>>> PREPARE OR REPAIR

How climate-proofing public infrastructure pays off

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CANADIAN CLIMATE INSTITUTE
L'INSTITUT CLIMATIQUE DU CANADA

EDITOR'S NOTE:

Prepare or Repair has been updated as of April 2026 to reflect a correction to the modelling results provided by a third-party consultant. Following publication of the report, the consultant provided a corrected version of results that differed from those originally supplied.

The correction impacts some of the figures in the report. In particular, the original February 2026 version stated that proactive infrastructure adaptation investment of $3 billion per year would generate net savings of up to $9.9 billion annually. Corrected results show that proactive investment of $4.1 billion per year would generate savings of up to $8.6 billion annually. Figures 4, 7, 8, 10 and 11 have been updated to reflect these changes.

These corrections do not affect the report's overall conclusions and recommendations.

The Canadian Climate Institute is committed to accuracy and transparency in our analysis and publications. We have updated the report and all related materials to reflect the corrected modelling results. The full technical report, published April 2026, is available here.

Executive summary

This report provides a national assessment of how climate change will affect the costs of maintaining, renewing, and repairing public infrastructure—and how acting early can significantly reduce those costs. Building on established methodologies, the analysis compares a scenario where infrastructure is maintained for the past climate and adaptation is either reactive or non-existent, to a scenario where proactive, sustained investments help prepare infrastructure for a harsher and more volatile future climate. The results show that acting early lowers long-term costs, improves infrastructure reliability, and reduces economic disruption.

Across all scenarios, climate change drives up future infrastructure costs and puts more pressure on public budgets. If governments upgrade their infrastructure proactively, before it fails, they will save money in the long-term and limit the cascading impacts that infrastructure failures and growing unreliability impose on families, businesses, and the broader economy.

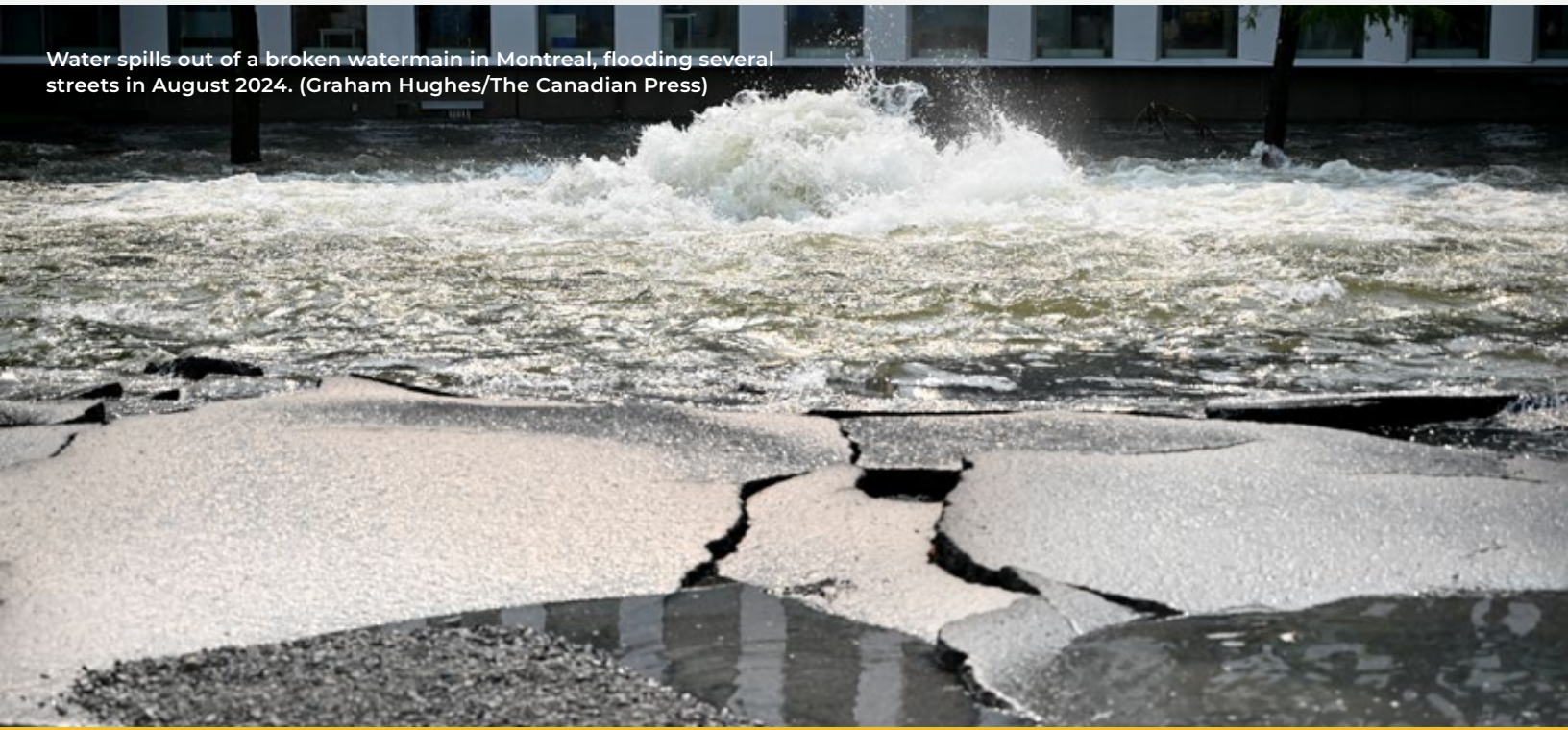
A Toronto Transit Commission vehicle, pictured in October 2018, is seen submerged in a water-filled sinkhole. (Frank Gunn/The Canadian Press)

Canadian communities, businesses, and families rely on public infrastructure every day—the roads and transit systems that connect people to work, school, and services; the bridges and highways that allow goods to move across regions; and the water and sewer systems that provide safe drinking water and keep homes and streets from flooding. When these systems work well, daily life runs smoothly and businesses operate efficiently.

