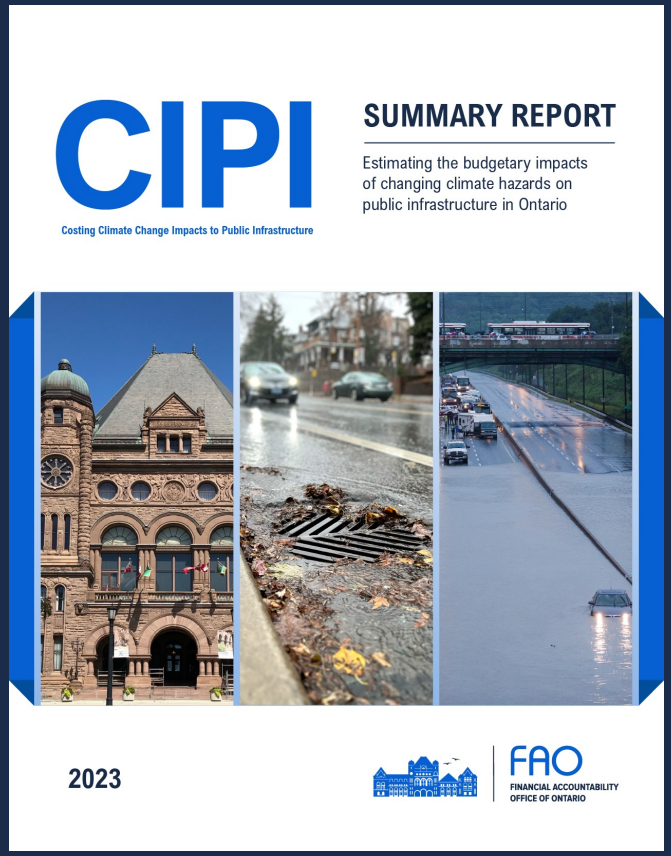
Briefing Deck



Costing Climate Change Impacts to Public Infrastructure: Summary Report

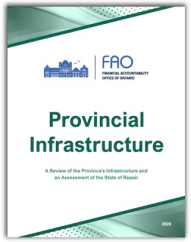
Estimating the budgetary impacts of changing climate hazards on public infrastructure in Ontario

FAO
FINANCIAL ACCOUNTABILITY OFFICE OF ONTARIO

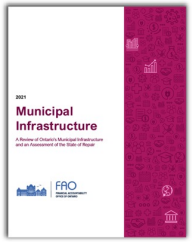
About the CIPI Project

- Despite numerous climate risk assessments, the cost implications of changing climate hazards for government infrastructure budgets remains largely unexplored.
- In 2019, a Member of Provincial Parliament asked the FAO to analyze the costs that the impacts of climate change could impose on Ontario's provincial and municipal infrastructure, and how those costs could affect the long-term budget outlook of the Province. In response, the FAO launched its Costing Climate Change Impacts to Public Infrastructure (CIPI) project.
- This summary report concludes the project, outlining the main results of the three sector reports and providing projections of their long-term budgetary impacts on key fiscal sustainability measures.

