



TRANSPORTING QUÉBEC TOWARDS MODERNITY

SUSTAINABLE MOBILITY POLICY - 2030

New Mobility
Intervention Framework

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1. New Mobility in Québec

This document is an integral part of the Sustainable Mobility Policy - 2030. It presents an overall portrait of the new mobility sector in Québec, its issues and all measures related to the 2018-2023 New Mobility 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 New Mobility Intervention Framework is a key component of the Sustainable Mobility Policy vision: In 2030, Québec will be a North American leader in 21st-century 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 transport ecosystem that contributes to Québec's prosperity and meets the needs of people and businesses.

Current Situation

New mobility is defined as a set of different transportation modes or services, interconnected or not, that meet the various mobility needs of people and goods. These include car sharing, self-service car rental, ridesharing (planned or spontaneous), bike sharing, taxi sharing, microtransit¹, urban cable car and river shuttles. New forms of mobility also include all the applications for trip planning and linking travel-related offer and demand.

New mobility depends on business models based on vehicle sharing, pooling or autonomy. It rounds out the traditional, currently available transportation offer that depends on private cars, public transit, taxis, bicycles and walking.

When transportation services are interconnected and optimized for the operators (networks, infrastructures) and the users (time, attractiveness, etc.), mobility is offered as a service (Mobility as a Service or MAAS) with the objectives of accessibility, efficiency, flexibility, simplicity, comfort and user-friendliness. Establishing this kind of service requires concerted action and collaboration among all mobility stakeholders (government, municipalities, public transit operators and private businesses) because shared knowledge and data constitute the hub of the service.

The Importance of New Mobility for Sustainable Mobility in Québec

Transportation is at the heart of economic and social activity in Québec. By expanding the offer of alternatives for the more traditional means of transportation, new mobility can help us achieve major advancements in terms of:

- Reduced GHG emissions. According to a Polytechnique Montréal study published in 2012², in Québec, one carshare vehicle replaces 10 private cars;
- Improved traffic flow, fewer trips and, by extension, less congestion. It has been demonstrated that the users of carshare vehicles travel by car four times less often than people who own a car²;

¹ "Microtransit" is a smaller, more flexible public transit system that responds dynamically to the needs of users or groups of users.

² Louiselle SIOUI, Catherine MORENCY and Martin TRÉPANIÉ, *How Car sharing Affects the Travel Behaviour of Households: A Case Study of Montréal, Canada*.

- The use of public services and urban space, since reduced car use goes hand in hand with increased use of public transit, cycling and walking.

New mobility is one of the essential components of sustainable mobility, and innovation in this area continues to advance. New products and business models are being developed to meet the growing needs of users, with the side benefit of reducing the environmental footprint of transportation.

The Gouvernement du Québec's Role in New Mobility

New mobility is a distillation of leading-edge technology, in terms of vehicles (electric motorization), electronic systems, connectivity, communications networks, big data, software and mobile applications. This sector may become a strategic economic lever for Québec.

The Gouvernement du Québec wants to be a forerunner in the field. It intends to mobilize transportation stakeholders from all across the territory to identify and implement innovative mobility solutions that will also contribute to the prosperity of Québec by improving residents' safety, health and quality of life. The choices that are made will also improve the environmental record of the transportation sector.

In this regard, the government will play a particular role in two areas:

> Experimentation and innovation

Even though it is drawing on worldwide best practices in the integration of new mobility in the Québec transportation system, the government is also encouraging innovative made-in-Québec initiatives that comply with current laws and regulations and complement the existing offer with a focus on universal accessibility.

> Adaptation of regulations

Some business models used for new mobility are not aligned with the laws and regulations currently in place in Québec. This is why the government is spearheading work to establish a favourable setting for new mobility, in the context of sustainable mobility.

Since the adoption of the Bill amending various legislative provisions respecting transportation services by taxi³ in June 2016, the Ministère des Transports, de la Mobilité durable et de l'Électrification des transports can, by ministerial order, authorize pilot projects to experiment with or innovate regarding taxi transportation services or study, improve or define related standards.

These legislative amendments allowed the government to establish the conditions of a pilot project concerning remunerated passenger transportation services requested exclusively using a mobile application (Uber). Five other pilot projects have been launched to modernize taxi transportation services, such as the pilot project to promote electric taxi transportation and the pilot project to optimize taxi transportation services ordered via mobile app in the Capitale-Nationale region.