However, much of this infrastructure is already in poor or declining condition after decades of underinvestment. Climate change is compounding this challenge by accelerating wear and tear and increasing service disruptions. As primary owners of public infrastructure, governments—especially municipalities—must absorb rising maintenance and repair demands within already constrained budgets. When these costs rise faster than available funding, the pressure is felt by communities and taxpayers—showing up through higher taxes and utility rates, and more service outages, flooding, and travel disruptions.

Climate change will significantly increase infrastructure costs

The analysis projects that climate-driven hazards will accelerate damage and deterioration across public infrastructure. It focuses on a subset of impacts—extreme rainfall, heat stress, and select flooding effects—which capture only part of the pressures infrastructure owners will face. Even within this limited scope, infrastructure costs without adaptation reach $14 billion per year by the 2050s and $19 billion per year by 2085 in the most likely scenario—with higher or lower costs possible under different climate outcomes.



Water spills out of a broken watermain in Montreal, flooding several streets in August 2024. (Graham Hughes/The Canadian Press)

Proactive adaptation reduces long-term costs

Upgrading assets for climate resilience before they reach critical deterioration points avoids costly failures, emergency repairs, and service disruptions.

Median estimates indicate that proactive adaptation to extreme rainfall and rising heat:

- **Lowers total costs** by nearly **$9 billion per year** compared with no adaptation and more than **$4 billion per year** compared with reactive adaptation at time of replacement.
- **Generates net savings based on avoided direct infrastructure damage alone** even after conservatively discounting future benefits.
- **Increases the share of climate-resilient assets** from near zero today **to nearly 25 per cent by 2030 and over 70 per cent by 2050**.
- **Avoids sharp cost escalation later in the century**, reducing the risk of large, unplanned infrastructure expenditures and improving budget predictability.

Although proactive adaptation delivers significant cost savings compared to reactive or no-adaptation approaches, it does not stop infrastructure costs from rising. Proactive adaptation requires sustained investment averaging $4 billion per year, but even with that, some climate damage will be unavoidable, leading to added costs. Taken together, infrastructure owners face average annual costs of over $6 billion, including both adaptation investment and damage repairs—still substantially lower and far more predictable than reactive or no-adaptation approaches.

The analysis also shows that adapting existing infrastructure to heat and rainfall is only part of the response required: as climate risks intensify, governments will need to make major additional investments in new protective infrastructure—such as flood protection measures like dikes—to manage risks that cannot be addressed solely through upgrades to existing assets.

Indirect benefits strengthen the case for adaptation

When public infrastructure fails, the ensuing costs extend beyond infrastructure budgets, creating broad ripple effects. Governments face emergency response and disaster assistance costs, while households and businesses experience losses that do not appear on public balance sheets, including property damage, disrupted mobility, supply-chain interruptions, and reduced economic output.

Many of the economic impacts of infrastructure damage and disruption—such as insurance premium increases, business interruption, and supply-chain disruption—are outside the scope of the analysis. If these impacts could be fully quantified, the overall benefits and returns on investment from proactive adaptation would be substantially higher.

Recommendations

The report identifies six priority policy pathways for federal, provincial, and territorial governments to accelerate proactive, co-ordinated public infrastructure adaptation and reduce long-term costs:

1. **Mobilize financing and partnerships for adaptation.** Expand funding for infrastructure adaptation and modernize financial tools available to municipalities and other infrastructure owners—including Indigenous governments—to finance resilience upgrades.
2. **Mainstream adaptation in infrastructure asset management.** Plan, operate, maintain, and renew public infrastructure so it continues to function safely and reliably under future climate conditions.
3. **Strengthen hazard data foundations.** Expand and strengthen climate hazard data and mapping nationwide to support consistent, risk-informed infrastructure decision-making.
4. **Modernize codes and standards for a changing climate.** Accelerate updates to infrastructure codes and standards so that new and renewed infrastructure is built to withstand Canada's changing climate.
5. **Integrate climate resilience into public infrastructure funding.** Ensure all public infrastructure funding consistently accounts for climate risk and supports infrastructure owners in reducing long-term vulnerability.
6. **Identify and support vulnerable communities and critical assets.** Tailor programs to support the most vulnerable communities and critical infrastructure.

Taken together, the evidence shows that acting now costs far less than waiting. It also delivers strong economic returns and reduces long-term risks to public finances. Investing in resilient infrastructure is a smart use of public funds to manage climate risk, protect communities and taxpayers, and ensure Canada's infrastructure continues to support economic productivity and community well-being in a changing climate.