPs address the challenges of urban mobility in the country's municipalities.

Measures have been implemented across most sustainable – mobility categories regarding subsidized public transport fares and ticketing integration, fleet electrification, cycling infrastructure, shared micromobility and Lisbon low-emission zone. Though results vary, public transport pricing increased the number of passengers, especially young people and socially vulnerable citizens and at the same time car dependency also increased. Air-quality remains an issue even if the fleet has been rejuvenated, cycling percentage did not change and road safety for cyclists and motorists decreased.

Stakeholders are actively and widely involved in sustainable mobility policy making, from mandatory public consultation for the SUMPs, to broader participatory-democracy instruments like Lisbon long-running participatory budget and formal advisory / consultative bodies engaging CSOs. Examples of actual participation through real engagement, with refusing prizes due to alterations on the proposals and continued civic advocacy work even after the state actor withdrawal. Also, a large-scale household mobility survey was conducted to capture residents' travel patterns and expectations with its results used as a direct input for public transport tendering and route design.

Challenges are addressed in several areas, to a unifying national ticketing – being under parliamentary debate, not concluded due to significant political disagreement, to the crisis in the active-mobility strategy due to the lapsed coordination structure, the deadline for the SUMPs, funds reallocated for sustainable mobility and smart mobility moving from an "*agenda*" to an operational scheme with Vehicle-to-everything (V2X), Intelligent Transport Systems, AI-based traffic management, digital twins and "*smart enforcement*", being on the agenda.

j. Spain

In Spain transport and sustainable mobility is addressed through a multilevel governance system with the national government establishing the legal and strategic framework and managing infrastructure and services, while the Autonomous Communities develop laws, strategies and plans and municipalities manages urban mobility, traffic, parking and public space. At national level the Sustainable Mobility Act regulates mobility of people and goods that created the General Sustainable Mobility System, which in turn, coordinates administration, stakeholders, planning and data. Several regions had already mobility legislation and at municipal level sustainable mobility ordinances existed. SUMPs are being prepared and the framework is supplemented by Climate Change and Energy Transition Act, National Cycling Strategy, etc.

Measures taken affect public transport, active mobility, shared mobility and micromobility, private vehicle use, commuting, urban logistics growth due to e-commerce, and demand-responsive transport for individuals in suburban areas and major trip-generating location. Renewal and electrifications of bus fleets, digitalization of services, stops' accessibility, bus lanes, metro and tram modernization and integration of transport modes, fare subsidies, youth pass and rail travelling are measures to strengthen public transport versus private car use. New cycle lanes and pedestrianization of streets are included in a broader transformation of public space, with safe school routes and green spaces. Shared mobility and micromobility are also encouraged. A program was launched for different companies' employees to commute and park together. Digitalization and intelligent transport systems including real-time travelling information and journey planning, ticketing and digital payment systems, traffic management and connected mobility measures are being developed.

Private car use remains predominant for work or study mobility, but for leisure and shopping declines in favor of active mobility, though road insecurity remains an issue. Spain has a distinctive high rate of walking. Intermodal travelling shows a positive trend, also given the fact of significant spatial coverage and frequency of services. Low-emission zones have proven useful for better air quality and become more effective when combined with other traffic restriction measures and improved public transport fleet.

The Sustainable Mobility Act requires open processes and participatory approach and establishes the Higher Council for Sustainable Mobility as a forum for participation and cooperation. The Open Mobility Dialogue was used to develop the Safe, Sustainable and Connected Mobility Strategy 2030 through public consultations, digital platforms and discussion events. Guidelines were published to help local authorities adapt. Incentives for electro- and active mobility were promoted, along with public awareness activities and knowledge sharing initiatives, that included even an Award during European Mobility Week.

Challenges lie in five main areas, governance and policy integration along with monitoring, integration of transport modes along with data interoperability, modal shift from private cars for commuting and suburban mobility with a sustainable parallel use of micromobility, technological and energy transition through electrification of fleets and relative infrastructure, balancing the risk of the continued reliance on private cars and equity and acceptance, moving from the plans for standard users to social different groups, while informing and raising awareness of the various users.

k. Sweden

In Sweden the overarching objective for transport policy is a cost-effective and long-term sustainable system for all, throughout the country, accessible and safe for the public health and the environment. Climate and energy policies are linked together. Sweden has a national cycling

strategy since 2017 that highlights the role of cycling in urban planning, focuses on specific groups of cyclists, promotes infrastructure and safety and develops statistics and research. In addition, the strategy for vibrant and safe cities provides for good accessibility, design that will address that, multi-modal perspective and safe routes, with municipalities and regions having significant responsibilities.

A Handbook on Transport Strategy and Sustainable Planning has been published that aims to place the transport system into a broader context, linked to different areas of urban planning. These apply also in regional level with guidelines regarding designing networks, routes, junctions, parking and their construction and maintenance, as well as evaluating measures. Walking and micro-mobility are attached to the cycling planning and its link to public transport. Freight, especially in cities with ports, mention a shift from road to rail or shipping and better planning, digitalization and adapting local regulations. Regions have different but active approach and this trend is transposed to local level with planning space-efficient and climate friendly modes, integrated approaches for urban development, electrification and hydrogen use and related infrastructure and fossil-free fleets.

Measures taken are focused on state funding and subsidies for individuals, companies and municipalities to move to cleaner technologies (electric or biofuels), incentives for relative infrastructure (charging, parking, commuting), along with campaigns towards behavioral change and collaborations between actors.

Evaluations show that travel by foot, bike and public transport has increased, while car traffic has decreased and in a larger scale than anticipated. Most effective measures address accessibility. Conditions of cycling were also examined and found, at some cases, more complex than needed, even though the numbers increased. Emissions' reduction, though reduced, were not cost-effective. On the contrary, subsidies for electrification had a positive impact. Regarding biofuels, a reverse effect with cost increase due to limited amount of biomass was identified. Regarding public transport, the market share has increased, along with the passenger's satisfaction. Congestion charges and parking fees led to reduced traffic and better air quality. A more frequent measures evaluation and dissemination of lessons learned could prove useful.

Though stakeholders' involvement is not concretely institutionalized, there are several initiatives that involve citizens, mainly in local plans. Uppsala' s Transport Provision Program suggested that an equal public transport system could benefit from increased public involvement in planning. Gothenburg includes forming a citizens' council in the strategic plan for sustainable transport. Malmo's traffic and mobility plan states that the city will work actively to engage with the public and locally, property owners and businesses are engaged in the dialogue regarding infrastructure.

The rise in accidents and injuries during the use of e-scooters need to be addressed with specific regulation, along with new rule for cycling to increase road safety. In addition, several laws need

amendments in order for local authorities to use tools to reduce emissions in cities. Public transport needs to become more affordable; infrastructure needs long-term financing and a balance is needed between technological solutions e.g. electrification and regulatory measures promoting more sustainable travel behavior.

l. Switzerland

In Switzerland the sub-program "*Mobility and Spatial Planning 2050*" of the Sectoral Plan for Transport coordinates the overall transport system, aligning spatial planning and environmental considerations. The direct democratic system provides for popular initiatives and referenda. The federal system allows to cantons and municipalities the responsibility of urban planning and the sustainability of urban mobility. The federal government provides financial support at decreasing traffic.

A single ticket covers all forms of public traffic in zones operated by over 250 transport companies formed in 20 networks, with Swiss Federal Rail being a key partner, aiming to shift commuter and leisure travel from cars to public transport. Larger urban areas offer night-time services on weekends and public holidays. Numerous towns promote the use of bicycles, e-bikes and e-scooters by bike-sharing schemes with almost 30% of users preferring micro-mobility complemented by public transport. Shared spaces have been used since 1996 with an official permit since 2002, marked with special signs and 20km/h speed limit.

Public transport services are constantly being expanded regarding frequency, new routes and longer operating hours. The percentage of car and bike owners are almost similar. Shared mobility has significantly grown and EnergieSchweiz provides a tool for users to hire the right vehicle for them at their chosen location. The Swiss Federal Railways have integrated all modes of mobility with stations to serve as multimodal transport hubs. The goal is easy, intermodal, door-to-door mobility. Opposite to that trend lies micro-mobility (e-scooters) that pose dangers both to users and pedestrians and being banned from several premises.

Participatory processes are widely addressed, where the public can express their needs and results are incorporated in future planning and designing.

Growing transport demand, limited urban space, GHG and noise emissions and the need for coordinated spatial and transport planning across different governance levels are the main challenges. Electricity demand growth may also become a challenging issue. Public and private sector partnerships run projects promoting sustainable urban mobility using various datasets, yet several risks occur regarding human rights and democratic values. Funding is always demanding, especially when allocation between different transport sectors is needed.

m. United Kingdom

The net zero target for UK in 2050 brings together measures on the electrification of transport, public transport and other forms of mobility. The 2026 National Planning Policy Framework specifies that sustainable transport should be considered early in planning, sustainable patterns of movement should be supported, transport facilities should be interconnected with local needs and adverse impacts, such as capacity, congestion and safety should be mitigated. Local transport Authorities are mandated to create a Local Transport Plan that will include an electric vehicle infrastructure strategy and individual transport schemes that required approval will need a carbon management plan.

The Cycling and Walking Investment Strategy targets for 55% of short urban journeys by foot or bike, enabling physical activity through safe active travel, which should become the easy and integrated choice. A national active travel network is planned, prioritizing school areas. E-scooters are forbidden from use in the road and people over 14 can ride an e-bike. Workplace parking is among licensing schemes but at the moment only Nottingham has implemented one. Road users charging schemes for older and polluting vehicles have been used to control traffic and reduce air pollution. Electrification grants exist for almost all kinds of vehicles, along with residential charging infrastructure.

Though e-scooter rentals have replaced a significant amount of walking journeys, benefits for health coming from better air quality in the Low Emission Zones. Electric vehicle purchases continue to rise but household income, range, batteries and charging spots affect consumers' choices.

Public consultation on Local Transport Plans includes a vast number of stakeholders, from users and business to operators and local administration.

Despite progress in electrification, surface transport emission increased, mainly due to the purchase of larger vehicles. EV backend plans should continue but there is also a need for behavioral change and other demand reduction approaches. Micromobility has to be regulated, giving powers to local transport authorities. Guidelines regarding fire risks associated with e-cycle, e-scooters and batteries have been drafted for safe purchase and handling of their vehicles.

n. United States of America

In the United States numerous entities carry out transportation planning through a collaborative process. The federal government provides for financial and technical aspects, including research, while local agencies operate transit systems. Energy and environmental issues are addressed simultaneously. Programs like Clean School Bus and Smart Growth and Transportation Program are nation-wide run to reduce miles traveled and GHG emissions.

A variety of measures have been implemented. Grants for advanced transportation technologies like smart traffic signals, drones that monitor traffic, self-driving vehicles have been announced, receiving hundreds of applications. Pilot programs received positive feedback, though they are not yet completed. Efforts to advance a nationwide electric vehicle charging network have been made with 60% of urban residents living within a mile of public charger. Vehicle-generated data has been increasingly used for quicker and more effective response on real time traffic management, regarding congestion and road safety. For example, traffic signal retiming is a cost-effective method of reducing congestion and energy consumption. Community efforts, such as improving access for pedestrians and cyclists, encourage residents' mobility habits, as well as teleworking as a post-pandemic increasing habit are also being promoted. Transit ridership has also declined.

State and local factors affect stakeholders' participation, yet transportation projects and programs are based on a continuing, cooperative and comprehensive (3 C) planning process.

Future sustainable urban mobility lies, among others, on hydrogen and on "*urban air mobility*". Regarding hydrogen, vehicles offer enhanced performance, efficiency and reduced emission, with quick refueling and good range. However, hydrogen technologies remain of high costs and are addressed to a limited market, along with transport and storage issues and the lack of regulation.

"U*rban air mobility*" reduces operating and environmental costs, is applicable in small spaces and can be used as taxi or cargo service. However, it lacks certification and needs infrastructure and regulation. Yet, it is considered as an option for transportation during the 2028 Los Angeles Olympic Games.

Key Findings

The 19 contributions reveal a shared commitment to more sustainable, accessible and inclusive urban mobility, but also considerable differences in policy priorities, institutional arrangements and implementation. While most countries combine public transport improvements, active mobility, electrification and digital technologies, their experiences demonstrate that technological progress does not necessarily translate into reduced car dependence or lasting changes in travel behavior.

A central distinction emerges between countries prioritizing the electrification of transport and those placing greater emphasis on reducing private car use. Electrification has delivered important environmental benefits, particularly regarding air quality and emissions. However, the experiences presented also illustrate an important limitation: cleaner vehicles do not automatically reduce congestion, road-space consumption or traffic-related safety risks.

Another common approach combines public transport improvements, walking, cycling and demand-management measures. Affordable or subsidized public transport represents an important instrument for encouraging sustainable mobility and promoting social inclusion. Nevertheless, the contributions suggest that lower fares alone are insufficient to achieve substantial modal shift without improvements in service quality, connectivity and measures discouraging unnecessary car use.

Several contributions highlight particularly interesting or distinctive approaches. Norway stands out for its exceptionally high share of electric vehicles among new passenger-car registrations, reaching 96% in 2025, while Chile demonstrates the potential of large-scale public bus electrification. France offers interesting findings on reducing road space for cars that has not increased overall congestion.

Luxembourg is particularly notable for nationwide fare-free public transport, although cross-border commuting and persistent car dependence limit its effects. Austria's KlimaTicket and Germany's nationwide flat-rate public transport ticket represent alternative approaches to affordability and integrated public transport access.

The Netherlands demonstrates the benefits of a long-established cycling culture and extensive infrastructure, while also identifying emerging safety challenges associated with e-bikes. Switzerland illustrates the importance of integrated public transport networks and multimodal hubs, supported by coordinated services across operators.

Japan's Utsunomiya Light Rail offers a distinctive example of integrated transport and urban design, particularly relevant to cities facing demographic decline. Belgium provides a different perspective by questioning whether multimodal information systems can genuinely change

mobility behavior. Its experience suggests that digital information, although useful, cannot compensate for structural barriers or established travel habits.

Catalonia is notable for its comprehensive mobility planning framework and specific instruments addressing mobility needs in workplaces and schools. Portugal's experience with participatory budgeting and household mobility surveys is particularly interesting, connecting public input with transport service design. Germany demonstrates how bottom-up cycling movements can influence legislation, while the United Kingdom's workplace parking levy in Nottingham illustrates the potential of targeted demand-management instruments.

Finally, the United States contributes examples of emerging technologies, including autonomous vehicles and urban air mobility, although their wider applicability and long-term sustainability remain uncertain.

The contributions also reveal differences in institutional capacity, governance arrangements and citizen involvement. The integration of mobility with spatial planning emerges as an important principle, particularly where transport policies are linked to urban development, land use, accessibility and environmental objectives.

However, fragmented responsibilities between national, regional and local authorities frequently complicate implementation. Coordination, financing, institutional capacity and uneven territorial development remain significant challenges, especially where metropolitan mobility extends beyond administrative boundaries.

Citizen and stakeholder participation is increasingly recognized as an essential component of sustainable mobility planning. Approaches range from formal consultation and participatory planning to community-led initiatives and continuous engagement. Nevertheless, the effectiveness of participation depends not only on the number of participants or consultation mechanisms, but also on their representativeness, timing and actual influence on decisions.

A recurring challenge is the transition from strategic commitments and pilot initiatives to operational, adequately funded and continuously evaluated policies. Digital technologies, intelligent transport systems and new mobility services offer considerable opportunities, but also raise questions regarding interoperability, governance, financial sustainability and accessibility.

Across the 19 contributions, several common conclusions emerge. Integrated policy packages appear more promising than isolated interventions. Affordable public transport is most effective when accompanied by reliable services. Electrification delivers environmental benefits but does not resolve congestion. Digital technologies improve information and efficiency without necessarily changing behaviour. Similarly, the introduction of new mobility options does not automatically reduce private car use, while reallocating road space may produce outcomes that challenge conventional assumptions about traffic congestion. Road safety, particularly for cyclists,

pedestrians and micromobility users, is an increasingly important concern. The effectiveness of mobility policies must therefore be assessed not only against environmental objectives, but also in terms of actual behavioural change, social equity and public acceptance.

The contributions suggest that the next phase of sustainable urban mobility will depend less on introducing individual technologies or measures and more on combining them into coherent, socially acceptable and financially sustainable mobility systems. Accessibility, equity, safety and the effective use of limited urban space emerge as shared priorities, alongside environmental objectives. It is evident that there is no single model of sustainable urban mobility. Successful approaches must respond to local circumstances while drawing on transferable lessons from other countries and regions.

Country Reports

1. Austria*[3]

Institute of Technology Assessment of the Austrian Academy of Sciences (OeAW ITA)

i. Legislative, policy and strategic frameworks governing sustainable urban mobility

In Austria, sustainable urban mobility is governed by a layered framework that combines binding EU law, national strategy, and city-level plans, in which competences for transport planning and funding are split among the federal government, the nine federal provinces (Länder), and the municipalities. The key instrument is the revised trans-European transport network (TEN-T) regulation (EU) 2024/1679[4] (in force since July 2024), prioritizing trans-border connectivity by contributing to the multimodal integration of EU transport infrastructure. Because all nine Austrian provincial capitals are TEN-T "urban nodes" each is required to adopt a Sustainable Urban Mobility Plan (SUMP) for its entire functional urban area by the end of 2027 and to report on sustainable urban mobility indicators. Methodological requirements derive from the Poly-SUMP Methodology guide,[5] the EU SUMP Guidelines[6] and Commission Recommendation (EU) 2023/550.[7]

The strategic anchor is the *Mobilitätsmasterplan 2030* (MMP)[8]—the climate-action framework for the transport sector, oriented toward Austria becoming climate-neutral by 2040 based on the "avoid–shift–improve" logic, which sequences measures as a hierarchy: first avoiding traffic, then shifting it to eco-mobility and only then improving the efficiency of what remains It is complemented by national sectoral strategies such as the series of master plans: *Masterplan Gehen 2030* (Walking), *Radfahren 2030* (Cycling), the National Energy and Climate Plan, and funding instruments such as *klimaaktivmobil* and various subsidies for the promotion of electric mobility are coordinated through the Federal Ministry of Innovation, Mobility and Infrastructure (BMIMI) platform *eMOVE*.[9] Lacking a formal National SUMP Support Programme (NSSP), the Climate-Neutral Cities Mission, which now includes all nine urban nodes, functions as Austria's de facto national support structure and a national SUMP contact point was established in 2025.

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[3] Authors: Martin Nestepny and Mahshid Sotoudeh

* This is the short version of the ITA report as a contribution to the 2026 EPTA report. More details and additional references can be found in: Nestepny/Sotoudeh (2026), Sustainable urban mobility. Policies, implementation and societal impact. The case of Austria, ITA Report ITA-2026-04, Vienna, September, https://epub.oeaw.ac.at/ita/ita-projektberichte/ITA-2026-04.pdf.

[4] TEN-T Regulation. http://data.europa.eu/eli/reg/2024/1679/oj.

[5] Poly-SUMP Methodology. https://urban-mobility-observatory.transport.ec.europa.eu/document/download/129e3ce9-5f7e-45a7-9f91-1698377afa46_en?filename=polysump-sump-methodology.pdf.

[6] SUMP Guidelines 3.0. https://www.rupprecht-consult.eu/post/sump-dritte-ausgabe.

[7] SUMP-Readiness 2024. https://www.bmimi.gv.at/dam/jcr:620a2a1f-3126-4f63-8b9f-000e9ea1d731/SUMP-Readiness_2024.pdf

[8] BMK 2021. Austria's 2030 Mobility Master Plan. The New Climate Action Framework for the Transport Sector: Sustainable – Resilient – Digital. Vienna: BMK.

[9] eMove Austria. https://emove-austria.gv.at.

The 2026 *SUMP-Readiness* study benchmarked the capitals against the SUMP criteria, finding readiness levels ranging from roughly 51 % to 91 %, with Vienna and Graz leading the ranking.[10]Vienna's *Fachkonzept Mobilität* as part of the STEP 2025 urban development plan and Graz's mobility plan 2040 are already recognized as SUMP-equivalent; Linz's *Mobilitätskonzept* and various city-level sectoral plans (cycling strategies and walking master plans) feed into SUMP readiness. At the federal level, transport and mobility policy, including the MMP 2030, TEN-T compliance, and the national SUMP contact point, falls under the BMIMI ministry. It is supported by federal agencies, including Klima- und Energiefonds (KLI.EN) and the Umweltbundesamt, for monitoring. At regional level, the nine Länder governments hold competences over regional public transport, roads and spatial planning; City administrations and, in Vienna, the districts adopt and implement their own plans. The federal evidence base relies on the national multimodal transport model (Verkehrsmodell Österreich, VMÖ) and its scenario-based demand forecast (Verkehrsprognose Österreich 2040+) to project long-term passenger and freight demand across all transport modes and provide the basis for dimensioning and planning the strategic road and rail network.[11]

ii. Sustainable urban mobility measures implemented in recent years

In the ITA's earlier contribution to the discussion on sustainable mobility from a socio-economic perspective, Chaloupka[12] et al. identify land use planning and the infrastructural link between urban and peri-urban transport as the central levers for sustainable mobility, and hold that a sustainable urban mobility plan must secure access to public transport infrastructure for all population groups. The measures adopted in recent years follow this logic across four fields: public transport and mobility pricing, active and shared mobility, access regulation and electrification, and intelligent transport systems.

a. Public transport and mobility pricing

The *KlimaTicket* Österreich, a nationwide flat-rate annual public-transport pass launched on 26 October 2021 (€1,095/year). It is complemented by the expansion and modernization of the regional and suburban (S-Bahn) rail network under the *Mobilitätsmasterplan 2030*8 and the Austrian Federal Railways (ÖBB) *Zielnetz 2040* Strategy, which is scheduled for completion by 2027. Graz opened the 1.2 km *Neutorlinie* tram relief line in November 2025, with two new tram stops, relieving the overloaded routes and creating capacity for further network extensions; Innsbruck extended tram lines in 2023, connecting the urban tram network with the regional rail system and replacing former bus corridors.

[10] Austria SUMP Assessment. https://www.bmimi.gv.at/dam/jcr:ba265e0d-a524-4f3a-80fd-61e3b12d9f93/20260209_Austria-SUMP-Assessment_EN_final.pdf.
[11] Österreich unterwegs 2026. https://www.bmimi.gv.at/themen/verkehrsplanung/statistik/oesterreich_unterwegs.html.
[12] Chaloupka et al. 2015. https://doi.org/10.1553/ITA-ms-15-02.

b. *Active and shared mobility*

Since 2021, the federal *klimaaktiv mobil* program has delivered active-mobility funding with *Bund–Länder* partnerships covering up to 50% of net costs for cycle-highway lead projects and a 2022 agreement to raise the cycling share from 7% to 13%. Vienna's *Wiener Linien* built the *WienMobil* platform of mobility hubs that bundle station-based e-carsharing, bike- and scooter-sharing, now spanning over 250 hubs and 100+ shared e-cars across all 23 districts, plus the on-demand *WienMobil Hüpfer* shuttle in outer districts. The *WienMobil Rad* bike-sharing service reached all Viennese districts by October 2022 and is half-price for public-transport/*KlimaTicket* subscribers. Shared e-scooters from six operators in Vienna are steered through municipal geofencing and no-parking zones managed by the *Mobilitätsagentur Wien*, the City of Vienna's agency for active and shared mobility, while new stricter safety requirements and technical equipment standards for e-scooters have been introduced.[13,14]

c. *Access regulation / Low-emission zones and Electrification*

Austria has not introduced IG-L (Air Quality Act) environmental zones that restrict older N-category commercial vehicles via an IG-L sticker, alongside air-quality speed limits (typically 100 km/h) on urban motorway sections.[15] Federal purchase subsidies (E-Mobilitätsoffensive), charging infrastructure funding (LADIN) and dedicated programs for emission-free buses (EBIN) and heavy commercial vehicles (ENIN) have accelerated fleet electrification, including e-bus deployment in cities such as Linz and Vienna.

d. *Intelligent transport systems*

Austria's digital-mobility agenda is steered by the *Aktionsplan Digitale Transformation in der Mobilität* (AP-DTM). The flagship Cooperative *ITS Corridor* running Rotterdam–Frankfurt–Vienna[16] is now being extended, where *AustriaTech* coordinates to harmonize Cooperative Intelligent Transport Systems ((C-)ITS) along five TEN-T corridors across Austria, Czechia, Hungary, Croatia, Romania, and Slovenia.[17] The AP-DTM also incorporates the implementation strategy for automated mobility, building on *the Aktionspaket Automatisierte Mobilität* (2019–2022).[18] This strategy is currently being renewed through a revision of the *Automatisiertes-Fahren-Verordnung*, expected to be completed by the end of 2026.

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13 Sharing Mobility Wien. https://www.mobilitaetsagentur.at/sharing-mobility/.
14 36. StVO-Novelle. https://www.bmimi.gv.at/service/presse/hanke/2026/0526-stvo.html.
15 Wien Kurzparkzone (UAR). https://urbanaccessregulations.eu/countries-mainmenu-147/austria-mainmenu-78/wien-vienna-kurzparkzone.
16 C-ITS Strategie Österreich. https://www.bmimi.gv.at/dam/jcr:805487b2-3563-4bd0-8fc6-e392970a42ec/citsstategy.pdf.
17 X4ITS (AustriaTech). https://www.austriatech.at/en/cross-for-its-x4its/.
18 BMVIT. 2018. Aktionspaket Automatisierte Mobilität 2019–2022. Vienna: BMVIT.

iii. Evidence regarding the impact of these measures on mobility patterns, citizens' behaviour, and urban quality of life

a. Data availability

Austria has strong national statistics on emissions, road safety and rail use, which allow mobility trends to be tracked at the aggregate level. Additionally, since 1995, BMIMI conducts regular national and municipal mobility surveys "Österreich unterwegs",11 applying smartphone-based GPS tracking of a travel day plus a short personal interview of passengers. The results feed the national transport model VMÖ and the *Verkehrsprognose 2040+*. A 15-year analysis was recently published in Vienna.[19] However, a recognized weakness is the lack of systematic monitoring and of indicators for evaluating individual measures.

b. Modal shift and travel behavior

Vienna's annual mobility survey shows the environmentally friendly modes reached 75% of trips in 2024, public transport 34 %, walking 30 %, and cycling 11 %, while the car fell to 25 %, its lowest since the survey began in 1993 (40 %).[20]Cycling rose from 7 % (2019) to 11 % (2024). Roughly 22 % of trips made with it would otherwise have been by car Acceptance of the *KlimaTicket* is high: with about 40 % of holders reporting more frequent public-transport use.[21] The main gap is in commuting: 77 % of people crossing Vienna's boundary still do so by car, reflecting weaker cross-border services within the functional urban area.

c. Environmental performance

Transport CO_2 emissions fell for the third year running in 2024, to about 19.3 Mt (~29 % of national emissions), which is ~20 % below 2005.[22,23]*KlimaTicket* research estimates roughly 3 million car trips were avoided in 2022, while rail emits about 96 % less CO_2 per passenger-km than a petrol car.[23] However, the Court of Audit also concluded in 2025 that, against annual subsidies of €396m, its measurable environmental impact has so far been modest and that demand rises most when public transport is improved, and car use is simultaneously made less attractive.[24]

d. Safety

2025 figures show road deaths rebounding to 403, leaving Austria well off its "Vision Zero" target of fewer than 207 by 2030.[25] The safety of vulnerable road users remains a key concern: in 2025,

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19 MA 18 Mobilitätsverhalten. https://www.digital.wienbibliothek.at/urn/urn:nbn:at:AT-WBR-1952965.

20 Modal Split Wien 2024. https://presse.wien.gv.at/presse/2025/03/16/modal-split-2024-weitere-zunahme-bei-oeffis-und-radfahren-zu-fuss-gehen-nach-wie-vor-auf-rekordniveau.

21 Drei Jahre KlimaTicket (klimaaktiv). https://www.klimaaktivmobil.at/fachpersonen/mobilitaet/studien/drei-jahre-klimaticket-eine-bilanz.

22 Nowcast 2024. https://infothek.bmimi.gv.at/nowcast-treibhausgas-emissionen-verkehr-2024/.

23 Umweltbundesamt. 2025. Fortschrittsbericht 2025 gemäß Klimaschutzgesetz. III-262 der Beilagen. Vienna: Umweltbundesamt (for BMLUK).

24 RH-Bericht KlimaTicket. https://www.rechnungshof.gv.at/rh/home/home/2025_38_OOe_6_Sbg_3_KlimaTicket.pdf.

25 VCÖ zur Unfallbilanz. https://vcoe.at/presse/presseaussendungen/detail/vcoe-zu-unfallbilanz-verstaerkte-unfallvermeidende-massnahmen-noetig.

65 cyclists (32 of them on e-bikes), 58 pedestrians and six e-scooter riders were killed. Notably, cyclist fatalities nearly doubled compared to the previous year, reflecting both increased exposure and growing active-mobility volumes.[26]

iv. Involvement of citizens and stakeholders in the planning, implementation and evaluation of sustainable urban mobility policies

Vienna is the benchmark: its *Fachkonzept Mobilität* (STEP 2025) was developed through the city-wide process "Wien 2025 – Meine Zukunft" [Vienna 2025 – My Future], using stakeholder forums, citizen dialogues, an online platform, social media and exhibitions, and involving district representatives, residents, experts, and interest groups; the plan scored 91% in the national assessment partly because of this participatory, integrated design.7 Additionally, Klagenfurt is now running a dedicated SUMP stakeholder process through a mobility laboratory "Policy Lab" to build its plan participatively.

More broadly, participation should be applied throughout all phases of any new SUMP, highlighting a gap that still exists in some Austrian cities: User needs and expectations are captured mainly through recurring surveys: the roughly decadal national mobility survey,11 city mobility surveys, the accompanying *KlimaTicket* research and the annual *VCÖ-Bahntest*, which identifies what would move more people from car to rail.

v. Main challenges and future policy priorities in relation to sustainable urban mobility

a. Near-term priorities

The dominant driver is the TEN-T obligation for all nine urban nodes to adopt a SUMP covering their whole functional urban area by end-2027. Several capitals (e.g., Salzburg) have plans in tender, supported by the newly published third edition of the EU SUMP Guidelines.6 Carbon pricing is a key emerging instrument: Austria's national CO_2 tax (in force since 2022) will continue through 2027 and be replaced by the new version of the EU Emissions Trading System (ETS2) from January 2028, backed up by a *Social Climate Fund*. ETS2 extends carbon pricing to fuel combustion in road transport and buildings, creating market incentives for low-emission mobility.

b. Challenges

Transport in Austria's climate sector is the largest source of emissions outside the EU ETS (~45 %).[27] Governance is fragmented: there is no dedicated SUMP law and coordination across functional urban areas remains weak, with 77 % of people crossing Vienna's boundary still driving. Two further recognized gaps are systematic monitoring/evaluation and road safety,

[26] Straßenverkehrsunfälle. https://www.statistik.at/fileadmin/publications/Strassenverkehrsunfaelle2025.pdf.
[27] NEKP 2024. https://www.bmluk.gv.at/dam/jcr:6c55ea04-e4b8-499f-ac3b-9d8786147cee/NEKP_final_20241203.pdf.

where Austria is unlikely to meet its "Vision Zero" target of ≤ 207 deaths by 2030.[28] In addition, data sharing beyond city boundaries remains restricted, particularly across functional urban areas, where data are often held at the provincial level or by private actors and are not readily accessible for integrated planning. Stakeholder coordination remains challenging, with some regions and federal provinces insufficiently involved in early planning stages. This is further complicated by administrative turnover and resulting knowledge gaps, while cooperation with surrounding municipalities remains limited due to the lack of a binding legal framework for joint mobility planning.7

[28] Verkehrssicherheitsstrategie 2021–2030. https://www.bmimi.gv.at/dam/jcr:e3798e81-353e-4b44-bccd-ddab0345fe54/BMK_VSS_2021-2030_DE_UA.pdf.

2. Wallonia[29]

SPIRAL research centre - Université de Liège

Can information drive sustainable mobility? Rethinking information-based policy instruments through multimodal mobility information systems in Belgium

Key findings

- Multimodal Information systems are increasingly used as behavioral policy instruments.
- Belgian public authorities struggle to maintain these systems over time.
- Governance and long-term funding remain unresolved issues.
- Information alone is unlikely to trigger large-scale modal shift.

Public systems compete against each other and with dominant private platforms such as Google Maps and Waze, which undermines their modal shift potential.

i. Introduction: The transition towards sustainable mobility and the individual behavior approach

This report analyses the implementation of public multimodal information system in Belgium. The country provides an interesting case study because, despite strong public support for sustainable mobility policies, the country has no national multimodal information platform and local authorities struggle to develop their own system. A fragmented landscape of local and operator-led systems has emerged, with mixed results in terms of uptake and long-term sustainability.From a technology assessment perspective, multimodal information systems illustrate how digital technologies are increasingly used to influence behavior rather than impose regulation. Their effectiveness therefore depends not only on technological performance but also on social practices, governance arrangements and public trust.

Mobility occupies a central and growing place in the functioning of contemporary European societies. Yet the emergence of sustainable development on the political agenda has made the transport sector a priority area for public action: its contribution to climate change is substantial, accounting, for example, for 34% of greenhouse gas (GHG) emissions in France in 2024[30]. Public authorities must therefore seek to reduce GHG emissions generated by passenger and freight transport, even though our way of life has become inseparable from this intensified mobility. Faced with this paradoxical situation, they have deployed numerous strategies: strengthening public transport provision, promoting active mobility, supporting the development of electric vehicles and new fuels, reconsidering spatial planning, establishing traffic-restricted zones and

[29] Author: Nathan FLORE

[30] Rapport Secten 2026, Émissions de gaz à effet de serre et de polluants atmosphériques en France | 1990-2025, p. 468. Available at https://www.citepa.org/donnees-air-climat/donnees-gaz-a-effet-de-serre/.

low-emission zones, introducing urban road pricing, and so forth. Yet one approach appears to be prominent among these efforts: that of making individuals responsible for their mobility behavior, notably through the concept of modal shift[31]. This approach corresponds to mobility management strategies, which seek to influence travel demand by encouraging individuals to adopt more sustainable travel practices. The concept of modal shift assumes that individuals are rational and that their choice of transport mode reflects an attempt to maximize personal utility[32]: "The user is conceived as a comparator, for whom real-time multimodal information on travel conditions improves the rationality of modal choice."[33]. The combination of – sometimes excessive – expectations regarding the effectiveness of ICTs and the concept of modal choice lie at the heart of public multimodal mobility information systems since their origin in the early 2000s. Today, the most advanced systems share three characteristics. First, they incorporate journey-planning functions combining all commonly used modes of transport: private car, public transport, active mobility and shared mobility. Second, they rely on several types of data – scheduled, real-time, historical and predictive. Third, they are accessible through dedicated mobile applications and websites. Less advanced systems may not offer journey-planning functions or may cover a more limited selection of modes. Others do not include predictive functionality.

ii. Belgian public multimodal mobility information systems

Belgium has relatively few public multimodal traveler information systems, and no national system[34]. The main systems operated by public actors are presented below.

a. The intelligent transport system of Namur

The Intelligent Transport System (ITS) of the City of Namur was launched in 2020. The Namur ITS is intended to enable users to "adapt their route"[35] (adapter leur itinéraire) to mobility conditions. On the one hand, the website compiles travel times collected by automatic number-plate recognition cameras into a traffic-color system, allowing users to visualize potential congestion on a road according to the color displayed (green/orange/red). The website also provides visitors with an interactive map showing information on public transport timetables and stops, the availability of shared bicycles, parking availability, and cycling infrastructure. In parallel, the ITS integrated management software is intended to automatically activate alternative-route suggestions in the event of congestion and display them on variable-message signs located on roads equipped with ANPR cameras. These signs also display other messages, including

[31] Reigner, H. (2016). Neoliberal rationality and neohygienist morality. A Foucaldian analysis of safe and sustainable urban transport policies in France. Territory, Politics, Governance, 4(2), 196-215.
[32] Bierlaire, M., Kaufmann, V., & Rérat, P. (2017). La mobilité en questions. Presses polytechniques et universitaires romandes.
[33] Adoue, F. (2014). Les T.I.C, nouvel Eldorado des politiques de régulation de la mobilité? Une analyse du discours d'acteurs de l'innovation dans les transports. *Géo-Regards*, *7*(1), 73-87. https://doi.org/10.33055/GEOREGARDS.2014.007.01.73, p. 83.
[34] Contrary to Luxembourg and its national system Mobiliteit.lu, for instance.
[35] Ville de Namur (2020). Un système de transport intelligent. Available at https://www.namur.be/fr/ma-ville/mobilite/mobilite/publications/systeme-de-transport-intelligent-sti (accessed 2 September 2026).

multimodal alternatives to the planned car journey (park-and-ride facilities and buses). The project, which represents an investment of four million euros, was financed to the extent of 90% by the European Regional Development Fund (ERDF). The system is currently experiencing serious technical malfunctions that prevent access to car travel-time measurements. The core of the ITS is therefore no longer operational.

b. The Slim naar Antwerpen system

Launched in 2016, Slim naar Antwerpen is an intermodal journey planner developed by the City of Antwerp and its partners (the Province, the Region, the Port, as well as public transport operators). The project was developed in the context of major roadworks in the city and the establishment of a low-emission zone. It received funding through five European grants[36]. The system consists of a website and an application, offering a realtime (and predictive) journey planner, an interactive map, editorial content (mobility news in Antwerp), and advice for businesses. The journey planner covers private cars, taxis, public transport, walking, cycling, boats, and shared bicycles, e-scooters, scooters and cars. This makes it a particularly comprehensive journey planner. The algorithm generating route suggestions proposes an "intelligent" combination of transport modes based on the characteristics of the journey. For short journeys, walking, cycling and e-bikes are prioritized. For longer journeys, taxis, public transport and shared motor vehicles are prioritized. A private-car route is proposed only when the journey by public transport takes one and a half times as long[37]. The map displays information on parking charges, the low-emission zone, road traffic, roadworks and events, as well as lifts. The journey-planning algorithm therefore constitutes the core mechanism through which Antwerp seeks to steer mobility behavior through information. It embeds, therefore, policy choices by systematically favoring certain transport modes over others. Finally, Slim naar Antwerpen is made available to third parties, which can display the journey planner on their own websites through the system's widget. This is intended to extend the reach of the system by broadening its potential user base. Slim naar Antwerpen is operational and regularly updated.

c. The Smart Mobility Planner of Belgian public transport operators and the Brussels Floya system

The Smart Mobility Planner is a journey planner resulting from a collaboration between Nextmoov, a start-up that used open data from transport operators to provide a private traveler-information service, and public transport operators (De Lijn–the Flemish public transport operator, TEC–the Walloon public transport operator, STIB–the Brussels public transport operator, and SNCB–the federal railway operator). The project was launched in 2019 with the support of the federal "Smart Mobility Belgium" funding programme. Although the system remains

[36] https://www.slimnaarantwerpen.be/nl/over-ons/met-europese-steun?tab=met-europese-steun (accessed 2 September 2026).
[37] Slim naar Antwerpen (2026). How does Slim's multimodal journey planner in Antwerp work? Available at https://www.slimnaarantwerpen.be/nl/routeplanner/faq (accessed 28 August 2026).

accessible, the project appears to have stalled at the testing stage. Another project led by public transport operators and supported by the Brussels-Capital Region experienced a similar fate: the Floya system. This service will be discontinued on 31 December 2026 because of its cost, which is considered too high in a context of budgetary restraint, and the ban on shared e-scooters in Brussels from 2027.

iii. Information as a behavioral policy instrument

The deployment of these systems forms part of mobility management policies implemented by local public authorities and, in some cases, national authorities. Their purpose is therefore not solely to improve the experience of people who already use active and public transport modes. They are intended to "steer users' behavior"[38] and to "change individual travelers' travel behavior to/from or within the city"[39], thereby acting on individual conduct. Information systems deployed by public authorities thus constitute *policy instruments* (instruments d'action publics)[40], that is, "a technical and social device that organizes specific social relations between public authorities and their recipients according to the representations and meanings it conveys"[41]. In this case, multimodal mobility information systems belong to the category of behavioral instruments, insofar as they are based on the idea that individual practices can be modified through informational stimuli. Citizens are encouraged to adopt virtuous–and therefore rational–behavior by relying on multimodal information. Mobility is viewed as consumer behavior within a market offering different transport options. Through their multimodal systems, public authorities do not prohibit particular modes of transport; rather, they seek to influence the choice made by citizens themselves. The form taken by public action here can be explained by a conception of mobility practices inspired by the Theory of Planned Behavior[42], which rests on the idea that transport-mode choice is an individual process that can be understood and influenced through psychological models[43].

iv. Can information really generate sustainable mobility? Three lessons from the Belgian experience

Without providing a quantitative assessment–difficult to establish–of the effectiveness of multimodal systems in generating modal shift, several limitations of these systems can nevertheless be identified.

[38] Ville de Namur (2020). S.T.I - Système de Transport Intelligent,https://www.le-nid.be/sti-systeme-de-transport-intelligent.
[39] Vervoerregio Antwerpen (n.d.). Routeplan 2030, https://routeplan2030.be (accessed 28 August 2026)
[40] Lascoumes, P., & Le Galès, P. (Eds.). (2005). *Gouverner par les instruments* (Vol. 200). Paris: Presses de Sciences po.
[41] Halpern, C., Lascoumes, P., & Le Galès, P. (2019). Instrument. Dans L. Boussaguet, S. Jacquot, & P. Ravinet (Eds.), *Dictionnaire des politiques publiques* (5th ed., pp. 321-330). Presses de Sciences Po. https://sciencespo.hal.science/hal-02375618v1.
[42]Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes*, *50*(2), 179-211.
[43] Barr, S., & Preston, J. (2019). "5: Influencing travel behaviour". In *Transport Matters*. Bristol, UK: Policy Press. Retrieved Aug 26, 2026, from https://doi.org/10.51952/9781447329572.ch005.

a. A first limitation: information in the service of automobility?

Motorists are the primary target of public policies falling under mobility management, including multimodal information. By showing them that attractive modal alternatives (potentially faster or more pleasant) exist for many origin-destination pairs, operators of multimodal systems hope to generate modal shift. However, the status assigned to the car within these systems can pose a challenge. If the car is presented as one mode among others, without restrictions or disincentives to its use, the system may simply support motorists' existing routines, or even facilitate car use. The case of the Namur ITS, discussed above, illustrates this situation: the system appears ultimately to have been designed for motorists, which may make it attractive, but raises questions about its consistency with the system's modal-shift objective. Conversely, if the car is absent from the system, it appears difficult to reach the system's target audience, namely motorists who use dedicated journey planners. The Antwerp system seems to offer an interesting response to this paradox, since it proposes a car route only when public transport takes one and a half times longer.

b. A second limitation: the complexity of influencing individual mobility habits

The deployment of multimodal systems by the public sector rests on the assumption that citizens will adopt these tools and, once they become users, use the information provided to optimize different dimensions of their mobility habits: routes, modal choices, and the timing of journeys. In this context, individuals are framed as economic actors who seek to maximize their utility. The systems aim to induce a form of *multimodal rationalization*[44]of mobility behavior. To this end, managers of multimodal systems seek to make users aware of the actual costs of car journeys while demonstrating the comparative advantages of other modes of transport, hoping that it will deter individuals from using their car. However, scientific literature has shown that appealing to individuals presumed instrumental rationality is insufficient to generate modal shift[45]. Under these conditions, what role can multimodal information play in the sustainable transition of mobility? The question remains open. The Lyon Mobility Agency may constitute an interesting initiative in this respect. It offers residents various channels of information and support for behavioral change (including a multimodal system), from a perspective that departs from the conventional use of multimodal information as a tool for optimizing day-to-day mobility choices: the aim is to leverage social changes occurring in people's lives (moving home, starting a new job)

[44]Flore, N. (2026, avril 23). *Transformer les mobilités sans contraindre : Le management de la mobilité par l'autonomisation informationnelle des individus* [Communication]. Colloque « Qui gouverne la ville ? Entre fragmentation et concentration du pouvoir urbain ? », Liège.
[45] Voir notamment Buhler, T. (2012). *Eléments pour la prise en compte de l'habitude dans les pratiques de déplacements urbains : Le cas des résistances aux injonctions au changement de mode de déplacement sur l'agglomération lyonnaise* [Doctorat ès Urbanisme, aménagement, PhD, Lyon, INSA]. https://doi.org/10.70675/b508ea6ez31b3z4682z97dez54af7c5f2cca ; Kaufmann, V. (1998). *Sociologie de la mobilité urbaine : La question du report modal* [Lausanne, EPFL]. https://doi.org/10.5075/EPFL-THESIS-1759; Rocci, A. (2009). *Changer les comportements de mobilité : Exploration d'outils de management de la mobilité : Les programmes d'incitation au changement de comportements volontaire (VTBC)* (p. 83). ⟨hal-00544419⟩.

in order to introduce them to new mobility practices, notably through the multimodal journey planner of the Lyon metropolitan area[46].

c. A third limitation: public-public and public-private competition between traveler information systems

Local authorities deploying multimodal information systems seek to encourage the adoption of new mobility practices, as illustrated by the Namur Intelligent Transport System and Slim naar Antwerpen. These systems constitute the media through which authorities seek to steer individual mobility behavior through information. Yet the use of these information systems cannot be taken for granted. Multiple journey planners are available on the market.

Sector	Type of actor	Examples
Private	Large digital corporations	Google Maps Waze (Google)
	Specialized multinationals	Moovit (Mobileye) Here We Go (Here)
Public	National public authorities	Mobiliteit.lu (Luxembourg)
	Regional public authorities	Île-de-France Mobilités application (Île-de-France Region) OURA application (Auvergne-Rhône-Alpes Region)
	Local public authorities	Slim naar Antwerpen (Antwerp) Intelligent Transport System (Namur) Lyon online Mobility Agency
	Public transport operators	National Railway Company of Belgium (SNCB) application TEC application (bus, Wallonia)

In this context, some multimodal systems operated by local public authorities fall into disuse because of their low–or very low–number of users. Their difficulty in attracting the public may be explained by the competition they face from private services, but also by the popularity of other public multimodal systems. The private sector–and Google Maps and Waze in particular–captures a substantial share of journey-planning queries. Public transport operators' applications also have very large user bases, namely people who regularly use public transport and whose needs are met through these dedicated applications. Cities' attempts to establish their own new multimodal information systems therefore frequently encounter low levels of use. Their systems are caught between a rock and a hard place: on the one hand, applications specializing in road transport, and on the other, applications specializing in public transport, without managing to establish a strong position of their own. Of course, motorists remain the primary target of public authorities,

[46] Flore, N. (2026). Op. cit.

which means that the low uptake of these multimodal systems among public transport users should be put into perspective. Nevertheless, the low absolute number of users can give local authorities behind these projects the impression that the resources committed to deploying their systems are disproportionate to their actual use[47]. Multimodal systems managed by public transport operators are sometimes more popular than those operated by local public authorities, since operators have a loyal customer base. However, two reservations can be raised regarding the generalization of single multimodal systems managed by operators: first, they generally target people who are already committed to public transport, whereas motorists are the people who need to be convinced – potentially by integrating the car among the modes covered by multimodal systems; second, they do not always cover shared mobility. Furthermore, as noted in the section presenting the main Belgian multimodal systems, these systems are often developed with substantial European financial support. Consequently, maintaining them over time can represent a significant financial burden for cities once deployment subsidies come to an end.

v. Conclusion: What kind of multimodal information for the sustainable mobility transition?

The Belgian experience suggests that the impact of multimodal information systems on mobility behavior remains complex to assess. While several projects were conducted by local authorities, many obstacles make it challenging to turn multimodal information into an effective tool to engender durable mobility practices. This report has emphasised four main impediments. Firstly, public authorities struggle to sustain the multimodal systems they have developed, owing to operating and maintenance costs, but also to the difficulty of establishing an effective and coherent strategy for operating these tools. Secondly, public multimodal systems compete against each other and against private systems. The multiplicity of public systems causes governance problems, while the popularity of private applications such as Google Maps and Wazeprevents multimodal information from fostering modal shift. Indeed, the popularity of these road-navigation applications jeopardize the uptake of public systems by drivers, even though the latter are precisely the primary target of mobility management policies. Thirdly, the status of the car in multimodal systems is still ambiguous. Ignoring the car when informing individuals of travel options may bolster the use of green modes, but it may also render multimodal systems unattractive to drivers, who are the target of mobility management policies. Fourthly, the conceptualization of modal shift at the heart of most multimodal systems raises questions. Modal shift is a particularly complex process, oversimplified by the current framing of multimodal system users. Whereas the individual is considered to be in search of self-optimization when making day-to-day mobility choices, the scientific literature has shown that many factors can affect mobility

[47] Furthermore, as noted in the section presenting the main Belgian multimodal systems, these systems are often developed with substantial European funding. Consequently, once deployment subsidies come to an end, maintaining and sustaining these systems can represent a significant financial burden for cities.

practices, including routines, town planning and structural constraints for instance. Empirical cases of multimodal information systems in Belgium highlight, overall, that the key challenge is not only technological innovation, but also the framing of modal shift and the institutional capacity to maintain, coordinate and strategically position multimodal systems within wider sustainable mobility policies.

3. Catalonia

Consell Assessor del Parlament sobre Ciència i Tecnologia (CAPCIT)

Diagnosis of the State of Sustainable Urban Mobility in Catalonia

i. Main legislative, policy and strategic frameworks

Catalan mobility policy is shaped by broader European climate and transport objectives. The **European Green Deal** and the **European Climate Law** establish the objective of climate neutrality by 2050 and a reduction of net GHG emissions of at least 55% by 2030 compared to 1990 levels. These objectives provide the wider policy context for the decarbonization of transport and sustainable mobility in Catalonia (Generalitat de Catalunya, 2026e).

At national level, Spain's **Law 9/2025 of 3 December on Sustainable Mobility**, in force since 5 December 2025, establishes a general framework for a sustainable, fair and inclusive mobility system. The law links mobility to social and territorial cohesion, economic resilience, decarbonization, air-quality improvement, accessibility, safety, digitalization and multimodality. It applies to passenger and freight transport and reinforces the role of public administrations in coordinating planning, financing, innovation and mobility services (Jefatura del Estado, 2025a). Of particular relevance for Catalonia are its provisions on sustainable workplace mobility plans for large employment centers, sustainable mobility plans and mobility managers for large activity centers, public-transport financing, the decarbonization and digitalization of passenger and freight transport, and stronger coordination between administrations (Generalitat de Catalunya, 2003, 2015b; Jefatura del Estado, 2025a).

Catalonia's sustainable urban mobility framework is structured as a **hierarchical planning system**. At the top, the **Catalan Mobility Act 9/2003** (LLEI 9/2003, de 13 de juny, de la mobilitat) acting as the main legal foundation for mobility planning (Generalitat de Catalunya, 2003). The Mobility Act establishes the planning system for mobility and provides for the development of mobility planning within a coordinated system that links regional, metropolitan, municipal, urban and sectoral planning instruments (Figure 1).

It is implemented through the **National Mobility Guidelines of 2006** (DECRET 362/2006, de 3 d'octubre, Directrius Nacionals de Mobilitat), which define the main criteria, objectives and areas of action for mobility policy in Catalonia. The National Mobility Guidelines are a **territorial-sectoral plan** and must be consistent with the General Territorial Plan of Catalonia. These guidelines are then developed territorially through mobility master plans and urban mobility plans, sectoral through specific transport and infrastructure plans and must be consistent with the General Territorial Plan of Catalonia (Generalitat de Catalunya, 2006a, 2026e).

Mobility Master Plans, Specific Plans and Urban Mobility Plans are the statutory planning instruments expressly established by the Catalan Mobility Act 9/2003. The Act also establishes programming, evaluation, monitoring and participation instruments. The individual plans, strategies and programs shown as examples in Figure 1, were adopted subsequently to implement or complement this legal framework (Generalitat de Catalunya, 2003, 2006a).

The **Law 21/2015** (LEY 21/2015, de 29 de julio, de financiación del sistema de transporte público de Cataluña) provides separate financial framework for the Catalan public-transport system. It regulates the financing of Catalonia's public-transport system, covering urban and interurban passenger transport by road and rail under the responsibility of the General Government of Catalonia (Generalitat) and local authorities. It establishes the principle that public transport should be financially structured to guarantee mobility for all users and support social and territorial cohesion (Generalitat de Catalunya, 2015b).

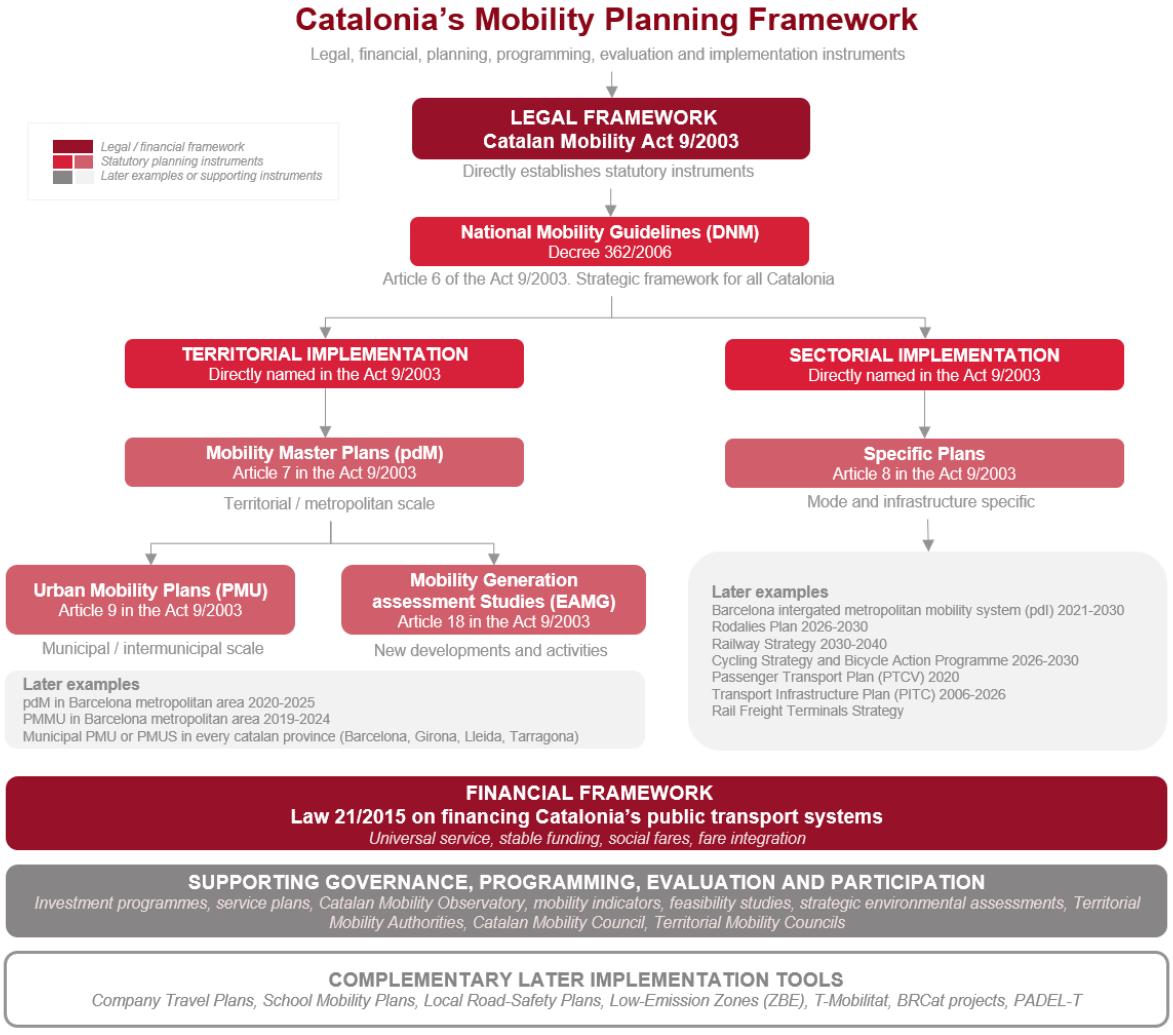


Figure 1.Mobility Planning structure connected to articles of legal and financial frameworks in Catalonia

a. National Mobility Guidelines

The **National Mobility Guidelines** of 2006 (DECRET 362/2006, de 3 d'octubre, Directrius Nacionals de Mobilitat, PDM) currently in force were approved by Decree 362/2006 of 3 October and apply throughout Catalonia and constitute the reference framework for implementing the objectives of the **Catalan Mobility Act 9/2003**. The Guidelines are organized around the main priorities of strengthening inclusive mobility, promoting the energy transition, incorporating new technologies, strengthening sustainability, and also the dimensions of social and environmental sustainability by means of establishing orientations, criteria, time-bound objectives, operational proposals and control indicator.

They also establish the relationship between land use and the provision of public and collective transport and provide strategic reference for the territorial and sectoral development of mobility planning, being consistent with the General Territorial Plan of Catalonia under the Department of Territory, Housing and Ecological Transition (Departament Territori, Habitatge i Transició Ecològica) (Generalitat de Catalunya, 2006a).

b. Territorial planning instruments

These instruments are intended to connect transport planning with territorial and urban planning, ensuring that new developments consider their effects on travel demand, accessibility, modal split and transport infrastructure.

Mobility Master Plans (Plans Directors de Mobilitat, pdM), developed by the Territorial Mobility Authorities (Autoritat del Transport Metropolità, ATM) to translate the guidance in the **DNM** of 2006 at **territorial scale**. They cover all modes of passenger and freight transport and address mobility management, public transport, active mobility, road traffic, parking and urban logistics.

Urban Mobility Plans (Pla de Mobilitat Urbana, PMUs) are Catalonia's **municipal** sustainable-mobility planning instruments and can be understood as the functional **equivalent of European SUMPs/Spanish PMUS**. They translate regional and metropolitan objectives into local actions on public transport, walking, cycling, road safety, parking, urban logistics, accessibility and public space (Generalitat de Catalunya, 2003; Jefatura del Estado, 2011). Based on Department of Territory of Catalonia, municipalities exceeding 50.000 people (20.000 for the Barcelona Region) are required to develop an Urban Mobility Plan (PMU), a 6-year plan focused on mobility services (OECD, 2025).

Metropolitan Barcelona benefits from the **Metropolitan Urban Mobility Plan** (Pla Metropolità de Mobilitat Urbana, PMMU) 2019-2024 which provides the reference framework for the 36 municipalities, under the technical and coordinating role of the Barcelona Metropolitan Area (Àrea Metropolitana de Barcelona, AMB) and Territorial Mobility Authorities (Autoritat del

Transport Metropolità, ATM), funcioning as an integrated transport system and dedicated participation and monitoring mechanisms (Área Metropolitana de Barcelona, 2020).

Mobility Generation Assessment Studies (Estudi d'Avaluació de la Mobilitat Generada EAMG) are statutory, project-specific assessments required by Article 18 of the Mobility Act 9/2003 and regulated by Decree 344/2006, prepared by the promoter of a new plan, development or major activity. They are submitted with the relevant project or planning instrument, subject to public information, and reviewed by the Territorial Mobility Authority or the Generalitat's mobility department. Their conclusions must be considered in the final approval and may require the promoter to contribute to additional sustainable-mobility measures or public-transport services. (Generalitat de Catalunya, 2003, 2006a).EAMGs are integrated into territorial, urban and development planning procedures (Urban Master Plan) and are generally subject to public information and review by the competent mobility authority.

c. Sectoral plans and strategies

Catalonia's sustainable mobility framework is complemented by Specific Plans (Plans Específics), which develop the National Mobility Guidelines for particular transport modes and mobility infrastructures, covering both passenger and freight transport. These statutory plans may operate at Catalan, metropolitan or territorial scale and are complemented in practice by sectoral strategies and programs for infrastructure, public transport, rail, cycling, freight logistics, ports and airports (Departament de Territori, Habitatge i Transició Ecològica, 2025; Generalitat de Catalunya, 2003).