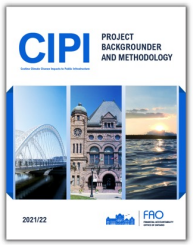
2020 → **2021** → **2022** → **2023**



Provincial Infrastructure

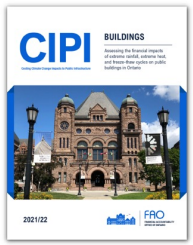


Municipal Infrastructure

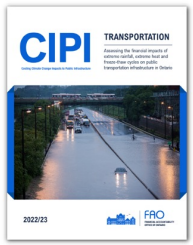


Project Backgrounder and Methodology

WSP Report

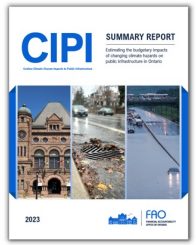


Buildings and Facilities



Transportation Infrastructure

Linear Storm and Wastewater Infrastructure

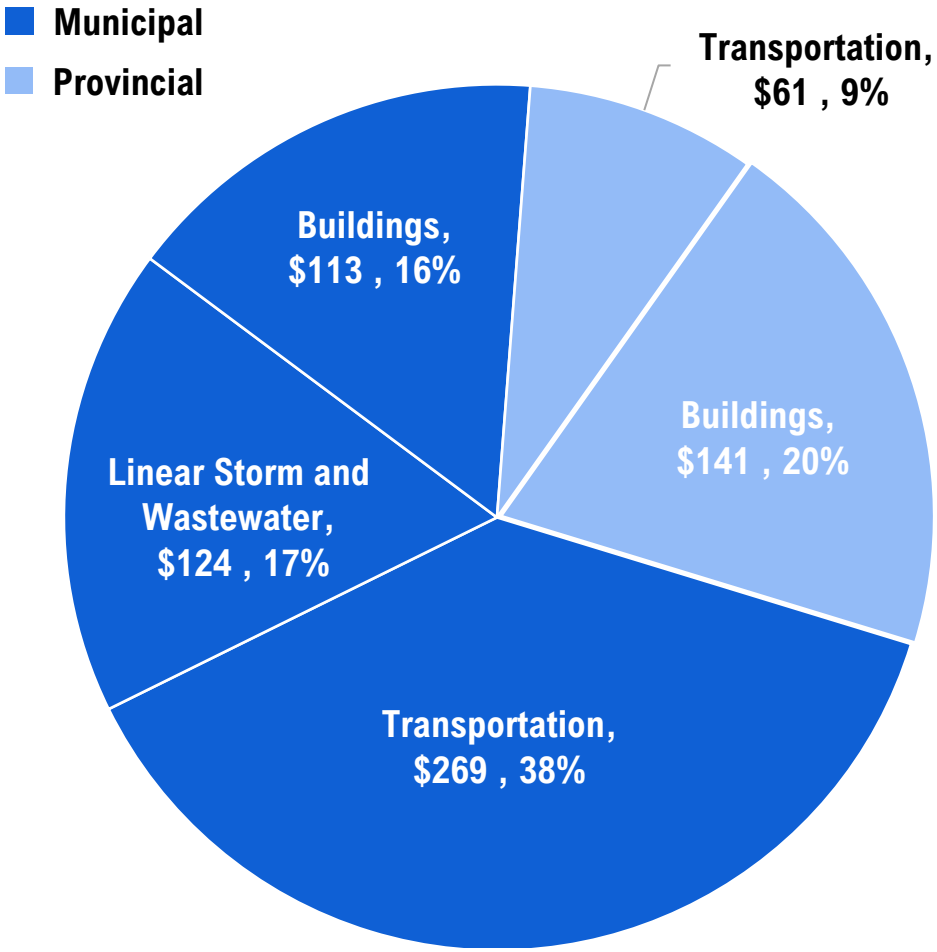


Summary Report

CIPI examined $708 billion of public infrastructure

- The CIPI project analyzed $708 billion in provincial and municipal public infrastructure in three sectors: buildings and facilities, transportation infrastructure, and linear storm and wastewater infrastructure.

- Ontario's 444 municipalities own and manage $506 billion of this infrastructure, representing 71 per cent of the infrastructure assets in scope. The Province owns $202 billion, or 29 per cent of assets in scope.

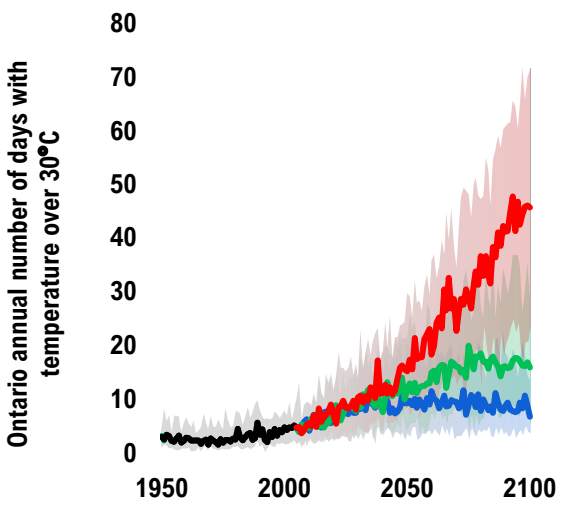


Note: CRV estimates are in real 2020 billion dollars.
Percentage values refer to the share of total CRV.
Source: FAO.

