TRANSPORTING QUÉBEC TOWARDS MODERNITY

SUSTAINABLE MOBILITY POLICY – 2030

Intelligent Transportation Systems Intervention Framework

Québec

This publication was prepared by the Direction générale de la Politique de mobilité durable et de l'électrification and edited by the Direction des communications of the ministère des Transports.

The content of this publication can be found on the Ministère's website at the following address: **www.transports.gouv.qc.ca**.

Cette publication est également disponible en français sous le titre *Cadre d'intervention en systèmes de transport intelligents*.

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ISBN 978-2-550-82692-7 (PDF)

(Original edition: ISBN 978-2-550-81191-6 [PDF])

Legal deposit – 2018
Bibliothèque et Archives nationales du Québec

1. Intelligent Transportation Systems in Québec

This document is an integral part of the Sustainable Mobility Policy 2030. It presents an overall portrait of intelligent transportation systems in Québec, associated issues and all measures related to the 2018-2023 Intelligent Transportation Systems Action Plan. The most promising and cross-sectional measures in this sectoral action plan also appear in the Sustainable Mobility Policy Comprehensive Action Plan.

The Intelligent Transportation Systems Intervention Framework is a key component of the Sustainable Mobility Policy vision: In 2030, Québec will be a North American leader in sustainable and integrated mobility. In a territory planned in accordance with sustainable mobility principles, it will have a high-performance, safe, connected and low-carbon transportation ecosystem that contributes to Québec's prosperity and meets the needs of people and businesses.

Current Situation

Intelligent transportation systems (ITS) offer numerous opportunities for making mobility more efficient and more sustainable.

"Intelligent transportation systems" are transportation systems with integrated information and communications technologies (ICT) that improve safety and efficiency. The ICT can include a vast array of systems and information processing and communications technologies, such as computers, sensors, electronic devices, communication devices and management strategies.

Historically, ITS have been used for simple applications such as vehicle detection at traffic lights or the video surveillance of tunnels. With technological developments, many new and varied options have become available. The ITS sector is expanding rapidly: route planners on smart phones, on-board GPS navigation systems that take current traffic into account to help drivers get to their destinations as quickly as possible, applications that tell public transit users when their bus will arrive and road vehicles with automated systems (automatic braking, intelligent speed regulators, etc.). We anticipate that in the not-too-distant future cars that are connected to the infrastructure or to other vehicles will be available, as well as cars with a high level of autonomy.
ITS are divided into nine service groups[1]:

1. **Traveller information –** Systems and applications that provide useful information before or during travel, as well as navigation systems that provide itinerary suggestions. For example, the systems used by the Québec 511 service[2] are part of this family.
2. **Traffic management –** Traffic management systems, including remote surveillance and traffic control, as well as integrated traffic corridors that optimize the use of road infrastructure. Speed detection devices (photo radar) are in this family.

[1] According to ITS Architecture for Canada: https://www.tc.gc.ca/eng/innovation/its-architecture.htm.
[2] http://www.quebec511.info/en/default.aspx.

3. **Public transit management –** Systems to manage public transit, such as capacity management systems.
4. **Electronic payment –** Systems that allow users to automatically pay for a fare, a toll or for parking.
5. **Operation of commercial vehicles –** Systems that control freight transportation vehicles and coordinate logistics services.
6. **Emergency management –** Systems used to support the allocation of emergency services, control the movement of emergency vehicles on the roads or facilitate the public evacuation.
7. **Advanced vehicle safety systems –** Driving control or assistance systems, including connected and automated vehicles, also known as autonomous or self-driving vehicles.
8. **Information management –** Data warehouse of information obtained from all systems that can be used to plan or optimize transportation systems.
9. **Management of maintenance and construction work –** Systems that support the planning and execution of maintenance or construction work on the road network and monitor road conditions or infrastructure conditions, such as bridge instrumentation and automated road analyzers.

The Importance of Intelligent Transportation Systems for Sustainability Mobility in Québec

In 2017, an inventory of ITS in Québec, including those of partners such as public transit organizations, municipalities, ports and many private transportation firms, identified about 500 intelligent transportation applications supporting various functions and services.

ITS offer many opportunities to improve mobility and make it more sustainable. They offer many solutions to current problems and include the following benefits:

> **Improve traveller experience**

When traveller information is made available to users of mobility services, it is easier for them to plan their trips. For example, before departure, they can determine the best available transportation option and know in advance the cost, trip duration and traffic conditions.

