The Cost of Doing Nothing

Building a Local Business Case for Adaptation

November 16, 2022
We acknowledge that we are gathered here today on the traditional territory of many nations including the Mississaugas of the Credit, the Anishnabeg, the Chippewa, the Haudenosaunee and the Wendat peoples.
Understanding the Costs of Climate Change

Direct costs
- Increased repair and replacement costs of hard infrastructure after a flood
- Increased operations and maintenance costs due to increased wear and tear

Indirect costs
- Increased municipal service disruptions
- Increased supply chain disruptions due to damaged infrastructure
The Mounting Costs of Climate Change

In 2021 alone, extreme weather caused $2.1 billion in insured damages.

Canada’s Top 10 Costliest Natural Disasters

- Fort MacMurray Wildfire 2016: $4 billion
- Eastern Ice Storm 1998: $2.3 billion
- Alberta Floods 2013: $1.8 billion
- Alberta Hailstorm 2020: $1.2 billion
- Toronto Flood 2013: $1.0 billion
- Ontario - Quebec Windstorm 2021: $875 million
- Toronto Flood 2005: $780 million
- Ontario Windstorm 2018: $695 million
- British Columbia Floods 2021: $675 million
- Slave Lake Wildfire 2013: $600 million

Source: IBC Fact Book 2021, CatIQ, Swiss Re, Munich Re & Deloitte
Re-defining “Cost” Assessments

**Social Costs** (e.g. Physical and mental health costs of extreme weather events)

**Ecological Costs** (e.g., loss of ecosystem services due to damage to natural infrastructure)

Need to weave together **Indigenous, Local & Western Knowledge Systems**

Source: Canadian Disaster Database
Understanding the Costs of Climate Change

Data Availability

New data on costs are coming out all the time – Often only at the national or subnational level

Lack of guidance on collecting data at the local level to build the local business case for action
Challenges Facing Municipalities in Implementing Adaptation

• Building the business case for adaptation

• Accessing funds for adaptation

• Assessing costs locally

• Allocating funds cost efficiently / effectively
Case Studies: The need for local costing

City of Windsor

City of Hamilton
Challenges with local data collection

Poll:

On a scale of 1 to 5, how difficult would it be to collect data locally?
Cost of Doing Nothing

A Toolbox for Building a Local Business Case for Adaptation
Methodology

- Identification and selection of National Impact Statements
- Longitudinal research of relevant national, subnational and local climate variables, climate impacts and costing data
  - Sources: all levels of government, academic research, environmental NGOs, private sector (e.g., Insurance and infrastructure)
- Guidance guided by research, experience working with municipalities and case studies

National impact statements

1. Increasing frequency of extreme precipitation events leading to overland flooding and damage to buildings and homes.
2. Increasing frequency of extreme weather events leading to damage to homes, infrastructure, power outages, safety and additional clean-up costs.
3. Increasing temperature and precipitation leading to increased replacement and maintenance cost of roads and transportation infrastructure.
4. Increasing frequency of extreme precipitation events leading to overland flooding and loss of local business and public services.
5. Increasing winter precipitation and freezing rain events leading to dangerous road and sidewalk conditions and increased liability for injury and property damage.
6. Increasing frequency of extreme heat resulting in negative health outcomes, particularly to vulnerable populations, from reduced air-quality and increased heat-stress.
7. Increasing temperature and precipitation leading to increased risk for vector borne disease and new infectious disease.
8. Increasing frequency of extreme weather events resulting in loss of ecosystem services.
Who should use it

Municipalities that have already completed (or are in the process of completing):

- An assessment of their local climate data and impacts
- An assessment of their climate impacts and risks
- A climate adaptation plan

Collection of baseline data

- Asset inventories (grey and green)
- Assessment of state of repair
- Understanding of operational, maintenance and replacement costs
This resource sets the foundation and overall context for assessing the cost of doing nothing to address climate change at the municipal level.
CODN Toolbox

Municipal Template & Instructions

**Municipal Template**
The CODN Municipal Template has been designed to be copied, edited, and customized by municipalities who would like to write their own cost of doing nothing report.