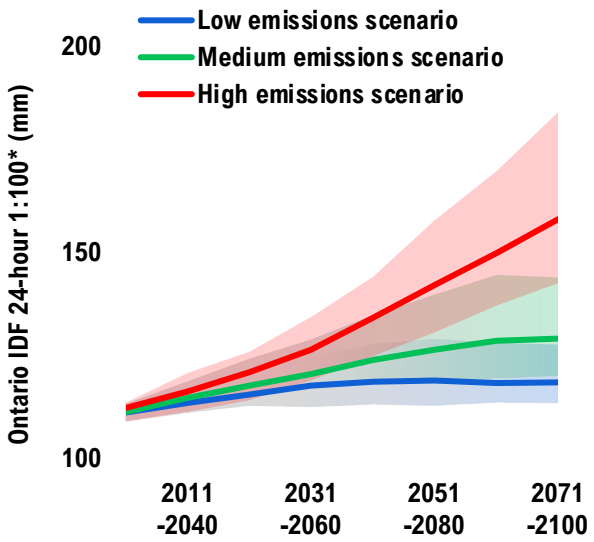
Ontario's public infrastructure is vulnerable to changing climate hazards

- Ontario's public infrastructure was designed, built and maintained to withstand a specific range of climate conditions, typically based on historical climatic data.
- Ontario's climate is changing, bringing more frequent and intense extreme rainfall and extreme heat, and fewer freeze-thaw cycles.

