INVESTING IN CANADA'S FUTURE:

The Cost of Climate Adaptation

Climate change costs Canadian taxpayers, governments and businesses billions of dollars every year. **The cost of inaction on climate adaptation is too high, threatening the economy and Canadians' well-being.** We must take the necessary steps to limit future losses.

WHAT IS CLIMATE ADAPTATION?

Climate change adaptation, or disaster mitigation, refers to actions taken to reduce a community's vulnerability to the negative impacts of climate change or extreme weather events due to climate change.

THREE TYPES OF ADAPTATION:

GREY

Human-made physical infrastructure (e.g. dikes, sea walls, fire-resistant building materials)

GREEN

Protecting, strengthening and light modifications to physical natural systems (e.g. wetlands, forest turnover rate, soil nutrition)

SOFT

Legal, socio-cultural, political and financial management policies and systems that enable adaptation[1]

IBC | BAC | FCM

Source: Federal Investment in Climate Change Disaster Mitigation and Adaptation Infrastructure Report. Access at: ibc.ca

[1] Climate-ADAPT, 2018, Adaptation Options. European Commission and European Environment Agency. Retrieved from: https://climate-adapt.eea.europa.eu/knowledge/adaptation-information/adaptation-measures.

CANADA'S INFRASTRUCTURE IS VULNERABLE

The poor state of Canada's aging infrastructure leaves all levels of government, especially municipalities, particularly vulnerable to the impacts of extreme weather events.[2] The increased risks of failure caused by climate change heightens the urgency for new or updated infrastructure.

~60% Amount of Canada's core public infrastructure owned/maintained by municipal governments[3]

35% Amount of municipal infrastructure in fair, poor or very poor condition[4]

CRITICAL PUBLIC INFRASTRUCTURE[5]

LAND TRANSPORTATION

BUILDINGS

WASTEWATER MANAGEMENT

MARINE INFRASTRUCTURE

WATER RESOURCES

EXAMPLES OF REGIONAL IMPACTS OF CLIMATE CHANGE[6]

WEST COAST

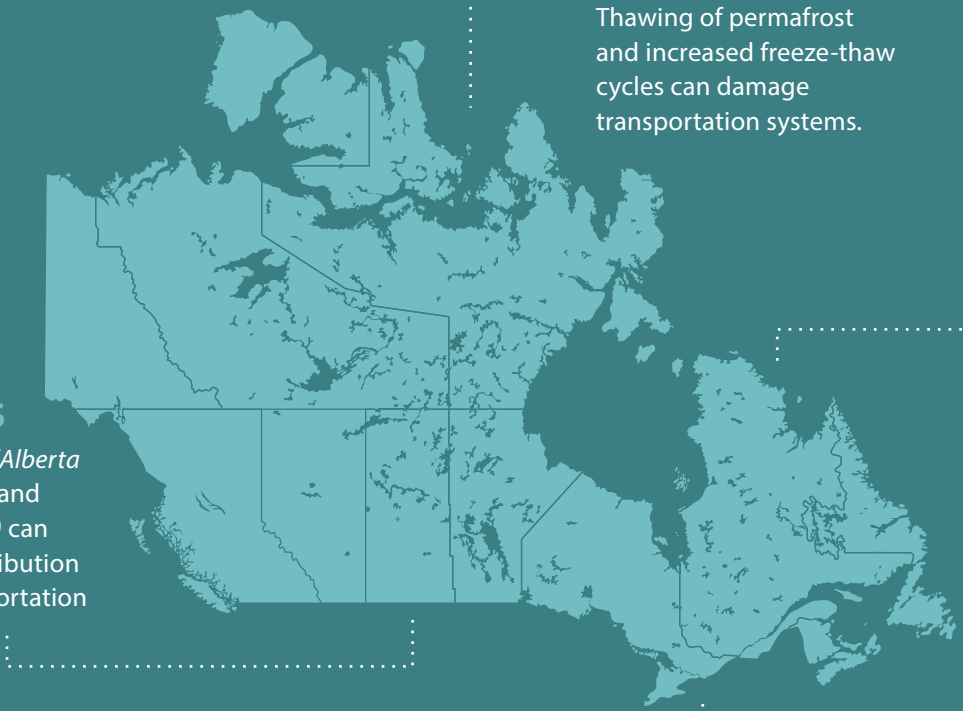
Changes in the frequency and pattern of storms threatens public infrastructure.