> **Increase the efficiency of mobility solutions**

ITS improve the performance of transportation systems, particularly through traffic management. By introducing integrated mobility corridors, the use of road infrastructure can be optimized and travel can be made more efficient. Furthermore, by helping users find routes on various mobility services, ITS let them optimize their travel by taking into account all services offered in their region: public transit, car sharing, bike sharing, ridesharing, active transportation, etc.

> **Improve user safety**

Driving assistance devices allow drivers to improve their own safety and that of other road users. For example, in some new vehicles, sensors detect objects in the blind spot and warn the driver who wants to change lanes by emitting a warning signal. Sensors can detect an approaching obstacle and automatically slow or stop the vehicle. Other devices, such as variable speed limits and radar speed signs, which inform drivers how fast they are going, can also help make roads safer.

> **Reduce environmental impact**

By helping to reduce road congestion and improve traffic flow, or by making public transit and other mobility options more appealing, ITS contribute significantly to the reduction of the environmental impact of travel. By optimising the use of existing infrastructure, ITS can also reduce the need for road expansion.

> **Emergence of new economic models**

Along with new technological platforms, ITS create economic and business models for transportation that are based on the sharing of vehicles, equipment and transportation infrastructures. In some cases, they can improve the alignment between offer and demand.

The Gouvernement du Québec's Role in Intelligent Transportation Systems

The efficiency of intelligent transportation systems is dependent on information sharing (from any source) and interoperability. As a front-line player in the organization of transportation systems in Québec, the ministère des Transports, de la Mobilité durable et de l'Électrification des transports (MTMDET) is taking on a growing leadership role among ITS partners-users concerning the orientations, priorities and deployment of these systems in Québec. The government unifies the main stakeholders, such as municipal road network managers, public transit and freight transportation operators and the public and private sectors.

The MTMDET's leadership helps maximize the benefits associated with the use of ITS by everyone, reduces the cost of development and use, and guide the partners in their choices of projects and investments.

This role of government leader stems from the fact that the MTMDET, as the operator of the highway system, is itself a major user of ITS. As it is responsible for a road network of over 30,900 km with nearly 9,660 structures (bridges, tunnels, walls, pumping stations and culverts), it needs to be very familiar with these systems and stay informed about technological advancements.

In this leadership role, the MTMDET is supported by various Québec government ministries and organizations that also play a role in ITS. For example, the ministère de l'Économie, de la Science et de l'Innovation, which has the mandate to support business growth, technological developments, exports and investment, is working to expand this sector of the economy in Québec. The ministère des Affaires municipales et de l'Occupation du territoire and the ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques also use ITS in their guidelines for smart city and sustainable development.

To fulfill this leadership role, the MTMDET has drawn up the Plan québécois des systèmes de transport intelligents (PQSTI – Québec Intelligent Transportation System Plan) which will:

- Draw a complete portrait of intelligent transportation systems in Québec, including those of partners;
- Clarify the practical needs of the MTMDET and its partners;
- Create an ITS architecture that reflects Québec's needs;
- Define ITS guidelines and objectives;
- Propose decision-making criteria and a preliminary ITS deployment plan for the next ten years.

Trends and outlook to 2030

ITS offer a variety of opportunities ranging from trip planning or optimization to driver assistance to automatic road de-icing devices. In light of the significant benefits ITS offer, we expect their presence to increase considerably in the years ahead.

Trend 1: Acceleration of technological developments

Technological developments are occurring at an increased pace, offering solutions that were not previously available, in all areas of transportation.

> Infrastructures

Currently available ITS used on road infrastructure include the use of preventive automatic de-icing devices on bridges, variable speed limit signs and road dynamics warning systems that adjust to road or climate conditions. These devices and systems have recently arrived in Québec and are contributing to sustainable mobility. But the cycle is not yet finished, because in the near future, infrastructure will have intelligent components able to communicate with autonomous vehicles to make travel safer and more efficient.

> Transportation systems

Technological developments can also help improve the functioning of public or shared transit systems. The use of smart cards shared by several public transit organizations to pay fares improves the user's experience and provides better service integration, for the user's benefit. These technological advances will be harnessed to develop new mobility.

> Vehicles

In the coming years, driver assistance systems will become more widespread, to the point that we expect fully autonomous vehicles to be on the roads in the not-so-distant future.