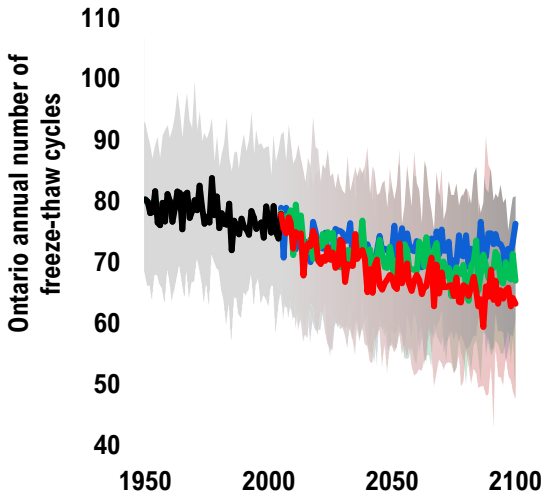
More Extreme Heat



More Extreme Rainfall



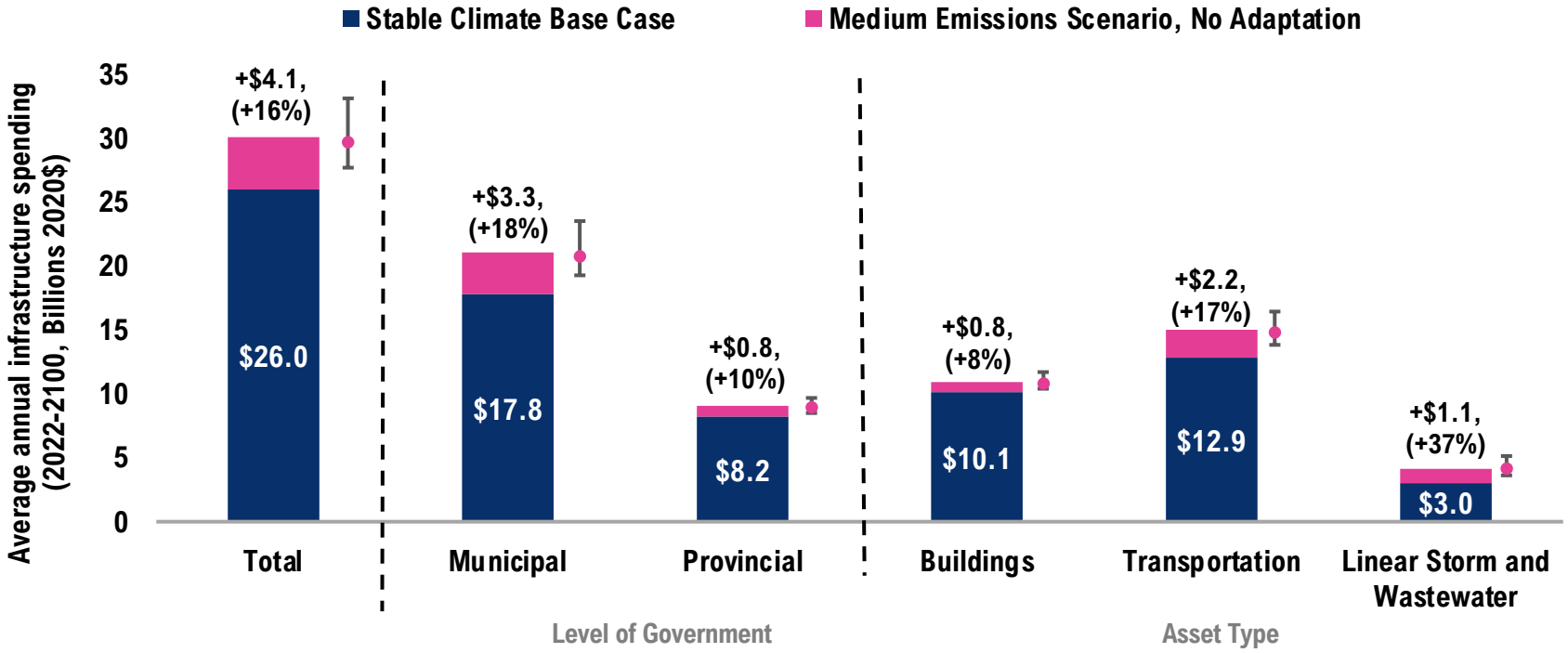
Less Freeze-Thaw Cycles



* This is the rainfall in millimetres that occurs in 24-hours for the 1-in-100-year storm event.
Note: Charts present Ontario average values. Regional projections vary.
Source: Canadian Centre for Climate Services.

Climate change will raise public infrastructure costs

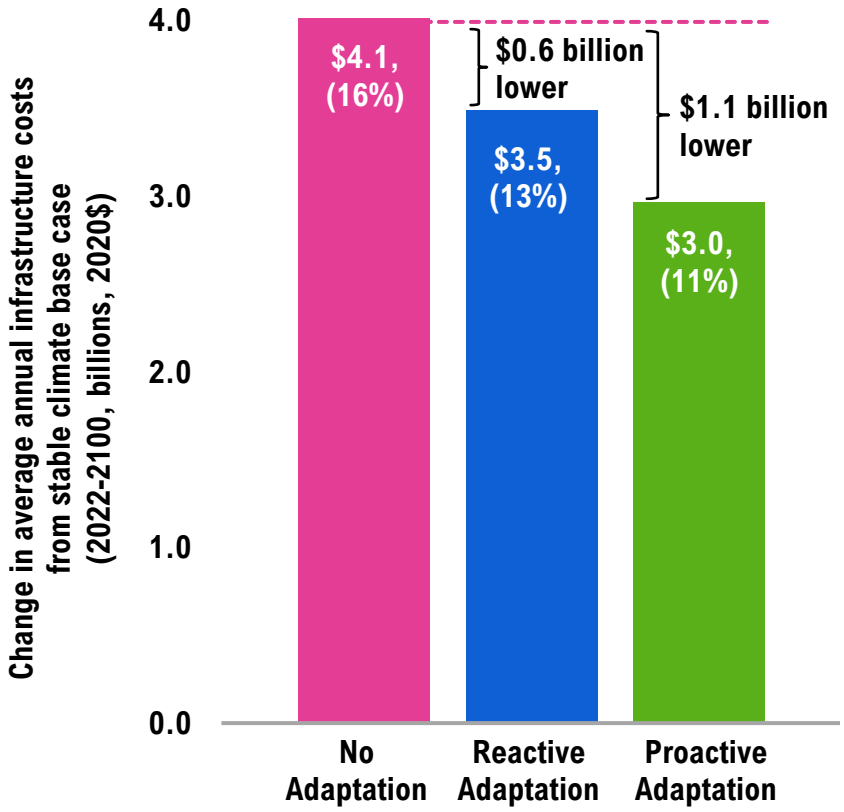
- In the absence of adaptation, these three climate hazards will accelerate asset deterioration, resulting in higher capital investments, more frequent rehabilitations, and earlier asset renewals. They would also require more operations and maintenance (O&M) activities.
- If a "no adaptation" asset management strategy was pursued, these climate hazards would add $4.1 billion per year on average to the cost of maintaining Ontario's public infrastructure in a state of good repair in a medium emissions scenario.



Note: Uncertainty bars represent the range of cost outcomes in the medium emissions scenario.
Source: FAO.

