

An aerial photograph of the Montreal skyline at sunset. The sun is low on the horizon, casting a warm orange and yellow glow over the city. Several prominent skyscrapers are visible, including the Bank of Montreal Tower and the 1000 de la Montagne. The sky is a mix of orange, pink, and purple. The city's buildings are densely packed, and some lights are visible in the windows.

PRELIMINARY

RESILIENCE

ASSESSMENT

SUMMARY VERSION - FEBRUARY 2017

Montréal 





INTRODUCTION

The Ville de Montréal's Bureau de la résilience was created in May 2016 with a mandate to develop a resilience strategy for Montréal as part of the 100 Resilient Cities (100RC) program put forward by the Rockefeller Foundation. The 100 Resilient Cities program (100RC) is dedicated to helping cities worldwide better face the social, economic and physical challenges that are a growing part of the 21st century. Montréal is the first Canadian city to join this international network, which includes the cities of New York, Paris, Kyoto and Mexico City.

In the decades to come, disasters are expected to become more frequent and intense. They will be made more complex, as well, by a host of environmental, technological, socioeconomic and demographic factors. For this reason, the Centre de sécurité civile, acting on behalf of the Ville de Montréal, applied to join the 100RC network. The city has a duty to anticipate events that occur on its territory and pose a risk of disrupting its proper operations by acting ahead of time to reduce vulnerabilities as opposed to solely practicing emergency preparedness for catastrophic events.

It is thus essential to adopt a comprehensive approach to risk management by calling upon specialists from a range of fields, including land use management, public health, engineering, and social and economic development, to name just a few. By adopting this approach and integrating risk management into project planning, the municipal administration will be able to go beyond emergency response and to better identify vulnerabilities and establish prevention and mitigation measures. In 2017, the Bureau de la résilience will establish a concrete action plan as part of its urban resilience strategy with the objective of integrating this approach at the municipal level and meeting emerging challenges.

WHAT IS URBAN RESILIENCE?

According to the definition developed by 100RC, urban resilience is the capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt and grow regardless of the disruptions they face. By responding, at once, to acute shocks (i.e., a sudden, destabilizing event such as an earthquake, fire or flood) and stresses (cyclical events that erode the urban fabric, such as traffic congestion, poverty, aging infrastructures), a city thus develops its resilience potential.

Fortunately, Montréal has largely been spared any major disasters over the last 375 years, especially when compared to other major cities in the world. The 1998 ice storm probably stands as the greatest shock experienced in the modern history of Montréal. And while they may be of lesser magnitude, extreme weather events, drinking water contamination or flooding at times have disrupted the health and safety of Montrealers.

Since the 1998 ice storm, several mechanisms – not least the creation of the Ville de Montréal’s Centre de sécurité civile – have been put in place to ensure the safety of citizens and prevent the consequences of such a disaster. The Centre de sécurité civile has since broadened its mandates and responsibilities. This evolution attests to the city’s intention to broaden its expertise when it comes to prevention and risk management.

While not explicitly cited as resilience initiatives, other initiatives already play a part in the city’s capacity to deal with the shocks and stresses to which it is exposed. These actions are intended to improve Montrealers’ quality of life and mitigate the harmful impacts of shocks and stresses on the lives of citizens. They include the Schéma d’aménagement du territoire, the thinking on business continuity, the looping of the drinking water network, and the Plan d’adaptation aux changements climatiques (climate change adaptation plan). These already well-established initiatives will serve as the basis for the development of the resilience strategy.

OUR APPROACH – PHASE 1

By joining the 100RC network, Montréal agrees to take part in a well-established approach, using tools that can be duplicated across all the cities in the network.

The initial exploratory stage in this approach is aimed at laying the groundwork for the development of resilience in Montréal. Its chief objectives are to get stakeholders engaged in the process of conducting a preliminary assessment of resilience in Montréal. This assessment will make it possible to identify the city’s main strengths when it comes to resilience as well as its shortcomings.

In order to achieve this, the team at the Bureau de la résilience has undertaken a major consultation with stakeholders and the public using a survey as well as meetings. The survey is intended to gauge perceptions on a variety of resilience factors and identify the action priorities that should be the focus of resilience efforts. An exhaustive survey of actions already in place has also been carried out and integrated into the ongoing assessment process.

Readers are invited to consult the complete version of the Ville de Montréal's Preliminary Resilience Assessment for more detailed results.