³ <http://www.2.publicationsduquebec.gouv.qc.ca/dynamicSearch/telecharge.php?type=5&file=2016C22A.PDF>

Main Initiatives in Québec

> Car sharing and self-service car rental

In Québec, the first new mobility initiative was launched in 1995 with the creation of Communauto, a car sharing service. Today, Communauto manages a fleet of over 2000 vehicles in seven cities, six in Canada (Montréal, Québec, Sherbrooke, Halifax, Gatineau and Ottawa) and one in France (Paris). It offers three types of services: round trip (return to point of origin), one way (return to another station) and the AutoMobile service, a self-serve option where the vehicle is picked up and left on the street within a defined geographic area. In Montréal, the Communauto services are integrated with other means of public transit and users use their Opus card to take possession of a vehicle.

A second car sharing service is offered in Montréal by Car2go, a subsidiary of the German car manufacturer Daimler Mercedes. Its fleet is made up entirely of Smart and Mercedes car models. Car2go allows one-way trips within the service area, with no reservations, and the cars are accessible on request. The car can be used for as long as desired with no obligation to return it at a particular time or to a particular place. It must, however, be parked in an authorized parking place within the service area. Use is charged by the minute and includes the price of fuel, insurance, parking and maintenance.

The Ville de Montréal has dedicated on-street parking places to these self-serve cars. In some neighbourhoods, like the business district, only electric vehicles have access to these places, which are equipped with *Circuit électrique* charging stations. The Ville de Montréal parking policy, tabled in June 2016, states that in 2020, for self-serve car services, only wholly electric cars will be authorized within the territory of Montréal.

Car sharing services are mainly used in cities, but since the beginning of 2017, six Québec municipalities have been taking part in a pilot project called SAUVÉR (Système d'autopartage avec véhicule électrique en région – electric vehicle car sharing system in the regions), which hopes to optimize the use of municipal vehicle fleets. During the day, the vehicles are used by municipal employees for work, and in the evenings and on weekends, they are put at the disposal of the public.

> Bike sharing

A bike sharing service has also been available in Montréal since 2009. Since 2014, BIXI Montréal, a not-for-profit organization, has been managing the bike sharing system, which has 6,250 bicycles and 540 stations across Montréal and in Longueuil and Westmount. The service is offered from April to November. Different packages and rates are available, to cover different kinds of situations (regular use, occasional, one-time, etc.). Payment is made by credit card and an email address is requested to conclude the transaction.

> Taxi sharing

Taxi sharing is a service that transports several people who have separately requested service to the same destination or to several destinations along the same route. The trip must be requested using a technological means that allows each passenger to accept the route sharing costs in advance. The first initiative was launched in 2015 in Montréal by Diamond Taxi in collaboration with Jour de la Terre Québec (JTQ).

> **Ridesharing**

There are many urban and intercity ridesharing services in Québec, such as Amigo Express (Canada), Ridesharing.com (Canada, United States), Monlift (for women only) and Covoiturage express (city of Québec).

At the regional level, initiatives have also been launched, such as Allo Transport in the RCMs of Maria-Chapdelaine and Domaine-du-Roy in Saguenay–Lac-Saint-Jean.

Finally, a ridesharing service is offered on the Ski Covoiturage platform to access certain ski stations from the main cities in Québec.

> **Websites and mobile apps**

Trip planning

A variety of apps can be used to plan trips or connect people who need transportation with carriers or drivers offering transportation services. One of these is OuiHop, a participatory short-distance transportation network based on trust, respect and mutual assistance.

There is also the Mon trajet platform, which includes different means of transportation (public transit, cycling and ridesharing) and offers trip planning in the Saguenay–Lac-Saint-Jean region. This service is an initiative of the Centre de gestion des déplacements (CGD) supported by the ministère des Transports, de la Mobilité durable et de l'Électrification des transports (MTMDET).

The Montréal app called Transit works anywhere you are: at home in Québec, on a trip to the United States or Europe and elsewhere in the world. Transit posts all the transportation options available where you are, along with the next departure times. The application works in 125 cities around the world, including the cities of Montréal and Québec.

Launched in August 2017, Chrono is a public transit planning app for Greater Montréal. Developed by the Réseau de transport métropolitain (RTM), it shows the schedules of all means of public transit in the metropolitan area (metro, bus and commuter train).

Netlift, another trip planning app for Montréal, recently received a financial boost from the Gouvernement du Québec to speed up the pace of its international expansion. In addition to ridesharing among individuals, this app makes use of available space in taxis, which are often busy in the morning and evening but unoccupied during the day.

