

# COMMUNITY RESILIENCE MINI-GUIDE

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### **About QUEST**

QUEST is a national non-government organization that works to accelerate the adoption of efficient and integrated community-scale energy systems in Canada by informing, inspiring, and connecting decision-makers. The organization commissions research, communicates best practices, convenes government, utility, and private-sector leaders, and works directly with local authorities to implement on-the-ground solutions. QUEST grounds all its activities in the “Smart Energy Community” – a concept that encapsulates the ideal end state of our work.

Visit us at [www.questcanada.org](http://www.questcanada.org).

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## Eight Tips to Develop a Resilience Strategy

### 1. Know where you stand before you start

**Set the context with an inter-departmental survey.** QUEST developed a survey that was sent to municipal staff representing different departments. The purpose was to identify policies, practices, and infrastructure in place, identify gaps, and collect other relevant information to get a better understanding of the community context and prepare next steps.

### 2. Know your enemy

**Obtain climate change projections** (e.g. using [Canada's Changing Climate Report](#) and [Climate Data for a Resilient Canada](#)) and determine implications for the community in terms of hazards. Discuss the probability and consequence of various types of direct and indirect climate hazards, and potential local impacts. In addition, use the [Justice Institute of British Columbia's Rural Disaster Resilience Portal](#) to identify level of risk and current level of resilience, for each hazard type e.g. flooding, ice storms, fires, etc.

### 3. Be broad, be open, be rigorous

**Adopt a robust, systematic, and inclusive methodology.** The approach adopted by QUEST is based on on-the-ground collection of data and information and robust and participatory methodology structured around a survey and two interactive and participatory workshops.

QUEST designed the workshop exercises to be inclusive and bring multiple stakeholder groups that do not usually discuss together around the same table. Participants included municipal staff from all departments both at the management level and in the field. Representatives from energy utilities, emergency measures, the business community, and community leaders also participated in the workshop. The diversity of participants in the room informed the conversation and captured more complete and accurate information.

The methodology (as outlined in [Section 2.4](#)) adopted during the project proved to be effective at engaging key stakeholders, assessing climate risk and local vulnerabilities, and identifying potential adaptation measures best suited to each community's context. Based on this we provide the following key considerations for municipalities interested in resilience planning.

Based on the results of this initiative QUEST recommends other Canadian municipalities use a flexible approach that includes:

- Gathering data about the municipality (e.g. infrastructure, policies and practices), and obtaining climate projections using [Canada's Climate Change Report](#) and [Climate Data for a Resilient Canada](#)
- Conducting two in-person workshops engaging all stakeholders (including staff, council members, energy utilities, EMO, local businesses, and community organizations)
- Undertaking a self-assessment using the [10 Essentials for Disaster Risk Reduction](#), to identify organizations strengths and opportunities for improving resilience
- Facilitating [table-top mapping exercise](#) to identify strengths, vulnerabilities and opportunities for improving resilience

- Analysing level of risk and resilience (for each hazard type) using [JIBC's Disaster Resilience Portal](#)
- Preparing recommendations (based on the results of the above steps)
- Discussing and selecting potential adaptation measures, assigning priority, cost, and Lead Department, identifying associated challenges or needs, and any existing plans or processes in which to embed the selected measures

#### 4. Identify your strengths and weaknesses

**Understand your organizational strengths and weaknesses.** QUEST conducted an exercise using the [10 Essentials for Disaster Risk Reduction approach](#) (also known as *Making Cities Resilient*). Developed by the UN ISDR (International Strategy for Disaster Reduction), this methodology is endorsed by the Government of Canada. It enables participants to identify community strengths and where improvements may be needed in a range of areas, including organization, budgeting, training, etc. It provides a high-level framework to determine the strengths and weaknesses in a community, to be able to better target efforts at improving resilience.

**Map your vulnerable and resilient assets.** The second exercise is a participatory mapping exercise<sup>1</sup> that provided workshop participants with a hands-on resilience-building mapping experience and enabled them to share knowledge, discuss localized resilience, apply basic techniques for identifying risks and vulnerabilities in a spatial context, as well as planning local adaptation and resilience measures. Participants then drew and noted hazards, risks and opportunities to improve resilience on a large map of their community. Dot stickers, markers, and a colour-coded legend enabled participants to note these opportunities, and discuss various aspects/viewpoints. The QUEST team collected and presented key findings in a Climate Risk and Resilience Assessment Report. This report lists facilities and assets located in hazard-prone areas, potential shelters for heat waves or power outages, vulnerable neighbourhoods, areas to encourage or discourage development, and more.