Adaptation can lower climate-related infrastructure costs

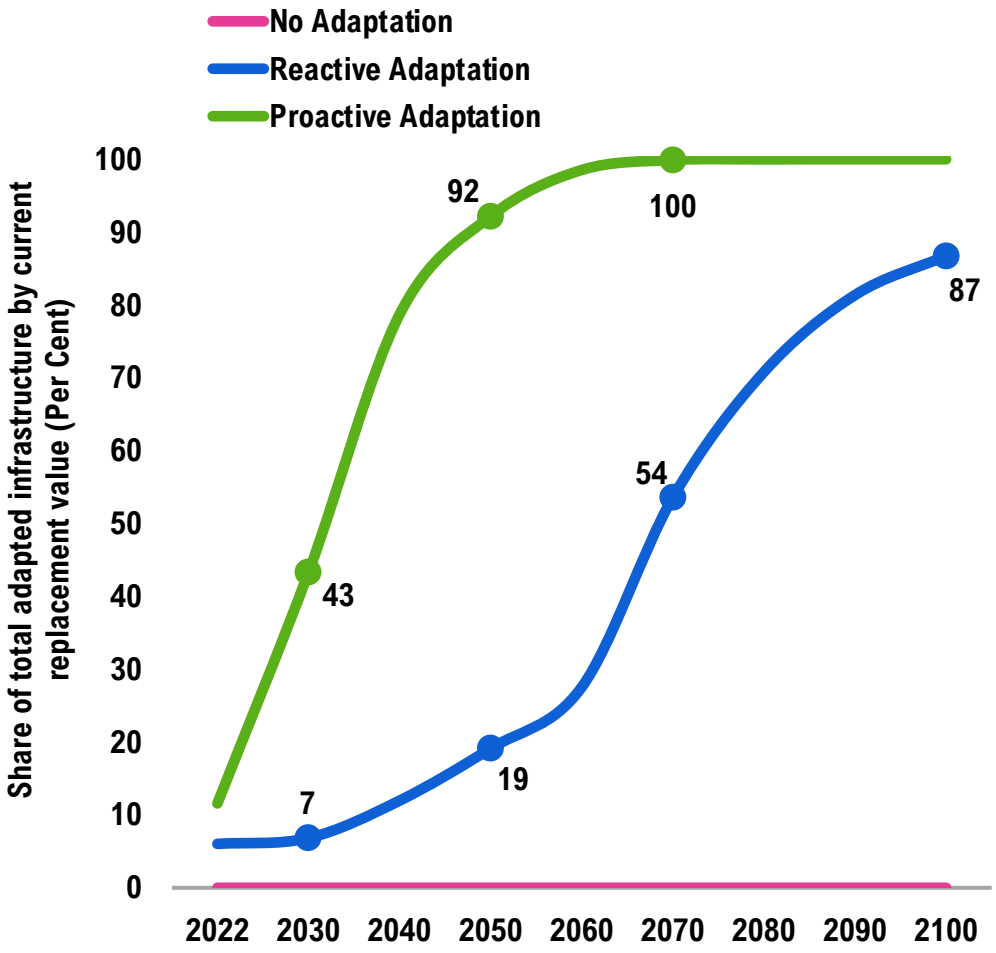
- Adapting public infrastructure can help to avoid accelerated deterioration and higher operations and maintenance costs. However, adaptive actions can also raise public infrastructure costs.
- The FAO costed two adaptation strategies: a **proactive strategy** which assumes asset managers adapt infrastructure either during an asset's next major rehabilitation or upcoming renewal, whichever comes first; and a **reactive strategy** which assumes infrastructure is adapted when replaced at the end of their useful lives.
- The proactive adaptation strategy carries the lowest climate-related costs in constant dollars, followed by the reactive strategy, with the no adaptation strategy being the most expensive.



Note: Results presented are for the medium emissions scenario. The uncertainty bands are omitted from this figure for clarity of presentation.
Source: FAO.

