

Reference document

# REDUCED DEPENDENCE ON FOSSIL FUELS IN MONTRÉAL

**VILLE DE MONTRÉAL**

**PRODUCTION**

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# ENERGY AND CLIMATE - DEFINITIONS AND POPULARIZATION OF CONCEPTS

## WHAT IS A FOSSIL FUEL?

A fossil fuel is a fuel derived from the combustion of hydrocarbons (organic compounds composed of carbon and hydrogen). The fuel is designated as “fossil”, since the hydrocarbons were extracted from the Earth’s underground geological formations where they had been buried for millions of years. Fossil fuels are not renewable, given that their supply on Earth is limited. The combustion of hydrocarbons releases greenhouse gases (GHG), which contribute to climate change. The adjacent table shows a few examples of fossil fuel sources and their use in Montréal.

SOURCE	EXAMPLE OF USE
Gasoline	Car fuel
Diesel	Truck fuel
Fuel oil	Heating
Coal	Production of cement in industries <sup>1</sup>
Natural gas	Heating, cooking
Propane	Barbecue
Butane	Camp stove



1. NATURAL RESOURCES CANADA. *Coal – Other information*, [Online], updated January 16, 2015. [[www.nrcan.gc.ca/mining-materials/markets/commodity-reviews/2012/14377](http://www.nrcan.gc.ca/mining-materials/markets/commodity-reviews/2012/14377)] (Consulted October 7, 2015).

## WHAT IS A RENEWABLE ENERGY?

### WHAT ARE THE DIFFERENT SOURCES OF RENEWABLE ENERGY?

Unlike fossil fuels, renewable energies are inexhaustible energies on a human timescale. They can be provided by the sun, the wind, the Earth's heat, the fall of water from a reservoir created by a dam, the tides or even plants through biomass combustion.

The following table describes the main sources of renewable energies and their relevance as a solution to reduce our dependence on fossil fuels in the agglomeration of Montréal (see the Portrait of fossil fuel consumption in Québec and possible solutions in page 8 for further explanations).

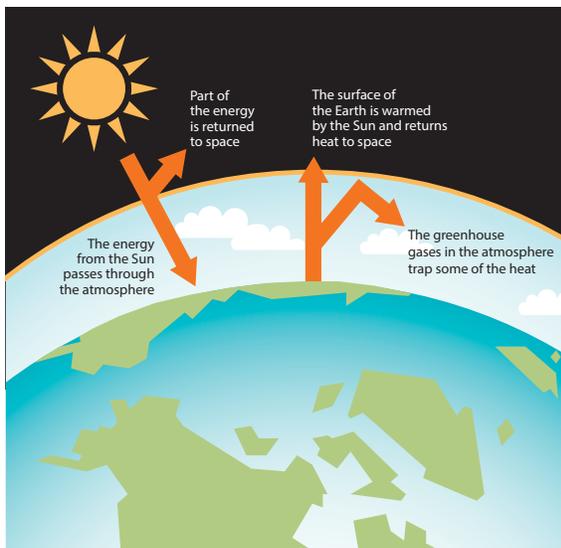
SOURCE	HOW	PRODUCT	IF HELPFUL TO REDUCE MONTRÉAL'S DEPENDENCE ON FOSSIL FUELS?
Solar	Photovoltaic cells	Electricity	No, as our electricity is already derived from a renewable energy source (hydroelectricity).
	Solar thermal collectors	Heat	Yes, if used to replace a solid fuel heating system.
	Passive solar <sup>2</sup>	Heat	Yes, if used to replace a solid fuel heating system.
Wind	Wind turbines	Electricity	No, as our electricity is already derived from a renewable energy source (hydroelectricity).
Hydraulic	Hydroelectric plants	Electricity	Québec's electricity is mainly derived from hydraulic energy (hydroelectricity).
	Marine turbines	Electricity	No, as our electricity is already derived from a renewable energy source (hydroelectricity).
Biomass	Fermentation or combustion of organic matter	Biogas Biofuels	Yes, if used to replace a solid fuel.
Geothermal	Heat pumps	Heat Air conditioning	Yes, if used to replace a solid fuel heating system.

<sup>2</sup> Integrating passive solar energy into the design of a building allows for the use of sunlight for lighting purposes, and of the sun's heat for heating during cold periods, while preventing that same heat from entering the building in warm periods, in order to reduce the use of other energy sources for lighting, heating or air conditioning purposes.

## WHAT IS THE GREENHOUSE EFFECT? HOW DOES IT RELATE TO CLIMATE WARMING?

The Earth's atmosphere can be represented by a transparent veil that partly captures the heat emitted by the Earth (a phenomenon designated as "greenhouse effect"). More accurately, this "veil" lets the sun's rays from space pass through, but captures part of the infrared radiation (heat) reemitted by the Earth towards space. Thanks to the greenhouse effect, the Earth's average temperature is 15 °C rather than -18 °C.

The quantity of heat captured depends on the concentration of certain gases, called greenhouse gases, such as carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) or nitrous oxide (N<sub>2</sub>O). Since the industrial revolution, the human population has considerably increased the concentration of these gases in the atmosphere, essentially through the combustion of fossil fuels and deforestation. As a result, the greenhouse effect has increased and will continue to do so. If no greenhouse gas reduction measures are implemented, the average temperature on Earth could increase by more than 4 °C by the end of this century. Such climate conditions have never been encountered since the beginning of mankind some 3 million years ago, which begs the question as to how mankind will adapt to these conditions.



## WHAT ARE THE CONCRETE IMPACTS OF CLIMATE CHANGE?

Climate change related to the increase in greenhouse gases has several impacts. The most obvious one is an increase in the global average temperature, accompanied by an increase in the frequency of heat waves. Another consequence is a modification of the hydraulic cycle with, in particular, more frequent intense precipitations. This is because warmer air contains more water vapour. In Montréal, one can observe a longer summer season, a shorter winter season, an increase in abundant rainfalls and heat waves, fewer snowfalls and an increase in freeze-thaw occurrences.

Similarly to air pollution, climate change can have an effect on human health. For instance, in Montréal between 1983 and 2013, 423 deaths were caused by heat waves. Also, an extended summer season has resulted in an increase of pollen-related allergies.

In addition to their repercussions on human health, climate change can impact infrastructures (e.g., potholes following a freeze-thaw) and the environment (e.g., lesser biodiversity, pollution of waterways due to sewer overflows).

## WHAT IS THE DIFFERENCE BETWEEN THE WEATHER AND THE CLIMATE? HOW DO WE FORECAST THE CLIMATE IN 50 YEARS IF WE ARE UNABLE TO PREDICT THE WEATHER IN 10 DAYS?

“Climate is what you expect, weather is what you get.” This sentence from mathematician and meteorologist Edward Norton Lorenz pretty well summarizes the difference between weather and climate. Taking Montréal as an example, on September 8, 2015, the average temperature for the day was 24.2 °C. This was the result of certain weather conditions that prevailed in the Montréal region in preceding days. If we focused instead on the average temperature of all September 8ths in each of the years in the 1981 to 2010 period, the “climate” average was 17.8 °C. The climate thus corresponds to the recorded weather averages over several years.

Montréal’s climate is influenced by well-known major atmospheric movements such as the polar jet stream, the cold and dry air of the Arctic regions in the winter or the hot and humid air of the Gulf of Mexico in the summer. These average climate conditions are supplemented by minor air movement disturbances that are impossible to measure extensively. It is these minor disturbances that explain why it is more difficult to predict the weather than the climate.

Also, the Earth’s global climate essentially depends on the Sun’s energy and the concentration of greenhouse gases, factors that are well understood. That is why climate model projections are more reliable when dealing with the climate in 50 years.

## WHAT IS A CLIMATE MODEL?

Climate models consist in very complex software applications that integrate mathematical equations of physics and chemistry describing the atmosphere, the ocean and continental surfaces. These equations represent the main exchanges of energy and matter that preside over meteorological, hydrological or biological phenomena. These models are able to simulate the speed and direction of winds and marine currents, but also the evolution of temperatures and precipitations, or the features of various plant covers. For additional details on the contents of climate models, an animated explanation (in French only) is available at the following internet address: [www.ipsl.fr/Mediatheque/Multimedia/Animation-sur-la-modelisation-climatique](http://www.ipsl.fr/Mediatheque/Multimedia/Animation-sur-la-modelisation-climatique).