#### 5. Consider your options

**Identify key areas of improvement and possible adaptation measures.** The results of the previous exercises reveal important areas of improvement and point toward possible adaptation measures. Just like in this project, a second workshop helps municipalities to identify, select, and prioritize recommendations for adapting to climate change. Don't forget to assign tasks and responsibilities!

**Build your library.** As adaptation to climate change is an increasing and pressing issue, provincial, federal, and international agencies are developing resources, tools and recommendations to assist municipalities in becoming more resilient. [Appendix 2](#) provides additional resources to guide you in the development and implementation of a Climate Adaptation Plan.

#### 6. Don't reinvent the wheel, just enhance how it spins

**Integrate recommendations into existing municipal plans and processes** as much as possible. For example, QUEST produced a *Recommendation Report* building on recommendations selected by participants in workshop 2. For each recommendation, we identify a Department Lead, timeline, urgency, cost, challenges, and next steps, as well as how to embed within existing plans (e.g. EM Plan, Land Use Plan, Asset Plan, etc.).

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<sup>1</sup> Originally developed by Spatial Quest to support NB Municipalities's work on resilience, the exercise has been adapted by QUEST for the Municipalities and Utilities Partnering for Resilience initiative.

**Improve existing public education into a sound communication strategy.** With relevant staff, assess your existing public communication strategy on disaster preparedness (before an event) and emergency response (during an event). Map community stakeholders who are already included and are missing. Develop specific messages and training exercises for each type of climate hazards for different audiences (public and business). [Section 4.2](#) below presents some tips for an efficient communication strategy.

**Look at what other municipalities are doing.** When developing your own climate measures or reviewing them, check what other municipalities have been doing and identify similarities and differences. This may help you identify strengths and gaps.

## **7. Secure stable financial resources.**

**Estimate costs and look for internal and external funding sources.** Securing funding and a budget is crucial to the viability of some climate adaptation and emergency management measures. It may be challenging to secure funding, especially when competing with other municipal priorities. There are different strategies to secure financial sources. They are presented in [Section 4.3](#) below. This is why it is important to estimate the cost of each action and to engage both the Chief Administrator office and the Finance office when developing an action plan.

## **8. Repeat**

Review on a regular basis climate projections and monitor and report on your progress. Reassess priorities at least once every 5 years. Continue engaging all staff and external community members.

## Tips for an Efficient Communication Strategy

Based on most frequently selected recommendations, **Table 9** presents some tips to develop an effective education communications plan. It can be tailored to the needs of any community.

**Table 9: Tips for an effective public education communications plan**

<p><b>Activities</b></p>	<ul style="list-style-type: none"> <li>● Plan annual resilience day activity or exercise (this is essential)</li> <li>● Engage other community organizations to educate employees, customers, participate in resilience day activity</li> <li>● Ensure local schools provide some training within the curriculum, on climate change, emergency preparedness, or organize a resilience awareness day</li> <li>● Ensure communication plan for promoting preparedness (72 to 96 hours) and alerting the public of hazards, how to prepare, where to shelter or when to evacuate, as well as how you will keep them informed</li> <li>● Provide seasonal updates and guidance (e.g. mail pamphlet, social media, news release)</li> <li>● Communicate/Alert public in advance of impending storms, floods, etc.</li> <li>● Provide clear, simple, or tailored messaging for different audiences (e.g. residents, businesses), by neighborhood, or by local risk and vulnerabilities and adaptive measures</li> </ul>
<p><b>Messaging</b></p>	<ul style="list-style-type: none"> <li>● Provide clear, simple, or tailored messaging for different audiences (e.g. residents, businesses) or by neighborhood</li> <li>● Ensure public knows where to get town's information</li> <li>● Incorporate specific messaging based on hazards in your community (see table below)</li> </ul>
<p><b>Channels / medium</b></p>	<p>Explore the use of various channels to communicate with the public:</p> <ul style="list-style-type: none"> <li>● website</li> <li>● media (radio, paper, tv)</li> <li>● notices</li> <li>● social media</li> <li>● brochures/pamphlets</li> <li>● workshops, events</li> <li>● bill inserts (e.g. water bills)</li> </ul>

**Table 10** suggests key messages for different types of climate hazards. The messaging recommendations were partly informed through [JIBC's Rural Disaster Resilience Portal](#).