Integrated Mobility Service

In August 2017, the Société de transport de Sherbrooke also launched a mobile app called Vermeille, which allows passengers to plan their trips, create a specific itinerary, quickly find stops and check the schedule of upcoming departures. It works with the Ticket app, which can be used to buy a ticket using a smart phone, only at the time the bus arrives at the stop.

The Réseau de transport de la Capitale (RTC) has started work on a technological platform that will include all transportation offered in the urban agglomeration of Québec – from bus to bike to taxi to ridesharing – and offer custom routes that can be reserved and paid for in just a few clicks. The passenger purchases their options as a package that can be customised. The Société de transport de Montréal is also working on a similar project, with several partners.

Paid transportation

Mobile applications for smart phones are central to the modernization of the taxi transportation industry. The Taxi Coop Québec app allows the user to order a taxi and rate the driver's courtesy and service and the cleanliness of the vehicle, as well as pay electronically. This application was the subject of a pilot project authorized by the ministère des Transports, de la Mobilité durable et de l'Électrification des transports which began on December 30, 2015, and ran for two years. It allows a taxi owner or driver in the Capitale-Nationale region to offer a ride that begins and ends outside their taxi servicing area ("agglomération d'appartenance") as long as the ride was ordered through the Taxi Coop Québec app.

New remunerated passenger transportation services are springing up thanks to new web technologies and a desire to see the industry embrace the future. A new kind of service offer came to Québec with the arrival of Uber. The launch of the pilot project for remunerated passenger transportation services ordered exclusively by mobile application meets the emerging needs of the public.

Transportation for people with disabilities

To improve the capacity of disabled people to travel independently, a multidisciplinary study was carried out from 2013 to 2016 by the Université Laval, with the active participation of the Institut de réadaptation en déficience physique de Québec (IRDPOQ) and the Ville de Québec. The goal was to design and develop a multimodal technological mobility assistance solution for people who use manual wheelchairs or four-wheeled scooters in the urban environment. Using an interactive app called MobilisIG, people with reduced mobility can access information about real-time accessibility from their mobile phones.

Freight transportation

Freight transportation has not been overlooked in the shift forward. The CargoMobile app allows truckers to find the most efficient route to their destination, based on traffic conditions in Montréal.

In its parking policy, published in June 2016, the Ville de Montréal announced that it plans to determine where deliveries and pickups should take place, even for short periods. Using technology, the various drivers will be informed of available spaces in real time. To promote "last mile logistics," the creation of an urban distribution centre (CDU – centre de distribution urbain) is currently under study.

Trends and outlook to 2030

New forms of mobility are emerging, shaped by new technologies. They are the source of great changes in the way transportation is used. Their common objective is to make travel easier and promote access to services for all residents.

With the rise in digital power, the aggravation of problems associated with the congestion or desertion of certain geographic areas, increasingly nomadic service needs, an increasingly mobile population and the desire to increase the social participation of disabled people, new forms of mobility offer a very positive outlook for users as well as great business opportunities for innovative businesses.

At the same time, resource pooling is becoming more common, in terms of both the physical sharing of equipment, such as car sharing and self-service transit options (such as Bixi and AutoMobile) and the sharing of information over applications that allow people to inform other users about the status of transit lines and the presence of an accident or roadwork, for example.

The changes underway are converging and moving toward a future mobility that will be clean, collaborative, smart, accessible, independent, connected and integrated.

Trend 1: Shared electric cars

There are many benefits to shared electric cars. First, instead of owning a car in a specific place, with the responsibility for parking and maintenance, the user has access to a variety of models of different types and sizes, in increasingly extensive territories, which allows them to meet multiple needs.

Then, even though shared electric cars travel on public roads and can contribute to congestion, the fact that they are electric makes them preferable to gas-powered cars, because they produce no CO₂ emissions. Car sharing services also reduce the urban space required for parking, which changes the physiognomy of cities.

Finally, since the cost of the car depends on use, people who sign up for car sharing drive less. Instead of paying to drive to the corner store or the mall a few streets away, they take their bikes or walk.

But car sharing will only be adopted if it is easy and flexible. The business models must provide reservation systems that can be accessed on any platform and that are capable of adapting to different situations (e.g., extending a rental) and that can be integrated with other transportation means and services available in the area.

Trend 2: Mobility as a service: Integrated, customized mobility

New methods and new business models that offer consumers an integrated, customized transportation offer without necessarily having to own a vehicle are a growing trend in urban areas. With the improvement in planning and physical infrastructures that makes it easier to change from one means of transportation to another, it has become normal to use several mobility services. Different means of transportation are used together or alternately to allow the user to continue or speed up their movements. Gateways are created by partnerships between car sharing, public transit and bike sharing, making the daily commute easier.