## REFERENCES FOR FURTHER INFORMATION

- [ville.montreal.qc.ca/portal/page?\\_pageid=7237,75083582&\\_dad=portal&\\_schema=PORTAL](http://ville.montreal.qc.ca/portal/page?_pageid=7237,75083582&_dad=portal&_schema=PORTAL)
- [www.ouranos.ca](http://www.ouranos.ca)

# PORTRAIT OF FOSSIL FUEL CONSUMPTION IN QUÉBEC AND POSSIBLE SOLUTIONS

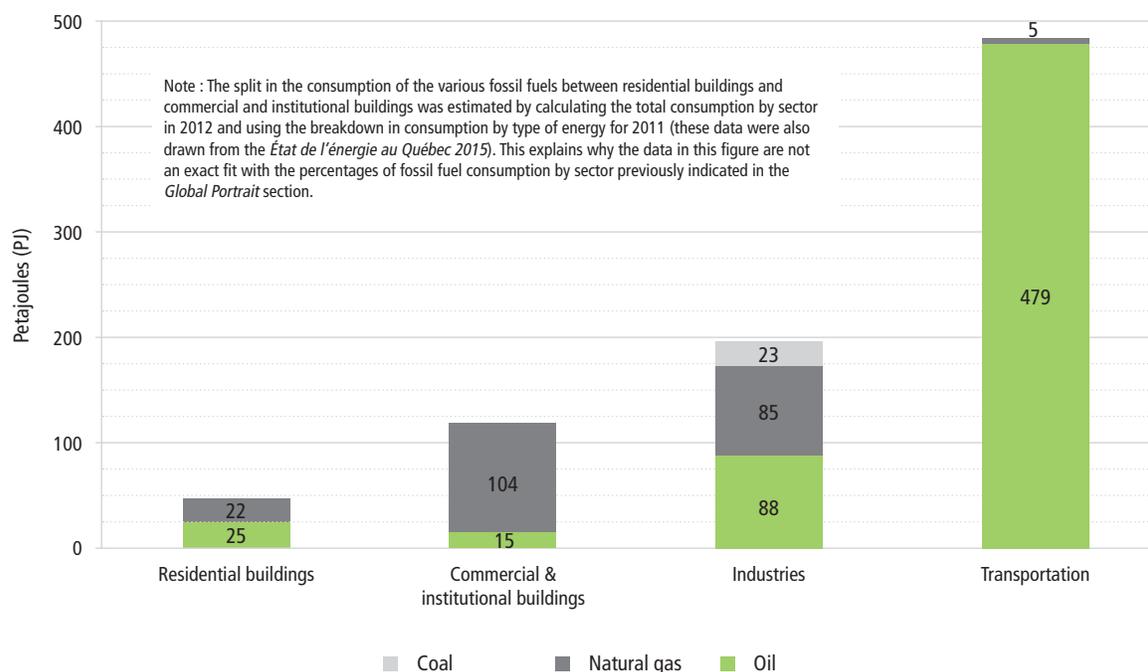
## GLOBAL PORTRAIT

51% of the energy consumed in Québec<sup>3</sup> is derived from fossil fuels (oil, natural gas and some coal). The rest comes from renewable energies (hydroelectricity, wind and biomass energy). Fossil fuel consumption breaks down as follows between these four sectors:

- 58% in transportation,
- 23% in industries,
- 14% in commercial and institutional buildings,
- 5% in residential buildings.

The figure below details the type of fossil fuel consumed by sector.

QUÉBEC CONSUMPTION OF FOSSIL FUELS BY SECTOR IN 2012



3. The data for Montréal are not available. All of the data presented in this figure are drawn from the *État de l'énergie au Québec 2015* produced by the *Chaire de gestion du secteur de l'énergie* of HEC Montréal ([energie.hec.ca/publications/etat-de-lenergie-au-quebec](http://energie.hec.ca/publications/etat-de-lenergie-au-quebec)).

## MONTRÉAL'S SPECIFICITIES IN REDUCING THE DEPENDENCE ON FOSSIL FUELS

### ***Why is it that other cities' oil exit programs cannot be directly applied to Montréal?***

In Québec, we're fortunate in that our electricity is derived in a proportion of almost 99% from a renewable energy, namely hydroelectricity. Consequently, and contrary to most other locations in the world engaged in a transition toward sustainable energy, implementing renewable electricity production programs (for instance electricity from wind or solar power) would not contribute to reducing our consumption of fossil fuels.

### ***Why is the relevance of municipalities' actions on the industrial sector limited?***

Municipalities have few levers to directly influence the energy choices of industries, among other reasons, because of their restricted regulatory powers in this matter. Also, industry's total energy consumption has decreased since 2004, while energy intensity (energy consumption relative to the gross domestic product) has been on a downward trend since the beginning of the 90s. This is explained by the fact that two major incentives are driving companies to reduce their energy consumption, particularly their consumption of fossil fuels: an optimization of their costs to improve their profitability, and Québec's *Règlement sur le système de plafonnement et d'échange de droits d'émission de gaz à effet de serre* (Regulation respecting a cap-and-trade system for greenhouse gas emission allowances) in force since 2013. For these reasons, the relevance of actions by the municipal level in this field is limited.

## PROMISING AVENUES TO REDUCE MONTRÉAL'S DEPENDENCE ON FOSSIL FUELS

### ***Priority number 1: rethinking transportation***

As indicated in page 8, the transportation sector consumes more fossil fuels than all of the other sectors combined. Consequently, it's in this sector that the greatest gains can be achieved in terms of reducing the use of fossil fuels.

To reduce fuel consumption in the transportation sector, both in the transportation of people and goods, two avenues can be considered:

1. favor transportation modes that consume less fuel on the basis of the distance travelled and by passenger or by quantity of goods transported, such as public transit, active transportation (walking, cycling, etc.), carpooling, electric vehicles, trains or boats;
2. reduce the distances to be travelled, for instance by developing more densely populated mixed-use neighbourhoods, by encouraging telecommuting or reducing the distances to be travelled by goods by prioritizing short distribution channels and local products.

### **Replace fossil fuels by second or third generation biofuels**

Biofuels are fuels produced from biomass (plant or animal matter). Once burned, biofuels release GHGs like carbon dioxide (CO<sub>2</sub>). However, these gases are not an additional source of carbon in the atmosphere as are fossil fuels, since they would have been released in any case during the decomposition of the plant or animal matter. That is why they are not recorded in greenhouse gas emission inventories and are considered to be zero emission GHG fuels.

First generation biofuels are produced from plant matter expressly cultivated for the purpose of producing biofuels (corn, beet, colza, sunflowers, etc.). Their use is controversial, since they use foods that could have served for human nutrition and, because of the laws of offer and demand, they may increase the price of foodstuffs. The increased demand for these foodstuffs could also result in the deforestation of some land to expand culture areas.

Second generation biofuels are produced from plant waste or residues. For example, biomethane can be produced from a municipality's organic waste and, ultimately, injected into the natural gas distribution network.

Third generation biofuels are produced from micro-organisms (algae or yeasts). This fuel stream is still at the development stage. It is not yet ready to be profitably exploited.

### **Reduce the consumption of fossil fuels for heating**

The fossil fuels used in residential, commercial and institutional buildings are mainly used for the heating of these spaces and of their water. To reduce their consumption, two avenues can be considered:

1. replace the fossil fuels (oil and natural gas) by renewable energies (hydroelectricity, biomass, etc.);
2. reduce the consumption of fossil fuels by implementing energy efficiency measures.

On August 27, 2009, the Montréal Agglomeration Council unanimously adopted the *Plan directeur de gestion des matières résiduelles – PDGMR* (Waste Management Master Plan). The Plan provides for all buildings of eight dwellings or less to be served by a source separated collection of food residues. This measure of the Plan is underway and, in 2014, the food waste collection service was being offered to almost 100,000 households in eight boroughs and, by the end of 2015, an additional 100,000 households will also be served.

The *Stratégie montréalaise d'implantation de la collecte des résidus alimentaires 2015-2019* (Montréal strategy for the implementation of the collection of food residues), announced by the municipal administration in August 2015 is intended to complete the implementation of the collection process in all buildings of eight dwellings or less by 2019. The great majority of food residues will be processed in two anaerobic digestion centres provided for in the Plan. This process allows for an important quantity of organic matter to be recycled and to produce about 8 million m<sup>3</sup> of biomethane. This biogas can then be used to replace fossil fuels.