Table 1. Examples of active plans and reference instruments

Topic	Plan / strategy	Main focus and current relevance	Source
Passenger transport	Pla de transport de viatgers de Catalunya (PTVC) 2020	Defines strategic guidelines and actions for the provision and integrated management of interurban public passenger transport across Catalonia, including commuter and regional rail, regular interurban bus services, demand-responsive transport and open school transport services. It was definitively approved by the Catalan Government on 7 March 2017 and replaced the earlier PTVC 2008-2012; the formal horizon has expired; it remains listed by the Generalitat among the current sectoral mobility-planning instruments.	(Generalitat de Catalunya, 2020b)
Transport infrastructure	Pla d'Infraestructures del Transport de Catalunya (PITC) 2006–2026	The integrated territorial-sectoral plan for Catalonia's Road, rail and logistics infrastructure. It has the dual status of a territorial-sectoral plan under the Territorial Policy Act and a specific plan under the Mobility Act.	(Generalitat de Catalunya, 2006b)

Metropolitan public transport infrastructure	Pla Director d'Infraestructures (pdI) 2021–2030	The specific plan for public-transport infrastructure in the Barcelona Integrated Metropolitan Mobility System. It includes railway-network expansion, tram, interchange nodes, collective road transport infrastructure, and modernization and upgrading of existing networks.	(ATM Barcelona, 2021a)
Rodalies and regional rail	Pla de Rodalies de Catalunya 2020-2030	The plan operates within a wider process of institutional reform of Rodalies governance, including the progressive transfer of responsibilities from the Spanish State to the Generalitat. However, the Pla de Rodalies is principally an investment programme for broad-gauge railway network managed by Adif and operated by Renfe. The current 2026–2030 phase prioritizes reliability of infrastructure, service quality and system capacity, with planned investment of €4.387 billion.	(Generalitat de Catalunya & Ministerio de Transportes y Mobilidad Sostenible, 2026)
Rail strategy and rail services	Estratègia Ferroviària de Catalunya and Pla de Serveis Ferroviaris 2030–2040	The Rail Strategy defines long-term horizons for 2030, 2040 and 2050, aiming to increase rail's role in sustainable mobility, improve reliability, accessibility and intermodality, support social and territorial cohesion, and increase rail freight. The Rail Services Plan translates this direction into a proposed future Rodalies and regional rail network.	(Generalitat de Catalunya, 2025a, 2026c)
Cycling and active mobility	Estratègia Catalana de la Bicicleta; Programa d'actuació de la bicicleta 2022-2025 y 2026-2030	The Catalan Cycling Strategy provides the overall framework for everyday cycling, cycling tourism/leisure and governance/training, and aims to make cycling a safe, comfortable and accessible option for everyday travel, particularly for short-distance interurban trips between population centers and employment areas. The Bicycle Action Program 2022–2025 promoted the construction of segregated cycling routes and the incorporation of cycle infrastructure into road-upgrading, traffic-calming and public-transport-priority projects. The 2026–2030 program translates it into infrastructure, intermodality, promotion and governance actions; it plans 266.5 km of cycling infrastructure with €222.2 million in investment. The program identifies 1,455 intermunicipal relations shorter than 10 km, which together represent 2.25 million daily trips; interventions on the 198 relations with more than 200 potential daily cycling trips would represent approximately 15% of potentially cyclable relations but could serve around 70% of potential cycling demand	(Generalitat de Catalunya, 2022c, 2023b, 2026d)

Freight terminals and logistics	Pla estratègic de terminals intermodals de mercaderies	Supports strategic terminals at Lleida, Empordà-Vilamalla, Penedès and Catalunya Sud-Terres de l'Ebre, linked to the Mediterranean Corridor and the ports of Barcelona and Tarragona. Rail currently carries only around 2–4% of freight in Catalonia, compared with more than 97% by road. The Generalitat aims to increase rail's share to 10% by 2030, through investment in intermodal terminals and rail–road–port logistics chains.	(Generalitat de Catalunya, 2022a, 2025b, 2026e)
Ports and airports	Pla de Ports de Catalunya, Horizon 2030; Pla d'aeroports, aeròdroms i heliports de Catalunya; DORA III 2027–2031 for Aena-managed airports	Sectoral instruments for maritime and air transport infrastructure. Generalitat plans cover Catalan port and airport infrastructure. DORA III, approved by Spain in September 2026, programs €1.962bn for Catalan Aena airports, including €1.765bn for Barcelona-El Prat, mainly for T1/T2 reconfiguration, parking and airfield works. Runway extension and a satellite terminal remain for later planning and regulatory cycles.	(Generalitat de Catalunya, 2015a, 2023c)
Traffic calming, pedestrian priority and road safety	National Pact for Safe and Sustainable Mobility (Pacte Nacional per a la Mobilitat Segura i Sostenible 2021-2030) Road Safety Plan 2024-2026(Pla de Seguretat Viària 2024-2026) Local Road-Safety Plans (Plans Locals de Seguretat Viària, PLSVs).	The Catalan Traffic Service which has deployed a cross-cutting strategy involving institutions, organizations and civil society. The National Pact promotes the adaptation of infrastructure to protect pedestrians, cyclists, motorcyclists, users of personal mobility vehicles and older people. Road Safety Plan translate strategic lines into concrete actions, many of which have a strong transformative impact on urban environments, establishing the strategic direction for combining road safety, environmental sustainability, accessibility and social inclusion in mobility policy. The Local Road-Safety Plans provide a mechanism for municipalities to diagnose crash patterns and risk conditions, define objectives, implement interventions and monitor results.	(Generalitat de Catalunya, 2024d; Generalitat de Catalunya & Servei Català de Trànsit, 2021).

d. Plans addressing organizations and specific mobility demands

Catalonia uses organization and demand-specific instruments to manage concentrated mobility generated by workplaces, schools, industrial estates, new developments and other major activity centers.

The principal instrument is the Company Travel Plan (Pla de Desplaçaments d'Empresa, PDE), which promotes public transport, active mobility, carpooling, shared services, collective access,

parking management and organizational measures to reduce car-dependent commuting (ATM Barcelona, 2025d; Generalitat de Catalunya, 2026b).

These instruments are complemented by School Mobility Plans, campus mobility plans, mobility plans for industrial and activity areas, local road-safety plans, and Mobility Generation Assessment Studies (EAMG) for new developments and land-use changes. Together, they connect mobility policy with employers, education centers, developers, local authorities and users of specific trip-generating sites (Generalitat de Catalunya, 2006a; Generalitat de Catalunya & Servei Català de Trànsit, 2021).

Table 2. Examples of main instruments

Instrument	Target group / demand	Purpose and measures	Source
Company Travel Plans (PDEs)	Employees, visitors, business travel and workplace-related goods movements	The main organization-based instrument for managing commuting and work-related mobility. Diagnosis and reduction of car dependence and improve sustainable access to workplaces. Public transport access, shuttle buses, carpooling, cycling facilities, parking management, flexible schedules and teleworking. The current regulatory framework links PDEs to mobility, air-quality and workplace-access objectives. Under Decree 132/2024, which approves the Air Quality Plan, Horizon 2027, PDEs are required for large workplaces above specified employment thresholds and for certain workplaces located in areas where air-quality limit values are exceeded.	(Generalitat de Catalunya, 2024a, 2026b)
School Mobility Plans / School Mobility Action Plans	Pupils, families, caregivers, teaching staff and school visitors	Improve safe, active and sustainable travel to educational facilities. Safe walking and cycling routes, traffic calming, school-street management, bicycle parking and road-safety education.	(Generalitat de Catalunya, n.d.-a, 2020a)
Mobility to universities campus zones	Students, staff, neighbors and university visitors	"Taula de Mobilitat de les Universitats" for the Diagonal campus, a 2012–2015 participatory forum involving Les Corts District, Barcelona's Mobility Department, the UB and the UPC. Diagnostics and micro-measures to promote walking, cycling and public transport around the shared campus zone. In the context of the Campus Salut Clinic-UB and the broader transformation of the Diagonal area.	(UPC, 2016)
Mobility plans for industrial	Workers, firms, visitors and freight operators in	Improve access to employment areas and reduce car-dependent commuting. Public	(Área Metropolitana de

estates and activity areas	industrial or logistics areas	transport improvements, collective transport, carpooling, active access, freight management and mobility coordination.	Barcelona, 2016; Generalitat de Catalunya, 2023d, 2024c)
Local road-safety plans (regions of Barcelona, Tarragona, Lleida and Girona)	Residents and all road users, particularly vulnerable groups	Address local crash risks and integrate road safety into municipal mobility and urban planning. Speed management, safer crossings, school-zone measures, pedestrian priority and street redesign.	(Generalitat de Catalunya, 2006c, 2024d, 2025d)

ii. Sustainable mobility measures implemented in Catalonia

Catalonia has implemented a broad package of measures addressing public transport, rail, bus, walking, cycling, private vehicles, shared mobility, personal mobility vehicles, workplace travel, school travel and urban freight. In the last 10 year, the policy approach increasingly combines infrastructure investment with traffic management, technological integration, clean-vehicle deployment, land-use regulation and behavior-oriented mobility management (ATM Barcelona, 2021a; Generalitat de Catalunya, 2026e; Generalitat de Catalunya & Servei Català de Trànsit, 2021).

a. Public transport and intermodality

Recent public-transport action in Catalonia has focused on network expansion, modernization, bus priority, rail reliability and interchanges.

One the weakest point of the current public transport is the **commuter and regional train**, Rodalies. The total estimated budget of 8.037M€ of the Rodalies Plan 2020-2030 has been executed the 36,9% until June of 2026 (Generalitat de Catalunya, 2026e; Generalitat de Catalunya & Ministerio de Transportes y Mobilidad Sostenible, 2026).

An example of metropolitan framework in action is the **Public Transport Infrastructure Master Plan 2021-2030** (Pla Director d'Infraestructures 2021-2030, pdI), which covers metro, light rail, railways, collective road transport, interchanges and network modernization (Table 1). However, the pdI is a ten-year investment programme and many of its interventions remain under construction or in preparation (ATM Barcelona, 2021a, 2024, 2025a).

Table 3. Examples of recent and ongoing public-transport and intermodality interventions in Public Transport Infrastructure Master Plan 2021-2030 of Barcelona

Intervention	Status	Main features	Source

Catalan Government Railways (Ferrocarrils de la Generalitat de Catalunya, FGC) urban extensions in Terrassa and Sabadell	Implemented (2015–2017)	Transformation of former termini into multi-station urban corridors (3 new stations in each city) on the FGC suburban network.	(ATM Barcelona, 2021a)
Redesign of Barcelona bus network (horizontal/vertical high-frequency lines)	Implemented (2012–2018)	Phased rollout of a new orthogonal bus network with high-frequency horizontal and vertical lines (5 lines in 2012, 5 in 2013, 3 in 2014, 3 in 2016, 4 in 2017, 8 in 2018).	(TMB, 2018)
Diagonal light-rail connection in Barcelona (Trambaix–Trambesòs)	Partially implemented (Phase 1 in 2024); further phases planned	Connects two previously separate light-rail systems, serves a dense mixed-use corridor and improves interchange with metro and bus; expected to increase ridership and reduce car use on Diagonal. First phase entered service in 2024.	(ATM Barcelona, 2021a)
L9/L10 metro (Barcelona)	Ongoing	Southern section (L9 Sud) already connects the city with Barcelona-El Prat Airport; central tunnel and northern sections under construction. Future R-Aeroport commuter-rail line will complement the airport link.	(ATM Barcelona, 2024, 2025a)
L8 extension (Plaça Espanya–Gràcia)	Ongoing (works under way)	New central tunnel linking the Llobregat-Anoia and Barcelona-Vallès FGC corridors, with 3 new stations and interchange with metro L5 and tram T1–T3. It Will allow direct cross-city journeys on FGC without passing through Plaça Espanya; improves network resilience and intermodality, potentially reducing car trips across the metropolitan area.	(ATM Barcelona, 2025a)
La Sagrera and Barcelona Sants train station transformations	Ongoing (multi-year works)	Major redevelopment of La Sagrera interchange and transformation of Barcelona Sants station (platforms, access, public space, integration with surrounding urban fabric).	(Ajuntament de Barcelona, 2026)
Interchange and access program (pdI)	Ongoing / pipeline	Investments in interchanges (e.g. Glòries, Plaça Catalunya-Passeig de Gràcia), future Barcelona-El Prat airport intermodal station, new FGC stations and park-and-ride facilities, plus bicycle parking and improved station access.	(ATM Barcelona, 2021a)

b. Ticketing, information and mobility-system integration

Barcelona has progressively deployed the **T-Mobilitat** system as the main instrument for technological and fare integration in public transport within the ATM Barcelona area. It introduces contactless validation and a unified technological framework for users, operators and public

administrations, replacing legacy magnetic ticketing systems. It also enables the use of different physical and digital media, including cards, mobile applications and other contactless supports (Generalitat de Catalunya, 2026e). The system currently covers the integrated fare network of the ATM of Barcelona (more than 300 municipalities, including the full 7-zone area since July 2025). In parallel, the Generalitat is leading the **T-mobCAT** project to extend this model to all four Catalan Territorial Mobility Authority areas, starting with **T-16** free transit card for children and young people operating in Girona, Tarragona and Lleida and a new **T-social** card for 21 municipalities in Barcelona applied in late 2026-early 2027 (Generalitat de Catalunya, 2026a; Generalitat de Catalunya, Departament de Territori, 2022).

Fare reductions have been one of the most visible public-transport measures implemented since September 2022. In the area covered by Barcelona's integrated fare system, ATM of Barcelona initially reduced the price of the T-usual and T-jove by 50% and the T-casual by 30%. The T-casual returned to its previous price in 2023, while the discounts on recurrent-use passes continued. Eligibility for the T-jove was extended to people under 30 in 2023, and a single price across fare zones was introduced in 2024. Although the measures arose in response to inflation and rising energy costs, they were also promoted as a way to increase public-transport use and reduce reliance on private vehicles (Jefatura del Estado, 2022b, 2022a; TMB, 2026).

c. Cycling and active mobility

By the implementation of the **Bicycle Action Program 2022–2025**, 33 cycling actions have been performed, 64.2 km of cycling infrastructure had been completed and a further 26.2 km were under construction, with €41.3 million invested. Measures include cycling infrastructure integrated into BRCat (Bus Rapid Catalonia) high-performance bus corridors on the C-245 (Castelldefels–Cornellà) and Girona–Salt axes, combining cycle tracks with bus-priority, road redesign and traffic calming (Generalitat de Catalunya, 2022c).

The **Bicycle Action Program 2026-2030** continues this integrated approach, planning 266.5 km of new cycling infrastructure and €222.2 million in investment, prioritizing high-demand intermunicipal relations under 10 km(Generalitat de Catalunya, 2026d).

At metropolitan level, cycling is reinforced by shared-bike and parking services. The AMBici electric bike-sharing system, launched in 2023, serves 15 municipalities with around 2,600 e-bikes at 236 stations and had recorded over two million trips by mid-2024. In Barcelona, Biking has expanded its fleet to 8,000 bicycles (5,000 electric) and is adding 36 new stations by 2026. The AMB has also enlarged the Bicibox secure-parking network by more than 20%, exceeding 3,000 spaces across 25 municipalities, mainly at rail, metro and bus interchanges (AMB, 2024, 2025; BSM, 2025).

d. Traffic calming, pedestrian priority and road safety

Sustainable mobility policy in Catalonia increasingly includes measures to reallocate public space towards pedestrians, cyclists and other vulnerable road users. This strategy is currently defined through the National Pact for Safe and Sustainable Mobility (Pacte Nacional per a la Mobilitat Segura i Sostenible 2021-2030) and the three-year Road Safety Plan (Pla de Seguretat Viària 2024-2026), which translate strategic lines into concrete actions.

They the adaptation of infrastructure to protect pedestrians, cyclists, motorcyclists, users of personal mobility vehicles and older people. The measures promoted include the extension of **30 km/h zones**, superblocks, traffic-calming hubs, pedestrian zones, single-platform streets with pedestrian priority, safer crossings, pedestrian islands and speed-reduction measures. (Generalitat de Catalunya, 2006c; Generalitat de Catalunya & Servei Català de Trànsit, 2021).

By 2024, 296 municipalities, representing 91.8% of the Catalan population, had prepared a Local Road-Safety Plan (Generalitat de Catalunya, 2006c).

e. Low-emission zones, clean vehicles and environmental traffic management

Air-quality and climate policy are increasingly integrated into mobility measures. The National Road Safety Pact promotes low-emission zones LEZs (Zonas de Bajas Emisiones, ZBEs), traffic restrictions, fleet renewal and communication on health benefits, prioritizing reduced car use, cleaner vehicles and stronger public transport and active mobility (Generalitat de Catalunya & Servei Català de Trànsit, 2021).

Under the Spanish Climate Change Law 7/2021, municipalities with more than 50,000 inhabitants, and those with more than 20,000 in air-quality exceedance areas, must adopt mobility plans including an LEZ. In Catalonia, 38 municipalities are subject to this obligation; by late 2025, 26 had already started enforcement[48](Generalitat de Catalunya, 2025e; Jefatura del Estado, 2021).

In Barcelona, environmental traffic management is complemented by fare and access instruments such as the T-Verda (free public transport for users with environmentally restricted vehicles) and by shared-mobility services (ATM Barcelona, n.d.). On the main access roads to Barcelona (C-32/B-20, C-31, AP-7/AP-2/B-23), variable speed limit systems adjust maximum speeds in real time to improve flows, safety and air quality. Strategic noise maps and noise action plans monitor exposure to road, rail and airport noise (Generalitat de Catalunya, 2026b; Generalitat de Catalunya & Servei Català de Trànsit, 2021).

[48] Barcelona, Badalona, Castelldefels, Cerdanyola del Vallès, Cornellà de Llobregat, El Prat de Llobregat, Esplugues de Llobregat, Gavà, Girona, Granollers, Lleida, L'Hospitalet de Llobregat, Manresa, Mataró, Mollet del Vallès, Reus, Rubí, Sabadell, Sant Boi de Llobregat, Sant Cugat del Vallès, Sant Joan Despí, Santa Coloma de Gramanet, Tarragona, Terrassa, Viladecans, i Vilanova i la Geltrú.

f. Shared mobility and personal mobility vehicles

The National Road Safety Pact and subsequent mobility policies promote car-sharing, motorcycle-sharing, bike-sharing and shared PMV services, including electric shared vehicles, as part of a diversified mobility offer. These measures aim to reduce vehicle ownership, improve parking management and facilitate access to lower-emission vehicles, especially when integrated with public transport and active mobility (Generalitat de Catalunya & Servei Català de Trànsit, 2021).

At operational level, the Generalitat and local authorities have supported public car-sharing schemes (often in partnership with municipalities and metropolitan authorities) that provide electric or low-emission vehicles for short-term use, typically located near transport nodes and in dense urban areas. These schemes are designed primarily for residents and commuters, offering subscription or pay-per-use models and prioritizing neighborhoods with limited parking and good public-transport access. Shared motorcycle and bicycle services, including electric bikes, further extend this offer for shorter trips and first-/last-mile connections (Generalitat de Catalunya & Servei Català de Trànsit, 2021).

For personal mobility vehicles, the Servei Català del Trànsit has promoted a model municipal ordinance recommending common rules on circulation (no riding on pavements, preferential use of cycle lanes and 30 km/h zones), minimum age, helmet use and civil-liability insurance, compiled in a technical dossier on safe PMV use. These measures address safety and coexistence with pedestrians and cyclists rather than promoting PMVs as a primary mode (Generalitat de Catalunya, 2023a).

g. Workplace mobility and Company Travel Plans

By December 2025, the ATM had processed 224 Company Travel Plan (Pla de Desplaçaments d'Empresa, PDEs), of which 29% related to public organizations and 71% to private organizations. Among the actions included in those PDEs, 38% concerned, reducing private-vehicle use, 31% focused on organizational and mobility-management measures, 24% promoted active mobility and 7% sought to improve public or collective transport access to workplaces (Generalitat de Catalunya, 2026e).

The ATM data also reveal the significance of workplace location: the private-car modal share associated with workplace mobility was 46% in urban locations and 74% in peri-urban locations. This highlights the need for differentiated access strategies for employment centers with limited public-transport provision or poor walking and cycling connections (Generalitat de Catalunya, 2026e).

Mobility associated with industrial estates, logistics areas and other large activity centers is not managed through one single standardized plan type. Instead, it is addressed through Company

Travel Plans, mobility master-plan measures, public-transport and intramodality interventions, land-use planning and Mobility Generation Assessment Studies. These instruments seek to improve public-transport access, active-mode connections, carpooling, parking management and freight efficiency in locations with concentrated employment and logistics demand (ATM Barcelona, 2019; Generalitat de Catalunya & Servei Català de Trànsit, 2021).

h. Freight transport and urban logistics

Recent measures also aim to improve the sustainability and efficiency of freight transport (Generalitat de Catalunya, 2026e):

Development of strategic and intermodal railway terminals in areas such as Lleida, Penedès, Empordà and Terres de l'Ebre.

Promotion of rail freight and connections with the Mediterranean Corridor.

Development of multimodal logistics chains to reduce costs, improve operational efficiency and reduce environmental impacts.

Digitalization of freight documentation through the PADEL-T platform.

Deployment of sensorisation and data systems to monitor vehicle loads, emissions, driving times, traffic flows and infrastructure conditions.

Measures for sustainable freight transport seek to reduce road dependence, increase rail–road–port intermodality, improve logistics efficiency and support the decarbonization and digitalization of urban and regional goods movement. The **Catalan Strategy for Railway Terminals** promotes the development of strategic multimodal rail freight terminals to increase the competitiveness of Catalan firms, reduce logistics costs and minimize environmental impacts (Generalitat de Catalunya, 2025a, 2026c).

The strategy identifies strategic terminal locations in the Plana de Lleida, Empordà-Vilamalla, Penedès and Catalunya Sud-Terres de l'Ebre, alongside connections with the ports of Barcelona and Tarragona and the Mediterranean Corridor. These interventions aim to strengthen integrated multimodal logistics chains and increase the role of rail freight (Generalitat de Catalunya, 2025a, 2026c).

For urban logistics, the National Pact promotes the involvement of the logistics sector in reducing air pollutant and greenhouse-gas emissions, including the use of electric and other non-polluting vehicles for last-mile delivery (Generalitat de Catalunya & Servei Català de Trànsit, 2021).

Digital measures include the PADEL-T platform for managing transport documentation, digitalization requirements for road-freight and discretionary passenger-transport documentation, and sensorisation systems for dynamic weighing, vehicle classification, load

monitoring, individualized emissions measurement, traffic-flow modelling and predictive road maintenance (El Canal Marítimo y Logístico, 2026).

iii. Evidence of impacts on mobility patterns, behavior and quality of life

There has been measurable progress in the provision and use of sustainable mobility options, particularly public transport and cycling. Public-transport demand has recovered strongly in metropolitan Barcelona since COVID; cycling infrastructure has expanded and is increasingly integrated with public-transport and traffic-calming projects; and public-space and road-safety measures target air quality, noise, safety and the conditions for walking (Generalitat de Catalunya, 2026e; Generalitat de Catalunya & Oficina Catalana del Canvi Climàtic, 2024). However, the modal shift of public transport has not been increased significantly in the last 10 years.

Table 4.Highlight evidence of impacts in Catalonia

Topic	Evidence from Catalonia	Source
Public transport and travel behavior	The Barcelona ATM area registered 1.166 billion public-transport validations in 2024; rail accounted for 59.3% and buses for 40.7% of demand. At Catalonia-wide level, annual public-transport demand has followed a similar trajectory: after a sharp pandemic-related drop in 2020, validations recovered steadily and by 2023–2024 exceeded pre-pandemic levels, with all operators recording historical maxima in monthly and rolling 12-month series.	(Institut Metròpoli & ATM Barcelona, 2025)
Cycling, walking and active mobility	The 2022–2025 Bicycle Action Program identified that interventions on 15% of key intermunicipal relations below 10 km serves around 70% of cycling demand. The share of active modes raised from 46.4% in 2017 to 51.1% in 2023, and bicycle/PMV trips increasing by 81.7% over the same period.	(Generalitat de Catalunya, 2025c; Observatori de la Mobilitat de Catalunya, 2025).
Traffic calming, safety and urban quality of life	The Health in the Streets (Salut als Carrers) evaluation of the Barcelona Superblocks found improved perceived tranquility, well-being, sleep quality and social interaction. At a neighborhood level, more than 900 users per hour were observed in the redesigned public space, with 92.9% walking; more than 60% of surveyed residents reported improved walking comfort. Road accidents have fallen by more than 60% since 1999, although reductions in fatalities and serious injuries have plateaued since 2013. The ATM appraisal framework identifies physical-activity and mental-health benefits when car trips shift to walking, cycling or public transport.	(Ajuntament de Barcelona & Agència de Salut Pública de Barcelona, 2021; Pérez et al., 2025).
Environmental and climate performance	Barcelona's LEZ reduced NO_2 concentrations at traffic monitoring stations by up to 7.6 µg/m³ (15.8%) between 2020 and 2022. In the pedestrianized areas, NO_2 fell by 25% and PM10 by 17%.	(Ajuntament de Barcelona & Agència de Salut Pública de Barcelona, 2021; Pérez et al., 2025).

a. Public transport and travel behavior

Public-transport demand in Catalonia has recovered strongly after the pandemic and reached high levels in the Barcelona metropolitan system. In 2024, the Barcelona ATM area recorded 1.166 billion public-transport validations, while the rest of Catalonia recorded around 60 million. Rail represented 59.3% of public-transport demand and buses 40.7%, confirming the central role of both modes in urban and metropolitan mobility (Institut Metròpoli & ATM Barcelona, 2025). In terms for modal shift, the **modal transport is slightly lower than the pre-pandemic period** (Figure 2).

Public-transport use is **highly concentrated in the Barcelona Integrated Metropolitan Mobility System** (SIMMB). The SIMMB includes approximately 75% of Catalonia's population but accounts for around 95% of its public-transport demand; in 2024 it registered 19.8 million weekday trips, or 3.95 trips per person. This suggests that dense settlements, integrated fare systems and extensive public-transport provision support high levels of collective travel, but it also highlights substantial territorial inequalities in access and use (Institut Metròpoli & ATM Barcelona, 2025).

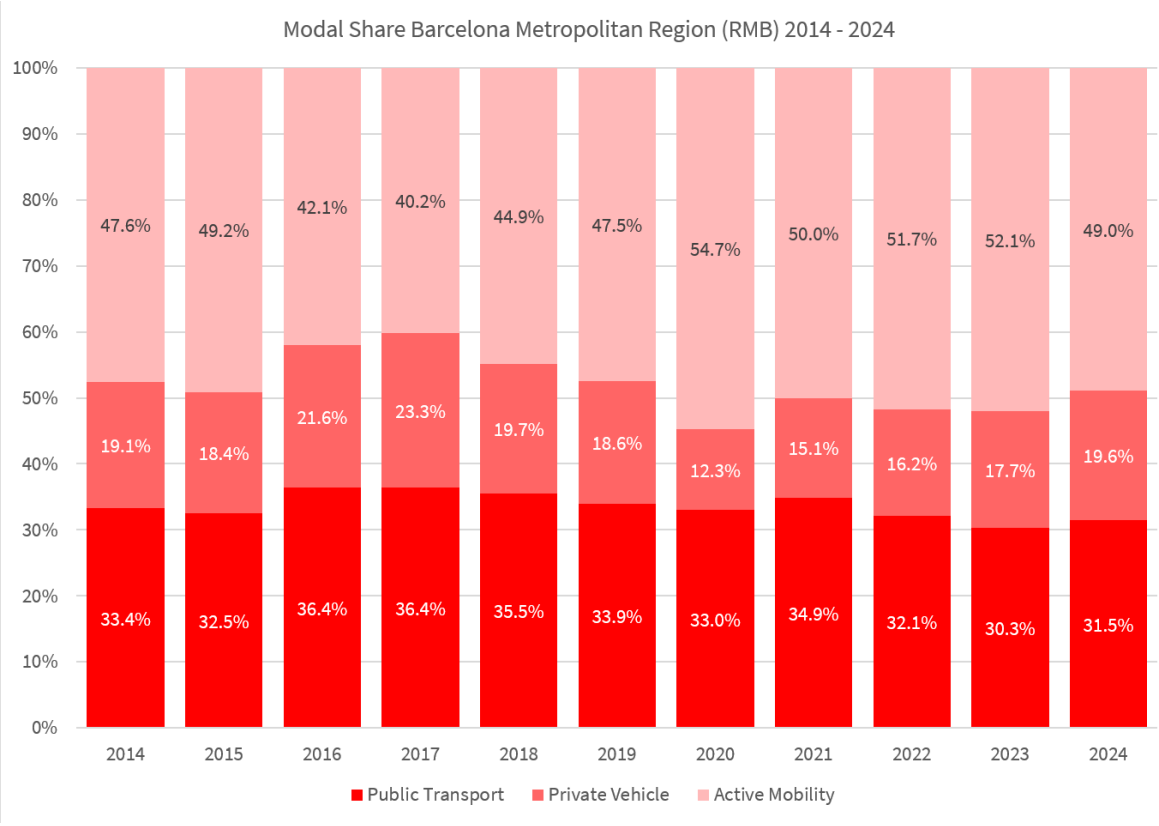


Figure 2. Historic representation of modal share in RMB 2014 - 2024(Institut Metròpoli & ATM Barcelona, 2025)

Since September 2022, public-transport use has been further supported by state-funded fare bonifications on season tickets and multi-trip passes, extended through 2026 under the law for measures to promote use of public transport (REAL DECRETO-LEY 17/2025). In the Barcelona

ATM, these measures have maintained a 50% discount on the most used titles (T-usual, T-jove and social fares), with the cost shared between the Spanish Ministry and the Generalitat (ATM Barcelona, 2025b; Jefatura del Estado, 2025b).

Evidence on behavioral impacts indicates that these measures have increased public-transport use but have had limited effect on car use. In ATM's 2023 weekday mobility survey, around 65% of respondents said the **discounts had not changed how often they used public transport**; 12.1% said they used it more, and only 1% said they had started using it because of the discounts. The survey also recorded more than 1.1 billion validations that year and a shift toward subscription titles (T-usual, T-jove). Meanwhile, private-vehicle trips remained stable in absolute terms in 2023 and 2024, and the private-vehicle modal share stood at 34.3% in 2025, compared with 32.5% in 2023. The discounts therefore coincided with greater use of public transport and a shift toward subscriptions, but with little sustained reduction in private-vehicle use (ATM Barcelona, 2023).

Ex-post assessments of new public-transport infrastructure show that additional capacity can attract users and shift some trips from private vehicles, with associated time savings. The Metro L5 extension between Horta and Vall d'Hebron recorded a consolidated weekday demand of 42,300 passengers, above the ex-ante forecast of 33,250, and was estimated to attract 2,538 daily users from private vehicles. User travel-time savings were estimated at 5.7 minutes per passenger, consistent with the original forecast. The FGC interventions to Terrassa and Sabadell achieved consolidated weekday demands of about 21,500 and 17,500 passengers, respectively, and were estimated to capture around 1,613 and 1,575 daily trips from private vehicles (ATM Barcelona, 2021a).

b. Cycling, walking and active mobility

Cycling and active mobility have been promoted through a combination of strategicplanning and implemented infrastructure and services. The Generalitat's cycling program uses a demand-based approach to prioritize corridors with the highest potential for modal shift.

Monitoring data show that these measures are associated with growing cycling use. The Working Day Mobility Survey (EMEF) for the Barcelona metropolitan area reports a **steady increase in active mobility** (walking, cycling and PMVs), **with the share of active modes rising from 46.4% in 2017 to 51.1% in 2023**, and bicycle/PMV trips increasing by 81.7% over the same period.

At network level, the Eco-Counter bicycle-counting system deployed across Catalan municipalities (in addition to Barcelona's own counters) shows a continuous upward trend in cycling flows on newly built or upgraded cycle corridors, confirming higher use of the new infrastructure (Generalitat de Catalunya, 2025c; Observatori de la Mobilitat de Catalunya, 2025).

c. Traffic calming, safety and urban quality of life

Road-safety outcomes in Catalonia have improved substantially over the long term. The Catalan Traffic Service reports an overall reduction of more than 60% in road accidents since the first Catalan Road Safety Plan was introduced in 1999 (Generalitat de Catalunya & Servei Català de Trànsit, 2021).

At Catalonia level, Local Road-Safety Plans have been prepared by 296 municipalities, covering 91.8% of Catalonia's population, and commonly include traffic-calming, speed-management, pedestrian-priority and safer-crossing measures. The evidence demonstrates widespread implementation of traffic-calming-related interventions, suggests that traffic calming improves urban livability through increased walkability, more diverse and social use of public space, improved accessibility and greater perceived tranquility (Ajuntament de Barcelona & Agència de Salut Pública de Barcelona, 2021; Palència et al., 2020).

The strongest empirical evidence comes from the Salut als Carrers (*Health in the Streets*) evaluation of the Poblenou, Sant Antoni and Horta Superblocks in Barcelona. The evaluation combined pre/post health surveys, walkability audits, direct observation of public-space use, interviews, focus groups and environmental measurements (Ajuntament de Barcelona & Agència de Salut Pública de Barcelona, 2021; Palència et al., 2020; Pérez et al., 2025).

The Barcelona Superblocks evaluation provides supporting evidence for these pathways. The walkability audit identified improvements in built-environment attributes that support pedestrian movement and physical activity. Direct observation using the SOPARC protocol showed that the redesigned space was predominantly used for walking. In Poblenou, for example, the share of people walking increased from around 60% before the intervention to 66% after, while the proportion engaging in vigorous physical activity remained low (about 2% before and 6% after). These findings suggest that traffic-calming interventions may first affect routine walking, perceived comfort and everyday outdoor activity; measurable changes in intensive physical activity or longer-term health outcomes require larger interventions and longer evaluation periods (Ajuntament de Barcelona & Agència de Salut Pública de Barcelona, 2021; Pérez et al., 2025).

The same evaluation also recorded environmental, and quality-of-life co-benefits consistent with the mobility measures described above. In the Sant Antoni superblock, monitoring showed a 25% reduction in NO_2 and a 17% reduction in PM_{10} within the intervention area, together with lower noise levels. Residents reported gains in well-being, tranquility, sleep quality, social interaction and perceived safety, particularly among families with children and older people. In Horta, where baseline pollution was already low, no significant changes in pollutant levels were detected, but residents similarly reported improved tranquility and social use of space (Ajuntament de Barcelona & Agència de Salut Pública de Barcelona, 2021; Pérez et al., 2025).

d. Environmental and climate performance

At Catalonia-wide scale, official monitoring shows a sustained improvement in air quality consistent with reduced traffic emissions in urban areas and the rollout of ZBEs. In **2023, for the first time outside the pandemic years, no monitoring station exceeded the annual legal limit for NO_2, and the network-wide average NO_2 level was clearly lower than in 2022** and below the 2015-2019 pre-pandemic average at 98% of stations. Annual limits for PM_{10} were also met across the network, with only one station recording an exceedance of the daily limit. In 2024, all reference values for NO_2, PM_{10} and $PM_{2.5}$ were again met throughout Catalonia, confirming a continued downward trend in traffic-related pollutants (Generalitat de Catalunya, 2024b).

At metropolitan level, Barcelona LEZ provides quasi-experimental evidence. Using data from 29 official Catalan air-quality monitoring stations between 2015 and 2022, a synthetic-control analysis estimated that the introduction of the permanent LEZ was associated with a reduction of up to 7.6 μg/m³ of NO_2 at traffic monitoring stations, equivalent to 15.8%. The estimated effect on PM10 and PM2.5 was smaller, around 1 μg/m³, and less robust (Dos Santos et al., 2026).

iv. Stakeholder and citizen involvement

In Catalonia, citizen and stakeholder involvement in sustainable urban mobility policy is organized through a combination of formal participation processes, **multi-level governance arrangements, sector-specific partnerships and monitoring systems**. Rather than relying on a single participatory mechanism, the system involves citizens and stakeholders at three main stages: the co-design of strategies and plans; the coordinated implementation of measures by public, private and social actors; and formal monitoring and evaluation (ATM Barcelona, 2021a; Generalitat de Catalunya & Servei Català de Trànsit, 2021).

a. Participation in strategic planning

The **National Pact for Safe and Sustainable Mobility 2021–2030** was developed through a participatory process involving public administrations, social and economic actors, mobility and road-safety organizations, and civil society. The process combined six in-person sessions held in November and December 2019 with an online participatory process undertaken in early 2020. This process recognized that sustainable mobility requires contributions from actors working in road safety, transport, urban planning, climate action, public health, education, digitalization and new mobility services (Generalitat de Catalunya & Servei Català de Trànsit, 2021, 2023).

Participation is also incorporated in the preparation of regional and metropolitan mobility instruments. The consultation process for the new **National Mobility Guidelines** allowed citizens and stakeholders to submit online contributions, participate in face-to-face sessions and consult the contributions made during the process (Generalitat de Catalunya, 2022b).

At metropolitan level, the preparation of the **Metropolitan Urban Mobility Plan 2019–2024** (Pla Metropolità de Mobilitat Urbana, PMMU) was accompanied by a parallel participation process involving institutional actors, AMB technical departments, the AMB Mobility Council, an expert committee and social and citizen organizations. The preparation of the new PMMU 2025–2030 includes an expanded process of information, deliberation, evaluation and follow-up through the AMB participation platform (Área Metropolitana de Barcelona, n.d.-a, n.d.-b).

b. Multi-level and cross-sectoral implementation

The implementation of sustainable mobility policy is shared **across multiple levels of government**. The principal public actors include the Generalitat de Catalunya, the Catalan Traffic Service, the ATM, the Barcelona Metropolitan Area, provincial councils, municipalities, local police forces, public transport operators and railway operators. The National Pact explicitly calls for coordination between the Generalitat, supra-local institutions and local authorities to ensure coherent implementation of mobility, road-safety, climate and public-space measures (Generalitat de Catalunya & Servei Català de Trànsit, 2023).

Depending on the policy area, implementation also involves employers, businesses, logistics operators, schools, universities, research organizations, mobility-service providers, professional and sectoral associations, victim associations and civil-society organizations (Generalitat de Catalunya & Servei Català de Trànsit, 2023).

Municipalities and local authorities are the central delivery bodies for measures affecting the urban environment. They translate regional and metropolitan objectives into Urban Mobility Plans, Local Road-Safety Plans, low-emission zones, traffic-calming interventions, walking and cycling networks, public-space redesign, local accessibility measures and public-transport initiatives (Generalitat de Catalunya, 2006c; Generalitat de Catalunya & Servei Català de Trànsit, 2021).

c. Formal adhesion and sectoral partnerships

The **National Pact** provides a formal mechanism through which supra-local and local administrations, as well as public and private organizations, can commit to its objectives. To adhere to the Pact, an entity must express its commitment to the strategic lines, present an existing or proposed action plan that includes relevant measures, and appoint a coordinator. This mechanism links stakeholder participation to practical implementation responsibility rather than only consultation (Generalitat de Catalunya & Servei Català de Trànsit, 2021).

Stakeholder participation is differentiated according to the policy domain. In public transport and intermodality, the ATM, AMB, municipalities, Generalitat departments, FGC, Renfe and other operators participate in planning, financing and delivering infrastructure and services. In traffic calming, low-emission zones and road safety, municipalities, the Catalan Traffic Service, local

police, public health authorities and community organizations are relevant actors. In urban freight, logistics operators and businesses are expected to participate in emission-reduction and last-mile delivery initiatives (Generalitat de Catalunya & Servei Català de Trànsit, 2021).

Workplace mobility is addressed through **Company Travel Plans** (Plans de Desplaçaments d'Empresa, PDEs), which involve employers and employees in identifying commuting patterns and implementing measures related to public transport, cycling, walking, carpooling, parking management and work organization. The ATM methodology requires worker participation in PDE preparation, alongside implementation monitoring and periodic plan review (ATM Barcelona, 2025d, 2025c).

The **Catalan Cycling Strategy** also relies on voluntary multi-actor cooperation. The Strategy was designed for adhesion by administrations, institutions, companies and organizations; by 2026, 34 entities had joined and were implementing program or actions within their respective competences (Generalitat de Catalunya, 2026d).

School mobility involves education centers, pupils, families, municipalities, local police and road-safety actors. The Catalan School Mobility Action Plan promotes coordination, training, safer school access and more sustainable travel patterns between homes and schools (Generalitat de Catalunya, n.d.-a, 2020a).

d. Monitoring, evaluation and accountability

The National Pact establishes formal monitoring and accountability structure. The **Interdepartmental Commission for the Improvement of Road Safety** (*ICIRS*) is responsible for monitoring progress in implementing the Pact's strategic lines every three years. The monitoring process draws on sectoral action plans and on information regarding the actions undertaken by public and private entities that have adhered to the Pact. A follow-up report is expected to assess achievement of the Pact's objectives and analyse the measures implemented under its strategic lines (Generalitat de Catalunya & Servei Català de Trànsit, 2021).

Major infrastructure and mobility plans use data and appraisal systems to inform prioritization and evaluation. The **Public Transport Infrastructure Master Plan 2021–2030** (*pdI*) uses mobility surveys, transport-demand matrices, mobile-phone data, environmental assessment, cost–benefit analysis and life-cycle assessment. It also includes implementation milestones for 2025 and 2030 and is subject to participatory and environmental assessment procedures (ATM Barcelona, 2021a).

The Public Transport Infrastructure Master Plan 2021–2030 also incorporates ex-post evaluation of completed interventions, comparing forecast and observed demand, investment expenditure and operating costs. This provides evidence for future planning and indicates that infrastructure

outcomes depend on demand, land-use context, service integration and cost control (ATM Barcelona, 2021a).

e. Inclusion and representativeness

Catalan mobility policy gives explicit attention to universal accessibility, gender equality and the needs of vulnerable users. The National Pact identifies older people, children, people with disabilities, pedestrians, cyclists, motorcyclists and users of personal mobility vehicles as priority groups. It also recognizes that women and men can have different travel patterns and that planning should take account of daily trip chains, travel time, accessibility and perceived safety (Generalitat de Catalunya & Servei Català de Trànsit, 2021).

The Public Transport Infrastructure Master Plan 2021–2030 incorporates social inclusion, gender and accessibility among its planning objectives. It aims to improve access to employment, ensure equitable use of public space and public transport, and provide conditions enabling people with functional diversity to use the transport system (ATM Barcelona, 2021a).

v. Main challenges and future policy priorities

Table 5. Main challenges and future policy priorities

Challenge	Future policy priority	Source
High road-transport emissions, air pollution and noise	Accelerate modal shift, vehicle electrification, fleet renewal, low-emission zones, cleaner passenger and freight fleets, and traffic management to reduce local pollutants and noise exposure.	(Generalitat de Catalunya & Oficina Catalana del Canvi Climàtic, 2024; Generalitat de Catalunya & Servei Català de Trànsit, 2021)
Persistent car dependence, particularly outside dense urban areas	Deliver reliable, frequent and affordable public transport; bus-priority infrastructure; rail modernization; interchanges; park-and-ride; secure bicycle parking; shared mobility and workplace travel measures. The poor quality of the Rodalies service, particularly in terms of reliability and delays, currently represents a significant barrier to modal shift in metropolitan mobility. The interurban bus network should be redesigned to better meet the needs of the new demand patterns.	(ATM Barcelona, 2021a; Generalitat de Catalunya & Servei Català de Trànsit, 2021)
Fragmented cycling and walking networks	Complete safe, continuous active-mobility corridors; remove road and rail barrier effects; integrate cycling with public transport and traffic-calming schemes; implement the 266.5 km cycling program for 2026-2030.	(Generalitat de Catalunya, 2023b, 2026d)
Road-safety progress	Extend traffic calming and 30 km/h environments; improve street design, crossings, enforcement, risk data and education; prioritize vulnerable road users.	(Generalitat de Catalunya & Servei Català de Trànsit, 2021)

Accessibility and equity gaps	Embed universal accessibility, gender equality, affordability, perceived safety and inclusive design in transport and public-space policies.	(ATM Barcelona, 2021a; Generalitat de Catalunya & Servei Català de Trànsit, 2021)
Integration between transport, land use and services	Integrate Mobility Generation Assessment Studies, Urban Mobility Plans, workplace accessibility, Company Travel Plans and spatial planning for new developments and activity areas.	(Generalitat de Catalunya, 2003, 2006a; Generalitat de Catalunya & Servei Català de Trànsit, 2021)
Digital and technological transition	Expand T-mobilitat, real-time multimodal information, interoperable and open data, MaaS and intelligent transport systems, while preventing digital exclusion and ensuring public data governance.	(Generalitat de Catalunya, 2026e; Generalitat de Catalunya & Servei Català de Trànsit, 2021)
Road-dominated freight and urban logistics	Increase rail–road–port intermodality; develop rail freight terminals; support zero-emission last-mile delivery; and deploy digital logistics tools.	(Generalitat de Catalunya, 2026e)
Funding and financing of public transport	The farebox recovery ratio in 2025 was of 33% and back in 2017 it was at 46%. Funding should be diversified so it does not rely on public administration funding only.	(ATM Barcelona, 2021a; Generalitat de Catalunya, 2026e)

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4. Chile[49]

Parliamentary Technical Advisory (ATP) of the Library of the National Congress of Chile

i. Main legislative, policy and strategic frameworks governing sustainable urban mobility

Please describe the main national, regional and local policies, plans or regulatory instruments currently in force, as well as the authorities responsible for their development and implementation.

Chile's sustainable urban mobility policy rests on a multi-layered legal architecture that combines general transport regulation, binding climate and energy targets, urban-planning standards, permanent financing mechanisms and mode-specific rules, coordinated across several national ministries and implemented through metropolitan and regional bodies.

The core institutional framework for public transport is set by **Law No. 18.059** (1981), which designates the Ministry of Transport and Telecommunications (**MTT**) as the national authority for traffic and transport. This is complemented by **Law No. 18.696**, which regulates remunerated public passenger transport and road-use concession tenders, and by **Supreme Decree No. 212/1992**, which establishes the regulatory framework for national public passenger transport services. Together these instruments allow the State to incorporate environmental, technological, energy-efficiency, safety and service-quality requirements directly into public transport tenders and contracts. In Santiago these powers are exercised by the **Metropolitan Public Transport Authority (DTPM)**, which plans, tenders, regulates and supervises the RED Movilidad system; in the rest of the country, they are exercised by the **Regional Public Transport Division (DTPR)**, which adapts national instruments to the needs of each territory.

[49] Authors: The information contained in this report is a compilation, prepared by the Parliamentary Technical Advisory Service of the Library of the National Congress of Chile, of the findings presented by the research centers CATLEC (Center for Advanced Transportation, Logistics and Economic Competitiveness) and CEDEUS (Center for Sustainable Urban Development), as part of a collaborative process between the Parliamentary Technical Advisory Service of the Library of the Chilean National Congress and the main publicly funded scientific research centers supported by the National Research and Development Agency of Chilean Government.
CATLEC, Center for Advanced Transportation, Logistics and Economic Competitiveness, is a research center of national interest based in Chile and funded by the National Research and Development Agency (ANID). Led by Pontificia Universidad Católica de Chile and Universidad Andrés Bello, in partnership with Universidad de los Andes and Universidad de Concepción, CATLEC conducts applied research to enhance the competitiveness, sustainability, and inclusiveness of Chile's transport and logistics systems.
Its research focuses on four main areas: national logistics competitiveness, food logistics, smart urban logistics, and transport systems for livable and competitive cities. Through close collaboration with academia, government, industry, and international partners, CATLEC seeks to generate evidence, develop innovative solutions, inform public policy, and facilitate knowledge and technology transfer to address key transport and logistics challenges.https://catlec.cl/
CEDEUS, Center for Sustainable Urban Development, is a research center of national interest based in Chile and funded by the National Research and Development Agency (ANID). Founded in 2013 and led by Pontificia Universidad Católica de Chile and Universidad de Concepción, in partnership with Universidad de La Frontera and Universidad Austral de Chile, CEDEUS conducts interdisciplinary research to improve the sustainability, equity, and quality of life of Chilean cities.
Its research focuses on four main areas: healthy watersheds, resilient built environments, just and cohesive cities, and just and efficient mobility. Through close collaboration with academia, national and local governments, civil society, and the private sector, CEDEUS seeks to generate evidence, strengthen sustainable urban development policy and practice, and translate scientific knowledge into public policies, regulations, and territorial interventions to address Chile's key urban challenges.https://www.cedeus.cl/

Financing rests on **Law No. 20.378** (2009), which created the National Subsidy for Remunerated Public Passenger Transport and has since been renewed and expanded through **Law No. 21.692**, guaranteeing subsidies for public transport in Santiago and the rest of the country for eight years (until 2032), with regional governors managing half of the funds allocated outside the capital. By partly separating the risks associated with service provision from those linked to asset investment, this financial architecture has been instrumental in enabling new electromobility business and contracting models. It is complemented by the **Law on Contributions to Public Space (Law No. 20.958)**, which requires real-estate developers to fund local infrastructure through **Communal Investment Plans for Mobility and Public Space (PIIMEP)**, although, as discussed under question 5, the scale and territorial distribution of these funds remain limited.

Urban mobility policy is also bound to Chile's climate and energy commitments. The **Framework Law on Climate Change (Law No. 21.455)**, which followed the country's 2015 Nationally Determined Contribution and its subsequent carbon-neutrality-by-2050 target, establishes the national climate governance structure and, under Article 8, mandates Sectoral Mitigation Plans for the MTT, the Ministry of Public Works (MOP) and the Ministry of Housing and Urbanism (MINVU), binding urban mobility targets to national decarbonization goals. For the transport sector specifically, these commitments are translated into the Long-Term Climate Strategy, successive NDCs and the Transport Sector Climate Change Mitigation and Adaptation Plan, while the National Energy Policy 2050 and **Law No. 21.305** on Energy Efficiency add further conditions for more efficient and progressively decarbonized transport energy use.

Two national strategies operationalize these commitments. The **National Sustainable Mobility Strategy (ENMS)** provides a long-term roadmap to 2050 structured around seven strategic goals and thirty actionable measures, coordinating ministries and local authorities and directing financing toward sustainable transport and urban-planning projects; it frames electromobility as one component of a broader avoid-shift-improve approach that also promotes active mobility, energy efficiency and more sustainable use of urban space. The **National Electromobility Strategy (ENE)**, first issued in 2017 and updated in 2021 and again in 2026 (National Electromobility Strategy 2030), sets clear fleet-transition milestones, including the requirement that 100% of new sales in urban public transport and light-to-medium private vehicles be zero-emission by 2035, supported by regulatory standards under the Energy Efficiency Law and targeted deployment of charging infrastructure.

Urban planning and active mobility are governed by a separate but related set of instruments. The **National Urban Development Policy (PNDU)** is the overarching framework for equity, spatial integration and sustainability in urban planning; although the current policy dates from 2014, the National Council for Territorial Development (CNDT) prepared an update during 2024-2025 through a nationwide participatory process and Strategic Environmental Assessment, which was approved by the Interministerial Commission for City, Housing and Territory (COMICIVYT) in

December 2025 but remains pending final presidential adoption after the incoming administration requested further review. The **General Ordinance of the General Law of Urban Planning and Constructions (OGUC, Decree No. 47)** sets the mandatory physical design standards for active mobility and universal accessibility, including sidewalk dimensioning (Article 2.2.8), accessible-route requirements (Article 2.3.2 bis) and technical standards for cycleways (Article 3.2.5).

Active mobility is further regulated by the **Road Coexistence Law (Law No. 21.088)**, a paradigm-shifting 2018 amendment to the Traffic Law that formally recognizes bicycles and other cycles as legitimate transport modes, standardizes their place on the road and reduced urban speed limits to 50 km/h; it was subsequently complemented by an updated Traffic Signage Manual and cycle-lane regulations. **Supreme Decree No. 102** establishes mandatory technical and safety standards for active-mobility infrastructure, operationalized through SECTRA's 2024 Cycle-Inclusive Road Design Guide, while the **Traffic-Calmed Zones Program**, coordinated by the National Road Safety Commission (CONASET) and MINVU under Article 146 of the Traffic Law and the Road Coexistence Law, empowers local authorities to introduce 30 km/h zones, physical traffic-calming measures and pedestrianization.

Finally, the **Gender Equity Policy in Transport 2023-2026** (MTT) incorporates a gender perspective into public transport planning, infrastructure design and mobility safety, targeting structural inequalities in personal safety, care-related mobility, accessibility and workforce representation. Taken together, this framework of binding climate mandates, permanent financing instruments, transport- and urban-planning regulation and multilevel institutional coordination among the MTT, DTPM, DTPR, MINVU, the Ministry of Energy and the Ministry of the Environment provides the backbone of Chile's sustainable urban mobility policy; the institutional governance arrangements that operationalize it are described further under question 4.

ii. Sustainable urban mobility measures implemented in recent years

Please refer, where applicable, to public transport, active mobility (walking and cycling), shared mobility, micromobility, low-emission zones, mobility pricing schemes, electrification, intelligent transport systems or other relevant initiatives.

In recent years Chile has moved from isolated pilot initiatives to a progressive, multimodal transformation of urban transport, combining large-scale bus electrification, the expansion of mass and rail transit, active-mobility infrastructure, fare and payment integration, and intelligent transport systems. Santiago is the main expression of this process, but it has progressively extended to regional cities.

Electrification of public transport is the largest-scale and most visible measure. The process began in 2017 with the first National Electromobility Strategy and the first electric-bus pilot in Santiago; the fleet then grew from 992 electric buses in March 2022 to 3,849 by the end of 2025 (about 58% of the operating fleet), with a projection of roughly 4,400 units, or approximately 68% of the fleet, by March 2026 (Metropolitan Public Transport Authority [DTPM], 2025; 2026). This has been accompanied by a rapid expansion of charging infrastructure: RED Movilidad had 73 terminals by the end of 2025, of which 45 (61%) were electroterminals, distributed across 15 municipalities of Greater Santiago, up from the system's first electroterminals in 2018. The transition is also expanding to the regions, with nearly 400 electric buses already operating in cities such as Arica, Iquique, Antofagasta, Copiapó, La Serena-Coquimbo, Valparaíso-Viña del Mar, Rancagua-Machalí, Concepción, Temuco and Puerto Montt, and pilot programs being scaled up in regional capitals including Concepción, Copiapó and Antofagasta. New electric buses incorporate air conditioning, USB chargers, security cameras, connectivity and universal-accessibility features, and the fleet has also been complemented by double-decker buses that increase capacity on high-demand corridors.

Mass and rail transit have expanded substantially alongside electrification. Metro de Santiago opened Line 6 in 2017 (10 stations, 15 km) and Line 3 in 2019, followed in 2023 by the extension of Line 2 to El Bosque and San Bernardo and of Line 3 to Quilicura, benefiting approximately 271,000 residents; Line 7 is now under construction to traverse the city east-to-west, and future Lines 8 and 9 will extend coverage to historically underserved areas such as La Pintana and Bajos de Mena. Metro now sources 60% of its electricity from wind and photovoltaic generation. Suburban and regional rail have also advanced: the Nos-Estación Central Train (2017) integrated southern municipalities into the fare system; new services connecting Santiago with Melipilla/Batuco are under construction and the Llanquihue-Puerto Montt service has been implemented, while extensions in Greater Valparaíso and Concepción are in the engineering-design phase; EFE notes that rail can generate up to 75% fewer CO2 emissions than other transport modes. The **Bicentennial Cable Car (Teleférico Bicentenario)**, Santiago's first public-transport cable car, is scheduled to begin operating in the first quarter of 2027 with 121 cabins (10 passengers each) and a capacity of up to 6,000 passengers per hour in both directions, cutting a roughly 45-minute car journey to about 13 minutes; similar aerial-transit projects are in engineering design for Iquique-Alto Hospicio, Talcahuano and Puerto Montt.

Fare and payment integration has deepened through RED Movilidad, which physically and financially integrates buses, Metro and the Nos Train under a common payment system, and through the digitalization of ticketing via bip! QR and DaleQR! with gradual bank-card payment on Metro and the Nos Train beginning in March 2026. Smart transit payment systems have also spread to Temuco, Antofagasta, Copiapó and La Serena, with Concepción and cities in the Los Lagos region expected to follow.

Active mobility has been promoted through a coordinated push to redesign urban space in favor of cyclists and pedestrians: approximately 500 kilometers of high-standard, segregated bike lanes have been built nationwide over the past four years, with a further 1,500 kilometers in different technical design phases. Flagship projects include the New Alameda Providencia, where a car lane on Santiago's main avenue was converted into a segregated cycle track (the first four-kilometer phase is heavily used, while the second phase was suspended), and the Mapocho Urban Corridor, which will add a cycle path and promenade along the Mapocho riverbed from 2027 to complement the existing Mapocho 42K riverside route.

Intelligent transport systems now integrate fleet management, passenger information, scheduling, ticketing and data governance across RED Movilidad. The Red Movilidad app lets users check routes and arrival times, top up balances and pay by QR code, and includes real-time safety features such as "Comparte tu viaje," which allows a passenger to share their trip details with a third party. In 2025 a video-surveillance system began operating on 1,600 buses, improving real-time incident response.

iii. Evidence regarding the impact of these measures on mobility patterns, citizens' behavior, and urban quality of life

Please provide, where available, data, studies or assessments concerning modal shift, accessibility, congestion, environmental performance, safety, public acceptance or social inclusion.

The available evidence — strongest for Santiago, where the scale of electromobility deployment allows system-wide assessment — points to measurable impacts on modal shift, environmental performance, safety, service quality, territorial equity and social inclusion, even as private car dependency continues to grow in parallel.

On **mobility patterns and demand**, the SECTRA Origin-Destination Survey (2012) provides the baseline for Santiago, recording 18.46 million daily trips, of which 5.37 million were by public transport, 5.86 million by private transport and 6.36 million on foot. More recent household mobility surveys (Hurtubia, Waintrub & Raveau, 2024a; Hurtubia, Medina de Cortillas & Carrasco, 2025) show a sustained shift toward cycling, whose share of daily trips roughly doubled over twelve years, from 4% to about 8% in Santiago and from 2% to 4% in Concepción. At the same time, RED Movilidad recorded more than 686 million bus transactions in 2025, an increase of 37.9% since 2022 — evidence of the recovery and strengthening of public transport use, although this growth cannot be attributed to electromobility alone, since post-pandemic recovery and changes in supply and fares are also contributing factors. Private-vehicle motorization rates continue to rise despite these gains, and public transport ridership is largely plateauing rather than capturing the growing mobility market.

On **environmental performance**, DTPM's Second Electromobility Report finds that, between 2018 and 2025, the replacement of diesel buses with electric vehicles reduced local NOx emissions associated with public transport by 93.6% and fine particulate matter (PM2.5) emissions by 74.4%. DTPM estimates that RED buses now account for only about 3.3% of transport emissions in Santiago, with roughly 90% coming from private cars and motorcycles — indicating that, while electrification of public transport delivers important local benefits, comprehensive decarbonization of urban mobility will also require action on private-vehicle use and a broader modal shift. These environmental gains are corroborated at the corridor level: along the Alameda corridor in central Santiago, electric bus operation has been linked to slight but significant reductions in local PM2.5 and ambient noise pollution (Pareja, 2026), and the Second Electromobility Report documents noise reductions of up to 64% along Alameda and 54% along Santa Rosa during peak hours, along with a case study of the Diego Portales electroterminal in La Florida showing an approximately 60% reduction in noise and a 33.5% decrease in particulate matter, together with a positive assessment by local residents.

On **road safety**, data from the Library of the National Congress (BCN) show that, between 2002 and 2023, the cyclist crash rate per 100,000 inhabitants fell by 52% and the cyclist mortality rate by 78%, reflecting the combined effect of better infrastructure and stronger road-safety regulation for active-mobility users.

On **service quality and citizen acceptance**, the 2025 Public Transport System Satisfaction Survey recorded ratings of 5.7 out of 7 for regularly used routes and 5.5 for the system as a whole — the highest since the measurement began in 2013 — with more than half of respondents rating the system 6 or 7 and 62% giving the same rating to their regular route; these results are attributed in part to onboard improvements such as air conditioning, Wi-Fi, USB chargers, security cameras and universal-accessibility features.

On **territorial equity**, the expansion of the electric fleet has begun reaching municipalities with historically larger service gaps: the Second Electromobility Report projects that more than 90% of the fleet serving Lo Espejo, Puente Alto, Maipú and El Bosque will meet the RED standard, indicating that electromobility is no longer confined to higher-income corridors. INE's Urban Development Indicators and Standards System (SIEDU) explicitly tracks access to public transport and sustainable modal split as dimensions of urban quality of life.

On **social and gender inclusion**, the number of women bus drivers grew from 959 in early 2022 to 2,402 in January 2026 — an increase of roughly 150% — reaching 2,476 in the first quarter of 2026, supported directly by DTPM's Women Drivers Program, which combines training with employment placement.

Finally, electrification has also generated **economic efficiencies**: DTPM estimates that electric buses are approximately 66% more energy-efficient and have roughly 44% lower maintenance

costs than diesel buses, together generating estimated fiscal savings of around US$60 million per year, evidence that the energy transition can deliver environmental and economic benefits simultaneously.

iv. Involvement of citizens and stakeholders in the planning, implementation and evaluation of sustainable urban mobility policies

Please describe consultation mechanisms, participatory processes, public engagement initiatives and any assessment of societal needs and expectations.

Chile channels citizen and stakeholder participation in mobility policy through a combination of institutionalized legal mechanisms, permanent advisory bodies, project-level environmental consultation, and ad hoc participatory processes tied to major reforms and tenders, operating at national, metropolitan, regional and local levels.

The legal basis is **Law No. 20.500** on associations and citizen participation in public administration, under which the MTT developed a 2022 Citizen Participation Manual with a gender and inclusion approach and, in 2023, an updated Citizen Participation Standard Formalizing Civil Society Councils, consultations, dialogues, community assemblies, public hearings and participatory budgets. **Civil Society Councils (COSOC)** operate at municipal, regional (regional governments) and national (ministerial) levels; although their role is strictly consultative and non-binding, they remain the primary institutional channel for continuous civil-society engagement in the design of local initiatives, regional plans and regulatory proposals.

At the operational level, DTPM's **"Creando Redes"** program (2022) plans the extension of bus routes and new services together with local residents, and DTPM routinely holds localized dialogues with neighborhood councils to plan, adjust and evaluate routes. The **"¿Qué te mueve?"** process (2023) gathered input from approximately 15,300 people through surveys, together with 20 community dialogues and workshops involving older people, people with disabilities, caregivers, students, migrants, children and adolescents, drivers, and organizations linked to gender and mobility; this input directly informed the design of the 2023 RED Movilidad tender specifications. Participation is complemented by continuous evaluation of the user experience through DTPM's satisfaction and perception surveys, whose 2025 results — historic ratings of 5.7 for routes and 5.5 for the system — demonstrate the systematic use of citizen perception as a management input.