In addition to reducing the number of vehicles on the road by optimizing the use of existing systems and new technologies, these models meet the needs of a new generation whose aspirations often do not include owning a car.

This model, known as “mobility as a service” or MAAS, decompartmentalizes transportation modes and services and offers enormous opportunities that public authorities would like to harness, especially to achieve the economic, social and environmental objectives of sustainable mobility. The user would have access, in the form of a package, to a custom mobility service that allows them to use a taxi, rental vehicle, bicycle or public transit for their travel. Using a smart phone, the user enters their destination and is given real-time options for getting there.

This service integration model requires better information sharing, however, and the standardization of reservation and payment systems, to make travel easier and more fluid. This scenario makes it less interesting to own and use a private car.

Trend 3: Transport on demand (ToD)

Mobility today involves day and night trips, during the week and on weekends, suburb-to-suburb trips and longer distances due to periurbanization and split trips. Traditional public transit is unable to satisfy these new mobility behaviours, however.

This is why certain public transit operators or communities are developing transport on demand, a flexible system that can be adjusted to each territory. From the virtual line that only operates when a reservation is made to the fixed-schedule zonal service that picks up the person at home for guaranteed, pre-defined destinations and schedules, a number of types of ToD can be offered. This is an alternative to traditional public transit to serve low-density areas, especially periurban or rural spaces, and meet specific needs such as those of disabled people, shared trips or service in areas with poor accessibility.

This is especially useful to replace an underused regular line. It also offers a strong social benefit, since it allows “unmotorized” people, vulnerable or not, to get around. The first initiatives were mainly intended to provide service to rural stores and markets for seniors. Today, ToD is offered to a broader public, for many travel reasons: entertainment, study, administrative procedures, errands, etc.

ToD is generally designed, defined and managed by a municipality or RCM. Service provision is then entrusted to carriers or taxi drivers chosen through a call for offers.

This model is sometimes rounded out by new alternative and cooperative modes of transportation that emerge more locally, supported by digital technology (blockchain⁴) such as rideshare systems that directly connect drivers and passengers. The drivers are free to set their own rates, determine which means of payment they accept and offer additional services such as delivery or roadside assistance. `Zooz, a young Israeli company, is an example of a transportation system with no intermediary and no central structure that embraces fair sharing, with no exchange of money.

Trend 4: Information in real time

Even though the quantity of digital information continues to increase, it is still largely under-analysed and under-used (lack of information sharing among operators). Information exchange is crucial, however, to optimize the road network, improve its safety and encourage the public to shift to new modes of transportation.

In light of the diversity of transportation means and services, the complexity of mobility options (several different options for a single trip) and the goal of reducing trip length, the availability of information on routes and schedules is a key success factor for encouraging the use of public transit or new mobility, in any form. Quality of information and speed of access are improved today with the use of new information and communications technologies. An uninterrupted information chain on various platforms must be available to the user, before their departure, during the trip and at intermodal stations.

Route calculators that combine various transportation services and allow users to buy their tickets from home using contactless ticketing are becoming the norm, as is real-time travel information at public transit stops and stations.

Likewise, the analysis of trip data, collected in real time with smart phones, such as the volumes and trajectories of pedestrians, bicycles, cars, buses and trucks, can identify places that are overcrowded or underused, anticipate the consequences of the closure of certain thoroughfares and detect dangerous turns or intersections to increase safety on the roads.

⁴ A blockchain is a distributed, transparent, secure database that functions without a central control organ.

The freeware FixMyStreet allows residents to use an interactive map to inform their local authorities about problems that need to be solved in their neighbourhoods: potholes, poor lighting, unsafe streets, etc. These “web and mobile services” have in common the fact that they were created, funded and managed by the public itself.

The positive and intelligent use of this information (big data) for the benefit of citizens, cities and the whole of society enhances the social acceptability of digital technology.

Trend 5: Autonomous and connected vehicles

With the new technologies at their disposal, vehicle manufacturers are going even further and building the cars of the future – autonomous and connected vehicles. A number of manufacturers have announced they will be ready by 2020. The obstacle to the arrival of these vehicles on the roads is mainly related to preparing the ecosystem for the upheaval: regulation, infrastructures, economic sectors.