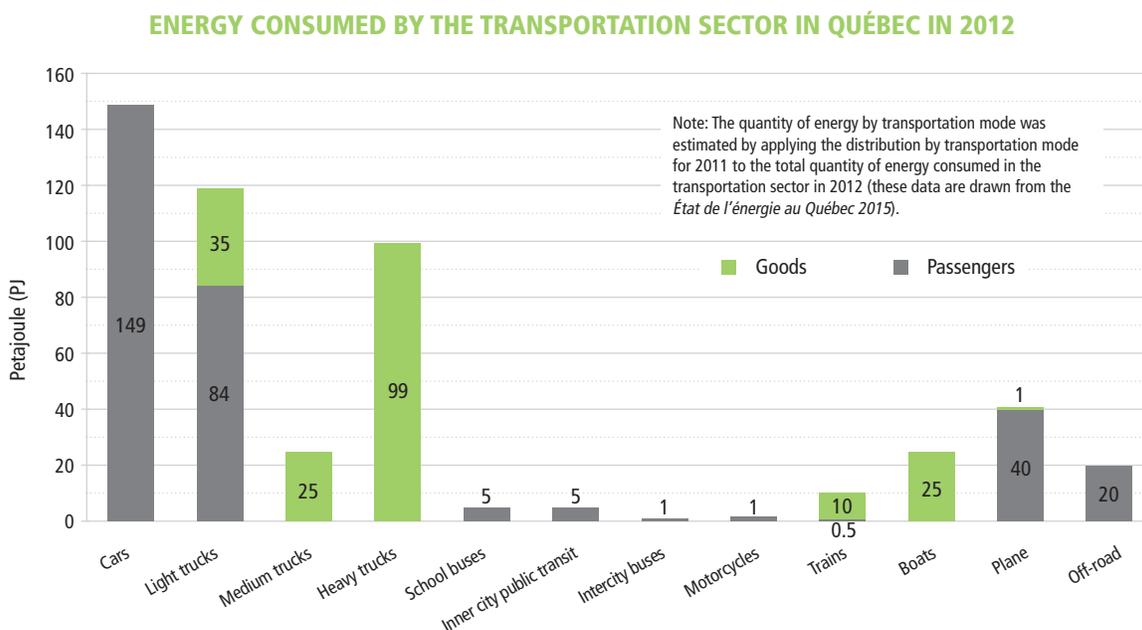
# TRANSPORTATION SECTOR

As mentioned in page 8, the transportation sector is responsible for 58% of the fossil fuels consumed in Québec.<sup>4</sup> Consequently, this sector offers the greatest potential gains in terms of a reduction in the use of fossil fuels. Two avenues are available to reduce fuel consumption in the transportation sector, both for the transportation of passengers and goods:

1. favor transportation modes that consume less fuel on the basis of the distance travelled and by passenger or by quantity of goods transported, such as public transit, active transportation (walking, cycling, etc.), carpooling, electric vehicles, trains or boats;
2. reduce the distances to be travelled, for instance by developing more densely populated mixed-use neighbourhoods, by encouraging telecommuting or reducing the distances to be travelled by goods by prioritizing short distribution channels and local products.

## PORTRAIT OF ENERGY CONSUMPTION IN THE TRANSPORTATION SECTOR

Of all the energy consumed in the transportation sector in Québec, 97.6% comes from fossil fuels (96.6 % of oil and 1.0 % of natural gas). The remaining 2.4 % is sourced from electricity. The figure below details the breakdown of energy consumption between the transportation of passengers and goods, and by transportation mode, irrespective of the energy sources.



4. The data for Montréal are not available. Unless otherwise indicated, the data presented in this fact sheet are drawn from the *État de l'énergie au Québec 2015* produced by the *Chaire de gestion du secteur de l'énergie* of HEC Montréal ([energie.hec.ca/publications/etat-de-lenergie-au-quebec](http://energie.hec.ca/publications/etat-de-lenergie-au-quebec)).

## TRANSPORTATION TRENDS

This section presents a few of the trends observed in recent years in the transportation sector. The focus is on road transportation, since more than 80% of the energy consumed in the transportation sector in Québec is used by various road vehicles.

The number of vehicles in circulation is increasing and this, at a faster rate than that of the population. For example, from 2006 to 2013, the number of private passenger vehicles registered in Montréal increased by 8.1%<sup>5</sup>, whereas the population increased by only 4.7 % in the same period<sup>6</sup>.

In Québec, since 1990, the distances travelled by vehicles declined by 8 to 10% for all road vehicle types, except for heavy trucks, whose average distance travelled increased by 5%. Many factors, of which the vigour of the economy, influence the distance travelled by heavy trucks. Consequently, this distance can vary significantly from one year to another.

Vehicles in the light truck category (sports utility vehicles and crossover vehicles) are gaining in popularity and now represent a greater proportion of the vehicles in circulation. In 1990, 64% of the vehicles registered on the Island of Montréal were automobiles and 14% were light trucks, whereas in 2009, these proportions were respectively of 44% and 25%. The proportion of heavy trucks is also on the increase, having progressed from 18% to 28% in the same period<sup>7</sup>.

The average consumption by vehicle has dropped. For private passenger vehicles on the Island of Montréal, this has slightly compensated for the increase in the number and size of light vehicles (automobiles and light trucks). However, because of the greater number of heavy trucks in circulation and the increase in the distance they travel, the consumption of energy in road transportation is rising<sup>8</sup>, and this, even if this type of vehicle is the one whose average consumption has improved the most, falling by 24% between 1990 and 2011 in Québec.



5. VILLE DE MONTRÉAL. "Nombre de véhicules en circulation", *Montréal en statistiques*, [Online]. [[ville.montreal.qc.ca/portal/page?\\_pageid=6897,67889677&\\_dad=portal&\\_schema=PORTAL](http://ville.montreal.qc.ca/portal/page?_pageid=6897,67889677&_dad=portal&_schema=PORTAL)] (Consulted September 16, 2015).

6. INSTITUT DE LA STATISTIQUE DU QUÉBEC. Le bilan démographique du Québec, [Online], 2014 edition, Government of Québec. [[www.stat.gouv.qc.ca/statistiques/population-demographie/bilan2014.pdf](http://www.stat.gouv.qc.ca/statistiques/population-demographie/bilan2014.pdf)] (Consulted September 16, 2015).

7. VILLE DE MONTRÉAL (2013). *Inventaire 2009 des émissions de gaz à effet de serre de la collectivité montréalaise*, Service de l'environnement, 70 pages. Also available on the Internet at the following address: [ville.montreal.qc.ca/pls/portal/docs/page/enviro\\_fr/media/documents/invent\\_collectivite\\_2009\\_vf.pdf](http://ville.montreal.qc.ca/pls/portal/docs/page/enviro_fr/media/documents/invent_collectivite_2009_vf.pdf).

## MONTRÉAL SPECIFICITIES

### *Transportation of passengers*

About one quarter of the population of Québec lives on the Island of Montréal. Such a population density in a relatively small territory is a boon to public transit and active transportation. Indeed, it's in Montréal that the proportional use of these transportation modes is the greatest in the Montréal Metropolitan region.

#### PROPORTION OF TRAVEL BY PUBLIC TRANSIT AND ACTIVE TRANSPORTATION IN THE GREATER MONTRÉAL REGION

	MORNING RUSH HOUR		COMPLETE DAY	
	PUBLIC TRANSIT	ACTIVE TRANSPORTATION	PUBLIC TRANSIT	ACTIVE TRANSPORTATION
Montréal	26.0%	14.5%	24.0%	17.5%
Longueuil	20.6%	7.3%	13.9%	7.8%
Laval	18.8%	5.2%	12.9%	5.4%
South shore	7.5%	6.9%	4.8%	6.7%
North shore	6.6%	5.9%	4.3%	6.0%

Source: SECRÉTARIAT À L'ENQUÊTE ORIGINE-DESTINATION. *Mobilité des personnes dans la région de Montréal. Enquête Origine-Destination 2013*, [Online], version 13.2a. [[www.amt.qc.ca/Media/Default/pdf/section8/enquete-od-2013-mobilite-personnes-region-montreal.pdf](http://www.amt.qc.ca/Media/Default/pdf/section8/enquete-od-2013-mobilite-personnes-region-montreal.pdf)] (Consulted September 21, 2015).

However, a picture of the territory of the Island in Montréal is far from being consistent. The central neighbourhoods are the most densely populated with a greater mixed-uses (dwellings, schools, businesses, work locations, etc.). The neighbourhoods in the eastern and western ends of the island are mainly comprised of residential sectors and some industrial areas less conducive to the use of public transit and active transportation. The table below presents the proportion of travel made by public transit and active transportation in different sectors of the Island of Montréal.