CANADA'S NORTH

Thawing of permafrost and increased freeze-thaw cycles can damage transportation systems.

EAST COAST

Rising seas levels increase the risk of flooding and shoreline erosion.



THE PRAIRIES

Increased drought *(Alberta and Saskatchewan)* and flooding *(Manitoba)* can damage water distribution systems and transportation infrastructure.

ONTARIO & QUEBEC

Intense rainfall, ice and windstorms, and heat waves can all cause disruptions to critical infrastructure.

[2,3,4] Canadian Infrastructure Report Card, 2016.
[5] Feltmate, B. and J. Thistlewaite, Climate Change Adaptation: A Priorities Plan for Canada, Report of the Climate Change Adaptation Project (Canada).
[6] Boyle J. et. al., 2013, Climate Change Adaptation and Canadian Infrastructure. The International Institute for Sustainable Development. Winnipeg, Manitoba.
Palko and D.S. Lemmen (Eds.), 2017, Climate risks and adaptation practices for the Canadian transportation sector 2016, Ottawa, ON: Government of Canada.
Northwest Territories, Environment and Natural Resources, 2008, NWT Climate Change Impacts and Adaptation Report, https://www.enr.gov.nt.ca/en/services/climate-change.

INVESTING IN CLIMATE ADAPTATION

Investments in adaptation and risk mitigation measures help ensure Canadian communities are resilient to threats caused by a changing climate. Research indicates that the benefits of investing in community adaptation and resilience outweigh the cost of such investments by a ratio of 6 to 1.[7]

An adaptation cost to GDP ratio further strengthens the business case for implementing various measures by providing a credible estimate of the level of investment needed to help communities adapt to climate change and reduce disaster risk.

In Canada, an average annual investment at the municipal level of between **0.2% to 0.3% of GDP** is needed to adapt to climate change. In national terms, this represents a total expenditure of **$5.3 billion per year**. These costs would be shared amongst all three orders of government, with the federal investment being well represented by current and future increased support to the Disaster Mitigation and Adaptation Fund.

WHAT REQUIRES THE GREATEST INVESTMENT IN ADAPTATION?

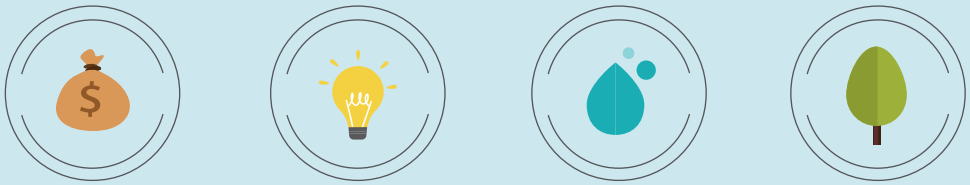
CLIMATE RISK	RATIO
Flood	1.25
Erosion	0.12
Permafrost	0.37

INFRASTRUCTURE	RATIO
Buildings	2.01
Dikes	1.18
Roads	0.47

BENEFITS OF CLIMATE ADAPTATION

Communities have seen both cost-savings and co-benefits from implementing adaptation measures. The main benefit is that the impacts from climate change can be avoided or reduced through climate adaptation measures and that the cost has been found to be less than responding to and recovering from the impacts of climate change.

CO-BENEFITS OF CLIMATE ADAPTATION[8]