**Table 10: Examples of key messages by hazard type**

<b>Blizzards, Snow/Ice Storms, and Cold Weather</b>	Encourage residents to have heating sources that do not require power and/or have alternate power sources (e.g., generator).
	Encourage homeowners to have back-up generation for any private and shared wells.
	Communicate a list of community heating locations/drop in zones.
	Encourage most residents have winter tires and winter emergency kits (including rock salt, shovels, blankets, food and water) in their vehicles.
	Encourage residents to help with breaking up ice and snow near drainage.
<b>Hailstorms</b>	Educate residents about storm safety e.g. to stay indoors and away from windows, skylights and glass doors during hail and avoid contact with plumbing, corded electrical equipment, concrete floors and walls if there is lightning along with the hail, as well as to store vehicles under cover.
	Encourage businesses and residents to store vehicles under cover.
<b>Heat Waves</b>	Educate residents about heat waves and how to know the warning symptoms of heat exhaustion and how best to keep cool (short term). Use Health Canada guidelines (Heat Alert Response System).
	Encourage businesses and residents to conserve water during the summer months (when there is a water deficit), and notify residents, businesses, farmers etc., of water shortages or drought conditions.
	Encourage businesses to self identify as potential cooling centres.
<b>Windstorm or Hurricane</b>	Encourage most residents have designated areas of refuge in their homes.
	Encourage businesses and residents to prepare for high winds by: covering windows with storm shutters or plywood, reinforcing garage doors, securing boats to land or storing them on land, and removing potential windborne missiles such as barbecues and patio furniture. Ensure residents are educated about storm safety and know to stay indoors and away from windows, skylights and glass doors during hail and avoid contact with plumbing, corded electrical equipment, concrete floors and walls if there is lightning along with the storm.
	Communicate evacuation routes and designated shelters, on an event by event basis.
<b>Hydrological Hazards, including floods</b>	Encourage businesses and residents to have back-water valves and sump pumps installed with back-up power.
	Encourage community organizations and watershed organizations to participate in tree planting, restoration, and protection of ecosystems (wetlands, watercourses, etc.). Encourage developers to consider bioretention practices.
	When flooding affects the town's wastewater system, ensure businesses and residents: limit their water use Less flushing and less use of appliances with pressurized drainage, such as dishwashers and washing machines, means less pressure on the system.
	Communicate location of shelters, closed roads and evacuation routes.



<b>Hazardous Material Spills</b>	Consider a public education program for the community on railway safety. Work with rail companies and local industry, as well as Fire Departments.
	Use signage to limit the amount of trucks carrying hazardous materials through core neighborhoods. Reduce speed limits, install roundabouts, and educate drivers.
	Educate residents about risks associated with driving during extreme weather events, such as ice storms, snow storms, wind storms, and flooding, and to drive with caution.
<b>Power Outage / Interruption to Energy Supply</b>	Educate residents on what to do (e.g. turn off all appliances) and not to do (e.g. avoid using propane, bbq inside) during restoration/cold start of grid. Educate residents on generator installation and use.
	Inform residents that 72 to 96 hours preparedness (especially in rural and remote areas) is better for prolonged outages.
	Educate residents on restoration procedure, priority level of customers.
	If outage occurs in winter, communicate a list of community heating locations/drop in zones, and charging centers, that have back-up power.
	Educate residents and businesses know how to handle or dispose of food items after power is restored.
	Encourage residents to have heating sources that do not require power and/or have alternate power sources (e.g., generator).
	Encourage homeowners to have back-up generation for private and shared wells, or for medical needs.
	Encourage businesses (including grocers, convenience stores, fueling stations, and key employers) to have back-up generators in place and ready to be used.
<b>Brush, Bush Grass Fires; Wildland / Urban Interface Fires</b>	Survey how many grocers, stores, fueling stations have back-up power.
	Recommend to residents to have home fire evacuation plans and have tested them.
	Promote and recommend FireSmart principles to residents.
<b>Food Security</b>	Encourage vegetation management (pruning trees, removing flammable brush, etc) to limit risk of forest-urban interface fires.
	Encourage residents to participate in community gardens, household gardens, rooftop gardens.
	Encourage and support locally grown food (e.g., community gardens in the summer, year-round greenhouse with back-up, container aquaculture/agriculture, local markets, etc).
	Encourage all farmers who have essential power needs (e.g., greenhouses, dairy operations) have back-up power supplies.
	Encourage residents to have non-perishable food stored as part of their 72 hour preparedness kit.