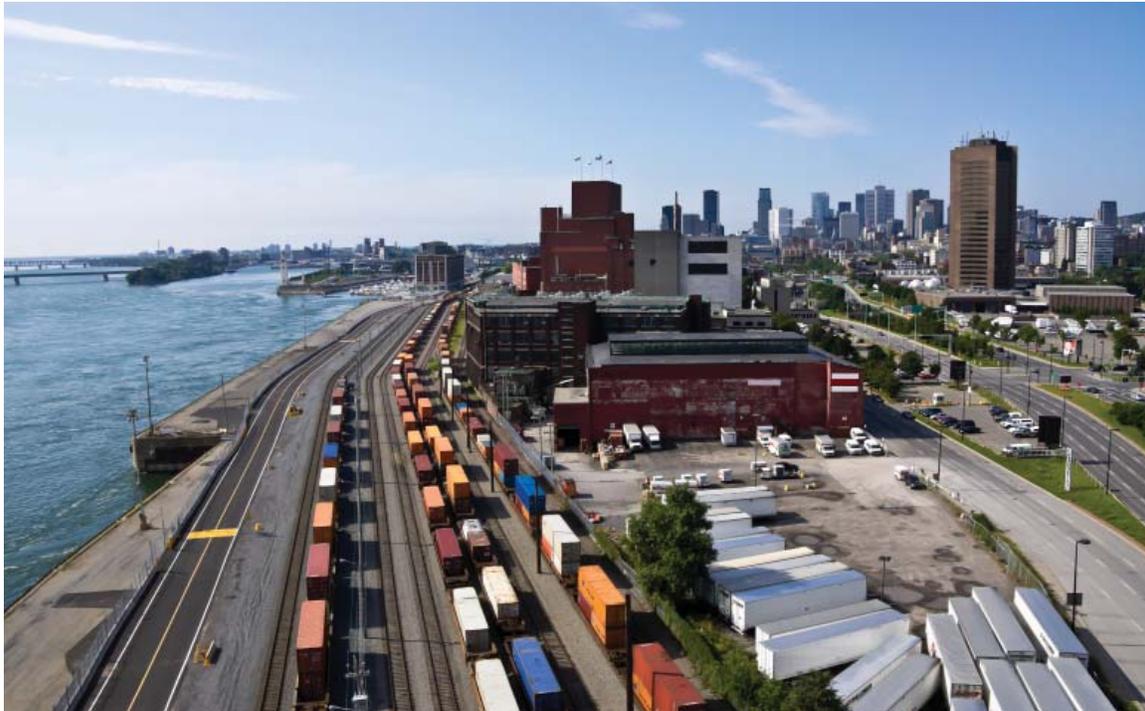
#### PROPORTION OF TRAVEL BY PUBLIC TRANSIT AND ACTIVE TRANSPORTATION IN THE CENTRE, EAST AND WESTERN SECTORS OF THE AGGLOMERATION OF MONTRÉAL

	MORNING RUSH HOUR		COMPLETE DAY	
	PUBLIC TRANSIT	ACTIVE TRANSPORTATION	PUBLIC TRANSIT	ACTIVE TRANSPORTATION
Centre of Montréal	29.0%	18.2%	27.7%	21.8%
East end of Montréal	24.0%	10.7%	20.0%	11.0%
West end of Montréal	21.0%	7.2%	16.0%	6.6%

Source: SECRÉTARIAT À L'ENQUÊTE ORIGINE-DESTINATION. *Mobilité des personnes dans la région de Montréal. Enquête Origine-Destination 2013*, [Online], version 13.2a. [[www.amt.qc.ca/Media/Default/pdf/section8/enquete-od-2013-mobilite-personnes-region-montreal.pdf](http://www.amt.qc.ca/Media/Default/pdf/section8/enquete-od-2013-mobilite-personnes-region-montreal.pdf)] (Consulted September 21, 2015).

### ***Transportation of goods***

There are generally more goods being transported on the territory of Montréal than elsewhere in Québec. Indeed, Montréal is a hub for the transportation of goods in North America, thanks to its port, its rail network belonging to the two most important railway companies in the country and its highway network. Consequently, many goods simply pass through Montréal without ever stopping on the island. Furthermore, the Québec distribution system of many companies relies on Montréal as a distribution centre. Goods are transited through Montréal warehouses before being redistributed to stores or directly to consumers elsewhere in Québec.



## **LIMITS TO THE POWERS OF VILLE DE MONTRÉAL**

### ***Governance***

Most measures that aim to reduce the consumption of fossil fuels in the transportation sector require the collaboration of many players for their implementation. Consequently, in many cases, the City will need to work collaboratively with the players involved (provincial and federal government, municipalities, boroughs, etc.) to implement projects of that nature.

### ***Financing***

Structuring measures in the field of transportation are measures that need to be implemented over the medium and long term. To be successful, these measures require an adequate, stable and sustainable financing. The sources of revenues of cities are presently limited. In Québec, these sources are established in the *Loi sur les cités et villes* (Cities and Towns Act). Their revenues are mainly derived from property taxes.

## PLANNED MEASURES BY VILLE DE MONTRÉAL

The City's vision for transportation consists in: "Offering the means of transportation to meet the needs of all Montrealers and making their agglomeration a pleasant place to live, a prosperous economic pole while respecting the environment. Toward this purpose, Montréal wishes to significantly reduce the use of personal vehicles through massive investments in public transit and active transportation such as the tramway, metro, performing bus, train, cycling and walking, and other better adapted uses of the automobile such as carpooling, car-sharing and the taxi." (*Plan de transport* (Transportation plan) 2008)

Montréal's urban planning documents and planning bylaws as well as its associated program of public investments all contribute, directly or indirectly, to the objective of reducing its dependence on fossil fuels.

These documents are based on orientations and objectives that are predicated upon the development of public transit and active transportation (cycling, walking), the offering of an efficient public transit service in employment sectors, the densification and diversification of the land use of the territory, the creation or maintenance of quality and complete environments. In sum, the intent is to attract and retain households in various Montréal neighbourhoods and thus reduce their dependence on the automobile.

The *Schéma de développement et d'aménagement de l'agglomération de Montréal* (Montréal agglomeration planning and development scheme) (Scheme) in force since 2015, the *Plan d'urbanisme de la Ville de Montréal* (Montréal Master Plan) (2004, revision expected in 2016) and the *Plan de transport* (Transportation plan (2008, also being revised)) all resolutely focus on reducing the dependence on the automobile. By the same token, the *Plan de réduction des émissions de gaz à effet de serre de la collectivité montréalaise 2013-2020* (Plan to reduce the greenhouse gas emissions of the Montréal community) suggests nine possible solutions to reduce the transportation sector's dependence on fossil fuels, as outlined in the table below.

POSSIBLE SOLUTIONS	ANTICIPATED REDUCTION (kt CO <sub>2</sub> -eq) *
1. Adequately finance GHG emission reduction projects in the field of transportation	Unquantifiable
2. Collect data allowing for a better assessment of factors influencing GHG emissions in transportation and of the measures to reduce them	Unquantifiable
3. Develop public transit	
4. Optimize parking	437
5. Manage the demand for transportation in an efficient fashion	
6. Develop active transportation	
7. Develop alternate means of transportation to solo driving (car-sharing and taxi)	0**
8. Reduce GHG emissions by vehicle	22
9. Facilitate the governance of transportation projects	Unquantifiable

\* Anticipated reduction relative to a business-as-usual scenario if the reduction measures are implemented by 2020.

\*\* No supplementary reduction expected; this is the reference scenario for 2020.

For each potential solution, the sections hereafter detail the suggested measures.

### **1) Adequately finance GHG emission reduction projects in the field of transportation**

As indicated previously, an efficient reduction of GHG emissions in the field of transportation is predicated upon sufficient financing from many sources: the federal and provincial governments, municipalities, boroughs, public transit agencies, etc. Among the funding levers available are the increase in the provincial budget dedicated to transportation, an increase in the gas tax and an indexation of vehicle registration taxes based on vehicles' cylinder capacity.

### **2) Collect data allowing for a better assessment of factors influencing GHG emissions in transportation and of the measures to reduce them**

Many means can be used to collect data allowing for a better understanding of mobility behavior and its impacts on GHG emissions. For example, the documentation accompanying the invoice for residential property transfer rights could include a link to an electronic survey on the travel patterns of the concerned households and the impact of their move on said patterns. The following information could be requested:

- the reasons for their move;
- their present and previous address;
- their present and previous place of employment if it has changed;
- information on the persons forming the present and previous household, if there have been any changes, and on their motorization.

During the development of new neighbourhoods, a survey similar to the regional Origin-Destination (OD) survey could be administered to residents. It is worthwhile mentioning that the *Direction des transports* of Ville de Montréal has started to assess the impacts of a few property development projects on mobility behavior. Similar information could also be collected from tenants, since 62% of households in the agglomeration are tenants.