With the challenge laid down by Google, which introduced its self-driving car in 2015, most major car manufacturers and high-tech businesses began development programs for vehicles equipped with automated driving systems that allow the driver to totally cede control of the vehicle. More and more prototypes have been made (Audi, Toyota, GM, Mercedes, Nissan, etc.) and some companies are already involved in pilot projects on the roads.

Tesla Motors, the electric car manufacturer, was the first to market serially produced vehicles with an automated piloting system (autopilot) on the North American market, including Canada. Nissan and Volvo have announced their intention to market this kind of car in 2020. According to American experts at the Institute of Electrical and Electronics Engineers (IEEE), up to 75% of the vehicles in circulation will be autonomous by 2040.

Trend 2: Democratization of mobile phones

Mobile phone apps allow users of different transportation systems to improve the efficiency of their trips. Route planners, car sharing solutions and transportation payment services are just a few examples of the uses that will continue to expand in the years ahead.

Trend 3: Connectivity and wireless telecommunications

Advances in telecommunications offer a host of opportunities, such as vehicles connected to infrastructure or other vehicles or even pedestrians and cyclists who have mobile phones. Equipped with such systems, the vehicles can, for example, brake automatically to avoid a collision with other road users.

Trend 4: Development of information technologies and data processing

The availability and effective processing of data give transportation system operators and users solutions for trip management and intervention opportunities that contribute to the sustainable mobility of goods and people.

Artificial intelligence and big data analysis offer many opportunities. Big data could be used to help transportation system managers make better decisions. For example, analysing data from people's mobile phones and from connected vehicles could be used to anticipate demand in order to improve planning and reduce the impacts of interventions on the transportation networks.

Trend 5: Increased collaboration among mobility stakeholders

When transportation networks are interconnected, transportation stakeholders and partners have found that information technology allows for the sharing of information and the pooling of means to improve the coordination and cohesion of actions and thereby achieve better integration of transportation services to make them more efficient and economical.

2. Sustainable Mobility Issues Related to Intelligent Transportation Systems

Issue 1: Availability of coherent information services meeting the mobility needs of users in all regions

It is critical for operators and users to be able to acquire and share knowledge about trips and the conditions that influence fluidity and safety. Information about trips, road conditions, modes of transportation, service availability, transportation infrastructure condition and regulatory requirements is required to implement solutions that reflect the needs of users in all regions.

The means deployed to collect, process and share relevant information must be sufficient to provide adequate territorial coverage and high-quality content, in order to support decision-making and planning for both transportation organizations and users. Information sharing is critical for effective coordination among organizations so transportation networks can function, especially during events that affect the safety and fluidity of the networks, which is why the services must be able to guarantee information sharing based on the stakeholders' various levels of responsibility.

Information collection and sharing services have been developed by individuals or organizations to meet specific needs. A variety of mobility information services or options are available in Québec, such as the MTMDET's Québec 511 service[33], as well as services offered by the private sector (e.g., Google, TomTom). These services are sometimes in competition with each other and sometimes complementary. This creates a number of disadvantages, including user services that are not equally distributed in all regions, system design, update and maintenance costs that are higher due to duplication and regional specificities.

Information coherency is crucial: the full range of transportation needs in urban, periurban and regional areas must be taken into account based on the available modes of transportation. For example, events that affect travel, whether they are planned (road works) or unplanned (traffic incidents), must be adequately described in terms of location, time, duration, conditions and consequences, in order to communicate the potential effects on the user's travel choices (route, time, means). Given the nature of travel, road conditions are generally more important for users in the regions than for those in major urban centres who have daily access to a lot of information about traffic conditions (e.g., congestion, incidents, road work) and public transit services.

Issue 2: Interoperability of the systems and applications that support mobility

The existing systems of the MTMDET and its public and private partners in the transportation sector and related fields do not communicate. However, for operators to be able to make sound decisions and for users to have access to integrated information, these systems need to allow for the rapid, complete and safe exchange of data. Interoperability is therefore an essential condition to permit the decision-making processes required to undertake and coordinate interventions that will ensure the fluidity and safety of the transportation networks and contribute to the longevity of infrastructure.

The increasing number of services and their uses mean that systems and applications can no longer be developed in isolation or independently, as they used to be. Systems must communicate in order to share information and become interoperable. Furthermore, to facilitate access to and use of as many product and service providers as possible, these systems must be designed based on common standards. This will also ensure the resiliency of the systems and the security of the information.