Adaptation reduces the risk of climate-related infrastructure service disruption

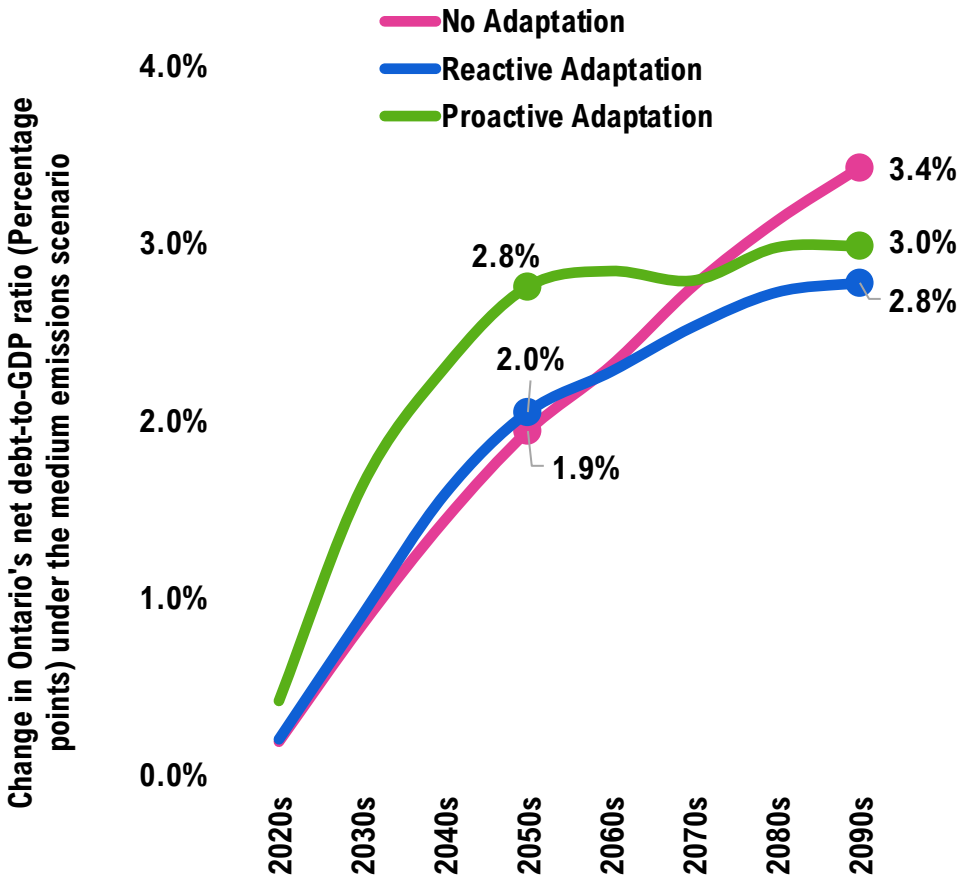
- Adapting public infrastructure reduces its climate vulnerability and lowers the risk of infrastructure failure or loss of performance. When public infrastructure suffers a loss of performance, or fails entirely, it can impose costs on households, businesses and the broader economy. These broader societal costs are likely to be substantial but were beyond the FAO's scope.
- The proactive strategy adapts almost all public infrastructure by 2050, rapidly improving the climate resilience of Ontario's portfolio.
- The reactive strategy leaves the majority of Ontario's public infrastructure more vulnerable to climate risk though to the 2060s.



Source: FAO.

The long-term budget impact of climate-related infrastructure costs for the Provincial portfolio

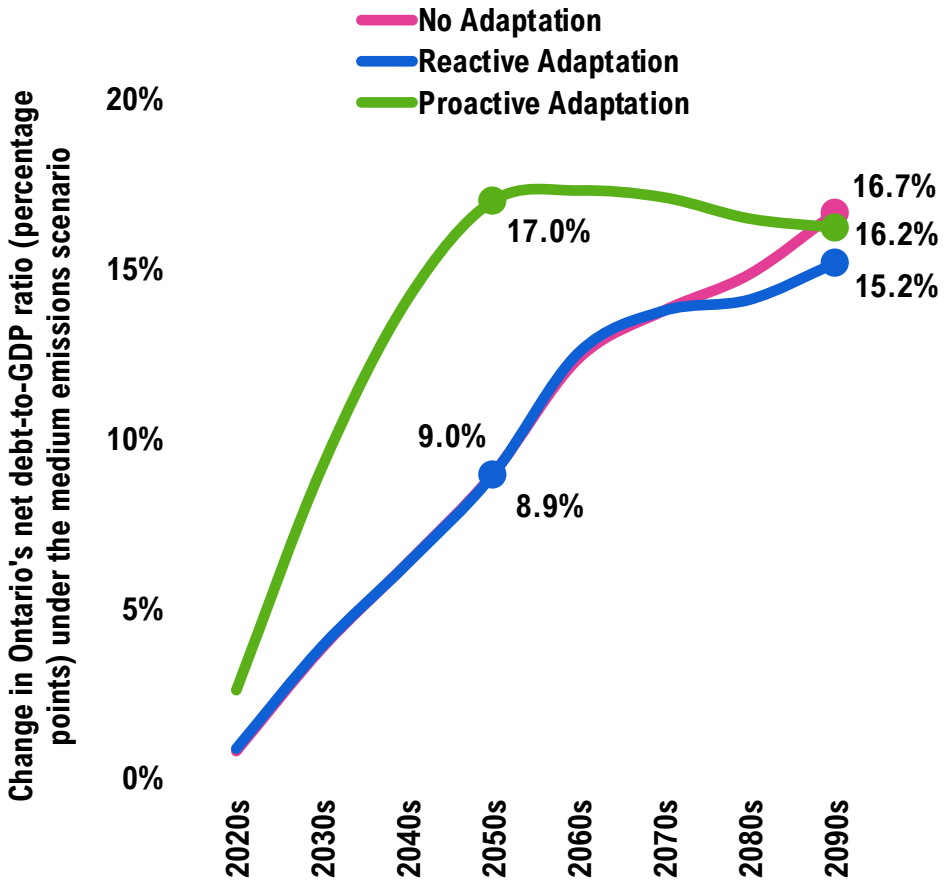
- In a medium emissions scenario, climate-related infrastructure costs to the provincial portfolio would add 2.8 to 3.4 percentage points to the Province's net debt-to-GDP ratio by the end of the century. These costs are not likely to significantly impact the Province's fiscal sustainability.
- The extent of climate change will impact Ontario's fiscal outcomes. For example, in the absence of adaptation, the FAO estimates that Ontario's net debt-to-GDP ratio would increase by 1.6 percentage points by the 2090s for every degree Celsius increase in global mean temperatures beyond 0.5ºC.