Participatory processes also operate at the **regional level**: DTPR recorded 157 participatory activities between January 2022 and January 2026, with more than 55,000 participants nationwide, including "El transporte que queremos" in Greater Valparaíso, which used dialogues and citizen consultations across five municipalities of Region V to inform the preparation of new transport-system tender documents. At the planning-methodology level, SECTRA's guide for

preparing Metropolitan Urban Transport Master Plans (PMTUM) — developed within the decentralization framework of **Law No. 21.074** — engages civil society and community organizations, private-sector stakeholders and transport associations, academia, research and technical-training centers, and international cooperation agencies from the diagnostic stage through validation of the final plan.

For major infrastructure projects such as Metro Line 7, suburban-rail extensions and the Bicentennial Cable Car, public involvement is channeled through the formal Citizen Participation (PAC) process within the Environmental Impact Assessment system (SEIA), which allows residents to review technical studies, raise concerns and request modifications regarding construction and operational impacts; while some of these processes have begun earlier in project design to improve acceptability, the mechanism remains an ex post, non-binding tool focused primarily on mitigating local impacts.

Beyond these standing mechanisms, two episodes illustrate deeper, deliberative engagement. The drafting and passage of the **Road Coexistence Law** is considered a landmark case of grassroots legislative advocacy, in which an extensive, multi-year participatory process led by cycling advocates, urban collectives and road-safety NGOs directly shaped and co-designed the final legislative text. Similarly, the 2024-2025 update of the **National Urban Development Policy (PNDU)** involved a nationwide deliberative process with nearly 2,000 participants, combining online surveys, citizen dialogues and workshops with public officials, municipalities, NGOs and scholars, university panel discussions, technical deliberations within the CNDT Urban Commission, and formal inputs under the Strategic Environmental Assessment framework.

Finally, participation extends to the scientific and technical community: coordinated work with academia and continuous knowledge transfer — particularly through research centers such as **CATLEC** and **CEDEUS** — is a recurring feature of Chile's approach, feeding evidence and territorial diagnostics into the planning, implementation and evaluation of mobility policy.

v. Main challenges and future policy priorities in relation to sustainable urban mobility

As Chile enters a new stage of policy consolidation, the central challenge is no longer solely to accelerate electrification but to decentralize its benefits, secure enabling infrastructure, advance equity and resilience, and strengthen the institutional and technical capacities needed to sustain the transition — against a backdrop of structural urban-form and equity dynamics that continue to constrain the societal reach of sustainable mobility gains.

Institutional resilience and continuity are a first-order challenge. Urban mobility policy remains vulnerable to political cycles: frequent changes in national and municipal administrations have repeatedly reprioritized, halted or delayed advanced infrastructure plans, as illustrated by the

PNDU update's pending presidential adoption, underscoring the need for more robust, depoliticized institutions capable of sustaining long-term strategies across political terms. A related **metropolitan governance deficit** — urban planning fragmented across dozens of independent municipalities in Santiago, Valparaíso and Concepción — hinders the delivery of continuous mobility networks, and establishing empowered, unified metropolitan transport authorities remains an unresolved legislative discussion. This is compounded by **sectoral and multi-level fragmentation**: transport policy sits with the MTT, major road infrastructure with MOP, and housing and zoning with MINVU, with weak alignment to the Ministry of Environment on climate action and to the health and education ministries on active travel to school and public health, alongside a broader lack of coordination across central, regional and municipal governance levels that hinders transit-oriented development and equitable spatial accessibility.

Funding limitations and spatial inequities also constrain progress. The Law on Contributions to Public Space (Law No. 20.958) created a localized financing mechanism through developer contributions (PIIMEP), but the resources it generates remain modest overall, leaving local mobility investment heavily dependent on central sectoral funds and the National Regional Development Fund (FNDR); because contributions scale directly with real-estate activity, high-growth, higher-income municipalities capture disproportionately more revenue, worsening spatial inequality across cities. At the national scale, a **decentralization and Santiago-regions gap** persists: Santiago's electric fleet (3,849 buses, or 58% of its fleet, as of December 2025, with roughly 4,400 buses, or 68%, projected during 2026) far outpaces the regions, and the public charging network of electroterminals and chargers remains heavily concentrated in the capital, limiting interurban connectivity and the viability of electromobility elsewhere — even as individual regions make progress, such as Copiapó's fully electric fleet of 121 buses.

Charging infrastructure and energy resilience require moving from isolated projects to an interoperable, accessible and territorially balanced national network; the availability of public fast chargers on highways and in municipal parking remains limited. The Ministry of Energy's June 2026 Public Charging Infrastructure Master Plan and the updated National Electromobility Strategy 2030 both reinforce charging infrastructure as a precondition for mass EV adoption, while the Superintendency of Electricity and Fuels updated Technical Regulatory Specification RIC No. 15 addresses safety, interoperability and grid-integration requirements for public and private chargers. The projected growth in electricity demand from EV charging will also require accelerated modernization of medium- and low-voltage distribution networks, together with smart-metering and demand-management mechanisms, to avoid overloads at peak hours.

Economic accessibility and equity in the transition itself remain a concern: upfront investment (CAPEX) barriers still constrain the electrification of taxis, shared taxis and small operators, and financing and fleet-renewal mechanisms will need to be strengthened to prevent electromobility from concentrating among better-capitalized operators. A parallel challenge concerns the **circular**

economy and battery life cycle: Chile's growing EV fleet introduces a new regulatory agenda around battery reuse, second-life applications, recycling, traceability and final disposal; batteries are already recognized as a priority product under the Extended Producer Responsibility (REP) Law, and further studies are needed given Chile's position as a leading global lithium producer. More broadly, the net environmental benefit of electromobility still depends on accelerating the phase-out of coal-fired generation so that charging electricity becomes fully renewable.

Sustaining the transition also requires investment in **human capital, regulation and technical standards** — specialized training in high-voltage systems, electric-powertrain maintenance, electrical safety, emergency response and charging-infrastructure management, together with continuously updated standards for chargers, vehicle-to-charger communication, residential installations and safety, an agenda the Superintendency of Electricity and Fuels and the Ministry of Energy are already advancing through the RIC No. 15 update. **Resilience, safety and regulatory adaptation** round out the operational agenda: DTPM has incorporated monitoring systems, cameras and real-time information tools and identifies a Resilience Plan against extreme weather, power disruptions, emergencies and vandalism as a priority line of work, while regional systems are adopting GPS and camera-based controls. An emerging issue is the regulatory framework for converting internal-combustion vehicles to electric propulsion (retrofit): **Law No. 21.793**, published in January 2026, empowers the MTT to authorize conversion workshops, and a near-term priority is to issue the implementing regulation — covering technical requirements, authorization procedures, safety conditions, certification and enforcement — which could support a more gradual and territorially inclusive transition by extending the useful life of existing fleets.

Beyond the electromobility-specific agenda, structural **urban-form and equity dynamics** remain a central constraint. Decades of urban growth have taken place substantially through sprawl (Schuster Olbrich et al., 2022), producing large peripheral areas that are dependent on the car for everyday mobility and intensifying the socio-spatial segregation already present in the consolidated city (Cox & Hurtubia, 2016; 2021). Nationwide car use continues to grow despite improvements in the quality of alternative modes, generating congestion, pollution, noise and fatalities, and indirectly limiting children's independent mobility (Waintrub, Jones & Tyler, 2025) — a problem exacerbated by continued low-density, car-dependent development on urban peripheries (Blandin et al., 2024; Hurtubia et al., 2024b). The quality of walking environments (Tiznado-Aitken et al., 2018; Herrmann-Lunecke et al., 2020), public space (Rossetti et al., 2019; Ramirez et al., 2021), cycling infrastructure (Mora et al., 2021; Tiznado-Aitken et al., 2022a) and public-transport-based access to opportunities (Tiznado-Aitken et al., 2021; 2022b) remains highly heterogeneous across the city and frequently correlates with zonal income.

Mobility policy has also historically centered on work-related trips made by adults (Figueroa Martínez et al., 2018), a focus that has left gaps in planning, design and construction for other

populations — children, adolescents and older people, among others — which is particularly significant given Chile's aging population (Herrmann-Lunecke et al., 2026); this reinforces structural barriers that limit the mobility of neglected groups (Waintrub & Figueroa-Martínez, 2024; SOCHITRAN, 2025) and leaves gaps in addressing care-related trips specifically (Jirón, Carrasco & Rebolledo, 2020).

Looking ahead, both centers converge on similar **future policy priorities**: addressing the unequal distribution of high-quality mobility infrastructure by prioritizing investment in peripheral and lower-income neighborhoods; integrating climate adaptation, resilience and public-health objectives directly into transport and streetscape design, so that cycleways and pedestrian networks incorporate nature-based solutions such as sustainable urban drainage and shade canopies to protect users from extreme heat; and decentralizing the benefits of electromobility while strengthening the institutional and technical capacities needed to sustain the transition. Strengthening collaboration with research and specialized knowledge centers such as **CATLEC** and **CEDEUS** is identified as a priority in itself, given their role in generating evidence, developing innovative solutions and transferring knowledge to support the design, implementation and evaluation of public policy.

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5. European Parliament[50]

Panel for the Future of Science and Technology (STOA) for the European Parliament

Preliminary note on STOA contribution

While the EPTA template is designed for national contributions describing country-specific developments, STOA contribution provides an overview of EU-wide policies, stats, trends, and relevant positions of the European Parliament. It is important to note that competences over urban mobility are mainly with Member States, regions and cities. The EU's role is indirectly exercised through funding, technical guidance and framework legislation.

i. Main legislative, policy and strategic frameworks governing sustainable urban mobility atEU-level

a. EU-level strategic framework

The Sustainable and Smart Mobility Strategy (SSMS)[51] sets out the vision for the transformation of the EU transport system including the target of a 90% reduction in transport greenhouse gas emissions by 2050. SSMS accompanying action plan lists 82 initiatives grouped in ten 'flagship' areas, several of which are directly linked to urban mobility.

In parallel, the EU Urban Mobility Framework[52], specifically targets cities and urban areas. It introduces the Sustainable Urban Mobility Plans (SUMPs)[53], links urban mobility to the Trans-European Transport Network (TEN-T)[54] urban-node concept and defines a set of Urban Mobility Indicators (UMI) intended to make city mobility systems comparable across the Union.

b. Regulatory and funding instruments

Two binding instruments directly implement the EU strategic framework on urban transport:

- The revised TEN-T Regulation[55] introduces 431 urban nodes across the European transport network and requires each node to adopt and monitor a SUMP covering its urban area.
- The Alternative Fuels Infrastructure Regulation (AFIR)[56] sets out binding national deployment targets for recharging and refueling infrastructure, including in the urban nodes.

There is substantial EU funding available for sustainable urban mobility projects and initiatives, in particular through Cohesion policy funds, the Recovery and Resilience Facility (RRF) and the

[50] Author: Vasco Guedes Ferreira
[51] https://transport.ec.europa.eu/transport-themes/mobility-strategy_en
[52] https://transport.ec.europa.eu/transport-themes/urban-transport/sustainable-urban-mobility_en
[53] https://transport.ec.europa.eu/transport-themes/urban-transport/sustainable-urban-mobility-planning-and-monitoring_en
[54] https://transport.ec.europa.eu/transport-themes/infrastructure-and-investment/trans-european-transport-network-ten-t_en
[55] https://eur-lex.europa.eu/eli/reg/2024/1679/oj/eng
[56] https://eur-lex.europa.eu/eli/reg/2023/1804/oj/eng

European Investment Bank[57]. For example, the current (2021-2027) cohesion policy programming allocated around €18 billion for investment in measures such as light rail, metro and tramlines, walking and cycling infrastructure, multimodal hubs, non-fossil bus fleets and digital traffic[58]. In the RRF, transport accounts for approximately €87 billion, with urban mobility accounting for about € 27 billion (including rolling stock). In addition, from 2012-2022 the EIB loaned an average of €10-11 billion for transport projects in the EU per year, and around 37% went specifically for urban areas[59]. "The InvestEU Sustainable Infrastructure Window provides an EU budgetary guarantee of €10 billion to de-risk sustainable-infrastructure projects, including clean mobility, smart infrastructure and logistics[60]. Also important to note that between 2021 and 2025, Horizon Europe allocated almost €430 million to urban mobility research and innovation projects[61].

c. Governance and planning frameworks

Sustainable Urban Mobility Plans (SUMPs) remain the main planning tool for urban mobility at EU-level. However, their quality varies considerably between cities. The European Court of Auditors found administrative capacity, fragmented competences between levels of government, and slow updating of older plans to be recurring weaknesses of SUMPs[62]. The 2024 TEN-T revision responds to this in part by making SUMP adoption binding for the designated 431 urban nodes. The deadline for the submission of SUMPs and accompanying UMIs is 31 December 2027.

ii. Sustainable urban mobility measures implemented in recent years

a. Public transport

Public transport reached 939 billion passenger-km in 2023 (about 15.8% of total passenger transport), with bus, rail and tram/metro traffic all growing between 2022 and 2023.[63] These networks have continued to expand in EU cities supported by EU and national funding instruments. Bus fleet renewals are increasingly focused on zero-emission vehicles. In 2025, around 60% of new EU city buses were zero-emission (roughly 56% battery-electric and 4% fuel-cell)[64]. However, the overall circulating bus fleet remains mostly diesel. In 2024, battery-electric buses represented only about 3% of EU buses, with hybrids at around 2.6% and diesel still accounting for nearly 89%[65].

[57] https://www.europarl.europa.eu/RegData/etudes/STUD/2026/783532/CASP_STU(2026)783532_EN.pdf
[58] https://ec.europa.eu/regional_policy/sources/reports/2021-2027-programming-outcome/report-outcome-2021-2027-cohesion-policy-programming-part1.pdf
[59] https://www.eib.org/attachments/lucalli/20230266_sustainable_transport_overview_2023_en.pdf
[60] https://investeu.europa.eu/investeu-programme/investeu-fund/about-investeu-fund_en
[61] https://cinea.ec.europa.eu/news-events/news/urban-mobility-days-2025-driving-forward-urban-mobility-transformation-2025-10-08_en
[62] https://www.eca.europa.eu/lists/ecadocuments/sr20_06/sr_sustainable_urban_mobility_en.pdf
[63] https://www.eea.europa.eu/en/analysis/publications/sustainability-of-europes-mobility-systems-2025/passenger-transport-activity
[64] https://www.transportenvironment.org/articles/past-the-inflection-point-electric-now-clearly-dominates-the-city-bus-market
[65] https://www.sustainable-bus.com/news/acea-electric-buses-2024-circulating-eu-fleet/

b. *Active mobility (walking and cycling)*

Many cities converted temporary pandemic-era 'pop-up' cycle lanes and widened pavements into permanent infrastructure. The JRC's 2023 assessment on post-pandemic trends in urban mobility[66] found that cycling and walking increased in 2020-21 and the trend continued in 2022.

The 2024 revision of the TEN-T Regulation linked walking and cycling to the network's general priorities, and the European Declaration on Cycling[67], signed by the European Parliament, Council and Commission in April 2024, sets out 8 principles and 36 commitments to guide national and local action. The Commission's first progress report on the Declaration[68] confirms strong momentum and highlights remaining challenges.

c. *Shared mobility and micromobility*

The EU Urban Mobility Framework treats shared mobility as a complement to public transport rather than a substitute for it. Car-sharing, bike-sharing and e-scooters have expanded across European cities with little EU regulation to date. Local planning and licensing are usually informed by best-practice exchange through the EU Urban Mobility Observatory[69] and CIVITAS (European Commission funded programme to promote ambitious urban mobility goals)[70].

d. *Low-emission zones and mobility pricing*

Low-emission zones (LEZs) have spread rapidly across EU cities, and their design and enforcement remain a national or local competence. In 2024 there were already more than 300 LEZs in the EU, with projections pointing to over 500 by 2025 as national laws in France, Spain and others mandate LEZs for medium and large municipalities[71]. By contrast, congestion charging remains limited to a handful of cities (notablyStockholm, Gothenburg and Milan).The revised Eurovignette Directive sets out aharmonizing framework for thedefinition of congestion charges also on urban roads[72].

e. *Electrification and intelligent transport systems*

AFIR's[73] binding targets are driving electrification of buses, taxis, delivery fleets and private cars, backed by EU funding for public charging infrastructure. AFIR introduces targets linking installed charging power to the vehicle on the road of at least 1.3 kW per battery-electric light-duty vehicle and 0.8 kW per plug-in hybrid. In 2012 there were about 10,500 charging points and that number

[66] https://publications.jrc.ec.europa.eu/repository/handle/JRC133322
[67] https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=OJ:C_202402377
[68] https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52025DC0566
[69] https://urban-mobility-observatory.transport.ec.europa.eu/index_en
[70] https://civitas.eu/
[71] https://link.springer.com/article/10.1186/s12544-025-00749-2
[72] https://transport.ec.europa.eu/transport-modes/road/road-charging_en
[73] https://eur-lex.europa.eu/eli/reg/2023/1804/oj/eng

grew to 630,000 in 2023, with fast and ultra-fast DC chargers reaching around 81,700 also in 2023[74].

Intelligent transport systems (ITS) and real-time traffic management are also being deployed at growing scale, documented in a rising number of EU-funded pilot projects. A JRC assessment identified 247 European R&I projects in smart mobility (mostly under Horizon 2020 and Horizon Europe), covering AI-based traffic management, cooperative and automated mobility, V2X[75] integration and multimodal digital services[76].

iii. Evidence available regarding the impact of these measures on mobility patterns, citizens' behavior and urban quality of life

a. Changes in mobility patterns and modal split

There is no harmonized EU-wide statistical series on current modal splits across all EU cities, making it difficult to draw meaningful conclusions about mobility patterns and modal splits across EU cities. However, the International Association of Public Transport's data from 2015 shows that sustainable-mode shares (walking, biking and public transport) represented more than 60% inBarcelona, Berlin, Munich, Paris Prague and Vienna[77]. More recent data, only available individually from local surveys, shows that in 2023 sustainable-mode shares inside Paris represented more than 90%[78] of city-trips, and in Barcelona 80%[79], Berlin[80], Munich[81], and Vienna[82] it was above 75%.

b. Environmental performance and congestion

In 2023, transport accounted for about one-third of EU-27 greenhouse gas emissions, with road transport responsible for roughly 73% of transport emissions and around 22–23% of all EU emissions[83].

The most recent evidence on urban congestion comes from the JRC's 2023 assessment, which combined TomTom traffic data from 178 EU cities with a travel survey and case studies from 40 cities[84]. The study found that congestion, which fell sharply in 2020, was converging back towards 2019 levels and was projected to reach or exceed them in most of the 178 monitored cities during 2023-24.

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[74] https://www.eea.europa.eu/en/analysis/publications/sustainability-of-europes-mobility-systems-2025/energy-infrastructure
[75] Vehicle-to-Everything
[76] https://data.jrc.ec.europa.eu/dataset/c789acc8-a74c-4d95-9e70-aa39731b7ade
[77] https://www.uitp.org/wp-content/uploads/sites/7/2025/04/MCD_2015_synthesis_web_0.pdf
[78] https://cdn.paris.fr/paris/2025/01/17/paris_ra2023-web-kqq9.pdf
[79] https://www.barcelona.cat/mobilitat/en/news-and-documents/news/record-number-of-sustainable-journeys-in-barcelona-in-2023-2-1361017
[80] file:///C:/Users/vguedesferreira/Downloads/srv_2023_berlin_modal_split_je_bezirk.pdf
[81] https://risi.muenchen.de/risi/dokument/v/9307363
[82] https://presse.wien.gv.at/presse/2025/03/16/modal-split-2024-weitere-zunahme-bei-oeffis-und-radfahren-zu-fuss-gehen-nach-wie-vor-auf-rekordniveau
[83] https://www.eea.europa.eu/en/topics/in-depth/transport-and-mobility?activeAccordion=4268d9b2-6e3b-409b-8b2a-b624c120090d&activeTab=e3e6b879-fef4-4a88-9436-5f0064698270
[84] https://publications.jrc.ec.europa.eu/repository/handle/JRC133322

c. *Accessibility and social inclusion*

The context on transport poverty policies at EU-level is summarized in a European Parliament Research Service (EPRS) briefing on the topic[85]. The JRC launched the Transport Poverty Hub[86]that provides indicators on the social dimension of mobility and transport. Their recent report[87]complements it with a review of EU-funded R&I transport projects to understand how future mobility systems can be inclusive and responsive to citizens' needs.

The Commission Recommendation[88] on transport poverty urges Member States to use anti-poverty strategies and Social Climate Fund resources for targeted measures to address this issue (e.g. improving public transport in low-income areas, supporting shared mobility, and social leasing of zero-emission vehicles for vulnerable users).

d. *Behavioral responses and public acceptance*

The Special Eurobarometer on mobility and transport[89] found that Europeans are acutely aware of the negative impacts of the current transport system and that their willingness to change modes is conditioned by cost, speed, availability and perceived safety of transport modes.

On the other hand, the JRC's post-pandemic urban mobility assessment found that, even after most restrictions were lifted, many people continued to work from home or avoid situations perceived as risky, and that risk aversion translated into favoring car use.

iv. Involvement of citizens and stakeholders in the planning, implementation and evaluation of sustainable urban mobility policies

The main framework to promote local participatory processes is the SUMPs. The SUMP guidelines[90] recommend identifying and involving impacted citizens from the outset. It also suggests that citizens and stakeholders should be involved in all steps of the process, including the evaluation of both policy results and the participation process itself.

SUMPs may also fall within the scope of the Strategic Environmental Assessment Directive[91] and require that the draft plan is made available to environmental authorities and the public for commenting before adoption. Similarly, EU guidance on transport poverty[92] calls for vulnerable groups to be involved in mobility policy design and for local authorities to assess the distributional impacts of proposed measures.

[85] https://www.europarl.europa.eu/RegData/etudes/ATAG/2022/738181/EPRS_ATA(2022)738181_EN.pdf
[86] https://regions-and-cities.ec.europa.eu/cities-portal/eu-initiatives-cities/transport-poverty-hub_en
[87] https://publications.jrc.ec.europa.eu/repository/handle/JRC144605
[88] https://eur-lex.europa.eu/eli/reco/2025/1021/oj/eng
[89] https://data.europa.eu/data/datasets/s2226_92_1_495_eng?locale=en
[90] https://urban-mobility-observatory.transport.ec.europa.eu/sustainable-urban-mobility-plans/guidelines-developing-and-implementing-sustainable-urban-mobility-plan-0_en
[91] https://environment.ec.europa.eu/law-and-governance/environmental-assessments/strategic-environmental-assessment-sea_en
[92] https://eur-lex.europa.eu/eli/reco/2025/1021/oj/eng

v. Main challenges and future policy priorities in relation to sustainable urban mobility

a. Persistent dependence on private cars

Car use still dominates commuting in most EU cities. European Parliament's resolution[93] on urban mobility calls for stronger public transport, active and micromobility, SUMPs, low-emission zones, road safety, accessibility, multimodal hubs, real-time mobility data and greater EU financing.

b. Transport poverty and social equity

European Parliament's 2026'New EU anti-poverty strategy' resolution[94] calls for stronger EU action on affordable and accessible transport and to target households and users experiencing transport poverty. The European Committee of the Regions (CoR) opinion[95] also notes that transport poverty is increasingly prevalent and urges the use of EU funds to address it.

c. Funding and investment

CEF, Cohesion Policy and the Recovery and Resilience Facility (RRF) remain the principal EU-level funding routes for urban mobility infrastructure. Parliament's resolution on the post-2027 EU budget calls for stronger transport investment, including TEN-T and CEF, digital booking and ticketing, alternative-fuels infrastructure and action against transport poverty.

d. Digitalization and data governance

A recent EPRS briefing on multimodal digital mobility services[96] identifies persistent problems involving technical standards, interoperability, access to ticketing systems, and the risk that large digital intermediaries become gatekeepers between passengers and transport operators. The also recent STOA study on the future of European rail reaches similar conclusions, calling for EU data governance to support data sharing, cybersecurity and common digital interfaces, as well as coordination between rail, regional and urban transport authorities[97]. The Commission's May 2026 multimodal-booking proposal[98] would address some of these issues but questions concerning governance and public-interest access remain open, which could require a more ambitious mobility data-governance framework.

e. Integrating urban mobility into other policy areas

Urban mobility increasingly needs to be considered together with energy, housing and digital policy. For example, AFIR's electric vehicle charging targets interact directly with local electricity

[93] https://www.europarl.europa.eu/doceo/document/TA-9-2023-0130_EN.html
[94] https://www.europarl.europa.eu/doceo/document/TA-10-2026-0049_EN.html
[95] https://www.cor.europa.eu/en/our-work/opinions/cdr-2437-2025
[96] https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2026)789303
[97] https://www.europarl.europa.eu/stoa/en/document/EPRS_STU(2026)788125
[98] https://transport.ec.europa.eu/document/download/17596ca2-fad5-467e-b71a-c490baf0bcd1_en?filename=COM_2026_231_Proposal_on_multimodal_booking.pdf

grid capacity and sustainable buildings policy, coupling transport, energy and housing instruments.

6. France

Office Parlementaire d´Evaluation des Choix Scientifiques et Technologiques (OPECST)

i. Legislative, policy and strategic frameworks governing sustainable urban mobility

European and French legislation, the French National Low-Carbon Strategy, regional and local plans form the foundation of France's sustainable urban mobility policy.

a. The Mobility Guidance Law (2019)

The cornerstone of French mobility strategy is the Mobility Guidance Law ("loi d'orientation des mobilités", or LOM) 99, passed in 2019. It brought about a paradigm shift in French public transportation policy.

In order to guaranty the ability to get around under reasonable conditions, especially by using public transit, the LOM creates a "right to mobility". Additionally, it reroutes some public funds toward shared and active mobility as well as public transportation.

The law also mandates Low-emission mobility zones (ZFE-m) in urban areas where air quality regulatory standards are often not complied with.

It incorporates into French legislation European goals for the electrification of vehicles and introduces initiatives to speed-up the implementation of charging infrastructure.

It establishes regional governments and certain types of local governments as Mobility Organizing Authority ("autorité organisatrice de la mobilité", or AOM) within their respective areas of jurisdiction.

b. The Climate and Resilience Law (2021)

The Law on combating climate change and strengthening resilience to its effects, known as the Climate and Resilience Law 100 ("loi portant lutte contre le dérèglement climatique et renforcement de la résilience face à ses effets", or loi "Climat et résilience"), was introduced in response to the conclusions of the Citizens' Convention on Climate ("convention citoyenne pour le climat", or CCC), which was convened from October 2019 to June 2020.

The Climate and Resilience Law did not significantly modify the framework of France's transportation decarbonization policy, which is primarily set by the Mobility Guidance Law and European legislation. But it demonstrates a change in the Government's approach, since factors

[99] LOI n° 2019-1428 du 24 décembre 2019 d'orientation des mobilités: https://www.legifrance.gouv.fr/jorf/id/JORFTEXT000039666574
[100] LOI n° 2021-1104 du 22 août 2021 portant lutte contre le dérèglement climatique et renforcement de la résilience face à ses effets: https://www.legifrance.gouv.fr/jorf/id/JORFTEXT000043956924

such as social acceptability, air quality, and land-use planning are more thoroughly taken into account.

The most significant measure is the expansion of low-emission mobility zones: the law mandates the formation of a Low-emission Mobility Zone (ZFE-m) in all metropolitan areas with more than 150,000 population.

Additionally, the law strengthens requirements for the renewal of public and private vehicle fleets with low-emission vehicles.

It reinforces active transportation, particularly cycling, and facilitates the integration of bicycle infrastructure into land-use planning projects. It also includes several measures designed to promote public transportation, carpooling, and intermodal transport.

It introduces several provisions aimed at limiting the need for travelling.

c. The National Low-Carbon Strategy (2026)

The French National Low-Carbon Strategy ("Stratégie nationale bas carbone", or SNBC) 101 is France's long-term roadmap to carbon neutrality by 2050. It also sets the reference trajectory for the assessment of transport policies.

The third version of the SNBC, finalised and made public in 2026, reflects France's heightened ambitions for reducing CO2 emissions. It calls for a 26% reduction in the transportation sector's emissions by 2030 and near-neutrality by 2050. It sets a carbon budget for the sector of 117 Mt CO2eq for the period 2024-2028, followed by 86 Mt CO2eq for the period 2029-2033 and 59 Mt CO2eq for the period 2034-2038.

This trajectory can only be achieved if the decarbonization of transport is significantly accelerated (only minor reductions in emissions have been recorded over the last two decades).

d. Regional and Metropolitan Planning

The Regional Spatial Planning, Sustainable Development, and Territorial Equality Scheme 102 ("schéma régional d'aménagement, de développement durable et d'égalité des territoires", or SRADDET) integrates mobility policy into a more comprehensive spatial planning.

Combating climate change and air pollution, enhancing access to rural areas, intermodality, and facing transportation growth are part of the eleven sectors for which the SRADDET establishes goals and regulations.

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[101] La stratégie nationale bas-carbone, Ministère de la Transition écologique, de l'aménagement du territoire, des transports, de la ville et du logement:
https://www.ecologie.gouv.fr/strategie-nationale-bas-carbone/feuille-route-climatique-francaise

[102] Introduced by the LOI no 2015-991 du 7 août 2015 portant nouvelle organisation territoriale de la République:
https://www.legifrance.gouv.fr/loda/id/JORFTEXT000030985460

e. *Local Mobility Plans*

At the metropolitan level, the Local Mobility Plan ("plan de mobilité", or PDM) 103 is the primary planning tool. The Local Mobility Plan is compulsory within the territorial jurisdiction of any Mobility Organizing Authority covering an urban area with more than 100,000 inhabitants.

The Local Mobility Plan must outline a variety of strategies, rules, and initiatives intended to lower greenhouse gas emissions associated with transportation while preventing air and noise pollution and protecting biodiversity.

Local Mobility plans developed by Mobility Organizing Authorities must be consistent with the general rules of the relevant SRADDET.

ii. Sustainable urban mobility measures

In recent years, France has implemented many measures to promote sustainable urban mobility. These policies apply to almost all modes of urban transportation and are focused on decarbonization.

Area	Main actions undertaken	Transport modes
Public transport	Investment in urban rail, tramways, buses, metropolitan regional express services (SERM), clean buses fleets	Metro, tram, bus, suburban rail
Active mobility	National Cycling Plan, cycling infrastructure, pedestrianization, bicycle parking, cycling education	Walking, cycling
Shared mobility	Car-sharing, carpooling incentives, Sustainable Mobility Package	Shared cars, carpooling
Low-Emission Mobility Zones	ZFE-m using Crit'Air anti-pollution vehicle sticker	Passenger cars, vans, trucks
Electrification	Purchase incentives, charging infrastructure, fleet electrification	Cars, buses, commercial vehicles
Intelligent transport systems	Mobility platforms, digital ticketing, MaaS, multimodal information	All transport modes

a. *Public transport*

France prioritizes investment in public transportation for the development of sustainable urban mobility. Recent initiatives include the development of tram networks across various urban areas

[103] Code des transports, chapitre IV : « Les plans de mobilité » (articles L. 1214-1 to L. 1214-38) : https://www.legifrance.gouv.fr/codes/section_lc/LEGITEXT000023086525/LEGISCTA000023069061/#LEGISCTA000039783635

104, the modernization of metro and suburban rail systems, particularly via the Metropolitan Regional Express Services ("services express régionaux métropolitains", or SERM) initiative, and the creation of multimodal interchange hubs.

The Metropolitan Regional Express Services initiative aims to enhance train frequencies and establish additional stations and park-and-ride amenities, to provide more appealing options for everyday commuters over private vehicle usage 105.

Numerous transportation agencies have allocated resources to battery-electric, hydrogen, and biomethane buses. For instance, Île-de-France Mobilités is implementing one of the most extensive decarbonization initiatives for its bus fleet in Europe 106.

Personal Rapid Transit

Transport stakeholders have long thought autonomous and modular transportation systems could combine the advantages of cars, such as speed and direct journeys, with those of public transport. This led to the emergence of the Personal Rapid Transit (PRT) paradigm, which refers to mobility systems consisting of a dedicated guideway network and automated vehicles that transport small groups of passengers from their origin to their destination without requiring transfers. This idea sparked international interest in the 1960s and 1970s including in France, where the Parisian public transport operator RATP and the firm Matra Transport developed the PRT project Aramis between 1970 and 1987 [107]. The project ended in failure (analyzed by Bruno Latour in *Aramis ou l'amour des techniques,* 1992) as almost no large-scale PRT system appeared during the late 20th century, except for the West Virginia University PRT which transports around 12,000 passengers daily across three university campuses and Morgantown's city center [108].

Presenting higher flexibility and better adaptation to low and temporally dispersed flux, the paradigm is regarded by some stakeholders such as the Abu Dhabi Transport Company as an interesting complement to conventional transports, especially for first- or last-mile mobility [109].

[104] Recent examples include the extension of Paris Tram T3b to Porte Dauphine (2024), the ongoing extensions of tram lines T1, T7 and T8 in the Paris region, the major extension of Marseille's Tram T3 (opened in 2026 with 6.2 km of new track and 12 stations), the opening of Montpellier's Line 5, the inauguration of Lyon's Tram T10, and continued network extensions in metropolitan areas such as Bordeaux, Nice and Strasbourg. These investments improve public transport accessibility, support urban regeneration, facilitate multimodal travel and provide attractive alternatives to private car use.

[105] The SERM program is being implemented progressively across France through metropolitan projects tailored to local mobility needs. Advanced examples include the Strasbourg Réseau Express Métropolitain Européen (REME), which significantly increased rail services from 2022; the Bordeaux metropolitan rail network, which has introduced through-running services and more frequent suburban trains; and the Montpellier SERM, which combines enhanced regional rail services with express buses, cycling infrastructure and multimodal hubs. Similar projects are under development in metropolitan areas such as Lyon, Lille and Rouen, with the objective of increasing service frequency, improving reliability, strengthening multimodal integration and providing attractive alternatives to private car use.

[106] Île-de-France Mobilités is implementing one of Europe's largest fleet decarbonization programs, with 5,172 buses and coaches operating on sustainable energy as of July 2025 and a target of a fully clean bus fleet by 2029. Other examples include hydrogen buses in Pau and battery-electric buses introduced in metropolitan areas such as Amiens, Bayonne–Anglet–Biarritz, Dijon, Metz and La Rochelle.

[107] https://en.wikipedia.org/wiki/Aramis_(personal_rapid_transit)

[108] J. E. Anderson, Some Lessons from the History of Personal Rapid Transit (PRT), University of Washington, 1996: https://faculty.washington.edu/jbs/itrans/history.htm

[109] N. Vorano, Masdar City's PRT, a test drive for future of transport, The National News, 2011 : https://www.thenationalnews.com/uae/environment/masdar-city-s-prt-a-test-drive-for-future-of-transport-1.377189

Though not labeled as PRT, the concept has been rehabilitated by the French start-up Urban Loop [110], which is developing networks of small, automated, electric, rail-guided vehicles with a strategy structured around lightweight infrastructure and energy efficiency. The start-up intends to increase modal shift by removing waiting and transfer time. After a first project in Saint-Quentin-en-Yvelines in 2024, Urban Loop, which originated at the University of Lorraine, signed agreements with the municipalities of Dunkerque and Abu Dhabi. It is also expected to deliver a 3.5 km long line to Nancy Métropole in 2027.

b. Active mobility (walking and cycling)

Cycling is one of the main priorities of the French urban mobility strategy. Successive National Cycling and Walking Plans (plans vélo et marche 111) have been financed by the National Active Mobility Fund (Fonds national mobilités actives). Since it was established in 2019, this fund has co-financed the building of thousands of kilometers of cycling infrastructure.

National and local authorities have also provided financial support for the purchase of conventional and electric bicycles 112. Moreover, some local authorities have implemented cycling proficiency schemes like "Savoir rouler à vélo" 113.

Large metropolitan areas are building numerous cycling facilities. In Paris, successive cycling plans have led to the creation of more than 1,000 kilometers of cycling paths 114. Lyon is building a metropolitan network of about 350 kilometers of cycle lanes: the "voies lyonnaises" 115. Grenoble is building the "Chronovélo network" 116 with protected riding routes around the metropolitan region.

French policymakers have encouraged the integration of cycling with public transport by creating secure bicycle parking at railway stations 117 and rolling out bike-share schemes near stations. Several local authorities have implemented 30 km/h speed limits that tend to make cycling and walking safer 118.

[110] https://urbanloop.fr/en/
[111] « Le Plan vélo et marche 2023-2027 est lancé », French Gouvernement, 5 May 2023: https://www.info.gouv.fr/actualite/le-plan-velo-et-marche-2023-2027-est-lance
[112] « Bonus vélo : tout ce qu'il faut savoir », French Government, 31 January 2025: https://www.economie.gouv.fr/particuliers/gerer-mon-argent/beneficier-daides-et-de-reductions-dimpots/bonus-velo-tout-ce-quil#
« Les aides financières à l'écomobilité », Paris City, 1st October 2026: https://www.paris.fr/pages/lutte-contre-la-pollution-les-aides-a-la-mobilite-5373
[113] « Le Savoir rouler à vélo, » ministère de l'Education nationale, février 2026 : https://eduscol.education.gouv.fr/5970/le-savoir-rouler-velo
[114] Natterer E., Loder A., Bogenberger K., Effects of the plan vélo I and II on vehicular flow in Paris - an empirical analysis, August 2, 2024: https://arxiv.org/pdf/2408.09836
[115] « Les Voies Lyonnaises, 13 lignes, 49 communes, plus de 350 km : d'ici 2030, le réseau des Voies Lyonnaises viendra mailler le territoire de la métropole », Métropole Grand Lyon : https://avelo.grandlyon.com/se-deplacer-a-velo/les-voies-lyonnaises
[116] « Carte : découvrez le futur proche et lointain du réseau Chronovélo », Grenoble Alpes métropole, 9 décembre 2024 : https://www.grenoblealpesmetropole.fr/actualite/312/45-carte-decouvrez-le-futur-proche-et-lointain-du-reseau-chronovelo.htm
[117] « Bicycle parking », Île-de-France mobilités, 23 January 2023: https://www.iledefrance-mobilites.fr/en/le-reseau/services-de-mobilite/velo/parkings-velo
[118] « 30 km/h un an après », Ville de Paris: https://opendata.paris.fr/pages/30kmheure0/
« La ville à 30km/h », Grenoble Alpes Métropole: https://www.grenoblealpesmetropole.fr/136-la-ville-a-30km-h.htm

Policymakers have also promoted walking. Policies include pedestrianization of city centers [119] and better access for persons with reduced mobility (PRM). Major pedestrian zones have been created in several cities, for instance Paris [120] (the banks of the Seine River, rue de Rivoli, etc.), Bordeaux [121], Nantes [122] and Strasbourg [123].

c. Shared mobility

The French authorities encourage shared mobility through regulations and financial incentives. Among the most notable initiatives are support for car-sharing [124] and carpooling [125] schemes, the creation of dedicated carpooling lanes [126], and assistance for employers in promoting sustainable commuting.

In this regard, the Sustainable Mobility Allowance ("forfait mobilités durables", or FMD) allows businesses to provide tax-free financial help to employees who commute by bicycle or shared mobility services [127]. However, this coverage of travel expenses is not mandatory.

d. Low-Emission mobility Zones (ZFE-m)

Low-Emission Mobility Zones are the main urban air-quality policy tool in France. They restrict the circulation of the most polluting vehicles according to the Crit'Air classification, which is based on six categories (Crit'Air 0 to 5) [128] and aims to minimize emissions of NO_2 and particulate matter.

Crit'Air category	Energy/Fuel type	Access to ZFE-m's in 2025
	Fully electric or hydrogen-powered vehicles	No restrictions

[119] « Livable city, walkable city », L'Institut Paris Region, 25 February 2022: https://en.institutparisregion.fr/know-how/mobility/livable-city-walkable-city/
[120] « Découvrez la carte Paris Piéton », City of Paris, 29 August 2023: https://www.paris.fr/pages/decouvrez-la-carte-paris-pieton-22310
[121] « Le secteur piéton de Bordeaux en 5 points », City of Bordeaux, 4 November 2025: https://www.bordeaux.fr/le-secteur-pieton-de-bordeaux-en-5-points
[122] « Les piétons gagnent du terrain dans la métropole », Nantes Ville et Métropole: https://metropole.nantes.fr/ma-ville-ma-metropole/les-grands-projets/les-pietons-gagnent-du-terrain-dans-la-metropole
[123] « Plan piéton », Strasbourg Métropole: https://www.strasbourg.eu/plan-pieton
[124] « Car-sharing in Île-de-France: how to use it », Île-de-France Mobilités: https://www.iledefrance-mobilites.fr/en/le-reseau/services-de-mobilite/auto-partage/autopartage-presentation
[125] « Ensemble développons le covoiturage courte distance », Ministère de la Transition écologique, de l'aménagement du territoire, des transports, de la ville et du logement: https://covoiturage.beta.gouv.fr/
[126] « Voies réservées sur les axes routiers structurants », Ministère de la Transition écologique, de l'aménagement du territoire, des transports, de la ville et du logement: https://www.ecologie.gouv.fr/politiques-publiques/voies-reservees-axes-routiers-structurants
[127] European Union, "France launches Sustainable Mobility Package to promote eco-friendly commuting", 13 May 2025: https://transition-pathways.europa.eu/tourism/funding-mechanisms/france-launches-sustainable-mobility-package-promote-eco-friendly
[128] « The Crit'Air anti-pollution vehicle sticker », Explore France: https://www.france.fr/en/article/crit-air-anti-pollution-vehicle-sticker/

Crit'Air category	Energy/Fuel type	Access to ZFE-m's in 2025
	Gas-powered vehicles Plug-in hybrids Euro 5&6 Petrol vehicles	Permitted
	Euro 4 Petrol vehicles Euro 5&6 Diesel vehicles	Permitted
	Euro 2&3 Petrol vehicles Euro 4 Diesel vehicles	Banned in several ZFE-m's
	Euro 3 Diesel vehicles	Banned in several ZFE-m's
	Euro 2 Diesel vehicles	Banned in several ZFE-m's

Source: French Ministry of Ecological Transition, Regional Planning, Transportation, Urban Affairs, and Housing

Under the ZFE-m scheme, the most polluting vehicles are banned from certain areas at certain times. Every vehicle registered in France is assigned a Crit'air category, based on the energy source or fuel used and its Euro standard; it must display the corresponding Crit'air sticker on its windscreen. Depending on this Crit'air category, the vehicle is allowed or not to circulate in a given Low Emission mobility Zone, in accordance with the decisions taken by the relevant municipality or inter-municipal cooperation body.

ZFE-m's were initially established for public health concerns. But they also help to decarbonize transport because they promote fleet renewal.

Some local authorities, for instance the metropolitan areas of Aix-Marseille, Toulouse and Strasbourg, have set up measures going further than the minimum requirements imposed by the national legislation: they apply stricter rules within mandatory ZFE-m zones or even create new restricted zones.

e. Electrification

Electrification is a key pillar of French mobility policy. It is supported by a broad set of incentive and regulatory measures, including purchase bonuses for electric cars, support for electric buses and heavy-duty vehicles and mandatory pre-equipping of new buildings for charging points. The ADVENIR program 129 subsidizes charging infrastructure for electric cars, buses and heavy-duty vehicles.

Hydrogen and biofuels use on buses and heavy-duty vehicles is being encouraged where battery-electric solutions are less appropriate.

f. Intelligent Transportation Systems (ITS)

Digital technologies are increasingly contributing to sustainable mobility by making public transport easier130. New digital mobility services include integrated ticketing systems, contactless bank card payments and Mobility-as-a-Service (MaaS) platforms 131.

For example, in 2025 the Île-de-France region has made travel easier for both regular and occasional users by reducing the number of different ticket types and expanding contactless payment options 132.

[129] « EV Infrastructure Charging Program (ADVENIR) », IEA, 23 June 2025: https://www.iea.org/policies/2716-ev-infrastructure-charging-program-advenir
[130] « Les apports du numérique », CEREMA: https://www.cerema.fr/fr/activites/mobilites/enjeux-politiques-mobilites/apports-du-numerique
[131] Observatoire des MaaS, Ministère de l'aménagement du territoire et de la décentralisation: https://www.francemobilites.fr/outils/maas
[132] « Your transport in Île-de-France made easy », île-de-France Mobilités: https://www.iledefrance-mobilites.fr/en/

15-Minute Cities (« Villes du Quart d'Heure »)

The "15-Minute City" is a concept of urban planning put forward by Franco-Colombian researcher Carlos Moreno: inhabitants should be able to reach critical services and amenities within a 15 minutes' walk or cycle trip. The idea lays out a polycentric urban paradigm where employment, retail trade, healthcare, education, leisure facilities and other everyday services are found locally. The aim is to reduce air pollution, improve residents' health and enhance the quality of life in the urban environment.

The proposal generated a great deal of interest among researchers and policymakers. Carlos Moreno has been awarded various distinctions including the UN-Habitat Scroll of Honor in 2022 [133].

The "15-Minute City" is currently a subject of active research in France and abroad. Within the context of ERA-NET Cofund Urban Accessibility and Connectivity (EN-UAC), the Joint Programming Initiative Urban Europe has launched the ACUTE project (Accessibility and Connectivity knowledge center for Urban Transformation in Europe) [134]. As part of the ACUTE project, a "15-Minute City" community has been created on the French "Expertise Territoire" platform [135], gathering specialists of different backgrounds, academics, public sector consultants, and practitioners in the field. The purpose of the initiative is to develop a transdisciplinary hub, improve collaboration among researchers, practitioners and other stakeholders, and identify the key barriers to implementing the "15-Minute City" concept.

The overall process is gaining ground among policymakers. Several European towns have adopted it and it was a key element of the City of Paris' urban policy for the 2020 – 2026 municipal term. The current city's urban planning is still influenced by this approach. The C40 Cities network, a coalition of mayors and administrations of some of the world's largest cities, many of them European capitals, has also embraced the "15-Minute City" concept in its recommendations on urban development methods [136].

iii. Impact of measures on mobility patterns, citizens' behaviour and urban quality of life

Data on the impacts of sustainable urban transportation projects in France is constantly growing. However, the amount of data available depends on the area of public policy. While policies supporting cycling and public transportation have been extensively researched, ex post data on Low-Emission Mobility Zones (ZFE-m) is only beginning to surface. Overall, the available data show positive trends in terms of modal shift and air quality, but also highlight obstacles to implementation, notably in terms of societal acceptance.

[133] https://unhabitat.org/news/19-sep-2022/2022-un-habitat-scroll-of-honour-award-winners-announced
[134] https://jpi-urbaneurope.eu/project/acute-accessibility-and-connectivity-knowledge-hub-for-urban-transformation-in-europe/
[135] https://www.expertises-territoires.fr/jcms/pl1_392505/en/15-min-cities-bringing-more-proximity-in-cities
[136] https://www.c40.org/what-we-do/scaling-up-climate-action/urban-planning-design/

a. *Modal shift*

In a recent report 137, ADEME, the French public agency for ecological transition, points out that free-floating bicycle systems tend to complement public transport and encourage active mobility. On the other hand, a life-cycle study of free-floating e-scooters in Paris showed that many e-scooter trips replaced trips previously performed by metro, rail or walking, rather than by private car 138.

On a local level, a research project commissioned by the City of Paris and led by the Laboratoire Ville Mobilité Transport (Gustave Eiffel University) aims to provide a detailed analysis of changes in transport mode choices for journeys to and from Paris. Based on observations made twenty years ago, the share of car journeys fell from 44% to 34% in Île-de-France, while the shares of public transit and cycling rose from 19% to 26% and from 1% to 8% respectively. In Paris itself, the share of car journeys allegedly dropped from 12.8% to 4.2% 139.

ADEME's report shows that the implementation of a ZFE-m can trigger a change toward a larger use of public transit: approximately 27% of affected users change to alternative ways, specifically 15% to public transport, 7% to cycling and 5% to walking. On the whole, public transport is able to accommodate 40% of journeys without increasing travel time 140.

b. *Congestion*

An empirical analysis of the City of Paris' cycling policies 141 shows that despite the reduction of road capacity allocated to cars, traffic congestion has not increased overall. This stability in congestion provides strong evidence that travelers shifted to other modes, mostly cycling and public transport.

The analysis of the national Plan Vélo shows that in certain regions, road capacity had been reduced by more than 50%, with no clear increase in traffic congestion being observed across the network as a whole.

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137 ADEME, *Impact socio-économique des usages du vélo en France,* 28 April 2026: https://librairie.ademe.fr/mobilite-et-transports/9313-11108-impact-socio-economique-des-usages-du-velo-en-france.html

138 Bortoli A., Christoforou Z., "Consequential LCA for territorial and multimodal transportation policies: method and application to the free-floating e-scooter disruption in Paris", *Journal of Cleaner Production,* Volume 273, 10 november 2020: https://www.sciencedirect.com/science/article/abs/pii/S0959652620329437

139 « (Toujours) moins de voitures dans Paris ? Analyse des déterminants et des enjeux d'amplification des dynamiques de report modal », Ville de Paris, 22 avril 2026 : https://www.paris.fr/pages/toujours-moins-de-voitures-dans-paris-analyse-des-determinants-et-des-enjeux-d-amplification-des-dynamiques-de-report-modal-35027

140 Laurent Proulhac, Jade Charbonnier, Caroline Gallez et Alexis Poulhès, « La Zone à Faibles Émissions mobilité (ZFE-m), une mesure inégalitaire ? Un éclairage par les pratiques de mobilité à partir du cas francilien », *Belgeo : Revue Belge de Géographie,* 2025: https://shs.hal.science/halshs-05537641

141 Natterer E., Loder A., Bogenberger K., "Effects of the plan vélo I and II on vehicular flow in Paris - an empirical analysis", August 2, 2024: https://arxiv.org/pdf/2408.09836

c. *Environmental performance*

The aforementioned ADEME report 142 states that the national development of cycling delivers tangible benefits, including lower greenhouse gas emissions and improved public health. The report points out that ADEME's AVELO program for the development of cycling infrastructure might avoid 0.6-0.9 MtCO2equ emissions annually.

National-level assessments of the environmental performance of ZFE-m's are still sparse. However, a modelling study of the Paris metropolitan area ZFE-m 143 suggests a significant reduction in particulate matter emissions: - 74% $PM_{2.5}$ within the low emission zone and - 62% in the overall Paris metropolitan area. According to this study, the improvement in air quality is mainly due to the restrictions imposed on older diesel vehicles.

d. *Security*

Gathering evidence on security issues is more difficult. However, the large-scale implementation of protected cycle lanes, traffic-calming measures and pedestrian zones should improve road safety by reducing conflicts between motor vehicles and vulnerable road users.

CEREMA recommends that road safety indicators be systematically included in assessments of transport policies 144.

e. *Public acceptance and social inclusion*

Social acceptance depends on the measures considered. For instance, acceptance of cycling infrastructure has increased alongside its usage 145.

Conversely, ZFE-m's have come under increasing criticism from the public and within Parliament. In April 2026, Parliament passed amendments aimed at repealing them. However, the Constitutional Council struck down the relevant provisions on procedural grounds 146.

These criticisms explain why CEREMA proposes that studies on ZFE-m's take into account social acceptance and consequences on vulnerable populations 147.

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142 ADEME, *Impact socio-économique des usages du vélo en France,* 28 April 2026: https://librairie.ademe.fr/mobilite-et-transports/9313-11108-impact-socio-economique-des-usages-du-velo-en-france.html

143 Diallo A. O., Michel P., Chasse A., Feng G., "Agent-Based Modeling of Paris Low-Emission Zone Impacts: Scale Effects and Behavioral Adaptations", *Procedia Computer Science,* Volume 280, 2026: https://www.sciencedirect.com/science/article/pii/S1877050926010707

144 Cerema, « Les recommandations méthodologiques du Cerema pour l'évaluation a posteriori des effets des ZFE-m sur la mobilité », 30 mai 2024:
https://www.cerema.fr/fr/actualites/recommandations-methodologiques-du-cerema-evaluation

145 N. Jouenne, « Quel regard sur la pratique du vélo en ville ? », *Structuration des mondes sociaux,* 1st June 2020:
https://sms.hypotheses.org/25006

146 Constitutional Council, Decision No. 2026-903 DC of 21 May 2026 :
https://www.conseil-constitutionnel.fr/decision/2026/2026903DC.htm

147 Cerema, « Les recommandations méthodologiques du Cerema pour l'évaluation a posteriori des effets des ZFE-m sur la mobilité », 30 mai 2024:
https://www.cerema.fr/fr/actualites/recommandations-methodologiques-du-cerema-evaluation

iv. Stakeholders' involvement in the planning, implementation and evaluation of sustainable urban mobility policies

France has put in place a multi-level participatory framework for sustainable urban mobility. The Environment Code and the Mobility Orientation Law (LOM) provide formal procedures, such as public debates organized by the National Commission for Public Debate ("Commission nationale du débat public", or CNDP) and public inquiries, with continual and close communication between local authorities and stakeholders.

a. Public engagement for major transport projects

The provisions of the Environment Code relating to public participation are applicable to major transport projects. Depending on the project, involvement may take the form of a public inquiry or a public debate.

Public debate (*débat public*)

Projects with major environmental or socio-economic impacts, such as railroad projects and urban transport infrastructure, may be referred to the National Commission for Public Debate (CNDP) 148.

The CNDP organizes public meetings and online consultations. It also disseminates expert studies and responses from the project developer. The purpose of the public debate is not to accept or reject a project, but to inform the decision-making process and the stakeholders.

Public inquiry (*enquête publique*)

Many smaller-scale transport projects must undergo a public inquiry 149 ("enquête publique") before being authorized. As part of this process, an independent commissioner gathers comments from local residents, if necessary, holds hearings, and delivers an independent report and recommendations.

b. Consultation during the development of Local Mobility Plans

The Mobility Orientation Law (LOM) requires Mobility Organizing Authorities (AOMs) to set up Local Mobility Plans for large urban areas. During the development phase, the AOM has to consult the municipalities, departmental and regional authorities, employers' organizations, environmental protection groups, cycling and pedestrian associations, etc. The final plan must take into account the results of this consultation.

[148] CNDP. « Our history » https://www.debatpublic.fr/en
[149] Public inquiry in France, Wikipedia: https://en.wikipedia.org/wiki/Public_inquiry_in_France

c. *Local public participation*

Beyond legal requirements, many metropolitan authorities have implemented participatory measures when drawing city-center redevelopments, introducing new traffic restrictions, etc. Consultations usually include online platforms, neighborhood meetings, citizens' panels or ad hoc committees 150.

d. *Assessing societal needs*

Local authorities update Local Mobility Plans according to changing mobility behaviors and consultations with stakeholders 151.

v. Challenges and future policy priorities identified in relation to sustainable urban mobility

Recent policy debates have shown that politically sensitive issues cannot be resolved by technical means only. When drawing up future mobility policies, environmental ambition, economic competitiveness and social acceptance must be addressed together. The French authorities identified a few priorities for advancing sustainable urban mobility: accelerating decarbonization, making electrification socially and economically sustainable, completing the transition to active mobility, making low-emission mobility zones more acceptable to the public and strengthening support for technology neutrality.

a. *Accelerating the decarbonization of transport*

The transport sector remains the leading source of greenhouse gas emissions in France, accounting for nearly one-third of the total. The third National Low-Carbon Strategy (SNBC-3) acknowledges that cutting down emissions in this sector has lagged behind the targets set, and it calls for a major acceleration over the coming decades. The trajectory sets an average 5% annual reduction through 2030, followed by 7% thereafter 152.

b. *Making electrification socially and economically sustainable*

Electrification is the cornerstone of French transport policy, but several issues remain open: electric vehicles are considered too expensive; access to charging infrastructure (in particular in blocks of flats) is uneven across the country; and electric vehicles account for only a very small proportion of commercial fleets.

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150 « Concertations, enquêtes publiques et consultations », Ville de Paris, 2 July 2026: https://www.paris.fr/pages/concertations-et-enquetes-publiques-2460

151 « Une méthode innovante pour réaliser un diagnostic des zones apaisées », CEREMA, 23 January 2025: https://www.cerema.fr/fr/actualites/methode-innovante-realiser-diagnostic-zones-apaisees

152 « La stratégie nationale bas-carbone », Ministère de la Transition écologique, de l'aménagement du territoire, des transports, de la ville et du logement: https://www.ecologie.gouv.fr/strategie-nationale-bas-carbone/feuille-route-climatique-francaise

As a result, current policy debates are increasingly focusing on social leasing schemes, the growth of second-hand electric car markets, the deployment of charging infrastructure in collective housing and support for charging at the office 153.

c. Completing the transition to active mobility

Although cycling has increased significantly in many places, major obstacles remain: fragmented cycling infrastructure, disparities between urban and rural areas, a lack of secure bicycle parking lots, limited cycling education and safety concerns.

Future policy priorities include implementing continuous cycle route networks, improving road safety, extending cycling policies to rural areas and improving connections between cycling and public transport.

d. Improving social acceptability of Low-Emission Mobility Zones

One of the most significant policy debates at present relates to Low-Emission Mobility Zones (ZFE-m). Although recognized as an effective tool for improving air quality, they have raised concerns about their impact on lower income people and their consequences for small businesses.

The debate focuses on the need for local authorities to be granted greater flexibility and appropriate financial support. Future strategy is expected to be based on a locally managed implementation rather than a uniform national approach 154.

e. Strengthening support for technology neutrality

French policymakers increasingly acknowledge that no single technology will be able to decarbonize all transport segments. Electrification is still a key focus for passenger cars, but policymakers also agree that hydrogen, biomethane, sustainable biofuels and synthetic fuels in niche applications as well as vehicle retrofitting could be effective tools too 155.

Smart cities

The “Smart City” is a somewhat nebulous concept that puts digital technologies as a key element of urban design. Smart cities aim to use digital information and communication to enhance urban services efficiency (transportation being a typical example) and improve citizens’ well-being. The concept recommends adopting a systemic approach to urban design, as information technologies and generalized data collection allow to link and visualize data from different sectors together. An advertising campaign by the tech giant IBM after the 2008 crisis was influential for the popularity of the concept, which enjoyed a sustained interest throughout the 2010s. With the rise of

[153] Jean-Luc Fugit, Member of the National Assembly, Pierre Médevielle, senator, *Assessment of the decarbonization of the land transport sector pursuant to Article 73 of Law No. 2019-1428 of 24 December 2019 on Mobility Orientation,* an OPECST Report, 2 July 2026.
[154] Jean-Luc Fugit, Member of the National Assembly, Pierre Médevielle, senator, op.cit.
[155] Ibidem.

awareness around climate change, the concept has come to include sustainable development as a core principle.

A wide spread, tech-enthusiast idea of smart cities rely on the deployment of a highly interconnected urban ecosystem of numerous digital objects, sensors, and services, through the Internet of Things (IoT). This aims to ensure the availability of a large amount of data for monitoring and providing precise insight for city government. A modern view of the smart city imagines an extensive use of data science and AI to monitor complex systems such as mobility or energy networks, and improve key insights on different aspects of the city.

"Smart" transportation has blurry boundaries and can be understood in diverse ways. As development of autonomous devices suggest smartness can be embedded within the transportation systems, data-collecting and AI-monitored networks are also usually qualified as smart mobility solutions. Smartness may also belong to the informed user, who can easily plan, book and carry out an efficient and multimodal trip across the city, when a Mobility as a Service platform is available.

In mobility and related systems, digital technologies and AI are mainly used for anomaly detection, which improves maintenance efficiency by forecasting breakdowns, as is the case for buses in Singapore[156], or for optimizing network flows. In Singapore, an AI-using traffic simulator was developed by the Government Technology Agency to help efficiently modify buses itineraries in real time[157]. Several cities around the world, such as Bangkok[158] and Pittsburgh[159,160], have opted for smart traffic lights systems. The aim of the device is to evaluate the effective traffic arriving from each direction of crossroads and adjust the traffic lights timing in a way that maximizes flow efficiency. While early systems relied on algorithms and specific sensors, solutions featuring machine learning techniques have emerged since the early 2010s. Pittsburgh announced a reduction of car users' idle time by 40% at covered crossroads and a corresponding CO_2 emissions cut by 21%[161].

French and European cities also implement numerous policies in the line of smart cities and smart transportation concepts. Many European municipalities, including most French metropolises, offer an open-data platform which gathers datasets covering diverse sectors of urban activity, including transport. Barcelona, as an early adopter of the concept, is a major hub for the community. It hosts the Smart City Expo World Congress, one of the world's largest events dedicated to smart cities[162,163].

French public-sector actors and researchers address the concept. Cerema has created the Fabric'O collective aiming to be an actor of data sovereignty and exploitability at a local and national level[164].

[156] https://www.straitstimes.com/singapore/transport/new-ai-powered-smrt-command-centre-aims-to-make-bus-services-safer-more-reliable-and-faster
[157] https://www.tech.gov.sg/technews/how-govtech-simulates-four-million-bus-rides-a-day/
[158] https://1001smartcities.org/projects/bangkok-smart-traffic/
[159] https://smartpittsburgh.org/programs/mobility-optimization-along-smart-spines
[160] https://www.cmu.edu/metro21/news/news-articles/news-articles-2018/mobilitylab-in-pittsburgh-machine-learning-improves-traffic-for-all-road-users-not-just-cars.html
[161] https://spectrum.ieee.org/pittsburgh-smart-traffic-signals-will-make-driving-less-boring
[162] https://www.chooseparisregion.org/fr/smart-city-expo-world-congress-barcelona-2026
[163] https://www.smartcityexpo.com/the-event/
[164] https://smart-city.cerema.fr/la-fabrique-numerique-linnovation-territoriale

Research also raises ethical concerns around the concept. Ifri (French Institute of International Relations) recommends defining an alternative and European vision of the smart city, in a sector caught between two opposing influences[165]. On one hand, China's model of safe cities is driven by mass surveillance and social control imperatives on behalf of the State. On the second hand, the consumerist Northern American model relies on an extensive use of personal data by private actors and raises concerns among citizens around privacy and the potential commercial exploitation of personal data[166].