**Instructions Document**
Provides important information and considerations for municipalities developing their CODN reporting using the Template.
CODN Toolbox

Data Collection Tracking Tool

Suggestions on potential sources of climate, costs, and impacts data identified in each of the selected national impact statements

Guidance on how best to attain and track the collection of this data
CODN Toolbox: Supporting Resources

Case Studies: City of Windsor, City of Hamilton

Summary Tables: National, Subnational & Local Data Sources
Building your own CODN Report Walkthrough

Municipal Template

Data Collection Tracking Tool
Walkthrough: Building your own CODN Report

✔ Read the **CODN Primer Document** and **Template Instructions**

✔ Using your understanding of local climate hazards, impacts and risks - Identify what data will be collected for your cost of doing nothing report, and who will be involved in the data collection.
Walkthrough: Building your own CODN Report

✔ Use the **CODN Data Tracking and Collection Tool** to start collecting your local data.

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### Increasing frequency of extreme precipitation events leading to overland flooding and damage to buildings and homes.

<table>
<thead>
<tr>
<th>Data Sources</th>
<th>Data</th>
<th>Possible Sources</th>
<th>Tracking Contact Name(s)</th>
<th>Contacted (Y/N)</th>
<th>Follow-Up (Y/N)</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate data</td>
<td>Local IDF curves, local precipitation data (total/meanprecip, intensity data, maximum events)</td>
<td><a href="https://www.idf-europe.org/">https://www.idf-europe.org/</a></td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Climate Data</td>
<td>Flood plain mapping by regional bodies</td>
<td>Local conservation authority</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Event-based data</td>
<td>Historical records of extreme precipitation events</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Event-based data</td>
<td>Records of 311 calls to report flooding of buildings and homes</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Event-based data</td>
<td>Flood mapping - locations of reported flooding locations</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Departmental Data</td>
<td>Departmental records as per local records</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Event-based data</td>
<td>Historical records of cost incurred by municipal services and social housing and shelter in event of flooding events</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Climate and Event-based</td>
<td>Models of municipal sewer system maps combined with IDF for different return periods and different climate projections to estimate number of flooded properties for both current and future flooding events.</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

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### Increasing frequency of extreme heat resulting in negative health outcomes, particularly to vulnerable populations.

<table>
<thead>
<tr>
<th>Data Sources</th>
<th>Data</th>
<th>Possible Sources</th>
<th>Tracking Contact Name(s)</th>
<th>Contacted (Y/N)</th>
<th>Follow-Up (Y/N)</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate Data</td>
<td>Current and future projections of extreme heat (e.g., extreme heat days, mean maximum temp, # of heat waves, avg length of heat waves, evening high, night time temperatures)</td>
<td><a href="http://ClimateData.ca">ClimateData.ca</a></td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Event-based data</td>
<td>Event-based data</td>
<td>Local counts of extreme heat warning (heat alerts) - including: # of heat warnings, duration (duration)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Event-based data</td>
<td>Event-based data</td>
<td>Local count of air quality statements, smog advisories, # of days with AQI above 100</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Departmental Data</td>
<td>Departmental Data</td>
<td>Increased demand on cooling infrastructure (shade spaces, cooling centres and social housing)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Departmental Data</td>
<td>Departmental Data</td>
<td>Increased enrolment and revenue from municipal outdoor programs</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Departmental Data</td>
<td>Departmental Data</td>
<td>Records of heat stress and air quality related health issues and absenteeism for municipal staff in particular those vulnerable exposed to heat (e.g., outdoor workers, ages pre-existing health conditions)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Departmental Data</td>
<td>Departmental Data</td>
<td>Increased operational maintenance and repair costs from increased use of air conditioning in municipal buildings, cooling centres and transport vehicles</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Departmental Data</td>
<td>Departmental Data</td>
<td>Records of cooling centre and municipal pool use, including costs for maintenance, energy use and chemical use</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Health Risk and Vulnerability Assessment Data (National, Provincial and Local)</td>
<td>National Health vulnerability assessment for increasing heat events: Ontario Climate Change and Health Vulnerability Assessment tools and data</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Walkthrough: Building your own CODN Report

CODN Municipal Template

Customizable pre-populated content with guided sections to input your local climate data.