This unprecedented revolution will allow new urban mobility to achieve a critical mass of users, which will boost the expansion of networks and services. Robotaxis, shuttles, shared cars: these vehicles may be driving around cities by 2030 and offering more mobility options that combine comfort, availability and speed.

The urban landscape and traffic will be considerably changed if these vehicles are reserved for shared mobility. Access to cities by these vehicles will have to be controlled to avoid the saturation of the road network by autonomous cars that are always driving, as some drivers will prefer to leave their cars driving around instead of paying for parking. Used as group shuttles or cars on demand on reserved sites, these electric self-driving vehicles, available 24/7, could help convince the last holdouts to take public transit.

While awaiting a more specific legislative framework, many cities are putting together innovation solutions that will allow transit operators to test autonomous vehicles. This is the case in Lyon and Strasbourg, in France, and Las Vegas, in the United States, which are testing the Navya shuttle made by the French company Keolis.

From January to April 2017, Paris established a new experimental link with two autonomous and electric shuttles, made by a young Toulouse company called EasyMile, on the Charles-de Gaulle bridge, to connect the Austerlitz and Lyon train stations. One of the underlying objectives for these shuttles is to improve the “first and last mile” of the journey.

In terms of freight transportation, several demonstrations of autonomous and semi-autonomous trucks are underway, mainly in Europe, by truck manufacturers Iveco, Mercedes, Volvo and Scania. In Canada, cooperative truck platooning was tested in August 2017 at the Centre d’essais pour véhicules automobiles (motor vehicle test centre) in Blainville. By reducing the aerodynamic drag and the space between vehicles, travelling in a platoon (several vehicles following each other very closely), using wireless communications and automation, would save fuel and improve traffic flow and road capacity, as well as road safety.

Autonomous vehicles are not yet ready to go everywhere, which is why more and more experiments are underway. Besides the technological advancements it is hoped they will provide, these tests are of pedagogical interest for the user and the public authorities.

Trend 6: Other technological progress

In the longer term, other technologies may arise in the transportation landscape, including “flying machines.” A number of laboratories are trying to achieve liftoff for vehicles (magnetic levitation). The most advanced project is the aircraft manufacturer Airbus CityAirbus, an autonomous electric flying taxi with the first tests scheduled for late 2018. In March 2017, at the International Motor Show in Geneva, the company presented Pop.Up, a modular urban vehicle that can move on the ground or in the air.

Meanwhile Italian designer Tomasso Gecchelin presented Next, electric, autonomous, modular capsules that can attach to one another and detach en route.

Uber also announced a partnership with NASA to develop flying taxis. Demonstrations of the UberAir program will begin in 2020 at three pilot sites, Los Angeles and Dallas in the United States and Dubai in the United Arab Emirates.

Alongside these initiatives, the development of the Hyperloop project launched in 2013 by Tesla boss Elon Musk is going well. This project offers a new type of transportation in capsules propelled at very high speed through low-pressure tubes. The capsule is held in the air using an electric magnetic levitation system and could achieve speeds of 1,200 km/h. Tests were held in July 2017 in the Nevada desert in the United States, where a 1-km tube was built. The first line could be in service by 2021. Of ten international Hyperloop proposals that were put forward, only the Montréal-Toronto connection proposed by the Canadian subsidiary of US engineering giant AECOM was retained.

Finally, outside cities, the roads of tomorrow will be smart (electric recharging, connections for data transfer), offer safety functions (information, guidance) and may give priority to public transit and vehicles occupied by multiple passengers or guide road users to alternative routes. They will also be more sustainable (self-diagnosis of the infrastructure using sensors, etc.).

2. Sustainable Mobility Issues Related to New Mobility

Issue 1: New mobility integrated into transportation systems

The integration of different transportation offers, including new forms of mobility that are often managed by private companies, is an essential condition for encouraging the public to switch to more sustainable mobility. Mobility must be offered to citizens as a service (MAAS).

Given the number and diversity of players in the transportation industry, however, integrating all these services may be complicated: information must be shared (open data), processes must be standardized, a single pricing strategy must be established, and the services must be completely interoperable. Using a single card, the user must be able to access several transportation services for a single trip or multiple routes.

The governance for operating an integrated model may also be an important issue, as the businesses in the sector operate under different regulatory frameworks (public vs. private transport).

In Montréal, a first step was taken with the creation of the Autorité régionale de transport métropolitain (ARTM), an umbrella organization for all public transit services in Greater Montréal. The ARTM is responsible for planning, organizing and financing the services, and it encourages the integration of transportation services, including active transport and ridesharing.