As smart city actors intended to revolutionize urban planning to the very way humans inhabit the city, the High Planning and Strategy Commission (Haut Commissariat à la Stratégie et au Plan) noted the phenomenon mostly amounted to a semantic revolution in the way the city was described, while its implementation in practice builds on a certain continuum[167]. France Urbaine, an association of French cities and metropolises, characterized in 2019 what seemed to emerge as the French conception of the smart city[168]. While acknowledging the diversity of French smart cities, the report identifies several axes of similarity. The initial concept inspired by techno-corporate interests is put aside in a shift from a paradigm of "more digital" to one of "better digital". The understanding of "smart" is hence displaced from technology to the urban planning, which deploys digital technology as a tool instead of a finality and is democratically designed around core human principles.

[165] https://www.ifri.org/fr/etudes/ni-surveillance-ni-consumerisme-algorithmique-vers-un-modele-europeen-alternatif-pour-les
[166] *Ibidem*
[167] https://www.strategie-plan.gouv.fr/sur-quel-horizon-se-construit-une-ville-retrospective-et-prospective-de-lintelligence-urbaine
[168] https://www.datapressepremium.com/rmdiff/2009950/Villes_numeriques_et_innovation_fr.pdf

7. Germany[169]

Büro für Technikfolgen-Abschätzung beim Deutschen Bundestag (TAB)

i. Legislative, policy and strategic frameworks governing sustainable urban mobility

Germany's sustainable urban mobility agenda is shaped by a dense landscape of laws, plans, funding programmes, experiments, and local initiatives aimed at implementing the 4V mobility principle. The 4V principle is a central guiding concept in modern transportation planning in Germany and beyond. It describes four strategic approaches—all beginning with the letter V in German, hence the name—to make transportation networks more efficient, environmentally friendly, and user-oriented. It consists of the following elements:

1. **Avoid (Vermeiden):** Unnecessary traffic should not arise in the first place. This is achieved, among other things, through smart land-use planning (e.g., short distances through mixed-use development), the promotion of working from home, and digital services.

2. **Shift (Verlagern):** Necessary travel should be shifted from inefficient modes of transportation to more environmentally friendly alternatives. Specifically, this means switching from cars to cycling, walking, or local public transportation.

3. **Design for Sustainability (Verträglich gestalten):** The modes of transportation used should be as environmentally and socially sustainable as possible. The focus here is on the transition to new propulsion systems (e.g., e-mobility), noise protection, and the reduction of pollutant emissions.

4. **Connect (Vernetzen):** The strength lies in combining modes. Individual modes of transportation are no longer viewed in isolation but are intelligently linked together (multimodality). This includes both physical integration (e.g., Bike+Ride, car-sharing stations at train stations) and digital services (e.g., mobility apps, e-ticketing).

Yet implementation remains uneven. The main issue is how a multi-level governance system translates broad goals into local change. EU environmental and planning norms, federal traffic law and funding, *Länder* responsibility for public transport, and municipal implementation all interact in ways that often slow delivery, fragment accountability, and expose local projects to legal and political reversal.

The core federal legal framework for ground transportation remains the road traffic regime, especially the *Straßenverkehrsgesetz* (StVG; Road Traffic Act, the primary legal foundation for German road traffic) and the *Straßenverkehrs-Ordnung* (StVO; Road Traffic Code, the

[169] Author: Torsten Fleischer

implementing regulation to the StVG, which includes rules of the road, additional safety provisions, and administrative and enforcement procedures). For many years, this framework strongly prioritized 'ease of traffic' and safety in a narrow sense, making it difficult for municipalities to justify speed limits, the conversion of road lanes into bike lanes, or neighborhood traffic calming on sustainability, health, or urban-design grounds. The ongoing reform of this framework is therefore one of the most important recent developments in German urban mobility policy. The amended road traffic law broadened the objectives that can be considered in subordinate traffic regulation, and the implementing reform of the *Allgemeine Verwaltungsvorschrift zur Straßenverkehrs-Ordnung* (VwV-StVO, an internal administrative guideline governing how municipalities and government agencies enforce StVO traffic rules) was approved by the *Bundesrat* (Federal Council, a constitutional body representing the sixteen *Länder* and defending their interests vis-à-vis the Federation and, indirectly, the European Union) on 21 March 2025. This reform gives *Länder* and municipalities more legal room to consider climate and environmental protection, health, and urban development when shaping local traffic organization.

The main federal strategic documents for active mobility are the National Cycling Plan 3.0 and the Federal Walking Strategy. The National Cycling Plan extends to 2030 and is presented by the federal government as a shared agenda for the Federation, *Länder*, municipalities, the business sector, and civil society. It is structured around policy, infrastructure, people, and the economy, with cross-cutting themes such as digitalization and urban-rural integration. The federal government frames cycling not as a niche mode but as a mainstream mobility and infrastructure issue. The Federal Walking Strategy, adopted in February 2025, performs a similar role for walking, as it is now being treated more explicitly as a policy field in its own right rather than merely the residual mode for short trips.

Federal funding is also central. For cycling, the *Stadt und Land* program—a special grant program administered by the Federal Ministry of Transportation that has provided funding for local bicycle infrastructure projects to *Länder* and municipalities since 2021—was extended to 2030. It supports separated cycle networks, bicycle streets, bridges, underpasses, parking facilities, and links to public transport, among other measures. For public transport, the *Gemeindeverkehrsfinanzierungsgesetz* (GVFG; Local Transport Financing Act) provides a key route for financing the construction, upgrading, and modernization of local and regional infrastructure, including tram extensions, bus-priority measures, interchange improvements, and station upgrades, following a standardized appraisal procedure for projects whose eligible categories include electrification and charging or refueling infrastructure for alternative propulsion systems."

At the *Länder* level, the key responsibilities are public transport governance, implementation of federal law, and mediation between federal strategy and municipal delivery. Public transport is

legally a *Länder* responsibility, which is why the *Länder* determine the price path of the Deutschlandticket (see 2). The *Länder* also shape state public transport laws, supervisory interpretations of road law, and the regional planning context within which cities act. Research literature shows that this intermediate level is often where implementation delay accumulates, especially when EU and federal requirements have to be translated into subnational legislation or administrative practice.

Broadly speaking, the municipal level has become the main arena where sustainable mobility is materially defined, particularly in choices over curb space, cycle lanes, bus priority, parking pricing, access restrictions, and neighborhood circulation. The main instruments for municipalities are *Verkehrsentwicklungspläne* (local transport plans), parking and street-management rules, cycling and walking plans, and, increasingly, SUMP-inspired integrated mobility plans. Germany still has no general legal duty for municipalities to prepare a transport development plan, but many funding programmes require one, and many cities use integrated planning linked to air-quality and noise planning. Under the revised EU TEN-T Regulation (EU) 2024/1679 on guidelines for the development of the trans-European transport network, major urban nodes on the network must adopt and monitor a Sustainable Urban Mobility Plan (SUMP) by 31 December 2027. In Germany, this has created a *de facto* priority obligation for the 78 TEN-T urban nodes and their functional urban regions, while some other municipalities with more than 100,000 inhabitants are being reviewed and supported in anticipation of EU-standard planning but are not, merely by virtue of size, subject to an identical direct national SUMP duty.

Three large cities hold the status of a German *Land* (the so-called 'city-states', including Berlin and Hamburg), which establishes a stronger statutory basis for climate-friendly and cleaner urban transport policies. The Berlin Mobility Act and *Zukunftsentscheid Hamburg* are important policy vehicles but remain contested both nationally and locally and may be subject to change should political majorities shift.

The most visible recent measures in Germany have addressed public transport, cycling, walking and public space, parking and street-space allocation, low-emission regulations, shared mobility and micromobility, and electrification.

In public transport, the two most prominent recent interventions have been the 9-Euro-Ticket and its successor. The 9-Euro-Ticket started as a temporary (limited to three months) public transport flat-rate introduced in Germany during the summer of 2022. It allowed unlimited travel on all local and regional transport networks nationwide, immediately gained immense popularity, and created substantial pressure on policymakers to develop it into a permanent offering. After some political debate, the *Deutschlandticket* (also known as the D-Ticket) was launched in May 2023. It operates on the same premise as the 9-Euro-Ticket, currently costs €63 per month, and is eligible for *Länder* or employer subsidies. These fare reforms covered bus, tram, metro,

suburban rail, and regional rail; they were coupled with a significant simplification of access to public transport, replacing complex fare structures with an easy-to-understand flat-rate, and were paired with a strong push toward digital ticket distribution. Current federal statistics report about 14.5 million users by spring 2026.

For cycling, recent measures include temporary cycle lanes introduced or accelerated during the pandemic, permanent protected lanes, bicycle streets, redesign of junctions, bicycle parking, and citywide network development. German municipalities have also used federal *Stadt und Land*-program (see above) funding for network expansion, bridges, underpasses, and multimodal links, including parking at interfaces with public transport. Empirically, the most dynamic cases have been large cities such as Berlin, Hamburg, Munich, and Frankfurt, but implementation remains uneven and strongly conditioned by local planning capacity.

Walking and public-space measures have become more visible in recent years. These include wider sidewalks, safer crossings, school-area interventions, traffic calming, temporary car-free zones, *Kiezblocks* (the German version of the well-known superblock concept, describing an urban residential area free of motorized through-traffic where residents, deliveries, and emergency services can still access all buildings, but cars can no longer use the residential streets as shortcuts), and redesign of local squares and streets for longer stays, greenery, and safer access. The new walking strategy and the 2025 VwV-StVO reform (see above) strengthen the policy basis for these measures, but many projects still depend on municipal initiative and legal confidence. Real-world laboratories and street experiments have often bundled walking, cycling, greenery, seating, and public-space redesign into single interventions, making them a key site for testing broader ideas of urban transformation.

Cities have also experimented with parking management, resident parking reform, lane conversion, road closures, loading-zone redesign, and various forms of modal filtering. These measures aim at both demand management and street-space redistribution. Yet current research shows that they are among the most conflict-prone instruments in Germany because they directly challenge the social and legal privilege long granted to the private car.

Shared mobility and micromobility have expanded through car sharing, bike sharing, and e-scooters. Their legal treatment is evolving. In February 2026, Germany enacted a reform of the *Elektrokleinstfahrzeuge-Verordnung* (eKFV; the German ordinance regulating the use of personal light electric vehicles such as e-scooters on public roads) that clarified that free-floating shared e-scooters and bikes are not subject to ordinary parking rules and gave municipalities more room to regulate them. This matters because local conflicts around sidewalk obstruction, fleet oversupply, and the use of public space have become a standard part of urban micromobility governance."

ii. Evidence regarding the impact of these measures on mobility patterns, citizens' behavior and urban quality of life

The strongest recent evidence concerns fare policy, air quality, selected cycling measures, and neighborhood experiments. The federal evaluation of the *Deutschlandticket* reports broad uptake, a significant shift from private car use to public transport, estimated annual CO_2 savings of around 2.5 million tones, and improved mobility and social participation for lower-income users. The academic literature is more cautious. Studies show that lower fares increased public transport use, but cheap tickets alone do not reliably break car dependence or solve congestion. Effects are stronger when paired with better service, network quality, and car-restrictive measures. This distinction matters: the ticket reforms increased use and access, but the deeper mobility-transition question is whether they changed routines, not just costs. Obviously, the measure mattered politically and symbolically, but its short duration and weak integration with broader policy packages limited its transformative reach so far.

For cycling, the evidence points to real gains, but also to strong dependence on local institutional readiness. Temporary cycle lanes spread most where cities already had planning capacity, prior active-mobility strategies, and an intention to make the measures permanent. This suggests that public support alone is not enough; what matters is whether a municipality already has the routines, staff, and political backing needed to use a policy window quickly.

The evidence on public acceptance of mobility interventions is mixed. Studies have shown that isolated 'push' measures such as universal parking fees are unpopular, while broader packages that combine restriction with visible local benefits are more acceptable. The politics of public acceptance therefore depend heavily on design, bundling, and distributional framing. Parking loss, traffic displacement, and fairness are recurrent flashpoints. The same studies also suggest that attitudes are not static. Measures that are abstractly opposed can gain support when benefits become tangible, but this is not guaranteed, especially where interventions are temporary, poorly communicated, or perceived as imposed from above.

For air quality, the literature is rather clear: litigation mattered. German cities long remained in non-compliance with EU nitrogen-dioxide limits, and environmental NGO lawsuits helped force stronger local plans and diesel restrictions. The broader lesson here is institutional rather than technical: implementation often advanced only after courts intervened, which indicates a deeper failure of normal administrative enforcement and multi-level coordination.

The evidence on urban experiments is more modest. Real-world laboratories, temporary car-free zones, *Kiezblocks*, and similar projects often generate learning, visibility, and local quality-of-life gains, but their citywide mobility effects are harder to measure and permanence is uncertain. Studies of Berlin public-space redesigns and neighborhood modal filters (physical barriers in urban road design that block motorized through-traffic on residential streets while allowing

pedestrians, cyclists, and emergency vehicles to pass through) point to tangible benefits such as calmer streets, safer walking and cycling conditions, and richer public-space use, but also to conflict over parking, deliveries, noise, and the social meaning of change.

In short, Germany has growing evidence that particular measures can work, but much weaker evidence that fragmented short-term pilots reliably scale into durable system change. The evidence on quality of life is therefore strongest where interventions directly change local space. Temporary or permanent redesigns can improve perceived safety, enable more walking and cycle, and increase the usability of public space for everyday social life. But these gains often remain politically fragile when they rely on temporary installations, project funding, or legal constructions that can be overturned.

iii. Involvement of citizens and stakeholders in the planning, implementation and evaluation of sustainable urban mobility policies

German urban mobility policy now uses a wide range of participatory practices: public consultations, workshops, scenario processes, neighborhood meetings, stakeholder roundtables, online surveys, citizen initiatives, and, increasingly, co-creative formats in experiments and SUMPs. Official planning guidance frames stakeholder and citizen participation as part of integrated mobility planning.

Research shows that German sustainable mobility planning often involves citizens strongly in early visioning stages, but much less in implementation and monitoring; professional stakeholders are also underused in some planning phases. This produces a familiar pattern: broad strategic visions are discussed in participatory terms, while the more technical and conflictual stages of delivery are handled in narrower administrative arenas. That weakens feedback loops and often leaves later conflict to be fought out in reactive rather than deliberative settings.

Bottom-up mobilization has been especially important in cycling policy. A study of *Volksentscheid Fahrrad* (Bicycle Referendum, a 2015–2016 grassroots campaign in Berlin that demanded safer bike lanes, protected intersections, and better infrastructure) shows how civil society pressure helped force cycling onto the formal political agenda and contributed to a legally stronger framework through Germany's first *Länder* Mobility Act (see section 1). More broadly, cycling growth in several German cities has been reinforced by grassroots campaigns and initiatives similar to *Volksentscheid Fahrrad* that turned latent demand into institutional pressure. These cases show that civic engagement in German mobility politics is not just consultative; it can be agenda-setting and, at times, law-shaping.

At the same time, the evaluation literature repeatedly warns that participation can be narrow, late, or symbolic. In Berlin street-redesign experiments, residents complained about poor information, inaccessible meeting times, perceived pre-decisions, and the dominance of already-

organized groups. Real-world laboratories often struggle to mobilize undecided or car-dependent groups and instead attract the already convinced. Participation also tends to underrepresent lower-income households, migrants, and people with limited time resources. The result is a persistent tension: participation is now expected, but not always trusted.

This is particularly clear in neighborhood-scale measures such as *Kiezblocks* or modal filters. These often affect daily routines directly and therefore trigger dense local negotiation over fairness, access, noise, loading, and the legitimacy of change. Literature suggests that participation is most effective where it begins early, remains transparent about legal and spatial constraints, and does not promise open-ended co-decision where the decision space is actually narrow.

Institutionalized expert participation also matters. The National Cycling Plan 3.0 was prepared through online participation and an expert dialogue forum, and the federal Advisory Council on Cycling advises the ministry on strategy, priorities, and funding for innovative model projects. These bodies are important because they institutionalize knowledge exchange between administration, planning experts, associations, and practitioners. However, their practical effect remains stronger on agenda-setting and justification than on final implementation, which is still constrained by legal, fiscal, and administrative bottlenecks.

iv. Main challenges and future policy priorities in relation to sustainable urban mobility

Recent parliamentary action has focused on the road-traffic framework and fare reform. In October 2023, the *Bundestag* held a public hearing on the Tenth Act amending the Road Traffic Act (StVG), and after conflict between *Bundestag* and *Bundesrat*, the reform moved into the Mediation Committee in June 2024 before the implementing VwV-StVO (see section 1) amendment was approved in March 2025. This shows both renewed legislative attention to sustainable urban mobility and the frictions built into German federalism. At the same time, the recurring *Deutschlandticket* evaluations have become a central reference point in debates on price and financing of public transport, and the future scope of fare integration.

For current and future mobility policymaking, six priorities appear to stand out:

(1) The legal opening created by the 2024–25 road-traffic reform must be translated into routine administrative practice. The reform gives municipalities more room, but conservative legal interpretation, fear of litigation, and weak staffing can still neutralize formal new powers. This is why the current policy debate is not only about whether the law changed, but whether municipalities can actually use it. Training, administrative guidance, model cases, and court practice will matter as much as legislative text.

(2) Municipalities need more stable delivery capacity: staff, legal expertise, data, and long-term budgets rather than short-lived project windows. Sustainable mobility is still often treated as a project portfolio rather than as a normal and durable function of local administration. This creates recurring gaps between ambition and delivery. Cities may win funding for pilot projects, but still lack the personnel to plan, evaluate, legalize, and maintain them over time. This makes sustainable mobility also vulnerable to changing policy priorities under financial limitations or to a changing broader policy climate.

(3) Germany still needs stronger integration of pricing, service, and street-space policy. The *Deutschlandticket* has broadened access and shifted some travel, but public transport fare reform alone will not deliver the mobility transition. If the ticket is to retain political legitimacy as its price rises, service quality, reliability, and financial stability will matter as much as affordability. Financing seems to be secured to 2030, but future debates will likely center on the price path, social discounts, the division of cost between *Bund* and *Länder*, and the risk that a successful ticket outpaces the service capacity and service quality of local networks.

(4) Active mobility policy is moving from isolated cycling measures toward broader street and neighborhood redesign. The walking strategy, cycling funding, *Kiezblock*-style approaches, and tighter micromobility regulation all point in that direction. The challenge will be to move from tactical interventions to permanent, citywide restructuring of streets, including parking management, safer junctions, and better integration between cycling, walking, and public transport. This will also require more explicit treatment of logistics, deliveries, and urban freight, which are often the point where sustainability goals collide with the everyday economy of dense cities.

(5) The politics of fairness will become more important. The future of sustainable urban mobility in Germany will depend not only on technical design, but on whether policies are seen as socially fair, locally intelligible, and visibly beneficial. The strongest opposition often gathers around the distribution of costs and inconveniences: who loses parking, who gains safer streets, whose commute becomes easier, and whether neighboring areas bear displaced traffic. This means that future policy will have to combine legal reform and infrastructure funding with better distributional design, targeted social compensation, and more credible participation.

(6) The adaptation of large urban municipalities to the emerging SUMP requirement is not just a technical planning issue. It will push cities toward more integrated and monitored mobility strategies, tighter linkage between transport and urban development, and stronger expectation of data-based planning. The challenge is that many municipalities are still operating within fragmented legal and administrative settings that were not originally designed for integrated mobility governance while increasingly being asked to adopt planning forms closer to EU SUMP standards.

In summary, Germany now has a broader and more modern framework for sustainable urban mobility than it did a decade ago. Recent measures in public transport, cycling, walking, street redesign, and emissions control have produced real if occasionally still uneven effects. Evidence shows that some interventions can shift behavior, improve accessibility, and raise urban quality of life, but also that their effects depend heavily on local capacity, political durability, and legal usability. Participation has become more prominent, yet remains selective and recurringly contested. The main challenge ahead is therefore not inventing new policy goals, but aligning legislation, funding, planning, participation, and implementation across the EU, federal, *Länder*, and municipal levels so that sustainable mobility becomes an ordinary function of urban governance rather than a series of exceptional pilot projects. The country already has many of the required instruments for sustainable urban mobility policy—what remains unresolved is how to align them across levels of government, how to strengthen them with necessary local capacity, and how to convert experiments, trials, and legal reforms into normal urban practice.

8. Greece

Ειδική Μόνιμη Επιτροπή Έρευνας και Τεχνολογίας – supported by the Directorate of Studies, Department for Economic, Environmental & Technological Studies

i. Legislative, policy and strategic frameworks governing sustainable urban mobility

Sustainable urban mobility in Greece is shaped through a multi-level system of policies, in which European strategies, national legislation and local planning policies interact. This approach reflects the shift from traditional traffic management policies to integrated sustainable mobility models, where mobility is seen as a tool for environmental protection, social cohesion and economic development.

At the national level, an important institutional development was the enactment of **Law 4784/2021**, which incorporated Sustainable **Urban Mobility Plans (SUMPs)** into the Greek legal order for the first time. The law defines the procedures for the preparation, approval, monitoring and evaluation of SUMPs, as well as the stakeholders involved and their obligations. as it provides for the active participation of citizens, professional bodies and social partners in all stages of planning. The implementation of the law was specified through ministerial decisions and technical directives of the Ministry of Infrastructure and Transport, which are harmonized with the European Commission's guidelines for Sustainable Urban Mobility Plans (SUMPs). These guidelines introduce an integrated planning methodology, which includes analysis of the current situation, participatory processes, vision formulation, selection of measures, definition of monitoring indicators and continuous evaluation of the effectiveness of interventions.

As far as the responsibilities of the Ministry of Environment and Energy are concerned, sustainable mobility is directly linked to the country's modern spatial planning system, as it was shaped by **Law 4447/2016**, **Law 4759/2020** and the **Spatial Planning and Urban Planning Code (Law 5306/2026).** These laws incorporate sustainable mobility as a key parameter of urban planning, providing for the development of compact cities, the reduction of mobility needs, the functional connection of land use and transport, as well as the promotion of soft forms of transport.

The National Climate Law (Law 4936/2022) **also plays an important role**, which sets binding targets for the reduction of greenhouse gas emissions and enhances electromobility, sustainable mobility and the energy transition of transport. These policies are directly linked to the Regional and Local Climate Change Adaptation Plans, as well as to the urban resilience strategies developed at the municipal level.

The concept of sustainable urban mobility in Greece has now expanded significantly, going beyond transport management and incorporating the principle of **universal accessibility** as a

basic condition for ensuring equal movement for all citizens. In this context, the Ministry of Environment and Energy (MEEN) has undertaken important institutional initiatives in recent years, with the aim of integrating accessibility into spatial and urban planning design, recognizing that the quality of mobility directly depends on how public space is designed.

A key tool of this policy is the **National Accessibility Plan with an emphasis on Climate Change (ESPEKA),** which addresses accessibility as an integral element of sustainable mobility policies. The plan provides for the integration of universal design principles into urban regeneration, pedestrian networks, public transport, public spaces and transport infrastructure, seeking to create cities in which All citizens can move autonomously, safely and without discrimination. At the same time, it links accessibility with climate resilience, promoting interventions that improve both urban mobility and the adaptation of cities to the impacts of climate change.

An important institutional development was also the issuance of the **Ministerial Decision YPEN/DESEDP/65826/699/2020 (Government Gazette Β΄ 2998/2020),** which defined the technical instructions for the adaptation of existing buildings and public infrastructure to the needs of people with disabilities and people with disabilities. Although the decision concerns the built environment, its provisions directly affect sustainable urban mobility, as they define the specifications for the formation of continuous and safe networks of sidewalks, ramps, crossings, paving guides for the blind, public transport stops, bicycle routes and other elements of public space that ensure the unhindered movement of all users.

At the same time, the operation of the **Central Accessibility Committee** of the Ministry of Environment and Energy contributes to ensuring the correct implementation of the relevant legislation and the uniform interpretation of technical specifications, enhancing the quality of interventions implemented in public spaces and transport infrastructure. In this way, accessibility ceases to be an exclusively technical requirement and becomes a key planning criterion for urban mobility.

In the context of enhancing universal accessibility and promoting sustainable urban mobility, the Ministry of Environment and Energy has introduced the **Urban Accessibility Plans (S.A.P.),** which are specialized strategic plans for the formation of a coherent and accessible transportation network within cities. The main objective of the S.A.P. is to ensure the safe, autonomous and unhindered movement of all users of public space, with special emphasis on people with disabilities, the elderly, children and disabled people in general.

The S.A.P. were established by **article 65 of Law 4819/2021** (Government Gazette Α΄ 129/23.07.2021), while the **technical specifications, content, methodology of preparation and requirements of the studies** were specified by the **Ministerial Decision ΥΠΕΝ/ΔΜΕΑΑΠ/110088/887/2022** (Government Gazette Β΄ 5553/31.10.2022). This decision

defines a single planning framework for all municipalities in the country, ensuring that accessibility interventions will follow common technical and operational principles.

According to the specifications, each Urban Accessibility Plan includes the mapping of the current state of public space, the recording of obstacles to the movement of pedestrians and people with disabilities, the evaluation of access routes to key destinations (public buildings, schools, health units, public transport stops, public areas, etc.) and the design of an integrated network of accessible routes. At the same time, the S.A.P. include a prioritization of the required interventions, an estimate of the cost of implementation, the prioritization of the projects and proposals for their inclusion in financial programs.

Of particular importance is the fact that the S.A.P. are not limited to dealing with individual technical problems but adopt an integrated approach to urban mobility planning. The proposed interventions concern the creation of continuous and safe sidewalks, the construction of ramps and guides for the blind, the improvement of pedestrian crossings, the accessibility of public transport stops, the connection of pedestrian networks with cycling infrastructure and the ensuring seamless access to the city's main service poles. In this way, the S.A.P. function as a tool for the application of the principles of **Universal Design** and contribute to the enhancement of active mobility, the reduction of social inequalities and the improvement of the quality of public space.

The elaboration of the S.A.P. was financially supported through a special **funding program of the Green Fund**, which was activated in 2022 in order to finance all municipalities in the country for the preparation of the relevant studies. The program covered the costs of drafting the plans, allowing municipalities to systematically record accessibility needs and create a mature pool of projects that can be financed by the NSRF 2021-2027, the Recovery and Resilience Fund, the Green Fund and other national or European financial instruments. In this way, the S.A.P. are the necessary programmatic link between strategic planning and the implementation of accessibility projects.

These institutional developments are directly linked to the **Sustainable Urban Mobility Plans (**SUMPs), which stipulate that any intervention in public space must ensure equal access for all users. According to the European guidelines for SUMPs and the Greek institutional framework, pedestrians, people with disabilities, the elderly, children and vulnerable groups in general are priority groups in mobility planning. As a result, the assessment of sustainable mobility projects is no longer limited to traffic efficiency or environmental impact indicators, but also includes accessibility, social inclusion and universal service indicators.

Therefore, the recent policy of the Ministry of Environment and Energy marks the transition from a concept that treated accessibility as a specialized technical requirement to an integrated model

of sustainable and inclusive urban mobility, where public space design, transport, urban regeneration and social equality are interrelated dimensions of the same development policy.

In addition to shaping the institutional framework, the Ministry of Environment and Energy (MEEN) has taken an active role in the implementation of sustainable urban development policies through special urban regeneration funding programs. The Ministry's modern policy is not limited to the aesthetic upgrading of cities but seeks to create public spaces that enhance sustainable mobility, environmental resilience, social cohesion and the quality of life of residents. This strategy is based on the perception that the design of public space is a key tool for changing mobility patterns and gradually reducing dependence on the private car.

Central to this new policy is the **Recovery and Resilience Fund "Interventions aimed at improving Public Space",** which is implemented by the Ministry of Environment and Energy and is addressed to the municipalities and regions of the country. The program finances integrated urban revitalization interventions that include the regeneration of public spaces, the upgrading of squares and pedestrian streets, the creation of pedestrian and bicycle networks, increase of urban greenery, bioclimatic interventions, rainwater management projects and measures to enhance accessibility for people with disabilities and disabled people.

Of particular importance is the fact that these projects are evaluated not only as technical interventions but also as interventions that contribute to the achievement of national and European goals for climate neutrality, the reduction of carbon dioxide emissions and the promotion of active forms of mobility. Therefore, the funded regeneration must incorporate elements such as universal accessibility, pedestrian and cyclist safety, the enhancement of public transport, the increase of urban greenery and the implementation of Nature-based Solutions, in order to create more resilient and functional public spaces.

At the same time, the Ministry of Environment and Energy promotes an integrated national policy of urban regeneration, according to which interventions in urban space must be part of a wider spatial planning and not fragmentary projects. This policy seeks to link regeneration with Local and Special Urban Plans, Sustainable Urban Mobility Plans (SUMPs), urban resilience strategies and climate change adaptation policies. In this way, the creation of coherent networks of public spaces is sought, where travelling on foot, by bicycle and by public transport is the dominant choice for citizens.

The integration of cycling into urban planning and building regulation constitutes an important institutional step towards embedding active mobility principles into the Greek urban environment. In this context, the **New Building Regulation (NOK – Law 4067/2012)** introduced specific provisions related to bicycle infrastructure, recognizing the bicycle as an element of sustainable urban mobility and establishing requirements for the provision of bicycle parking facilities in new developments.

The inclusion of bicycle-related provisions in the NOK reflects the gradual transition from a car-oriented approach to urban planning towards a more sustainable mobility model, in line with European policies promoting active travel, reduced dependence on private vehicles and the development of compact, accessible and environmentally friendly cities.

In particular, the NOK introduced the obligation to provide **bicycle parking spaces in new buildings and developments**, aiming to ensure that cycling is supported not only through public infrastructure but also through appropriate facilities within the built environment. These provisions establish minimum requirements for bicycle storage areas, ensuring that residents, employees and visitors have access to safe and convenient bicycle parking facilities.

The regulatory framework was further strengthened through subsequent amendments and ministerial decisions that specified technical requirements regarding the location, dimensions and functionality of bicycle parking spaces. The objective was to ensure that bicycle facilities are integrated into the design of buildings from the early planning stage and are easily accessible, secure and compatible with the needs of users.

The incorporation of bicycle infrastructure requirements into the NOK represents an important link between **spatial planning and sustainable mobility**, as it acknowledges that travel behavior is strongly influenced by the characteristics of the built environment. By ensuring that new residential, commercial and public buildings provide facilities for cyclists, the regulation supports the creation of a more bicycle-friendly urban environment and complements wider investments in cycling networks and active mobility infrastructure.

At the level of development policy, sustainable mobility is integrated into the **Regional Development Partnership Agreement (NSRF) 2021–2027**, the **Integrated Spatial Investments (ITI),** the **Sustainable Urban Developments (SUD)** and the **Recovery and Resilience Fund**, through which projects such as bicycle lane networks, regeneration of public spaces, smart transport systems, electromobility, upgrading of public spaces are financed. and interventions to improve accessibility.

At the same time, Greece actively participates in European initiatives such as **NetZeroCities**, **Mission Climate-Neutral and Smart Cities**, **CIVITAS,** URBACT**,** European **Urban Initiative (EUI)** and Intelligent **Cities Challenge (ICC),** through which know-how, financial tools and good practices for the implementation of innovative urban mobility policies are transferred.

ii. Sustainable urban mobility measures implemented in recent years

Active mobility has become a key component of Greece's sustainable urban development strategy, with the **Ministry of Environment and Energy (MoEN)** playing a leading role in promoting cycling through large-scale urban regeneration projects. Rather than treating cycling infrastructure as isolated transport investments, the Ministry incorporates bicycle networks into

broader public space regeneration policies aimed at improving urban quality, environmental sustainability and climate resilience.

Within the framework of the **Recovery and Resilience Facility (RRF – Greece 2.0)**, the Ministry finances the development of major cycling corridors that create continuous metropolitan bicycle networks and strengthen sustainable mobility across urban and peri-urban areas. These projects are designed to encourage modal shift from private cars to cycling while improving connectivity between residential districts, employment centers, educational institutions, recreational areas and public transport hubs.

Among the flagship projects are the **Gazi–Kifissia Metropolitan Cycling Corridor**, establishing a continuous north–south cycling route through the Athens metropolitan area; the **University Campus Cycling Network**, designed to improve safe cycling connections between major university campuses and surrounding urban areas while encouraging sustainable commuting by students, faculty and staff; the **Agioi Anargyroi–Lavrio–Sounio Cycling Corridor**, extending cycling infrastructure from the western suburbs of Athens towards eastern Attica and the coastal region; and the **Athenian Riviera Cycling Corridor**, connecting the coastal municipalities of the Athens metropolitan area through a continuous bicycle route that supports both everyday mobility and sustainable tourism.

These projects are implemented as part of integrated urban regeneration interventions that combine cycling infrastructure with pedestrian improvements, public space enhancement, green infrastructure, climate adaptation measures and universal accessibility. Consequently, cycling is considered not only a transport mode but also a catalyst for healthier lifestyles, environmental improvement, urban resilience and economic revitalization.

Electrification has become one of the principal pillars of Greece's sustainable mobility policy, supporting the transition towards low-carbon urban transport and contributing to the country's climate neutrality objectives. An important milestone in this transition was the launch of the **"Kinoumai Ilektrika" (Move Electrically)** programme by the **Ministry of Environment and Energy (MoEN)** in **2020**.

The programme was introduced as Greece's first comprehensive national incentive scheme promoting electric mobility. Its primary objective was to accelerate the replacement of conventional internal combustion engine vehicles with zero-emission alternatives while encouraging citizens, businesses and public authorities to adopt cleaner transport technologies. Financial incentives were provided for the purchase or lease of battery electric vehicles, plug-in hybrid vehicles, electric motorcycles, electric scooters and electric bicycles. Additional subsidies

supported the installation of private electric vehicle charging infrastructure as well as the replacement of older, more polluting vehicles through scrappage incentives.

The programme formed part of the National Energy and Climate Plan (NECP) and was closely aligned with the objectives of the European Green Deal and the Sustainable and Smart Mobility Strategy. Beyond reducing greenhouse gas emissions, the initiative sought to improve urban air quality, decrease dependence on fossil fuels and stimulate the domestic market for electric mobility technologies.

Successive phases of the programme (**Kinoumai Ilektrika I**, launched in 2020, and **Kinoumai Ilektrika II**, introduced in 2022) expanded the available financial incentives and broadened eligibility criteria for individuals, businesses and vulnerable social groups. The programme also supported the electrification of commercial fleets, taxis and shared mobility services, reinforcing the transition towards cleaner urban transport systems.

Although primarily focused on vehicle electrification, the programme complemented broader sustainable mobility policies by promoting the integration of electric vehicles with public transport, active mobility and intelligent transport systems. Together with investments in public charging infrastructure and electric public transport fleets, it represents one of Greece's most significant policy instruments for decarbonizing urban mobility.

The promotion of cycling as a sustainable transport mode in Greece has also been strengthened through the country’s participation in the **EuroVelo network**, the European network of long-distance cycling routes coordinated by the European Cyclists’ Federation (ECF). EuroVelo aims to develop a trans-European network of high-quality cycling routes that support sustainable mobility, tourism, local economic development and the transition towards low-carbon transport systems.

Greece participates in the EuroVelo network through the development of transnational cycling corridors that connect Greek regions with the wider European cycling infrastructure. The most important route crossing Greece is **EuroVelo 8 – Mediterranean Route**, which follows the Mediterranean coastline and connects Spain, France, Italy, Slovenia, Croatia, Montenegro, Albania, Greece, Cyprus and Türkiye. The Greek section of EuroVelo 8 extends along important coastal and urban areas, linking cultural landscapes, natural assets and tourism destinations while creating opportunities for sustainable mobility and cycling tourism.

The support for EuroVelo is aligned with Greece’s broader policies for sustainable mobility and green infrastructure, as cycling is increasingly recognized not only as a recreational activity but also as a component of integrated transport planning. The development of long-distance cycling

routes complements urban cycling networks, providing opportunities for regional connectivity and strengthening links between urban centers, suburban areas and rural territories.

In the context of the Ministry of Environment and Energy's policies, EuroVelo contributes to the wider strategy of developing **green corridors and sustainable mobility networks**, particularly through the connection of cycling infrastructure with urban regeneration projects, public space improvements and climate adaptation measures. The integration of EuroVelo principles into national and regional planning encourages the creation of safe, continuous and accessible cycling routes, while promoting environmentally responsible forms of tourism and local economic revitalization.

iii. Evidence regarding the impact of these measures on mobility patterns, citizens' behavior, and urban quality of life

The collection of data required for the analysis and evaluation of sustainable urban mobility conditions is based on the systematic exploitation of information generated through the contemporary spatial planning and urban governance instruments implemented in Greece. In particular, the analysis incorporates the data and findings derived from **Local Urban Plans (ΤοπικάΠολεοδομικάΣχέδια – ΤΠΣ)**, **Special Urban Plans (ΕιδικάΠολεοδομικάΣχέδια – ΕΠΣ)**, as well as from complementary planning tools focusing on accessibility, digital transformation, and urban resilience.

The **Local Urban Plans (ΤΠΣ)** and **Special Urban Plans (ΕΠΣ)** constitute primary sources of spatial information, as they provide a comprehensive assessment of the existing urban structure, land-use patterns, demographic characteristics, mobility conditions, transport networks, public space availability and environmental pressures. Through the analysis phase of these plans, valuable data are collected regarding the spatial distribution of activities, the relationship between land uses and transport demand, the accessibility of essential services, the hierarchy of the road network, pedestrian and cycling infrastructure, and existing mobility constraints. These elements are essential for understanding the factors that influence travel behavior and the potential for sustainable mobility interventions.

Complementary information is derived from the **Urban Accessibility Plans (ΣχέδιαΑστικήςΠροσβασιμότητας – ΣΑΠ)**, which provide detailed data regarding the accessibility conditions of the urban environment. The ΣΑΠ contribute to the identification of barriers affecting pedestrian movement and the mobility of people with disabilities and reduced mobility. Through the mapping of existing sidewalks, pedestrian routes, crossings, public facilities and transport nodes, they provide critical information for assessing the inclusiveness and functionality of the urban mobility system. These data are particularly relevant for evaluating

active mobility networks and the degree to which urban environments support safe and equitable movement for all users.

Furthermore, the analysis incorporates data from the **Strategic Plans for Digital Transformation of Cities (ΣχέδιαΦόρτισηςΗλεκτρικώνΟχημάτων – ΣΦΗΟ)**, which provide information regarding the spatial requirements and infrastructure needs associated with the transition towards electric mobility. The ΣΦΗΟ contribute data concerning the location and capacity of charging infrastructure, potential demand areas, parking conditions and integration opportunities with existing transport systems. These elements support the assessment of the readiness of urban areas to adopt low-emission mobility solutions and facilitate the electrification of transport.

Finally, data are also collected from the **Urban Resilience Plans (ΣχέδιαΑστικήςΑνθεκτικότητας – ΣΑΑ)**, which provide information on the vulnerability of urban systems and the capacity of cities to respond to environmental, social and economic challenges. Within the field of mobility, these plans contribute information related to climate risks affecting transport infrastructure, accessibility during emergency situations, the resilience of public spaces, and the capacity of urban networks to adapt to changing conditions. Their integration allows the evaluation of mobility systems not only in terms of efficiency but also in terms of resilience and long-term sustainability.

The combined use of these planning instruments creates a comprehensive and multidimensional database for analyzing sustainable urban mobility. While each instrument focuses on a different aspect of urban development, their integration enables a holistic understanding of the interactions between land use, transport, accessibility, digital infrastructure, climate adaptation and urban resilience. Consequently, these datasets provide the necessary evidence base for identifying key variables, assessing existing conditions and supporting decision-making processes for sustainable urban transformation.

iv. Involvement of citizens and stakeholders in the planning, implementation and evaluation of sustainable urban mobility policies

An important dimension of Greece's sustainable urban mobility policy concerns the development of communication, awareness-raising and participatory governance mechanisms. Recognizing that the transition towards sustainable mobility requires not only infrastructure investments but also changes in travel behavior and social acceptance, the Ministry of Environment and Energy (MoEN) supports European awareness-raising initiatives and promotes the active involvement of local authorities and citizens in the planning process.

Within this framework, the Ministry supports the **European Commission's communication campaigns on sustainable mobility**, including initiatives such as the **European Mobility Week**, which aims to encourage cities, municipalities and citizens to adopt cleaner, healthier and more sustainable transport behaviors. Through the coordination and promotion of these initiatives at national level, local authorities are encouraged to organize awareness activities, public events, educational actions and mobility demonstrations that highlight the benefits of walking, cycling, public transport, shared mobility and low-emission transport solutions.

The involvement of **local government authorities** constitutes a central element of this approach. Municipalities, as the level of governance closest to citizens, play a critical role in translating national and European mobility objectives into local actions. Through their participation in Sustainable Urban Mobility Plans (SUMPs), Urban Accessibility Plans (SAPs), urban regeneration programmes and other spatial planning instruments, local authorities contribute to identifying local mobility challenges, defining priorities and implementing context-specific solutions. This cooperation strengthens institutional capacity and promotes the development of mobility policies adapted to the specific characteristics and needs of each urban area.

At the same time, the Ministry has progressively strengthened **participatory planning procedures** across all levels of spatial and urban planning. Contemporary planning instruments, including **Local Urban Plans (ΤΠΣ)**, **Special Urban Plans (ΕΠΣ)**, **Urban Accessibility Plans (ΣΑΠ)** and **Urban Resilience Plans (ΣΑΑ)**, incorporate consultation mechanisms that enable the participation of municipalities, public authorities, professional organisation, scientific institutions, local stakeholders and citizens. These procedures aim to ensure transparency, improve the quality of decisions and integrate local knowledge and social needs into planning outcomes.

The participatory dimension is particularly important in sustainable mobility planning, as mobility patterns are strongly influenced by citizens' perceptions, habits and everyday experiences. Through consultation processes, stakeholders can contribute to the identification of accessibility barriers, mobility problems, safety concerns and opportunities for improvement, while increasing social acceptance of proposed interventions. This approach reflects the principles of collaborative governance promoted by European urban policy, where sustainable urban transformation is achieved through cooperation among public authorities, private actors and civil society.

Overall, the Ministry's emphasis on communication, public awareness and stakeholder engagement demonstrates a shift from a purely technical approach to mobility planning towards a more integrated governance model. Sustainable urban mobility is increasingly understood as a collective process that requires not only the implementation of infrastructure and regulatory

measures but also the active participation, behavioral change and shared responsibility of all urban actors. This participatory dimension strengthens the effectiveness and long-term sustainability of mobility policies and contributes to the creation of more inclusive, resilient and people-centered cities.

v. Main challenges and future policy priorities in relation to sustainable urban mobility

Despite the significant progress achieved in recent years in the field of sustainable urban mobility, important challenges remain regarding the transition from strategic planning to effective implementation. A key challenge concerns the **institutionalization and operational activation of recently developed national strategic frameworks**, particularly the **National Walking Strategy** and the **National Accessibility Plan**. These initiatives represent important steps towards a more inclusive, healthy and sustainable mobility model; however, their full contribution requires their formal integration into the national planning framework and their systematic implementation at local level.

The **National Walking Strategy** introduces a comprehensive approach for promoting walking as a fundamental component of everyday mobility, recognizing pedestrians as priority users of the urban environment. Its implementation can contribute to improving the quality, safety and connectivity of pedestrian networks, reducing dependence on private vehicles and strengthening active mobility. However, a major challenge remains the establishment of an appropriate institutional framework that will define implementation mechanisms, responsibilities, monitoring procedures and funding opportunities, ensuring that walking is incorporated consistently into urban planning, transport policies and regeneration programmes.

Similarly, the **National Accessibility Plan** provides an important strategic framework for achieving a universally accessible built environment and ensuring equal opportunities for mobility for all citizens, including people with disabilities and people with reduced mobility. Its effective implementation requires the strengthening of coordination mechanisms between national and local authorities, the integration of accessibility principles into all levels of spatial planning, and the systematic connection with existing tools such as Sustainable Urban Mobility Plans (SUMPs), Urban Accessibility Plans (SAPs) and urban regeneration programmes.

The activation of these two strategic frameworks represents a critical next step for Greek sustainable mobility policy. Their institutional recognition would strengthen the coherence of existing interventions by providing common objectives, technical guidance and evaluation mechanisms for municipalities and other stakeholders. Furthermore, their implementation would support a more holistic approach to mobility, where walking and accessibility are not

treated as complementary issues but as fundamental components of sustainable, inclusive and resilient urban systems.

Therefore, the main challenge for the coming years is not only the preparation of strategic documents but their transition into **operational policies supported by legislation, funding mechanisms, governance structures and monitoring systems**. The effective implementation of the National Walking Strategy and the National Accessibility Plan can significantly enhance the integration of active mobility, universal design and social inclusion into Greece's sustainable urban transformation agenda.

9. Japan[170]

Research and Legislative Reference Bureau (RLRB), National Diet Library (NDL)

i. Key legal systems, policies, and strategic frameworks governing sustainable urban mobility

a. Basic Act on Transportation Policy and Basic Plan for Transport

In Japan, the Basic Act on Transportation Policy (Act No. 92 of 2013) was enacted in 2013 to clarify the principles and basic direction of transportation policy in general, including Urban Mobility[171]. The Act stipulates that, as a fundamental principle for promoting transportation measures, "Since the function of transportation is to ensure the people can carry out their everyday activities and lead their lives in society independently, enable an active inter-regional and international exchange, as well as guarantee a smooth distribution of goods, and since transportation is indispensable for improving stability of the lives of the people and ensuring a sound development of the national economy, transportation policies must be promoted with the basic understanding that it is important to properly satisfy the basic transportation needs of residents and other members of the public (omitted) by making sure that transportation functions to its full potential into the future." The Act promotes the maintenance and improvement of transportation functions, the reduction of environmental impacts from transportation, and the appropriate division of roles and integrated and efficient coordination among different transport modes.

Furthermore, the Basic Act on Transportation Policy requires the government to establish a basic plan for transportation measures in order to promote such measures in a comprehensive and systematic manner; based on this, the Basic Plan on Transport Policy has been formulated. Currently, the Third Basic Plan for Transportation Policy[172], covering fiscal years 2025 through 2030, is in place. Based on the basic recognition that Japan should "turn the crisis of population decline into an opportunity and realize a sustainable, vibrant economy and society where every individual can feel a sense of prosperity and security," the Plan sets out 11 goals in line with Basic Policies A through D, as shown in Table. Among these, Goal 2 under Basic Policy A promotes the formation of core public transportation corridors that serve as the backbone of cities[173].

Table: Objectives of Basic Transport Policy

Basic Policy A: Creating transportation systems that support local communities and address local challenges

[170] Author: Taisuke Kohari
[171] Shukuri Masahumi and Shinji Jikumaru (eds.), *Theory of Regional Public Transportation Policy, 2nd Edition*, The University of Tokyo Press, 2024, pp.12-13; "Basic Act on Transportation Policy." Japanese Law Translation Website https://www.japaneselawtranslation.go.jp/ja/laws/view/4890
[172] Ministry of Land, Infrastructure, Transport and Tourism, "Overview of the Third Basic Plan for Transport Policy" https://www.mlit.go.jp/sogoseisaku/transport/content/001977287.pdf
[173] *ibid.*

Goal 1:	Eliminate "transportation gaps" and resolve local issues through the full-scale redesign of local transportation
Goal 2:	Advance transportation policies that foster sustainable community development and revitalize local industries
Basic Policy B:	Creating of transportation networks that support a growth-oriented economy
Goal 3:	Implement smooth inter-regional flow of people and interaction through the expansion and strengthening of diverse transportation functions
Goal 4:	Implement sustainable logistics through an optimal mix of diverse policies
Goal 5:	Enhance international competitiveness through the strengthening of transportation networks
Basic Policy C:	Creating a robust and resilient transport infrastructure that supports a sustainable, safe, and secure society
Goal 6:	Address diverse disaster risks, aging infrastructure, and the creation of an environment that ensures thorough transport safety
Goal 7:	Create transport systems that contribute to a green society, taking into account the manifest impacts of climate change and global trends
Goal 8:	Create transport systems that support an inclusive society where everyone can play an active role
Basic Policy D:	Developing transport services in response to changing times and environments by leveraging digital and new technologies
Goal 9:	Create new value as well as more convenient and comfortable mobility through service enhancement and data-driven initiatives
Goal 10:	Achieve increased productivity and other improvements through structural transformation of services via automation, remote operation, and other means
Goal 11:	Achieve safe and secure transport services by fully anticipating cyber risks and implementing appropriate countermeasures

(Source) Prepared based on the following document: "Basic Plan for Transport," pp.16–70, Ministry of Land, Infrastructure, Transport and Tourism website https://www.mlit.go.jp/sogoseisaku/transport/content/001977285.pdf

b. Local Public Transportation Act

In Japan, maintaining local public transportation is a major challenge. The legal framework governing sustainable urban mobility includes the "Act on Revitalization and Rehabilitation of Local Public Transportation" (Act No. 59 of 2007)[174]. This Act aims to have local governments take the lead in establishing councils involving a wide range of stakeholders to discuss and examine the optimal forms of local transportation—including daily commuting—and to facilitate

[174] Act on the Revitalization and Regeneration of Local Public Transportation (Act No. 59 of Heisei 19) e-GOV website https://laws.e-gov.go.jp/law/419AC0000000059

consensus-building among those stakeholders[175]. Local governments are required to formulate regional public transportation plans in accordance with this Act. These plans may include provisions for various projects, related to systems such as next-generation light rail transit (LRT) and bus rapid transit (BRT). LRT can improve accessibility, punctuality, speed, and passenger comfort by introducing low-floor light rail vehicles (LRVs) and upgrading tracks and stops.[176]. The Track Transportation Advancement Project supports the introduction of LRT[177]. When a project is certified, it may become eligible for regulatory exemptions and financial support. In addition, the Act stipulates measures to facilitate new regional passenger transportation services[178] and new mobility services that contribute to the integration of transport modes[179]. Furthermore, based on this Act, the Minister of Internal Affairs and Communications and the Minister of Land, Infrastructure, Transport and Tourism have formulated the "Basic Policy on the Promotion of the Revitalization and Regeneration of Regional Public Transportation" (Reiwa 5 Notification No. 2 of the Ministry of Internal Affairs and Communications and the Ministry of Land, Infrastructure, Transport and Tourism)[180], which sets forth basic policy matters regarding regional public transportation[181]. Incidentally, the Act was amended in 2026 most recently to ensure residents have access to transportation in areas where public transportation has been left unserved due to reduced bus and taxi services or service discontinuations; the amendment aims to utilize school buses and hospital shuttle vehicles, among others, for transporting residents[182].

ii. Recent Measures for Sustainable Urban Mobility

A notable example of recent sustainable urban mobility initiatives in Japan is Utsunomiya Light Rail[183]. Utsunomiya City is the central city of Tochigi Prefecture, located in the northern part of

[175] Shukuri et al., *op.cit*.(171), pp.9–12.
[176] *ibid.*
[177] By receiving certification under the Rail Transport Advancement Project, from an institutional perspective, operators running LRT services can obtain a "rail transport operator" license, and local governments and other entities that develop and own LRT facilities can obtain a "railway infrastructure operator" license. From a financial perspective, the national government can provide support to facility developers for construction costs and vehicle purchases, and local governments are permitted to issue local bonds to cover a portion of their financial burden. Takanori Kurotori, "Subsidies for Streetcars and LRTs," *Considering Regional Transportation*, No.17, February 2026, p.12.
[178] This refers to businesses that provide transportation services spanning multiple transport modes, such as public transit and private vehicles. Hokkaido Regional Transport Bureau, Transportation Policy Department, Transportation Planning Division, "Systems and Implementation of the Act on the Revitalization and Regeneration of Regional Public Transportation," September 2022, p.1. https://wwwtb.mlit.go.jp/hokkaido/content/000273071.pdf
[179] This refers to businesses that provide new mobility services such as Maas (Mobility as a service: A service that optimally combines multiple modes of public transport and other mobility services to enable integrated search, booking, and payment). *ibid.*
[180] Basic Policy on Promoting the Revitalization and Regeneration of Local Public Transportation (Reiwa 5 Ministry of Internal Affairs and Communications Notification and Ministry of Land, Infrastructure, Transport and Tourism Notification No.2) Ministry of Land, Infrastructure, Transport and Tourism website https://www.mlit.go.jp/sogoseisaku/transport/content/001626577.pdf
[181] In Japan, the Ministry of Internal Affairs and Communications is responsible for local government affairs, while the Ministry of Land, Infrastructure, Transport and Tourism is responsible for transportation and traffic affairs.
[182] "Cabinet Approves 'Bill to Partially Amend the Act on the Revitalization and Regeneration of Regional Public Transportation—Toward the Realization of Sustainable Regional Public Transportation by Eliminating 'Transportation Gaps' and Other Issues'" March 10, 2026. Ministry of Land, Infrastructure, Transport and Tourism website https://www.mlit.go.jp/report/press/sogo12_hh_000505.html; "School and Hospital Buses to Transport Residents as Well: Legislation Enacted to Eliminate 'Transportation Gaps' Through Local Government-Led Measures," *Tokyo Shimbun*, June 4, 2026.
[183] "Utsunomiya Light Rail," https://www.miyarail.co.jp/; Utsunomiya City, "【CATV】Utsunomiya Trip by LRT: Lightline Information Bureau," https://www.youtube.com/playlist?list=PLOFrOMPz-hHRqdgsDaetuE9zUAIW_zKpn

the Kanto region, with a population of approximately 510,000[184]. In recent years, LRT has attracted attention in Japan as well not only for its low construction costs but also as a means of reducing dependence on private cars and the emissions associated with car-based transport[185]. The Utsunomiya Light Rail, which connects Utsunomiya Station East to Haga Takanezawa Industrial Park, began operations on August 26, 2023. The project was initially considered as a way to address changes in population distribution—specifically, a decline in the city center and an increase in the suburbs—and to alleviate traffic congestion in eastern Utsunomiya caused by growing dependence on automobiles. However, it was later positioned as a core public transportation system for sustainable long-term urban development[186]. As Japan's first full-scale LRT newly developed from scratch, the Utsunomiya Light Rail was developed primarily by the Utsunomiya City, which led the planning process from its earliest stages. In addition to selecting the route and conducting demand forecasts, the city employed a "total design" approach for the entire project, ensuring a unified design for rolling stock, stations, transit centers, and other elements based on a single concept[187].

Furthermore, the Utsunomiya Light Rail has been certified as a "Rail Transport Modernization Project" under the Act on the Revitalization and Regeneration of Local Public Transportation, as mentioned in 1.2[188]. As a result, public authorities cover the initial investment costs for track construction, while a private operator (Utsunomiya Light Rail Co., Ltd., a public-private partnership) leases the facilities and operates the system under a model in which infrastructure is publicly owned and operations are managed separately[189].

iii. The Impact of Urban Mobility Measures on Mobility Patterns, Citizen Behavior, and the Quality of Urban Life

A survey was conducted on changes in residents' mobility patterns among residents living along the Utsunomiya Light Rail route, both before and after its opening[190]. This survey targeted residents living within 500 meters of the light rail line in Utsunomiya City. The pre-opening survey (August 2023) received 509 responses, while the post-opening survey (February 2024)—which targeted households that had responded to the pre-opening survey—received 356 responses.

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[184] "Population, Area, and Other Information on Utsunomiya City" Utsunomiya City Website https://www.city.utsunomiya.lg.jp/shisei/gaiyo/1007461.html

[185] "The 'Utsunomiya Light Rail' Is Amazing! Why Pre-War 'Trams' Are Making a Major Comeback Around the World," October 2, 2024. JB Press website https://jbpress.ismedia.jp/articles/-/83507

[186] Masahito Anbo, "The Journey to the Opening of the Utsunomiya Light Rail," *Thinking About Local Transportation*, No. 17, February 2026, pp.18–19.

[187] *ibid*., p.16.

[188] "Minister of Land, Infrastructure, Transport and Tourism Approves LRT Projects in Utsunomiya City and Other Areas; Project Cost: 45.8 Billion Yen; Aiming for 2019 Launch" October 5, 2016. Nikkei BP Website https://project.nikkeibp.co.jp/atclppp/PPP/news/100300038/

[189] Anbo, *op.cit*, (186), pp.23–24; "Regarding the Haga–Utsunomiya LRT Project," May 9, 2025, p.9. Utsunomiya City website https://www.city.utsunomiya.lg.jp/_res/projects/default_project/_page_/001/039/604/shiryou_20250509.pdf

[190] Anbo, *op.cit*, (186), pp.23–24; "Regarding the Haga–Utsunomiya LRT Project," May 9, 2025, p.9. Utsunomiya City website https://www.city.utsunomiya.lg.jp/_res/projects/default_project/_page_/001/039/604/shiryou_20250509.pdf

This survey examined the residents' modal shares before and after the opening of the Utsunomiya Light Rail. The modal share of the Utsunomiya Light Rail after its opening was 8.5%, and the modal share of public transportation—comprising rail, buses, and the Utsunomiya Light Rail—rose from 7.4% to 14.5% between the periods before and after the light rail's opening. In addition, the modal share for walking increased from 5.1% to 10.0%. On the other hand, the mode share for cars decreased from 70.1% to 62.9% driving oneself and from 5.1% to 4.6% for riding as a passenger, resulting in an overall decrease from 75.2% to 67.5%. Although the bus modal share decreased from 5.1% to 3.3% following the light rail's opening, the overall public transportation mode share increased while the car mode share declined; this suggests that the light rail had a significant impact on the transportation choices of residents along the line. Furthermore, when analyzed by respondent demographics, car use decreased relatively more significantly in households with children in middle school or younger. The light rail's characteristics of "punctuality" and "barrier-free accessibility" were cited as factors contributing to these changes these behavioral changes.

The survey also examined changes in frequency of going out before and after the light rail line opened. While 36.0% reported that their outings had "increased" or "increased slightly" after the opening— although the increase was smaller than initially expected—the findings confirm that the light rail line's opening has prompted changes in the outing patterns of more than one-third of residents along the route. In terms of types of activities, among all respondents, "going out for a change of pace" rose from 16.1% to 30.8%. Furthermore, among households with children and those consisting of self-employed or unemployed respondents, "attending theater performances, sports events, movies, art exhibitions, and other entertainment" also increased.

In addition, regarding the quality of urban life, reports indicate that the opening of the Utsunomiya Light Rail has not only reduced the average travel time for passengers to their destinations by approximately 16 minutes but has also improved satisfaction with the transportation environment for commuting, going to school, shopping, and visiting medical facilities[191].

iv. Citizen and stakeholder engagement in the planning, implementation, and evaluation of sustainable urban mobility policies

In Utsunomiya City, where daily life has long been car-oriented and there was previously no tradition of streetcars, it was necessary to help residents and businesses understand the need to build a public transportation network and the role of the Utsunomiya Light Rail throughout the project development process. Therefore, the city has actively worked to foster understanding by

[191] "On the Effects of Light Rail Development (Detailed Version)" (Document 2—Appendix for the 43rd Haga-Utsunomiya Core Public Transportation Study Committee), July 16, 2026, pp.12–18. https://www.city.utsunomiya.lg.jp/_res/projects/default_project/_page_/001/006/078/43_seibikoukasyousai.pdf

holding citizen forums and open houses to exchange views with residents, as well as organizing hands-on events that make use of the vehicles and facilities prior to the opening[192]. Specifically, in addition to initiatives to build momentum for the light rail's launch—such as the opening of a permanent information hub, "Utsunomiya Open Square: City of Future Transportation," and the formation of the citizen group "teamNEXT" aimed at spreading information through word of mouth—the city collaborated with residents to select the design and nickname of the trains, the names of the stations, and the designs for the station's distinctive wall murals[193].

On the citizen side, the civic group which aims to promote urban development through LRT, was established in 2004. In addition to conducting research and promotional activities related to LRT, the group publishes its findings in booklets and carries out public awareness campaigns through regular meetings, lectures, and participation in events[194]. In preparation for the opening of this light rail line, consultations were held with affected companies, and measures such as the reorganization of bus routes were implemented[195].

