

CLIMATE RISK AND RESILIENCE RECOMMENDATIONS REPORT

CITY OF CHARLOTTETOWN

This Report was prepared as part of the Municipalities and Utilities Partnering for Resilience
Project led by QUEST (www.questcanada.org)

QUEST

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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 recognizes communities that have embraced these principles by referring to them as Smart Energy Communities. Visit us at www.questcanada.org.



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1.0 Executive Summary

1.1. Key findings

In the Resilience Assessment Report the City of Charlottetown identified the following weaknesses or areas of improvement: a need for more communication, coordination, and partnerships with local key stakeholders on emergency management and resilience/adaptation measures; regulations to encourage low risk development; budget and resources to carry out proactive risk reduction planning and measures (as identified in this report); and reducing risk to any facilities and key infrastructure that was identified as being vulnerable, including reducing flood risk and implementing back-up power systems. The City displayed strong support for improved communication, engagement, education, collaboration, and information sharing with the community and local stakeholders, as well as a need to improve policies, budget and resources, to advance risk reduction activities, and to integrate climate, resilience, and adaptation considerations across all departments and activities.

This report is intended to help the City address these shortcomings with specific recommendations selected during the second workshop. This Recommendations Report cover each of these key hazards. To make this report user-friendly and impactful, the recommendations detailed below are organized by lead department responsible for implementing them.

As a reminder, the major hazards identified in the City of Charlottetown are presented in the table below.

Table 1: Major Hazards

Hazard types	Description
Atmospheric hazards	Increase frequency of snow storms, ice storms, wind storms, sea storms and surges, and the number of hot days (above 29 degrees Celsius) which are expected to more than quadruple by the 2080s, with more freeze-thaw cycles in the winter months.
Hydrological hazards	Coastal flooding, sea level rise, and other forms of flooding (e.g. rainstorm) from increased precipitation, especially in winter and spring.
Geological Hazards	Shoreline Erosion
Power & Water Outages	Extended outages are possible due to ice loading and extreme weather events on distribution and transmission lines. Food and diesel (for generators) are transported to the city via the Confederation Bridge which is closed several times a year due to extreme weather.
Hazardous material spills / contamination	Identified as a risk to the city's drinking water. Charlottetown's potable water comes from a series of wells located within the Winter River watershed.

1.2 Key priority actions

Some key recommended priority actions are presented in the table below. They are based on the data collected during the two workshops and the survey.

Table 2: Key recommended priority actions

Recommendation	Description	Refer to...
Create a task force, committee, or working group, to oversee progress and advance climate adaptation measures	Does not have a group or person responsible for resilience. EMO Committee is comprised of Management staff (not a council committee). All resilience work could be overseen by EMO Committee, with participation from Environment and Sustainability Department. The Fire Chief is the EM Coordinator. The committee will engage community stakeholders, enable collaboration, knowledge exchange, and accountability. This committee should involve staff, council member, and a range of community stakeholders (industry, power utilities, community associations, local government, emergency management, reps from school and care facility, insurance provider, etc.)	Section 3.1
Designate a lead who will report to Council	The coordinator should be designated from the Environment and Sustainability Department and overseen by the EMO committee.	Section 3.1
Ensure all critical municipal facilities and services have access to mobile or stationary back-up	Consider multiple energy sources for Emergency Operations Centre, Lift Stations/Water Treatment, Emergency Shelters. This can be achieved through diesel generators (mobile), or natural gas (stationary), and renewable energy sources. This will provide redundancy to mitigate potential gaps in critical services provided to citizens during severe weather events. Participants noted: need new portable generator. Fixed generator for Public Works is needed. Mid sized mobile generator for lift stations needed.	Section 3.1
Ensure that hazard, risk assessment, climate change plan, emergency plan, asset plan reference and leverage each other	Cross integration of these plans will help mitigate possible gaps in each individual plan, as well as provide strong disaster risk reduction during rapidly changing conditions.	Section 3.1
Consider a Property Assessed Clean Energy program or other financing tool to encourage community energy efficiency and on-site renewable generation.	Consider a Property Assessed Clean Energy program or other financing tool to encourage community energy efficiency and on-site renewable generation. The City may offer education on incentives. Funding could be provided from the FCM and provincial and federal governments when feasible.	Section 3.2

Invest in green Infrastructure	An investment in green infrastructure will enhance resilience strategies and climate adaptation plans. Green infrastructure may include bio-retention and a greater number of green spaces). By using a Natural Asset Management approach, the City may reduce risk of flooding and reduce stormwater intrusion in sewer systems. Participants identified a potential for green infrastructure in the Ellen’s Creek area, the Belvedere Golf and Winter Club area, and the area between Kensington Road and Strawberry Lane. Participants noted: Need more retention.	Section 3.3
Update Asset Management Plan to incorporate climate risk	The City’s Asset Management plan is under development and will incorporate a climate risk assessment.	Section 3.4
Create a shared GIS system between the Province, Municipality and Utilities	The creation of a shared GIS system will facilitate engagement and accountability between these stakeholders. This system would facilitate data integration and support EM teams to provide a broad scope of potential hazards and risks.	Section 3.5
Ensure existing shelters have provisions for increased capacity during hazardous conditions	Preparedness will mitigate gaps in critical services and reduces risks to vulnerable members of the population that are disproportionately affected by climate change and related hazards. This also includes back-up power supplies and emergency transportation plans to local hospitals.	Section 3.5
Ensure the community has suitable regulations to limit or prohibit development, within flood hazard areas	Risk sensitive land use regulations, building and health and safety codes need to support disaster risk reduction. Limit land use, or require specific building codes for developments, such as elevating structures above maximum flood levels (e.g., 100 to 200 year flood level), requiring waterproof materials and anchoring buildings to prevent floatation, requiring set-backs from flood prone areas, raising electrical equipment	Section 3.5
Work with property owners in flood prone areas	Collaboration property owners with to examine options for reducing flood risk. Floodplains have been identified and mapped, but it is unclear how many buildings are affected in the City.	Section 3.5
Ensure flooded properties only rebuild with the necessary flood mitigation measures	Provide measures such as elevating structures, waterproofing, anchoring buildings, raising electrical panel/equipment, relocating and set-backs to reduce future risks to previously impacted properties.	Section 3.5
Identify zones where development is discouraged	Through the City’s Land Use Plan, and zoning regulations, or Official Plan, notify builders of restrictions. Specifically, along coastal, shoreline areas due to the risks related to sea level rise.	Section 3.5

Consider preventing new development	Consider preventing new development, or requirements for set-backs, raising structures, or flood-proofing structures, to protect from impacts of sea level rise	Section 3.5
Develop Corporate heat wave policy for municipal staff	Reduce risk of heat exhaustion and other heat related illnesses to staff through policy management, and health and safety regulations.	Section 3.6
Ensure the community has implemented structural measures to reduce the risk of flooding	Construction of such as dams, dykes and floodwalls, creating reservoirs or making channel improvements will reduce risks to the City. Participants noted the need to protect the wastewater treatment plant and lift stations.	Section 3.7
Ensure the community has updated water infrastructure	Participants noted aging infrastructure that still includes the use of iron pipes. Developing Sewer and Water Master Plan is needed to provide guidance on appropriate mitigative measures. In addition, “hot-spot” mapping of issues is needed to identify critical areas in immediate need of service. The installation of fiber optic lines would improve communications for water system management.	Section 3.7
Develop an ongoing public education and outreach strategy to increase resilience to climate hazards in the community	Consider implementing a combination of activities, clear and simple messaging, and a variety of communication channels, to inform and educate the public and vulnerable populations	Section 3.8
Secure budget and funding	Access to financial resources is crucial to the viability of many climate adaptation and emergency management measures. Participants in the first and second workshops 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. The City is invited to explore multiple funding sources and mechanisms	Section 4.0