### **3) Develop public transit**

Many measures, ongoing or under discussion, aim to develop public transit in Montréal:

- sustained increase in the municipal contribution to the STM since 2008 (\$409 M in 2015) allowing it to substantially enhance its service offering (+26% between 2006 and 2014) and resulting in a 15% increase of passenger traffic over the same period;
- implementation of 375 additional km of preferential measures for buses that already cover more than 200 km on the Island of Montréal;
- implementation of a bus rapid transit (BRT) on the Pie-IX Blvd. axis;
- extension of the blue metro line (5 stations), then of the orange line (3 stations) on the Island of Montréal;
- implementation of new train systems (light rail transit (LRT) or tram-train) between the downtown district and the western end of Montréal, and also from Angrignon station to LaSalle, Lachine and Dorval, including a shuttle between downtown Montréal and the airport;
- design of local mobility plans, for the boroughs and municipalities, that reflect the orientations of the Scheme and the Transportation plan at the local level, in order to ensure the tranquillity and safety of residential neighbourhoods, while improving access to the major activity poles.

#### **4) Optimize parking**

The Transportation plan promotes the elaboration of a parking policy for the territory of the agglomeration. The City will be adopting a parking policy by the end of 2015. The draft policy will be subjected to a public consultation by the *Commission sur les transports et les travaux publics*. The strategic management of parking is a tool that cities can use to nurture reliance on public transit and active transportation.

#### **5) Manage the demand for transportation in an efficient fashion: develop and sustain the density and diversity of the urban fabric**

The urban fabric of the agglomeration is different from that of the rest of the Metropolitan Region owing to various residential neighbourhoods with a greater density. This form of urbanization allows for a reduction of infrastructure costs, a closer proximity between residential sectors and collective equipment, services and places of employment, and the exploitation of an efficient public transit system, while promoting active commutes and reducing the dependence on the automobile.

The Scheme supports interventions that improve the living environment, from a sustainable development point of view. The sustainable vision of the territory's planning and development relies on three key orientations, of which the first two, that are related to a more efficient management of the demand for transportation, aim to:

- foster a quality living environment;
- support the vitality of the agglomeration and the centre of the metropolis;
- showcase areas of interest.



Credit: © Lissandra Melo, Shutterstock.com

### *Foster a quality living environment*

The vision of the Scheme favours the “compactness” of activities and the diversity of neighbourhoods, the proximity of services and places of employment as well as the quality of the architecture and development of public spaces. The organization of the living environment aims to minimize commuting and prioritize urban transit and active transportation, in an environment where constraints and nuisances are mitigated.

### *Support the vitality of the agglomeration and the centre of the metropolis*

Accessibility also contributes to the vitality of the agglomeration and, in this respect, the Scheme intends to implement various projects that focus both on the road network and public transit, while promoting walking and cycling.

The Scheme encourages interventions that purport to reduce dependence on the automobile and that contribute to the diversification and intensification of the activities of the central sectors, while favouring an urban intensity sufficient to support a public transit network on the outskirts. Cycling, for the purpose of commuting, is a distinctive feature of Montréal, particularly in the central neighbourhoods. Both the Scheme and the Master plan encourage developments that favour active commutes, whether walking or cycling, as well as short commutes to access points to the public transit system.

The Scheme also proposes a set of interventions, in the short to long term, that focus both on public transit and road transportation, and will be detailed in the upcoming revision of the Transportation plan by 2017. These projects are intended to improve the accessibility of the major poles of economic activity in the Centre, east end and west end of the Island by favouring public transit and active transportation. The Scheme proposes, by 2021, that 55% of the commutes of the agglomeration’s residents, during the morning rush hour, be done by public transit and active transportation (compared to 47% in 2008). Also, the proportion of commutes by public transit will rise from 32% to 37%, while those relying on active transportation (walking and cycling) will ramp up from 15% to 18%. The interventions conducted in the public domain will need to focus on user friendliness and the safety of pedestrians and cyclists.

Furthermore, the City is studying the development of an advanced logistic pole in the L’Assomption Sud sector. The objective is to regroup the players involved in the Montréal field of logistics around the port’s properties to enhance the productivity of their activities and considerably lessen the circulation of the trucks of these logistic companies that are located far from the port. This would result in a significant decrease of the GHG emitted by the trucking industry.



Crédit : © Société de transport de Montréal

### *Densify the occupation of the territory*

In accordance with the Metropolitan land use and development plan, whose objective is to direct 40% of the increase in the number of households toward access points to the public transit system, the Scheme supports the densification of the territory near train and metro stations in the long term. Three objectives have been established:

- consolidate the urban compactness of the central territory of the agglomeration;
- support the intensification and diversification of urban activities in priority sectors on the outskirts of the central territory;
- strengthen the urbanization of the agglomeration's extremities.

To ensure that the densification targets are met, reports will indicate the number of dwellings by gross hectare of the projects realized on all of the agglomeration's territory. Through its various orientations and interventions in housing, the City is consolidating its urban space for the purpose of offering an alternative to urban sprawl and can participate in reducing the potential consumption of fossil fuels. The City's current interventions, among other objectives, aim to:

- influence the choice of a greater number of families to stay in Montréal, particularly through measures for property purchase assistance and measures fostering the construction of large lodgings;
- foster the conservation of the existing lodging stock through financial incentives for renovation works;
- develop residential neighbourhoods where residents are pleased to live and grow, through the valorization of existing neighbourhoods and the planning of new neighbourhoods, in collaboration with public and private stakeholders (school boards, child-care centres, healthcare providers, etc.);
- promote living in Montréal through promotional campaigns on the Web and with employees of major institutions.

### *Companies' participation*

Companies can also contribute to the management of their employees', clients' and users' demand for transportation by a company demand management program. By defraying the costs of their employees' public transit fares, companies may benefit from a tax deduction of up to 200%<sup>8</sup>.

## **6) Develop active transportation**

Many means can be used to grow the proportional use of active transportation. Here are a few examples.

- Design projects that foster the practice of cycling, for instance:
  - » the extension and updating of the bicycle network;
  - » adapted facilities near congestion points of the network, for example 'bicycle boulevards' (streets that prioritize cycling over motoring), and in accident prone locations, for example bike boxes;
  - » safe, interior or exterior, parking spaces for bicycles in public spaces and on private properties;
  - » adapted bus stops near bicycle paths.

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8. CHAMBRE DE COMMERCE DE L'EST DE MONTRÉAL. *Déduction d'impôt pouvant aller jusqu'à 200 % de l'investissement de l'employeur en transport collectif*, [Online]. [[www.ccemontreal.ca/node/500](http://www.ccemontreal.ca/node/500)] (Consulted September 16, 2015).

- Substantially increase the capacity of the public transit system to accommodate bicycles.
- Encourage taxis to be equipped with bicycle racks, which could turn out to be an interesting commercial opportunity for taxi drivers to develop a new clientele whose transportation mode is compatible with the use of taxis.
- Continue to develop and maintain the bicycle network to encourage cycling year-round and leave bicycle stands in place during the winter.
- Multiply the points of contact with nature (greening, fountains and other water uses) to make the journey more interesting for pedestrians and cyclists.

Many measures have been implemented to attain this objective:

- the adoption of a *Charte du piéton* (Pedestrian charter) within the Transportation plan, which establishes the primacy of the pedestrian in the transportation system;
- the launching of a program of *Quartiers verts* (Green neighbourhoods) promoting the creation of living environments favorable to the use of public transit and active transportation modes, chosen by local stakeholders and the boroughs;
- the launching of a bike-share system in 2009 (BIXI), which now includes 5,120 bicycles and more than 400 stations, while ensuring a recurring financing;
- the sustained expansion of the bicycle network which increased from 417 km to 680 km between 2007 and 2014. During the reviews of the Transportation plan, 600 new kilometres of bicycle pathways were identified, leading to a new objective of 1,280 km. The work scheduled for 2015 alone will result in the addition of 50 km.

### **7) Develop other alternate means of transportation to solo driving (car-sharing and taxi)**

The City continues its deployment of alternate means of transportation to solo driving in order to reduce the dependence on the automobile and the volume of traffic. One of the factors that currently curtails the development of car-sharing is the lack of parking spaces. Possible solutions to mitigate this situation could include the leasing, at a reasonable price, of strategically located parking spaces to car-sharing companies.

However, the installation of bicycle racks on taxi vehicles, as suggested in the previous section, could allow taxis to tap the cycling clientele.