Following the opening of the Utsunomiya Light Rail, Utsunomiya City and Haga Town—the municipalities through which the light rail runs—have jointly formulated a regional public transportation plan (see 1.2). They are currently evaluating the light rail system, while also considering an extension of the line to the west of Utsunomiya Station East[196]. One notable feature of the council organized to formulate this regional public transportation plan is the inclusion of users of the regional public transportation system[197].

v. Key Challenges and Future Policy Priorities for Sustainable Urban Transport

With regard to sustainable urban transportation, key challenges include not only maintaining and enhancing public transportation in the future and promoting environmentally and people-friendly transportation—such as decarbonization—but also coordinating with urban development efforts[198]. The LRT system introduced in Utsunomiya City in 2023 has brought about a major shift in transportation modes and is contributing to decarbonization, while also drawing attention for its role in urban development. This is partly due to the fact that the promotion of the "Compact Plus Network" has been identified as a key policy initiative for sustainable urban

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[192] Anbo, *op.cit*. (186), pp.24–26.
[193] *ibid*.
[194] Masahiro Ikeda, "The Launch of the Utsunomiya LRT and the Future of 'Transportation-Oriented Urban Planning': An Analysis Based on Citizen Movements Nationwide," *Residents and Local Government*, No.748, August 2025, pp.34–37.
[195] "Proposed Reorganization of Bus Routes on the East Side of JR Utsunomiya Station" (Reiwa 4, 1st Meeting—Haga and Eastern Utsunomiya Regional Public Transportation Revitalization Council, Document 2) August 23, 2022. Utsunomiya City Website https://www.city.utsunomiya.lg.jp/_res/projects/default_project/_page_/001/030/025/02siryou2.pdf
[196] "Haga-Utsunomiya Regional Public Transportation Plan [Formulated in June Reiwa 6 (2024) (Partially Revised in March Reiwa 7 (2025))]" March 2025. Utsunomiya City Website https://www.city.utsunomiya.lg.jp/_res/projects/default_project/_page_/001/006/023/utsunomiyachiikikoutsuukeikaku.pdf
[197] Article 6, Paragraph 2, Item 4 of the Act on the Revitalization and Regeneration of Local Public Transportation lists users of local public transportation and others as members of the council.
[198] "Vision for the Future and Steps Toward Its Realization" (Document 2 for the 4th Meeting of the Tokyo Metropolitan Government's Study Group on the Future of Local Public Transportation), June 4, 2021, p.24. https://www.toshiseibi.metro.tokyo.lg.jp/documents/d/toshiseibi/pdf_bunyabetsu_kotsu_butsuryu_pdf_chiiki_koutsu_kentoukai04_2

transportation in Japan. The "Compact Plus Network" aims to create more compact urban structures while utilizing public transportation networks to making it easier for residents to travel by public transport[199]. In Japan, where population decline and aging are accelerating, there is a growing need—particularly in regional cities—for compact urban development that integrates with public transportation[200]. The aforementioned Act on the Revitalization and Regeneration of Regional Public Transportation incorporates the "Compact Plus Network" concept and establishes a framework for regional public transportation planning. Furthermore, amendments to the Act on Special Measures concerning Urban Reconstruction (Act No. 22 of 2002) introduced a system to guide and concentrate welfare, medical, and residential facilities in local community hubs and other areas, thereby promoting the promoting closer integration between transport policy and urban planning of transportation and urban policies[201]. In addition, Goal 2 of the Third Basic Plan for Transportation Policy also aims to promote the "Compact Plus Network" concept. In the case of the Utsunomiya Light Rail, this concept was reflected in the planning stage[202]. Meanwhile, compact urban development utilizing LRT has already been implemented in Toyama City, Toyama Prefecture[203]; more recently, LRT and streetcars are attracting attention across Japan, with examples such as the opening of a new streetcar line in Hiroshima City, Hiroshima Prefecture[204], and the consideration of introducing LRT in Kyoto[205].

Most recently, the Urban Development Bureau of the Ministry of Land, Infrastructure, Transport and Tourism—which oversees urban policy—has served as the secretariat for a study group on the reorganization of urban transportation policies, held at the ministry with the participation of Utsunomiya City. The group is discussing the vision of a city that "makes people want to—and be able to—go out and about with ease." As a measure to increase citizens' activity levels—and thereby prevent the city's vitality and economy from stagnating even amid population decline—the group is exploring ways to enhance urban transportation planning in tandem with community development[206].

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[199] Takayuki Kishii, "Public Transportation and Urban Development: Entering the Era of the 100-Year Life," *Monorail* (150), Japan Monorail Association, June 2026, pp.5–6.

[200] Shukuri et al., *op.cit*. (171), p.11.

[201] "Priority Initiatives: Compact Plus Network" Ministry of Land, Infrastructure, Transport and Tourism website https://www.mlit.go.jp/toshi/toshi_ccpn_000016.html

[202] Anbo, *op.cit*. (186), pp.20–21. It has been pointed out that the development of the LRT system in Utsunomiya City goes beyond simply improving transportation convenience; it also supports the creation of a sustainable urban structure centered on public transportation through urban development along the LRT corridor. Shozo Hirai, "Toward Further Promotion of the 'Compact Plus Network': Attracting Private Investment to the Region and Realizing Distinctive Urban Spaces," *Transportation and Economy* (950), August 2026, p.62.

[203] Shinji Honda, "Advancing Compact Urban Development in Toyama City," *Environmental Information Science*, 54(1), 2025, pp.22–29. https://www.jstage.jst.go.jp/article/eis/54/1/54_22/_article/-char/ja/

[204] "Towards a Comfortable City: Re-evaluating Streetcars," *Yomiuri Shimbun* (Osaka Edition), February 18, 2026.

[205] Yutaro Takada, "Will Kyoto's 'Inbound Tourism Congestion' Be Resolved? The Reality Behind the Growing View of LRT as a Savior in Regional Areas," June 16, 2026, Nikkei Cross Trend website https://xtrend.nikkei.com/atcl/contents/18/01400/00002/

[206] Study Group on the Reorganization of Municipal Transportation Policies: "Future Directions for Urban Transportation Policies—Promoting Travel to Various Destinations Through 'Hubs' and 'Axes'—Interim Report," June 26, 2026. Ministry of Land, Infrastructure, Transport and Tourism website https://www.mlit.go.jp/toshi/content/002008711.pdf

10. Luxembourg[207]

Cellule Scientifique of the Chambre des Députés

i. Legislative, policy and strategic frameworks governing sustainable urban mobility

Luxembourg's sustainable urban mobility policy is implemented though a combination of national mobility strategies, legally binding spatial-planning instruments and municipal mobility plans. At the national level, the Ministry of Mobility and Public Works (*Ministère de la Mobilité et des Travaux publics*) is responsible for transport policy, in coordination with the Ministry of Housing and Spatial Planning (*Ministère du Logement et de l'Aménagement du territoire*), municipalities and transport operators. Parliamentary oversight is exercised notably through the Chamber of Deputies' Committee on Mobility and Public Works (*Commission de la Mobilité et des Travaux Publics)* and Committee on Housing and Spatial Planning (*Commission du Logement et de l'Aménagement du territoire*).

The current operational planning framework is the National Mobility Plan 2035 (PNM 2035)[208], presented in 2022. It sets out an integrated approach for accommodating an estimated 40% increase in daily trips between 2017 and 2035, primarily by increasing the capacity and use of rail, tram and bus services, as well as cycling and walking, rather than through a corresponding increase in private-car traffic. The PNM 2035 is intended to be updated at five-year intervals.

The PNM 2035 builds on Modu 2.0, adopted in 2018 as Luxembourg's preceding strategic framework for sustainable mobility[209]. Its continuing relevance lies in the principles subsequently operationalised by the PNM 2035: anticipating mobility demand, prioritizing the mobility of people over that of vehicles, using infrastructure efficiently, and mobilizing the State, municipalities, employers and citizens.

The principal legally binding spatial-planning instrument is the Plan *directeur sectoriel "transports"* (PST)[210], in force since 1 March 2021. The PST reserves land for strategic transport infrastructure and aligns municipal land-use planning with national projects. It covers 81 infrastructure projects, including public transport, road schemes, park-and-ride facilities, interchange hubs and the national cycling network.

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[207] Author: Dr. Estelle Mennicken

[208] Ministère de la Mobilité et des Travaux publics. (2022). *PNM 2035 : Plan national de mobilité*. Gouvernement du Grand-Duché de Luxembourg.

[209] Ministère de la Mobilité et des Travaux publics. (2025). *Chiffres clés de la mobilité : modal split 2017*. Gouvernement du Grand-Duché de Luxembourg.

[210] Ministère du Logement et de l'Aménagement du territoire. (2024). *Plan directeur sectoriel « transports » : rapport triennal 2021–2024*. Gouvernement du Grand-Duché de Luxembourg.

Municipalities locally implement the framework through street design, parking management, traffic calming, cycling infrastructure and local mobility plans. The City of Luxembourg's Mobility Plan is a major example: it aims for public transport and active modes to represent 51% of trips by 2035[211].

ii. Sustainable urban mobility measures implemented in recent years

Over the last years, Luxembourg has introduced a broad package of measures to promote sustainable mobility, most notably fare-free public transport. Other measures include the expansion of the tramway network, the restructuring of the national bus-network (RGTR), cycling investment targeted at everyday mobility (more continuous, safe and direct cycling networks, improved bicycle parking and stronger integration with public transport, e-shared-bike system), mobility hubs and planning coordination.

The biggest measure, the introduction of fare-free public transport was introduced on 1 March 2020 for domestic journeys by bus, tram and second-class rail. First-class rail travel and international segments remain subject to fares. It became the first country to offer fare-free public transport on its entire national territory. The government cites several reasons for making public transport free. It forms part of an overall transport strategy aimed at bringing a shift in transport behavior: encouraging people to swap their cars for buses, trains, trams and bicycles. Furthermore, the abolition of paid tickets is expected to make a small contribution to social equality and to be recognized as a positive marketing measure for Luxembourg in the context of "nation branding"[212]. As public transport had already been subsidized at approximately 90-94% before the reform, the policy primarily removed the user fare[213].

Luxembourg doesn't apply any congestion charge or low-emission zone. Instead, the country principally uses measures such as park-and-ride facilities, public-transport priority, mobility hubs, parking management, traffic calming and employer mobility planning. Modu 2.0 also promotes teleworking, staggered work schedules, carpooling and measures to reduce single-occupancy commuting.

iii. Evidence regarding the impact of these measures on mobility patterns, citizens' behavior, and urban quality of life

The available evidence does not allow observed changes in mobility patterns to be attributed to any single policy measure described above. In particular, the nationwide abolition of public-transport fares took effect on 1 March 2020, at the beginning of the COVID-19 pandemic, while

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[211] Ville de Luxembourg. (2024). *Mobility Plan / Mobilitéitsplang*.

[212] Science.lu, Fact check :la gratuité des transports en commun (2020). Les transports publics gratuits, à quoi ça sert ?

[213] Ministère de la Mobilité et des Travaux publics. (2025). *Free passenger transport: Frequently asked questions*. Gouvernement du Grand-Duché de Luxembourg.

the tram system was expanding and the national bus network was subsequently reorganized. These overlapping developments make it difficult to isolate the effects of individual measures and limit the extent to which their impact can be assessed through simple before-and-after comparisons.

Public transport use and network effects

The most quantifiable outcome is the rapid increase in tram ridership. The Ministry of mobility recorded an annual use rise from 6.2 million passengers in 2019 to 31.7 million in 2024[214]. This growth occurred alongside progressive network extensions. The current first tram line extends over 16 km, serves 24 stops and includes 10 interchange hubs.

This trend is consistent with increased attractiveness of public transport, but it should not be interpreted as evidence that fare-free transport or the network extensions alone caused the increase.

A 2024 master's thesis examining selected transport corridors in Luxembourg found that fare-free public transport was associated with a 12-18% increase in public-transport passenger volumes[215]. However, it found no statistically discernible decrease in road-traffic volumes on parallel routes. The study therefore suggests that fare-free transport increased public-transport use but did not by itself produce a sufficiently large modal shift to produce a measurable reduction in motor traffic on the corresponding roads.

A simulation study found comparable results[216]. It estimated substantial growth in public-transport passenger-kilometers and passenger-hours after fare abolition, especially among cross-border commuters. Yet, the estimated decline in car use was insufficient to eliminate congestion problems. The authors identify high levels of car ownership and the relative convenience of the car for many cross-border and peripheral trips.

Car dependency and modal shift

Census data from the national statistics institute indicate a modest decline in car dependence for commuting, rather than a radical transition. Between 2011 and 2021, the car share of journeys to work declined from 72.3% to 69.3%[217]. At the same time, the combined share of walking and

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[214] Gouvernement du Grand-Duché de Luxembourg. (2025, 28 February). Cinq ans de gratuité des transports publics: un bilan positif pour la mobilité au Luxembourg - Le gouvernement luxembourgeois.

[215] Pires, E. (2024). *Analysing the effects of free public transport on passenger and traffic numbers along specific transport corridors in Luxembourg* [Master's thesis, Vrije Universiteit Amsterdam].

[216] Bigi, F., Schwemmle, N., & Viti, F. (2023). *The impact of free public transport in Luxembourg: A modelling approach*. Paper presented at the 11th Symposium of the European Association for Research in Transportation (hEART 2023).

[217] STATEC. (2025). *La dépendance automobile persiste pour les déplacements domicile-travail*. Institut national de la statistique et des études économiques du Grand-Duché de Luxembourg.

cycling increased from 8.4% to 12.7%. Public transport accounted for 17.6% of commuting trips in 2021, a proportion close to the 2011 level.

These figures should be interpreted in the context of Luxembourg's territorial structure. Employment is heavily concentrated in Luxembourg City and a few other economic centers, while residential locations are more widely dispersed across the country and neighboring cross-border regions. The country also recorded 668 passenger cars per 1000 inhabitants in 2025[218], an exceptionally high level compared to other EU member states.

Therefore, the issue is not merely whether public transport is available or free, but whether it is competitive with the car in terms of door-to-door travel time, reliability, frequency, comfort, interchange quality and suitability for non-standard working hours. These considerations are particularly important for cross-border workers, residents of lower-density areas, shift workers and households with complex trip chains involving childcare, shopping or care responsibilities.

Luxembourg's fare-free policy has potential social benefits beyond its effect on modal share. By removing fares for domestic bus, tram and second-class rail travel, it reduces the immediate financial cost of travel for work, education, health care, leisure and social participation. This may be especially relevant for younger people, students, unemployed persons, low-income households and people without access to a private car.

Recent research presentations at conferences examined user satisfaction and behavioral changes through a comparison of mobility-survey evidence from 2020 and 2024-25[219,220]. The authors report that fare-free transport is associated with greater satisfaction and with stronger willingness to continue using or recommend public transport. These associations appear particularly relevant for younger and lower-income users.

However, their research also underlines that free access does not compensate for poor service. Users continue to evaluate public transport primarily through frequency, reliability, travel time, comfort, safety, availability of connections and network coverage. This is particularly important for Luxembourg: with fares removed from domestic public transport, the attractiveness of public transport relative to the private car increasingly depends on these non-price characteristics of the journey.

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[218] Eurostat. (2026). *Passenger cars, by number per thousand inhabitants* [Dataset: road_eqs_carhab]. European Commission.

[219] Falanga, A., da Silva Penedos, S., Cartenì, A., Henke, I., & Viti, F. (2025). *Understanding satisfaction and travel behavior of nationwide fare-free public transport users: Evidence from Luxembourg*. Paper presented at Transport Research Day 2025.

[220] Falanga, A., da Silva Penedos, S., Cartenì, A., Henke, I., & Viti, F. (2025). *The impact of free public transport in Luxembourg*. In *Proceedings of the BIVEC Transport Research Day*.

Environmental effects

More broadly, environmental benefits depend on the extent to which public-transport trips replace car trips rather than walking, cycling or newly generated journeys.

A 2026 study already established the environmental impact of fare-free public transport[221]. It estimates that Luxembourg's policy reduced road-transport CO_2 emissions by 5.9% during 2020-2021. Similar results are reported for overall GHG emissions such as NO_x.

International evidence on fare-free transport

International research provides a useful benchmark for interpreting Luxembourg's experience. At the world scale, almost 100 localities have implemented fare-free public transport. Overall, the literature indicates that fare-free public transport generally increases public-transport use and may improve affordability and social inclusion. However, the evidence is much less conclusive regarding a sustained reduction in private-car use, traffic congestion or transport-related emissions. The scale and direction of impacts depend on the quality and capacity of public-transport services, the spatial distribution of users and jobs, the availability of alternatives, and the existence of complementary policies that discourage car use.

The experience of Tallinn, Estonia, is among the most frequently cited examples of fare-free public transport. Tallinn introduced fare-free public transport for registered residents in January 2013. Cats, Susilo and Reimal (2017) found that public-transport use increased after the reform, with an estimated growth in the public-transport modal share of around 14% during the first year[222]. However, the authors did not find robust evidence that the measure had significantly reduced car use. Instead, part of the increase in public-transport demand appeared to result from people switching from walking, and potentially from other low-cost or active modes, rather than from private cars. The authors therefore concluded that free fares alone were unlikely to meet ambitious congestion-reduction or car-dependency objectives without complementary measures, including better service provision and restrictions on automobile use.

A broader assessment of Tallinn's policy by Galbadón-Estevan and colleagues (2019) similarly emphasizes that its effects were not confined to modal shift[223]. The policy was embedded in a wider political and institutional strategy that aimed to improve the affordability and accessibility of mobility for residents. The study reports increased public-transport use and improvements in perceived satisfaction. It also underlines the potential role of fare-free transport in supporting social inclusion and access to urban opportunities. However, the authors indicate that fare

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[221] Fernando, S., et al. (2026). *Zero fare, cleaner air? The causal effect of Luxembourg's free public transportation policy on transport emissions*. *Environmental and Resource Economics*.

[222] Cats, O., Susilo, Y. O., & Reimal, T. (2017). *The prospects of fare-free public transport: Evidence from Tallinn*. *Transportation, 44*, 1083–1104.

[223] Galbadón-Estevan, P., et al. (2019). *Broader impacts of the fare-free public transportation system in Tallinn*. *Journal of Urban Technology, 26*(4), 25–45.

abolition alone is insufficient to substantially reduce car dependence. In particular, the social and political benefits of fare-free public transport may be more immediately visible than its environmental benefits.

Experimental evidence confirms this cautious interpretation. Bull, Muñoz and Silva (2021) conducted a randomized controlled trial of fare-free public-transport access[224]. Their study found that providing free access increased total travel by 12%. It also increased off-peak travel by 23%, indicating that the fare reduction influenced discretionary and non-commuting mobility in addition to work-related travel. However, the study found no evidence of a reduction in private-vehicle travel. The effects were concentrated among participants living within one kilometer of a metro station, demonstrating that the behavioral impact of lower fares depends heavily on proximity to a frequent, rapid and accessible transport service.

Research syntheses reinforce the conclusion that fare-free transport has multiple but context-dependent effects. A 2026 systematic review by Lightner and colleagues examined 45 original empirical studies of fare-free public-transport interventions[225]. The review identifies recurring evidence of increased public-transport ridership and improved access to services and social activities. It also suggests that benefits may be relatively important for groups facing economic or mobility disadvantage, including older people and socially marginalized populations. Nonetheless, the review reports heterogeneous evidence concerning car-use reduction, environmental gains and wider health effects. Again, the outcomes depend on whether additional public-transport trips replace car trips, walking or cycling, or whether they represent newly generated travel.

For Luxembourg, in a context of particularly high levels of car ownership, a dispersed settlement structure and the prominence of long-distance and cross-border commuting, the international evidence suggests that fare-free public transport must be accompanied by improvements in service quality, travel time and network coverage. They are likely to be at least as important as the absence of fares in achieving a substantial modal shift.

Road safety and urban quality of life

Road safety represents another relevant dimension of sustainable urban mobility. Road fatalities in Luxembourg declined from 41 in 2013 to 18 in 2024. However, serious injuries remain high: 308 people were seriously injured in road traffic crashes in 2024, alongside more than 1100 persons with slight injuries.

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[224] Bull, O., Muñoz, J. C., & Silva, H. E. (2021). *The impact of fare-free public transport on travel behavior: Evidence from a randomized controlled trial*. *Regional Science and Urban Economics, 86*, 103616.

[225] Lightner, J. S., Ziegler, N., Prochnow, T., et al. (2026). *Fare-free public transportation: A systematic review of outcomes*. *Transportation Research Interdisciplinary Perspectives, 36*, 101921.

This pattern suggests that policies should not focus exclusively on reducing fatalities. Safer road design, lower speeds, pedestrian priority, protected cycling facilities, safe crossings and conflict reduction at junctions remain central to improving urban quality of life and making active mobility more attractive.

On-going research and cross-border governance

Cross-border coordination is essential because a large share of people working in Luxembourg reside in border countries, France, Belgium and Germany. The travel patterns of these cross-border commuters have significant implications for congestion, public-transport demand and transport-related emissions.

The MMUST and MMUST+ projects, co-financed by the EU and running until December 2028, strengthen institutional cooperation by bringing together public authorities and research organisation across the Greater Region (territories of Lorraine in the French region Grand Est, Wallonia in Belgium, Saarland and Rhineland-Palatinate in Germany as well as the Grand Duchy of Luxembourg).

Its two principal objectives are to analyze and simulate the relationship between residential and daily mobility, and to facilitate coordinated urban-development policies in the cross-border area in order to promote low-emission and more sustainable travel. The project is intended to enable the effects of proposed mobility policies on greenhouse-gas and air-pollutant emissions to be assessed before their implementation.

MMUST+ is primarily an instrument of interinstitutional and scientific coordination. It is precisely relevant because it seeks to integrate residential and daily mobility in a cross-border model and to support coordinated, low-emission planning. Its success will depend on whether the scenarios are translated into jointly financed and implemented projects rather than remaining only analytical outputs.

iv. Involvement of citizens and stakeholders in the planning, implementation and evaluation of sustainable urban mobility policies

Research conducted for the Chamber of Deputies highlights the importance of institutionalizing citizen participation[226]. The study argues that participation mechanisms are most credible when they combine socio-demographically stratified selection, multilingual and accessible procedures, independent facilitation, pluralistic scientific input, transparent publication of recommendations, and a formal obligation for public authorities to provide reasoned follow-up. These principles are particularly relevant for mobility policy, where decisions on road-space allocation, public

[226] Émilien Paulis, Raphaël Kies, Racha El Herfi, "La participation citoyenne peut-elle être institutionnalisée ? Étude de la faisabilité d'une plateforme nationale de participation citoyenne au Luxembourg" [Can citizen participation be institutionalised? A feasibility study for a national citizen participation platform in Luxembourg], Luxembourg, Scientific Unit of the Chamber of Deputies, 28 October 2025.

transport, parking, cycling infrastructure and major investments generate uneven territorial and social effects.

The Luxembourg context makes inclusiveness particularly important. Foreign nationals represented 47% of the resident population at the beginning of 2025, while cross-border workers play a major role in the country's mobility system but do not participate in national elections. Mobility participation would therefore be most effective when including residents and workers regardless of nationality and when developing appropriate cross-border mechanisms for commuters and neighboring authorities.

Nevertheless, even though deliberative practices are currently not governed by a permanent legal and organisational framework with guaranteed political follow-up, project-based or temporary deliberative practices exist. Rather than deliberative co-design processes, a few consultation and communication activities on mobility were held in Luxembourg in recent years.

A first example is the PNM 2035 (see question 1) which was presented to the public through ten regional public meetings, organized between April and July 2022[227]. The geographic distribution was intended to reach residents across the country. These events were thought to be as accessible as possible, in terms of schedule and languages. This public-engagement exercise is difficult to assess. In fact, there is little publicly available information on participant numbers, respondent profiles, formal consultation submissions, or the degree to which feedback altered the final result.

A second example can be found at the municipal level with the City of Luxembourg's Mobilitéitsplang, which incorporated citizen participation into the development of the city's mobility plan[228]. The planning process combined technical expertise, political decision-making and public participation. It explicitly treated citizen engagement as one of three pillars of the plan's development, alongside expert and stakeholder input and political decision-making. The participatory process included a public launch event in October 2021, an online survey that received more than 8400 responses and approximately 4250 written comments, followed by further public meetings and information events in 2022, and a final presentation on 27 June 2024[229].

The number of contributions indicates a substantial level of participation in the municipal planning process. It likely enabled the city to collect information on perceived mobility problems, desired improvements and conflicts over road space, cycling, parking, pedestrian access and public transport. However, participation volume should not be equated with representativeness. Luxembourg City is a regional and international employment center; its daily users include

[227] Luxtram. (2022, 24 avril). *Présentation du Plan national de mobilité : PNM 2035*.

[228] Ville de Luxembourg. (2024). *Mobilitéitsplang : rapport final*.

[229] Ville de Luxembourg. (2024). *Participation des citoyens : Mobilitéitsplang*.

residents, commuters from other Luxembourg municipalities, and large numbers of cross-border workers. An evaluation of the process would ideally assess whether respondents reflected these groups proportionately. It would also examine the participation of younger people, older people, people with disabilities, people with lower incomes, people without cars and people who travel at non-standard times.

Formal participation under spatial planning

Participation is also incorporated into the statutory procedures governing spatial planning. The *Plan directeur sectoriel transports* (PST) is a legally binding plan that reserves land and corridors for transport infrastructure. Amendments and related infrastructure proposals may affect property, urban form, landscape, noise exposure and accessibility, and are therefore subject to public inquiry procedures.

The proposed amendment to the PST concerning the Nordstad area in 2024 provides an example of this form of statutory public consultation[230]. The process made the relevant documents publicly available and allowed citizens to submit observations and suggestions. The aim was to integrate the *Concept de mobilité Nordstad 2035* into the sectoral planning framework.

Statutory public inquiries provide formal rights of access to planning information and opportunities to submit observations. However, their capacity to influence the fundamental characteristics of a project may be more limited when consultation takes place after a preferred project, corridor or technical solution has already been substantially developed. Earlier-stage participation can therefore complement statutory consultation by allowing public input while a wider range of options remains under consideration.

The Biergerkommitee Lëtzebuerg 2050 (2021-22)[231] and the Klima-Biergerrot (2022) were temporary deliberative processes in which citizens worked over several months, with expert input, to formulate recommendations for policymakers. Both addressed mobility-related questions among their topics, although within different thematic and institutional frameworks.

The Biergerkommitee, established as the *Luxembourg in Transition* consultation, brought together 30 citizens and produced 44 recommendations concerning the transition towards a carbon-neutral Luxembourg by 2050[232]. It treated mobility mainly as a territorial-planning issue, linking travel patterns with housing, proximity to services, urban development and the cross-border functional region. The recommendations were intended to contribute to the revision of

[230] Ministère du Logement et de l'Aménagement du territoire. (2024). *Modification du plan directeur sectoriel « transports » sur le territoire de la Nordstad*.

[231] Gouvernement du Grand-Duché de Luxembourg. (2022). *Biergerkommitee Lëtzebuerg 2050: Unsere Empfehlungen an die Politik*.

[232] Ministère de l'Aménagement du territoire. (2022, 20 janvier). *Le Biergerkommitee Lëtzebuerg 2050 émet 44 propositions pour réussir la transition du territoire vers la neutralité carbone*.

the national spatial-planning framework (PDAT – Programme directeur d'aménagement du territoire).

The Klima-Biergerrot was a national climate assembly that formulated 56 recommendations and 142 concrete measures, including a dedicated set of proposals on mobility and transport[233]. Its relevance lies in demonstrating that informed citizens can discuss transport decarbonisation as a package of mutually connected social, economic and environmental choices. The government subsequently published a follow-up matrix comparing the assembly's recommendations with measures in the National Energy and Climate Plan[234].

Taken together, these cases show that Luxembourg has experimented with meaningful citizen participation on mobility-related issues. However, these initiatives have largely been organized through project-specific or temporary arrangements rather than through a permanent institutional framework for citizen participation in mobility policymaking.

Employers, schools and transport operators

Participation in mobility policy extends beyond consultation with individual citizens. Employers and educational institutions are important mobility actors because commuting and education-related travel contribute substantially to peak-period demand. Modu 2.0 explicitly identifies employers, schools and citizens as mobility actors, alongside the State and municipalities[235]. Relevant employer-based measures include mobility plans, teleworking arrangements, flexible working hours, subsidized or facilitated public-transport use, secure bicycle parking, showers and changing facilities, carpooling schemes and management of workplace parking.

v. Main challenges and future policy priorities in relation to sustainable urban mobility

A central challenge for Luxembourg's mobility transition is the practical implementation of a mobility transition at a time of continued demographic, employment and cross-border commuting growth.

Delivering sufficient transport capacity

The first priority is to provide enough high-quality capacity through rail, tram and buses, as their impacts are expected to exceed the ones of free public transport. Luxembourg's economic and

[233] Klima-Biergerrot. (2022). *Rapport final : 56 propositions pour accélérer et intensifier la lutte contre le réchauffement climatique au Luxembourg*.

[234] Gouvernement du Grand-Duché de Luxembourg. (2022). *Suivi des recommandations du Klima-Biergerrot et de l'Observatoire de la politique climatique* [Dataset].

[235] Ministère de la Mobilité et des Travaux publics. (2018). *Modu 2.0: Strategy for sustainable mobility*. Gouvernement du Grand-Duché de Luxembourg.

demographic growth creates a continuing need for additional passenger capacity, particularly on corridors into Luxembourg City and between the capital and southern employment centers.

The PNM 2035 indicates that completing the planned tram network by 2035 would require an acceleration of construction from approximately 1.5-2 km per year between 2016 and 2021 to 2-3 km per year. This raises concrete questions regarding public finance, engineering capacity, planning approvals, utility relocation, construction disruption, land acquisition and acceptance by residents and businesses.

The 2023-2028 coalition agreement[236]sets out a continued commitment to multimodal mobility, focused on increasing the capacity of rail, bus and tram services while expanding active mobility. The tram network will remain central to this strategy. Planned extensions include further development of the existing line and a fast-tram connection between Luxembourg City and Esch-sur-Alzette/Belval.

Reducing dependence on the private car

Car dependence remains one of Luxembourg's most persistent challenges[237], particularly for cross-border and peripheral commuting. The problem is not limited to individual preference: it is produced by land-use patterns, job concentration, housing costs, spatial dispersion, service gaps and the need to make multi-purpose trips efficiently.

Achieving a substantial modal shift is likely to depend on a combination of measures that improve the attractiveness of alternatives to private-car travel and measures that influence travel demand. The political difficulty also lies in ensuring that restrictive measures affecting car use are not perceived as unfair to households and workers with few realistic alternatives. Demand management therefore needs to be paired with visible improvements in service quality and accessibility.

Active mobility and road-space reallocation

Walking and cycling form an important component of the PNM 2035, particularly for shorter journeys and for first- and last-mile access to public transport. Their contribution to modal shift depends not only on the extent of the network but also on its quality, continuity, directness, safety and integration with other modes. Cycling infrastructure is less likely to provide an attractive alternative to car travel where routes are indirect or discontinuous, junctions are perceived as unsafe, or connections to public-transport hubs and employment centers are weak. Further development of active mobility therefore involves both expanding network coverage and

[236] Gouvernement du Grand-Duché de Luxembourg. (2023). *Accord de coalition 2023–2028 : Lëtzebuerg fir d'Zukunft stäerken*.

[237] STATEC, *La dépendance automobile persiste pour les déplacements domicile-travail*, 2025

improving continuous intermunicipal cycling connections, safe infrastructure and crossings, secure bicycle parking, and accessible and attractive conditions for walking.

A central challenge for urban mobility policy concerns the allocation of limited public space among competing uses. Dedicated tram alignments, bus lanes, cycle tracks, wider pavements, and urban greening may compete with general traffic lanes and conventional on-street parking. Public acceptance will depend on whether the benefits are made tangible.

Spatial planning, housing and accessibility

Transport policy cannot resolve mobility problems independently of housing and land-use policy. High housing costs and limited supply close to employment centers contribute to longer commuting distances and cross-border residential expansion. New housing, employment zones and public services need to be aligned with rail stations, tram lines, high-quality bus corridors and cycling infrastructure.

The PST is the principal national instrument for reserving the corridors and sites needed for strategic infrastructure[238]. However, effective integration depends on municipal land-use plans, housing policies, developer obligations and coordination across administrative boundaries[239].

In this context, transit-oriented development provides an important approach to integrating mobility and spatial planning. Concentrating an appropriate mix of housing, employment, services and amenities around high-capacity public-transport corridors and interchange hubs can shorten some journeys, support demand for frequent public-transport services and improve access to everyday activities without reliance on the private car.

Cross-border mobility

Cross-border mobility is arguably the most distinctive challenge facing Luxembourg. Public transport must serve flows originating in several national territories, each with its own rail systems, local authorities, timetables, funding mechanisms and planning rules. The performance of the Luxembourg mobility system therefore partly depends on infrastructure and urban-development decisions made in Lorraine, Wallonia, Saarland and Rhineland-Palatinate.

Climate, air quality and environmental objectives

Transport remains a major challenge for Luxembourg's climate policy because road traffic is strongly linked to car commuting and freight flows. Fare-free public transport may contribute to lower emissions, but the evidence shows that its effect is unlikely to be sufficient in the absence of broader car-use reduction and transport-system decarbonisation.

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[238] Ministère du Logement et de l'Aménagement du territoire. (2024). *Plan directeur sectoriel « transports » : rapport triennal 2021–2024*. Gouvernement du Grand-Duché de Luxembourg.

[239] Ministère du Logement et de l'Aménagement du territoire. (2025). *Aménagement du territoire*. Gouvernement du Grand-Duché de Luxembourg.

In addition to the measures mentioned above, the electrification of bus fleets and the support of cleaner vehicle technologies where motorized travel remains necessary can help reach the environmental objectives.

Monitoring and evaluation

Finally, Luxembourg requires more systematic and transparent monitoring. The *Observatoire digital de la mobilité*[240] provides an institutional basis for this work, while Luxmobil surveys, operator data, traffic counts and MMUST+ modelling offer complementary evidence.

A Luxmobil survey was commissioned in 2024[241]. It is intended to provide representative mobility data on residents and cross-border workers from Belgium and Germany, and contribute to the evidence base for the preparation of the next National Mobility Plan.

[240] Ministère de la Mobilité et des Travaux publics. (2025). *Observatoire digital de la mobilité*. Gouvernement du Grand-Duché de Luxembourg.

[241] Portail des marchés publics du Grand-Duché de Luxembourg. (2024). *Réalisation d'une enquête de mobilité Luxmobil 2024* [Avis de marché no 2401021].

11. Netherlands[242]

Rathenau Instituut

i. Policy frameworks for urban sustainable mobility in the Netherlands

Urban mobility is facing a broad transition challenge. Urbanization and mobility demand are putting increasing pressure on urban space, while cities simultaneously need to maintain accessibility and quality of life. Moreover, in 2024, mobility (domestic transport) accounted for 20% of total Dutch greenhouse gas emissions, making it the second-largest emitting sector after industry (Statistics Netherlands, 2025). Below, we explore the Dutch perspective on sustainable urban mobility and the corresponding multilevel policy framework.

Broad perspective on sustainable urban mobility

The Paris Agreement commits countries to limiting global warming to below 2°C and pursuing efforts to limit it to 1.5°C. In the Netherlands, these ambitions are reflected in the Climate Agreement of 2019. The agreement initially aimed to reduce national greenhouse gas emissions by 49% by 2030 compared with 1990. This target was subsequently strengthened to at least 55% through the Climate Act (Klimaatwet, 2019).

The Climate Agreement set out specific ambitions for the mobility sector, while also linking the transition to broader objectives. For 2050, it aims for emission-free mobility, that is accessible, safe, convenient and healthy for everyone. For urban mobility it emphasizes *"smart, sustainable and compact cities with an optimal flow of people and goods"* (Ministry of Economic Affairs and Climate, 2019, p. 45).

The Association of Dutch Municipalities (VNG, 2023) proposes to look at mobility from a 'broad prosperity' perspective, going beyond economic indicators. Their definition rests on four dimensions:

- **Living environment:** spatial quality, climate change, environmental pollution, barrier effects[243]
- **Accessibility/inclusivity:** jobs, social contacts, access to amenities
- **Health:** harmful emissions, physical activity
- **Safety:** social safety, traffic safety

Both policy perspectives share several core principles with the EU Urban Mobility Framework, which defines "safe, accessible, inclusive, smart, resilient and zero-emission urban mobility" (European Commission, 2021, p. 2).

[242] Authors: Schuijer, M.E., Verstappen, J., van Dijk, J.G.W., & van Est, Q.C.
[243] This refers to the barrier effects created by roads, railway lines and canals, which physically divide the living environment and can impede movement between areas.

A multilevel policy framework for sustainable urban mobility

This section traces the key policy developments that have shaped urban mobility policy at the national, regional and local levels. These developments span multiple levels of governance and different policy domains, ranging from European emissions standards and national climate and fiscal policies to regional mobility programmes and local regulatory instruments. Rather than providing an exhaustive overview, we focus on newly adopted policies and measures that directly relate to sustainable urban mobility. Table 1summarizes the most relevant developments across the different governance levels[244].

Table 1. Key policies for sustainable urban mobility

Level	Key policy frameworks	Relevance for urban mobility
European	EU Urban Mobility Framework (2021); revised TEN-T Regulation (2024)	EU framework for sustainable urban mobility, defining 26 "urban nodes" in the Netherlands
National	Climate Agreement (2019); Climate Act (2019)	Legally binding climate targets and national mobility transition
	NOVI (2020); Environment and Planning Act (2024); National Spatial Policy (in progress)	Integration of mobility, infrastructure and spatial development
	Mobility Vision 2050 (2023)	Long-term vision for future mobility
	Mobility Fund (2022); MIRT (ongoing)	National framework for mobility and infrastructure investment
Regional	Provincial spatial/environmental visions; Regional Mobility Programmes (RMPs)	Coordination of national objectives at regional level, mobility and spatial measures
Local	Municipal spatial visions and mobility plans; SUMPs; VNG Mobility Vision 2050 (2023)	Integration of mobility in local spatial planning

On a national level, the Climate Act serves as the central legal foundation for Dutch climate policy. The Act stipulates the need for regular planning, reporting and evaluations on a national level, helping steer and monitor the country's progress towards climate neutrality. Alongside this legal foundation, the Dutch Climate Agreement anticipated significant changes in the mobility landscape between 2019 and 2050. It distinguished between measures to make mobility cleaner (with zero-emission transport becoming the norm), smarter (through greater use of data and mobility-as-a-service), and different (shifting from fossil-fuel-based transport to multimodal

[244] For a more comprehensive overview, see (Liu et al., 2024).

travel with a larger role for biking and public transport). This framework is operationalized in a multitude of measures (table 2), ranging from zero-emission zones and electric vehicles to investments in cycling infrastructure, shared mobility and public transport (Ministry of Economic Affairs and Climate, 2019).

Table 2. Relevant measures in the Climate Agreement framework (2019)

Cleaner	**Smarter**	**Different**
Zero emission public transport, taxis, and urban logistics EV technology Charging infrastructure	Mobility-as-a-service Mobility data governance Smart traffic management Multimodal hubs	Shared mobility Behavioral change Cycling Public transport Demand management Platformisation/automation

The mobility section of the Climate Agreement consists of four themes: 1) sustainable energy carriers for transport and logistics; 2) electric mobility, targeting 100% emission-free new car sales by 2030; 3) logistics decarbonization, including implementation of 30 to 40 zero-emission zones in larger municipalities; and 4) passenger mobility measures aimed at reducing business-related car kilometers and capping work-related mobility emissions for larger employers (Ministry of Economic Affairs and Climate, 2019, p. 48).

Within the mobility policy domain, an agenda-setting Mobility Vision for 2050 was established on a national level in 2023 (Ministry of Infrastructure and Water Management, 2023). On the topic of urbanization, it specifically mentions the future challenges of increased urbanization, people living in single-person households and the effects on mobility. It is linked to housing policy and developed in parallel with a new national spatial policy (Nota Ruimte) (Ministry of Housing and Spatial Planning, 2025). More structurally, multiple national government actors are involved in mobility policy, fiscal measures, public transportation tenders, infrastructure investment and spatial policy. Their key responsibilities are summarized in table 3.

On a regional level, Regional Mobility Programmes (RMPs) have become a principal policy instrument for sustainable urban mobility. RMPs are drawn up by provinces and municipalities, in collaboration with regional partners such as transport authorities, businesses, and civil society organizations. Provinces and metropolitan transport authorities translate these ambitions into multi-year *execution programmes* covering public transport, road safety and sustainable mobility, which cover investment in cycling infrastructure, public transport capacity and behavioral measures such as workplace travel schemes (VNG, 2026).

On a local level, Dutch cities are required to have a Sustainable Urban Mobility Plan (SUMP) in place by 2028(Directorate-General for Mobility and Transport, 2026). For the Netherlands, 26 cities are marked as 'urban nodes' in the trans-European transport network (TEN-T) (European Commission, 2024). Local SUMPs, aligned with the EU's SUMP guidelines, have been adopted by several larger cities, including Amsterdam, Rotterdam and Utrecht, embedding national and regional targets into city-specific spatial and transport strategy. The Association of Dutch Municipalities (VNG) published its own vision for 2050, stating the need for sharper choices in urban planning due to space scarcity and proposing more fundamental investment in public transport, making it a competitive alternative to cars. Furthermore, sustainable future mobility should be included in early planning stages of housing development (VNG, 2023).

Table 3. Key actors and responsibilities in urban mobility governance

Governance actor	Relevant role in sustainable urban mobility
Ministry of Infrastructure and Water Management	National mobility policy, oversees national infrastructure investment and regional mobility coordination
Ministry of Economic Affairs and Climate	Coordinates national climate targets and leads national science, technology and innovation policy
Ministry of Finance	Sets mobility-related taxation and fiscal incentives, manages the Mobility Fund, and oversees the state' shares in national railways
Ministry of Housing and Spatial Planning	Responsible for the national spatial-planning framework and integration of housing, urban development, infrastructure and accessibility
Provinces	Investments in regional infrastructure and cycling, safety plans, commissioning of regional public transport
Metropolitan regions / transport authorities	Develop regional accessibility strategies
Municipalities	Responsible for urban mobility planning, traffic management, parking, cycling and walking, local infrastructure and implementation of measures such as ZE-zones and shared mobility

ii. Measures and interventions

Dutch urban sustainable mobility is intrinsically linked to its history of spatial planning. With around 18 million residents, the strongly urbanized Netherlands took a different developmental path than metropoles like Paris and London. Rather than growing around a single central city, it evolved into a polycentric network of closely spaced cities, linked by rail and highway (Burdett et al., 2011). Approximately a third of the population is concentrated in the Randstad, one of the most highly urbanized regions of Europe, with Amsterdam, Rotterdam, The Hague and Utrecht as largest cities (Ploeger, 2024). Below, we discuss how urban spatial planning has influenced

different modes of transport, and what measures have been taken to stimulate sustainable travel behavior.

Biking

Due to the polycentric model, biking became the most common mode of transport within cities, giving the country a headstart in making urban mobility more sustainable. A 1958 analysis argued that urban regions should be sized around bikeability, keeping every point within a 30-minute (roughly 4 km) cycle ride of open countryside 9 (See Figure 1). This shaped a vision of capping cities at a million residents, limiting their width to eight kilometers, with at least four kilometers of green space separating them, which is still in place today (Ploeger, 2024, p. 96).

In recent years, provinces and municipalities have successfully taken measures to further stimulate biking. Cities like Amsterdam, The Hague and Utrecht have expanded their cycling infrastructure, mostly at the expense of car lanes and parking spaces. At the same time, more people are switching to electric bikes: e-bike ownership among adults increased from 27% in 2019 to 48% in 2025 (Goudappel & IPOS I&O, 2026). Together with the construction of over 1000 km long-distance, high-velocity cycling lanes between cities and villages (Fietsberaad, 2025), the e-bike allows people to travel longer distances without the need for cars or public transport.

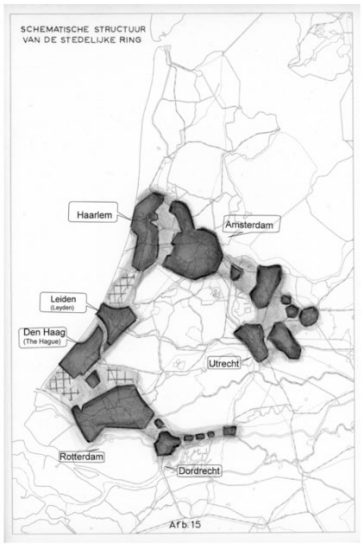


*Figure 2*Schematic overview of the urbanized western part of the Netherlands, according to the 1958 study 'De ontwikkeling van het Westen des Lands'. The image shows what is now called the Randstad, consisting of compact 'bicycle cities' surrounded by rural areas. Source: Ploeger, 2024.

Public transport

The polycentric setup and the Dutch cycling culture also affect public transport services. These services rely on high passenger numbers, which are difficult to obtain in smaller cities where people mostly travel by bike. The four biggest cities (Amsterdam, Rotterdam, The Hague and Utrecht) have metro or tram line. Other cities rely on bus services, which are increasingly

electrified: over half of the Dutch bus fleet is emission-free (CROW-KpVV, 2026b). For travelling between cities, people have access to one of the busiest train networks in Europe (ProRail & NS, 2023), with a minimum of two trains per hour on every track and up to six trains per hour on the most crowded lines.

Increasing costs and declining passenger numbers are the biggest challenges for Dutch public transport. Because of the Covid pandemic, passenger numbers have dropped and have not completely recovered due to permanent shifts in commuting and remote work (KiM, 2026b). In the meantime, transit fares cannot keep up with increased costs, meaning public transport services need to be scaled down. On top of this, the former right-wing cabinet (consisting of PVV, NSC, VVD and BBB) announced major spending cuts on public transport for 2026 and 2027 (House of Parliament, 2025). Due to political opposition from the left (PRO, ChristenUnie and SP), these cuts have been postponed.

Cars

Car ownership remains a bottleneck in sustainability ambitions, as private cars are responsible for half of the CO_2-emissions from domestic traffic in the Netherlands (Statistics Netherlands, 2025). Every Dutch household has one car on average, but car ownership is generally twice as high in rural areas compared to city centers (Martensen & Arendsen, 2024). Many cities discourage private car ownership in several ways, such as stricter parking policies, lower speed limits and electric car sharing schemes (Jorritsma et al., 2023). In addition, the cities of Amsterdam, Arnhem, The Hague and Utrecht introduced low-emission zones to ban the most polluting vehicles from the city center (RVO, 2026).

In contrast with local policies, national measures to discourage car use have little political support. Since the 1980s, policy makers have been working on road pricing schemes, but these schemes have never been implemented. The lack of national decisiveness also results in friction between policy levels (Liu et al., 2024). For instance, the municipality of Amsterdam was recently forced to postpone the implementation of zero-emission zones for private cars because there is no national law that allows them to take such a measure (Amsterdam City Council, 2026). Twenty municipalities did introduce zero-emission zones for trucks and delivery vans, even though a majority of the House of Representatives wanted to postpone this measure (House of Representatives, 2024).

The national government launched several tax schemes and subsidies to encourage the purchase and use of electric cars. Since 2018, the share of fully electric cars has increased from 0,5% to 6% in 2024 (Martensen & Arendsen, 2024). The subsidy scheme for the purchase of private electric vehicles was closed in 2025. However, due to the increased energy prices, the government recently announced a new trade-in subsidy for fossil-fuel vehicles to support the purchase of

second-hand electric cars (House of Representatives, 2026). This would make electric driving more accessible for lower- and middle-income households.

Shared mobility

Shared mobility has so far played a minor role in the Dutch mobility transition. The availability of shared services for cars, (cargo) bikes, e-bikes and e-mopeds has gradually increased since 2020, but the majority of the people (78% in 2025) do not use these services (Ministry of Infrastructure and Water Management, 2026). An exception is the so-called 'public transport bike' (in Dutch: OV-fiets) offered by the Dutch Railways, which has become increasingly popular for incidental bike rides to and from train stations.

For most companies, it is challenging to find a business case for shared mobility initiatives, resulting in bankruptcies and frequent changes in providers (CROW-KpVV, 2026a). Shared mobility requires low costs and high coverage to be an attractive alternative to private cars or public transport. Therefore, initiatives are highly dependent on public funding. Furthermore, municipalities have different regulations and permit schemes, resulting in high administration costs. In order to stabilize the market, the cities of Utrecht and Eindhoven have implemented regional concessions for shared bicycles and e-mopeds, including financial support to cover the less profitable surrounding municipalities (CROW-KpVV, 2026a).

iii. Impacts on mobility patterns, behavior and urban quality of life

In line with the Dutch Climate Agreement, sustainability measures are aimed at travelling smarter, cleaner and different (Ministry of Economic Affairs and Climate, 2019). In practice this means: less use of fossil fuel vehicles and more use of active mobility (biking or hiking), public transport or electronic vehicles (shared or private). Below, we discuss the impact of mobility measures on these different modes of transport. In addition, we present the available knowledge on sustainable travel behavior, environmental performance and other relevant effects.

Modal split

Sustainability measures have so far not resulted in major modal shifts. In the Netherlands, private cars remain the most dominant mode of transportation, although this depends on the travel motive (Goudappel & Ipsos I&O, 2026; Roeleven et al., 2026). For daily commutes, 74% of the population travels by car and this percentage has remained stable over the last six years (Goudappel & Ipsos I&O, 2026). For educational purposes or leisure activities, people are more inclined to go by bike or public transport (Goudappel & Ipsos I&O, 2026; Roeleven et al., 2026).

There is a significant increase in electric vehicles, corresponding with the aim to travel cleaner. The share of fully electric cars has grown from 0,5% in 2018 to 6% in 2024 and the share of e-bikes has grown from 8% in 2014 to 38% 2023 (KiM, 2026b). E-bikes could potentially replace car

rides, but studies suggest the rise of the e-bike is primarily at the expense of the regular bike (Rijs et al., 2026; Roeleven et al., 2026), which causes negative rather than positive climate effects.

The use of mobility-as-a-service is marginal and its success depends on the providers (Goudappel & Ipsos I&O, 2026; KiM, 2026a). When well organized on a national level, it could potentially persuade a small group of car owners to use more public transport and shared mobility. But it could also draw people from public transport to a shared car. The effect on the environment will likely be bigger if this is combined with measures to discourage car ownership (KiM, 2026a). Research shows that shared cars are mainly used for recreational purposes and that most users (7 in 10) also have a private car (Ipsos I&O, 2025). Among users that do not own a car, 71% intents to remain car-free.

Sustainable travel behavior

In June 2026, the Netherlands Institute for Transport Policy Analysis (Kennisinstituut voor Mobiliteitsbeleid, KiM) published an overview of the available knowledge on the impact of mobility measures on traffic flow and sustainable travel behavior (KiM, 2026a). According to KiM, the Dutch literature does not provide many data on the effectiveness of mobility measures after implementation. The effects of these measures are often not evaluated or structurally monitored. However, some general remarks can be made, which we will discuss below.

Firstly, measures to discourage car use are more effective than measures that stimulate the use of more sustainable modes of transport (KiM, 2026a, p. 235). Investing in public transport or lowering transit fares will mostly benefit people that already use this mode of transport (CROW-KpVV, 2025; Haas et al., 2022). Therefore, a better way to discourage fossil transport is through regulatory measures such as parking restrictions, tax increases and zero-emission zones. Ideally, such disincentives for fossil transport are combined with incentives for more sustainable modes of transport to provide travelers with an alternative.

Secondly, the effectiveness of measures depends heavily on the specific context in which the measures are taken (KiM, 2026a, p. 235). For instance, a car-free or low-traffic policy is most effective in densely populated areas (Jorritsma et al., 2023). In these areas, cars take up a lot of space that is also needed for other purposes. A car-lite policy could not only reduce greenhouse gas emissions, but also improve urban quality of life, safety and active mobility. These policies are less effective in rural areas, where space is less of an issue and people have limited travel alternatives.

Environmental performance

In order to reach the 55% reduction goal, the government aims to decrease mobility emissions to 21,3 Mton CO_2-equivalents in 2030 (Ministry of Climate and Green Growth, 2025). In 2024, the mobility sector emitted 29,2 Mton CO2-equivalents, a 13% decrease compared to 1990 (KiM,

2026b; PBL, 2025). These emissions are mainly caused by road traffic. The reduction is attributed to an increase in electric driving, reduced diesel sales and higher biofuel blending (PBL, 2025). Road traffic decreased significantly during the Covid pandemic and is now slowly increasing, but has not yet reached its pre-Covid levels due to a structural increase in remote working (KiM, 2026b).

Apart from greenhouse gas emissions, road traffic also has other environmental impacts. The mobility sector accounts for 49% of the Dutch nitrogen dioxide (NO_2) emissions (Mijnen-Visser et al., 2025). In addition, road traffic is an important source of particulate matter due to tyres and road wear. Both NO_2 and PM are harmful to nature and human health. These emissions decreased by 35% and 12% respectively between 2015 and 2024 (KiM, 2026b). However, PM emissions of private cars increased since 2022 due to an increase in vehicle kilometers (KiM, 2026b).

Health, safety and rebound effects

The growth of electric vehicles has raised concerns about health, safety and rebound effects. Apart from the higher purchase costs, driving an electric car is cheaper than running a petrol equivalent. This seems to lead to an increase in car use, especially on long distances in the weekends (Trinks et al., 2025), which could partly negate climate gains. Furthermore, electric vehicles are heavier than their fossil counterparts, which could cause increased PM emissions and more damage in case of accidents, posing risks to public health (Lin et al., 2026).

E-bikes among children and elderly people are also part of the public debate, especially regarding safety and health. In 2025, 56% of the people over 55 owned an e-bike (Goudappel & Ipsos I&O, 2026). E-bikes, and particularly 'fatbikes' (e-bikes with wide tyres) are also increasingly popular among teenagers (Roeleven & de Haas, 2026). Both groups show an increase in the frequency and severity of accidents (Rijs et al., 2026). Health benefits are mainly expected when e-bikes replace cars, which is more likely for elderly people than for children. In addition, people have raised concerns about dangerous and reckless driving (Roeleven & de Haas, 2026) and several municipalities have introduced a fatbike ban in busy areas in response to these complaints.

iv. Citizen and stakeholder participation

Sustainable urban mobility is not a single policy issue, but cuts across multiple governance levels and policy domains. Citizen and stakeholder involvement concerns a range of issues, from infrastructure decisions and behavioral measures to pricing, investment in technology and innovation, and long-term mobility visions. It also takes different forms, ranging from consultation in spatial planning to national negotiations between government, employers, trade unions and other organized interests, reflecting the Dutch tradition of the *polder model* (Van Der Linde et al., 2021).

For spatial planning, the Environment and Planning Act (2024) is the central instrument that poses a framework for participation in spatial strategy. It stipulates the need for participation in pre-defined phases of planning, but does not prescribe how this process is executed. This gives municipalities and other authorities considerable freedom in designing the participation process (Rijkswaterstaat, 2026). As a result, participation can vary quite strongly, from informing and consulting citizens, to more collaborative forms of policy development in earlier stages of the policy cycle. The latter is more in line with the European Commission's SUMP strategy, which advocates for citizen involvement in the very beginning of the transport planning process (Lindenau and Böhler-Baedeker, 2014, p. 348).

Local experimentation

Considerable variation in participation typologies or 'repertoires' can be observed in the Netherlands, that each vary in timing and their degree of openness (May et al., 2017; Metze et al., 2023; Stirling, 2008). The city of Rotterdam illustrates a comparatively open approach: rather than testing a single predefined technology, the city gathered a broad, loosely structured coalition of public, private and civil-society actors to co-create its own mobility transition agenda (Loorbach et al., 2021). While considerable local experimentation takes place in many Dutch cities, national regulation, funding and political choices impacts whether these processes are successful. Research suggests that municipalities do not always have the means and influence necessary to implement an integral mobility strategy due to national policy restrictions (Liu et al., 2024; May et al., 2017, p. 12).

At the same time, local governments can find traction for measures that are contested or difficult to implement on a national scale. The debate on kilometer charges for passenger cars illustrates this dynamic. Pricing measures have been debated nationally since the 2000s, but have not been implemented to date. A closer look at of Dutch municipal car-reduction policy finds that most municipalities have successfully adopted measures to reduced parking, lower speed limits, and reallocate street space originally meant for cars, using aspects such as livability as motivation, rather than emissions alone (Jorritsma et al., 2023).

The added value of stakeholder participation is not always recognized by policymakers, and involving stakeholders can be challenging (Van Der Linde et al., 2021). Participation is also not necessarily representative, as illustrated by Hansel et al. (2025): frequent users of shared mobility, for instance, are more likely to take part in consultations. Framed through the lens of mobility justice, who is included in participation processes can shape which mobility problems are addressed. Research on Utrecht's mobility plan illustrates this concern: disadvantaged groups can face difficulty accessing transport services, deepening existing social exclusion (Van Der Craats et al., 2025).

National deliberation and organized interest

On a national level, mobility policy is strongly shaped by technical expertise, political negotiation and the distribution of costs and benefits. A longstanding tradition of stakeholder involvement exists, characterized by negotiation between government and organized interests, reflecting the Dutch 'polder model'. These interest groups include passenger organisation, cyclists' and motorists' associations, employers and trade unions (Van Der Linde et al., 2021).

Recently, several initiatives have been launched to include citizens in early-stage deliberation processes on a national scale. The recent Dutch National Climate Citizens' Assembly provides an example of a more upstream form of participation, in which 175 randomly selected citizens formulated recommendations for national climate policy. Mobility was one of the themes addressed by the assembly. The cabinet recently promised to adopt a number of the proposed mobility measures, amongst which making electric driving more accessible, by subsidizing a trade-in scheme for old petrol or diesel cars for second-hand electric cars (Ministry of Economic Affairs and Climate, 2026).

v. Challenges and future policy priorities

The previous chapters, together with expert interviews and desk research, point to several future priorities for sustainable urban mobility policy in the Netherlands.

Accelerating the transition beyond electrification

Greenhouse gas emissions of road traffic have decreased over the last years, but according to the Netherlands Environmental Assessment Agency (PBL), there is only a 10% chance that the mobility sector will reach the goals for 2030 (PBL, 2025). The current and expected emission reduction is mainly due to an increase in electric vehicles and a larger share of biofuels. Overall, mobility patterns haven't changed: private car ownership is still growing and technological innovations such as e-bikes and shared mobility mainly replace regular biking and public transport if car ownership is not actively discouraged.

Strengthening public transport and reducing car dependency

Sustainable urban mobility requires a systems change. While measures to discourage car use are highly effective for reducing greenhouse gases on paper, they are generally unpopular and difficult to implement. Currently, the national government prioritizes car ownership over public transport, and car ownership continues to grow. As the VNG mobility vision points out, public transport services are essential for climate neutrality and accessibility (VNG, 2023). However, these services are also under pressure, due to increasing costs and a lack of investment.

Improving the living environment and use of space in cities

Air quality, noise reduction, physical activity, heat stress and climate adaptation are becoming increasingly important. With urban space becoming scarcer and 900,000 new homes planned by 2030, cities will need to critically consider how space is allocated. In inner cities, car ownership is increasingly difficult to accommodate and people will rely more on public transport. However, people living further from urban centers are likely to remain car-dependent. For these groups, electrification will be the dominant strategy for reaching the 2050 climate goals.

Addressing emerging safety challenges

Electrification poses several challenges to safety and public health. Cycling lanes are becoming more occupied with a variety of light electronic vehicles, creating safety risks due to the larger speed gap between drivers. In addition, larger and heavier cars can increase the severity of accidents and road wear. To address these challenges, there is a need for a new perspective on multimodal cycle paths and regulation of vehicle weight, for instance by stimulating the development of lighter battery technologies.

A critical perspective on technology and innovation

High expectations were placed on technological innovations such as shared mobility and autonomous vehicles in the 2019 Climate Agreement. However, their potential to contribute to a broader mobility transition remains uncertain. A new development in the mobility transition is vehicle-to-grid (V2G) technology. With increased electrification, net congestion is one of the biggest challenges for the Dutch electricity network. V2G technology turns electric cars into mobile batteries, sending stored energy back to the grid when energy demands are high. Utrecht is the first European city that offers a shared car service with this technology (Nederland Elektrisch, 2025).

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12. Norway[245]

Teknologirådet

i. Policy frameworks for urban sustainable mobility in Norway

Key facts on urban mobility in Norway

Norway has 5.6 million inhabitants, a low population density and few large urban areas. Oslo is the only urban area exceeding 1 million inhabitants. Bergen, Stavanger/Sandnes and Trondheim follow with urban areas of roughly 200,000–300,000.[246]

Norway leads the world in vehicle electrification. Battery-electric vehicles accounted for 95.9% of new passenger cars registered in 2025, and over 30% of the national fleet is now electric.[247]

Daily travel statistics, from the annual National Travel Survey – numbers from 2025:[248]

Area	Car	Public transport	Walking	Bicycle
National average	**61%**	**10%**	**21%**	**5%**
Oslo	42%	21%	27%	6%
Bergen	56%	15%	22%	3%
Stavanger area	59%	9%	20%	7%
Trondheim	52%	13%	24%	7%

National Transport Plan (NTP): Long term plans revised every 4 years

The overarching national policy framework for transport in Norway is the National Transport Plan. It is revised every four years and covers all transport modes and both urban and regional

[245] Author: Joakim Valevatn
[246] Statistics Norway (SSB), "Tettsteders befolkning og areal" updated 31 August 2026, https://www.ssb.no/befolkning/folketall/statistikk/tettsteders-befolkning-og-areal
[247] Norwegian Road Federation (OFV), "2025 ble tidenes rekordår for bilsalget," 2 January 2026, https://ofv.no/aktuelt/2026/2025-ble-tidenes-rekord%C3%A5r-for-bilsalget; Norwegian Road Federation (OFV), "Historisk skifte: flere elbiler enn dieselbiler i personbilparken," 2025, https://ofv.no/aktuelt/2025/historisk-skifte-flere-elbiler-enn-dieselbiler-i-personbilparken
[248] Norwegian Public Roads Administration (Statens vegvesen), "Reisevaner 2025," National Travel Survey. Car figures include both driver and passenger, https://www.vegvesen.no/vegprosjekter/nasjonal-transportplan/den-nasjonale-reisevaneundersokelsen/reisevaner-20252/reisevaner-2025/

transport. The current plan was presented to the Parliament in March 2024 and covers 2025–2036.[249]

The plan has a total frame of EUR 120.9 billion.[250] The national road network receives 48% of the funds. Urban transport receives 7%. Rail receives 36%, much of which also benefits urban transport.