1.3 Challenges

Some of the key challenges that have been identified by workshop participants are:

- Need to create a committee structure to coordinate advancing these recommendations, and report to council. This could take the form of a staff task force, council committee, or integrated with an existing committee.
- Need for additional capacity (1 FT staff) to tackle many of the recommendations, and develop, implement, and report on long-term adaptation measures
- Ensuring alignment of hazard/risk assessment, climate change plan, emergency plan, asset plan, and that they inform each other.
- Continued public education and stakeholder engagement - must be proactive
- Budgetary constraints are a barrier to the implementation of some recommendations.
- The municipality does not always have the power to constrain residents and business owners, nor to involve schools and change building codes as those are provincial powers.

2.0 Introduction

2.1 Contents of This Report

This report covers recommendations ranked as “Important” by participants for improving community resilience and adapting to climate change. They are tailored to local context and use data presented in the Resilience Assessment report and collected during the second workshop.

This report organizes all selected recommendations by the stakeholder/department identified as being responsible for implementation (i.e.: the “lead”), as well as by priority assigned by the participants. Recommendations address vulnerabilities associated with each type of climate-related hazard and areas of low resilience for each community. It also integrates a specific lens on addressing the needs of vulnerable populations. Areas of strength, or measures that are already implemented by the municipality, were identified within the Climate Risk and Vulnerability Assessment Report and associated annexes - these areas of strength are not covered in this recommendations report.

Finally, the report also includes a detailed section on budget and funding consideration and on internal and external communication strategy, which are crucial to the implementation of all recommendations.

2.2 The Issue

Municipalities across Canada are facing extreme climate change impacts, such as high winds, ice storms, floods, droughts, and forest fires. At the same time, almost 90% of Canadian energy utilities have been significantly impacted by a weather event in the past decade¹. Both municipal systems and energy distribution systems are essential, interconnected, and must work together to maintain the resilience of a community. Reliable energy supply is needed to maintain the essential functions of everyday life. This includes the operation of municipal infrastructure such as water and wastewater treatment, heating and cooling of buildings, operating vehicle fleets, street lighting, powering emergency shelters, as well as other community infrastructure such as health systems, communications, transportation, food production, financial systems, and the list goes on.

Despite concerns that climate change and weather related events threaten the reliability and resiliency of Canadian energy distribution services, there remains limited tools and assessment processes to help local governments and utilities collaboratively and effectively plan to reduce risks and costs to residents and businesses. This project aimed to develop assessment tools and recommendations to foster collaboration between municipalities, utilities, and other key community stakeholders so they can work together on adaptation through land use planning, energy planning and reliability measures, and emergency response during power outages.

2.3 The Project

The “**Municipalities and Utilities Partnering for Community Resilience**” project led by QUEST with funding from Natural Resources Canada (NRCan), supported six municipalities to develop climate risk and vulnerability assessments using a combination of workshop exercises, validated tools, and methods.

¹ See QUEST’s [Resilient Pipes and Wires](#) report. 2015

In 2018, a survey and a workshop assessing resilience were conducted. The participatory and interactive workshop tapped in participants’ knowledge to identify strengths and gaps in their community to climate and industrial hazards. Each participating community received their draft Resilience Assessment report, which also includes climate change trends, in early 2019.

Based on the Resilience Assessment report the project team prepared a set of recommendations for each community. The recommendations were selected, discussed, and prioritized during a second workshop with municipal participants, local utilities, and other local stakeholders that took place in Spring 2019. For each recommendation selected, participants were invited to assign a timeline, a cost range, and a department/unit lead. Participants were also invited to identify other stakeholders to engage; and whether the implementation of this recommendation needed further study, faced any specific challenges, or could be integrated within existing plans.

2.4 List of Stakeholders

Table 3: Participating Stakeholders

Person’s Role	Organization
Manager, Environment and Sustainability	City of Charlottetown
Manager or Parks and Recreation	City of Charlottetown
Manager of Planning and Heritage	City of Charlottetown
Manager Water and Sewer	City of Charlottetown
Superintendent	Maritime Electric
Superintendent, Engineering	Maritime Electric
Sustainability officer	City of Charlottetown
Energy Coordinator	City of Charlottetown
Infrastructure and Asset Management	City of Charlottetown
Senior Climate Change Adaptation Policy Advisor	PEI Climate Change Secretariat

In order to implement resilience recommendations, the municipality should also engage:

- A specific staff person responsible for resilience and sustainability
- CAO and Staff from all departments
- Council (for budget and policy decisions)
- Emergency Service Providers
- External stakeholders
- Public

3.0 Recommendations by Lead Responsible

This section presents the key recommendations for the community by lead department/organisation. The recommendations address vulnerabilities associated with climate hazards that have been identified in the Assessment report. For a detailed list of all recommendations, see the spreadsheet document, sent in a separate Annex.

3.1 EMO

Recommendation	<ul style="list-style-type: none"> • Create a task force, committee, or working group, to oversee progress and advance climate adaptation measures; to engage community stakeholders, enable collaboration, knowledge exchange, and accountability. This should involve a range of community stakeholders (industry, power utilities, community associations, local government, emergency management, reps from school and care facility, insurance provider, etc.) • Designate a lead / coordinator, who can report to Council
Category	Coordination and Planning
What was said?	Does not have a group or person responsible for resilience. EMO Committee is comprised of Management staff (not a council committee). All resilience work could be overseen by EMO Committee, with participation from Environment and Sustainability Department. The Fire Chief is the EM Coordinator. The Town currently doesn't have Directors or Deputy CAO, so it's difficult to allocate responsibilities. Could involve standing committee of council "Strategic Priorities and Intergovernmental Communications" only comprised of councillors
Who will lead?	EMO Committee
Who to engage?	Nothing Specified (suggest: all those listed in recommendation)
What municipal plans to leverage?	EM Plan
Potential next steps	<ul style="list-style-type: none"> • Establish committee or task force (Council directive), or assign these actions to existing committee e.g. Environment or EMO Committees. • Appoint Chair, who will develop a schedule of meetings, engage committee/task force members, facilitate meetings, provide oversight • Receive updates from Chair of Task Force/committee (quarterly)
Timeframe	Short
Priority	High
Cost	Low

	Yr-2020	Yr 2021	Yr 2022
A study <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Stakeholders Engagement <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Funding <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:
Implementation	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed

* Add level of completion: 25% 50% 75%

NOTES:

Recommendation	Ensure all critical municipal facilities and services (e.g., EMO Centre, Lift Stations/Water Treatment, Shelters, etc) have access to mobile or stationary back-up. Consider multiple energy sources: diesel generators (mobile), diesel or natural gas (stationary), and renewable energy sources that may compliment.
Category	Power Outage / Interruption to Energy Supply
What was said?	The City has backup power at City Hall and EMO, lift stations, water treatment, and four emergency shelters. The hospital, senior community care facilities, grocery stores, and fuel storage facility all have backup power. Conducted cost analysis involving upgrading or installing backup power in 23 buildings. The community has some backup generators, but there is no explicit count in the community. Participants noted: need new portable generator. Fixed generator for Public Works is needed. Mid sized mobile generator for lift stations needed.
Who will lead?	EMO Committee
Who to engage?	Council for funding decisions
What municipal plans to leverage?	EM Plan
Potential next steps	<ul style="list-style-type: none"> ● Identify and prioritize facilities needed back-up power ● Study to size back-up power correctly. ● Access funding / obtain Council approval on budget. ● Implement back-up power systems
Timeframe	Short
Priority	High
Cost	High

	Yr-2020	Yr 2021	Yr 2022
A study <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
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* Add level of completion: 25% 50% 75%

Recommendation	Ensure that hazard/risk assessment, climate change plan, emergency plan, asset plan, etc reference and leverage each other.
Category	Coordination and Planning
What was said?	Participants Noted: we don't have someone to coordinate. All departments need to integrate their policies into the planning document. Resilience needs a section, under which could fall the EMP. Does not have climate adaptation plan
Who will lead?	EMO Committee, Environment and Sustainability Department
Who to engage?	Heads of Departments, and all staff
What municipal plans to leverage?	Nothing Specified (all)
Potential next steps	<ul style="list-style-type: none"> • Complete climate adaptation plan, integrate recommendations from this report; or, assign recommendations to each Department/Lead • Ensure staff responsible for each plan (asset management, land use, EM) integrate climate considerations and consult each other.
Timeframe	Low to Mid
Priority	Mid to High
Cost	Low

	Yr-2020	Yr 2021	Yr 2022
A study <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Stakeholders Engagement <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
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Recommendation	Have plans in place to deal with : tourist peaks, as well as evacuees from other communities, during extreme events (i.e. extra shelters, water distribution, EMS, transportation, accommodation).
Category	Coordination and Planning
What was said?	Participants Noted: limited capacity at Emergency Operations Centers. Need Communications about evacuations. Need to develop shelter plans for each season. Set up shelter for utility crews (priority access) - hotels are sometimes unavailable. Could use AirBnBs / BnBs. Red Cross can set up cots / volunteers. Need to plan shelter arrangements for tourists (cruise ships), utility crews, and citizens. Cruise ship tourists can occupy 80% of shelters/hotels. Can Cruise Ships be used as shelter - usually self-sufficient.
Who will lead?	EM Committee, Parks and Recreation
Who to engage?	EM Committee, local hotels, venues, radio stations, cruise ships
What municipal plans to leverage?	EM Plan
Potential next steps	<ul style="list-style-type: none"> ● Organize a table top discussion with stakeholders ● Discuss vulnerabilities and identify actions with stakeholder input ● Conduct study if needed
Timeframe	Mid
Priority	Low to Mid
Cost	Low

	Yr-2020	Yr 2021	Yr 2022
A study <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
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* Add level of completion: 25% 50% 75%

Recommendation	Lessons learned / debrief post events - Need to formalize recording of lessons learned.
Category	Coordination and Planning
What was said?	Also need training for EOC staff on the emotional aspects of working these positions (separation from family, dealing with injuries, etc.)
Who will lead?	EM coordinator
Who to engage?	EM Committee members
What municipal plans to leverage?	EM Plan
Potential next steps	<ul style="list-style-type: none"> Summarize outcomes / Lessons learned and potential actions
Timeframe	Short
Priority	Low
Cost	Low

	Yr-2020	Yr 2021	Yr 2022
A study <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
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* Add level of completion: 25% 50% 75%

NOTES:

Recommendation	Work with local and provincial EMO to design training / exercises. Focus on key hazards identified in this assessment.
Category	Coordination and Planning
What was said?	Participants noted: EMO offers courses that some staff take. Provincial EMO often attend our table-top exercises. Participants noted: Food Security Committee undertook an asset mapping to document Food supplies, Food banks, refrigeration, etc.
Who will lead?	EM Committee
Who to engage?	EOC, some staff, Province
What municipal plans to leverage?	EM Plan
Potential next steps	<ul style="list-style-type: none"> ● Identify exercise scenarios or table top topics ● Invite internal and external stakeholders to participate ● Hold hazard-specific exercises or table top discussions ● Summarize outcomes / Lessons learned and potential actions
Timeframe	Short
Priority	Low
Cost	Low

	Yr-2020	Yr 2021	Yr 2022
A study <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
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* Add level of completion: 25% 50% 75%

NOTES:

Recommendation	<ul style="list-style-type: none"> • Ensure vulnerable populations are informed of plans / what to do • Create a voluntary registry of vulnerable persons, invite the public to register. Update contact tree to include groups that currently serve / or could help reach vulnerable citizens • Establish plan for transporting disabled, elderly, low-income, newcomers, etc, to shelters; and evacuating potentially isolated neighborhoods • Communicate future potential hazards / climate risk in the community, and your planned measures or adaptations
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Category	Vulnerable Populations
What was said?	Affordable housing committee launched in 2019
Who will lead?	EM Coordinator, with support of Social Development, Social Housing, Province Community support for Queen's County (Angela Blanchard)
Who to engage?	Nothing Specified (Suggest EMO, Committee), local groups
What municipal plans to leverage?	Nothing Specified (Suggest: EM Plan)
Potential next steps	<ul style="list-style-type: none"> • Establish voluntary registry, contact tree • Coordinate with local organizations to engage vulnerable groups • Create Annex to EM Plan for communicating with and transporting vulnerable persons,
Timeframe	Nothing Specified
Priority	Nothing Specified
Cost	Nothing Specified

	Yr-2020	Yr 2021	Yr 2022
A study <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
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Implementation	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed

3.2 Environment and Sustainability

Recommendation	Consider PACE (Property Assessed Clean Energy) Program or other financing tool to encourage community energy efficiency and on-site renewable generation (using funding from FCM/Gov) if and when Provincial government/regulations allows.
Category	Power Outage / Interruption to Energy Supply
What was said?	Participants noted: City could offer education on incentives, home efficiency audits, and home solar. Doing a pilot soon
Who will lead?	Environment and Sustainability Department
Who to engage?	Efficiency PEI, Sherwood, HomeSol, Town staff
What municipal plans to leverage?	Community Energy Plan (CEP)
Potential next steps	<ul style="list-style-type: none"> Advocate to Province for enabling municipalities to implement PACE programming Study options for delivering a community retrofit program - e.g. Apply for FCM funding to conduct retrofits of 100 homes.
Timeframe	Short
Priority	Mid to High
Cost	Low

	Yr-2020	Yr 2021	Yr 2022
A study <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Stakeholders Engagement <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Funding <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:
Implementation	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed

* Add level of completion: 25% 50% 75%

Recommendation	Do survey and manage trees that could come down and affect power lines to municipal facilities - do trimming or place wires underground at those locations.
Category	Coordination and Planning
What was said?	Nothing Specified
Who will lead?	Environment and Sustainability Department
Who to engage?	Maritime Electric
What municipal plans to leverage?	Tree Bylaw, Forest Management Plan
Potential next steps	<ul style="list-style-type: none"> ● Conduct survey of trees near municipal facilities ● Identify trees needing trimming, or ● Identify wires to be put underground (and cost)
Timeframe	Short to Mid
Priority	High
Cost	High