### **8) Reduce GHG emissions by vehicle**

To reduce GHG emissions by vehicle, two possible solutions can be entertained: ensuring an improvement in the energy efficiency of gas powered vehicles and promoting the electrification of transportation.

#### *Ensuring an improvement in the energy efficiency of gas powered vehicles*

The following measures could be implemented:

- pursue the application of existing rules and the implementation of announced rules limiting the consumption of new vehicles through the imposition of a standard for car manufacturers (responsibility of the federal government);
- apply a bonus-malus system that penalizes buyers of light vehicles that consume more than 5 L/100 km and rewards buyers of vehicles that consume less than that threshold.

### Promote the electrification of transportation

Ville de Montréal has elaborated a transportation electrification strategy that builds on the orientations described in the *Plan d'urbanisme* (Master plan), Transportation plan and the *Plan de développement durable de la collectivité montréalaise 2010-2015* (Sustainable development plan). The major thrusts of the City's transportation electrification strategy are four-pronged:

1. Electrification of the buses of the Société de transport de Montréal (STM):
  - the acquisition of 650 hybrid buses by 2020;
  - the implementation of a dynamic recharging electric bus line (modern trolleybus equipped with batteries allowing for the elimination of cables on certain line segments);
  - the trial of fast conduction recharging electric buses (*Cité mobilité* project) in 2016.
2. The conversion of the fleet of municipal combustion vehicles to electric vehicles.
3. The setting up of a self-service electric car system:
  - Montréal launched (June 29, 2015) a call for interest to companies to implement, as soon as 2016, 1,000 charging stations to allow the deployment of a fleet of 1,000 self-service electric vehicles.
4. Sustained collaboration between the City and its government partners:
  - continue working with governments to implement measures to foster the development of electric technologies in public transit as well as programs facilitating the purchase of electric vehicles.



Credit: © Société de transport de Montréal

Simultaneously, the City's *Service de développement économique* is studying the possibility of developing a transportation electrification pole. The phases of the feasibility study are the following:

- assess the scope of the City's, boroughs', AMT's and STM's fleet of vehicles for which a first order would give birth to a transportation electrification industrial sector;
- progressively electrify all of the City's vehicles and act as a test bed for the new companies within that sector;
- describe the hypothetical chain of companies in that sector;
- support the launch of companies to complete that chain, of which a part assembly plant;
- reinvigorate an industrial park by installing the transportation electrification sector therein;
- in partnership with Hydro-Québec, finance the installation of electric charging stations on the City's territory.



Credit: © Yves Provencher, Journal Métro

### **9) Facilitate the governance of transportation projects**

As was previously mentioned, the issue of transportation in Montréal involves many stakeholders, including the federal and provincial governments, the municipalities of the Communauté métropolitaine de Montréal (CMM), the Montréal boroughs and the authorities that manage transportation activities. Consequently, cross-functional efforts and a close coordination between these stakeholders is essential to reduce the transportation sector's dependence on fossil fuels.

# BUILDING SECTOR

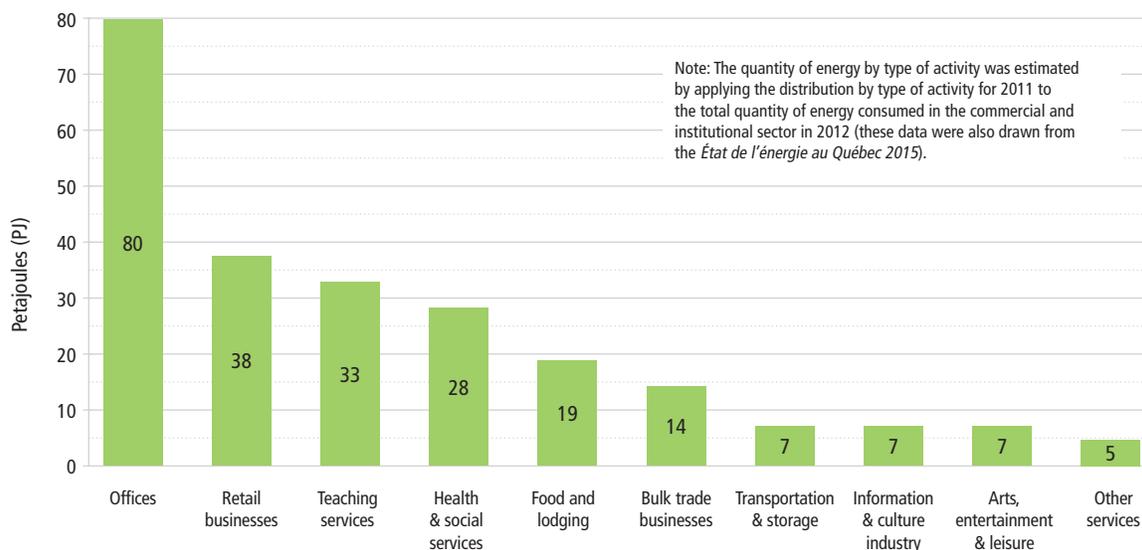
As mentioned in page 8, 14% of the fossil fuels consumed in Québec are used in the heating of commercial and institutional buildings and 5% in the heating of residential buildings<sup>9</sup>. Some gains in terms of reduced fossil fuel consumption can still be achieved in these fields, although they are far inferior to the potential gains that can be achieved in the transportation sector. The fossil fuels used in buildings mainly serve to heat the buildings and water (a small proportion is used in the kitchen). To reduce their consumption, two possible solutions can be contemplated:

1. replace the fossil fuels (oil and natural gas) by renewable energies (hydroelectricity, biomass, etc.);
2. reduce the consumption of fossil fuels by implementing energy efficiency measures.

## ENERGY CONSUMPTION PORTRAIT IN THE BUILDING SECTOR

In the commercial and institutional building sector, 42% of the total energy consumed is derived from fossil fuels (37% from natural gas, 3% from light oils and kerosene, 2% from propane and 0.4% from heavy oils). Distribution of energy consumption (irrespective of the form of energy) by activity in the commercial and institutional sector is presented in the figure below. In the residential building sector, only 15% of the total energy consumed is derived from fossil fuels (7% from natural gas and 8% from fuel oil).

**ENERGY CONSUMED, IRRESPECTIVE OF THE FORM OF ENERGY, IN THE QUÉBEC COMMERCIAL AND INSTITUTIONAL SECTOR BY TYPE OF ACTIVITY IN 2012**



<sup>9</sup>The data for Montréal are not available. Unless otherwise indicated, the data presented in this fact sheet are drawn from the *État de l'énergie au Québec 2015* produced by the Chaire de gestion du secteur de l'énergie of HEC Montréal ([energie.hec.ca/publications/etat-de-lenergie-au-quebec](http://energie.hec.ca/publications/etat-de-lenergie-au-quebec)).

## BUILDING TRENDS

### **Commercial and institutional sector**

In Québec, although the energy intensity (energy consumed per square metre) of businesses and institutions has declined by 19% between 1990 and 2012, the increase in floor area of businesses and institutions (+41%) has resulted in an increase of 13% in energy consumption over the same period.<sup>10</sup>

### **Residential sector**

In Québec, although the energy intensity of dwellings has declined by 27% between 1990 and 2011, the increase in their size (+14%) and their number (+32%) has brought about a rise of 9% in energy consumption over the same period.

The increase in the number of dwellings is partly explained by a lower average of the number of persons comprising a household. In 1991, still in Québec, 56% of households were composed of one or two persons, whereas in 2006, their proportion grew to 65%.<sup>11</sup>

The use of fossil fuels for residential heating purposes is on the wane. In fact, many oil heating systems have been replaced by electric heating systems in the last decades. Between 1990 and 2011, the sector's oil consumption has dropped from 66 to 27 PJ, or from 19 to 8% of the sector's total energy consumption. Natural gas consumption has been rather stable. Over the past few years, it has even enjoyed a slight growth in popularity given its affordable price.



10. NATURAL RESOURCES CANADA. *Commercial/Institutional sector, Québec. Table 1: Secondary energy use and GHG emissions by energy source*, [Online], Office of Energy Efficiency, Government of Canada. [[oee.nrcan.gc.ca/corporate/statistics/neud/dpa/showTable.cfm?type=CP&sector=com&juris=qc&n=1&page=3](http://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/showTable.cfm?type=CP&sector=com&juris=qc&n=1&page=3)] (Consulted September 21, 2015).