Note: The uncertainty bands are omitted from this figure for clarity of presentation. Values represent the median projection of the medium emissions scenario.
Source: FAO.

The budget impact of climate-related infrastructure costs to the provincial and municipal portfolios

- Ontario's municipalities own 71 per cent of asset's in CIPI's scope and are projected to incur about four times the climate-related infrastructure costs than the Province.
- To illustrate the size of the combined budgetary liability, the FAO projected the impact of both provincial and municipal climate-related infrastructure costs on the Province's long term fiscal position.
- In a medium emissions scenario, climate-related infrastructure costs to the combined portfolio would add 15.2 to 16.7 percentage points to the Province's net debt-to-GDP ratio by the end of the century. Given the much larger size of the combined infrastructure portfolio, the budget impacts are much larger than for the provincial portfolio alone.

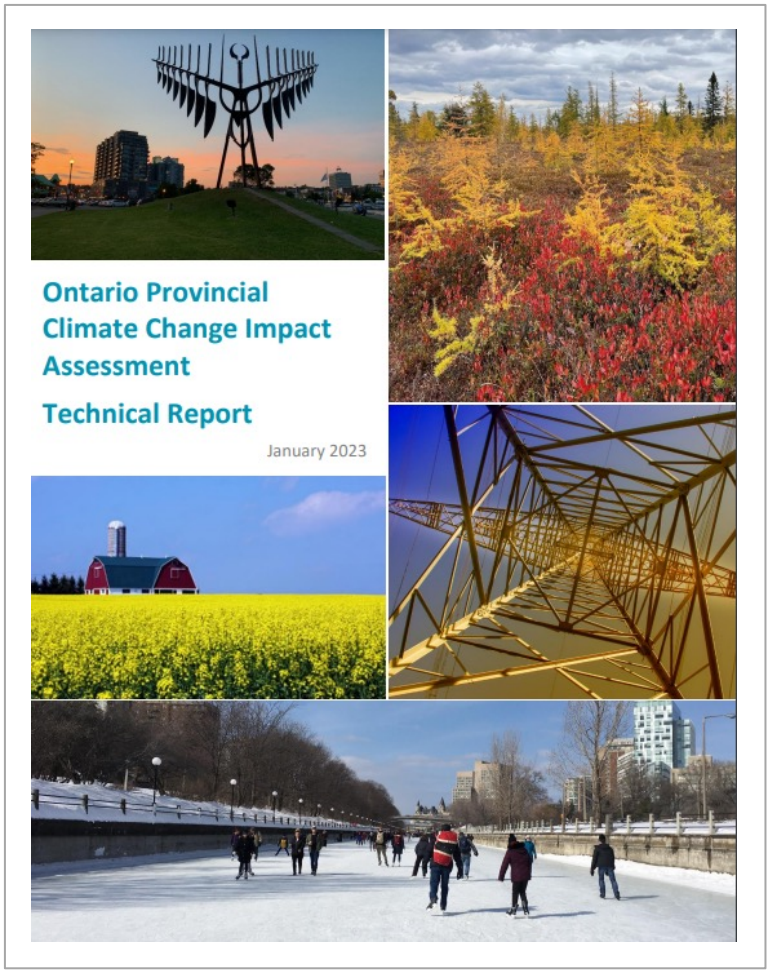


Note: The uncertainty bands are omitted from this figure for clarity of presentation. Values represent the median projection of the medium emissions scenario.
Source: FAO.