There are cybersecurity concerns (e.g., personally identifiable data, hacking, etc.) both technologically and legislatively. This applies to information networks, databases, access to personally identifiable data, user safety and national security, not to mention the effects of new transportation business models. This is particularly critical with recent technological advances related to big data (multiple sources) and autonomous and connected vehicles. The actions chosen must therefore take cybersecurity concerns into consideration for all ITS issues.

A connected vehicle can record a lot of data on its routes. Many entities may want to access that information, such as advertising agencies that may use it to learn the users' consumption habits in order to better gear advertising towards them. A connected vehicle could also be hacked, endangering both the passengers and the public at large. The information recorded by connected vehicles can also be used by network managers to understand traffic flow and congested locations, for example. As such, it is imperative for access to data and to vehicles that are carefully managed to ensure privacy and safety.

[3] http://www.quebec511.info/en/default.aspx

Issue 3: Control of technological innovation

Given the fast pace of technological developments, transportation organizations must dedicate resources to staying up to date on changes in technology. They must also have mechanisms to facilitate the adoption of the best technological innovations.

New areas of innovation have arisen in automation, artificial intelligence and the availability of massive quantities of real-time data from various external sources on all aspects of transportation. The producers and holders of this information can also be sources of competition or complementarity to traditional transportation organizations. Technological innovation is already upsetting current paradigms of service provision. It is anticipated that legislation and regulations will have to be adjusted to take into account these changing conditions. The roles and responsibilities of the various stakeholders will undoubtedly change.

The technological vitality of increasingly connected ITS and the potential offered by big data create many business opportunities, but also challenges. Users will be increasingly dependent on technology because of the benefits it offers, but we must remain alert to the related threats, particularly those related to user safety and the right to privacy.

3. 2018-2023 Intelligent Transportation Systems Action Plan

In terms of the MTMDET's mission and priorities, ITS are tools that can improve the efficiency, effectiveness and safety of passenger and freight transportation networks all across Québec. They can also meet information needs, for both the users of transportation networks (public roads, public transit, etc.) and the operators.

The actions set out below were identified when the Plan québécois des STI (PQSTI – Québec ITS plan) was prepared, with input from over 60 partners or stakeholders from the public sector (municipalities, transit corporations, etc.) and the private sector (passenger and freight transportation companies).

Issue 1: Availability of coherent information services meeting the mobility needs of users in all regions

Sound management of the road networks ensures the fluidity and safety of vehicle traffic, a critical matter for the continuity of economic and social activities. Intelligent transportation systems have become indispensable management tools for network operators today. To fully benefit from these systems, however, interoperability and information sharing are required.

This set of actions establishes the foundation for creating effective, high-performance transportation systems, for the benefit of both users and operators.

The first step is to define the standards that will guide the deployment of an integrated system, at the MTMDET and with its partners. The next step is to create or upgrade systems for each partner, and then, finally, to completely integrate the systems.

INTERVENTION PRIORITY 1.1: APPLY COMMON STANDARDS AND SUPPORT THE ADAPTATION OF ITS

Measure 1: Standardization of information and implementation studies (PQSTI Initiative 1)

The transportation sector is fragmented between public and private sector players. At present, systems are deployed independently, with technologies that are often not compatible. Effective coordination among organizations is crucial for the management and operation of transportation networks. The application of a normative framework that fosters data exchange and system interoperability has been targeted as the first step for ITS deployment in Québec.

Measure 1 will, with the input of ITS stakeholders in Québec, establish the structures, standards and means required to create a transportation data exchange platform for Québec, the *Centre intégré d'information et de coordination en transport* (integrated transportation information and coordination centre) and ensure that its deployment is feasible.

The *Centre intégré d'information et de coordination en transport* collects information from the systems of public or private stakeholders (MTMDET, cities, transport organization authorities [TOA], etc.) and puts it at the disposal of partners and road users – open data layers, accessible based on needs and agreements. This centre is managed by a consortium of partners.

The implementation of this action is being piloted by the MTMDET and carried out in collaboration with stakeholders.

Indicator: Percentage of target attained
Target: 100% by 2023
Budget: $0.8 million over five years (additional funds)

Measure 2: Implementation or adaptation ITS in order to allow the collection and exchange of standardized information (PQSTI Initiative 2)

It is critical for network operators to be able to acquire and share knowledge about travel and the conditions that influence fluidity and user safety. The systems required to share this information must be available and deployed in the right location and the right way, based on previously established standards.

Measure 2 will introduce or adapt the ITS required by stakeholders to support the exchange of information with the Centre intégré d'information et de coordination en transport. It will ensure that ITS are deployed effectively and improve interoperability among the various systems, as well as protect the longevity of the partners' systems.