In addition to plans for funding, the NTP sets goals and frameworks for (sustainable) transport: The aim for 100% electric vehicles has been a part of the NTP, as an ambition for 20% bicycle share in urban areas. The NTP is also used as a document for forecasts of transport demand, technology development, important trends and foresight.

Overarching principle: Zero growth of car traffic in urban areas

The main principle for Norway's sustainable urban mobility is The Zero Growth Target.[251] This target states that all growth in passenger transport in the largest urban areas shall be absorbed by public transport, cycling and walking, rather than private car use. It was first defined in a parliamentary Climate Agreement in 2012, and has been carried forward in National Transport Plans and urban transport policy since then.[252]

The target aims at limiting growth in car traffic. It does not differentiate between fossil fuel vehicles and EVs. The target was first stated in the context of a climate agreement, which has caused debate in recent years, as EVs contribute to emission reduction while increasing car traffic.[253]

Key regulatory instrument: Urban Growth Agreements

The Zero Growth Target is implemented through Urban Growth Agreements (*byvekstavtaler*), negotiated between the state, county authorities and municipalities. Seven urban regions currently take part in Urban Growth Agreements.[254]

Funding for urban transport in the National Transport Plan largely goes through the Urban Growth Agreements. Local authorities commit to measures that limit growth in car traffic. In exchange, the state contributes funding for public transport, cycling infrastructure and local road projects.[255]

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[249] Ministry of Transport, Meld. St. 14 (2023-2024), Nasjonal transportplan 2025-2036, 22 March 2024, https://www.regjeringen.no/no/dokumenter/meld.-st.-14-20232024/id3030714/

[250] NOK 1,308 billion

[251] Norwegian Public Roads Administration (Statens vegvesen), "Om nullvekstmålet og oppfølging av avtalene," https://www.vegvesen.no/vegprosjekter/nasjonal-transportplan/byvekstavtaler/om-nullvekstmalet-og-oppfolging-av-avtalene/

[252] Norwegian Public Roads Administration (Statens vegvesen), Bjørne Grimsrud, "Kronikk: Byvekstavtaler gir nødvendig innovasjon og effektivitet," 22 July 2020, https://www.vegvesen.no/om-oss/presse/aktuelt/nasjonalt/kronikk-byvekstavtaler-gir-nodvendig-innovasjon-og-effektivitet/

[253] Ministry of Transport, Meld. St. 14 (2023-2024), Nasjonal transportplan 2025-2036, section on the zero-growth target, 22 March 2024, https://www.regjeringen.no/no/dokumenter/meld.-st.-14-20232024/id3030714/?ch=3&q=nullvekstm%C3%A5l

[254] Norwegian Public Roads Administration (Statens vegvesen), "Om byvekstavtaler, belønningsavtaler og tilskudd til mindre byområder," https://www.vegvesen.no/vegprosjekter/nasjonal-transportplan/byvekstavtaler/om-byvekstavtaler/

[255] Ministry of Transport, "Byvekstavtaler og tilskudd til byområder," https://www.regjeringen.no/no/tema/transport-og-kommunikasjon/kollektivtransport/byvekstavtalerogtilskudd/id2571977/

With car traffic being on the rise, staying within the Zero Growth Target is under pressure in several cities. However, sanctions for breaching the agreements are not clearly defined.[256]

Responsible authorities:

- **Ministry of Transport:** NTP and Urban Growth Agreements.
- **Ministry of Finance:** Vehicle taxation and tax-related EV incentives.
- **County authorities:** Regional public transport and county roads
- **Municipalities:** Land-use planning, parking policy, municipal roads and walking/cycling infrastructure, urban toll rings

ii. Measures and interventions

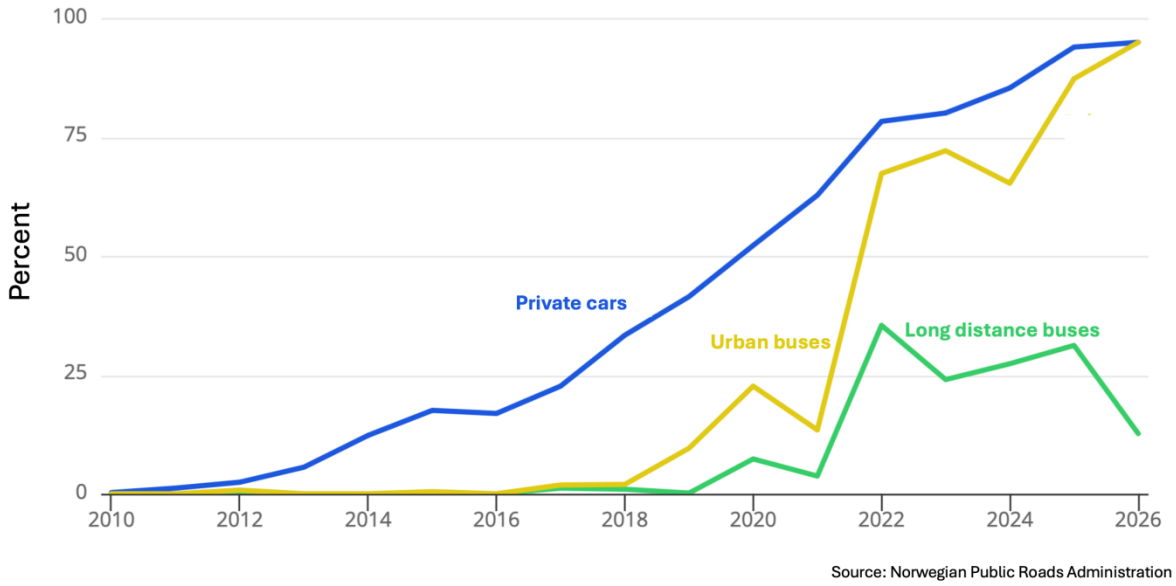
Target of 100% EVs effectively reached

In 2016 the Government stated a goal that all new passenger cars sold in Norway shall be electric by 2025. This goal was restated in the subsequent National Transport Plans.[257] The goal was in practice reached: In 2025, 95.9% of new registrations were battery-electric and over 30% of the national private car fleet is now electric. The target was reached through a number of incentives: For instance tax and VAT exemptions, reduced road tolls, access to bus lanes and reduced parking fees.[258] As the volume of EVs has increased, incentives have gradually been reduced. For instance, access to the bus lane has been reduced, road tolls have been raised. The 2026 national budget reduced the VAT exemption, with a proposal to remove it entirely from 2027.[259]

Bus fleets have also to a large extent been electrified. Currently 34.7% of all urban buses are electric. So far in 2026, 95% of newly registered urban buses are electric.

[256] NRK, "Biltrafikken øker - kan byvekstavtalen ryke?", https://www.nrk.no/rogaland/biltrafikken-oker-_-kan-byvekstavtalen-ryke_-1.17627961
[257] Ministry of Transport, Meld. St. 33 (2016-2017), Nasjonal transportplan 2018-2029, https://www.regjeringen.no/no/dokumenter/meld.-st.-33-20162017/id2546287/; Ministry of Petroleum and Energy, Meld. St. 25 (2015-2016), Kraft til endring: Energipolitikken mot 2030, https://www.regjeringen.no/no/dokumenter/meld.-st.-25-20152016/id2482952/
[258] Norwegian Automobile Federation (NAF) "Dette er fordelene for elbiler," 8 November 2024, https://www.naf.no/elbil/bruke-elbil/dette-er-fordelene-for-elbiler
[259] Ministry of Finance, Prop. 1 LS (2025-2026), Taxes 2026, https://www.regjeringen.no/en/documents/prop.-1-ls-20252026/id3125412/

Share of electric private cars, city buses, and long-distance buses among new vehicle sales



Source: Norwegian Public Roads Administration

Mobility pricing: From road financing to traffic management

In 1986 Norway was the first country in Europe to introduce urban toll rings.[260] The toll rings were first built in order to finance road construction. In recent years, traffic management has become an additional purpose, through time-differentiated rush-hour rates and environmentally differentiated tariffs. Revenue from toll rings finances public transport and cycling infrastructure, and the toll financing is a central part of the Urban Growth Agreements. Norway has been an early adopter of automatic tolling technology.[261] Distance-based road pricing has been studied repeatedly as a replacement, but has not yet been adopted.[262]

Micromobility: From regulatory vacuum to control

Shared e-scooters arrived overnight in Norwegian cities in 2019. A 2018 rule had classified e-scooters as equivalent to bicycles, not foreseeing the arrival of large rental fleets. In Oslo the number of rental e-scooters in the city centre quickly grew to around 25.000, giving it the highest density of shared e-scooters per capita of any city in Europe in 2020. The situation exposed a national-vs-local regulatory gap: Municipalities had no legal instrument to restrict fleets, even as accidents and complaints piled up.[263]

Regulations have come in two stages:

[260] Store norske leksikon, "Bompenger," https://snl.no/bompenger
[261] Petros Ieromonachou, Stephen Potter and James P. Warren, "Norway's urban toll rings: Evolving towards congestion charging?", Transport Policy 13(5) (2006): 367-378, https://doi.org/10.1016/j.tranpol.2006.01.003
[262] NRK, "Veiprising prøves ut i Norge," 9 January 2022, https://www.nrk.no/norge/veiprising-proves-ut-i-norge-1.15800153
[263] Ministry of Transport, "Gode erfaringer med lov som regulerer utleie av elsparkesykler," 17 February 2023, https://www.regjeringen.no/no/aktuelt/gode-erfaringer-med-lov-som-regulerer-utleie-av-elsparkesykler/id2963650/

- In 2021, a national rental law gave municipalities power to cap fleet sizes and set parking and night-time rules. Oslo reduced the fleet from 25.000 to 8000 and introduced a nightly rental closure.[264] The cap has later been raised to 16.000.[265]
- In 2022, e-scooters were also reclassified nationally from bicycles to small electric motor vehicles, adding an alcohol limit, minimum age of 12, helmet requirement for under-15s, speed limit, and compulsory insurance.[266]

The effects on car use appear limited: According to a survey, more than 50% of trips replace walking, around one-third replace public transport, while only around 7% replace car or taxi journeys.[267]

Autonomous vehicle testing for public transport

Testing of autonomous vehicles has been permitted since 2018, with an act that allows exemptions from the road-traffic law that normally would require a human driver.[268] The public transport authority in Oslo, Ruter, has since 2023 been testing on-demand shared autonomous vehicles in Groruddalen as a potential permanent supplement to scheduled services.[269] Ruter has a strategic priority that autonomous driving should be developed as a shared public service rather than as private individual transport. In 2019, Ruter modelled a scenario in which a fleet of shared autonomous vehicles could the reduce the number of cars needed by 84-93%, conditional on high sharing rates.[270]

Digital mobility: Large ambitions but results are still lacking

Digital transport services can support more sustainable mobility by making it easier to combine various modes of public transport and shared mobility services. Many Norwegian transport services are to a large extent digital and app-based: Ticketing, journey planning, parking, tolls, city bikes, and micromobility. MaaS (Mobility as a Service) has been part of Norwegian public transport authorities' ambitions since around 2016–17, initiated by the Norwegian Public Transport Association.[271] In 2016 the state established Entur, a national ticketing and journey-planning system, meant to serve two purposes: A back-end for ticket sales across operators, and an integrated consumer travel planner. The system has become important as a back-end service

[264] City of Oslo, "Nye regler for elsparkesykler i Oslo," 13 July 2021, https://aktuelt.oslo.kommune.no/nye-regler-for-elsparkesykler-i-oslo
[265] City of Oslo, "Leie av elsparkesykler og elsykler," https://www.oslo.kommune.no/gate-transport-og-parkering/sykkel/leie-av-elsparkesykler-og-elsykler/
[266] Ministry of Transport, "Nå blir det strengere regler for bruk av elsparkesykler," 23 May 2022, https://www.regjeringen.no/no/aktuelt/na-blir-det-strengere-regler-for-bruk-av-elsparkesykler/id2914010/
[267] Institute of Transport Economics (TØI), "Seksdobling av ulykker blant de som kjører sammen på elsparkesykkel," 14 April 2026, https://www.toi.no/forskningsomrader/atferd-og-transport/seksdobling-av-ulykker-blant-de-som-kjorer-sammen-pa-elsparkesykkel
[268] Lovdata, Lov om utprøving av selvkjørende kjøretøy (LOV-2017-12-15-112), 15 December 2017, effective 1 January 2018, https://lovdata.no/lov/2017-12-15-112
[269] Ruter, "Selvkjøringspiloten," https://ruter.no/prosjekter-og-nyutvikling/selvkjoringspiloten/
[270] Ruter, COWI and PTV Group, The Oslo Study - How Autonomous Cars May Change Transport in Cities, April 2019, https://cdn.sanity.io/files/5a84xxkm/prod/f739a68d98e54bcf6090027efd97a2b71682685a.pdf
[271] Kollektivtrafikkforeningen, Årsrapport 2019, https://kollektivtrafikk.no/app/uploads/2021/01/Arsrapport-2019-komplett-1.pdf

for ticketing, but is not widely used as a consumer product. Less than 3% of public-transport tickets are bought through the Entur app itself.[272] Instead of an integrated MaaS system, mobility services remain fragmented across operators, cities, and modes.

iii. Impacts on mobility patterns, behavior and urban quality of life

Climate emissions and air quality

Electrification has contributed to a reduction in CO2-emissions from road transport. National road-traffic emissions fell from 7.5 million tonnes CO2 in 2024 to 6.9 million tonnes in 2025, more than 8% down and the largest single contributor to the national decline of 1.2%.[273] This happened while the traffic volume was rising.[274]

EVs have also contributed to better air quality in cities: Nitrogen dioxide has fallen substantially. However, particulate matter has not fallen at the same rate, since much of it comes from wear on asphalt, tyres and from road dust resuspension.[275]

Modal shift: Car use has bounced back after the pandemic

The pandemic led to a 6.1% reduction in car traffic in 2020, but this decline did not persist. Since then, traffic has bounced back.[276] The 2025 National Travel Survey shows the share of trips made by car[277] has risen nationally from 47% in 2024 to 53% in 2025. The Directorate of Public Roads attributes this to population growth, increased electric car ownership, and the low running costs of electric vehicles.[278]

Mobility pricing has had a measurable effect

Time-differentiated tolls have measurable effects: Rush-hour charges were introduced in Bergen in 2016, and after one year congestion on the main roads had halved, rush-hour traffic was down 14% and daily traffic down 5%.[279]

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[272] Office of the Auditor General of Norway (Riksrevisjonen), Dokument 3:10 (2023-2024), "Sømløse kollektivreiser," published 17 January 2024, https://www.riksrevisjonen.no/rapporter-mappe/no-2023-2024/somlose-kollektivreiser/; Digi.no, "Nesten ingen kjøper billetter i Entur-appen," 22 May 2026, https://www.digi.no/artikler/nesten-ingen-kjoper-billetter-i-entur-appen/572513

[273] Statistics Norway (SSB), Berit Storbråten, "Liten nedgang i klimagassutslipp i 2025," 4 June 2026, https://www.ssb.no/natur-og-miljo/forurensning-og-klima/statistikk/utslipp-til-luft/artikler/liten-nedgang-i-klimagassutslipp-i-2025

[274] Statistics Norway (SSB), "Hvor mye bil kjører nordmenn?", updated 8 April 2026, https://www.ssb.no/transport-og-reiseliv/landtransport/statistikk/kjorelengder/artikler/hvor-mye-bil-kj%C3%B8rer-nordmenn

[275] NRK, "Elbiler: Kan slite mer på veier og dekk," https://www.nrk.no/buskerud/elbiler_-_-kan-slite-mer-pa-veier-og-dekk-1.17742922; Norwegian Environment Agency (Miljødirektoratet), "Lokal luftkvalitet," https://www.miljodirektoratet.no/ansvarsomrader/forurensning/luftkvalitet/lokal-luftkvalitet/

[276] Ministry of Transport, Prop. 1 S (2021-2022), For budsjettåret 2022 under Samferdselsdepartementet, https://www.regjeringen.no/no/dokumenter/prop.-1-s-20212022/id2875085/; Institute of Transport Economics (TØI), Ingunn Opheim Ellis, Rune Elvik and Susanne Nordbakke, Trafikkutvikling under koronapandemien og status i forhold til Paris-avtalen og norske klimaforpliktelser, TØI Report 1874/2022, https://www.toi.no/publikasjoner/trafikkutvikling-under-koronapandemien-og-status-i-forhold-til-paris-avtalen-og-norske-klimaforpliktelser

[277] As driver, not including passengers

[278] Norwegian Public Roads Administration (Statens vegvesen), "Reisevaneundersøkelsen 2025: Bilreisene øker i byområdene," 27 February 2026, https://www.vegvesen.no/nn/om-oss/presse/aktuelt/2026/02/reisevaneundersokelsen-2025-bilreisene-oker-i-byomradene/

[279] Samferdsel & Infrastruktur, "Status etter et år med rushavgift i Bergen," 3 August 2017, reporting figures from the Norwegian Public Roads Administration, https://www.samferdselinfra.no/status-etter-et-ar-med-rushavgift-i-bergen/.

Strong road-safety record, but injuries on the rise

Norway has had the lowest road-death rate in Europe for 10 consecutive years in 2024.[280]

However, 2025 saw a reversal: 111 deaths against 87 in 2024, and an estimated 600 or more seriously injured. Vulnerable road users drove much of the rise: pedestrians, cyclists and e-scooter riders together saw 23 deaths, nearly double the prior two years, and unprotected road users made up 47% of all traffic deaths in 2025.[281]

Public acceptance: Restrictive car policies under debate

Tolls have long been a politically contested instrument in Norwegian transport policy. Ahead of the 2019 local elections, a single-issue anti-toll party ran for election in eleven municipalities and four counties.[282] Despite this, toll financing remains a central part of the urban transport policy.

More recently, the Zero Growth Target itself has become contested: In March 2026 the Progress Party proposed abolishing it[283], and in June 2026 the Centre Party also called for scrapping it, arguing it is too rigid for municipalities surrounding the largest cities.[284]

iv. Citizen and stakeholder participation

Participation as part of municipal planning processes

The Planning and Building Act requires citizen participation in urban development projects. This mainly concerns new buildings and urban development but can also be of concern for certain transport projects.Plans are subject to public consultation and public inspection. Electronic presentation and dialogue must be facilitated. Public meetings, workshops and other dialogue processes are also commonly used in larger planning processes.[285]

Stakeholder involvement at national and local level

Stakeholders are also consulted in national transport planning. During preparation of the National Transport Plan 2025–2036, the government organised input meetings with county authorities, the largest cities, relevant businesses and interest organizations.[286] This process ensures a wide range of local perspectives being taken into account for the long-term national plan.

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[280] Norwegian Public Roads Administration (Statens vegvesen), "Norge - 10 år på trafikksikkerhetstoppen i Europa," 28 March 2025, https://www.vegvesen.no/nn/om-oss/presse/aktuelt/2025/032/best-pa-ts/; European Transport Safety Council (ETSC)
[281] Norwegian Public Roads Administration (Statens vegvesen), "111 omkomne i trafikken i 2025," 1 January 2026, https://www.vegvesen.no/om-oss/presse/aktuelt/2026/01/111-omkomne-i-trafikken-i-ar/
[282] Store norske leksikon, "Bompenger," https://snl.no/bompenger; Store norske leksikon, "Folkets parti FNB," https://snl.no/Folkets_parti_FNB
[283] Norwegian Parliament (Stortinget), Dokument 8:232 S (2025-2026), Representantforslag om å avslutte byvekstavtaler og avvikle nullvekstmålet, 26 March 2026, https://www.stortinget.no/no/Saker-og-publikasjoner/Publikasjoner/Representantforslag/2025-2026/dok8-202526-232s/?all=true
[284] NRK "Senterpartiet snur om nullvekstmål i biltrafikken - meiner det hindrar utvikling i distriktet," 2026, https://www.nrk.no/trondelag/senterpartiet-snur-om-nullvekstmal-i-biltrafikken-_-meiner-det-hindrar-utvikling-i-distriktet-1.17908086
[285] Ministry of Local Government and Regional Development, "Medvirkning," https://www.regjeringen.no/no/tema/plan-bygg-og-eiendom/plan_bygningsloven/planlegging/fagtema/medvirkning/id2961720/
[286] Ministry of Transport, "NTP 2025-2036: Regionale innspillsmøter høsten 2023 - presentasjoner og oppsummeringer," 14 December 2023, https://www.regjeringen.no/no/aktuelt/ntp-2025-2036-regionale-innspillsmoter-hosten-2023-presentasjoner-og-oppsummeringer/id3019999/

Participatory strategic foresight

In the most recent National Transport Plan, participatory foresight methods were used to support long-term planning. Traditional forecasting models were combined with scenarios and backcasting to explore different pathways toward long-term goals, including a low-emission society by 2050. The work was carried out jointly by Avinor and Bane NOR, the public agencies responsible for air and rail transport, together with other transport authorities.[287]

v. Challenges and future policy priorities

Electrification vs. the zero growth target

Norway's rapid EV adoption is one of its most visible climate successes, but it creates tension with the main urban mobility target. The Zero Growth Target applies to car traffic regardless of whether vehicles are fossil-fuelled or electric. At the same time, the 2025 National Travel Survey indicates that increased EV ownership and the lower running costs of EVs are contributing to rising car traffic.[288] Currently the EV incentives are being phased out. In 2026, the threshold for the VAT exemption on new EVs was reduced, and the government has announced that the exemption will be removed entirely from 2027.[289] A long term challenge will be to reconcile climate policy with goals for sustainable urban mobility.

Distance based road pricing under evaluation

Distance-based pricing has for a long time been discussed to replace tolls and fuel taxes.[290] A 2023 government study recommended a stepwise, position-based system, but the government paused the follow-up in its 2025 budget.[291] A tax comission in 2026 has also recommended distance based road pricing, with pilot tests planned for 2026.[292] Recent research on public attitudes finds that distance-based pricing is unpopular among broadly the same groups that oppose tolls, so replacing one with the other will not clearly solve the acceptance problem.[293]

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[287] Norwegian Railway Directorate "Forbedring av det faglige grunnlaget for å vurdere måloppnåelse og fremtidig transportetterspørsel," 12 November 2025, https://www.jernbanedirektoratet.no/ntpmetode/nyheter/forbedring-av-det-faglige-grunnlaget-for-a-vurdere-maloppnaelse-og-fremtidig-transportettersporsel/

[288] Norwegian Public Roads Administration (Statens vegvesen), "Reisevaneundersøkelsen 2025: Bilreisene øker i byområdene," 27 February 2026, https://www.vegvesen.no/nn/om-oss/presse/aktuelt/2026/02/reisevaneundersokelsen-2025-bilreisene-oker-i-byomradene/

[289] Ministry of Finance, Prop. 1 LS (2025-2026), Taxes 2026, proposal to reduce the EV VAT-exemption threshold from NOK 500,000 to NOK 300,000 in 2026 and phase out the exemption from 2027, https://www.regjeringen.no/en/documents/prop.-1-ls-20252026/id3125412/.

[290] Norwegian Board of Technology, "Saken forklart: GPS-basert veiprising - fremtidens bilavgift?", 23 January 2010, https://teknologiradet.no/publication/saken-forklart-gps-basert-veiprising-fremtidens-bilavgift/

[291] Norwegian Tax Administration and Norwegian Public Roads Administration, "Konseptvalg for et nytt system for veibruksavgift og bompenger," 23 November 2022, https://www.skatteetaten.no/rettskilder/type/horinger/konseptvalg-for-et-nytt-system-for-veibruksavgift-og-bompenger/; Ministry of Transport, Prop. 1 S (2024-2025), For budsjettåret 2025 under Samferdselsdepartementet, https://www.regjeringen.no/no/dokumenter/prop.-1-s-20242025/id3056778/

[292] Ministry of Finance, NOU 2026: 9, Veien mot et bedre og mer forutsigbart skattesystem, 24 June 2026, https://www.regjeringen.no/no/dokumenter/nou-2026-9/id3167167/

[293] Institute of Transport Economics (TØI), Askill Harkjerr Halse, Alice Ciccone and Olivia Potash, Attitudes towards road pricing and road tolls: Survey design and data description, TØI Report 2074/2025, https://www.toi.no/publikasjoner/holdninger-til-veiprising-og-bompenger-undersokelsesopplegg-og-beskrivelse-av-data

Security and supply dependency in electrification

Public transport has been rapidly electrified, following stricter environmental requirements. Chinese manufacturers have increasingly won tenders by offerling high-quality buses at competetive prices. This has caused debate on technological security and supply dependency. A growing share of buses purchased in Norway are produced in countries with which Norway does not have security-policy cooperation.

The public transport agency Ruter conducted security tests on relevant electric buses, and found that the manufacturer of one of the buses had direct digital access for software updates and diagnostics, including access to battery and power-management systems. The test concluded that this could, in principle, allow a bus to be stopped or rendered inoperable remotely. Ruter has stressed, however, that the underlying issue concerns connected vehicle technology and is not limited to a particular manufacturer or country.[294]

In August 2026, the Ministry of Transport proposed new risk-reducing measures for public bus procurement. The proposals include recommending that a substantial share of buses come from countries with which Norway has security-policy cooperation, greater diversification between suppliers and countries, and increased attention to supply-chain risks and access to critical components. The Ministry has also proposed an exemption from the zero-emission requirement for public bus procurement where necessary for security and preparedness. The proposals are currently under public consultation.[295]

[294] Ruter, "Omfattende sikkerhetstest av elektriske busser," 28 October 2025, https://ruter.no/ruter-med-omfattende-sikkerhetstest-av-elektriske-busser

[295] Ministry of Transport, "Høring om risikoreduserende tiltak i bussanskaffelser," 19 August 2026, https://www.regjeringen.no/no/dokumenter/horing-om-risikoreduserende-tiltak-i-bussanskaffelser/id3170830/

13. Poland[296]

Bureau of Research (BEOS), Chancellery of the Sejm

i. Legislative, policy and strategic frameworks governing sustainable urban mobility

In Poland European Union legal acts and documents play a significant role in shaping sustainable urban mobility, in particular:

- Communication from the Commission "The New EU Urban Mobility Framework"[297],
- Commission Recommendation (EU) 2023/550 on National Support Programmes for Sustainable Urban Mobility Planning[298], and
- Regulation (EU) 2024/1679 of the European Parliament and of the Council on Union guidelines for the development of the trans-European transport network (TEN-T)[299].

The TEN-T Regulation strengthens the role of urban nodes and requires Member States to ensure that a sustainable urban mobility plan is adopted and monitored for each urban node. The plan should cover the entire functional urban area, account for passenger and freight flows, and be based on policy integration, participation, and evaluation. The deadline for adopting the required plans is December 31, 2027. Poland has 30 urban nodes listed in Annex II to the Regulation[300].

A Sustainable Urban Mobility Plan (SUMP – pl. *Plan Zrównoważonej Mobilności Miejskiej*) is a strategic planning document designed to meet the mobility needs of people and businesses in a city and its surrounding areas, with due regard for quality of life. A SUMP extends beyond the administrative boundaries of a single municipality and should address actual functional linkages and transport patterns[301].

At the national level, key importance is also held by the Act of 16 December 2010 on Public Collective Transport[302], the Act of 11 January 2018 on Electromobility and Alternative Fuels[303], the Act of 21 March 1985 on Public Roads[304], and the Act of 20 June 1997 – Road Traffic Law[305].

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[296] Authors: Ziemowit Socha and Miroslaw Sobolewski

[297] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, The New EU Urban Mobility Framework, COM(2021) 811, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52021DC0811

[298] Commission Recommendation (EU) 2023/550 of 8 March 2023 on National Support Programmes for Sustainable Urban Mobility Planning (notified under document C(2023) 1524), https://eur-lex.europa.eu/eli/reco/2023/550/oj/eng

[299] Regulation (EU) 2024/1679 of the European Parliament and of the Council of 13 June 2024 on Union guidelines for the development of the trans-European transport network, amending Regulations (EU) 2021/1153 and (EU) No 913/2010 and repealing Regulation (EU) No 1315/2013 (Text with EEA relevance), https://eur-lex.europa.eu/eli/reg/2024/1679/oj

[300] *ibidem*

[301] Sustainable urban mobility planning and monitoring, European Commision, https://transport.ec.europa.eu/transport-themes/urban-transport/sustainable-urban-mobility-planning-and-monitoring_en

[302] Journal of Laws 2011, item 13, as amended, text in Polish: https://isap.sejm.gov.pl/isap.nsf/DocDetails.xsp?id=wdu20110050013

[303] Journal of Laws 2024, item 1289, as amended, text in Polish: https://api.sejm.gov.pl/eli/acts/DU/2024/1289/text.pdf

[304] Journal of Laws 1985, item 60, as amended, text in Polish: https://api.sejm.gov.pl/eli/acts/DU/2025/889/text.html

[305] Journal of Laws 2024, item 1251, as amended, text in Polish: https://api.sejm.gov.pl/eli/acts/DU/2024/1251/text.pdf

They respectively regulate the organization and financing of public transport, alternative fuels infrastructure and clean transport zones, paid parking zones, and traffic rules, including rules for bicycles and e-scooters. The key strategic documents relating to mobility specifically include the Strategy for Sustainable Transport Development up to 2030[306] and the National Urban Policy 2030[307]. At the regional and local levels, this framework is further developed in the development strategies of voivodeships, municipalities, and supra-local areas, spatial planning documents, transport plans, and SUMP[308].

National transport policy is primarily the responsibility of the Ministry of Infrastructure. Operating within its structure is the SUMP Competence Centre, headed by the Plenipotentiary of the Minister of Infrastructure for Sustainable Urban Mobility Plans[309]. The Centre coordinates advisory support, maintains a repository of plans, supports their assessment system, and monitors implementation. A Steering Committee for Sustainable Urban Mobility Plan Support (SC SUMP) was also established as a consultative and advisory body to the Minister. Its task is to support the development of SUMPs and to coordinate the preparation and implementation of these plans in cities and functional urban areas. The Committee comprises representatives of the government administration, including ministers responsible for regional development, public administration, construction, spatial planning and development, housing, climate and environment, as well as representatives of local governments and academic experts. The National SUMP Support Programme was adopted by Resolution No. 5 of the Steering Committee on 20 August 2025, and the Plenipotentiary also serves as the National SUMP Contact Point[310].

An important task remains the comprehensive regulation of SUMPs in Polish law. Since 2025, work has been underway on a draft Act on the Sustainable Development of Cities and Their Functional Areas, prepared by the Ministry of Development Funds and Regional Policy in cooperation with the Ministry of Infrastructure. The draft includes provisions that give SUMPs an explicit legal basis and define their role in the system of urban development planning and local government cooperation. The planned regulations are also intended to structure the principles for preparing SUMPs, including defining the minimum scope of the document, the methodology for its elaboration, stakeholder involvement, and rules for monitoring and updating. The objective is to ensure greater consistency and comparability of plans, as well as to more effectively support investment planning and the use of EU funds for sustainable mobility. At the current stage, the draft remains part of the government's legislative process[311].

[306] Strategia Zrównoważonego Rozwoju Transportu do 2030 roku, https://www.gov.pl/web/infrastruktura/projekt-strategii-zrownowazonego-rozwoju-transportu-do-2030-roku2
[307] Krajowa Polityka Miejska 2030, https://www.gov.pl/attachment/01114756-5e93-4607-a616-44d59a24e9d5
[308] Ministry of Infrastructure, National SUMP Support Programme, https://www.gov.pl/web/infrastruktura/krajowy-program-wsparcia-sump
[309] Ministry of Infrastructure, SUMP Competence Centre, https://www.gov.pl/web/infrastruktura/centrum-kompetencji-sump
[310] Uchwała nr 5 Komitetu Sterującego ds. wsparcia SUMP z 20 sierpnia 2025 r..
https://www.gov.pl/attachment/1f7e0e0d-e8e8-47a0-bc6b-e6198f53e898
[311] Government Legislative Center, Project UPR03: Draft Act on the Sustainable Development of Cities and Their Functional Areas, https://legislacja.gov.pl/projekt/12406700

Table 1. Governance levels and basic instruments

Level	Entities	Instruments
National	Ministry of Infrastructure; Ministry of Development Funds and Regional Policy; National SUMP Contact Point	Legislative acts; transport strategy; National Urban Policy 2030; National SUMP Support Programme; guidelines and support system
Regional	Voivodeship governments	Development strategies; regional transport policies and plans; spatial planning documents
Local	Municipalities, cities, counties, unions and agreements of local government units, public transport authorities	SUMPs; local and supra-local strategies; transport plans; local legal acts; spatial planning documents

Source: own elaboration

ii. Sustainable urban mobility measures implemented in recent years

In recent years, the efforts of government and local administrations have focused on strengthening public transport and active mobility, reducing the negative impact of road transport, and increasing the share of zero-emission vehicles. In most major cities, a large-scale modernization of public transport is taking place (for instance, in Warsaw, the expansion of the metro and tram networks continues). The scale and suite of instruments vary across cities. General conclusions can be drawn as follows:

- Public transport and its electrification: Purchase of zero-emission buses and trams, modernization of infrastructure, construction or reconstruction of loops, stops, technical facilities, and charging or hydrogen refuelling infrastructure.
- Pedestrian and bicycle mobility: Development of cycle tracks, pedestrian paths, and combined pedestrian-cyclist routes, traffic calming, and improving safety for vulnerable road users. Public bike-sharing systems (e.g., Warsaw's Veturilo) are a popular element of urban mobility.
- Intermodal hubs and integration: Construction of interchange hubs, Park & Ride and Bike & Ride facilities, as well as the integration of timetables, tariffs, and passenger information.
- Digitalization and Intelligent Transport Systems: ITS implementations, public transport prioritization, dynamic passenger information, and ticketing solutions.
- Parking policy: Reduction of parking spaces in city centres (for instance, in Katowice, where over 1,000 non-compliant or disruptive parking spaces were eliminated as part of

the new parking policy implementation) as well as the establishment and expansion of paid parking zones[312].

- Clean transport zones: Their legal basis is established under the Act on Electromobility and Alternative Fuels. The Warsaw SCT has been operational since 1 July 2024[313]; the Krakow zone entered into force on 1 January 2026 and covers approximately 60% of the city's area[314]. Clean zones also operate in Katowice and Szczecin[315].
- Micromobility: The Road Traffic Law defines the legal status and rules for operating electric e-scooters and personal mobility devices, establishing the priority of cycling infrastructure and setting the conditions for their use on carriageways or pedestrian paths[316].

An example of a financial instrument is the "Sustainable Urban Mobility" measure of the European Funds for Eastern Poland 2021–2027 programme. It includes, among others, co-financing the purchase of zero-emission vehicles and buses, urban transport infrastructure, active forms of mobility, transfer hubs and digital solutions[317].

iii. Evidence regarding the impact of these measures on mobility patterns, citizens' behavior, and urban quality of life

Available data and studies indicate that sustainable mobility measures can influence travel patterns, transport accessibility, safety, and residents' quality of life; however, the scale and permanence of these effects vary across cities. At the same time, evaluating these outcomes is hampered by the lack of a uniform urban mobility monitoring system and comparable data across all Polish cities. Comprehensive traffic studies serve as a fundamental source of information on modal split, enabling the tracking of public transport, private vehicle, walking, and cycling shares, as well as the assessment of mobility trends.

Data points to positive shifts in public transport development, active mobility, and rolling stock modernization, as well as an increasing share of non-car trips in certain municipalities. For instance, findings from the Warsaw Traffic Survey demonstrate that travel habits differ significantly depending on the area – distinct patterns characterize the inner-city center, the rest of Warsaw, and the surrounding suburban municipalities within the metropolitan area (see table below).

[312] Changes in parking policy, Katowice, https://katowice.eu/Konsultacje/Strony/Zmiany-w-polityce-parkingowej.aspx
[313] Clean Transport Zone in Warsaw, https://transport.um.warszawa.pl/sct
[314] Clean Transport Zone in Krakow – map, https://www.krakow.pl/305667,artykul,strefa-czystego-transportu-w-krakowie-%E2%80%93-mapa.html
[315] P. Wiewiora, *More clean transport zones in Poland. After Krakow, it's time for Szczecin and Katowice*, PortalSamorzadowy.pl, 19 January 2026, https://www.portalsamorzadowy.pl/ochrona-srodowiska/kolejne-strefy-czystego-transportu-w-polsce-po-krakowie-pora-na-szczecin-i-katowice,644987.html.
[316] Journal of Laws 2024, item 1251, as amended, text in Polish: https://api.sejm.gov.pl/eli/acts/DU/2024/1251/text.pdf
[317] Polish Agency for Enterprise Development, Action FEPW.03.01 Sustainable Urban Mobility, https://www.parp.gov.pl/component/grants/grants/zrownowazona-mobilnosc-miejska.

Table 2. Transport habits of Warsaw residents by territorial division

Zone	Public transport	On foot	Passenger car	Bicycle / E-scooter
Inner City	40,6%	33%	23,6%	~3%
Outer districts	23,6%	37,3%	35,5%	~3,6%
Metropolitan municipalities	23,6%	31%	55%	~2,8%

Source: Official publication of the City of Warsaw[318]

The metro, trams, buses, and rail remain the transport backbone of the agglomeration, playing a critical role particularly in commuting to and from central districts. The development of local services has led residents to travel more frequently within their own neighborhoods rather than to the center, significantly driving pedestrian and bicycle traffic (which is now frequently year-round). The widespread adoption of hybrid and remote work has flattened traditional morning and afternoon peak hours, distributing traffic more evenly throughout the day. The number of cars entering Warsaw grew from 0.96 million in 2018 to 1.7 million in 2025.

Another documented example is Wrocław, where in 2024 non-car trips accounted for 60.2% of all journeys[319]. Similarly to Warsaw, residents of surrounding municipalities rely on cars more frequently. The number of trips made by residents of neighboring municipalities increased by 93%, translating to approximately 248,000 passenger cars entering Wrocław every day. Resident automobile traffic is shifting to bypass routes (including the Wrocław Motorway Bypass – with traffic volume increasing by over 60%), which helps alleviate congestion on inner-city streets. Although the absolute number of public transport passengers grew, its percentage share of total journeys dropped from 27.6% to 21.6% (primarily in favor of walking and remote work).

At the same time, evidence of a direct causal link between specific sustainable mobility policy measures and changes in residents' behavior remains limited. This is due to a lack of systematic ex-post evaluations and comparable indicators for Polish cities. The development of SUMP monitoring and evaluation systems is currently one of the key elements under discussion and negotiation in Poland as part of preparations to submit the first package of mandatory indicators to the EC under Commission Implementing Regulation (EU) 2026/1554 laying down rules for the collection and transmission of urban mobility data.

[318] Traffic Study for Warsaw, https://warszawa19115.pl/-/warszawskie-badanie-ruchu.
[319] Comprehensive Traffic Study – Wrocław, https://portalkomunalny.pl/wroclaw-wykonal-kompleksowe-badanie-ruchu-571711.

iv. Involvement of citizens and stakeholders in the planning, implementation and evaluation of sustainable urban mobility policies

Public engagement takes place primarily at the local government level. The most frequently used formats include public consultations, surveys, workshops, town hall meetings, participatory budgeting, and electronic feedback channels. In practice, however, the degree and scope of public involvement vary significantly across cities – ranging from passive information sharing and consulting pre-drafted proposals to active co-creation of mobility solutions and joint monitoring of their outcomes.

In the case of SUMPs, participation must not be reduced to merely presenting a finalized document. In line with the European Commission's framework, the plan should be co-developed with residents and stakeholders, cover the entire functional urban area, and integrate the planning process with continuous monitoring and evaluation[320].

Good practice dictates involving not only residents of the core municipality, but also representatives from neighboring municipalities, transport authorities and operators, road infrastructure managers, businesses, educational institutions, civil society organizations, and user groups with specific mobility needs. Furthermore, the consultation report must explicitly outline which feedback was submitted, how it was addressed, and what modifications were subsequently introduced to the draft plan.

An example of civic participation in this domain was the "Roundtable for Clean Mobility" debate, organized by the non-governmental organization Polish Economics Network (pl. Polska Sieć Ekonomii) at the SGH Warsaw School of Economics[321]. During the debate, participants highlighted the allocation of EU funds under the National Recovery Plan (pl. *Krajowy Plan Odbudowy*) in ways inconsistent with the green transport hierarchy. The primary criticism raised during the discussions concerned the design of subsidy programs (such as "My e-Vehicle" program), which utilize public funds to subsidize private vehicle purchases for higher-income individuals or corporations. Rather than resolving urban transport challenges, this policy leads precisely to the "electrification of traffic congestion" as electric vehicles occupy the exact same amount of road space and paid parking slots as internal combustion engine vehicles. It was emphasized that European funding should instead be channeled into expanding public transit systems. Debates organized by non-governmental organizations can complement formal procedures and expose social costs or conflicts surrounding mobility transformation; however, they do not replace representative public opinion surveys or formal consultations conducted by competent public authorities.

[320] Sustainable urban mobility planning and monitoring, European Commission, https://transport.ec.europa.eu/transport-themes/urban-transport/sustainable-urban-mobility-planning-and-monitoring_en.
[321] Round Table for Clean Mobility, https://plse.org.pl/okragly-stol-dla-czystej-mobilnosci.

v. Main challenges and future policy priorities in relation to sustainable urban mobility

In Poland, the main challenges and future policy priorities in the field of sustainable urban mobility include: (1) the continued development of public transport and the reduction of transport exclusion, particularly in areas where residents remain dependent on private cars; (2) addressing suburbanization and urban sprawl; and (3) ensuring that the transition towards sustainable mobility is socially just and equitable.

1. A major challenge is to ensure that high-quality and accessible public transport is available not only in large cities, but also in suburban areas and smaller municipalities. In this context, the integration of transport services across functional urban areas (FUAs) is becoming increasingly important. This includes the coordination of transport authorities and operators, fares, timetables, passenger information and interchange facilities. Strengthening cooperation between core cities and surrounding gminas and poviats is a central focus of ongoing work on the act on the sustainable development of cities and their functional areas. The proposed legislative solutions are also intended to support transport integration and joint development planning at the FUA level. Furthermore, a key priority will be to continue enhancing the attractiveness of public transport and active mobility while curtailing car traffic, particularly in urban centers. Public debate increasingly highlights the need for a comprehensive approach to sustainable mobility – one that combines investment in public transit, pedestrian and cycling infrastructure, intermodal solutions, and effective traffic and urban space management.

2. Another priority is counteracting suburbanization and urban sprawl, which inflate private vehicle travel demand and complicate the efficient organization of public transit. In this regard, future urban policy should more tightly integrate spatial and transport planning while strengthening cooperation among local government units within FUAs. The draft act on the sustainable development of cities introduces new statutory mechanisms for inter-municipal cooperation and joint governance of functional area development.

3. An important challenge for sustainable urban mobility policy is to ensure that the transition towards lower-emission transport does not exacerbate existing social and territorial inequalities. In Poland, the costs of measures aimed at reducing transport emissions may be felt particularly by residents of smaller towns, suburban areas and other locations with limited access to public transport. In such areas, private cars frequently remain the primary, or even the only practicable, means of travelling to work, education, healthcare and other essential services.

More stringent emission standards, clean transport zones and restrictions applying to older vehicles may therefore create a risk of mobility exclusion for people who cannot afford to replace their vehicles. This risk may be particularly significant for lower-income households, residents of peripheral areas and people commuting to larger cities for work or access to services. The costs

of the transition may consequently place a disproportionate burden on less affluent households, while higher-income groups may find it easier to comply with new requirements by purchasing a newer or electric vehicle. Measures granting preferential treatment to particular categories of vehicles, for example through preferential parking arrangements or access to designated infrastructure, should therefore be assessed not only in environmental terms but also in terms of their distributional effects.

In the absence of appropriate mitigating measures, sustainable mobility policies may be perceived as favoring more affluent groups while imposing comparatively higher adjustment costs on lower-income households. Such concerns may weaken public acceptance and hinder the effective implementation of mobility policies.

Accordingly, a key priority for sustainable mobility policy in Poland is to align the transition with the principle of social fairness. This requires the continued development of affordable and accessible public transport, improved connections between smaller localities and urban centers, and appropriate support for groups most affected by restrictions on older vehicles. It also requires avoiding measures that, in practice, make access to cities, employment, education or public services dependent on household income.

A transition towards sustainable mobility cannot be considered socially just if reductions in transport emissions are achieved at the expense of access to employment, education, healthcare, public services, or participation in social and civic life. These concerns have recently been brought into focus by the debate surrounding the referendum in Kraków, which illustrated the potential for public resistance where mobility policies are perceived as unfair or insufficiently aligned with residents' economic circumstances and transport needs. The debate on the Clean Transport Zone highlighted the tension between environmental objectives and considerations of accessibility and affordability. Particular attention should be paid to owners of older vehicles, for whom replacing a car may represent a substantial financial burden, as well as to residents of suburban areas who remain dependent on private cars because of limited access to public transport[322].

[322] See J. Lipiec, Z. Socha, *Transport exclusion in Poland*, "Infos", No. 4 (337), 30 April 2026, https://orka.sejm.gov.pl/WydBAS.nsf/0/15F2347710239CB8C1258DED003A9761/$file/infos_337EN.pdf.

14. Portugal[323]

Observatory of Technology Assessment (OAT)

i. Legislative, policy and strategic frameworks governing sustainable urban mobility

Sustainable urban mobility in Portugal sits at the intersection of **climate law** (Lei de Bases do Clima), which makes Sustainable Urban Mobility Plans (PMUS) legally mandatory for municipalities, **energy/climate strategy** (PNEC 2030 [324], RNC 2050), **EU regulation** (TEN-T Regulation and the open-data Regulation (EU) 2024/490), and older sectoral transport law (Lei de Bases do Sistema de Transportes Terrestres). A PLANAPP policy brief [325] translates the PNEC 2030 decarbonisation goals and the EU data regulation into operational tools for bus fleets.

The **Lei de Bases do Sistema de Transportes Terrestres** (Lei n. º 10/90, 17 Mar [326]) is a foundational 1990 law establishing Portugal's land transport system; still the legal basis underlying sectoral regulation and the mandate of IMT/AMT. This Law, in its article number 2, states that "the organization and functioning of the land transport system has as its fundamental objectives to ensure the maximum contribution to economic development and to promote the greatest well-being of the population, especially through: a) The permanent adaptation of the supply of transport services to the needs of users, in quantitative and qualitative aspects; b) The progressive reduction of the social and economic costs of transport". Besides that, it must comply with the following basic guiding principles: a) Users are guaranteed freedom of choice of means of transport, including the use of transport on their own; b) Users are guaranteed, under equal conditions, equal treatment in access to and enjoyment of transport services. The **IMT / AMT** (Decreto-Lei n. º 78/2014) is the institutional regulator being the Autoridade da Mobilidade e dos Transportes (AMT) the successor of the Instituto da Mobilidade e dos Transportes (IMT) [327].

The PNEC 2030 (National Energy and Climate Plan 2030) is Portugal's main energy and climate policy instrument for the decade 2021-2030.This plan establishes targets and measures for the decarbonization of the economy, the energy transition, and the integration of renewable energies, aligning with international and European Union commitments. Considering the adaptation to the new Framework Law on Climate, and following a public consultation, the approval by the Council of Ministers, the submission of a document to the Assembly of the Republic (Parliament), and recommendations from the European Commission itself, Resolution

[323] Author: António B. Moniz
[324] https://www.portugal.gov.pt/pt/gc24/comunicacao/comunicado?i=plano-de-energia-e-clima-2030-com-metas-mais-ambiciosas-aprovado-sem-votos-contra-no-parlamento
[325] Borges, A., Alves, W., Dranka, G. G., Machado, W. (2026). *Transition to sustainable urban mobility: the contribution of AI to bus fleet selection in Portugal.PLANAPP S4P-25 Policy Brief* 8045/2025
[326] https://dre.tretas.org/dre/7633/lei-10-90-de-17-de-marco
[327] https://pgdlisboa.pt/leis/leimostraarticulado.php?nid=2102&somiolo=&tabela=leis

of the Assembly of the Republic No. 127/2025, of April 10, 2025, has now been published, updating the PNEC 2030.

The main goals of the PNEC 2030 include: a) Reducing greenhouse gas (GHG) emissions by 55% by 2030, compared to 2005; b) Increasing the share of renewable energy in gross final energy consumption to 51%; c) Reducing primary and final energy consumption, with targets of 16,711 ktoe and 14,371 ktoe, respectively; d) Setting the electricity interconnection target at 15% (maintaining the same target as the initial version of PNEC 2030); e) Increasing the percentage of renewable energy incorporated in transport to 29%. The raised GHG-reduction target (55% vs. 2005) and renewables target (51%) are explicitly referenced as the driver for decarbonising bus fleets.

The Roadmap to Carbon Neutrality, or **RNC 2050** (Roteiro para a Neutralidade Carbónica), is a long-term roadmap and sets the 2050 carbon-neutrality horizon that PNEC 2030 operationalises for the current decade [328].

According to the environmentalist association ZERO, the Sustainable Urban Mobility Plans (PMUS [329]) are comprehensive sectoral plans that aim to address the challenges of urban mobility while simultaneously addressing environmental, social, and economic challenges, namely:

a) ensuring all citizens have mobility options that allow access to destinations and services;
b) improving road safety;
c) reducing air and noise pollution, greenhouse gas (GHG) emissions, and energy consumption;
d) improving the efficiency and cost-effectiveness of passenger and freight transport;
e) contributing to improving the attractiveness and quality of the urban environment and urban design for the benefit of citizens, the economy, and society.

This association argues that all municipalities in Portugal should urgently create or update their Municipal Sustainable Development Plans (MSDPs), prioritizing Metropolitan Areas, Intermunicipal Communities, and cities along the Trans-European Transport Network (TEN-T), as well as municipalities with more than 100,000 inhabitants. The European Commission has proposed that, by December 31, 2025, Member States ensure that urban nodes on the TEN-T network adopt a MSDP and collect relevant data on urban mobility. Furthermore, ZERO emphasizes the need for a national mandate for the implementation and monitoring of MSDPs, ensuring that all municipalities comply with these guidelines effectively and uniformly. The EU TEN-T Regulation (EU) 2024/1679 requires PMUS adoption/monitoring for designated "urban nodes" (431 across the EU, several in Portugal >100,000 inhabitants) by December 2027.

[328] https://www.adene.pt/plano-nacional-de-energia-e-clima/
[329] https://www.imt-ip.pt/mobilidade-sustentavel/pmus-planos-de-mobilidade-urbana-sustentavel/

ii. Sustainable urban mobility measures implemented in recent years

Portugal has implemented measures across most sustainable-mobility categories in the past 3–5 years: subsidised public transport fares (Navegante/PART), fleet electrification (Carris, STCP), a national cycling-infrastructure programme (Portugal Ciclável 2030), one low-emission zone (Lisbon ZER), regulated shared micromobility (GIRA, e-scooters), and early-stage ITS/MaaS ticketing integration (OTLIS/VIVA) — but active-mobility investment lags EU peers and low-emission zones remain limited to a single city.

In terms of public transport (pricing & service) **one can consider the PART (Programa de Apoio à Redução Tarifária [330], 2019–2023)** created the **Navegante** flat-fare pass system in the Lisbon area (€30 municipal / €40 metropolitan), replacing hundreds of fragmented tickets; young people under 24 travel free [331]. Since 2024 funding continues via **Incentiva + TP** the Navegante pass began with financing from PART between 2019 and 2023, and since 2024 has been financed by Incentiva + TP. The PART scheme aims to counter negative externalities of mobility such as social exclusion, greenhouse-gas emissions, air pollution, congestion, noise and energy consumption. Discounts extend nationally via **Circula PT** for low-income and disabled users.

In terms of electrification, the **PRR-funded bus decarbonisation** reinforced by the government with a €137 million allocation of notice No. 01/C21-i12/2024, raising total investment to €227 million, to increase the zero-emission bus fleet and expand charging/refuelling infrastructure nationwide [332]. In Lisbon, the public transport company **Carris** acquired 44 new electric buses (30 standard + 14 mini-buses), a €16 million investment supported by PRR and POSEUR funds, quadrupling its electric fleet, with a target of 87% renewable-energy fleet by 2027. The public transport **STCP of Porto** added 48 new 100% electric buses from the Chinese Original Equipment Manufacturer (OEM) Zhongtong, raising its zero-emission fleet from 20 to 68 vehicles and cutting CO2 emissions by about 4,000 tonnes/year; a further 30-bus order followed in 2025 to the Portuguese OEM CaetanoBus[333] in the value of €11.6m. Regional operators (Carris Metropolitana, Trevo in Évora, Alsa Todi in Setúbal) and even long-distance coach (FlixBus Lisbon–Porto) are electrifying[334] .

Portugal Ciclável 2030 is a national programme running 2019–2030 with €300 million to build 110 cycling routes totalling 960 km, connecting significant urban clusters, split into subprogrammes for intermunicipal and contiguous-agglomeration cycle lanes, with dedicated funding rounds via the Fundo Ambiental [335].

[330] Program to Support Tariff Reduction in the Public Transport
[331] https://www.navegante.pt/viajar/descontos
[332] https://www.fundoambiental.pt/apoios-prr/c15-mobilidade-sustentavel/01c15-i05-descarbonizacao-transportes-publicos.aspx
[333] https://caetanobus.pt/en/home-3/
[334] https://www.revistaeurotransporte.pt/reportagem/61/7067/eletrificacao-dos-pesados-um-caminho-com-desafio-mas-com-futuro/
[335] https://www.fundoambiental.pt/listagem-noticias/pagamentos-da-agencia-para-o-clima-ip-dezembro-de-2025.aspx and https://www.fundoambiental.pt/apoios-2026/mitigacao-as-alteracoes-climaticas/incentivo-pela-aquisicao-de-veiculos-de-emissoes-nulas-ano-20252026-mobilidade-verde-passageiros-2-fase.aspx

Portugal has only **one operational low-emission zone**, Lisbon's ZER (since 2011, tightened in 2015 and again under review), restricting older/high-emission vehicles in the historic centre (Avenida da Liberdade/Baixa/Chiado) — by contrast, in 15 European countries there are more than 300 such zones, expected to exceed 500 next year. Porto is reportedly studying its own ZER but has not yet implemented one [336].

Considering the intelligent transport systems / MaaS the **OTLIS/VIVA ticketing** integrates contactless fares across Lisbon-area operators, with EU co-financing (€4.1m via CEF) for the **MOBIL.T** project extending it toward Mobility-as-a-Service[337]. According to OTLIS (Lisbon Region Transport Operators), "the MOBIL.T project is yet another contribution to consolidating the VIVA system as a mobility solution for the Lisbon Metropolitan Area, incorporating the most advanced functionalities and new digital technologies available. Lisbon is positioning itself at the forefront of multimodal public transport integration and is prepared for the new mobility patterns of the population and the availability/integration of Mobility as a Service (MaaS) solution" [338].

The October 2024 **"Pacote Mobilidade Verde"**(Green Mobility Package) [339] bundled several ITS/electrification measures: €10 million to the Public Transport Service Fund to support decarbonisation, digitalisation, AI use, and passenger information, plus €20 million for zero-emission vehicle purchase incentives (cars, e-bikes, mobility devices, chargers) and €3 million to accelerate Portugal Ciclável 2030 cycle-lane construction.

Metropolitan Lisbon Transports (TML) activity plan for 2024-27 [340] explicitly targets and develops an integrating platform for intelligent transport services and systems geared toward Mobility-as-a-Service, including a mobility account for users.

Besides these programs and projects, no road-pricing/congestion-charge scheme has been implemented in Portugal to date; measures found are limited to public-transport fare subsidy (PART/Navegante) rather than demand-management pricing (e.g. cordon tolls). This is a gap relative to some EU peers — worth flagging if pricing instruments are a specific area of interest.

iii. Evidence regarding the impact of these measures on mobility patterns, citizens' behaviour, and urban quality of life

Available evidence shows mixed but generally measurable results: public transport pricing reforms drove strong ridership growth (though still below pre-pandemic levels in Lisbon), car dependency actually increased in the 2011–2021 Census period, cycling's national mode shares barely moved, the Lisbon low-emission zone measurably rejuvenated the vehicle fleet without

[336] https://caetano.pt/blog/zer-lisboa/
[337] https://www.portalviva.pt/pt/homepage/projetos-com-apoio-da-ue/mobilt.aspx
[338] https://inova.business/casos-de-sucesso/cef-aprovado-cofinancia-4-1me-para-sistema-de-bilhetica-de-lisboa/
[339] https://portugal.gov.pt/gc24/comunicacao/noticias/governo-aprova-pacote-mobilidade-verde-medidas-para-um-futuro-mais-sustentavel
[340] https://www.tmlmobilidade.pt/wp-content/uploads/2021/12/PAO-20242027.pdf

eliminating air-quality breaches, and cyclist/e-scooter safety worsened even as overall road deaths fell. Other major Portuguese cities do not have yet low-emission zones.

Considering the modal shift and the public transport uptakes, these are the strongest evidence base. The **Navegante/PART pass** means that it currently accounts for **90% of trips** in the Lisbon metropolitan area, and the number of loaded passes has grown **75% since 2019**, prompting seven consecutive years of price freezes. The **national urban patronage**, like Metro Lisboa, Metro Porto and Transtejo/Soflusa, carried **260.4 million passengers in 2023, up 21% on 2022**; however, Lisbon's Metro remained **7% below 2019 (pre-pandemic) levels**, while Porto's Metro and Transtejo exceeded 2019 levels by 11% and 2% respectively — reflecting uneven recovery, partly attributed to network-expansion works restricting Lisbon Metro capacity.

The IMT/PLANAPP have produced **formal ex-post impact evaluations of PART (2019–2022) and PROTransP (2020–2022)**. It is the government's own instrument for tracking causal effects on the national public transport system [341]. PART is the Programa de Apoio à Redução Tarifária nos Transportes Públicos (Program of Support Tariff Reduction in the Public Transport) started in 2019, and the PROTransP is the Programa de Apoio à Densificação e Reforço da Oferta de Transporte Público (Program of Support to Increasing and Strengthening the Supply of Public Transportation) started in 2020. The investment of PART was 136,8 million euros in 2022. The municipal investment was around 34,8 million euros, being the total investment more than 170 million. The budget for 2022 framed by the PROTransp was 20 million euros. Most of the investment was applied to measures supporting the maintenance of essential services, representing 96.5% of the total funding (State Budget + local entities), which amounted to €34 million. The remaining 3.5% was allocated to measures such as increasing the frequency of existing lines, creating new public transport lines, extending existing lines and flexible transport services, as well as conducting studies [342].

In spite these measures, Census 2021 data show car use for commuting **rose from 61.6% (2011) to 66% (2021)** nationally — i.e., despite public transport pricing reforms, the car's mode share for commuting *grew*, not shrank, over the decade (partly confounded by pandemic effects on 2021 data collection). Such trend will have to be confirmed in a later census exercise.

On active mobility (cycling & walking) **the cycling mode shares stagnated**. This means that nationally it rose only **from 0.5% to 0.6%** of commuting trips between 2011 and 2021 — with metropolitan areas gaining slightly but traditionally bike-friendly municipalities (e.g. Murtosa, Aveiro) losing a third of their cyclists. **The infrastructure delivery has lagged targets**: only **300 of 4700 km** of planned cycle paths were completed by the original 2023 deadline. The investment

[341] https://www.imt-ip.pt/noticias/relatorio-2022-4o-relatorio-de-avaliacao-do-impacto-do-part-3o-relatorio-de-avaliacao-do-impacto-do-protransp/

[342] Martins, R. Coord. (2023), *Relatório 2022,4º Relatório de avaliação do impacto do PART, 3º Relatório de avaliação do impacto do PROTransp*, Lisbon, IMT, 77 pp.

has been roughly **€0.30 per resident/year**, versus **€15–20** in comparable European countries (European Cyclists' Federation, 2022) — experts say **ENMAC's 2030 mode-share targets are very unlikely to be met** [343].

On the implementation of low-emission zones and environmental performance we have three indicators. One is the dedicated academic evaluation of **Lisbon's ZER Phase 3 (2016–2019)**[344] and found measurable **fleet rejuvenation** (older/higher-emission cars replaced faster) and **improved compliance rates**, but pollutant concentrations (NO_2, PM10) still peaked in evening rush hour and winter months and remained influenced primarily by road traffic.

Another one is the **2023–2024 regional air-quality reports, produced by the** CCDR-LVT [345], which shows continued **NO_2 exceedances** in the Lisbon metropolitan area's northern zone (43 µg/m³ in 2024, above the 40 µg/m³ legal limit) and in Entre Douro e Minho, though Porto Litoral improved to compliance. The Zero association (NGO) measurements near 15 Lisbon schools in 2026 still found NO_2 above WHO and forthcoming EU 2030 limits — indicating the single ZER has not resolved localised pollution "hotspots".

Finally, there is no comparative before/after CO_2 or NOx dataset directly tied to bus electrification was found beyond fleet-operator claims (e.g. STCP citing ~4,000 t CO2/year avoided from 48 new electric buses) — these are operator self-reported, not independently audited.

On **road safety, the overall road deaths** are around 460 fatalities in 2024, down **8.0% versus the 2019 baseline** — but Portugal's mortality rate (58.1 deaths/million inhabitants in 2024) remains **above the EU average (45)** and well above Spain (36.7), with urban roads (not motorways) concentrating most deaths. **The active/micromobility safety has worsened sharply**. For example, cyclist and e-scooter fatalities rose **48–52% versus 2019**, and 2023 alone saw **3,239 bicycle/e-scooter accidents with 26 deaths** — attributed by the road-safety NGO Prevenção Rodoviária Portuguesa (PRP)[346] to insufficient dedicated infrastructure and growing rider numbers outpacing safety measures. This is an important caveat: active-mobility promotion has not been matched by proportional safety gains [347]. The Portugal's National Road Safety Strategy (ENSR) **expired in 2020** and had not been renewed as of mid-2025, per PRP — a governance gap likely contributing to stagnation.