- **Introduction**
  - Summary of climate costs
  - Why it matters

- **8 Impact Statement Sections**
  - Climate Hazards and Impacts
  - Local Vulnerability and Risks
  - National and Subnational Costs
  - Local Climate Narratives
  - Local Climate Costs

- **Conclusions & Recommendations**
Walkthrough: Building your own CODN Report

✔ Customize the CODN Municipal Template to match your locally-identified risks.

✔ Add content to the highlighted areas throughout the template (i.e., adding local climate projections, risks, impact examples, and most importantly, local cost data).

✔ Edit/remove any of the pre-populated content that is not relevant to your municipality, and add your own content as needed.

✔ Add your conclusions and recommendations for moving forward on adaptation.

RISK 1
The increasing frequency of extreme precipitation events will lead to overland flooding and damage buildings and homes.

WHAT TO KNOW ABOUT THIS RISK
The annual mean precipitation in Canada has increased since the mid-20th century and is projected to increase further under both low and high emission scenarios (Both & Germain, 2019). Climate change is also expected to increase the intensity, duration, and frequency of extreme precipitation events. Intensity-duration-frequency (IDF) curves can be used to predict heavy precipitation under a changing climate. For example, IDF curves for Toronto, London, and Calgary project 100-year flood events are expected to become 6-year events (Ness et al., 2021).

Extreme precipitation in [add name of municipality]

<table>
<thead>
<tr>
<th>Year</th>
<th>Mean Precipitation (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>1234.56</td>
</tr>
<tr>
<td>2020</td>
<td>1234.56</td>
</tr>
</tbody>
</table>

Heavy precipitation events are expected to increase by approximately [add heavy precipitation data projection] mm for 10-year, 50-year, and 100-year events.

THE IMpACTS OF THIS RISK
Flooding due to extreme precipitation is among the most prevalent and costly climate change hazards affecting Canadian municipalities. Intense precipitation combined with lack of permeable surfaces can quickly overwhelm the capacity of drainage systems and lead to flooding, water infiltration and damage to buildings and homes. In addition, infrastructure damage has cascading impacts through socio-economic and natural systems including reduced economic output, threatening health, well-being, and livelihoods of municipal residents.

Many of Canada’s major sites are at risk of flooding with hundreds of thousands of homes and buildings within flood zones. Analysis of current housing stock suggests that Winnipeg, Toronto, Vancouver, Ottawa, and Montreal are the major urban centres with the greatest current and future flood risk (Ness et al., 2021).

Past extreme precipitation and flooding events in [add name of municipality]

- [Add local examples of how risk has already impacted your municipality, include the date, name of the event if applicable, and a short description of the impacts on the community]

COSTS RELATED TO THIS RISK
Canada has a major deficit in public asset and infrastructure spending, with recent estimates to maintain existing infrastructure between $110 and $270 billion (Ness et al., 2021). This deficit is compounded by the fact that public assets and infrastructure were not built for a warmer climate.
What to do with our CODN Report: Multiple use-cases

Call to action OR galvanize support

Examples:
- Stand-alone report to council
- Report to go along with your adaption plan
- Backgrounder to NEW councils
- Update report to external / internal stakeholders
- Turned into an infographic
- Support funding applications
Key Considerations & Recommendations

- Collaboration is key
- Give yourself time
- Prioritize feasible data
- Focus on progress
Q & A

Please turn your mic on

OR

Type your questions in the chat

Raise Hand