Indicator: Percentage of target attained
Target: 100% by 2023
Budget: $6 million over three years (additional funds)

INTERVENTION PRIORITY 1.2: OFFER INTEGRATED AND ADAPTED INFORMATION SERVICES TO SUPPORT TRIP PLANNING AND USER TRAVEL

Measure 3: Integration of user information in transportation (PQSTI Initiative 4)

Measure 3 will integrate all public information about transportation with the Québec 511 service. This integrated information could also be enriched by various public or private sources.

Measure 3 will establish an integrated information service for users and travellers in Québec, which will then be enhanced with trip planning and optimization tools.

Indicator: Percentage of target attained
Target: 100% by 2023
Budget: $3.3 million over three years (additional funds)

INTERVENTION PRIORITY 1.3: COORDINATE INFORMATION SHARING AMONG PARTNERS ACROSS THE ENTIRE TERRITORY

Measure 4: Introduce data sharing services (PQSTI Initiative 3)

This three-part action will establish a shared information service that will allow for improved coordination among transportation partners. It will deploy or upgrade and then share centralized services to exchange three types of data: informational, operational and ordering data.

- **Deployment of public information sharing services (informational level) (PQSTI Initiative 3.1)**

  Measure 4 seeks to set up shared centralized services to support the hosting and exchange of informational data with the *Centre intégré d'information et coordination en transport* (currently Québec 511). These raw or aggregated data, once verified under the terms of the agreement established among the stakeholders, will be available for dissemination to transportation users.

  Indicator: Percentage of target attained
  Target: 100% by 2023
  Budget: $2 million over two years (additional funds)

- **Deployment of information sharing among partners (operational level) (PQSTI Initiative 3.2)**

  Measure 4 will set up shared centralized services to support the hosting and exchange of operational data that will improve coordination of operations by partners, such as traffic and emergency management and resource mobilization. The data will be aggregated under the terms of the agreements among stakeholders and will be subject to thorough verification. This data will support decision-making processes.

  Indicator: Percentage of target attained
  Target: 40% by 2023
  Budget: $1.6 million over one year (additional funds)

- **Deployment of information services among partners (ordering level)**

  Measure 4 will set up shared centralized services to support the exchange of ordering data among the partners' systems. Direct system-to-system exchanges will facilitate certain operations to support decision-making processes and reduce reaction time.

  Indicator: Percentage of target attained
  Target: 5% by 2023
  Budget: $0.1 million over five years (additional funds)

Issue 2: Interoperability of the systems and applications that support mobility

INTERVENTION PRIORITY 2.1: CONNECTIVITY AND INTEGRATION OF TRANSPORTATION SERVICES

Improving connectivity among modes of transportation and stakeholders facilitates the complementarity of passenger mobility services and the intermodality of freight transportation, and it encourages more sustainable mobility choices on the part of stakeholders and users.

ITS can help align offer and demand (user needs) by encouraging the complementarity of services in an approach that maximizes the concept of "seamless mobility." Service synchronization and access based on the users' regions and preferences are important issues. The electrification of transportation, intelligent vehicles and the establishment of information platforms that include transport on demand services in the regions are all current and future factors that require the integration of various mobility services and options.

Measure 5: Integration of ITS into the MTMDET and with the cities and public transit bodies, e.g., traffic management, integrated corridor management (PQSTI Initiative 5)

This two-part action deals with the integration of ITS at the MTMDET (internally) and the integration of the MTMDET's ITS with those of its partners.

> **Integration of MTMDET's ITS, particularly for traffic management and emergency management (PQSTI Initiative 5.1)**

Measure 5 will integrate the MTMDET's ITS in a cohesive and coherent whole that will support the operation and management of passenger and freight mobility **on the highways**, including the establishment of an advanced traffic management system (ATMS).

Indicator: Percentage of target attained
Target: 50% by 2023
Budget: $4.3 million over two years (additional funds)

> **Integration of MTMDET's ITS with those of its partners (PQSTI Initiative 5.2)**

Measure 5 will integrate the MTMDET's systems with those of its partners (cities, TOA, etc.) in a coherent whole to support the integrated management of passenger and freight mobility in defined corridors.

Indicator: Percentage of target attained
Target: 5% by 2023
Budget: $0.1 million over one year (additional funds)

Measure 6: Integration of modal passenger transportation platforms (PQSTI Initiative 6)

Measure 6 will provide the users of passenger transportation tools to optimize their trip choices and encourage more sustainable modes of transportation.