11. SOCIÉTÉ D'HABITATION DU QUÉBEC (2012). *L'évolution démographique et le logement au Québec : rétrospective 1991-2006 et perspectives 2006-2056*, [Online], 146 pages. [[www.habitation.gouv.qc.ca/fileadmin/internet/publications/0000021500.pdf](http://www.habitation.gouv.qc.ca/fileadmin/internet/publications/0000021500.pdf)] (Consulted September 21, 2015).

## MONTRÉAL SPECIFICITIES

### **Commercial and institutional sector**

Proportionally to its population, the agglomeration of Montréal has a large number of businesses and institutions. In fact, 24% of the population of Québec lived on the Island of Montréal in 2011<sup>12</sup>, whereas its industries, commercial establishments and institutions accounted for 35% of Québec's gross domestic product<sup>13</sup>.

### **Residential sector**

In Montréal, the average energy consumption of dwellings is lower than elsewhere in Québec. This is explained by the smaller size of Montréal dwellings and their particular types. In fact, the smaller the dwelling, the less energy it requires for heating purposes. Also, apartments and, to a lesser extent, semi-detached homes have a smaller proportion of their walls exposed to outdoor air than detached homes, which limits heat losses. On average in Québec, in 2012, a detached home consumed 140 GJ<sup>14</sup>, all energy sources combined, whereas an apartment only consumed 68 GJ<sup>15</sup>. However, the territory of the Island of Montréal is far from being uniform. The central neighbourhoods are those that include a greater proportion of small dwellings and of dwellings of the apartment or semi-detached home type. The neighbourhoods of the east and west ends of the Island have a greater proportion of larger dwellings and of detached homes.



12. INSTITUT DE LA STATISTIQUE DU QUÉBEC. Le bilan démographique du Québec, [Online], 2014 edition, Government of Québec. [[www.stat.gouv.qc.ca/statistiques/population-demographie/bilan2014.pdf](http://www.stat.gouv.qc.ca/statistiques/population-demographie/bilan2014.pdf)] (Consulted September 21, 2015).

13. VILLE DE MONTRÉAL. "Profil sectoriel : Ensemble des secteurs d'industrie de l'agglomération de Montréal", *Montréal en statistiques*, [Online], May 2014. [[ville.montreal.qc.ca/pls/portal/docs/PAGE/MTL\\_STATS\\_FR/MEDIA/DOCUMENTS/PS\\_ENSEMBLE%20DES%20SECTEURS%202013\\_0.PDF](http://ville.montreal.qc.ca/pls/portal/docs/PAGE/MTL_STATS_FR/MEDIA/DOCUMENTS/PS_ENSEMBLE%20DES%20SECTEURS%202013_0.PDF)] (Consulted September 21, 2015).

14. NATURAL RESOURCES CANADA. *Residential sector, Québec. Table 2: Residential single detached Secondary Energy Use by Energy Source and End-Use*, [Online], Office of Energy Efficiency, Government of Canada. [[oee.nrcan.gc.ca/corporate/statistics/neud/dpa/showTable.cfm?type=HB&sector=res&juris=00&rn=2&page=3](http://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/showTable.cfm?type=HB&sector=res&juris=00&rn=2&page=3)] (Consulted September 21, 2015).

15. NATURAL RESOURCES CANADA. *Residential sector, Québec. Table 4: Residential apartments Secondary Energy Use by Energy Source and End-Use*, [Online], Office of Energy Efficiency, Government of Canada. [[oee.nrcan.gc.ca/corporate/statistics/neud/dpa/showTable.cfm?type=CP&sector=res&juris=qc&rn=38&page=3](http://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/showTable.cfm?type=CP&sector=res&juris=qc&rn=38&page=3)] (Consulted September 21, 2015).

## LIMITS TO THE POWERS OF VILLE DE MONTRÉAL

### ***Jurisdiction***

In Québec, the construction standards in force are stipulated in the Québec Construction Code (QCC), the responsibility of the *Régie du bâtiment du Québec* (RBQ). Ville de Montréal has adopted the QCC while adapting it to the particularities of Montréal's built environment, when warranted, through its By-law concerning the construction and conversion of buildings (Bylaw 11-018).

In 2012, the RBQ introduced, for the first time in the Code, a chapter on energy efficiency (chapter 11 of the QCC). Since then, the RBQ ensures that all new small (three floors or less or eight dwellings or less) residential buildings are built according to the thermal insulation and air leakage standards equivalent to the Novoclimat standard. New medium and large sized residential buildings, a common occurrence in Montréal, are not yet subject to this standard. In its GHG reduction plan, the City has requested of the RBQ that it continue to complement the Code's regulations on energy efficiency to include the buildings that are not yet subjected to chapter 11 of the Code.

### ***Energy conservation programs***

Energy conservation is a good thing. It is "a driver of competitiveness, growth and economic wealth."<sup>16</sup> However, in terms of reduced dependence on fossil fuels, the gains that can be achieved by relying on energy conservation in buildings alone are limited. As a reminder, less than 20% of the fossil fuels consumed in Québec are used in the residential, commercial and institutional building sector. Moreover, implementing energy efficiency measures only allows for a partial reduction of energy consumption, never of its integrality. Finally, if an energy efficiency program targets all buildings, irrespective of the energy source that is used, many of the energy consumption reductions will impact hydroelectricity, a renewable energy.

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16. WHITMORE, Johanne and Pierre-Olivier PINEAU (2015). *État de l'énergie au Québec*, [Online], HEC Montréal, Chaire de gestion du secteur de l'énergie de HEC Montréal. [[energie.hec.ca/publications/etat-de-lenergie-au-quebec](http://energie.hec.ca/publications/etat-de-lenergie-au-quebec)] (Consulted September 14, 2015).

## PLANNED MEASURES BY VILLE DE MONTRÉAL

To reduce dependence on fossil fuels in the building sector, the *Plan de réduction des émissions de gaz à effet de serre de la collectivité montréalaise 2013-2020* (Montréal Community plan to reduce greenhouse gas emissions) includes three potential solutions, as outlined in the table below.

POSSIBLE SOLUTIONS	ANTICIPATED REDUCTION (kt CO <sub>2</sub> -eq)
1. Improve buildings' energy efficiency	571
2. Reduce fuel oil consumption	710
3. Encourage the use of renewable energies	Unquantifiable

For each potential solution, the sections hereafter detail the suggested measures.

### 1) **Improve buildings' energy efficiency**

- Create an Energy efficiency fund for renovation projects that integrates energy efficiency in commercial and institutional buildings whose loans would be reimbursable through the energy savings achieved.

#### *Subsidy programs for residential construction and renovation*

In terms of residential construction and renovation, the City's subsidy programs include measures that promote a greater energy efficiency in buildings while integrating, in certain cases, the Novoclimat construction standards of the *Bureau de l'efficacité et de l'innovation énergétiques du Québec*. Although these standards do not prevent the targeted buildings from having a fossil fuel heating system (heating oil, natural gas or dual energy), the thermal insulation and air leakage factors of Novoclimat buildings result in a significant reduction in energy consumption.

More specifically, the City integrates in its interventions on buildings provisions that promote sustainable development and a more responsible use of energy resources, for example:

- within its renovation programs, requirements for certain energy efficient materials and greater financial assistance if energy efficiency measures are in place and, in particular, financial assistance for the installation of a complete electric heating system if the heating system in place is not electric;
- within its property purchase assistance program, measures that facilitate the purchase of a new dwelling that is compliant with the Novoclimat energy efficiency program and LEED certified;
- the integration of Novoclimat standards in the building of social housing.

### *Dialogue with real estate developers*

When the *Service du développement économique* meets developers, it ensures that the real estate development is compliant with the City's ecological transition initiative. The constructions that satisfy the following criteria are thus favoured:

- LEED certification,
- solar energy,
- charging stations for electric vehicles,
- parking for bicycles.

### *The City sets a good example*

In 2009, the City, owner of a considerable real estate portfolio, adopted its Policy of sustainable development for the buildings of Ville de Montréal with, in particular, the objective of reducing GHG emissions by 2% and reducing by 15% the energy consumption of corporate municipal buildings.

## **2) Reduce fuel oil consumption**

Ville de Montréal provides financial assistance for the installation of a complete electric heating system if the heating system in place is not electric. This measure is intended to promote the third potential solution, namely the use of a renewable energy.

## **3) Encourage the use of renewable energies**

- Assess the feasibility of implementing an urban heating and air conditioning system that relies on renewable energy for the development project of the Hippodrome site in Montréal.
- Publicize the good practices of businesses and institutions for their use of renewable energies.