The Navegante freeze and youth-fare-waiver (100% discount under 24) appear to have driven **measurable uptake among young people** and low-income users via the **Circula PT** discount

[343] https://www.publico.pt/2023/01/09/azul/noticia/municipios-amigos-bicicleta-estao-pedalar-menos-estrategia-nacional-risco-2034130

[344] Feijão, J. (2021), *Avaliação da 3ª Fase da Zona de Emissões Reduzidas de Lisboa e Perspetivas Futuras*, MSc dissertation, Caparica, NOVA FCT, https://run.unl.pt/entities/publication/3b3b89b2-f1ac-4e29-927e-ac28460f8ba4

[345] CCDRLVT (Comissão de Coordenação e Desenvolvimento Regional de Lisboa e Vale do Tejo), (2025), Avaliação da Qualidade do Ar na Região de Lisboa e Vale do Tejo em 2024, Lisbon, CCDRLVT, 61 pp. https://www.ccdr-lvt.pt/wp-content/uploads/2025/10/Relatorio_Qualidade_Ar_CCDR-LVT_2024_1.pdf

[346] https://prp.pt/sinistralidade-rodoviaria-com-trotinetas-e-bicicletas-aumenta-em-2023/

[347] https://foren.pt/case-studies/sinistralidade-rodoviaria-em-2024/

scheme, suggesting positive social-inclusion effects, although there are no independent satisfaction/acceptance survey data (only ridership and pricing figures). This can be an evidence gap. The Lisbon's shared micromobility regulation remains **unfinished more than two years after being approved** (Sept 2022), with the city relying on voluntary operator agreements. This suggests limited institutional capacity to translate public complaints (overcrowding, unsafe parking) into binding rules, a proxy for weak "public acceptance management" rather than genuine endorsement.

iv. Involvement of citizens and stakeholders in the planning, implementation and evaluation of sustainable urban mobility policies

Citizen and stakeholder involvement in Portuguese sustainable mobility policy operates on three tiers: mandatory statutory public consultations for PMUS (typically 90 days, per municipality), broader participatory-democracy instruments like Lisbon's long-running participatory budget, and formal advisory/consultative bodies engaging civil-society organisations (e.g. MUBi, ZERO) at national level — though the latter show signs of institutional fragility (an interministerial working group recently lapsed without renewal).

At the municipal level there is statutory public consultation on PMUS. Each municipality developing a PMUS is legally required to run a **public consultation period** (commonly ~90 days) covering the Plan, Action Plan and financing sources, following a public presentation session. Examples found: **Sintra** (90-day consultation of PMUS incl. Action Plan/Programme/funding [348]), **Leiria** (public presentation session followed by consultation, Aug–Sept [349]), **Porto** (city council voted to submit its PMUS — including major proposals like burying sections of the VCI ring road — to public consultation explicitly "to reinforce transparency" and "ensure greater legitimacy, effectiveness and fit of the measures to be implemented" [350]), **Lisbon** (2026 PMUS consultation using two online questionnaires — one on strategic objectives, one on strategy/action-plan phases — open until 15 September, explicitly citing input from Turismo de Portugal via thematic workshops on "Urban Node" and "Lisboa Cidade" themes), and smaller municipalities (**Pinhel, Grândola/Carvalhal/Melides**) using online survey tools (e.g. QuestionPro) alongside document consultation [351].

The **AMAL (Algarve Intermunicipal Community)** is running a **population survey** to inform PMUS Algarve 2.0, explicitly structuring the process around "information, consultation and public participation actions, involving citizens, municipalities, public entities, companies and other stakeholders" across the plan's different drafting phases [352].

[348] https://cm-sintra.pt/atualidade/noticias-institucional/plano-de-mobilidade-urbana-sustentavel-para-sintra-em-consulta-publica
[349] https://www.cm-leiria.pt/areas-de-atividade/mobilidade/pmus-plano-de-mobilidade-urbana-sustentavel-de-leiria
[350] https://observador.pt/2026/09/04/porto-vota-submeter-plano-de-mobilidade-urbana-sustentavel-a-consulta-publica/
[351] https://www.turismodeportugal.pt/pt/Noticias/Paginas/consulta-publica-pmus-2026.aspx
[352] https://maisalgarve.pt/2026/07/07/amal-lanca-inquerito-a-populacao-no-ambito-do-novo-plano-de-mobilidade-urbana-sustentavel/

On the Participatory budgeting, where citizen have co-decision on specific projects, the example of **Lisbon's Orçamento Participativo (OP)** may be mentioned. It is running since 2008 and lets residents aged 16+ submit and vote on proposals with **real budgetary weight**. The 2021 edition (12th edition) received 251 proposals, of which 69 became funded projects, with **"Smart and sustainable mobility" as one of the top three most-proposed themes** (alongside sport/health promotion and climate adaptation) [353]. Lisbon's OP won Portugal's **2019 Prémio de Boas Práticas de Participação** (national participatory-democracy award), reflecting institutional recognition of its legitimacy — though a notable 2022 case shows friction: the winning 2021 project proponents **refused their prize** after the municipality altered their proposal, illustrating a real limit on how binding "citizen decision-making" actually is in practice.

On formal advisory/consultative bodies, at national level, and covering the whole civil society, the **ENMAC/ENMAP** (national cycling and pedestrian strategies) is an important example. it created, via Ministerial Resolution (**Resolução do Conselho de Ministros n. º 67/2023)**, an **interministerial Project Group** and a **Conselho Consultivo para a Mobilidade Ativa** (Active Mobility Advisory Council), with **MUBi (national cycling advocacy NGO) as a formal member**, holding "monitoring, recommendation and participation" powers in policy development. **However, this structure lapsed at the end of 2025** without government renewal of its mandate — MUBi's own account describes this as a real institutional weakness: "despite institutional limitations and the absence of a dedicated budget," civil society continued advocacy work without a formal government counterpart [354].

MUBi has held **direct audiences with the Secretary of State for Mobility** (at least three documented, 2024–2025), submitting formal opinions in public consultations (e.g. on the "Lisboa – Contrato Climático da Cidade 2030" report) and pressing for a legally mandated new deadline once the government revoked ENMAC's original 2019 measure-definition deadline — a case where NGO input **shaped consultation submissions but did not force a policy reversal** [355]. MUBi and **ZERO** (environmental NGO) have also used **formal legal channels** — e.g., filing a complaint with the Public Prosecutor's Office (Ministério Público) against Lisbon City Council for removing a cycle-lane segment on Avenida de Berna to reinstate car parking — indicating civil society sometimes escalates beyond consultation into legal/oversight mechanisms when it judges participatory promises unmet.

On quantitative societal-needs assessment instruments, we may mention the **INE's IMOB (Inquérito à Mobilidade)**— a large-scale household mobility survey covering Lisbon and Porto Metropolitan Areas (last major round in 2017, with ~1 million people/~200,000 dwellings sampled) — which is explicitly designed to capture **residents' travel patterns and expectations**,

[353] https://informacao.lisboa.pt/noticias/arquivo/detalhe/apresentacao-dos-projetos-vencedores-do-op-lisboa-21
[354] https://mubi.pt/2026/05/10/mubi-participa-debate-politicas-publicas-boa-governanca-mobilidade-activa-mobi-think/
[355] https://mubi.pt/2024/05/21/audiencia-mubi-secretaria-estado-mobilidade-urgencias-e-preocupacoes/

and its results are used as a direct input for public transport network tendering and route design ("adjusting routes according to real population needs, based on substantiated demand estimates"). This is the clearest **institutionalised, government-run needs-assessment mechanism** found — distinguishing it from ad hoc municipal consultations, since it feeds directly into procurement specifications for transport service contracts.

v. Main challenges and future policy priorities in relation to sustainable urban mobility

Portugal's live policy debates centre on four fronts: unifying national ticketing (1Bilhete.pt, actively debated in Parliament in 2026), rescuing stalled active-mobility targets (MUBi's 2026 budget proposals responding to a lapsed government coordination structure), the 2027 EU deadline forcing most municipalities to finalise PMUS this year, and a broader push toward "smart mobility" (V2X, digital twins, connected infrastructure) still at an early, aspirational stage.

The national ticketing unification had an active parliamentary debate. The **1Bilhete.pt initiative**, launched February 2023 by IMT with TML (Lisbon) and TIP (Porto), aims to let any transport card, mobile app or bank card work across all Portuguese operators, plus create nationally valid tickets. Adoption is proceeding region by region — Lisbon, Porto, CP (national rail), Transtejo/Soflusa and multiple intermunicipal communities (Leiria, Coimbra, Algarve, Cávado, Tâmega e Sousa, Aveiro, and others) have joined, with a phased rollout (classic card interoperability, then mobile ticketing, then bank-card payment) [356]

This is now a **live, contested legislative issue**. In 2026 the parliament (Assembleia da República) has debated multiple competing resolutions: the extreme right party Chega's proposal to mandate 1Bilhete.pt as the "Sistema Nacional Único de Bilhética Integrada," the environment party PAN's proposal for a "Passe Nacional Multimodal," centre-left party Livre's "Passe de Mobilidade Nacional," and a rejected leftwing party Bloco de Esquerda bill to extend free passes to under-25s. Reporting characterises this as **cross-party consensus that fragmentation is a problem, but disagreement on the model**: left-wing parties frame a national pass as a "driver of social change," while the centre-right government and centrist parties treat it as a technical end-goal contingent on infrastructure readiness, and Iniciativa Liberal/Chega favour market-based rather than what they call "ideological" solutions [357].

In second place, the active-mobility strategy is in crisis, with a lapsed coordination structure. As covered in the previous turn, the **interministerial Project Group and Conselho Consultivo para a Mobilidade Ativa** (created under RCM 67/2023) **expired at the end of 2025 without government**

[356] https://1bilhete.pt/
[357] https://conta-la.pt/2026/07/08/mobilidade-nacional-gera-consenso-politico-mas-sem-acordo-no-modelo/

renewal — MUBi describes this as removing the main institutional mechanism coordinating ENMAC/ENMAP implementation.

In response, **MUBi submitted 16 priority proposals for the 2026 State Budget** (Oct 2025) to the government and all parliamentary parties, including: a national training/hiring programme for municipal active-mobility technicians (modelled on Ireland's 248 dedicated local-government technicians); financial support for municipalities drafting/implementing PMUS; universal cycling education in years 1–2 of school; stable subsidies for bicycle purchase (conventional, electric, cargo, adapted); reactivation of the stalled Portugal Ciclável 2030 programme; creation of the Passe Nacional Multimodal; tax incentives for employers promoting active commuting; and a proposal that **at least 10% of the transport budget go to cycling** and another 10% to walking [358].

MUBi's central warning was that without "consistent policies and structured public investment to change the mobility paradigm," Portugal **will miss its target of cutting transport-sector emissions 40% by 2030**— explicitly linking active-mobility underinvestment to the PNEC 2030 climate target discussed earlier [359].

In third place, there is a PMUS deadline pressure (2026–2027) as the dominant near-term driver. Because **PMUS is now required to access EU funding**, most municipalities are expected to finalise their plans by 2026, with the EU TEN-T urban-node deadline of **December 2027** looming behind that. Trade coverage frames the central risk explicitly: PMUS must not become "mere academic exercises" but action plans with **real impact on traffic reduction, air quality and modal shift**— and this depends on **continuity of funding, technical capacity in municipalities, and monitoring/transparency mechanisms**, which sources describe as currently insufficient. Live examples of this pressure in motion: Porto's city council voting (Sept 2026) to send its PMUS to public consultation, including major structural proposals (burying sections of the VCI ring road, extending BRT-style bus corridors, traffic-light priority for public transport); Lisbon's PMUS finalising public consultation by mid-September 2026.

On the fourth place, there is a new sectoral transport fund reorienting toward sustainability. A **"Fundo para a Mobilidade e Transportes"** is being restructured (mid-2026), with government-published Strategic Guidelines explicitly setting **sustainable mobility and sector decarbonisation as its priorities**, and a focus on intermodal projects — suggesting continued institutional emphasis on integrating funding streams that were previously split across PART/PROTransP.

Finally, an emerging technology agenda ("smart mobility") is still aspirational, but not yet operational. Industry commentary frames **2026 as a potential inflection year** for connected-mobility technologies in Portugal: Vehicle-to-Everything (V2X) communication, Cooperative Intelligent Transport Systems (C-ITS), AI-based traffic management, digital twins for testing policy

[358] https://mubi.pt/2025/10/08/16-medidas-prioritarias-oe2026/
[359] https://mubi.pt/2026/05/10/mubi-participa-debate-politicas-publicas-boa-governanca-mobilidade-activa-mobi-think/.

before rollout, and "smart enforcement." This is presented as a **necessity** (framed by the source as "inadiável" — unavoidable) rather than a confirmed government commitment; I found no binding legislative or budgetary instrument attached to it, only advocacy/industry framing. This should be treated as an **emerging discussion**, not a confirmed policy priority, pending firmer government commitment.

As an assessment of evidence quality, there is a **strong, current evidence**: the 1Bilhete.pt ticketing debate is directly sourced from Assembleia da República's own agenda documents and multiple news outlets — reliable and current as of 2026.

In terms of advocacy-source evidence (which should be treated with appropriate caution), we can mention the MUBi's 16-point OE2026 proposal is self-published by the organization. It is useful for understanding **what civil society is asking for**, but it is not evidence that these measures will be adopted. The government's response was not found in our searches.

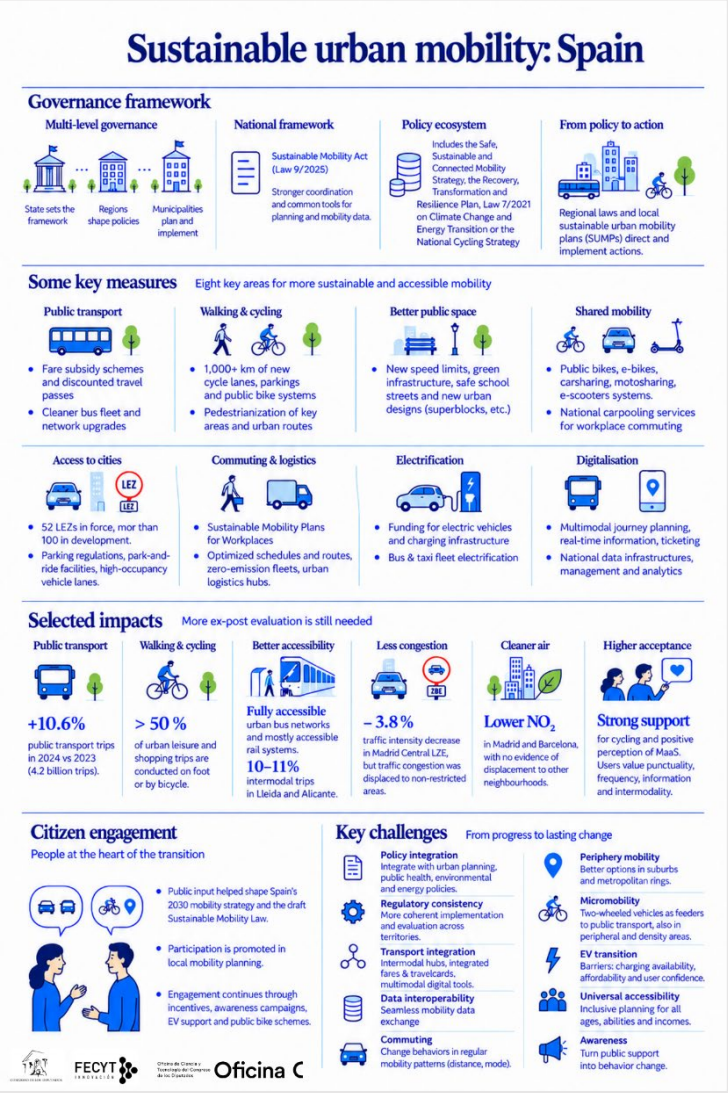
15. Spain[360]

Science and Technology Office of the Congress of Deputies (Oficina C)

i. Legislative, policy and strategic frameworks governing sustainable urban mobility

To understand this framework, it is useful to distinguish between the distribution of responsibilities across levels of government, the state-level instruments, and their regional and local implementation.

Spain organizes transport and sustainable mobility through **a multilevel governance system** in which responsibilities are shared among the central government, the Autonomous Communities and local authorities[1]. The national government establishes the overall legal and strategic framework and manages transport infrastructure and services under its responsibility, mainly through the Ministry of Transport and Sustainable Mobility[2].



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The Autonomous Communities develop their own laws, strategies and plans within their territories[3], while municipalities are responsible for urban mobility, traffic management, parking, public space and urban transport[3]. In other words, each level of government plays a different role, but their actions must be coordinated.

At the national level, the main legislative framework is the **Sustainable Mobility Act (Law 9/2025)**[4], in force since December 2025. Although it regulates the mobility of both people and goods, it also establishes obligations and instruments directly linked to sustainable, fair and inclusive urban mobility. One of its key instruments is the General Sustainable Mobility System. The Act created this system to coordinate public administrations, facilitate the participation of other stakeholders and provide common planning and data management tools[4]. The governance of the General Sustainable Mobility System is supported by two bodies[5]. The Territorial Forum promotes cooperation among public administrations, while the Higher Council brings together institutional, economic, academic and social stakeholders. The system also includes two key tools: the Sustainable Mobility Guidelines Document (DOMOS by its Spanish acronym)[4], which will establish common planning and management criteria, and the Integrated Mobility Data Space (EDIM by its Spanish acronym)[6], designed to integrate and facilitate the use of mobility data.

Some of the instruments established by the Act, including DOMOS, are still under development. While they are being implemented, the Safe, Sustainable and Connected Mobility Strategy 2030, approved by the Ministry in 2021, remains a key strategic reference for mobility policies[7]. Its priorities cover accessibility, safety, low-emission mobility, digitalization, intermodality and social and labor-related dimensions.

Public administrations have also supported sustainable mobility investments in many Spanish cities through the Recovery, Transformation and Resilience Plan[8]. A national dashboard makes it possible to explore the measures financed through these funds and their geographical distribution[9].

Within this common framework, the Autonomous Communities develop their own legislative and strategic instruments. Several regions already had specific mobility legislation before the adoption of Law 9/2025, including Catalonia[10], the Valencian Community[11], the Balearic Islands[12] and the Basque Country[13]. Others, such as the Canary Islands[14] and the Community of Madrid[15], are currently updating their frameworks. At the municipal level, local sustainable mobility ordinances also existed prior to the new national framework, as in the case of Madrid[16].

At the local level, Sustainable Urban Mobility Plans (PMUS by its Spanish acronym) are currently the main instrument for planning and implementing measures related to public transport, active mobility, low-emission zones, parking and other aspects of sustainable urban mobility[17]. These plans also include monitoring and evaluation mechanisms to assess their results. Municipalities prepare PMUS with technical and methodological support from the National Programme for

Sustainable Urban Mobility Planning[17]. They also benefit from guidance and recommendations developed under Recommendation (EU) 2023/55018[18]. In some cases, metropolitan or supramunicipal authorities may also prepare these plans. In fact, the PMUS approach promotes planning at the scale of the functional urban area, which is particularly relevant for journeys that cross municipal boundaries.

This framework is complemented by national[19] and supranational[20] instruments, such as the Climate Change and Energy Transition Act (Law 7/2021)[21], which is particularly relevant for zero-emission mobility and Low-Emission Zones (LEZs), as well as other specific strategies such as the National Cycling Strategy[22]. In Spain, law 7/2021 introduced the obligation to establish LEZs in municipalities with more than 50,000 inhabitants, and in municipalities with more than 20,000 inhabitants facing air quality problems, before January 2023[21]. Royal Decree 1052/2022 further develops this requirement by defining the minimum standards that all LEZs must meet in Spain[23]. The national framework therefore sets common requirements, while municipalities are responsible for designing and implementing each LEZ.

ii. Sustainable urban mobility measures implemented in recent years

In recent years, public administrations have introduced measures affecting public transport, active mobility, shared mobility and micromobility, private vehicle use, commuting, urban logistics and demand-responsive transport. Digitalization and electrification have also emerged as cross-cutting areas that affect several of these modes, especially in the field of public transport.

One of the main priorities has been strengthening **public transport** and increasing its competitiveness compared with private car use[10,24]. Measures include the renewal and electrification of urban bus fleets, the acquisition of low-emission vehicles and the digitalization of services (all discussed in greater detail below). They also include improvements in accessibility at stops, dedicated bus lanes, the modernization of metro and tram networks, and stronger integration between different transport modes. To encourage public transport use, Spain has introduced new fare subsidy schemes and discounted travel passes[25]. These measures apply to urban mobility but also extend beyond it. For example, the Verano Joven programme[26] offers young people aged 18 to 30 discounts of up to 90% on rail travel across Spain and Europe. Another initiative is the national travel pass, which allows affordable travel by train and bus across the country, including suburban rail services[27].

At the same time, cities have expanded **cycling and walking networks** through new cycle lanes, in line with the National Cycling Strategy[22], and through the pedestrianization of streets and public spaces[28,29]. By mid-2026, European funds had financed more than 1,000 km of new cycling infrastructure in 124 municipalities, almost 11,000 bicycle parking spaces and 22 public bike-sharing systems[28].

These measures are part of a broader **transformation of urban space**[4,7,28,29]. Cities have implemented traffic-calming measures, improved universal accessibility and developed safe school routes and environments[7,30]. Among these measures, one of the most significant has been the widespread introduction, since 2021, of the 30 km/h speed limit on single-lane urban roads. Urban renewal initiatives also include green infrastructure and climate adaptation measures such as urban trees and shade provision[7,30]. More broadly, urban planning increasingly seeks to improve access to services through sustainable transport modes[7,30]. In other words, these initiatives are not limited to building cycle lanes or pedestrian areas. They also redistribute urban space to encourage walking, cycling and public transport use. For example, in 2023 Spain published new guidelines for cycling infrastructure design, including recommendations for planning and integrating cycling facilities into urban environments[31].

Among the best-known examples of urban redesign are Barcelona's superblocks (superilles)[32], although similar initiatives have emerged elsewhere in Spain[30].

Alongside traditional transport modes, **shared mobility services and micromobility** have also expanded[33,34]. These include public bicycle and e-bike schemes, car-sharing and motorcycle-sharing services, which can facilitate first- and last-mile travel and improve connections with public transport[35]. The Spanish Traffic Authority (DGT) launched the "28027 Share a Car" project to improve mobility for commuting trips[36]. The initiative was developed in collaboration with the private company TRIBBU. The project aims to reduce single-occupancy vehicle trips and make it easier for employees from different companies to share vehicles and parking spaces.

Spain has also introduced new regulatory frameworks for micromobility vehicles, whether privately owned or shared. In particular, the rapid growth of personal mobility vehicles, especially e-scooters[37,38], has led both the national government and municipalities to adopt new regulations. National rules establish technical and safety requirements for these vehicles[37,39], while municipal ordinances regulate their circulation and parking[40]. Some studies recommend greater harmonization of these rules within and across metropolitan areas, as well as better integration of micromobility services with public transport[38].

Another major area of action is **transportation demand management**, which seeks to influence how, when and by which mode people travel. To achieve this, public administrations combine restrictions on urban access and parking with sustainable alternatives to private vehicle use[30,41].

Unlike urban road pricing schemes adopted in several European cities, Spanish **Low-Emission Zones (LEZs)** are mainly based on access and circulation restrictions. Local authorities may also regulate parking according to vehicles' environmental classifications[42]. The implementation of LEZs has progressed unevenly, and many municipalities have experienced delays[43]. As of January 2025, there were 52 operational LEZs, 91 under development and 9 in the implementation phase, in addition to four voluntarily established zones[44]. LEZs are complemented by other municipal

measures that regulate access to city centers and the use of private vehicles. These include temporary protocols during high-pollution episodes[30,44], environmentally differentiated parking regulations[42], park-and-ride facilities connected to public transport, high-occupancy vehicle lanes and other forms of road-space reallocation[41,45,46].

Demand management also covers **commuting** and major trip-generating locations such as industrial estates, universities, hospitals, large retail centers and major infrastructure facilities. Law 9/2025 requires Sustainable Mobility Plans for Workplaces for companies and public sector entities above thresholds defined in the legislation[4]. These plans promote public transport, active mobility and car-sharing. Official guidance is available to support their design and implementation[47]. However, some Autonomous Communities had already introduced similar requirements before the adoption of the law[48,49].

Urban logistics and last-mile freight distribution are another important area of intervention due to the rapid growth of e-commerce. Mobility plans include measures such as coordinating delivery schedules, consolidating shipments, promoting zero-emission vehicles, supporting cycle logistics, creating consolidation centers and urban warehouses, digitalizing loading and unloading zones, and optimizing delivery routes[4,30]. Some regions have introduced specific requirements in this area[48,49], while several municipalities have already implemented established measures for freight distribution[45,50] and vehicle replacement programmes[51].

Outside urban centers, **demand-responsive transport services** play an important role in adapting public transport supply to the needs of low-density areas. These services are particularly relevant in rural areas, where dispersed populations make it difficult to maintain conventional fixed-route services[52,53]. Castilla y León, Galicia and the Sierra Norte area of Madrid are among the regions with established experience in this field. Demand-responsive transport improves access to mobility and essential services while complementing conventional public transport through services adapted to user requests[54].

Digitalization and intelligent transport systems represent another rapidly developing area in Spain[4,55–57]. These tools provide travelers with information, facilitate trip planning and payment, support transport network management and generate data for policy planning and evaluation.

Measures include real-time travel information and journey planning, ticketing and digital payment systems, intelligent traffic management, LEZ access control and data-sharing platforms[57–60]. Royal Decree 450/2026 has reinforced this area by establishing a framework for Intelligent Transport Systems (ITS), interoperable data exchange and connected mobility services[61]. At the national level, the DGT connected vehicle platform[62] and the Integrated Mobility Data Space (EDIM)[63] play a key role in data generation and management. Mobility as a Service (MaaS) solutions use these data to integrate different transport modes and services into a single platform, ranging from journey planning to booking and payment in some cases[57–59]. The National

Access Point for Multimodal Transport provides access to official transport data that can be reused by mobility applications[64]. This open-data approach supports collaboration between public administrations and platforms such as Google Maps, Moovit and Citymapper[65]. For example, the Community of Madrid has integrated real-time bus information into Google Maps[66]. Such integrations help users plan public transport journeys using up-to-date information.

MaaS solutions provide different functions. One of their core features is multimodal journey planners, which allow users to compare and combine transport options for the same trip. This helps operators and public authorities manage multimodal transport more effectively. In addition, real-time information systems improve the user experience of public transport by providing information on service schedules, the best travel options, disruptions, delays, and other relevant updates[7].

Integrated **ticketing systems** also support intermodality and make public transport easier to use[67]. Cities such as Madrid, Barcelona, Valencia and Bilbao already operate integrated ticketing systems. Some regions, such as Galicia, have integrated all regional transport services into a single platform, the Galicia Transport Platform 4.0[67]. According to experts consulted, these initiatives place Spain in a competitive position compared with other European countries[67].

In addition, some public administrations are introducing digital tools to monitor and evaluate mobility policies through indicators and data analytics systems[68]. Advanced simulation tools and digital twins are also being used in some cities to test scenarios and support planning[69,70]. Law 9/2025 on Sustainable Mobility also provides for regulatory sandboxes that allow innovative mobility solutions to be tested under controlled conditions before wider deployment or integration into the legal framework[4].

Finally, electrification affects multiple transport modes. Key measures include the deployment of public charging infrastructure, fleet renewal programmes and the public procurement of electric vehicles. Support programmes such as MOVES III[71] have provided funding for the purchase of electric vehicles and charging points by public administrations, companies and private users[72]. More recently, the Auto+ Programme[73] has promoted vehicle purchases by individuals. Many municipalities are making progress in electrifying public transport fleets and have set ambitious targets in this area[74–80]. Electrification has also expanded to professional fleets, including taxis, through specific support schemes implemented in some Autonomous Communities[51].

iii. Evidence regarding the impact of these measures on mobility patterns, citizens' behavior, and urban quality of life

Evidence on the impacts of sustainable urban mobility measures depends on the type of intervention, its degree of implementation, and the context in which it is applied. Measures may focus exclusively on mobility issues, or they may adopt a broader perspective that considers the

interaction between land use and transport, as is the case with urban planning initiatives such as **Barcelona's superblocks**[81].

In general terms, the *ex-post* evaluation of mobility policies remains uneven and, for many interventions, it is difficult to isolate their effects from other factors that also influence mobility behavior. In this regard, mobility studies using Big Data are already being conducted by the Ministry of Transport and Sustainable Mobility, which can support the evaluation of the effectiveness of the implemented measures[82]. The following section presents general data on mobility in Spain, together with evidence from selected local initiatives related to **modal shift, accessibility, urban traffic congestion, environmental performance, and public perception**.

a. Urban modal split: walking plays a central role in mobility patterns across Spanish cities

Data from 2024 collected by the Spanish Metropolitan Mobility Observatory show a total of 4.204 million public transport journeys across the metropolitan areas analyzed, including both bus and rail modes[83]. This represents a 10.6% increase in the total number of trips compared with 2023[83]. This growth has helped restore and, in many cases, exceed pre-COVID-19 demand levels[83].

Modal split patterns vary depending on urban location (city center or periphery) **and trip purpose** (work, education, or other activities). For mandatory trips to work or study, private car use remains predominant and can account for up to 75% of journeys in small and medium-sized cities, such as Cáceres and Huelva[83]. In larger urban areas, the share of public transport increases substantially. In Madrid and Barcelona, for example, public transport accounts for more than 32% of trips. By contrast, for leisure and shopping trips, car use declines in favor of active mobility, with walking and cycling together accounting for nearly 50% of journeys on average[83].

In general terms, there is a growing trend towards intermodal travel, combining two or more transport modes. Such trips are more common in areas with integrated transport networks and fare systems. Lleida and Alicante record the highest shares, with intermodal journeys accounting for between 10% and 11% of all trips[83].

One of the most distinctive features of Spain is its high rate of walking, which exceeds 31% of all trips in the urban areas analysed[83]. Innovative measures to promote walkable cities have proven particularly effective, such as Pontevedra's **"Metrominuto"** initiative[81]. The city received the **Intermodes Award** in 2012, becoming a benchmark and source of inspiration for other cities[81].

b. Accessibility to public transport continues to improve

Public transport accessibility is assessed across three dimensions: temporal, geographical, and universal accessibility. Service operating hours are broadly similar across bus and rail networks, although night-time services are mainly concentrated in the largest metropolitan areas[83]. Smaller urban areas tend to have better territorial coverage, while some peripheral zones remain less well connected. In addition to the spatial coverage of public transport services, it is important to know

their frequency. This is because having a stop nearby does not always correlate with having good public transport availability. Frequency reaches very high values in urban cores for bus services (more than 30% of the population has access to over 32 services/hour within a 7.5-minute walk) and rail (more than 47% of the population has access to over 4 services per hour within a 15-minute walk)[84]. The challenge lies in expanding coverage to intermediate and rural areas[84].

Finally, accessibility for people with reduced mobility is regulated by Royal Legislative Decree 1/2013. In this regard, urban bus networks are fully accessible, and most rail services are accessible as well, although challenges remain in metropolitan road-based transport systems[83].

c. Trends in urban traffic congestion in Spain

Regarding congestion when accessing cities, public transport stands out as a competitive alternative in environments where high levels of congestion on city access routes coincide with a robust intercity public transport offer[81]. This is reflected in data from metropolitan areas such as Barcelona and Madrid. These findings highlight the close relationship between urban system design, the availability of transport options, and people's mobility choices.

Regarding congestion within cities, low-emission zones can reduce urban traffic levels, as is the case with Madrid Central[85].Following its implementation, within the restricted area, a reduction of 26.4 vehicles per hour was estimated on a typical weekday, equivalent to an approximate decrease of 3.8% in traffic intensity[85]. However, traffic increased in some bordering areas, suggesting a spatial displacement effect towards streets not subject to the restrictions[85].

d. Environmental performance: air quality continues to improve

Regulated access zones have evidence of their effectiveness in reducing pollution across several Spanish cities. For instance, in Madrid[30] the implementation of LEZ has proven effective in reducing nitrogen dioxide without causing pollution displacement to other city neighborhoods[86]. LEZ in Barcelona was effective in reducing NO_2 concentrations[87], and was most effective when combining this measure with other traffic restriction measures[88]. Air quality is also influenced by improvements in public transport technology and fuels. In 2024, progress continued in modernizing and decarbonizing urban and metropolitan fleets. Although diesel remains the predominant fuel, lower environmental impact options, such as compressed natural gas, are being incorporated, alongside a growing presence of hybrid and electric vehicles[83].

e. Social perceptions and mobility

Public authorities monitor satisfaction with public transport services to improve service quality. Survey results vary across cities and are reported in the latest edition of the Metropolitan Mobility Observatory report[83]. To encourage a shift away from private car use, research continues into the priorities and preferences of regular car users. In Madrid, punctuality, service frequency, availability of information, and intermodality rank among the most highly valued attributes[89].

Improvements in passenger information systems have contributed to enhancing both the user experience and the accessibility of public transport[83], although their ability to drive a significant modal shift remains limited. In this context, there is evidence that Mobility as a Service (MaaS) initiatives generate a favorable perception[90], for example in Madrid, with the Madrid Mobility 360 application[91]. Likewise, despite initial controversy, Madrid Central's Low Emission Zone enjoys favorable public acceptance, with 37.9% of survey respondents expressing a positive view[92].

On the other hand, the majority of the population supports promoting bicycle use, valued for its speed, flexibility, and health benefits, while road insecurity and coexistence with motorized traffic remain the main obstacles to its adoption[93].

iv. Involvement of citizens and stakeholders in the planning, implementation and evaluation of sustainable urban mobility policies

Civil society has participated in sustainable mobility policies through a range of processes. The Sustainable Mobility Act, Law 9/2025, has strengthened this participatory approach. The Act requires mobility plans, programmes, strategies and instruments to be developed through open processes that guarantee the participation of citizens and interested social and economic stakeholders[4]. It also establishes the Higher Council for Sustainable Mobility as an institutional forum for participation and cooperation among economic sectors, social organisation, transport users and public authorities[4].

Several examples can be found in the planning phase. Spain developed its Safe, Sustainable and Connected Mobility Strategy 2030 through a participatory process known as the Open Mobility Dialogue. The process combined public consultations, digital platforms and discussion events involving citizens, public authorities, businesses, universities and social organisations[7]. Between September and December 2020, more than 10,000 people took part in these events, which generated 746 proposals for improving the Strategy[7].

The government also held a public consultation on the preliminary draft of the Sustainable Mobility Act. The consultation remained open between July and November 2020 and received 306 submissions from citizens, businesses, business associations, professionals, public authorities and universities. Citizens were the largest group of contributors, accounting for 33% of all submissions[94].

Guidelines have also been published to help local authorities align their Sustainable Urban Mobility Plans with the European framework. These guidelines recommend involving citizens from the earliest stages of the planning process[95]. One example is the Barcelona Metropolitan Area, which launched a participatory process in October 2024 to prepare its Metropolitan Urban Mobility Plan. The process combined in-person sessions and digital tools to encourage the early involvement of as many stakeholders as possible. It generated 754 public proposals covering a

wide range of issues[96]. In Madrid, the initial version of the Madrid 360 Sustainable Mobility Plan underwent public consultation in 2022. Individuals and organisation submitted 698 comments, of which 163 were accepted and incorporated into the Plan[97].

Stakeholder participation can also extend to policy monitoring and evaluation. One example is the Mobility Council of the Barcelona Metropolitan Area. Madrid also plans to establish a mobility forum to monitor and support the implementation of its Plan.

During the implementation phase, governments have used financial incentives to encourage citizens to adopt more sustainable travel habits. Measures supporting electric mobility have been particularly prominent. The MOVES III programme was the main national instrument for accelerating the replacement of combustion-engine vehicles with electric vehicles and developing the charging infrastructure needed for this transition. The programme ended in December 2025, after mobilizing more than €1.7 billion since its launch in 2021 and awarding €990 million in grants for vehicle purchases and related charging points[98,99]. The Auto+ Programme has now taken over this role and pursues similar objectives[100].

Alongside support for electric mobility, public authorities have promoted active travel through specific funding programmes. One example is the programme designed to encourage the use of public bike-sharing services. It provided €10 million to reduce the cost of recurring passes for public bike-sharing systems by at least 50% during 2025[101].

In addition to financial incentives, public authorities have used awareness-raising activities and knowledge-sharing initiatives to encourage changes in travel habits. Examples include the Sustainable Mobility Good Practice Awards for businesses and municipalities and the awareness-raising activities held each year during European Mobility Week[102]. In 2025, these events covered issues such as decarbonization, digitalization, urban logistics and inclusive mobility. They also promoted coordination across transport modes to support a more efficient and sustainable mobility system[102].

v. Main challenges and future policy priorities in relation to sustainable urban mobility

The main future challenges and policy priorities for sustainable mobility in Spain are outlined below.

Governance and policy integration

1. Integrating mobility with other policy areas

Mobility policies need to be better integrated into a broader policy framework and more closely connected with urban planning, public health, environmental and energy policies. This requires joint planning, appropriate financial instruments and effective dialogue among public authorities.

Coordination is needed both across ministries and, especially, among the national government, the Autonomous Communities and municipalities[103,104].

2. Ensuring consistent implementation and monitoring of legislation

According to experts, some regulations are implemented using inconsistent criteria, making it difficult to monitor the environmental and social impacts of transport[103]. One example is the variation in how Low-Emission Zones are implemented and enforced across Spain[103,105].

Law 9/2025 provides for a system of indicators and regular reporting to support integrated evaluations of sustainable mobility policies[4]. However, further progress is needed to develop comparable indicators and strengthen the evaluation of measures after they have been implemented. This would provide a clearer understanding of their actual effects[4]. An audit by the Spanish Court of Auditors found that, of the 85 municipalities with a Sustainable Urban Mobility Plan, only 23% subsequently monitored the implementation of their plans[106].

Integration and efficiency of the mobility system

3. Integrating transport modes

Different transport modes, territorial levels and digital tools need to be connected more seamlessly[103]. In practice, this means developing well-planned intermodal hubs that connect public transport, cycling facilities with secure bicycle parking, and walking routes. It also means creating less fragmented cycling networks, developing applications that bring together different mobility options, and improving fare and operational coordination. One example would be a single travel card that allows passengers to use public transport in different cities[83,103].

4. Data interoperability

Fragmented data, technological differences and the limited capacity of platforms to work together create barriers for both mobility management tools and long-term planning tools, including mobile phone data and digital twins[107,108].

Data must be interoperable to support real-time information exchange and the processing of large volumes of data. The Integrated Mobility Data Space (EDIM) strategy seeks to advance in this direction by creating a shared data exchange ecosystem for public and private stakeholders[107,108].

Modal shift and reduced dependence on private cars

5. Commuting

The data show that private car use is particularly common for regular journeys to work or education, accounting for 59 % of these trips. By contrast, active travel plays a greater role in non-routine journeys and represents 49.6 % of the total[83].

Experts identify commuting as one of the main unresolved challenges for sustainable mobility and an area in which public transport use could increase considerably[83]. Moreover, since the adoption of Law 9/2025, companies and public entities with more than 200 employees, or 100 employees per shift, must introduce sustainable mobility plans within twelve months[4]. This requirement makes commuting an immediate policy priority.

6. Mobility in peripheral urban areas

In large cities, central urban areas are losing population while neighbourhoods further from the center are growing[109]. Mobility in these areas is therefore becoming increasingly important.

Almost half of all journeys in the metropolitan areas of large cities are currently made by private vehicle. This reflects both more limited access to public transport and a lower density of services[83]. Private cars also account for two thirds of journeys between outer metropolitan areas and the central city[83]. Experts therefore see a significant opportunity to expand public transport in these areas[83].

7. Micromobility

Current data indicate that shared micromobility is not reducing dependence on private cars. Instead, it often replaces journeys that would otherwise have been made by public transport or by foot[110]. Experts recommend increasing the availability of shared two-wheeled vehicles, including bicycles, motorcycles and e-scooters, in peripheral and lower-density areas. These services should act as connections to major public transport hubs. For example, a shared bicycle could provide the first or last part of a journey to a suburban rail station[110].

Privately owned micromobility vehicles present a different pattern. Their users are often middle-aged men with higher incomes who make frequent and relatively long journeys. In these cases, micromobility can replace car trips[111].

Technological and energy transition

8. Challenges in the transition to electric vehicles

The market share of battery electric vehicles has increased considerably in recent years, reaching 9.8% by mid-2026. However, this remains well below the European Union average of 20.7%, which indicates that Spain is lagging behind[112,113].

Some studies of public perceptions in Spain identify barriers to wider uptake. One persistent concern is the availability of charging points[114]. This problem is more acute in rural and suburban areas and for people who do not have access to a private garage. Potential users also have concerns about the performance of electric cars compared with combustion-engine vehicles, including questions about battery life[114].

Although respondents recognize that electric vehicles may cost less over the longer term, the high purchase price and uncertainty surrounding their wider adoption remain important barriers[114,115]. Some experts also argue that financial incentives need to be improved, given their apparent importance in other countries. Other experts emphasize that promoting electric vehicles may encourage continued reliance on private cars. Although electric vehicles do not produce exhaust emissions from fuel combustion, they do not resolve problems such as congestion, road accidents or the amount of urban space occupied by cars.

Equity and public acceptance

9. Social inclusion and universal accessibility

Under Law 9/2025, mobility is a right that enables citizens to access employment and education opportunities, public services and leisure activities[4]. Public authorities must therefore regulate and safeguard this right as a means of enabling people to exercise other rights[4]. The Act also requires the national government to adopt a National Strategy against Transport Poverty by December 2027. The Strategy will aim to prevent transport poverty and facilitate access to public services and essential activities[4].

Transport planning has traditionally been based largely on the needs of a standard or assumed typical user. Greater awareness of social diversity is now encouraging planners to consider different needs from the outset. These include the specific requirements of older people, people with reduced mobility, children and households with fewer financial resources[104].

10. Public awareness

Public awareness does not depend only on individual attitudes. It is also shaped by factors such as the availability of infrastructure and financial incentives. Nevertheless, some surveys show that six in ten people in Spain consider sustainable urban mobility important or very important, with even higher levels reported in other studies[116,117]. However, only 42% have considered replacing a combustion-engine mode of transport with a bicycle or e-scooter. These alternatives receive greater support among younger respondents[116]. At the same time, 58% would be willing to use public transport in their daily lives, while three in ten would consider giving up private car ownership[116].

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16. Sweden[361]

Evaluation and Research Secretariat (ERS) of the Swedish Riksdag

At the national level, the Swedish Transport Administration (Trafikverket) is responsible for long-term infrastructure planning for road, rail, maritime and air transport, and for the construction and operation of state roads and railways. The Riksdag decides on the overall budget while the Government establishes the national infrastructure plan for the coming 12 years every four years. The latest plan was decided in April 2026.[362] The infrastructure plan is based on Sweden's national transport policy objectives and principles (see below), which are set by the Riksdag, the Government's infrastructure bill and its terms of reference.[363]

According to the relevant laws – the Planning and Building Act (2010:900), the Road Act (1971:948), the Public Transport Act (2010:1065) and the Act on Regional Development Responsibility (2010:630) – the authorities mainly responsible for urban planning are the municipal councils (for local roads, footpaths and cycle routes) and the regional councils (for public transport). The regions are also responsible for drawing up and adopting plans for regional transport infrastructure. The Public Transport Act (2010:1065) states that municipalities and regions have a shared responsibility. In practice, however, the regions normally assume the role as regional public transport authority, in collaboration with the municipalities.

i. Policies and strategies

a. National level

National transport policy

The overarching objective for transport policy in Sweden is to ensure a cost-effective and long-term sustainable transport system for citizens and businesses throughout the country.[364] There are two sub-goals concerning *Accessibility* (to provide everyone with basic services of good quality and functionality, and to contribute to development across the country) and *Safety, environment and health* (to prevent deaths and serious injury and to help achieve the environmental quality objectives and improve public health). Sustainable transport is explicitly linked to climate and energy policy in the Government bill that proposed the current objectives.[365]

[361] Author: Riksdagsförvaltningen, Swedish Riksdag
[362] Skr. 2026:259.
[363] Trafikverket (2025a).
[364] Prop. 2008/09:93, bet. 2008/09:TU14.
[365] Prop. 2008/09:93, p. 25, 54.

Strategies

A few national strategies are relevant for sustainable urban mobility. Sweden has had a national cycling strategy since 2017.[366] The purpose of the strategy is to increase cycling and to improve safety for cyclists, thereby contributing to sustainability and public health. The strategy sets out five priority areas:

- Highlight the role of cycling in urban planning – integrate cycling into spatial planning and transport planning, with a focus on coherent cycle networks, cycle parking facilities and connections to public transport.
- Increase the focus on specific groups of cyclists – adapt measures to the needs of different groups, for example children, commuters, new immigrants, older people and tourists.
- Promote a more functional and user-friendly infrastructure – the cycle network needs to be upgraded, better maintained and better adapted to different types of bikes and cyclists.
- Promote safe cycling – through maintenance, appropriate speed limits, safer vehicles, and more information on protection, such as the wearing of helmets.
- Develop statistics and research – there is a need for more comparable statistics on cycling, a clearer understanding of cause-and-effect relationships, more research into health and safety, and better dissemination of knowledge.

Another relevant national strategy is the Government's strategy for vibrant and safe cities.[367] The strategy lists a number of conditions for building vibrant, safe and resilient cities. Among these, several examples concern transport:

- Good accessibility within a city, as well as to and from surrounding areas is crucial to the development of cities and, consequently, of Sweden.
- The design, function and use of the transport system should help to provide everyone with basic accessibility of good quality and functionality.
- A holistic, multi-modal perspective is required.
- Plan for safe routes to school. This can also have a positive impact on children's health through increased physical activity.

Given the role of the regional and municipal authorities, and within the framework of local self-government, the Government considers that the municipalities and regions have a significant responsibility – including through transport and infrastructure planning – to develop the country's towns and cities.

[366] Regeringskansliet (2017).
[367] Skr. 2024/25:96, bet. 2024/25:CU16.

Guidelines

The Swedish Transport Administration, in collaboration with other organisations, has published a general handbook on transport strategy for sustainable planning[368], and several more in-depth documents on specific aspects of this strategic work. These documents are intended to provide knowledge and support for transport planners, urban planners, planning architects and elected representatives at the local and regional levels, as well as government agencies and NGOs.

The handbook aims to place the transport system in a broader context and to link together different areas of urban planning. The most prioritised measures to increase sustainability without jeopardising accessibility within this framework are digitalisation, urban density (increased proximity of points of destination), and a modal shift to walking, cycling and shared transport.

The handbook describes a process for developing a transport strategy at the local and regional level, in addition to a detailed analysis of communication and stakeholder engagement. The outlined process is based on the process set out in the EU's Guidelines for developing and implementing a Sustainable Urban Mobility Plan.[369]

In a more recent document, methods such as conducting a local area analysis, working with scenarios, conducting a network analysis and developing a freight strategy are described in more detail.[370] Another report concerns regional strategies.[371] The purpose of this report is to achieve greater coordination between primarily the national and the regional level. At the regional level, the process is more complex than at the local level, as the region needs to involve municipalities, bordering regions, national road and rail networks, while at the same time having fewer available tools (as municipalities have a monopoly on planning and building permits).

b. Regional and local level

The Swedish Association of Local Authorities and Regions, SALAR (Sveriges kommuner och regioner, SKR) is an organisation that promotes the interests of municipalities and regions vis-à-vis the central government and provides expertise, advice and training for its members. Regarding planning for sustainable urban mobility, the SALAR primarily refers to the handbook on transport strategy for sustainable planning mentioned above.[372]As regards mobility for pedestrians, cyclists and moped riders, the SALAR has published a handbook in collaboration with the Swedish Transport Administration.[373] The handbook provides practical advice on the design of networks, routes, junctions and parking facilities, as well as on the construction, maintenance and operation

[368] Boverket, SKR & Trafikverket (2022).
[369] European Commission (2026a).
[370] Trafikverket (2025b).
[371] Trafikverket (2023).
[372] Boverket, SKR & Trafikverket (2022).
[373] SKR & Trafikverket (2022).

of such infrastructure. It also describes methods and approaches for quantifying and evaluating measures.

SALAR also maintains an online Case Study Bank, which presents examples across several areas linked, for example, to road planning, environmental impact assessments and environmental reports. The aim of the knowledge bank is to highlight good examples or examples where both positive and negative aspects can be discussed. The Swedish Association of Local Authorities and Regions moreover provide standard drawings for cycle and pedestrian crossings and is an active member of national networks supporting cycling and cycling safety.

Metropolitan areas in Sweden

Four geographical areas in Sweden can be described as metropolitan areas according to the EU/OECD definition – a Functional Urban Area (FUA) of at least 250,000 inhabitants.[374] In the following text, this report is limited to analysing plans and strategies from these four areas.[375]

Table 1. Population size (in thousands) of metropolitan areas in Sweden.

City	Region	City	FUA	Region
Stockholm	Stockholm	1,626	2,562	2,486
Gothenburg	Västra Götaland	721	1,097	1,778
Malmö	Skåne	366	877	1,433
Uppsala	Uppsala	248	327	411

Source: OECD data explorer (2024), Statistics Sweden (SCB) population statistics (2025).

Regional authorities

An analysis of current programmes, plans and strategies in the four regions shows that the two most frequently mentioned modes of transport are public transport and cycling. The main focus in public transport plans is accessibility, mobility, capacity and interchange points. For cycling, the focus is primarily on developing the regional cycling infrastructure, making it easier to combine cycling with public transport, cycle parking, missing links and improving cycle routes close to urban areas. Walking is seldom addressed separately but is usually considered alongside cycling or as part of the 'entire journey'. The same can be said for other types of micro-mobility, like e-scooters, that are included in the terms "combined mobility" and "mobility hubs".

Common objectives for public transport are an increased market share, to improve accessibility and connect different parts of the region, to decrease journey times and provide a high service frequency. Objectives for cycling are again an increased market share, and there are objectives or strategic priorities regarding the development of the regional cycle network, missing links and better connections to public transport.

[374] Dijkstra, Poelman, & Veneri (2019).
[375] Included documents are listed in references.

Three of the four regions (Region Skåne, Västra Götaland and Stockholm) have plans specifically for freight. These regions have large ports and/or extensive waterways. Region Skåne has especially ambitious goals, for example transport by sea should increase from 25 to 40 per cent (between 2006 and 2050), while transport by road should decrease from 58 to 40 per cent. All regions mention a shift from road to rail or shipping and increased efficiency through, for example, better planning, digitalisation and adapting local regulations.

All regions specify their objectives with a number of indicators, regarding, for example, the proportion of journeys made by public transport, walking or cycling, the proportion of accessible stops/interchange points, the ability to reach the regional centre within a certain timeframe, the proportion who perceive public transport as safe and the total climate impact of public transport.

There are some notable differences between the regions. Region Skåne has the clearest ambition to cover the transport system as a whole. In both Region Skåne and Region Stockholm, the region is responsible for producing overarching development plans concerning physical planning that link spatial planning with transport planning.[376] Region Västra Götaland places a special emphasis on expanding the public transport system. In Region Uppsala, measures for cycling are more closely connected with public transport and combined journeys than in the other regions. Uppsala is unique in that it has begun building a completely new tram system in collaboration with the municipality.

Local authorities

The same type of analysis has been conducted on relevant documents from the local authorities in the four metropolitan cities. Common among all four municipalities are:

- Urban transport should be transformed towards more space-efficient and climate-friendly modes of travel.
- The plans have a broader focus than the regional plans as they include urban development as a whole, for instance improving the quality of public spaces, but also environmental goals and health and safety.
- Electrification and sustainable fuels are clear themes, and include plans for charging infrastructure, availability of hydrogen refuelling, and having municipal fossil-free vehicle fleets.
- It is also common to incorporate or have specific plans for sustainable freight. Freight is most often linked to city logistics, consolidated freight, more efficient deliveries, electrification and the need to reduce disruption in dense urban environments.

The objectives concern a modal shift from motor vehicles to sustainable transport, making journeys safer, faster and more accessible, improving the quality and walkability of the outdoor

[376] Plan och bygglag (2010:900) kap. 7. 1 §.

environment, as well as improving air quality and reducing noise. There are also specific accessibility and equality targets – the transport system must work for a wider range of groups, including children, older people and people with disabilities.

Some differences between the cities are that Stockholm has more mode-specific plans, while Gothenburg places a greater emphasis on public transport. The City of Malmö has the most integrated and broad mobility policy and is the only municipality with a specific strategy regarding mobility hubs and shared vehicles, for instance through car pools and bike/e-scooter sharing. The plan involves an extensive network of mobility hubs offering various types of shared vehicles to meet different needs. Malmö also has quantified targets for shared mobility up to 2040, such as 80 per cent of residents having access to shared transport within 500 m, and 10 per cent of car journeys and 15 per cent of cycle journeys being made using shared mobility. Shared mobility is mentioned by other municipalities but is less prominent and less concrete. In Stockholm, a growing use of e-scooters is described mainly as a problem for traffic safety.

ii. Implemented measures

a. National measures

Urban areas

As regards public transport, as well as local roads and streets, regions and municipalities may apply for state co-funding for up to 50 per cent of the costs of infrastructure investments.[377] In addition, six metropolitan area agreements (storstadsavtal) were reached between the state, the regions and the municipalities in the three largest metropolitan areas in 2014 and 2018. These agreements cover public transport, cycling infrastructure and housing, and cover a total investment cost of approximately EUR 9 billion[378].

From 2015 to 2023, municipalities and regions could apply for grants under an urban environment agreement (stadsmiljöavtal).[379] The agreement meant that the Government co-funded up to 50 per cent of measures relating to public transport, cycling, and sustainable freight. Compared with the "normal" co-funding provided through the regional transport infrastructure plans, the agreement was more clearly directed at investments with an environmental impact and geared towards towns and cities. Since 2024, no new applications have been processed as the Government decided to phase out this grant to make room for other investments.[380]

General measures

Several grants support the electrification of the vehicle fleet. Sweden has a subsidy (klimatpremie) for the purchase of certain electric buses, light electric lorries, certain heavy

[377] Förordning (2009:237).
[378] 2026 price level. All information relating to amounts has been converted to EUR using the exchange rate in July 2026.
[379] Förordning (2015:579).
[380] Prop. 2023/24:1.

lorries and environmentally friendly construction machinery.[381] For example, a regional public transport authority may receive a subsidy covering up to 20 per cent of the purchase price of an electric bus. There is a separate subsidy for electric passenger cars. Since 2026 it has been targeted at people in certain rural areas below an income ceiling.[382] Earlier subsidies directed at low-emission passenger cars[383] were phased out in 2022. There was a short-lived subsidy for e-bikes and mopeds/motorcycles in 2018–2019 (the electric vehicle grant). For private citizens, tax relief is available for green technology, for example the installation of charging points. This tax relief was introduced in 2021 and means that 50 per cent of installation costs are reimbursed.[384]

The investment support scheme Klimatklivet ("Climate Leap") provides funding for physical investments that reduce greenhouse gas emissions. For example, investment support for charging infrastructure, production, distribution and use of renewable hydrogen, and production and use of biofuels and electric fuels.[385] Since 2015, the initiative has allocated over 2 billion EUR to over 31,500 investments.

A reduction obligation for all fossil fuel was introduced on 1 July 2018 in order to reduce greenhouse gas emissions.[386]In 2019–2022, the requirements were gradually increased, from a 19.3 per cent reduction of emissions for diesel and 2.6 per cent for petrol, to 30.5 per cent for diesel and 10.1 per cent for petrol. The Government reduced these levels significantly in 2024 and adjusted them slightly upwards in 2025, to 10 per cent for both diesel and petrol. The primary reason for the decrease was to bring fuel prices under control and reduce costs for households and businesses. From 1 July 2025, suppliers will also be able to meet part of their reduction obligation through electricity credits from public charging of electric vehicles.[387]

b. Regional measures

Measures that are frequently listed in regional plans regarding public transport include:

- Improved traffic flow and capacity – establishing bus lanes, signal priority, track expansion and the development of the core network through, for example, new express bus lines.
- Interchange points and end-to-end journey measures – refurbished or new interchange points, travel centres, stations and bus stops. Safe walking and cycling links, cycle/commuter parking, the option to take a bike on trains.
- Quality and accessibility – accessibility improvements for people with disabilities, clearer information to passengers and safety measures such as CCTV and security officers/stewards.

[381] Source: https://www.energimyndigheten.se/klimat/transporter/transporteffektivt-samhalle/klimatpremie/.
[382] Förordning (2025:1574).
[383] The super-green car incentive (2012–2017) and the bonus-malus system (2018–2022).
[384] Inkomstskattelag (1999:1229) 67 kap. 2 §.
[385] For more information, see https://www.naturvardsverket.se/amnesomraden/klimatomstallningen/klimatklivet/.
[386] Lag (2017:1201) om reduktion av växthusgasutsläpp från bensin och diesel.
[387] Förordning (2025:589).

Some documents mention electrification and biofuels, but as over 90 per cent of the public transport vehicle fleet already runs on electricity or renewable fuels, this is a more marginal concern.[388] When it comes to cycling, most measures concern the physical infrastructure:

- Expansion of regional cycle routes and cycle paths, completion of missing links.
- Maintenance and safety measures – improved quality of existing routes, dedicated cycle paths, safer junctions and crossings, grade-separated crossings, improved signage, operation and maintenance plans.
- Better links between cycling and public transport – improved accessibility by bike to public transport hubs, cycle parking at stations and interchange points.

In addition, softer measures such as campaigns for behavioural change, promoting cycling culture and collaboration with employers and schools are also mentioned. Apart from these measures, the plans concern measures regarding regional roads. These measures are directed at increasing safety, decreasing noise pollution, and directing traffic away from city centres.

c. Local measures

At the local level, the most common measures include physical infrastructure, electrification, and the use of regulations:

- Cycling and walking infrastructure – expanding main and commuter cycle routes, widening and separating cycle lanes, improving junctions and crossings, new cycle parking facilities, better maintenance, wider pavements, establishing pedestrian zones.
- Public transport – establishing bus lanes and signal priority, improving bus stops and interchange points, improving city buses and trams, better pedestrian and cycle links to interchange points, prioritising new development close to public transport.
- Fossil-free transport – developing the charging infrastructure (public and private), electrified municipal vehicle fleets, procurement requirements, fossil-free city buses and ferries, electrification of freight transport and last-mile deliveries.
- Reallocation and management of street space – prioritising space for walking, cycling and public transport, speed limits adapted to urban environments, controlling traffic through parking (location, regulation and fees), reducing through traffic and creating more spaces for people in the street environment.
- Sustainable freight – consolidated freight, higher load factors, local transshipment points and home-based goods delivery, off-peak transport, and fossil-free delivery vehicles.

The cities also mention the importance of collaboration – most commonly with the regional public transport authority, but also local businesses and property owners regarding for example charging infrastructure and freight transport.

[388] Bet. 2025/26: TU15, p. 44.

Measures regarding particles and noise reduction are normally found in separate plans/strategies from those on infrastructure but may also be relevant. Typical measures are reducing traffic on vulnerable streets, speed limits, environmental zones and bans on studded tyres, resurfacing of roads and noise barriers.

iii. Evidence of impact

a. National policy and strategy

Urban areas

The Swedish National Audit Office (Riksrevisionen) has examined the metropolitan area agreements.[389]Its overall assessment is that the Government failed to ensure that the state co-funding allocated to regional public transport infrastructure under the agreements was consistent with the Riksdag's transport policy objectives. There was a focus on expensive rail investments without proper cost-benefit analyses, and the final prioritisation was based on a very limited analysis of the benefits of the projects. There has been no broad follow-up of the outcomes of the agreements in terms of, for example, increased public transport.

Several evaluations have examined the urban environment agreements.[390]These show that travel by foot, bike and public transport has increased, while car traffic has decreased. Walking, cycling and public transport increased in line with predictions made by local authorities and regions when applying for the grant. Car traffic, on the other hand, decreased to a significantly greater extent than was predicted.[391] Of the five measures estimated to have the greatest impact on carbon dioxide emissions, four out of five relate to measures to improve bus accessibility in major urban areas.[392] The fifth measure concerns the construction of a new tram line to replace bus services. The conclusion was that the agreements have played a key role in creating the conditions for sustainable and active travel in urban areas.

The Swedish National Audit Office has also examined the Government's efforts to improve conditions for cycling.[393]It identified a number of obstacles that make the planning of state-funded cycling infrastructure more inefficient and complex than necessary. Among other shortcomings, the Swedish Transport Administration was criticised for failing to spend the funds earmarked for cycling initiatives in the national plan and regional plans. A recommendation to the Government was to amend the Road Act to make it possible to build state-funded cycle paths separately from main roads. The Swedish National Audit Office also remarked that there is a lack of focus on concrete measures in the Government's policy guidance to achieve the objective of increased and safer cycling, and that the Government should examine national cycle traffic

[389] Riksrevisionen (2021:15).
[390] Larsson & Svensson (2021), Brundell Freij, Håkansson & Vuorenmaa Berdica (2022), Trafikverket (2025c).
[391] Trafikverket (2025c).
[392] Brundell Freij, Håkansson & Vuorenmaa Berdica (2022).
[393] Riksrevisionen (2025:11).

principles to ensure priority. In its assessment of the Swedish National Audit Office's observations and recommendations, the Government took the view that clearer government priorities for cycling infrastructure do not require specific principles or requirements for cycling; rather, these priorities should, as at present, be based on a cost-benefit analysis.[394] The Government also emphasised that cycling infrastructure in and around urban areas is largely a matter for local and regional authorities.