Finally, the accessibility for the most vulnerable people to the new mobility integrated into the transportation systems will also be a matter for consideration. Mobile applications will have to include “spoken” options for non-seeing people.

Issue 2: Emergence of new transportation models

New transportation models are one means of responding to the social and environmental imperatives in Québec. Québec is very large, and realities differ from region to region. A single model will not be appropriate. Innovation must be encouraged, since new technologies and resulting methods are obliging various transportation sectors to redefine themselves and review their practices.

Québec has many young companies in the digital technology sector that can put forward innovative solutions that are suitable for Québec’s situation, that respond to problems experienced elsewhere in the world and that replace the private car model or the individual merchandise delivery model. New transportation models for people and goods, particularly in the urban environment, can help improve traffic flow and optimize the use of public space.

Finally, in light of the rapid advancements in technology, the search for new, credible and appealing solutions must be ongoing. The introduction of these new models transforms the sector and, in some cases, the legislative and regulatory framework will have to change to make way for them. In these cases, protecting the collective interests of Québec will be an issue.

Issue 3: Ignorance about the benefits of new mobility

In North America, mobility habits and behaviours are deeply anchored. For many people, car ownership is synonymous with freedom. Awareness, promotion and communications efforts are required to inform the public about the various options available and show the many benefits (economic, practical, efficiency, etc.) of the new forms of mobility. In the coming years, more and more of the vehicles on the roads will shift from privately owned to on-demand use.

3. 2018-2023 New Mobility Action Plan

Issue 1: New mobility integrated into transportation systems

Objective: Offer citizens a package of interrelated, efficient, fast and comfortable mobility services

INTERVENTION PRIORITY 1.1: ENCOURAGE TRANSPORTATION SERVICE OPERATORS TO WORK TOGETHER

Measure 1: Present MAAS through a regional tour

Mobility as a service (MAAS) means putting the user at the heart of transportation services and offering customized mobility solutions based on their needs. This is a new approach in transportation, which combines various means to offer unique and accessible mobility on demand. The users access the services through a unique account by purchasing a monthly subscription. A single application allows them to check schedules, find multimodal transportation offers, make reservations and pay for their chosen trip.

This system is still in very limited use around the world, because it requires complete integration of the different transportation services. In Québec, no projects of this type have been launched.

Measure 1 will present the model to transportation networks and service operators to encourage them to consider increased collaboration and transparency, for the benefit of users and society in general (social and environmental benefits).

- Indicator:** Number of operators met
- Target:** Meetings with main operators by 2021
- Budget:** \$200,000 over three years (additional funds)

Measure 2: Support the implementation of integrated systems (MAAS) – Studies and execution

Establishing a MAAS system is complex and requires the full cooperation of the various transportation players. Upstream studies are required to identify the stakeholders and systems in place and determine the obstacles to be overcome and the key success factors to leverage. Then, the development or implementation costs for the technological platform to support the system may be an important issue.

Measure 2 will create a financial assistance program to guide and support the mobility players that would like to set up such a system.

This program is for the transportation organization administrations, transit companies, municipalities or RCM. A private player may take part in a project but cannot be the leader.

The financial assistance may cover up to 50% of eligible expenses, to a maximum of \$2 million per project.

- Indicator:** Number of cities equipped annually
- Target:** 10 biggest cities in Québec equipped by 2023
- Budget:** \$8 million over five years (additional funds)

INTERVENTION PRIORITY 1.2: SUPPORT THE INTRODUCTION OF NEW ELECTRIC MOBILITY SOLUTIONS

Measure 3: Deployment of transport on demand

Transport on demand (ToD) is a public transportation service that only operates at the request of one or more clients (trip triggered by passenger reservation) to adjust to usage levels. It may be complementary to the regular lines or the only transportation service in low-density areas. It may therefore take very different forms and meet the specific needs of people who cannot use the regular services.

In Québec, public transit is concentrated mainly in urban and semi-urban areas, leaving vast swaths uncovered. Access to transportation services contributes to the economic and social development of a region. In the context of the ageing population, it can help counter the depopulation of the regions.

Measure 3 will support regional county municipalities (RCM) in the establishment of a transport on demand service in their territories. The program will help finance planning activities (studies) and service implementation (reservation platform).

- Indicator:** Number of administrative regions equipped
- Target:** At least one ToD per administrative region by 2023
- Budget:** \$5.1 million over five years (additional funds)

Measure 4: Deployment of shared mobility pilot projects

Shared mobility is an emerging field that seeks to resolve passenger and freight transportation issues such as GHG emissions, congestion and urban sprawl. Shared mobility includes solutions such as sharing cars and other vehicles, ridesharing, microtransit, shared parking and recharging stations.