In conjunction with these efforts, four committees of experts were formed in order to flesh out the problems and issues concerning Montréal's capacity to respond and adapt to shocks and stresses on its territory. These committees were assigned to cover four areas of expertise: diversity and social equity; urban infrastructure and public utilities; prosperity and innovation; and quality of living environments. The four committees report to a Steering Committee made up of influential members of the Montréal community and the municipal administration. Its members have the expertise and experience required to review and improve the city's assessment of its resilience priorities. They also have the capacity to help mobilize resources and the influence required to set in motion the resilience strategy.

Two meetings were held with the expert committees, while the Steering Committee convened at the mid-point. Some 30 individual meetings were also held with stakeholders.

These discussions, coupled with the survey results and the individual meetings, served to guide the subsequent work and determine the focus areas for Phase 2.

FOUR FOCUS AREAS

FOCUS AREA 1: AN ENGAGED MONTRÉAL COMMUNITY

HOW CAN WE PROMOTE AWARENESS OF DISASTER PREPAREDNESS AMONG MONTREAL COMMUNITIES WHILE HIGHLIGHTING THE IMPORTANCE OF CIVIC ENGAGEMENT AND SOLIDARITY?

This work stream is aimed at creating opportunities and evaluating new approaches meant to prepare the broader Montréal community to deal with disasters and support citizens. Further study in this work stream will make it possible to better understand the circumstances under which Montréal's

population would be vulnerable and use these vulnerabilities as the basis for actions by public authorities.

One of the challenges lies in knowing and understanding the characteristics of this population. There is widespread recognition, in Montréal, that the western part of the island, with its anglophone majority, is more affluent, while the eastern, predominantly francophone part of the city and the historically working-class Hochelaga-Maisonneuve and Sud-Ouest boroughs have higher rates of poverty. Moreover, immigrants tend to settle in specific central neighbourhoods, notably Côte-des-Neiges and Park Extension. With the arrival of new immigrants, however, these Montréal neighbourhoods have undergone demographic changes. Indeed, Statistics Canada census data show that neighbourhoods with the lowest family incomes tend to be those with the highest density of new immigrants. However, understanding these social phenomena is limited by a lack of conclusive data, since the most recent Canadian census data dates back to 2006. For the past 10 years, little data has been published on household incomes, languages spoken at home, the country of origin of respondents, and a great deal more relevant information.

What we do know, however, is that Montréal is home to people from about 120 countries speaking close to 200 languages, and that one in three Montrealers was born outside Canada. These elements reflect Montréal's plurality, and they constitute a source of diversity and richness to the city; but they also present numerous challenges, notably when it comes to communication in the event of major disasters or the prevention thereof. Achieving timely communication with the public in emergency situations represents one of the great difficulties facing the agglomeration, with the 200 languages spoken in Montréal further complicating the task for authorities.

The Montréal population also presents major shortcomings when it comes to the individual state of preparedness to deal with disaster. Recent statistics show that only one in five Quebecers has an emergency kit. The lack of awareness probably stems from the fact that Montréal has experienced few major events in recent years, fuelling the popular perception that prevention measures are of little importance. It would be interesting to know if new immigrants – who often come from countries more affected by disaster or war – are better prepared to face a major disaster. The state of preparedness of the boroughs and reconstituted cities within the Montréal agglomeration is relatively high, however. Each has an emergency measures plan that is evaluated and improved on a yearly basis. An exercise program is also in place, making it possible to simulate the opening of an emergency shelter or a mobilization undertaken by the Centre de coordination des mesures d'urgence.

Like other major world cities, Montréal is facing a range of social problems, including homelessness and the aging of the population. Poverty, precarity and exclusion are on the rise, and today's so-called vulnerable people constitute a diverse population. New immigrants, for the most of part, choose to live in Quebec's largest city, and too often they end up swelling the ranks of Montrealers living in precarity.

Numerous questions must be answered. Who are the people living under vulnerable circumstances? What specific management tools are available to assist them? Several interventions, measures and programs are in place to prevent these phenomena specific to large cities and help citizens in need. It is essential to determine whether these resources are adequately publicized and accessible, however. Are people in need identified by these assistance networks, and do they have access to resources?