	Yr-2020	Yr 2021	Yr 2022
A study <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Stakeholders Engagement <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Funding <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:
Implementation	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed

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Recommendation	Work with local insurers to encourage them to provide flood insurance products in your community
Category	Coordination and Planning
What was said?	Participants Noted: Educate each other - coordinate messaging. Partner with insurers to educate the public - especially on sump pumps and flood risk reduction. Province is developing a campaign on home flood risk reduction.
Who will lead?	Environment, with support of Communications
Who to engage?	Local Insurers
What municipal plans to leverage?	Communications Strategy
Potential next steps	<ul style="list-style-type: none"> • Contact insurers to determine if adequate coverage is available • Encourage at risk residents and businesses to get insurance
Timeframe	Short to Mid
Priority	Mid
Cost	Low

	Yr-2020	Yr 2021	Yr 2022
A study <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Stakeholders Engagement <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Funding <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:
Implementation	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed

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Recommendation	Explore local energy resources (CEP) for local renewable power and heat options at municipal facilities and shelters, for community energy (e.g. solar farm, microgrid), or district heat system.
Category	Power Outage / Interruption to Energy Supply
What was said?	<p>There is 40 MW permanent district heat, and 1.2 MW in electricity production which is primarily used by the Waste-To-Energy District Heat system. Looking to increase to 3 MW, and supply grid. Currently provides heat to key facilities such as: University of PEI, schools, Civic Centre, Fire Hall, Town Hall, Conference Centre, Mall and Plaza.</p> <p>Developed a Community Energy Plan. New opportunities were identified for:</p> <ul style="list-style-type: none"> ● 100kW solar – pumping; ● 100kW solar – reservoir; ● Biogas heating; ● Jean Canfield Office Building Federal; ● Asphalt plant (waste heat); ● Water reservoir solar field; ● Former landfill solar farm; ● WWTP solar; ● Micro-hydro at WWTP outfall.
Who will lead?	Environment and Sustainability Department
Who to engage?	Public Works, Utility, Asset Management, Parks and Recreation, Fleet operators, transit, Finance (PACE).
What municipal plans to leverage?	CEP
Potential next steps	<ul style="list-style-type: none"> ● Identify locations to study feasibility of renewable energy systems. ● Conduct or contract study to determine technical and financial feasibility of systems. Can apply for support from FCM GMF for studies. ● Apply for funding / budget for installation of renewable energy systems, where viable, in combination with new build and efficiency retrofits. Engage other community partners. ● Install community wind, solar and storage solutions, where feasible ● Consider expanding district heat system
Timeframe	Mid to Long
Priority	Mid
Cost	High

	Yr-2020	Yr 2021	Yr 2022
A study <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Stakeholders Engagement <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
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Implementation	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed

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Recommendation Install or subscribe to energy monitoring and management systems for all municipal facilities/assets, to analyse and identify measures to lower peak demand and energy useage, thus reducing energy costs while minimizing potential reductions/interruptions to services. This can include for example reducing non-essential power usage (e.g., turn-off unnecessary appliances, limit heavy usage to non-peak hours, adjusting HVAC, efficiency etc).

Category	Power Outage / Interruption to Energy Supply
What was said?	Participants noted: Lots of older buildings without controls. Honeywell has done some work, ASHRAE level 1 done. LED traffic lights , and some bulbs (streetlights) switched over.
Who will lead?	Environment and Sustainability Department
Who to engage?	Town staff, Contractors, Efficiency PEI
What municipal plans to leverage?	CEP
Potential next steps	<ul style="list-style-type: none"> ● Pilot/Implement energy monitoring software + equipment ● Run reports (energy use, costs), expand monitoring if needed ● Adjust power use/demand, through technology and operation improvements ● Apply to energy utility for incentives, FCM GMF for building retrofits
Timeframe	Long
Priority	Nothing Specified
Cost	High

	Yr-2020	Yr 2021	Yr 2022
A study <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Stakeholders Engagement <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Funding <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:
Implementation	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed

Recommendation	Use ECCC's new Climate Change Report / Portal to stay up to date with climate projections and hazards
Category	Coordination and Planning
What was said?	Participants noted: Have a preliminary draft of land use plan, may need to consider future climate risk. Does not have climate adaptation plan.
Who will lead?	Any staff
Who to engage?	Nothing Specified
What municipal plans to leverage?	Nothing Specified
Potential next steps	<ul style="list-style-type: none"> ● Access ECCCs Climate Change Report and Services ● Create data dictionary - of existing and needed data sets / maps ● Request or download additional GIS data: environmental, energy, etc ● Work with / advocate for provincial support
Timeframe	Short
Priority	Low
Cost	Low

	Yr-2020	Yr 2021	Yr 2022
A study <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
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Funding <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:
Implementation	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed

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Recommendation	In order to prevent local erosion implement appropriate measures: <ul style="list-style-type: none"> • Berms in coastal areas. • Working with the Province on coastal adaptation.
Category	Erosion
What was said?	Nothing Specified
Who will lead?	Environment and Sustainability with support of EMO
Who to engage?	Nothing Specified (Suggest: Province, property owners)
What municipal plans to leverage?	Nothing Specified
Potential next steps	<ul style="list-style-type: none"> • Conduct erosion and flood risk assessment • Study technical/financial feasibility of adaptation measures (e.g. berms) • Discuss with task force and Province • Apply for funding / council approval to implement
Timeframe	Nothing Specified
Priority	Nothing Specified
Cost	Nothing Specified

	Yr-2020	Yr 2021	Yr 2022
A study <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Stakeholders Engagement <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Funding <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:
Implementation	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed

* Add level of completion: 25% 50% 75%

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3.3 Public Works

Recommendation	Invest in green infrastructure (bio-retention, green spaces) / Take a Natural Asset Management approach, to reduce risk of flooding and reduce stormwater intrusion in sewer systems
Category	Hydrological (flooding)
What was said?	Participants identified a potential for green infrastructure in the Ellen’s Creek area, the Belvedere Golf and Winter Club area, and the area between Kensington Road and Strawberry Lane. Participants noted: Need more retention. Is a debate in Council and in public. Need to change development standards and more uptake by developers. Tax incentives could be used, or permit reimbursement. Net-zero bylaw not popular with Council for new development, costs are passed to customer, and may discourage development / shift to neighboring areas.
Who will lead?	Public Works
Who to engage?	Council, Developers, Local environmental groups
What municipal plans to leverage?	Create stormwater management plan
Potential next steps	<ul style="list-style-type: none"> ● Study feasibility (technical, financial) of bioretention, green infrastructure, and erosion control measures. Pilot measures with local groups. ● Apply for funding / budget for selected measures. ● Request council directive for green infrastructure / bioretention measures, and to consider Natural Asset Management approach to new development ● Provide support to local groups on ecosystem protection and restoration (wetlands, watercourses) to improve flood control, as well as for tree planting and piloting green infrastructure in urban environments. ● Empower and educate citizens and developers
Timeframe	Short
Priority	Mid to High
Cost	High

	Yr-2020	Yr 2021	Yr 2022
A study <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Stakeholders Engagement <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Funding <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:
Implementation	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed

* Add level of completion: 25% 50% 75%

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Recommendation	Ensure the community has implemented measures to reduce the risk of local flooding, such as ensuring that storm sewage drains and systems are well maintained, and separated to the degree possible, as well as upgrading culverts for 100 year flood/water levels.
Category	ALL Hydrological Hazards: Flash Flood, Ice Jam Flood, Local Flooding, Rain Storm Flood, Snow Melt Flood, Water Balance.
What was said?	The City has separated stormwater and sewer systems. Participants noted: storm water system can not handle 1 in 100 year flood events. Problem spots include Queen's and Lower Pass. Some Culverts could be upgraded. Province is responsible for Bride and on ramps. New wastewater line from Stratford to Charlottetown will go across the upgraded bridge.
Who will lead?	Public Works
Who to engage?	Nothing Specified
What municipal plans to leverage?	Nothing Specified
Potential next steps	<ul style="list-style-type: none"> ● Conduct drainage assessment ● Prioritize upgrades ● Access funding / obtain council approval - Possible to direct Gas Tax to critical infrastructure improvements
Timeframe	Short
Priority	Mid
Cost	High

	Yr-2020	Yr 2021	Yr 2022
A study <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Stakeholders Engagement <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Funding <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:
Implementation	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed

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Recommendation	Ensure Lift Stations (pumps), wastewater treatment plant / lagoon, and outflow pipe, are above a 1 in 100 year rain storm flood level. If not, consider raising/relocating them
Category	Hydrological (flooding)
What was said?	The City is decommissioning a lagoon which is at the water's edge, but entrances are above 1 in 100 year flood events. Sewage outflow pipe discharges below sea-level. Participants noted: Wastewater climate change risk assessment is being done (for flood risk).
Who will lead?	Nothing Specified (Suggest: Public Works, Water Utility)
Who to engage?	Nothing Specified
What municipal plans to leverage?	Nothing Specified
Potential next steps	<ul style="list-style-type: none"> ● Study flood protection measures for wastewater treatment plant. Provide Council with options and associated costs. ● Prioritize Lift Stations to relocate or protect from flooding. Provide Council with options and associated costs. ● Budget or apply for funding for adapting water infrastructure.
Timeframe	Nothing Specified
Priority	Nothing Specified
Cost	Nothing Specified

	Yr-2020	Yr 2021	Yr 2022
A study <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
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Implementation	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed

* Add level of completion: 25% 50% 75%

3.4 Asset Management

Recommendation	Update Asset Management Plan to incorporate climate risk
Category	Coordination and Planning
What was said?	Participants noted: Asset plan is in its infancy / under review to incorporate climate risk.
Who will lead?	Asset Manager
Who to engage?	Nothing Specified
What municipal plans to leverage?	Asset Management Plan (in development)
Potential next steps	Update Asset Management plan to include climate risk factors
Timeframe	Mid
Priority	Mid to High
Cost	Low to Mid

	Yr-2020	Yr 2021	Yr 2022
A study <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
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Implementation	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed

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3.5 Planning

Recommendation	Ensure existing homeless shelters have made provisions for increased capacity and hazard specific conditions, and have back-up power.
Category	Planning
What was said?	Participants noted: homeless/transition shelters have no back-up; have a transportation plan to hospital
Who will lead?	Planning with support from Affordable Housing
Who to engage?	Town staff, Social Housing, EMO, Shelters
What municipal plans to leverage?	EMO Plan
Potential next steps	<ul style="list-style-type: none"> ● Identify and prioritize facilities needed back-up power ● Study to size back-up power correctly. ● Access funding / obtain Council approval on budget. ● Implement back-up power systems
Timeframe	Short
Priority	High
Cost	Nothing Specified

	Yr-2020	Yr 2021	Yr 2022
A study <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
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Implementation	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed

* Add level of completion: 25% 50% 75%

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Recommendation	Explore avenues to create GIS system where province, municipality and utilities can overlay their information so that EM teams can get a full picture of what is going on with respect to hazards and risks
Category	Coordination and Planning
What was said?	Participants noted: There is City owned GIS, and will obtain provincial data (flood risk). Would like also outage maps.
Who will lead?	Planning
Who to engage?	Planning staff, EM, web services, Province
What municipal plans to leverage?	EM Plan
Potential next steps	<ul style="list-style-type: none"> ● Create data dictionary - of existing and needed data sets / maps ● Request or download additional GIS data: environmental, energy, etc ● Work with / advocate for provincial support
Timeframe	Mid
Priority	High
Cost	Low

	Yr-2020	Yr 2021	Yr 2022
A study <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Stakeholders Engagement <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Funding <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:
Implementation	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed

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Recommendation	Adopt regulations that prohibit development, limit land use, or require specific building codes for developments within flood hazard areas, such as elevating structures above maximum flood levels (e.g. 100 to 200 year flood level), requiring waterproof materials and anchoring buildings to prevent floatation, requiring set-backs from flood prone areas, raising electrical panel/equipment
Category	Hydrological
What was said?	Risk-sensitive land use regulations, building codes, and health and safety codes are in place but are not a major focus. Minimum requirements are set, however, very few existing regulations support disaster risk reduction. There are plans to make improvements in this area. There is a regulation for foundation height. Waterfront is already developed. During redevelopment should take flood risk into account. IDF curves for rainfall are used to determine Culvert sizes, need to plan for 2050. When the tide is in, unable to get water out due to low elevation.
Who will lead?	Planning with support from Council
Who to engage?	Nothing Specified
What municipal plans to leverage?	Local Planning Bylaws
Potential next steps	<ul style="list-style-type: none"> Identify needs associated with adoption of new Codes/regulations, refine timeline for training, adopting codes, implementing / enforcing them. Consult/Educate Developers and the Public
Timeframe	Mid
Priority	High
Cost	Low

	Yr-2020	Yr 2021	Yr 2022
A study <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Stakeholders Engagement <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Implementation	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed

Recommendation	Work with current property owners in flood prone areas, to examine options for reducing flood risk: e.g. flood-proofing structures (allowing flooding, but ensuring little damage). Ensure flooded properties only rebuild with the necessary flood mitigation measures - e.g. elevate structures, waterproofing, anchoring buildings, raising electrical panel/equipment, and relocating / set-back.
Category	Hydrological
What was said?	Floodplains have been identified and mapped, but it is unclear how many buildings are affected, or if the City implemented restrictions on building elevations in floodplains and notifies permit applicants. Participants noted: there are not many incidents. Need education on flood proofing. Queen Street Floods. Other options are more costly. Participants noted: the Permit process requires minimum building elevation, but not flood proofing, and there are no waivers.
Who will lead?	Planning
Who to engage?	Homeowners / Business Owners
What municipal plans to leverage?	Any changes to zoning, bylaws, etc, need Council approval
Potential next steps	<ul style="list-style-type: none"> • Work with task force/committee, identify needs associated with adoption of new Codes, and refine timeline for training, adopting codes, and implementing / enforcing them. • Consult/Educate Developers and the Public
Timeframe	Long
Priority	High
Cost	Low

	Yr-2020	Yr 2021	Yr 2022
A study <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Stakeholders Engagement <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Implementation	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed

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Recommendation	<ul style="list-style-type: none"> Identify zones to discourage development in Land Use Plan, Zoning, or Official Plan, and notify builders of restrictions. Identify zones to encourage development in Land Use Plan, Zoning, or Official Plan, and notify builders of incentives (e.g. faster permitting)
Category	Hydrological
What was said?	Local government has building permit construction program in place. Limit development along the shore as part of official municipal plan / land use plan, considering future sea level rise. Province has set-backs from the Coast, riparian areas, etc. Province could do a PEI wide guidance to municipalities.
Who will lead?	Planning
Who to engage?	Council, Developers, Province (for guidance)
What municipal plans to leverage?	Any changes to zoning, bylaws, etc, need Council approval
Potential next steps	<ul style="list-style-type: none"> Obtain updated flood risk maps. Conduct study for 1 in 200 year flood events. Municipal Plan Review, land use and building code bylaw amendments Implement codes/regulations, notify developers, use permit process Consider providing incentives e.g. high efficiency, flood proofed buildings could be reimbursed permit fees.
Timeframe	Long
Priority	High
Cost	Low

	Yr-2020	Yr 2021	Yr 2022
A study <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
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Funding <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:
Implementation	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed

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Recommendation	Consider the following Adaptation options for Sea Level Rise: <ul style="list-style-type: none"> • Prevent new development • Wetland protection • Build berms/wave breaks • Build Sea Wall, Levee, or Dyke • Adapt Buildings/Infrastructure e.g. flood-proofing • Adopt new building code and land use regulations
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Category	Sea Level Rise
What was said?	While we can prevent new development, need to consider existing Wastewater treatment, Irving Oil tanks, Fertilizer storage, Maritime Electric, Cruise Ship Warf, may need to be raised or relocated. May need Federal/Provincial support.
Who will lead?	Planning
Who to engage?	Nothing Specified (suggest: Province and Federal Government)
What municipal plans to leverage?	Nothing Specified
Potential next steps	<ul style="list-style-type: none"> • Conduct flood risk assessment • Study technical/financial feasibility of adaptation measures • Discuss with task force / stakeholders • Apply for funding / council approval
Timeframe	Long
Priority	High
Cost	High

	Yr-2020	Yr 2021	Yr 2022
A study <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Stakeholders Engagement <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
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Implementation	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed

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Recommendation	<ul style="list-style-type: none"> • Ensure, if applicable, harbour masters are familiar with the harbour and are available to board and navigate ships. • Ensure marinas have warning system in place to notify boat operators of potential heavy fog or storms. • Ensure officials perform regular safety checks of storage structures (e.g., gas and oil barges) in marinas and harbours.
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Category	Hazardous Material Spills involving marine transport
What was said?	Participants noted: responsibility of Port Authority. The City should check with the Port Authority to see what plans they have
Who will lead?	Planning
Who to engage?	Port Authority
What municipal plans to leverage?	EM Plan
Potential next steps	<ul style="list-style-type: none"> • Consult Port Authority
Timeframe	Short
Priority	Nothing Specified
Cost	Low

	Yr-2020	Yr 2021	Yr 2022
A study <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Stakeholders Engagement <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Funding <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:
Implementation	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed

* Add level of completion: 25% 50% 75%

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Recommendation	Encourage businesses to have back-up generators in place and ready to be used
Category	Power Outage / Interruption to Energy Supply
What was said?	some do. Could be part of communications campaign. Participants noted: City can have direct influence on fuel stations and grocery stores, for approval to build, the need to install back-up power.
Who will lead?	Planning(?), with support of Communications
Who to engage?	Nothing Specified (suggest fuel stations, grocery stores, key suppliers)
What municipal plans to leverage?	Nothing Specified
Potential next steps	<ul style="list-style-type: none"> • Survey how many grocers, stores, fueling stations have back-up power • Secure standing agreements for EMO, with key suppliers with back-up
Timeframe	Nothing Specified
Priority	Nothing Specified
Cost	Nothing Specified

	Yr-2020	Yr 2021	Yr 2022
A study <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Stakeholders Engagement <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Funding <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:
Implementation	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed

* Add level of completion: 25% 50% 75%

NOTES:

3.6 Health and Safety

Recommendation	Develop Corporate heat wave policy for municipal staff (i.e. working conditions).	
Category	Heat Wave	
What was said?	Nothing Specified	
Who will lead?	Health and Safety	
Who to engage?	Town staff	
What municipal plans to leverage?	HR Policy	
Potential next steps	<ul style="list-style-type: none"> • Develop policy - use Health Canada guidelines • Implement policy 	
Timeframe	Short	
Priority	High	
Cost	Low	

	Yr-2020	Yr 2021	Yr 2022
A study <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Stakeholders Engagement <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Funding <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:
Implementation	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed

* Add level of completion: 25% 50% 75%

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3.7 Water and Sewer utility

Recommendation	Ensure the community has implemented structural measures to reduce the risk of flooding, such as building dams, dykes and floodwalls, creating reservoirs or making channel improvements.
Category	ALL Hydrological Hazards: Flash Flood, Ice Jam Flood, Local Flooding, Rain Storm Flood, Snow Melt Flood, Water Balance.
What was said?	Participants noted: need to berm around Wastewater treatment plant and lift stations. Waiting for funding from ICIP
Who will lead?	Water and Sewer utility
Who to engage?	Nothing Specified
What municipal plans to leverage?	Sewer and Water Master Plan
Potential next steps	<ul style="list-style-type: none"> ● Conduct flood risk assessment ● Conduct drainage assessment ● Conduct engineering study (as needed for selected structural measures) and assess technical/financial feasibility. ● Apply for funding / obtain council approval (budget)
Timeframe	Mid
Priority	High
Cost	High

	Yr-2020	Yr 2021	Yr 2022
A study <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Stakeholders Engagement <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Funding <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:
Implementation	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed

* Add level of completion: 25% 50% 75%

Recommendation	Ensure the community has updated old and worn out pipes, or pipes made from gray cast iron to prevent pipeline failure in the future.
Category	Water Outage
What was said?	Participants noted: Still som iron pipe in the City. Some pipes are very old. Hot spot mapping of issues is needed. Mix of reactive and proactive funding for upgrades is secured annually for the past few years. Developing Sewer and Water Master Plan. Installing Fiber to improve communications for water system management. Recent wellfield built for hurricane resistance.
Who will lead?	Water Utility
Who to engage?	Water, Planning, Public Works, Finance
What municipal plans to leverage?	Water and Sewer Master Plan, Asset Management Plan (in development)
Potential next steps	<ul style="list-style-type: none"> ● Conduct drainage assessment ● Prioritize upgrades ● Access funding / obtain council approval - Possible to direct Gas Tax to critical infrastructure improvements
Timeframe	Mid
Priority	High
Cost	High

	Yr-2020	Yr 2021	Yr 2022
A study <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Stakeholders Engagement <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Funding <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:
Implementation	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed

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3.8 Communications

This section contains all the recommendations that pertain to external and internal communications regarding climate change, community resilience, and emergency preparedness. To improve community resilience to the impact of climate change, sound communication is critically important across all municipal departments and emergency services, external stakeholders and the public.

This section is divided into two parts:

- The Public Education Strategy, or External Communication, presents specific public messaging and recommendations for all hazard types.
- The Internal Communications recommendations presents recommendations for all hazard types that strengthen the internal capacity of municipal staff to efficiently coordinate across all departments, and with emergency responses organisations.