INCREASED EMPLOYMENT

REDUCED ENERGY COSTS

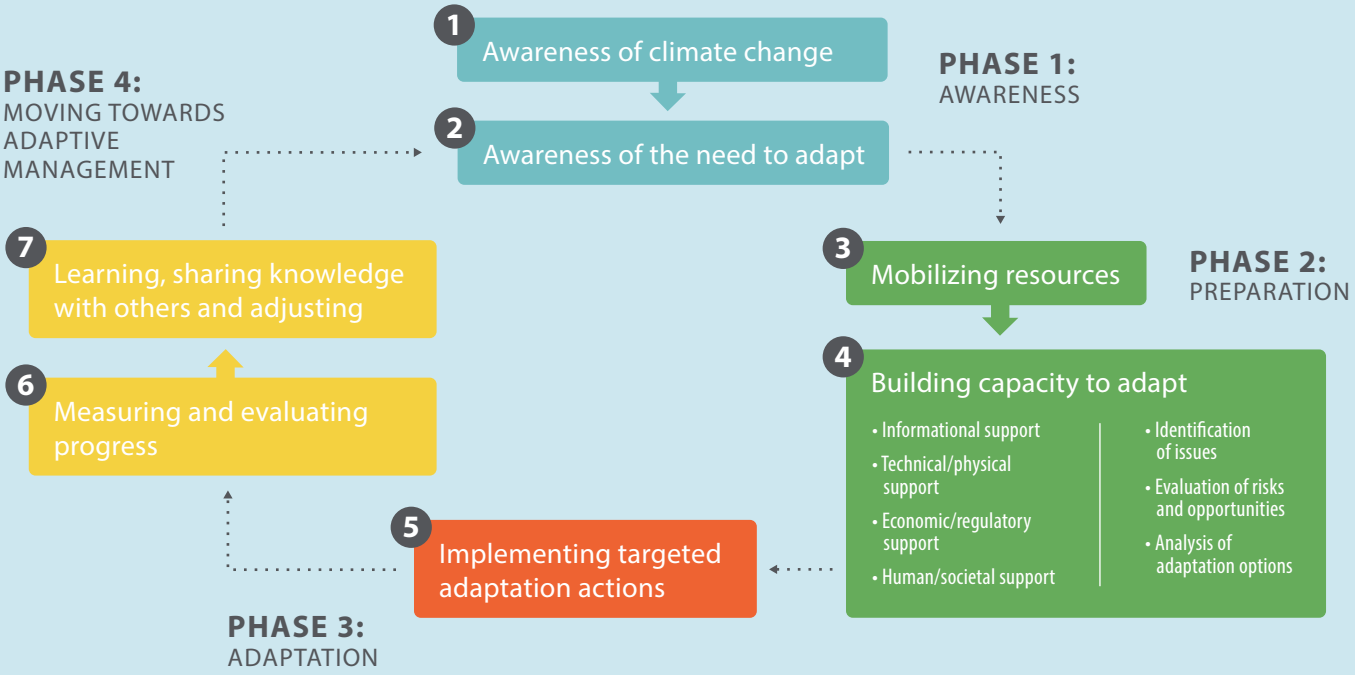
IMPROVED AIR & WATER QUALITY

ENHANCED LIVEABILITY & SERVICES

[7] Martinez-Diaz, L., 2018, Investing in resilience today to prepare for tomorrow's climate change. Bulletin of the Atomic Scientists, 74:22, pp. 66-72.

[8] City of Surrey, City of Surrey Climate Adaptation Strategy.

CLIMATE CHANGE ADAPTATION PROCESS: PHASES AND STEPS[9]



CLIMATE ADAPTATION IN ACTION

Public Safety Canada estimates that every dollar invested in mitigation saves **$3 to $5** in recovery costs.

The **$63 million** invested to build the Manitoba Red River Floodway in 1960 is estimated to have saved **$8 billion** by 2008 in avoided flood recovery costs.[10]

Wetlands that are maintained in their natural state can reduce flood damage costs to buildings by close to **40%** under conditions of a severe rainfall event.[11]

FINAL THOUGHT

The cost of identifying and undertaking adaptation actions is cheaper than the cost of restoring infrastructure after it has been damaged.[12] What is needed now is an ambitious and long-term investment plan for disaster mitigation and adaptation charted along a time frame of not year-to-year, but for the next twenty years or longer.

[9] Warren, F.J. and Lemmen, D.S., editors, 2014, Canada in a Changing Climate: Sector Perspectives on Impacts and Adaptation; Government of Canada, Ottawa, ON.
[10] Office of the Auditor General of Canada. 2016.
[11] Intact Centre on Climate Adaptation. (2017). When the Big Storms Hit: The Role of Wetlands to Limit Urban and Rural Flood Damage.
[12] Feltmate, B. and J. Thistlewaite, Climate Change Adaptation: A Priorities Plan for Canada, Report of the Climate Change Adaptation Project (Canada).