Measure 4 will support projects that advocate facilitating the use of equipment and means of transportation available in a territory (private cars, fleet cars, bicycles, parking, recharging stations, etc.) by offering sharing platforms and encouraging residents to consume mobility as a service, rather than through asset ownership.

- Indicator:** Number of projects implemented
- Target:** 6 projects by 2023
- Budget:** \$7.2 million over five years (additional funds)

Issue 2: Emergence of new transportation models

Objectives: Economic development, increased knowledge, experience sharing

INTERVENTION PRIORITY 2.1: SUPPORT INNOVATION AND NEW BUSINESS MODELS

Measure 5: Support pilot projects to test autonomous electric vehicles

Measure 5 will allow the Ville de Montréal to conduct pilot projects with the goal of using autonomous electric vehicles to improve access to public transit. This initiative will allow the city to seize opportunities related to the advancement of this technology and make informed investment decisions for new transportation solutions.

- Indicator:** Number of projects
- Target:** 5 projects by 2023
- Budget:** \$5 million (additional funds)

Measure 6: Support the deployment of shared electric delivery projects

Freight transportation is energy-intensive and emits significant pollution and GHGs. Constant inventory turnover and online shopping generate increased parcel delivery in urban areas and more sparsely populated zones. The increase in delivery vehicle traffic compromises the residents' quality of life, and municipalities are seeking solutions to reduce its impact (noise, congestion, safety). Some cities go so far as restricting delivery services during the day.

Measure 6 will improve the efficiency of freight transportation through improved cooperation among the stakeholders. It will:

- Reduce the number of trucks on the streets and roads;
- Optimize vehicle use (loading);
- Reduce the cost of transportation;
- Reduce the negative impacts on public health, as urban deliveries are responsible for a significant share of the pollution in cities.

The program will support collaborative shared electric delivery projects and is geared for not-for-profit organizations (e.g., clusters, sector associations, retailer associations, etc.) as well as municipalities and RCMs. Projects submitted under calls for projects could be based on the use of light trucks or heavy vehicles.

Several types of projects could be considered:

- Networks based on operator cooperation to offer last-mile delivery;
- Networks based on cooperation among businesses in a geographic sector or based on specific activities to optimize vehicle loading and reduce operating costs;
- Governance, operations and business models for logistics platforms;
- Development/deployment of smart systems that are interoperable with the information systems of supply chain stakeholders, including the MTMDET and the cities; etc.

Indicator: Number of projects

Target: 4 projects by 2023

Budget: \$10 million over four years (additional funds)

INTERVENTION PRIORITY 2.2: DEVELOP AND SHARE KNOWLEDGE

Measure 7: Collect data for autonomous vehicles

The databases used to program autonomous and connected vehicles (ACV) are mainly comprised of information collected by American companies. At present, Québec does not have sufficient, relevant, reliable data to allow ACV to drive here safely.

To prepare for the arrival of autonomous vehicles, this project seeks to build a customized open database for Québec. For this purpose, a hundred MTMDET vehicles in all regions of Québec will be equipped with cameras, onboard sensors and other location equipment.

Québec has significant expertise in artificial intelligence (AI), especially in deep learning, but there is very little activity related to vehicle applications due to a lack of data available to train neuron networks. To be effective, neuron networks need to be trained using a great deal of data covering all possible variations of a situation.

By providing university and college researchers (or even private researchers, possibly for a fee) with access to a large quantity of data, applications better suited to the situation in Québec could be created, stimulating economic development in this field.

Through this type of initiative, the MTMDET would become a pioneer among public administrations and secure its footing in the field of artificial intelligence, because currently no such database exists. It would be a unique opportunity to ensure that applications related to the transportation network function properly under a given authority.

There are many and varied potential benefits, the scope of which would be difficult to do justice to in advance, but they would include:

- Improve Québec's standing in the autonomous vehicle ecosystem;
- Train autonomous navigation systems to work better and more fully recognize the characteristics of Québec's environment (safer for our roads);
- Allow Québec startups to grow their operations without having to make a big investment in data creation;
- Have the capacity to develop applications for the MTMDET to automatically monitor the network, etc.;
- Attract foreign players in the field.

This project will be steered by the Institut du véhicule innovant (IVI) and carried out in collaboration with the Centre de gestion de l'équipement roulant (CGER).