Indicator: Percentage of target attained
Target: 40% by 2023
Budget: $1.2 million over two years (additional funds)

Measure 7: Implementation of multimodal route planners for passenger and freight transportation (PQSTI Initiative 7)

Measure 7 will evaluate the potential and suitability of deploying a multimodal route planning tool for passengers and freight, inspired by the Logistics and Transportation Metropolitan Cluster of Montréal model, CargoM.

To improve the fluidity of truck transportation, especially to the Port of Montréal, CargoM developed and launched a technological tool (CargoMobile) for truckers, which allows them to find the most effective route to a destination in real time. Taking into consideration the location of restrictions and hindrances on the road network, the application, which works on mobile phones and tablets, makes it easier for freight transporters to choose their route and timing across the entire Greater Montréal road network.

Indicator: Percentage of target attained
Target: 5% by 2023
Budget: $0.1 million over one year (additional funds)

Issue 3: Control of technological innovation

INTERVENTION PRIORITY 3.1: HARMONIOUS INTRODUCTION OF ADVANTAGEOUS TECHNOLOGICAL INNOVATIONS IN SUSTAINABLE MOBILITY

Openness to innovation is essential if the transportation sector is to adapt to the current shift and benefit from technological advances and the increase in available data. In the current context of upheaval in the sector, innovation must be promoted and stimulated to ensure that the changes are introduced as harmoniously as possible, for both passenger and freight transportation. Adopting a shared vision will make it easier to guide and manage the effects on current service provision modes.

Measure 8: Studies and integration of technological innovations (PQSTI Initiative 8)

Measure 8 will adopt various advances related to the ITS technology market and new business models, particularly in relation to mobile applications, intelligent vehicles, mobility as a service and artificial intelligence.

Indicators: Number of studies, number of recommendations implemented
Target: 3 studies by 2023
Budget: $0.5 million over four years (additional funds)

SUMMARY TABLE

Intelligent Transportation System Intervention Framework Issues, Intervention Priorities and Measures	Indicator	Target	Contribution to aspects of the Sustainable Mobility Policy					
			SMP aspect 1	SMP aspect 2	SMP aspect 3	SMP aspect 4	SMP aspect 5	Winning conditions
ISSUE 1: Availability of coherent information services meeting the mobility needs of users in all regions								
Intervention priority 1.1: Apply common standards and support the adaptation of ITS								
Measure 1: Standardization of information and implementation studies (MTMDET)	Percentage of target attained	100%	X					
Measure 2: Implementation or adaptation of ITS in order to allow the collection and exchange of standardized information (MTMDET)	Percentage of target attained	100%	X					
Intervention priority 1.2: Offer integrated and adapted information services to support trip planning and user travel								
Measure 3: Integration of user information in transportation (MTMDET)	Percentage of target attained	100%	X					
Intervention priority 1.3: Coordinate information sharing among partners across the entire territory								
Measure 4: Introduce data sharing services (MTMDET) > Deployment of public information sharing services (informational level) > Deployment of information sharing among partners (operational level) > Deployment of information services among partners (ordering level)	Percentage of target attained	100% 40% 5%	X					

Intelligent Transportation System Intervention Framework Issues, Intervention Priorities and Measures	Indicator	Target	Contribution to aspects of the Sustainable Mobility Policy					
			SMP aspect 1	SMP aspect 2	SMP aspect 3	SMP aspect 4	SMP aspect 5	Winning conditions
ISSUE 2: Interoperability of the systems and applications that support mobility								
Intervention priority 2.1: Connectivity and integration of transportation services								
Measure 5: Integration of ITS into the MTMDET and with the cities and public transit bodies – e.g., traffic management, integrated corridor management (MTMDET) > Integration of MTMDET's ITS, particularly for traffic management and emergency management > Integration of MTMDET's ITS with those of its partners	Percentage of target attained	50% 5%	X					
Measure 6: Integration of modal passenger transportation platforms (TOA)	Percentage of target attained	40%	X					
Measure 7: Implementation of multimodal route planners for passenger and freight transportation (MTMDET)	Percentage of target attained	5%	X					
ISSUE 3: Control of technological innovation								
Intervention priority 3.1: Harmonious introduction of advantageous technological innovations in sustainable mobility								
Measure 8: Studies and integration of technological innovations (MTMDET)	Number of studies conducted	3 studies by 2023	X					