EXECUTIVE Sunnary

Northern Canada faces a double threat of alreadyinadequate infrastructure in a rapidly warming climate. *Due North*, the first major assessment of the costs of climate change to infrastructure across all of Northern Canada, finds that all orders of government should set policies and make investments without delay to prepare for the impacts of climate change on Northern infrastructure.

Despite infrastructure's crucial role in the North, the region already faces a significant infrastructure gap. Inadequate infrastructure is a threat to health, well-being, and livelihoods across the North—particularly for Indigenous People. Housing insecurity is worse in the North than anywhere else in Canada. Most Northern communities rely on diesel generators for electricity and do not have reliable high-speed internet. Advanced medical care frequently requires a flight to southern Canada, and prices for food and other goods can be two to five times higher than in southern Canada because of poor transportation infrastructure. As if these challenges weren't enough, the climate in Northern Canada is warming three times faster than the global average. The resulting permafrost thaw, more frequent and damaging extreme weather, and unpredictable snow and ice conditions are amplifying existing Northern infrastructure problems, with devastating consequences for Northerners.

Over the past two years, the Canadian Climate Institute has been working, with input from Northern rights holders, governments, and other stakeholders, to identify the costs of climate change impacts to Northern infrastructure. Due North documents the findings of our analysis, including:

- The first ever permafrost thaw projections for the entire North and estimates of the cost of damage for Northern infrastructure
- Projections of winter road viability
- First-hand accounts of the social and cultural impacts of climate-related infrastructure failure and disrepair

Executive summary

 Estimates of the costs and benefits of both incremental and transformative adaptation measures to prevent or delay the impacts of climate change

Infrastructure damage from permafrost thaw across Northern Canada—Yukon, Northwest Territories, Nunavut, Nunavik, and Nunatsiavut, as well as the northern regions of British Columbia, Alberta, Saskatchewan, Manitoba, and Ontario—is increasing rapidly. Runways, roads, and building foundations will sustain significant damage from permafrost thaw, winter roads will become more unsafe and less viable during warmer winters, and sea level rise and floods will threaten the viability of some communities.

Our analysis shows that early investments in infrastructure adaptation can reduce costs and prevent disruption of essential services. However, incremental adaptations alone won't be sufficient—the effects of climate change are only exacerbating decades, if not centuries, of poor planning, underinvestment, and neglect. Developing infrastructure for the future of the North will require transformative adaptations as well as incremental adaptations. In many cases, this will mean following the lead of Northerners to reimagine the way that infrastructure services are delivered and support education and community knowledge-sharing networks.

We recommend four types of actions that can not only reduce climate change costs and impacts on Northern infrastructure but can also lay a path to more functional, appropriate, and resilient infrastructure.

 FUNDING: The federal government should dedicate new financial resources for Northern infrastructure and should restructure existing infrastructure funding programs to increase accessibility and usefulness to Northern governments.

- INFORMATION: The federal government should support provincial, territorial, and Indigenous governments in developing and maintaining accurate and practical information about Northern-relevant climate risks to infrastructure. This data should prioritize information that is important to Northern decision makers and Indigenous communities.
- INNOVATION: All orders of government should prioritize infrastructure replacement and transformative leapfrogging over repair and protection wherever this is found to be a more effective, efficient, and sustainable way to safeguard services.
- REGULATION: Federal, provincial, and territorial governments should update infrastructure policies, regulations, standards, and codes to explicitly account for the more complex and severe impacts of climate change in the North and to ensure that new infrastructure is resilient.

Because colonization and racism are among the root causes of climate change infrastructure vulnerability, the four recommendations are rooted in a guiding principle of self-determination: All infrastructure development and adaptation policies should be implemented in a manner that is consistent with the principles outlined in Canada's Truth and Reconciliation Report. By working with Indigenous Peoples through a process of partnership and equal collaboration, federal, provincial, and territorial governments have an opportunity to fundamentally rethink the way infrastructure is built in the North to better serve the needs of Indigenous Peoples.

Executive summary

Russia's February 2022 invasion of Ukraine brought significant attention to questions of Northern security and national defence. Defence investments and policies resulting from these concerns have the potential to address pre-existing threats and build Northern resilience; however, unless Canada learns from mistakes of the past, such policies could also exacerbate North-south infrastructure inequities, disempower Indigenous Peoples, and increase vulnerability to climate change. Our analysis underscores the centrality of infrastructure and climate adaptation in any assessment of the threats facing the North.

For too long, reliable, functional, and high-quality infrastructure has been unavailable for many Northerners. With the climate changing faster in Northern Canada than anywhere else in North America, the challenge is only growing. All orders of government must act to help transform Northern infrastructure—from inadequate and vulnerable to appropriate and resilient—to help Northerners secure a safe, healthy, and prosperous future.