In Montréal, several initiatives meant to fight poverty and social exclusion have been put forward. They include the Revitalisation urbaine intégrée (RUI) in eight sectors with high concentrations of poverty. Like many others, these initiatives are cited as exemplary local practices that could be duplicated in or adapted to other sectors. Civic engagement is key to successfully implementing and developing innovative projects at the neighborhood level. It is important to motivate Montrealers to engage, invest and give back to their communities. There is renewed interest in public consultation in Montréal. Be it to discuss urban agriculture, restore Parc Lafontaine and develop the downtown area, citizens, increasingly, are coming out in force, and they're making a difference. It is essential to determine how to harness and accentuate this trend.

In the course of discussions with stakeholders, several questions were raised in support of this focus area.

- How can Montrealers be made more aware of major risks, and how can the adoption of good practices be promoted in order to develop their capacity to deal with these risks?
- How can a better job be done of identifying people in vulnerable situations so that they become known to assistance networks?
- How can we draw inspiration from exemplary initiatives in Montréal neighbourhoods, and how can best practices in urban planning be used to promote community resilience?
- How can we promote civic engagement and oversee local initiatives in order to foster greater solidarity in communities by drawing on their diversities?

FOCUS AREA 2: A FLEXIBLE CITY THAT VALUES COLLABORATION

HOW CAN INTERNAL COLLABORATION BE PROMOTED IN ORDER TO BETTER ADAPT TO TOMORROW'S CHALLENGES AND MEET MONTREALERS' EXPECTATIONS, BOTH ON A DAY-TO-DAY BASIS AND IN CRISIS SITUATIONS?

This work stream is aimed at studying how the city can promote its capacity for collaboration both internally and with other levels of government in order to better adapt to the challenges it faces and better meet the needs of Montrealers, both on a daily basis and in times of crisis.

Efforts are currently underway at the Ville de Montréal to improve organizational performance and the quality of the client experience (between the city and its citizens). The city manager has identified these two areas as priorities for 2017, and they present an opportunity for collaboration between the Bureau de la résilience and the departments concerned. New technologies are being implemented in these areas in order to optimize to the successful completion of tasks and improve communications with Montrealers.

Montréal must not only improve its performance on a daily basis, but it must also do a better job of anticipating the various disruptions that can adversely affect its citizens' quality of life and safety. Collaboration between city departments thus becomes the key for better understanding and adapting to specific complex problems. Such is the case, in particular, for dangerous goods stored on city territory. Internally, at the city, this issue involves civil security representatives, urban and environmental planners, as well as representatives from legal and economic development departments. Based on this internal (and external) collaboration, the city is developing a by-law that will address the various perspectives on this issue. Other internal collaboration initiatives are underway and under development, although they are not systematic and too often rely upon individuals rather than a process meant to facilitate collaboration.

The Bureau de la résilience, for its part, will attempt to integrate resilience thinking in city projects pertaining to organizational performance and the quality of the client experience. How can effective communication with citizens be achieved in times of crisis? How can new technologies be used to improve and facilitate coordination between departments tasked with preparedness and emergency measures? How can the risk culture be improved within the municipal administration, and how can we ensure that decision-making is consistent with this vision?

In 2016, the Ville de Montréal, in response to recommendations issued by the auditor general, put forward a business continuity program overseen by the Direction de la sécurité civile et de la résilience. A pilot project with the waterworks, police, fire, payroll and IT departments is now underway, and the first continuity plans should be ready by early 2018. This program will allow the city to better anticipate service disruptions in the event of a crisis and put in place solutions.

Another challenge facing the city lies in better taking into account the current and future needs of various Montréal actors in decision-making processes. Through the Office de consultation publique, the Ville de Montréal, in a quasi-systematic manner, is making efforts to integrate citizens in decision-making processes, particularly in the development of major new urban developments. In addition, the city has established a number of consultation initiatives, including surveys and mixed committees (i.e., merchants, community groups, citizens, etc.) with the objective of giving citizens and merchants a voice on new urban developments and the allocation of municipal budgets at the local level. These consultation

methods promote ties between actors and in turn foster a better understanding of citizens' many needs; as a result, the city is better able to meet those needs and to significantly increase acceptability and a sense of belonging among local populations. As mentioned, the city has already established a number of consultations; however, these initiatives are inconsistent from one borough to the next, with some consulting a great deal, and others consulting very little.

These projects are extremely stimulating for Montréal. But with its roughly 28,000 employees and 103 elected officials – Montréal has the largest number of elected officials among Canadian cities with populations of more than 200,000 – the mayor of Montréal is at the head of a huge administration. Under these circumstances, increasing municipal effectiveness remains a daunting challenge.