External Communications:

Recommendation	Establish annual updates to key stakeholders and the Public
Category	Communications
What was said?	Participants noted: should be done annually
Who will lead?	Fire Chief, with support of Communications
Who to engage?	Nothing Specified
What municipal plans to leverage?	Nothing Specified
Potential next steps	<ul style="list-style-type: none"> • Schedule quarterly updates for stakeholders, annual for the public • Task force to prepare updates (with input from Department Heads)
Timeframe	Short
Priority	Low
Cost	Low

	Yr-2020	Yr 2021	Yr 2022
Stakeholders Engagement <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Implementation	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed

* Add level of completion: 25% 50% 75%

Recommendation	Have community / neighborhood leads/champions that are trained and can help communicate things at the neighborhood level, and that report to the municipality. Train citizens with support from municipality. Community leads as communication conduits. Reach out to retired police officers, fire fighters, red cross workers, people who have taken EM training.
Category	Communication
What was said?	There are capacity issues that exist in the City - Managers need support to actually undertake activities.
Who will lead?	Communications, with support of EMS (Fire, Police services)
Who to engage?	Nothing Specified (e.g. Red Cross)
What municipal plans to leverage?	Nothing Specified
Potential next steps	Reach out to retired police officers, fire fighters, red cross workers, people who have taken EM training, and other community leaders, to help the City with communicating about climate risks\hazards and preparedness
Timeframe	Nothing Specified
Priority	Nothing Specified
Cost	Nothing Specified

	Yr-2020	Yr 2021	Yr 2022
A study <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Stakeholders Engagement <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Funding <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:
Implementation	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed

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NOTES:

Recommendation	Develop an ongoing public education and outreach strategy to increase resilience to climate hazards in the community
Category	Communication
What was said?	Nothing Specified
Who will lead?	Environment and Sustainability Department and Communications
Who to engage?	Nothing Specified
What municipal plans to leverage?	communications strategy
Potential next steps	<ul style="list-style-type: none"> ● Consider implementing a combination of activities, clear and simple messaging, and a variety of communication channels, to inform and educate the public and vulnerable populations (see Tables 4 and 5 below) ● Develop communications material / content ● Conduct activities on a quarterly or annual basis
Timeframe	Short
Priority	Nothing Specified
Cost	Low

	Yr-2020	Yr 2021	Yr 2022
A study <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
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Implementation	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed

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NOTES:

The table below presents some tips to develop an effective education communications plan. It can be tailored to the needs of your community.

Table 4: Tips for an effective public education communications plan

Activities	<p>Participants selected actions:</p> <ul style="list-style-type: none"> ● Each Fall, Open House, Emergency Preparedness week ● Engage other groups (e.g. Newcomers Association, Ambassador Program, PEI EMO, City EM Committee, Maritime Electric) ● Maritime Electric can provide information / pamphlets. ● Educate Citizens on flood risk reduction and insurance ● Continue educating on fire risk prevention ● Promote 72 to 96 hour preparedness ● Provide seasonal updates including messaging according to these recommendations.
Messaging	<ul style="list-style-type: none"> ● Provide clear, simple, or tailored messaging for different audiences (e.g. residents, businesses) / by neighborhood ● Ensure public knows where to get town’s information ● Incorporate specific messaging based on hazards in your community (see table below)
Channels / medium	<p>Explore the use of various channels to communicate with the public:</p> <ul style="list-style-type: none"> ● Website ● Newsletter ● Media ● Social Media ● Pamphlets ● Displays, and ● Events

The table below presents the key messaging the municipality should focus on in its disaster preparedness communications to the public. They are tailored to the most frequent hazards occurring in the community and were selected by participants in the second workshop.

Table 5: Key messages by hazard type for external communications

Hazards	Hazard-related recommendations	Participant’s Comments
ALL Atmospheric Hazards	Ensure existing homeless shelters have made provisions for increased capacity and hazard specific conditions, and have back-up power	Participants noted: homeless/transition shelters have no back-up; have transportation plan to hospital
Blizzards, Snow Storms, Cold Weather, and Ice Storms	Encourage residents to have winter tires and winter emergency kits (including rock salt, shovels, blankets, food and water) in their vehicles	

	Encourage homes to have well insulated walls, attics and pipes and roofs are in good condition	
	Encourage residents to break up ice near drainage.	
	Ensure most buildings have secure roofs attached to building frames with straps or clips	
	Encourage residents to have designated areas of refuge in their homes	
Hurricanes, Windstorms, Sea Storms and Storm Surges	Encourage residents to prepare for high winds and flooding by: covering windows with storm shutters or plywood, reinforcing garage doors, clearing rain gutters and downspouts, securing boats to land or storing them on land and removing potential windborne missiles such as barbecues and patio furniture. Educate the public about storm safety and know to stay indoors and away from windows, skylights and glass doors and avoid contact with plumbing, corded electrical equipment, concrete floors and walls if there is lightning along with the storm	Participants noted: could put literature in City Hall, on Website, Newsletters, and Water Bill inserts. Should communicate often / proactively. Need to ensure messages are relevant to each season.
Heat Waves	Educate residents about heat waves and how to recognize the warning symptoms of heat exhaustion and how best to keep cool. Designate Cooling Center	
	Encourage developers and property owners to install air conditioning in new commercial buildings. This could include heat pumps, which also provide cooling.	Can encourage, but is their responsibility
ALL Hydrological Hazards: Flash Flood, Ice Jam Flood, Local Flooding, Rain Storm Flood, Snow Melt Flood, Water Balance.	Encourage residents and businesses to have back-water valves and sump pumps installed with back-up power. When flooding affects the town's wastewater system, ensure residents limit their water use e.g. Less flushing and less use of appliances with pressurized drainage, such as dishwashers and washing machines, means less pressure on the system.	

	<p>Inform residents of what to avoid (e.g. using propane, bbq inside), and to turn off all appliances during restoration/cold start of grid. Educate on use of generators. Inform residents (especially in rural areas) of the priority sequence for power restoration crews.</p>	<p>Participants noted: Need to coordinate messaging with EMO, Province, Maritime Electric and City. Need to inform residents of power restoration priorities so that people don't unnecessarily use energy and cause tripping of the system, as well as not to use BBQs inside, to instal a working CO detector, etc.</p>
Power Outage / Interruption to Energy Supply	<p>Encourage all residents who have essential power needs (e.g., on a respirator) have back-up power supplies.</p>	<p>Could be part of voluntary registry of vulnerable persons. Participants noted: it is the responsibility of the individual e.g. to have back-up, additional oxygen tanks. City could work with partners (Community Connector, Queen's County, Social Development and Housing PEI), to ensure access to back-up.</p>
	<p>Encourage residents to have heating sources that do not require power and/or have alternate power sources (e.g., generator).</p>	
	<p>Communicate shelter locations during prolonged outages</p>	
	<p>Plan is in place to ensure regular contact and collaboration with local utility to adapt and plan for new energy or infrastructure projects and developments</p>	<p>Meetings occur as needed. Have discussed wind projects. Regular contact with Maritime Electric on development of CEP and EV discussions. City has quarterly meetings with Efficiency PEI. During recent Hurricane, the City informed Maritime Electric of lift stations that needed restoration prioritization.</p>
	<p>Inform residents that 96 hours preparedness (especially in rural and remote areas) is better for prolonged outages</p>	
Food Shortage	<p>Encourage and support locally grown food (e.g., community gardens in the summer, year-round greenhouse with back-up, container aquaculture/agriculture, local markets).</p>	
	<p>Encourage Grocers, and greenhouses, to have back-up power, or plans for mobile refrigeration</p>	