*Note: Messaging recommendations were partly informed through the Justice Institute of British Columbia's Rural Disaster Resilience Portal.*

## Budget and Funding Considerations

Participating municipalities noted that municipal financial capacities are limited, and that investment from the federal and provincial levels of government is needed to support local projects and initiatives.

It may be challenging to secure funding, especially when competing with other municipal priorities. The table below presents different strategies to secure financial resources for municipalities. These funding sources are usually available for plans, studies, pilot projects and/or capital projects. They may require matching funding.

FCM and the Local Governments for Sustainability (ICLEI) recently published a toolkit called [On the money: Financing tools for local climate action](#), that explains how your municipality can leverage private and community investors to help you take action on climate change in your community. This toolkit includes tips on how to harness people power through group purchasing and community owned renewable power, break capital barriers with local improvements and energy performance contracts, and create a funding cycle with green revolving funds and green bonds.

The two following handbooks provide helpful, on-the-ground solutions to secure funding for energy resilient infrastructure that may be relevant to your community:

- [Bridgewater Financing Mechanism Scoping Study \(2019\)](#)
- [Community Energy Investment Strategy for Waterloo Region \(2018\)](#)

**Table 11** presents some possible funding strategies to secure financial resources for the development and implementation of Climate Adaptation Plan.

**Table 11: Strategies to secure financial resources**

Sources	Description
Budget	Create budget item/fund for adaptation to support adaptation measures
Internal financing sources	<ul style="list-style-type: none"> <li>● Property taxes, tax levies</li> <li>● Tax Increment Financing, Local Improvement Charges</li> <li>● User fees (on water, power and natural gas distribution system, waste, etc.)</li> <li>● Development Cost Charges (DCCs)</li> <li>● Green bonds</li> </ul>
Local Incentives and Rebates	<ul style="list-style-type: none"> <li>● Development Cost Charge reductions</li> <li>● Local Improvement Charge financing (LIC) or Property Assessed Clean Energy (PACE) programs</li> <li>● Fee rebates/credits (on water and energy bills); local economic incentives for investing in disaster risk reduction for households and businesses, and new developments (e.g. tax holidays for businesses, faster permitting for developments meeting certain adaptation criteria)</li> </ul>
New accounting/ decision-making tools	<ul style="list-style-type: none"> <li>● Consider natural asset management approach - full cost accounting and valuation of natural assets</li> <li>● Estimate avoided cost when presenting business case for adaptation measures</li> <li>● Combine funding with Gas Tax revenue</li> <li>● Reinvest efficiency savings into low cost adaptation measures, community engagement, etc.</li> <li>● Update the long term financial plan to include considerations of climate change mitigation and adaptation</li> </ul>
Institutional grants and external sources of funding	<p>Scan and submit funding applications to</p> <ul style="list-style-type: none"> <li>● Federal agencies and governments               <ul style="list-style-type: none"> <li>○ <a href="#">NRCAN</a></li> <li>○ <a href="#">Environment and Climate Change Canada</a> (ECCC)</li> <li>○ <a href="#">Infrastructure Canada</a> programs</li> </ul> </li> <li>● FCM programs, including:               <ul style="list-style-type: none"> <li>○ <a href="#">Green Municipal Fund</a></li> <li>○ <a href="#">Municipalities for Climate Innovations Program</a></li> <li>○ <a href="#">Municipal Asset Management Programs</a></li> </ul> </li> <li>● Provincial programs and agencies</li> </ul>
Loans	<ul style="list-style-type: none"> <li>● FCM low-interest loan (GMF)</li> <li>● Municipal green bonds</li> </ul>
Leverage private investments	<ul style="list-style-type: none"> <li>● Engage private sector, to partner and financially support adaptation measures for infrastructure that supports their operations and/or immediate community</li> <li>● Ensure local Chamber of Commerce or others support efforts of small enterprises for business continuity during and after disasters</li> </ul>
Economy of scales and synergies at the local level	<ul style="list-style-type: none"> <li>● Leverage existing initiatives or project by expanding/adapting their scope and collaborating with other departments (thinking beyond silos)</li> <li>● Collaborate with neighbouring municipalities</li> <li>● When a measure involves several communities, cost-share (e.g. procurement of generators, building sea walls, etc.)</li> </ul>

## The library

### Generic resources

Natural Resources Canada's Impact and Adaptation Platform:  
<https://www.nrcan.gc.ca/climate-change/impacts-adaptations/10761>

Adaptation to Climate Change Team, Faculty of Environment, Pacific Water Research Centre,  
Resources page: <https://act-adapt.org/community/commuity-books/>

### Climate change data

Canada's Climate Change Data portal: <http://www.canadaccdp.ca/>

Climate Data for a Resilient Canada: <https://climatedata.ca/>

### Infrastructure and asset management planning

[Combatting Canada's Rising Flood Costs: Natural infrastructure is an underutilized option](#)  
Insurance Bureau of Canada, 2018. This report provides guidance to those considering or opting for a natural infrastructure solution. The natural infrastructure implementation framework that is being introduced provides such a structure, and it is consistent with the natural infrastructure preservation commitments Canada has made under the Paris Agreement, the United Nations' Sendai Framework for Disaster Risk Reduction and the Pan-Canadian Framework on Clean Growth and Climate Change.