This focus, through four specific questions, is thus aimed at pursuing and facilitating internal collaboration at the city as well as external collaboration, in keeping with the city's organizational priorities and in consideration of the bill on the status of metropolis currently being studied by the Government of Quebec. The committee will address the following questions:

- How can the city foster greater inter-departmental collaboration, knowledge-sharing and organizational flexibility in order to make the municipal administration more adaptable?
- How can citizens be included in decision-making at the borough level and in the reconstituted cities, by highlighting existing initiatives for purposes of promoting buy-in to a common vision for Montréal?
- How can exchanges between the city and citizens be improved to ensure effective communication in emergency situations?
- How can the risk culture be improved within the municipal administration, and how can flexible intervention tools be adopted in order to foster a better state of preparedness for shocks and stresses?

FOCUS AREA 3: AN ECONOMY THAT ANTICIPATES CHANGE

HOW CAN WE ADAPT TO NEW TRENDS, ANTICIPATE FUTURE DEMAND, AND DRAW ON ECONOMIC DIVERSITY AND THE RELIABILITY OF ESSENTIAL SYSTEMS?

Montréal's economy is as textured as its citizenry is diverse. The city was built around its port and the railways that connect it to the North American continent. Today, the Port de Montréal generates annual economic benefits of about \$1.5 billion for the Greater Montréal region, and it has initiated

an innovation shift intended to better adapt to a rapidly changing environment. Climate change is sure to have an impact on the port's activities, notably as regards potential variations in water levels on the St. Lawrence River and recurring high-risk weather events. What would be the effect of a major disruption in its activities on the local and regional economy, not to mention the national supply chain? What can organizations that depend on imports and exports through the Port of Montréal and the pan-Canadian and North American rail system do to be better prepared?

Montréal's economy, like that of several other large North American cities, has long been based on its manufacturing sector, which remains important and is now made up largely of small- to medium-sized enterprises (SME). Today, Montréal's economy is particularly active in eight major sectors, including ICTs, a fast-growing industry made up of some 5,000 private enterprises accounting for about 120,000 jobs. As well, a survey of research centres in the health sciences and the amounts invested in research and development shows that Montréal is first among Canadian cities and one of just a handful of cities in the world where all the components required to manufacture an airplane are available. To say nothing of the video game industry, which generates \$1 billion and employs thousands. Also known as a cultural city, Montréal offers an infrastructure conducive to a range of leading-edge creative industries, including numerous yearly festivals.

On the whole, however, do these economic sectors have the flexibility to adapt to the socioeconomic, technological and environmental changes expected in the 21st century? A major technological challenge awaits the manufacturing sector, for one: in Quebec, as is the case elsewhere in Canada, manufacturing lags behind in terms of the modernization of equipment and robotization. This lag could be sharply felt with the expected entry into force of Canada-EU free trade agreement in 2017. Indeed, in April 2016 the Government of Québec launched a strategy meant to address this problem.

Also worth mentioning are the potential impacts of climate change on Montréal territory—impacts that could affect the natural and built environments alike, as well as populations and socioeconomic activities. Extreme weather events are occurring with increasing frequency, and they will affect the way SMEs and large corporations operate. During the 1998 ice storm, we witnessed first-hand the risks that climate change poses to our society, and we saw what happens when the essential systems we rely upon break down.

Following discussions with stakeholders on the Prosperity and Innovation Committee, it was determined that Montréal companies are not prepared to pursue their activities in the wake of a major disruption or even a smaller-scale event. A key factor behind this conclusion is that business continuity is not yet well entrenched in Quebec industries, particularly in SMEs, which often have far fewer human and financial resources to develop adequate plans. Given that 43% of North American companies faced with a major

crisis are forced to close and that 29% of the remaining companies cease their operations within two years, this situation is of non-negligible importance to a resilience strategy.

The aging of the population is also an issue that raised concern among our collaborators. How will companies adapt to the loss of expertise or retirements on a massive scale? With one of the lowest birth rates in the world, Quebec, like the rest of Canada, is facing a major demographic challenge. Our economy's dependence on immigration will continue to grow, as a result. According to Statistics Canada, in the absence of a sustained level of immigration or a substantial increase in the birth rate, Canada's demographic growth could fall to near zero within the next 20 years.

In this context, discussions aimed at increasing immigration are underway at both the federal and provincial levels. In Montréal, the question being asked is how can we retain new immigrants and foreign students when statistics demonstrate they have difficulty integrating into the job market? How can we keep skilled labour in the city, when young professionals, increasingly, are more mobile and sought-after across Canada and throughout the continent?