General measures

The previous bonus–malus policy for passenger cars (2018–2022), which meant that a charge (malus) is levied or a subsidy (bonus) is granted based on the vehicle's emissions intensity, was evaluated in 2025.[395] The report shows that the change in policy (from the super-green car incentive to the bonus–malus system) led to a fall in sales of fossil-fuel cars of around 5 per cent, while sales of plug-in electric vehicles rose by around 10 per cent. The reduction in carbon dioxide emissions resulting from the policy amounted to 6 per cent of total emissions from new cars. An earlier review of the Government's various environmental policies targeted at passenger cars by the Swedish National Audit Office concluded that these were generally not a cost-effectivemeans of decreasing carbon emissions.[396]The Swedish National Audit Office's calculations also show that high levels of exports of subsidised eco-friendly cars risk significantly increasing the socio-economic cost. This problem prompted the Riksdag to pass a resolution calling on the Government to take urgent action to address the issue of exports of eco-friendly cars.[397]

An evaluation of the temporary 2018–2019 electric vehicle grant (e-bikes, electric mopeds and motorcycles) has shown that the programme almost doubled sales of e-bikes although one-third of adopters were non-additional.[398] The authors concluded that the reduction in carbon emissions achieved by the programme came at a high price (around EUR 515 per tonne). Uptake was also lower for the three main cities (Stockholm, Malmö and Gothenburg) and in dense areas overall, and the programme was thus not likely to contribute to less congestion.

IVL Swedish Environmental Research Institute (Svenska Miljöinstitutet) has analysed the market for vehicles and machinery covered by the subsidy klimatpremie.[399] It concludes that the subsidy is important for the ability to invest in electric lorries. There are costly barriers to starting the electrification process, for example in relation to charging infrastructure, grid connection and bank loans, and the climate subsidy may compensate to some extent for these costs. Gas-powered vehicles (especially CBG-vehicles)[400]are generally a more established technology than electric trucks, but it would be premature to phase out support for gas-powered trucks. IVL also

[394] Skr. 2025/26:56.
[395] Krishnamurthy, Daniel & Hart (2025).
[396] Riksrevisionen (2020:1).
[397] Bet. 2020/21:MJU3.
[398] Anderson & Hong (2022).
[399] IVL Svenska Miljöinstitutet(2025).
[400] CBG stands for Compressed Biogas.

recommends an expansion of the subsidy to all zero-emission heavy-duty vehicles, which is currently not the case for hydrogen combustion vehicles.

There have been several evaluations of the Climate Leap investment subsidy scheme (Klimatklivet). Statistical analyses indicate that the Climate Leap has led to investments that would not have been made otherwise.[401] The initiative has also contributed to market replication and diffusion of technology. The analysis of interviews and market data suggests that investments are made in public charging infrastructure even without the subsidy, particularly by larger actors. Therefore, the Climate Leap does not contribute as much to additional investments for charging infrastructure compared to support for biogas production. In an earlier evaluation, the Swedish National Audit Office criticised the Climate Leap for being less cost-effective than, for example, a carbon tax.[402]

Evaluations show that the reduction obligation has contributed to lower greenhouse gas emissions and an increased consumption of biofuels.[403] However, the Swedish National Audit Office has pointed out unintended consequences such as cost increases. The rise in the price of biofuels has reduced the cost advantage of the reduction obligation compared with other ways of achieving climate targets and has led to regressive distributional effects. Another risk concerns the limited amount of biomass available.

b. Regional and local level

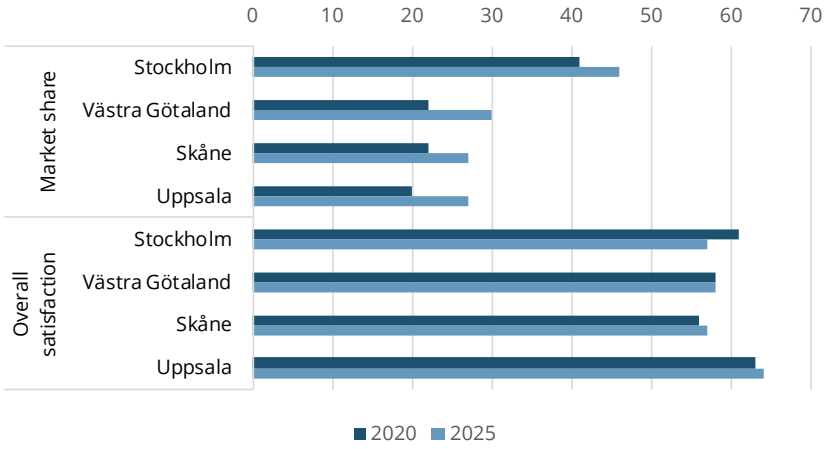
Regional follow-up studies

The regions usually monitor the outcomes of their various measures through population and passenger surveys and their own statistics such as the number of passengers, length of completed cycle paths, service frequency and delays, and air quality. For example, Region Stockholm has published a follow-up of cycling over a 10-year period (2014–2024) which shows that the proportion of all trips made by bike increased from 5 to 10 per cent.[404] In addition, 27 per cent of the cycle network has been upgraded, and the total length of the network has increased by 600 km.

The Swedish Public Transport Association (Svensk Kollektivtrafik) has conducted an annual population survey since 2001, containing questions on, for instance, customer satisfaction, travel habits, knowledge and attitudes.[405] The survey covers the whole country and makes it possible to compare regions and to follow outcomes over time.[406]Figure 1 shows a comparison between 2020 and 2025.

[401] Pädam et al (2024).
[402] Riksrevisionen (2019:1).
[403] Energimyndigheten (2022:7), Riksrevisionen (2023:13).
[404] Region Stockholm (2024a).
[405] Svensk Kollektivtrafik (2026).
[406]One caveat is that the response rate is very low (around 20 %). Although results are weighted, they may not accurately reflect the population.

Figure 1. Market share and customer satisfaction in four metropolitan areas



Source: Svensk Kollektivtrafik (2021, 2026).

The market share for public transport has increased in all the metropolitan areas but remains higher in Stockholm. Overall customer satisfaction has been fairly high and stable over time. However, in Stockholm customer satisfaction has decreased somewhat.

Evaluations seem to be rare. One exception is an evaluation of a marketing campaign in Region Skåne to increase public awareness of new cycle routes.[407] The report was based on cycle counts along both old and new routes, a postal survey and face-to-face interviews with cyclists on the routes. Results show that almost all respondents knew about the new routes, and 60 per cent were aware of the marketing campaign. 30 per cent of the respondents said that they had started to cycle more because of the campaign and the new infrastructure. On average, cycling measured by counting increased by 30 per cent on the new cycle paths, while on the comparison route, cycling increased by almost 90 per cent. Another study of regional cycle routes evaluated the quality of new or amended routes based on observation, cycle counts, surveys and focus groups.[408]

Local evaluations and follow-up studies

Some measures at the local level have been the subject of research. Congestion charges were introduced in Stockholm in 2007 and in Gothenburg in 2013. The tax is collected by the central government and is allocated through the national budget to infrastructure projects in accordance with specific agreements for the respective cities.[409] Research has shown that the introduction led to reduced traffic and better air quality in the local area.[410] Further fee increases had a smaller marginal impact than the initial introduction, while expanding the time window for congestion

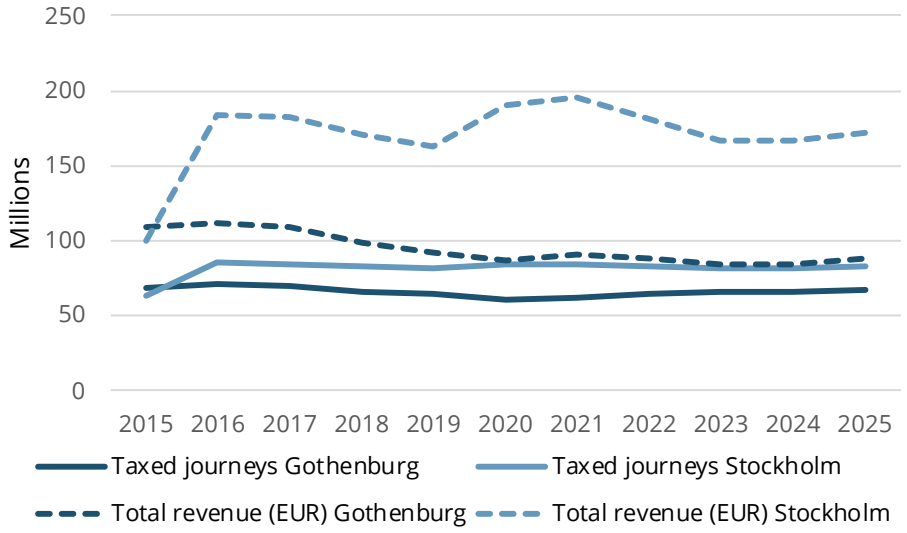
[407] Trivector Traffic (2020).
[408] Forsman et al (2023).
[409] For more information, see https://www.trafikverket.se/resa-och-trafik/vag/trangselskatt-och-infrastrukturavgifter/.
[410] Börjesson & Kristoffersson (2018). Johansson, Burman & Forsberg (2009). Simeonova et al (2019).

charges led to further reductions.[411] Evaluations also show that while public acceptance is widespread in Stockholm, it is much lower in Gothenburg (below 50 %), which may in part be due to higher car dependence in Gothenburg, and the framing of charges as a tax instrument rather than a green policy.[412] This is despite the fact that charges are lower in Gothenburg – between the equivalent of 80 cents and 2 EUR compared to about 1 to 4.2 EUR in Stockholm.[413] Correspondingly, the total revenue from congestion tax is almost twice as high in Stockholm than in Gothenburg (Figure 2).Stockholm, Gothenburg and Malmö have had low emission zones (LEZ) restricting access for heavy traffic since 1996.[414] Currently, another 5 cities, including Uppsala, have introduced such zones.[415] Early studies found that the introduction of LEZs led to a reduction in emissions of hydrocarbon, nitrogen oxide and particulate matter, and a decrease in noise pollution.[416] Stockholm, Gothenburg and Uppsala have also introduced bans for vehicles with studded tyres on certain streets. Evaluations and follow-up studies show that bans have led to a reduction in traffic and the use of studded tyres, and in some cases lower particulate emissions.[417]

Many local authorities use parking fees to control and reduce traffic, yet there are few evaluations of this tool. Studies using statistical modelling suggest that introducing optimal parking fees (depending on area and peak or off-peak hours) could lead to a reduction in the proportion of car trips by 10 to 15 per cent, and on the number of trips by about 7 per cent, with Malmö and Uppsala as the case cities.[418]

[411] Börjesson & Kristoffersson (2018), Trafikverket (2020).
[412] Börjesson & Kristoffersson (2018)
[413] In July 2026. For more information, see https://www.transportstyrelsen.se/sv/vagtrafik/fordon/skatter-och-avgifter/trangselskatt/.
[414] Trafikverket (2010).
[415] For more information, see https://www.transportstyrelsen.se/sv/vagtrafik/miljo/miljozoner/.
[416] Trafikverket (2010).
[417] Johansson, Norman & Burman (2011), WSP (2011), Uppsala kommun (2014).
[418] Asplund & Pyddokke (2021), Pyddokke & Lind (2024).

Figure 2. Total number of taxed journeys and total congestion tax revenue (including late-payment surcharges) in Stockholm and Gothenburg, 2015–2025



Source: The Swedish Transport Agency (Transportstyrelsen).[419]

Overall, the Swedish evidence base consists largely of local authority follow-up studies and technical reports, while there are few scientific impact assessments of specific measures. For example, the City of Gothenburg publishes an annual report with an assessment of achievement for nine impact targets and 15 indicators.[420] The report analyses external conditions, describes implemented measures and concludes with recommendations for further planning. Annual cycle reports similar to the one published by Region Stockholm are also common.

For the local and regional authorities, simple monitoring studies probably suffice to guide the strategic implementation of adopted strategies. However, it is unfortunate that measures are not evaluated more often, and lessons learnt are not widely disseminated. The European Commission has recently mandated Member States to collect policy-relevant data on urban mobility.[421] Member States are required to submit the first set of data by the end of 2027, with updates every four years. Member States can collect data by using a survey, mobile phone data, a transport model or other big data sources. Indicators include number of trips in the geographical area by transport mode, road traffic accidents and injuries, accessibility and registered passenger cars by energy source. When this data infrastructure is in place, it will be easier to compare the situation in different metropolitan areas and follow up on local measures.

[419] Source: https://www.transportstyrelsen.se/sv/om-oss/statistik-och-analys/statistik-inom-vagtrafik/trangselskatt-statistik/.
[420] Göteborgs Stad (2026a).
[421] European Commission (2026b).

iv. Citizen and stakeholder involvement

The regional plans seldom mention citizen involvement. It is mainly through local or national surveys that feedback from citizens and passengers is collected. One exception is Region Uppsala's transport provision programme 2020–2030 where one strategy to achieve the objective "an equal public transport system" is to increase public involvement in public transport planning.[422] This will be realised, for example, by developing better processes for handling feedback received via the transport authority's customer service, local authorities and transport operators and by holding special public consultations on issues of special importance to individuals and groups of citizens. When plans include building new infrastructure, citizens and stakeholders are legally entitled to be consulted and have the right to appeal against a decision on a local development plan.[423]

The regions collaborate closely with the municipalities and with neighbouring regions and participate in various national and regional networks. For example, Region Stockholm collaborates with six neighbouring regions and the county administrative boards regarding transport policy, and participates in the Nordic Cycle Network, national cycling networks and regional forums on transport planning that include the region's municipalities and the Swedish Transport Administration.[424] It is also common for NGOs and local businesses to participate in these networks.

It is somewhat more common to mention citizen involvement in local plans, although this is by no means a prominent theme. In the City of Gothenburg, the strategic plan for sustainable transport includes forming a citizens' council.[425] The council consists of 50 members and is intended to reflect Gothenburg's population in terms of, for example, age, gender, neighbourhood, income and political views. The remit of the citizens' council is to draw up recommendations for the Urban Environment Committee on how the city should prioritise its efforts to become a greener and more accessible city. The City of Malmö's traffic and mobility plan states that the city will work actively to engage with the public, foster dialogue and improve communication in order to reinforce or change travel habits.[426] However, it is not clear exactly how citizens will be involved.

In local plans, it is also common to mention collaboration with property owners regarding charging infrastructure and car pools, and to engage in dialogue with local businesses regarding, for example, efficient and sustainable freight.

[422] Region Uppsala (2020).
[423] Plan och bygglag (2010:900) 5 kap. 11 §, 13 kap. 11 §.
[424] For a full list, see https://www.regionstockholm.se/regional-utveckling/samverkan-for-regional-utveckling/.
[425] Göteborgs Stad (2025).
[426] Malmö stad (2026).

v. Challenges and priorities

In the latest Government communication on transport policy, there is no mention of any new central government co-funding for local authority public transport, walking or cycling projects.[427] Existing national climate and transport targets remain unchanged, while recent government initiatives mainly concern the implementation of the national transport plan, which does not specifically target sustainable urban mobility.

Cycle networks are still a priority within the budget for optimisation and capacity measures and through county plans, rather than through urban environment agreements. There is also a new focus on cycling safety. As part of measures to improve accessibility, the Government has allocated 230 million EUR to promote safer and more widespread cycling.[428] The Swedish Transport Agency has been tasked with investigating new rules for cycling, including how a minimum distance rule, clearer guidelines or road marking for motor vehicles when overtaking cyclists might be introduced.[429]It will also carry out a review of safety measures, international experience and differences between urban areas and rural roads. Another ongoing project at the Swedish Transport Agency concerns reviewing the regulations governing the use of electric scooters, after a sharp rise in accidents and injuries involving this mode of transport.[430]

An ongoing priority concerns continued electrification and digitalisation of the transport system. Overall, there is a shift towards more resources channelled into operations and maintenance rather than to new investments. This may indirectly affect the scope for larger state-funded urban development projects. Another policy priority is improving coordination between transport planning, land-use planning and urban development. The Government's strategy for vibrant and safe cities emphasises integrated planning and cooperation between municipalities, regions and national authorities.[431]

According to the Swedish Climate Policy Council (Klimatpolitiska rådet), the Government should amend existing laws and regulations to make it easier for local authorities to use tools to reduce emissions in cities.[432] For example by reforming parking regulations to benefit car pools, and making congestion charges a local policy.[433] Public transport should also be made more affordable, for example through a reform of the travel tax credit which, in its current form, favours car users, or through government-subsidised season tickets for public transport.[434]

[427] Skr. 2025/26:259, Bet. 2025/26:TU20.
[428] ibid.
[429] Landsbygds- och infrastrukturdepartementet (2025).
[430] For more information, see https://www.transportstyrelsen.se/sv/om-oss/pressrum/nyhetsarkiv/2026/ny-sidatransportstyrelsen-ser-over-elsparkcykelregler/.
[431] Skr. 2024/25:96, bet. 2024/25:CU16
[432] Klimatpolitiska rådet (2026).
[433] Klimatpolitiska rådet (2019).
[434] It is worth noting that research shows that the most important attributes driving preference for public transport in two metropolitan areas (Stockholm and Skåne) were comfort, walking distance and reliability, while price was the least important factor (Göransson & Andersson [2025]).

The Swedish Association of Local Authorities and Regions has published a position paper on the overall investment needs of municipalities and regions, with demands for a more sustainable long-term division of responsibilities, funding and risk-taking between the local sector and central government.[435] In the report, it calls for a reinstatement of the urban environment agreements. According to the Swedish Association of Local Authorities and Regions, there is a significant need for investment in public transport, particularly in larger cities, and the Government needs to review regulations or consider other measures to ensure long-term, sustainable funding.

Key issues for the future therefore include long-term financing of public transport and urban infrastructure, as well as the balance between technological solutions such as electrification and other regulatory measures promoting more sustainable travel behaviour.

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17. Switzerland

Swiss Foundation for Technology Assessment (TA-SWISS)

i. Legislative, policy and strategic frameworks governing sustainable urban mobility

In Switzerland, the Sectoral Plan for Transport, specifically the sub-programme on 'Mobility and Spatial Planning 2050'[436], coordinates at national level the long-term development of the country's overall transport system, ensuring it is aligned with spatial planning and environmental considerations. The Sector Plan sets out principles for cooperation between the Confederation, the cantons, towns and municipalities.

The policy framework in Switzerland is based on a direct democratic system including the possibility of popular initiatives and referenda (either optional or mandatory). Both offer the Swiss people the opportunity for participation in decision-making[437]. At the cantonal and municipal levels, political participation is defined by the respective cantonal regulations, involving for example elections and popular votes. At the municipal level, there may also be additional organisational forms and instruments for political participation. Based on Switzerland's federal system, state responsibilities are divided among the Confederation, the cantons and the municipalities, with the cantons and municipalities enjoying broad autonomy in certain areas. In particular, urban planning and the sustainability of urban mobility lies primarily in the responsibility of the cantons and municipalities.

As part of its agglomeration programme, the federal government provides financial support for cantonal measures aimed at coordinating urban development and transport and, more generally, at decreasing the growth in traffic. The federal government has allocated CHF 1.7 billion in funding for the period up to 2045 for agglomeration projects with a total investment of CHF 4.1 billion[438]. Otherwise, national responsibility primarily covers the Swiss Federal Railways (SBB) and national roads.

The cantons enact their own spatial planning laws, while the municipalities draw up their own building regulations. These usually include regulations on shared-space zones and 30 km/h zones, as well as rules on car park management. In addition, some cantonal energy laws have an impact on the provision of charging infrastructure for electric vehicles; this contributes to mobility with lower CO_2 emissions.

[436] Federal Office for Spatial Development ARE: https://www.are.admin.ch/de/mobilitaet-und-raum-2050-sachplan-verkehr-teil-programm (website only in German)
[437] For a brief description of these instruments, see the entries in the Lexicon of parliamentary terms "popular initiatives" and "referenda": https://www.parlament.ch/en/%C3%BCber-das-parlament/parlamentsw%C3%B6rterbuch)
[438] Federal Department of the Environment, Transport, Energy and Communications (DETEC), June 2026: Verkehr '45: Faktenblatt 1 - 19. Juni 2026. Projekte Bahn, Strasse, Agglomerationen, S. 8. (only available in German)

ii. Sustainable urban mobility measures implemented in recent years

The main providers of urban mobility are the municipal and regional transport authorities. In Switzerland, over 250 transport companies ensure a well-coordinated public transport system. Many of them have joined together to form one of around 20 transport networks[439]. These networks make it possible to use all forms of public transport within the zones covered by a single ticket. The Swiss Federal Railways (SBB) are also a key partner in this regard. By means of a range of season ticket options tailored to different needs, the aim is to shift commuter and leisure travel from cars to public transport, thereby making it more sustainable. Public transport generates around 40 per cent of its revenue within these transport networks. In this context, a study of TA-SWISS describes several advantages and challenges of self-driving vehicles may provide to commuters[440].

The larger urban areas (Zurich, Bern, Lucerne, Eastern Switzerland, Lausanne, Geneva) also offer special services for night-time travelers at weekends and on public holidays. This means you can leave your car in the garage even at times when the trains are not running.

In recent years, numerous towns and cities have developed schemes to promote shared bicycles, e-bikes and e-scooters. The cities enter into service agreements with the companies operating these bike-share schemes and provide them with funding. These accessible services for non-motorized transport (shared micro-mobility) complement public transport in cities and agglomerations and are designed to encourage as many people as possible to leave their cars at home. In a survey conducted in 10 Swiss cities, 26 per cent of respondents stated that they use a bike-sharing scheme. In places where the network is particularly dense, such as Bern and Lucerne, the figure is even over 30 per cent[441].

Virtually all Swiss towns have introduced shared spaces in recent years. The town of Burgdorf was a pioneer in this regard. In 1996, it designated a pedestrian zone, which became the prototype for shared spaces. Such zones have been officially permitted in Switzerland since 2002. Since 1 January 2023, an expert report is no longer required for the introduction of a shared space on non-traffic-oriented minor roads. The details are set out in the Federal Ordinance [442]of 28 September 2001 on 30 km/h zones and shared spaces. In these areas, which are marked with special signs, a maximum speed limit of 20 km/h applies; pedestrians have right of way and – like skateboarders and roller skaters – are permitted to use the entire area.

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[439] Swiss Association of Public Transport (VöV/UTP), 2024/2025: Fakten&Argumente. Zum öffentlichen Verkehr der Schweiz. Bern: VöV. (only available in German and French).

[440] TA-SWISS study on automated driving in Switzerland (2020), Executive Summary in Englisch p. 23: https://www.ta-swiss.ch/en/self-driving-cars

[441] gfs.bern, 2025: *Mobility in Swiss Cities: Urban Transport Policy in Line with Residents' Needs*. Study commissioned by the Conference of Cities for Mobility. Bern: gfs.bern: https://www.gfsbern.ch/en/news/mobility-in-swiss-cities/

[442] Ordinance on 30 km/h Zones and Pedestrian Priority Zones (DETEC): https://www.fedlex.admin.ch/eli/cc/2002/23/de (website in German and French)

iii. Evidence regarding the impact of these measures on mobility patterns, citizens' behavior, and urban quality of life

Public transport services are constantly being expanded: trains, buses and trams are running more frequently, serving new routes and operating for longer hours. In 2022, public transport vehicles covered around 50 per cent more kilometers than in 2000. Consequently, the use of public transport also increased over the same period. The number of passenger journeys on the public transport network rose by over 50 per cent[443].

Cycling plays an important role in sustainable urban transport. City dwellers are almost as likely to own a bicycle or e-bike (63 per cent) as they are to own a car (67 per cent)[444].

By means of car-sharing, even people who do not own a car of their own can hire a vehicle of various sizes and specifications when needed. In Switzerland, there are around 6,000 shared cars; some 300,000 users make around 17 journeys a year, borrowing a vehicle for an average of 6 hours each time. One car-sharing vehicle replaces 11 private cars[445]. This helps to preserve or create open spaces in towns and cities, as fewer parking spaces are required.

Furthermore, there are over 11,000 shared bikes, over 6,000 shared scooters and more than 380 shared cargo bikes in Switzerland.[446] All categories of bike-sharing have grown significantly in recent years. According to EnergieSchweiz, the number of PubliBike users has tripled in three years. EnergieSchweiz provides a tool that allows interested users to hire the right vehicle for them at their chosen location.

Also, the Swiss Federal Railways (SBB) aim to integrate rail, bus, cycling and shared mobility services into a seamless travel chain. Railway stations are increasingly intended to serve as multimodal transport hubs. The goal is sustainable door-to-door mobility, with transfers between different modes of transport made as easy as possible[447].

However, 'micromobility' involving shared vehicles has also attracted criticism. E-scooters in particular – which are not tied to specific drop-off points and are therefore often left lying on the pavement as obstacles – are increasingly prompting counter-measures. Furthermore, they are considered dangerous: the risk of a serious accident is five times higher with e-scooters than with bicycles, and as much as 40 times higher than when using a car[448]. In Switzerland, various major retailers have now banned customers from bringing e-scooters into their premises.

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[443] Swiss Association of Public Transport (VöV/UTP), 2024/2025: Fakten&Argumente. Zum öffentlichen Verkehr der Schweiz. Bern: VöV. (only available in German).
[444] gfs.bern, 2025: *Mobility in Swiss Cities: Urban Transport Policy in Line with Residents' Needs*. Study commissioned by the Conference of Cities for Mobility. Bern: gfs.bern: https://www.gfsbern.ch/en/news/mobility-in-swiss-cities/
[445] EnergieSchweiz, 2022: Shared Mobility Agenda 2030. *Synthesis Report*. Bern: Swiss Federal Office of Energy (only available in German and French)
[446] https://www.energieschweiz.ch/mobilitaet/shared-mobility/
[447] Sustainability Concepts of the Swiss Federal Railways: https://company.sbb.ch/en/company/responsibility/sustainability.html
[448] https://www.watson.ch/schweiz/food/150669049-starbucks-migros-und-coop-verbieten-e-scooter

iv. Involvement of citizens and stakeholders in the planning, implementation and evaluation of sustainable urban mobility policies

Switzerland's direct-democratic and federal system enables political participation and decision-making at all levels of government, while granting cantons and municipalities broad autonomy, as it is the case in urban planning and sustainable urban mobility.

Particularly in larger cities, participatory processes have taken place – and continue to do so – through which the public can express their needs regarding urban mobility. The results are incorporated into the future planning and design of mobility and urban spaces. Here are three examples:

- In the city of Zurich, for example, 1,200 people expressed their views via the e-participation platform, and 800 people took part in a total of five on-site participation processes.
- The canton of Basel-Stadt explicitly incorporates the participation of local residents into its cantonal constitution in Article 55.
- The City of Biel has launched an interactive map showing all the planning projects currently underway in the various neighbourhoods. Forms have been made available to the public, enabling them to express their views on future development.

v. Main challenges and future policy priorities in relation to sustainable urban mobility

The main challenges for sustainable urban mobility in Switzerland include growing transport demand, limited urban space, greenhouse gas and noise emissions, and the need to coordinate transport and spatial planning across different levels of government. Future policy priorities include shifting more journeys to public transport, walking and cycling, expanding multimodal mobility hubs and low-emission transport, and improving coordination between the Confederation, cantons and municipalities[449]. With the growth of electric mobility, increasing electricity demand is also becoming an important issue[450].

A number of projects aimed at promoting sustainable urban mobility are based on partnerships between public and private sector organizations. For example, the 'MixMyRide' (2023-2024) pilot project was co-funded by the Swiss Federal Office of Energy[451]. As part of this pilot project, an app was made available, designed to help users reach their destination in the most environmentally friendly way possible by using multimodal routes. By planning and booking routes that combine car-sharing, public transport and active mobility, the aim was to reduce solo journeys and the associated CO_2 emissions. For this project, the Federal Office of Transport and

[449]Federal Office for Spatial Development ARE: https://www.are.admin.ch/de/pav?utm_source=chatgpt.com (website in German and French)
[450] See also upcoming TA-Study on "New Nuclear Technologies": https://www.ta-swiss.ch/en/mobility-energy-climate/novel-nuclear-technologies
[451] https://mixmyride.com/de/

the Federal Roads Office provided various datasets; open data on bicycle and e-scooter hire was obtained from the Federal Geoportal.

The pilot project revealed both obstacles – in particular the lack of critical mass – and genuine levers for action. Success requires an active community, targeted incentives and a better-structured service offering.

A sustainability score could make such data-driven incentive systems more attractive. However, these systems entail considerable risks to fundamental human rights, such as autonomy and freedom, as well as the danger of undermining the democratic rule of law through pressure to conform. TA-SWISS will publish a study in November 2026 examining possible scenarios involving state-run and state-affiliated social scoring systems[452].

To have a tangible impact on urban mobility and reduce CO_2 emissions, future Mobility-as-a-Service initiatives such as MixMyRide should first build a community on a platform and/or make use of an existing, real-world and active community. In addition, sufficient funds must be made available for financial incentives, advertising and marketing. In addition to the already extensive subsidization of public transport – an achievement that must not be relinquished – public funding for private car-sharing schemes could also be envisaged under certain conditions.

[452] TA-SWISS "Systems of Social Scoring": https://www.ta-swiss.ch/en/social-scoring

18. United Kingdom[453]

Parliamentary Office of Science and Technology (POST)

i. Legislative, policy and strategic frameworks governing sustainable urban mobility

a. National policy

The UK is committed to reaching net zero by 2050. The UK Government has adopted a suite of policies to reach net zero. These include meeting interim targets, known as carbon budgets. The 2025 Carbon Budget and Growth Delivery Plan sets out policies to meet the carbon budgets and the net zero target.[1] It brings together measures on the electrification of transport, public transport and other forms of mobility, including:

- A Sustainable Aviation Fuel mandate
- Car policies, including on expanding electrical vehicles
- Freight, logistics and heavy good vehicle
- Active travel spending
- Rail electrification
- Renewable transport fuel obligations

The 2026 National Planning Policy Framework by the Ministry of Housing, Communities and Local Government specifies that, when considering new developments:[2]

- Sustainable transport should be considered early in planning, alongside public engagement, and aligns with Local Transport Plans, Local Cycling and Walking Infrastructure Plans and Rights of Way Improvement Plans.
- Proposed developments should be located where it can support sustainable patterns of movement, minimize the number and length of journeys, widen transport choice and make effective use of existing or proposed transport infrastructure. The government's Connectivity Tool, aims to help developers understand the transport and sustainability impacts of specific projects.[3]
- Transport facilities that need to be located in the area are provided for, expanded or adapted, such as ports, lorry parking, public transport and freight hubs, bus and rail depots, charging infrastructure and roadside services.
- Significant adverse impacts from the development on the transport network such as capacity, congestion or safety, should be mitigated, alongside assessing and mitigating environmental impacts such as air pollution.

[453] This briefing was supported by Professor Louise Reardon, Thematic Research Lead for Transport at UK Parliament.

b. *Local transport plans*

Local Transport Authorities are responsible for strategic transport planning and can influence local policies on planning and development.

Local Transport Authorities are mandated to create a Local Transport Plan (LTP) for their areas under the Transport Act 2000. These plans should consider how they can reduce carbon emissions from transport.[4]

In 2025, the government published Quantifiable Carbon Guidance (QCG), which provides advice to local authorities on using carbon analysis to quantify the carbon impact of their transport strategies.[5] Local Transport Authorities must also report the carbon emissions of their local transport projects and plans.

For individual transport schemes, any scheme requiring approval by government will need a carbon management plan (CMP) which sets out how a transport project will measure, manage and reduce carbon management throughout its lifecycle.

c. *Electric vehicle infrastructure charging strategy*

Local Transport Authorities must include an electric vehicle infrastructure strategy as part of its LTP, which should be in line with national objectives and include policy on cross-pavement charging solutions.

This strategy should identify where and when new charging infrastructure may be required, create new investment opportunities and inspire local confidence in EVs, and monitor progress and adapt policy in line with evolving priorities.[4]

ii. Sustainable urban mobility measures implemented in recent years

a. *Active mobility*

The UK Government's 2026 Cycling and Walking Investment Strategy for England commits to £4.5 billion of investment to 2030 with a target that by 2035 55% of all short journeys in towns and cities in England should be walked or cycled.[6]

The strategy has three strategic objectives:

- to enable physical activity through active travel
- make active travel the easy and integrated choice
- improve safety for people walking, wheeling and cycling

The Strategy also aims to establish a national active travel network which connects the high-quality local routes already built, funded or planned, alongside prioritizing the building of active travel networks around schools through a national safe route to school programme.

Local transport authorities may also encourage active travel by promoting active travel schemes and through making active travel safer using civil enforcement powers.

In the 2017Cycling and Walking Investment Strategy, the UK Government introduced Local Cycling and Walking Infrastructure Plans which aimed to provide a strategic approach to developing local walking and cycling networks.[7]

b. Shared and micromobility

Electric scooters

Privately owned e-scooters remain illegal to use on roads, cycle lanes and pavements in the UK, unless they have been rented as a part of the government's e-scooter trials. The trials started in 2020 and have been extended and are now due to end in May 2028.[8]

Bikes and electric bikes

People aged over 14 in the UK can ride an electric bike (e-bike) just like a pedal bicycle, so long as it meets the legal definition of an Electrically Assisted Pedal Cycle.[9] E-bike hire/share schemes have grown in popularity across the UK in recent years, with prominent operators including Lime, Forest, and Voi.[10]

Hire scheme operators can enter into contracts with local transport authorities where they wish to offer bikes and designated bike parking (see for example, Hounslow Council's contracts with Forest and Voi).[11] Whilst councils cannot stop bike and e-bike schemes from operating in their area, these contracts enable specific operators to access parking bays and other benefits, making it hard for rival companies to operate in the same area.

c. Workplace parking

Local transport authorities have the power to implement workplace parking levies (a form of licensing scheme) on employers who provide workplace parking. Nottingham is the only authority to implement a work-place parking levy, although it is being considered by others.[12]

d. Road charging

Local Transport Authorities have the power to implement road user charging schemes under the Transport Act 2000. These powers have not been used to date to control traffic volume/reduce congestion, with two proposals rejected in Greater Manchester and Cambridgeshire. They have been introduced in some parts of the UK with an aim to improve air quality of cities by charging drivers of older, more polluting vehicles to enter them.[13] These zones include:

- London's low emission zone (LEZ) and ultra-low emission zone (ULEZ)
- England's clean air zones (CAZ)
- Scotland's low emission zones (LEZ).

There are currently seven cities charging under clean air zones (CAZ) in England. Daily entry charges for non-compliant vehicles range from £7 for taxis in Bradford[14], to £100 for lorries, buses and coaches in Bristol.[15]

London has had a low emission zone for larger vehicles like buses, lorries and coaches, since 2008.[16] It has been gradually expanded to cover all London boroughs. Daily LEZ charges for non-compliant vehicles are between £100 and £300. An ultra-low emission zone (ULEZ) which was introduced in 2019, and applies to more vehicle types, including cars, motorcycles and vans was expanded in 2023to cover all London Boroughs. The ULEZ charge is currently £12.50 per day for non-compliant vehicles.[17]

e. Electrification

Zero emission vehicles mandate

The Zero Emission Vehicle (ZEV) mandate for car manufacturers came into force in January 2024.[18] The mandate phases out the sale of new non-zero emission cars and vans to 100% in 2035. The table below shows the minimum percentage of car manufacturers' sales that must be zero-emission vehicles each year. The legislation currently applies only in Great Britain. In 2024 the Northern Ireland Assembly indicated that it would also implement the mandate from January 2025.

ZEV mandate target dates

	2024	2025	2026	2027	2028	2029
Cars	22%	28%	33%	38%	52%	66%
Vans	10%	16%	24%	34%	46%	58%
	2030	2031	2032	2033	2034	2035
Cars	80%	84%	88%	92%	96%	100%
Vans	70%	76%	82%	88%	94%	100%

Notes: The ZEV mandate specifies the minimum percentage of car manufacturers' sales that must be zero-emission vehicles each year, this is shown above.

The targets for 2031-2035 are yet to be set in legislation

Source: Electric vehicles and infrastructure, House of Commons Library, 2025

The electric car grant discounts the sale price of a new battery electric vehicles by up to £3750, provided it fits certain criteria.[19] Similar grants exist for vans, trucks and wheelchair accessible vehicles.

The Local EV Infrastructure Fund provides capital and capability funding to local authorities in England for residential charging infrastructure for residents without off-street parking.[20]

The electric vehicle charge point grant provides up to £500 per socket for homeowners, renters, some landlords, businesses and workplaces in the UK for both on-street and off-street parking until March 2027.[21]

iii. Evidence regarding the impact of these measures on mobility patterns, citizens' behavior, and urban quality of life

a. E-scooters

In December 2022, the government released its national evaluation of its e-scooter trials, covering the 32 trials across 55 areas that had then been implemented. The evaluation found that by December 2021 rental e-scooter journeys most commonly replaced walking journeys (42 per cent), followed by private motor vehicles or taxis (21 per cent). However, the proportion of private motor vehicle or taxi journeys being replaced increased over time. The evaluation also found that frequent rental users were less likely to have travelled by foot in the absence of a rental e-scooter than infrequent users.[22]

The biggest challenges from the trials were cited as characteristics of local areas, public perceptions related to a new mode of transport, resource constraints within local authorities, and the legal status of private e-scooters. The government began a second national evaluation of e-scooter trials in 2025 and expects to report the results in 2027.

b. Clean Air Zones/Ultra Low Emission Zones

Recent analysis has found positive health benefits of the clean air zone in London. Analysis by Imperial College London finds that between 2019 and 2024 there was around a 40% reduction in estimated deaths associated with air pollution in London. The analysis also shows estimated reductions of particulate matter and nitrogen dioxide, which are key pollutants.[23]

Analysis from the University of Bath finds that since the introduction of the London clean air zone in 2008, there has been an 18.5% reduction in sick leave in Greater London, a 6.8% drop in the incidence of health problems, a 10.2% decrease in respiratory issues and reported improvements in happiness, life satisfaction and reduced anxiety. The research estimates annual public health savings of over £37 million due to fewer respiratory illnesses and reduced job absenteeism.[24]

In a study of 3400 children, research led by Queen Mary University of London, has found that air quality improvements following introduction of London's ULEZ are strongly associated with accelerated lung growth in children. The study finds that the air quality improvements help restore lung growth previous stunted by exposure to air pollution.[25]

Analysis of Birmingham's clean air zone found that in the first seven months of implementation, there was a modest but significant reduction in nitrogen oxide (NO_2) of up to 7.3% and reductions in nitrogen oxide (NO_2) outside of the clean air zone area, indicating wider benefits outside of the scheme. However, the analysis did not find any detectable impact on particulate matter.[26]

c. Electric vehicles

The UK Government's National Travel Attitudes Survey 2024 finds that of those respondents intending to purchase a new car in the near future, 49% said they were intending to purchase an Ultra Low Emission Vehicle (ULEV). However, household income is a large factor. Of those with a household income £50,000 or more, 57% were planning to make a ULEV their next purchase. This falls to 41% of those in households with an income of less than £15,000.[27]

Research by the Centre for Climate Change and Social Transformations finds that electric vehicles are seen as an 'obvious strategy' for moving towards more sustainable transport and a desirable option for many people.[28] Allowing them to keep the freedom and autonomy of individualized transport, whilst also supporting sustainability. However, they are also seen as too expensive to be a viable option for many people. Evidence submitted to a recent Transport Committee Inquiry, also identify range anxiety, battery health and the availability and cost of public charging as factors negatively effecting consumer confidence in moving to electric vehicles.[29]

iv. Involvement of citizens and stakeholders in the planning, implementation and evaluation of sustainable urban mobility policies

Under the Transport Act 2000, when a local transport authority is developing or reviewing its Local Transport Plan it must consult all constituent local authorities.[30]If the local transport authority is a county council, it must consult all district councils within the county on the LTP. The local transport authority must also consult (as they consider appropriate):

- operators of any network or station, or of any railway services, in their area
- operators or providers of other transport services in their area, or organizations appearing to the authority to be representative of the interests of such persons
- organizations appearing to the authority to be representative of the interests of users of transport services and facilities in their area

In developing their electric vehicle infrastructure strategy, the Local Transport Authority should engage with residents and businesses to ensure the strategy meets the local charging needs of all residents, fleets and visitors including disabled people. Local Transport Authorities should also work with local electricity distribution network operators to understand energy considerations and broader local planning, mapping and climate change and air quality plans.[4]

v. Main challenges and future policy priorities in relation to sustainable urban mobility

a. Emissions from surface transport

Surface transport (emissions from vehicles on the roads and rail) is the highest emitting sector across the UK. It was responsible for 31% of UK emissions in 2025. Despite progress on electric vehicle sales, surface transport emissions increased in 2025.[31] In its 2026 progress report, the Committee on Climate Change (CCC) attributed this increase to more vehicle kilometers being driven, resulting in higher demand for petrol and diesel than in preceding years. When compared to years in which similar vehicle kilometers were driven pre-pandemic, surface transport emissions for 2025 are on average lower (for example, 7.3% lower than 2019 levels), and the CCC estimates that EV adoption could be responsible for around half of this reduction in relative emissions.[32]

In 2024, the CCC welcomed policy progress, such as the reinstatement of the 2030 phase-out date for new petrol and diesel cars and the zero-emission vehicle (ZEV) mandate. However, the CCC noted that transport emissions since 2008 have not reduced as much as they had predicted, largely because of a trend towards larger cars which has offset efficiency gains in the overall car fleet. They assess that the annual reduction in surface transport emissions across the rest of this decade will need to be more than four times that seen in 2023.[33]

However, it noted that despite this challenge, surface transport is one of the only sectors in which a rapid-roll out of low-carbon technology has the potential to deliver rapid emissions reductions.[33] In its 2026 progress report, the CCC called for an acceleration of surface transport decarbonization through continued EV sales backed by government support.[32] However, recent academic analysis suggests that there needs to be more focus on behavior change and other demand reduction measures if the UK's targets are to be met.[34]

b. Zero Emission Vehicle Mandate

The Zero Emission Vehicle (ZEV) mandate is currently under review. The government states that this review will 'ensure the policy remains effective in delivering the transition to zero emission vehicles, while supporting consumers, industry and the UK's wider decarbonization objectives.[35]

The consultation opened in August 2026 and closes in October 2026 and is seeking views on a range of issues including the current ZEV trajectory and yearly headline targets, and the effectiveness of existing compliance flexibilities. In its most recent progress report, the CCC said that it is "essential" that the review "does not lead to further concessions" which could undermine achievement of 2030 targets.[32]

c. Future electric micromobility regulation

Micromobility devices are small, usually electric, personal mobility devices such as electric scooters, segways and skateboards and e-bikes.

The English Devolution and Community Empowerment Act seeks to address concerns that local transport authorities do not have sufficient regulatory powers over micromobility rental schemes. Schedule 7 of the Act sets out a regulatory framework for licensing of these schemes and grants local transport authorities the power to license micromobility providers, and issue fines to e-bike companies that break license conditions.[36]

The government has not confirmed how it plans to regulate e-scooter use and has said that this will be informed by lessons learned from e-scooter trials.[9] The second national e-scooter evaluation is due to conclude at the end of 2026.[37]

The previous government had announced intentions to introduce primary legislation to create a Low-speed Zero Emission Vehicle (LZEV) category and ultimately legalize private and rental use of e-scooters. This legislation was not introduced before the 2024 General Election.

In 2024, the Department for Transport published a series of guidance documents on managing the fire risks associated with e-cycle and e-scooter batteries. It said the purpose was to "raise awareness for owners on how to safely purchase an e-cycle or e-scooter, ensure it meets manufacturing requirements and is only bought from reputable sellers", and "also cover safe storage and charging, the warning signs for fire risk and how to address them, and how to dispose of batteries responsibly."[9]

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19. United States of America

Science, Technology Assessment, and Analytics team (STAA) of the U.S. Government Accountability Office (GAO)

Introduction

A wide range of entities at the local, state, and national level are involved with sustainable urban mobility in the United States. Our work at the U.S. Government Accountability Office (GAO) focuses primarily on government efforts at the national (federal) level or local and state efforts that are supported by the federal level. We highlight below some of GAO's recent work related to this topic. Our work sometimes focuses on certain aspects of efforts or technologies and is not exhaustive in its treatment of sustainable urban mobility.

i. Legislative, policy and strategic frameworks governing sustainable urban mobility

In the United States, transportation planning is a collaborative process carried out by numerous entities, such as transportation planners at the U.S. Department of Transportation (DOT), Metropolitan Planning Organizations (MPO), public transit agencies, and local and Tribal governments.[454] The federal government acts as a financial and technical partner to state and local governments, providing capital grants, safety oversight, and research, while local agencies own and operate the actual transit systems. The Federal Transit Administration (FTA), an agency under DOT, supports transit systems nationwide, including buses, subways, light rail, commuter rail, trolleys, and ferries, through funding—currently investing more than $20 billion annually—and technical assistance. FTA also oversees safety, protecting transit riders and workers, and helps develop the next generation of transit innovation through research. Other parts of the federal government, such as the Department of Energy (DOE) and the Environmental Protection Agency (EPA) also play roles in sustainable urban mobility. For example, among other things, DOE has supported research on alternative fuels, fuel cells, batteries, and electric vehicles and their infrastructure. EPA runs programs such as the Clean School Bus Program and the Smart Growth and Transportation Program to reduce vehicle miles traveled and greenhouse gas emissions.

ii. Sustainable urban mobility measures implemented in recent years

The U.S. federal government, states, and local governments have implemented a variety of measures related to sustainable urban mobility. We highlight below some of our recent work related to this topic.

[454]A metropolitan planning organization (MPO) is a federally-mandated and federally-funded transportation policy-making organization that is made up of representatives from local governments and governmental transportation authorities. Federal law requires the formation of an MPO for any urbanized area with a population greater than 50,000. Federal funding for transportation projects and programs are channeled through this planning process.

a. Grants for advanced transportation technologies demonstration programs

In March of 2026, we reported on DOT's Strengthening Mobility and Revolutionizing Transportation (SMART) grants program.[455] This program funds demonstration projects that use advanced transportation technologies. Examples include:

- Smart traffic signals that can give transit and emergency vehicles priority at intersections
- Drones that can monitor traffic and help inspect bridges and roads
- Self-driving vehicles and automated driver assistance systems

In the first 3 years of the program, DOT received 1,073 applications across a variety of community sizes, entity types, and technology areas. As of September 2025, DOT had announced awards of around $289 million, which is 58 percent of the total authorized and appropriated funding for the program in the Infrastructure Investment and Jobs Act (IIJA), for 135 SMART projects.

b. Electric vehicle charging infrastructure

The number of electric vehicles in the United States has increased in recent years, but the limited network of chargers presents a barrier to their adoption. States, localities, and private entities are working to build a nationwide network of publicly accessible electric vehicle chargers. We reported in July 2025 that, at the federal level, DOE, DOT, and the Joint Office of Energy and Transportation collaborated extensively to advance electric vehicle charging infrastructure.[456]The Joint Office has played a key role in coordinating efforts to advance a nationwide electric vehicle charging network, such as by providing technical assistance to state transportation departments. In addition, the Federal Highway Administration (FHWA), within DOT, administers two programs that support public electric vehicle charging infrastructure: the National Electric Vehicle Infrastructure Formula Program (NEVI) and the Charging and Fueling Infrastructure Discretionary Grant Program (CFI). As of April 2025, 384 NEVI- and CFI-funded chargers were open to the public.

c. Smart Cities Technologies

Smart transportation technology systems support cities' traffic management and safety and transportation planning efforts. For example, they can help reduce congestion and idling and identify changes needed to reduce injuries. We issued a technology assessment on smart cities technologies in April 2025.[457] We highlighted a variety of technologies and associated data, such as from traffic cameras, Bluetooth readers, in-vehicle sensors, adaptive signal control, and vehicle telematics systems.

[455]Transportation Demonstration Grants: DOT Should Develop and Implement a Lessons Learned Plan | U.S. GAO
[456]Electric Vehicle Infrastructure: Improved Performance Management Needs to Be Part of Any Related Federal Efforts | U.S. GAO
[457]Smart Cities: Technologies and Policy Options to Enhance Services and Transparency | U.S. GAO

Cities are increasingly using vehicle-generated data to support traffic management. Vehicles typically have an onboard modem or other communications equipment, which allows them to connect and transmit data to an external network. This connectivity allows vehicles to automatically transmit data on speed, acceleration, braking, and steering, in real time or at regular intervals. Transportation departments can acquire these vehicle data and use them to conduct studies and develop tools with the goal of obtaining information on real-time roadway conditions to allow for quicker and more effective responses to any traffic issues, as well as to improve future planning.

Examples of real-world applications of smart cities technologies include:

- Traffic Signal Timing: In Birmingham, Michigan, researchers used data from a U.S. vehicle manufacturer to adjust the timing of traffic signals at 34 intersections to smooth traffic flow. This decreased the delay at these intersections by up to 20% and the number of stops by up to 30%. According to a study, traffic signal retiming is a cost-effective method for reducing congestion and energy consumption because it does not require changes to existing infrastructure.[458]
- Transportation Planning: Researchers in Atlanta, Georgia, piloted an on-demand transit system. Using machine learning and optimization techniques, researchers sought to scale the system to address the distance that transit riders must walk to reach their stops or stations. During the system's 6-month pilot in 2022, public transportation riders in Atlanta could request through a smartphone application that a shuttle pick them up at a specified location and take them to a transit hub. The long-term objective in developing this system is to provide cost-effective transportation to residents in underserved communities, connecting them to jobs, healthcare, education, and healthy food.

d. Available public transit options to access airports

Accessing airports by transit, instead of driving or taking taxis or rideshares, can help reduce congestion on increasingly busy airport roads. GAO found that 23 of the nation's 31 large airports have rail service such as light or commuter rail.[459] For 18 of these airports, the rail service is either located on airport grounds or off-site but connected by an air train that moves passengers on dedicated tracks. The remaining five large airports with rail service have that service located off the airport grounds but connected by a free bus. An additional 20 selected medium and small airports generally have bus service from the airport curb to the local downtown.

Some airports have begun to implement transportation demand management (TDM) strategies to promote the use of existing transit options. TDM broadly refers to efforts to reduce congestion

[458]Wang, Xingmin and Jerome, Zachary et al. Traffic light optimization with low penetration rate vehicle trajectory data. Nature Communication 15, 1306 (2024). https://doi.org/10.1038/s41467-024-45427-4.
[459]Accessing Airports: Available Public Transit Options and Efforts to Promote Their Use | U.S. GAO

and vehicle-related emissions. Five airports GAO visited were implementing TDM strategies, such as additional signage or advertising of transit options, or offering incentives, such as reduced-cost transit.

e. Examples of local efforts related to sustainable urban mobility

In a 2026 report on telework and changing travel patterns, we highlighted some community efforts that could contribute to sustainable urban mobility.[460] We reported that nearly 70 percent of MPOs reported changing roadway use since 2019, such as adding bike lanes or removing parking. For example, residents in San Francisco voted to permanently close two roads to car traffic that were temporarily closed during the pandemic. The closures have created new public spaces, such as walking and biking paths, and increased safety. Other communities also changed roadway use to improve access for pedestrians and cyclists, which could encourage residents to walk or bike rather than drive. For instance, a representative from the Cincinnati MPO told us that, since the pandemic, residents are increasingly looking for projects that have active transportation components, such as walking and biking paths. They said that since 2020, the number of pedestrian and cyclist projects or projects with a pedestrian or cyclist element has increased substantially. According to the region's long-range plan, these investments help reduce fuel consumption, congestion, and vehicle emissions and are especially valuable for replacing short-distance auto trips, which have the highest rate of emissions.

iii. Evidence regarding the impact of these measures on mobility patterns, citizens' behavior, and urban quality of life

Some of our work has examined the impacts of sustainable urban mobility efforts. However, large-scale impacts can be difficult to assess for a variety of reasons, such as confounding factors.

a. Grants for advanced transportation technologies demonstration programs

We reviewed some results of the SMART grants program. While citing challenges that delayed the implementation of their projects, SMART funding recipients GAO interviewed had generally positive views of the program. Recipients reported challenges in procuring the necessary technology and equipment, which affected their projects' timeframes. As of September 2025, most SMART projects were not yet completed, but DOT officials expected many projects to be completed by the end of 2026. Recipients identified positive effects of the SMART program, including that the program allows them to test and demonstrate innovative technology solutions. Further, some recipients said the program allowed them to speed up the research or project timeframes compared with the timeline if they relied on local funding.

[460] Telework and Changing Travel Patterns: Department of Transportation Should Develop Guidance to Help Communities Prioritize Investments | U.S. GAO

b. *Electric vehicle charging infrastructure*

According to a 2024 Pew Research Center report, 60 percent of urban residents live within 1 mile of a public electric vehicle charger, compared with 41 percent of suburban and 17 percent of rural residents.[461] Argonne National Laboratory reports that over 5.7 million electric vehicles are on the road in the United States today. We have not directly assessed the extent to which federal incentives and other activities have contributed to those numbers.

c. *Smart cities technologies*

City officials stated that smart technologies can benefit their delivery of transportation and law enforcement services. However, assessments of benefits are difficult to develop. Researchers stated that agencies may use multiple transportation technologies, making any attribution of effectiveness for individual technologies difficult. The report suggested that policymakers facilitate improved collaboration to evaluate technology use.

d. *Available public transit options to access airports*

Although public transportation to airports is widely available and some airports have promoted strategies to promote the use of existing transit options, use of transit by passengers and airport and airline employees varies widely across airports.[462]For passenger trips, transit use ranged from 4 percent to 19 percent for the 12 airports whose data GAO examined. For employees, officials at two large airports GAO visited reported that 17 percent and 19 percent of surveyed employees used public transit. Meanwhile an estimated 4 percent of airport and airline employees nationwide used public transit to commute, according to GAO's analysis of census data. Factors that influence individuals' transit decisions include cost, travel time, and familiarity with transit options, according to Transit Cooperative Research Program reports and stakeholders GAO interviewed. In addition, people with disabilities consider factors such as availability of elevators or accommodations for mobility aids. Employees may also consider the availability of parking or transit benefits and transportation modes that match their work shifts, which often begin early in the morning.

e. *Confounding factors in evaluating the impact of some sustainable urban mobility measures*

Currently there are such major changes at play that it could be difficult to pinpoint effects of specific measures focused on sustainable urban mobility, especially those related to use of public transportation and traffic patterns more generally. Specifically, we reported in April 2026 that teleworking has influenced mobility patterns.[463] Telework rates spiked during the pandemic and

[461]Samuel Bestvater and Sono Shah, Electric Vehicle Charging Infrastructure in the U.S., Pew Research Center (Washington, D.C.: May 2024).
[462]Accessing Airports: Available Public Transit Options and Efforts to Promote Their Use | U.S. GAO
[463]Telework and Changing Travel Patterns: Department of Transportation Should Develop Guidance to Help Communities Prioritize Investments | U.S. GAO

remain, on average, about twice 2019 levels across large, medium, and small communities (i.e., more than 50,000 people). GAO found that increases in telework—which were, on average, highest in large communities with populations of 1 million or more—contributed to changes in transit, vehicle use, and real estate, primarily in large communities. Changes included decreased transit ridership and fare revenue; new vehicle travel patterns, such as when and where people traveled; and a shift in demand for commercial real estate and housing away from some central business districts.

Transit ridership and fare revenue have declined from 2019 through 2024 in about half of the MPOs that responded to our survey. A greater percentage of large communities experienced this decline than medium- and small-sized ones. For example, according to our survey, most MPOs (79 percent) in large communities reported that ridership declined. At the same time, about two-thirds of MPOs reported that vehicle miles traveled in their communities had returned to or surpassed 2019 levels in 2024. These results are consistent with nationwide trends.

Overall, most transit agencies have struggled to return to 2019 ridership levels. As of fiscal year 2024, only one of the 26 cities designated by FTA as top transit cities had ridership levels that had returned to or surpassed 2019 levels. The remaining transit cities' recoveries varied widely but were still below 2019 levels.

iv. Involvement of citizens and stakeholders in the planning, implementation and evaluation of sustainable urban mobility policies

Citizens and stakeholders can be involved in the planning, implementation, and evaluation of sustainable urban mobility in a variety of ways that may depend on local or state factors. We have not issued recent reports specific to this issue. However, our 2026 report on telework and changing travel patterns discussed various groups' involvement in the implementation of sustainable urban mobility efforts. The U.S. Congress created MPOs to ensure that existing and future expenditures of federal funds for transportation projects and programs are based on a continuing, cooperative, and comprehensive (3 C) planning process. The "cooperative" element of this process calls for local governments, state departments of transportation, public transit agencies, and the public to work together to build consensus on regional projects.

v. Main challenges and future policy priorities in relation to sustainable urban mobility

We have examined multiple topics related in some way to the future of sustainable urban mobility. Two recent examples include a technology assessment on hydrogen and another report on what is sometimes called "urban air mobility" or "advanced air mobility."[464]

a. Hydrogen

Hydrogen is a versatile chemical with many potential uses, including vehicle fuel cells, power generation, and aviation fuel. Hydrogen energy technologies offer long-duration energy storage, increased transportation efficiencies, quiet operation, reduced air-polluting emissions, and potentially broad availability. In one example especially relevant to sustainable urban mobility, we reported that hydrogen fuel cell buses and heavy-duty trucks offer enhanced performance, efficiency, and reduced emissions. They operate without air pollutant emissions and with a smoother ride and more powerful torque than diesel vehicles. Compared to electric vehicles, hydrogen vehicles have quicker refuelling time and better range. Stakeholders from a transit agency we spoke with told us that their hydrogen fuel cell buses experience few weather-related efficiency issues, are less expensive than electric vehicles to operate, and allowed them to expand their low-emission fleet.

However, hydrogen energy technologies have not been widely adopted because of hydrogen's relatively high cost and limited market. Additionally, GAO identified four technical challenges to widespread use. 1. Hydrogen's physical characteristics make it particularly susceptible to efficiency losses, leakage, and emergency response risks. 2. Transport and storage infrastructure is generally lacking or confined to certain regions of the United States, and existing natural gas pipeline infrastructure might not be suitable for hydrogen. 3. Geographic constraints can increase transport and storage costs for hydrogen users. 4. Unclear federal jurisdiction and lack of standards can slow projects down.

b. Advanced air mobility or "urban air mobility"

Air mobility is an emerging concept of air transportation that will leverage new types of aircraft and innovative technologies, such as electrified propulsion systems, to move people and goods, while operating more quietly than traditional aircraft and with reduced emissions. Electric propulsion aircraft have the potential to reduce operating costs, increase access to air service for regional airports, and reduce environmental impacts and noise from aviation. However, the

[464] Hydrogen Energy: Technologies Offer Potential Benefits but Face Challenges to Widespread Use | U.S. GAO and Electric Aircraft: FAA Is Evaluating Designs for Certification and Considering Long-Term Regulatory Approaches | U.S. GAO. See also Advanced Air Mobility: Legal Authorities and Issues to Consider for Operations | U.S. GAO.

Federal Aviation Administration (FAA) had not certified a manned electric aircraft as of March 2026, and when such aircraft will be able to commercially operate is not clear.

Manufacturers are developing fully electric and hybrid-electric aircraft, mostly for short-range and medium-range flying. These aircraft vary widely in design. Some require a runway for takeoff, while others take off vertically, for example, from the top of a building. They also have a wide variety of potential uses, including air taxi service and cargo transport. We found that the infrastructure to support electric aircraft at U.S. airports is currently limited. As of March 2026, FAA is evaluating electric aircraft and engine designs for certification on a case-by-case basis but is considering regulatory changes, such as developing dedicated airworthiness standards for electric vertical takeoff and landing aircraft, that could standardize its approach to evaluating these products in the long term. Stakeholders described challenges with FAA's approach, including insufficient FAA staff with expertise in electric propulsion and limited standardization in the certification process. Recent news reports have indicated that two companies are partnering to develop a vertiport[465] for urban air mobility in Los Angeles and a company will test electric vertical takeoff and landing aircraft over Los Angeles this year, with the goal of using them as a transportation option at the 2028 Olympic Games.[466]

[465]A vertiport is an area or a structure for takeoff, landing, and other purposes for verticle lift aircraft.
[466]Forbes, "Electric Copters Will Fly Out Of Downtown L.A. Ahead Of 2028 Olympics," accessed August 28, 2026, https://www.forbes.com/sites/alanohnsman/2026/08/21/electric-copters-will-fly-out-of-downtown-la-ahead-of-2028-olympics/. Los Angeles Times, "AEG and Archer Announce First Downtown Vertiport at L.A. LIVE Ahead of 2028 Olympics," accessed August 28, 2026, https://www.latimes.com/b2b/ai-technology/story/2026-08-25/aeg-archer-aviation-unveil-dtla-vertiport-for-la28. Aerospace Global News, "Archer Aviation plans downtown Los Angeles vertiport ahead of LA28 Olympics," accessed August 28, 2026, https://aerospaceglobalnews.com/news/archer-los-angeles-air-taxi-vertiport-la28/.