Internal Communications:

Recommendation	Establish monthly, quarterly or annual updates to Council, all Staff
Category	Communications
What was said?	Could be part of task force duties. Participants noted: should be done monthly, with quarterly EMO Communications
Who will lead?	Fire Chief
Who to engage?	Nothing Specified
What municipal plans to leverage?	EM Plan
Potential next steps	<ul style="list-style-type: none"> ● Engage task force members on quarterly (minimum) basis, to update on progress with selected recommendations / actions. ● Identify challenges and opportunities, resource needs ● Enable cross-department collaboration ● Enable collaboration with external stakeholders ● Prepare annual updates for Council
Timeframe	Short
Priority	Low
Cost	Nothing Specified

	Yr-2020	Yr 2021	Yr 2022
A study <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Stakeholders Engagement <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress <input type="checkbox"/> Completed
Funding <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:	<input type="checkbox"/> Pending <input type="checkbox"/> Secured. Source:
Implementation	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed	<input type="checkbox"/> Pending <input type="checkbox"/> In progress*: <input type="checkbox"/> Completed

* Add level of completion: 25% 50% 75%

NOTES:

4.0 Budget and Funding Considerations

Workshop participants did not have time to discuss in depth funding resources and budget options available to them to implement the recommendations detailed in the previous section. Securing funding and a budget is crucial to the viability of some climate adaptation and emergency management measures.

Participants in the first and second workshops 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.

Recommendation. The municipality is invited to collect internal information to answer the following questions:

- Which financial resources have been explored in the past?
- Which are being explored currently?
- Which could be explored to support the actions and strategies identified below?

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 usually require matching funding.

Table 6: 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"> • Property taxes, tax levies • Tax Increment Financing, Local Improvement Charges • User fees (on water, power and natural gas distribution system, waste, ect.) • Development Cost Charges (DCCs) • Green bonds
Local Incentives and Rebates	<ul style="list-style-type: none"> • Development Cost Charge reductions • Local Improvement Charge financing (LIC) or Property Assessed Clean Energy (PACE) programs • 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)

New accounting/ decision-making tools	<ul style="list-style-type: none"> ● Consider natural asset management approach - full cost accounting and valuation of natural assets ● Estimate avoided cost when presenting business case for adaptation measures ● Combine funding with Gas Tax revenue ● Reinvest efficiency savings into low cost adaptation measures, community engagement, etc. ● Update the long term financial plan to include considerations of climate change mitigation and adaptation
Institutional grants and external sources of funding	<p>Scan and submit funding applications to</p> <ul style="list-style-type: none"> ● Federal agencies and governments <ul style="list-style-type: none"> ○ NRCan ○ Environment and Climate Change (ECC) ○ Infrastructure Canada programs ● FCM programs, including: <ul style="list-style-type: none"> ○ Green Municipal Fund ○ Municipalities for Climate Innovations Program ○ Municipal Asset Management Programs ● Provincial programs and agencies
Loans	<ul style="list-style-type: none"> ● FCM low-interest loan (GMF) ● Municipal green bonds
Leverage private investments	<ul style="list-style-type: none"> ● Engage private sector, to partner and financially support adaptation measures for infrastructure that supports their operations and/or immediate community ● Ensure local Chamber of Commerce or others support efforts of small enterprises for business continuity during and after disasters
Economy of scales and synergies at the local level	<ul style="list-style-type: none"> ● Leverage existing initiatives or project by expanding / adapting their scope and collaborating with other departments (thinking beyond silos) ● Collaborate with neighbouring municipalities ● When a measure involves several communities, cost-share (e.g. procurement of generators, building sea walls, etc.)

FCM and 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)

5.0 Monitoring and Reporting Progress

QUEST strongly recommends that the Chief Administrative Officer reviews each recommendation and confirms, or assigns when needed, the following:

- A Priority
- A Lead Department
- A Lead Staff
- A Cost

In the short term, QUEST also recommends to create a committee, or to leverage an existing committee, in order to integrate the recommendations into relevant municipal documents and strategies as well as to monitor and report on their implementation.

To assist in this task, QUEST added an Action Tracking Table below each recommendation table. The purpose of these tables are twofold :

- **Monitor progress internally.** By creating an interactive document, lead staff can update and comment on progress made in implementing selected priority actions on a yearly-basis over the next three years; and
- **Report back to NRCan.** This project being funded by NRCan, QUEST and each participating municipality has to report back annually on the project impact over the next three years. The Tracking Tables provide an easy way to collect information for NRCan.

These tracking tables are a tool to collect information about progress on conducting survey, securing funding, engaging stakeholders, and implementation.

The use of the Tracking Tables is effective only if the municipality sets up a reporting process at the CAO level, or as part of established task force or committee, to ensure information is collected yearly from all Lead Departments and Lead staff. This process can be integrated in existing annual review process.

6.0 Conclusion

This report is a living document prepared with the intent to be shared among identified shareholders and updated annually by using the tracking tables for each recommendation. Along with the Climate Risk and Vulnerability Assessment Report (delivered in Fall 2019), this report intends to inform the work of the City of Charlottetown on climate adaptation, resilient planning, and emergency preparedness.

The next recommended steps the municipality can take are:

- Create a task force, committee, or assign to existing committee, for continued oversight, coordination, and reporting.
- Have CAO review responsible department for each set of recommendations, and assign a specific lead staff person for each recommendation. The Department in charge of implementing recommendations has not always been identified for recommendations selected by workshop participants.
- Continue integrating climate projections and climate hazard into the reviews of all municipal plans and bylaws - e.g. EM Plan, Land Use Plan, Asset Plan, building regulations, etc.

- Continue working closely with energy utilities to build a resilient grid.
- Continue to implement the Community Energy Plan, engage multiple stakeholder groups to convene, coordinate, and implement innovative community energy projects and programs, resulting in more energy efficient, resilient and vibrant community.

The primary goals of the project were threefold. First, to increase participants' understanding of climate impacts, vulnerabilities, and opportunities for building a resilient community. Second, to inform the municipality and utilities' actions and initiatives on climate adaptation and emergency management. Finally, to foster collaboration among various stakeholders, including municipal staff and energy utilities to align asset management and planning, and emergency preparedness. The methodology and approach used by QUEST has proven effective in bringing together diverse stakeholder groups and tapping into participants' knowledge to prepare this second report.

QUEST has appreciated working with the City of Charlottetown municipal staff, local stakeholders, and energy utilities. QUEST team, would like to thank each of the workshop participants for their time and valuable insights. QUEST team hopes they found the workshops informative and impactful to incorporate resilience in their day-to-day activity.

All the lessons learned will be compiled by QUEST into a final public Lessons Learned report. This lessons learned report will present key challenges Canadian communities and utilities are facing when building a resilient community and adapting energy infrastructure to a changing climate. It will also emphasize observed good practice and opportunities. This report will be shared with other municipalities across Canada to help them become more resilient to climate hazards.

Appendix 1 - Tables from Workshop #2

Sent as a separate document.

Appendix 2 - Assessment report

Sent as a separate document.

Appendix 3 - Additional resources

Climate change data

ECCC 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 the 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.

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

[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 resiliency 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.

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