Montréal's economy is also shaped by the development of new startups and, as in many of the world's large cities, by the emergence of practices related to sharing and circular economies. What impact will these new economic models have on the resilience of Montréal-based companies?

This work stream will thus be aimed at better understanding the various challenges facing Montréal's economy and identifying potential opportunities. Four major questions will be used to address the subject:

- How can companies be made more aware of the importance of preparing for shocks and stresses in order to maintain the offer of services and minimize the impact on Montréal's economy?
- How can we ensure greater reliability of essential systems by anticipating technological and environmental risks?
- How can we better understand the importance of railway and maritime transportation for the economy and the impacts of a disruption in supply chains?
- How can new economic models strengthen or reduce the resilience of Montréal's economy?

FOCUS AREA 4: A CITY THAT LOOKS TO THE FUTURE

HOW CAN URBAN DEVELOPMENT BE OPTIMIZED IN ORDER TO RESPOND TO CHANGES, WHILE PRIORITIZING THE HARMONIOUS MIX OF USES?

Each week, cities across the world take in 1.4 million new immigrants. Modern populations are drawn to cities, as centers of economic activity, social connection, urban mobility, opportunity and innovation. Among North American cities, Montréal is considered a dense and concentrated city.

In fact, 60% of the Greater Montréal region lies within a 15-km radius of downtown. Forecasts suggest that by 2031 the agglomeration's population will total 2.1 million, an increase of 21% compared to 2006. Of this population, the proportion of people aged 65 and over will rise from 16% in 2011 to 21% in 2031.

These demographic changes, coupled with the anticipated impacts of climate changes and aging infrastructures, will exert greater stress on the city's natural and built environments and on the health of Montrealers. Montréal is already a densely-populated island. In order to meet new urban development demands (housing, transportation, parks, schools, etc.), the urban tools in place must be used and even improved with the objective of better overseeing these new developments and thus limiting the creation of new vulnerabilities associated with risks such as construction in flood zones or in proximity to high-risk industries. In addition, as in all the world's large cities, urban mobility is a chronic problem whose impact can be exacerbated under emergency situations. Montréal, as an island, faces specific challenges in this regard.

These realities must be taken into account now in order to mitigate adverse impacts in the future, while considering the economic costs of the choices made in the short, medium and long terms. An analysis of the costs, benefits and opportunities of redeveloping and repairing infrastructures, in particular, is necessary in order to optimize investments. These investments must ensure that Montrealers are able to maintain their quality of life and urban mobility, while also sustaining the city economic development, keeping its citizens safe, and preserving its ecosystems. The relationships between these related advantages must be better understood and supported by conclusive data that facilitate decision-making in land use development, in particular. Is it financially feasible to redevelop the city in a safe and sustainable manner? Are the principal shocks with the potential to threaten Montréal being taken into account in urban planning and infrastructure repair work?

New technologies and the contribution of massive open data also have a role to play in decision-making by public authorities. We now understand the full scope of their potential uses in fields as varied as urban mobility, communication of risks, optimization of electrical networks and territorial planning. But these new technologies can also make a society highly vulnerable, owing in particular to the growing dependence on telecommunications networks. What's more, it's important to make sense of the varied data compiled so that it serves the public interest, while ensuring the protection of citizens' privacy.

With a focus on five specific questions, therefore, this focus area seeks to give closer scrutiny to the challenges Montréal will face in the future:

- How can smart transportation be used to improve urban mobility on a daily basis and facilitate movement in the event of a disaster?
- How can land use development planning better take into account natural and man-made risks and the protection of ecosystems?
- How can we take advantage of the upgrading of infrastructures to ensure that tendering conditions account for climate and demographic change, while sticking to cost-benefit analyses?
- How can we anticipate the needs of citizens in terms of housing and coordinate relocation efforts in emergency situations?
- How can we make the most of big data and better use conclusive data to support decision-making and actions that hold related advantages?

TOWARDS A RESILIENCE STRATEGY FOR MONTRÉAL / PHASE 2

The work carried out in recent months served to raise a number of questions. Phase 2, which began in January 2017, will provide an opportunity to analyze our focus areas by developing more in-depth diagnostic questions together with the city's stakeholders. Prioritization exercises and brainstorming workshops will be used to forge new collaborations within the framework of the resilience strategy and to promote further consideration of resilience as a part of initiatives underway at the city.

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