[Public Infrastructure Engineering Vulnerability Committee \(PIEVC\) Protocol, Engineers Canada.](#)  
The Protocol systematically reviews historical climate information and projects the nature, severity and probability of future climate changes and events. It also establishes the adaptive capacity of an individual infrastructure as determined by its design, operation and maintenance. It includes an estimate of the severity of climate impacts on the components of the infrastructure (i.e. deterioration, damage or destruction) to enable the identification of higher risk components and the nature of the threat from climate change impact. This information can be used to make informed engineering judgments on what components require adaptation as well as how to adapt them e.g. design adjustments, changes to operational or maintenance procedures.

The [Municipal Natural Asset Initiative's](#) latest research report, [Opportunities to Fund Municipal Natural Asset Management Projects](#), reviews six of Canada's major infrastructure funding programs from the perspective of a manager wanting to fund a municipal natural asset project. It identifies key considerations in determining project eligibility and funding terms and offers an easy-to-use program overview chart

[Building Community Resilience Through Asset Management. A handbook and toolkit for Alberta Municipalities.](#) (2015). The purpose of this handbook is to introduce asset management concepts with a focus on implementation to small and mid-sized communities. This handbook:

1) provides an overview of the process of asset management, the objectives, and the benefits; 2) Identifies the mindsets and key elements of asset management that enable success; 3) Describes information management for asset management and good decision making; 4) Shows how staff throughout a municipality contribute to successful asset management; and 5) Suggests ways of implementing asset management through existing municipal processes.

## Land-use planning

[Risk-based Land-use Guide: Safe use of land based on hazard risk assessment](#), NRCAN, 2015.

This guide explains three key actions intended to assist municipal staff determine whether land-use proposals will be safe for their intended use. It explains: 1) how to integrate hazard risk management into existing land-use management instruments; 2) how to determine if the hazard risk of a land-use proposal is acceptable; 3) how to consider reducing the risk to tolerable and acceptable levels.

## Emergency response

Institute for Catastrophic Loss Reduction: <https://www.iclr.org/>

[Heat Alert and Response Systems to Protect Health: Best Practices Guidebook](#). Government of Canada. The guidebook provides an overview of health risks from extreme heat and offers evidence-based strategies for alerting health authorities and the public when hazardous conditions arise. It is intended for use by policymakers, planners and service providers involved in protecting citizens from extreme heat events. The Guidebook is designed to help develop interventions tailored to the needs of a specific community.

## Building codes and standards

[Infrastructure Canada's Climate-Resilient Buildings and Core Public Infrastructure Initiative](#). With \$42.5 million in financial support from Infrastructure Canada, and in support of the Pan-Canadian Framework on Clean Growth and Climate Change, the National Research Council Canada (NRC) is undertaking ground-breaking work to integrate climate resilience into building and infrastructure design, guides, and codes. This initiative is intended to develop capacity in Canada's construction industries to adapt to the increasing demands on our built infrastructure attributed to climate change. The work undertaken by the NRC will contribute to an infrastructure landscape that can keep Canadian communities safer from extreme weather and the effects of climate change.

[Building for climate change A quick guide for homeowners and builders](#). Southwest New Brunswick Service Commission. This handbook will focus on building and landscaping approaches to address four key threats: wildfire, flood, extreme precipitation, extreme wind.

## Funding and budget

[On the money: Financing tools for local climate action](#), FCM and ICLEI (2018). The report explains how your municipality can leverage private and community investors to help you take action on climate change in your community. This toolkit includes tips on how to harness people power through group purchasing and community owned renewable power, break capital barriers with

local improvements and energy performance contracts, and create a funding cycle with green revolving funds and green bonds.

The two following handbooks provide helpful, on-the-ground solutions to secure funding for energy resilient infrastructure that may be relevant to your community:

- [Bridgewater Financing Mechanism Scoping Study](#) (2019)
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