# LIST OF MONTRÉAL COMMUNITY PLANS FOR LESSER DEPENDENCE ON FOSSIL FUELS

The table below shows the plans that contribute to reducing the Montréal community's dependence on fossil fuels. Many of these plans will be renewed in the next few years. The recommendations that will emanate from the consultation will be considered in preparing these new plans.

PLANS	INTERNET LINKS
Montréal Community sustainable development plan (2010-2015)	<a href="http://ville.montreal.qc.ca/portal/page?_pageid=7137,78111572&amp;_dad=portal&amp;_schema=PORTAL">ville.montreal.qc.ca/portal/page?_pageid=7137,78111572&amp;_dad=portal&amp;_schema=PORTAL</a>
Monitoring progress report of the Montréal Community sustainable development plan (2010-2015)	<a href="http://ville.montreal.qc.ca/portal/page?_pageid=7137,11455572&amp;_dad=portal&amp;_schema=PORTAL">ville.montreal.qc.ca/portal/page?_pageid=7137,11455572&amp;_dad=portal&amp;_schema=PORTAL</a>
<i>Plan de réduction des émissions de gaz à effet de serre de la collectivité 2013 -2020*</i> (Community plan for the reduction of greenhouse gas emissions 2013-2020)	<a href="http://ville.montreal.qc.ca/pls/portal/docs/page/enviro_fr/media/documents/plan_collectivite_2013-2020_vf.pdf">ville.montreal.qc.ca/pls/portal/docs/page/enviro_fr/media/documents/plan_collectivite_2013-2020_vf.pdf</a>
<i>Plan de transport*</i> (Transportation plan) 2008	<a href="http://ville.montreal.qc.ca/portal/page?_pageid=8957,99681670&amp;_dad=portal&amp;_schema=PORTAL">ville.montreal.qc.ca/portal/page?_pageid=8957,99681670&amp;_dad=portal&amp;_schema=PORTAL</a>
<i>Bilan quinquennal 2008-2012 – Mise en œuvre du plan de transport*</i> (Five-year review 2008-2012 – Implementation of the Transportation plan)	<a href="http://ville.montreal.qc.ca/pls/portal/docs/PAGE/TRANSPORTS_FR/MEDIA/DOCUMENTS/2013-09-05_BILAN%20QUINQUENNAL%202008-2012.PDF">ville.montreal.qc.ca/pls/portal/docs/PAGE/TRANSPORTS_FR/MEDIA/DOCUMENTS/2013-09-05_BILAN%20QUINQUENNAL%202008-2012.PDF</a>
Master plan (2004)	<a href="http://ville.montreal.qc.ca/portal/page?_pageid=2762,3099656&amp;_dad=portal&amp;_schema=PORTAL">ville.montreal.qc.ca/portal/page?_pageid=2762,3099656&amp;_dad=portal&amp;_schema=PORTAL</a>
Bylaw concerning the construction and conversion of buildings (Bylaw 11-018)	<a href="http://ville.montreal.qc.ca/sel/sypre-consultation/afficherpdf?idDoc=26690&amp;typeDoc=1">ville.montreal.qc.ca/sel/sypre-consultation/afficherpdf?idDoc=26690&amp;typeDoc=1</a>

\* In French only

# LIST OF CORPORATE INITIATIVES FOR LESSER DEPENDENCE ON FOSSIL FUELS

The table below presents corporate plans that contribute to reducing municipal activities' dependence on fossil fuels. The table in the following page presents other initiatives that also contribute to reducing the use of fossil fuels.

POLICIES, PLANS AND PROGRAMS	INTERNET LINKS	DESCRIPTIONS	SECTOR	
			TRANSPORT	BUILDING
<i>Plan de réduction des émissions de gaz à effet de serre corporatives 2013-2020*</i> (Corporate Greenhouse Gas Emissions Reduction Plan 2013-2020)	<a href="http://ville.montreal.qc.ca/pls/portal/docs/page/enviro_fr/media/documents/plan_corporatif_2013-2020_vf.pdf">ville.montreal.qc.ca/pls/portal/docs/page/enviro_fr/media/documents/plan_corporatif_2013-2020_vf.pdf</a>	Many measures implemented to reduce the energy consumption of buildings and the consumption of fuel by vehicles and equipment.	X	X
<i>Politique de développement durable pour les édifices de la Ville de Montréal, 2009*</i> (Sustainable development policy for Ville de Montréal's buildings, 2009)	<a href="http://ville.montreal.qc.ca/portal/page?_pageid=7237,75085658&amp;_dad=portal&amp;_schema=PORTAL">ville.montreal.qc.ca/portal/page?_pageid=7237,75085658&amp;_dad=portal&amp;_schema=PORTAL</a>	Policy that includes requirements relating to the construction, renovation and operation of buildings owned by the City or that it rents. Many of the requirements allow for a reduction of the energy consumption of buildings, while others promote the practice of cycling among the users of these buildings.	X	X
<i>Plan d'action en développement durable pour les édifices de la Ville de Montréal, 2013-2015*</i> (Sustainable development action plan for Ville de Montréal buildings, 2013-2015)		The plan includes many measures to promote energy savings and the use of electric vehicles.	X	X
<i>Plan d'économie d'énergie 2013-2015 et autres projets de la Direction des stratégies et transactions immobilières*</i> (Energy savings plan 2013-2015 and other projects)	<a href="http://carbonn.org/uploads/tx_carbonndata/Plan%20EE%202013%202015%20avec%20annexes.pdf">carbonn.org/uploads/tx_carbonndata/Plan%20EE%202013%202015%20avec%20annexes.pdf</a>	One of the plan's objectives is to reduce by 20% energy consumption by buildings compared to 2011.		X
Espace pour la vie Energy saving program	<a href="http://espacepurlavie.ca/en/energy-saving-program">espacepurlavie.ca/en/energy-saving-program</a>	A vast energy efficiency project that resulted in a 40% decline in the use of energy by three museums (Biodome, Insectarium and Planetarium) and of 44% in their GHG emissions.		X
<i>Programme de soutien à la mise aux normes des aréas municipaux*</i> (Environmental standards upgrading program for municipal arenas)	<a href="http://ville.montreal.qc.ca/portal/page?_pageid=9037,101773696&amp;_dad=portal&amp;_schema=PORTAL">ville.montreal.qc.ca/portal/page?_pageid=9037,101773696&amp;_dad=portal&amp;_schema=PORTAL</a>	Upgrades, among others, to replace freon refrigeration systems and maximize energy savings.		X
<i>Politique verte du matériel roulant – Deuxième génération 2012-2015*</i> (Green policy for rolling stock – Second generation 2012-2015)	<a href="http://ocpm.qc.ca/sites/import.ocpm.aegirvps.net/files/pdf/P70/5c7.pdf">ocpm.qc.ca/sites/import.ocpm.aegirvps.net/files/pdf/P70/5c7.pdf</a>	The policy covers many actions of which the acquisition of hybrid and smaller cylinder vehicles, the ecological management of energy-intensive accessories, the training of drivers on ecodriving and the implementation of a rigorous maintenance program to minimize the consumption of vehicles.		X

\* In French only

INITIATIVES	INTERNET LINKS	DESCRIPTIONS	SECTOR	
			TRANSPORT	BUILDING
Team dedicated to climate change	<a href="http://ville.montreal.qc.ca/portal/page?_pageid=7237,75083582&amp;dad=portal&amp;_schema=PORTAL">ville.montreal.qc.ca/portal/page?_pageid=7237,75083582&amp;dad=portal&amp;_schema=PORTAL</a>	A team from the City's <i>Service de l'environnement</i> is working cooperatively with the central departments and boroughs of Montréal, as well as with the related cities of the agglomeration of Montréal on measures to be implemented for the reduction of GHG emissions and adaptation to climate change. The team is also responsible for the GHG emission corporate and community inventories.	X	X
Bâtivert committee		Committee established in 2005 by the <i>Direction des stratégies et des transactions immobilières</i> whose key objective is to integrate efficient and innovative sustainable development features in the City's activities and real estate projects for the purpose of reducing their environmental and social impacts as well as their total cost.	X	X
Bonus-malus system for the acquisition of light vehicles		In 2012, the City implemented a system of bonus-malus applicable to the purchase or long-term rental of a light vehicle with the objective of promoting the purchase of hybrid or electric vehicles.	X	
Zero Emission Market Acceleration Partnerships (ZE MAP) Program of the University of California Davis	<a href="http://zeroemissionmap.ucdavis.edu/">zeroemissionmap.ucdavis.edu/</a>	Montréal is part of a group of states and municipalities that wish to become the most important North American forum to discuss strategies and actions intended to stimulate the market for zero emission vehicles.	X	

\* In French only