Indicator: % completion

Target: All roads in Québec scanned by 2023

Budget: \$1.5 million over four years (additional funds)

Measure 8: Support the technical monitoring of autonomous and connected vehicle demonstrations (shuttles or car sharing) on public roads

The arrival of autonomous and connected vehicles represents a major change in the field of personal and freight transportation. With the rapid advances in technology, driverless vehicle could be on our roads by 2025. In addition to the regulatory issues for governments, having autonomous vehicles on the public roads will lead to many challenges, such as the interaction of the vehicles and pedestrians, adaptation to the environment and climate conditions in Québec and communications with the infrastructure.

Measure 8 will provide research centres (public or private) with support to technically monitor demonstrations and draft study reports. The demonstrations may be carried out by private companies or transit corporations.

Indicator: Number of projects carried out

Target: 2 projects by 2021

Budget: \$500,000 over two years (additional funds)

Issue 3: Ignorance about the benefits of new mobility

Objectives: Inform the public about the new models available, raise awareness about the impact of their mobility choices and encourage people to use them

INTERVENTION PRIORITY 3.1: PROMOTE TRANSITION TO NEW MOBILITY SERVICES

Measure 9: Support the introduction of car sharing services in businesses

To offer an alternative to current public transit services and private car ownership, Measure 9 will support the launch of car sharing projects using electric vehicles for employees within a company or a group of neighbouring companies (e.g., in an industrial or technology park).

These projects will expand the range of mobility solutions offered to workers and encourage the use of vehicles that are more environmentally friendly. These vehicles could be used to meet professional and personal needs.

The members of a car sharing service would share the use of a fleet of vehicles. The reservations could be made with a short lead time, by phone, reservation terminal or internet. Such cars are accessed independently, generally using a chip card that unblocks a key box or an onboard computer in the car. The car sharing service would be used for short trips with proportional prices based on duration of use and kilometrage.

- Indicator:** Number of projects
- Target:** 5 ongoing projects by 2022
- Budget:** \$1.5 million over three years (additional funds)

INTERVENTION PRIORITY 3.2: PROMOTE NEW MOBILITY

Measure 10: Hold an annual communications campaign

As new forms of mobility emerge, the transportation sector is evolving rapidly. These new services are often not well known, and their benefits need to be communicated to the public.

- Indicator:** Number of campaigns held per year
- Target:** 5 campaigns by 2023
- Budget:** \$3 million over five years (additional funds)

SUMMARY TABLE

New Mobility 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: New mobility integrated into transportation systems								
Intervention priority 1.1: Encourage transportation service operators to work together								
Measure 1: Present MAAS through a regional tour (MTMDET)	Number of operators met	Meetings with main operators by 2021	X					
Measure 2: Support the implementation of integrated systems (MAAS) – Studies and execution (MTMDET)	Number of cities equipped annually	10 biggest cities in Québec equipped by 2023	X					
Intervention priority 1.2: Support the introduction of new electric mobility solutions								
Measure 3: deployment of transport on demand (MTMDET or MAMOT)	Number of administrative regions equipped	At least one ToD per administrative region by 2023	X					
Measure 4: Deployment of shared mobility pilot projects (MTMDET)	Number of projects implemented	6 projects by 2023	X					
ISSUE 2: Emergence of new transportation models								
Intervention priority 2.1: Support innovation and new business models								
Measure 5: Support pilot projects to test autonomous electric vehicles (MAMOT)	Number of projects carried out	5 projects by 2023				X		
Measure 6: Support the deployment of shared electric delivery projects (MTMDET)	Number of projects	4 projects by 2023		X				
Intervention priority 2.2: Develop and share knowledge								
Measure 7: Collect data for autonomous vehicles (MTMDET, CGER)	% of roads scanned	All roads in Québec scanned by 2023	X					

New Mobility 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	
Measure 8: Support the technical monitoring of autonomous and connected vehicle demonstrations (shuttles or car sharing) on public roads (MTMDET, SAAQ)	Number of projects carried out	2 projects by 2021	X						
ISSUE 3: Ignorance about the benefits of new mobility									
Intervention priority 3.1: Safely oversee the introduction of autonomous and connected vehicles									
Measure 9: Support the introduction of car sharing services in businesses (MTMDET)	Number of projects	5 ongoing projects by 2022	X						
Intervention priority 3.2: Promote the new forms of mobility									
Measure 10: Hold an annual communications campaign (MTMDET)	Number of campaigns held per year	5 campaigns by 2023							X