

THE ENGINEERING PROFESSION'S POSITION

- Essential infrastructure on Indigenous reserves and in remote Indigenous communities, such as safe drinking water, reliable electricity, wastewater treatment, waste management, information technology, schools, and housing, must be properly funded, built to appropriate standards, and resilient.
- Engineers are well positioned to assist Indigenous communities in building capacity to achieve the communities' desired outcomes for the planning, design, construction, and operation of essential infrastructure elements.
- The engineering profession seeks to honour traditional and cultural practices while working with the Indigenous peoples of Canada.

The challenge(s)

Public infrastructure across Canada must meet the needs of individuals, families, and communities. Reliable infrastructure is the foundation for improving the quality of life and economic outcomes of individuals living in northern, remote, and rural communities across Canada. The 2016 federal budget announced approximately \$4 billion of funding to improve Indigenous community infrastructure.¹ The 2017 federal budget proposed to invest an additional \$4 billion over 10 years through the [Investing in Canada Plan](#)², starting in 2018–2019, to build and improve housing, water treatment systems, health facilities, and other community infrastructure in partnership with Indigenous peoples. While these much-needed investments are welcomed, there is still a lot of work that needs to be done to strengthen vulnerable infrastructure on reserves and in remote communities.

A significant percentage of existing public infrastructure is considered ageing, inadequate, and in poor condition, further increasing the negative effects on the social and economic fabric of Indigenous reserve communities. According to the Canadian

Council for Public-Private Partnerships, the infrastructure deficit on Indigenous communities is estimated to be \$30 billion.³

Infrastructure deficits in Canada are not exclusive to Indigenous communities, but the level of inadequate public infrastructure in northern, remote, and on-reserve communities compared to off-reserve communities and municipalities is evident. Although we applaud the Government of Canada's commitment to end all long-term drinking water advisories on public systems on reserve before March 2021, more work still needs to be done. In addition, existing infrastructure on Indigenous reserves remains vulnerable to extreme weather events as its effects have not been completely considered in the planning, construction, or operation phases of most infrastructure elements.

How Engineers Canada has contributed

Engineers Canada has helped Indigenous communities across the country, including the Unama'ki in Cape Breton, Nova Scotia, the Moose Cree reserve in northern Ontario, and the Mohawk Akwesasne reserve in eastern Ontario, to apply the Public

Infrastructure Engineering Vulnerability Committee (PIEVC) Protocol to assess the climate vulnerability of their water and wastewater systems. The Protocol was also used to assess housing, school, and supporting infrastructure for the Oneida reserve in southern Ontario. This work includes the development of an Indigenous toolkit that incorporates climate risk assessments as part of Indigenous community asset management plans.

Engineers Canada has helped with capacity building for Indigenous engineers and communities across the country through PIEVC training and risk assessment workshops. Engineering faculties across the country have also collaborated with Indigenous communities to help build capacity and improve existing public infrastructure. The ownership of the PIEVC protocol was transferred to the Institute for Catastrophic Loss Reduction in March 2020.

In June 2018, the Government of Canada announced that as part of the Investing in Canada Plan, new major infrastructure projects that are seeking federal funding will be required to undertake an assessment of how their projects will contribute to or reduce carbon pollution, and to consider climate change risks in the location, design, and planned operation of an infrastructure project. Infrastructure Canada will also require that a professional engineer, registered professional planner, or appropriately specialized biologist or hydrologist provide an attestation that the climate change resilience assessment was carried out using a methodology that is in accordance with ISO 31000 Risk Management standard.

The Climate Lens⁵ also lists the Engineers Canada-founded PIEVC Protocol as one of these methodologies for climate change resilience that is consistent with ISO 31000.

Recommendations to the federal government

Infrastructure that many Indigenous reserves lack is usually provided to other types of non-Indigenous communities by municipalities or provinces and territories. However, under the Indian Act, this is the federal government's responsibility on Indigenous reserves.

The government should continue to fulfill its promise of Budget 2016 and lift the two per cent cap on funding for Indigenous programs and work to establish a new fiscal relationship that gives Indigenous communities sufficient, predictable, and sustained funding. This funding must focus largely on resilient and sustainable public infrastructure.

On top of funding infrastructure projects, the government must help Indigenous communities develop their capacity through training in asset management practices to assess, plan, and manage their infrastructure. The government should also work to fulfill its promise to eliminate long-term drinking water advisories on public systems on reserve by 2021.

The government should support updates to Indigenous infrastructure asset inventories, which would include modernizing the data management and support systems as well as a review of the asset categories and descriptions to ensure they are up-to-date, and that they describe age, current condition, and climate vulnerability. This information

is vital for effective asset management and consideration of climate risks. These efforts, combined with committed funding and training in asset management, will enhance the capacity of communities to meet their needs for climate resilient infrastructure.

How Engineers Canada will contribute

The engineering profession is ready to share its unbiased expertise with the federal government through advice, review, collaboration, and mentorship. Engineers in Canada have the technical expertise to support the development and implementation of sustainable and economically feasible plans that create sustainable infrastructure.

Engineers Canada supports programs that increase the representation of Indigenous peoples in post-secondary engineering programs, with the intent to increase the number of Indigenous engineers.

Engineers Canada is dedicated to working with the federal government and directly with Indigenous peoples and their communities to build upon the necessary knowledge, skills, and experiences to assess infrastructure climate vulnerabilities and risks.

¹ Government of Canada (2019). "Indigenous Services Canada: Departmental Plan 2019-2020." Retrieved June 13, 2019 from: <https://www.sac-isc.gc.ca/eng/1553090854386/1553090905214?wbdisable=true>.

² Government of Canada (2019). "Investing in Canada Plan." Retrieved August 13, 2019 from: <https://www.infrastructure.gc.ca/plan/about-invest-apropos-eng.html>.

³ Government of Canada (2019). "Indigenous Services Canada: Departmental Plan 2019-2020." Retrieved June 13, 2019 from: <https://www.sac-isc.gc.ca/eng/1553090854386/1553090905214?wbdisable=true>.

⁴ Government of Canada (2019). "Indigenous Services Canada: Departmental Plan 2019-2020." Retrieved June 13, 2019 from: <https://www.sac-isc.gc.ca/eng/1553090854386/1553090905214?wbdisable=true>.

⁵ Government of Canada (2019). "Infrastructure Canada: Climate Lens – General Guidance." Retrieved August 13, 2019 from: <https://www.infrastructure.gc.ca/pub/other-autre/cl-occ-eng.html>.