The Province's climate change risk assessment aligns with CIPI

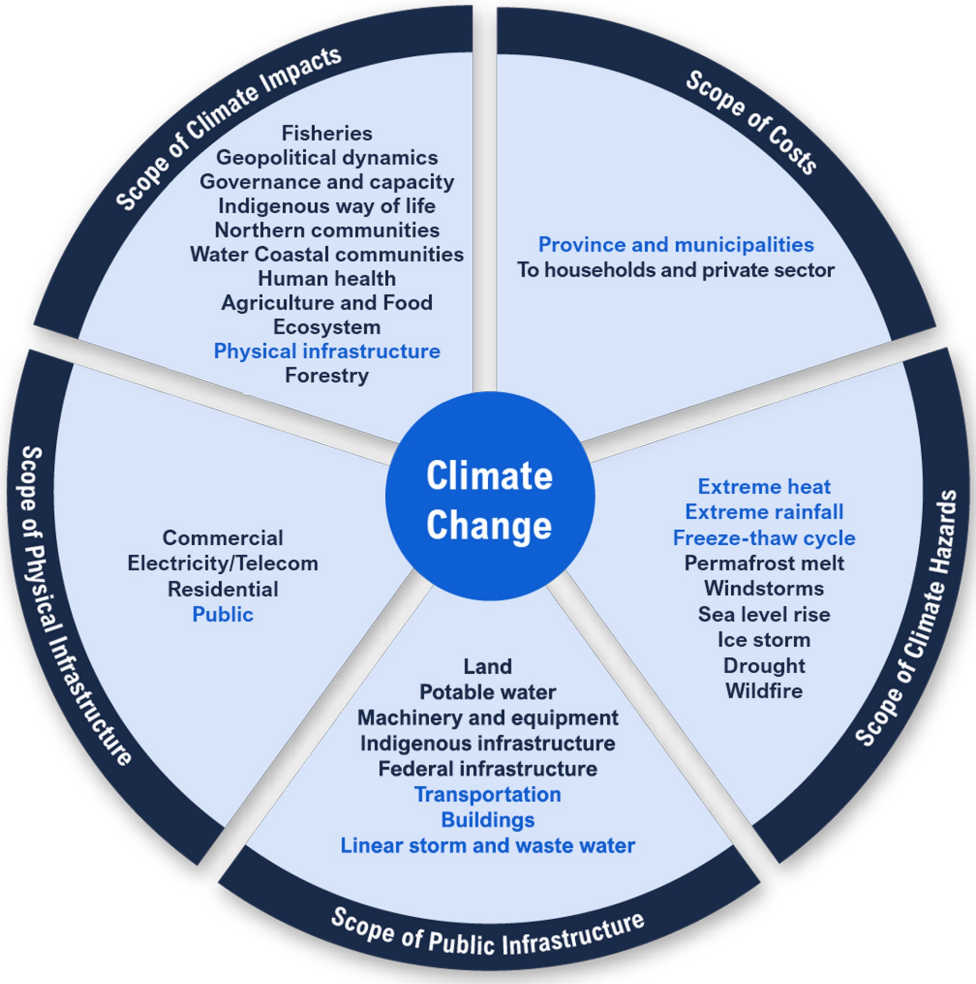
- The province recently released its Provincial Climate Change Impact Assessment (PCCIA), which found that "…all infrastructure across Ontario face climate risk."

- While the PCCIA examined a broader range of climate hazards on a different composition of public and private infrastructure asset classes, its conclusions with respect to the climate vulnerability of public infrastructure are broadly aligned with those of the CIPI project.



The FAO's climate costs are lower bound estimates

- Public infrastructure is one of many ways that climate change is impacting Ontario's society and economy.
- Within the scope of climate change's impact to public infrastructure, the FAO's costs estimates reflect the lower bound of potential impacts. The CIPI project examined only three of many climate hazards, considering only a sub-set of Ontario's public infrastructure and did not incorporate the broader climate-related costs to households and business from climate change's impact on public infrastructure.



Thank you!

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