

Pre-Budget Submission to the House of Commons
Standing Committee on Finance

August 2019



The University of Alberta recommends that the Government of Canada:

1. Increase levels of sustained funding for the full scope research endeavours with particular support of environment and climate change research.
2. Create a large-scale fund to support the sustainable renewal of post-secondary infrastructure.
2. Expand funding for successful university programming and initiatives that support Indigenous student retention and success.

The urgency and scale of global climate change and its threat to natural and human systems cannot be understated, necessitating co-ordinated, broad-based action across all communities and players in the public and private sector. With Canada's climate warming at double the rate of overall global warming,ⁱ the time for action is now.

To provide a sustainable and prosperous future for generations to come, Canada must harness the creativity of its citizens to produce the innovative technologies, processes and systems that create stronger, adaptable and resilient communities that can thrive amid environmental degradation and begin to reverse adverse developments.

Canada's universities are indispensable to driving inclusive growth in the face of global environmental, social and economic shifts. In addition to conducting the cutting-edge research key to a clean future, universities train the next generation of leaders and innovators who will continue the transition to a low-carbon economy. In service of building a more innovative and sustainable nation, the University of Alberta presents the following submission for consideration in advance of Budget 2020.

BUILDING A LOW-CARBON ECONOMY

Research is critical to the fight against climate change and forging a path to a low-carbon economy. Investments in the full life cycle of research—from data collection to discovery to market—are necessary for Canada to meet its global climate commitments and make well-informed, ambitious and strategic policy decisions to mitigate, and adapt to, a changing environment.

Governments and organizations worldwide recognize public investment in research as a key policy measure necessary for successful low-carbon transitions. However, an Organisation for Economic Co-operation and Development (OECD) study found that, on a global scale, “public budgets for energy research have not kept pace with the urgency of a transition in the energy sector” and the “share of energy R&D in total R&D has fallen from over ten per cent to less than five per cent in the last four decades.”ⁱⁱ

According to Canada's latest OECD environmental performance review, despite a strong innovation framework, Canada's pace of eco-innovation has been slow relative to leading OECD countries. Canada has a diminishing share of the global clean technology market, and its support for renewable energy and energy efficiency remains one of the lowest among OECD nations as a percentage of total public energy R&D.ⁱⁱⁱ

Investments in cutting-edge scientific and social research at Canada's universities are paying dividends, expanding Canada's knowledge base in areas including, but not limited to, solar cell development, wind and geothermal energy, carbon capture and storage, land and water reclamation, and the sociocultural impacts of climate change on northern and mountainous regions. Advances in all these areas and more are taking place at the University of Alberta through our Energy Systems Signature Research Area.

Building on these foundations and recognizing the complexity of this global challenge, the Government of Canada has made critical investments in interdisciplinary and intersectoral energy and climate change research. At the University of Alberta, this includes \$18.3 million to the Canadian Mountain Network (CMN)—through the Networks of Centres of Excellence program—and \$75 million for Future Energy Systems through the Canada First Research Excellence Fund.

Through ambitious research programs and networks like these, Canada has made considerable progress in its efforts to become a global leader in climate science and the technologies and policies needed to prepare for and reverse adverse climate conditions. However, more can be done. In a recent survey from Evidence for Democracy, 97 per cent of climate scientists called for increased funding, with 77 per cent citing concerns over the loss of highly qualified personnel (HQP) from the field.^{iv} This loss of talent is particularly damaging to Canada's climate leadership. HQP—including post-doctoral fellows—are integral to maintaining the quality of research outcomes, and to training and mentoring the next generation of researchers.

To close this gap, meet the needs of climate scientists and translate complex scientific results into public impact, a continued and accelerated effort to invest in the full scope and life cycle of research is required. This includes funds for data collection, storage and analysis; equipment purchasing and maintenance; administration and personnel; scaling up of promising projects; funds to leverage international partnerships; and expenditures associated with knowledge transfer and public accessibility to data and research outcomes.

An illustrative example of the complex needs of large-scale climate research is the Canadian Ice Core Archive (CICA)—home to ancient ice cores containing data on past climates, episodic environmental events and global industrial activity. Through analysis, researchers map the progression of environmental changes to inform future trajectories and policy actions on climate change, energy use and industrial emissions. Unfortunately, as ice caps rapidly diminish, there is an urgency to accelerate collection and storage of new ice cores before this irreplaceable and extremely valuable data disappears. Sustained funding would ensure these records remain intact, accessible to the public and available for new types of analysis in the future.

Bolstering investments in the full scope of research across disciplines, including through unique and state-of-the-art research hubs like CICA, serves the needs of today's researchers while providing foundations for future generations to deliver innovations that will contribute to a more sustainable future.

Recommendation: Increase levels of sustained funding for the full scope research endeavours, with particular support of environment and climate change research.

SUSTAINABLE INFRASTRUCTURE

Universities across Canada are leading the charge for sustainable operations, resource conservation and minimization of ecological footprints, decreasing greenhouse gas (GHG) emissions and building a culture of sustainability on campus and in the greater community.

As a globally recognized leader in sustainability and energy efficiency, the University of Alberta has implemented an ambitious energy management program, reducing GHG emissions on campus by more than 2.3 million tonnes. This is possible in part due to our ownership and operation of a district energy system, which is more cost-effective and efficient than conventional energy systems, preventing approximately 60,000 tonnes of carbon dioxide emissions from entering our atmosphere each year.

Despite these gains, concerns about energy usage, environmental impacts, climate change and increasing utility costs are adding pressure to realize greater energy reduction opportunities. The University of Alberta has the largest inventory of land and buildings of any university in Canada, but 60 per cent of those buildings are over 40 years old. Aging facilities and systems come with subsequent loss of efficiency and increased energy consumption and, in the presence of climate disruptions, pose greater risk to university operations.

Additional investments in sustainable post-secondary infrastructure would enable the functional and physical renewal of campus infrastructure in a cost-efficient manner, minimizing the need for new buildings and addressing environmental realities while meeting the needs of today's learners and researchers.

In addition to improving the sustainability of campus communities themselves, further investment in green infrastructure would have far-reaching economic and environmental benefits. University campuses are optimal test beds for research and development of efficient systems and renewable energy technology that can be implemented in buildings and homes.

At the University of Alberta, “living lab” initiatives provide experiential learning opportunities while using campus buildings, biodiversity and communities as a testing ground to develop sustainability solutions. Projects include harvesting wind energy in an urban environment, multi-modal transportation planning, solar micro-grid and energy storage, and facade design specific to northern climates to reduce a building's energy consumption by half.

A dedicated post-secondary infrastructure stream is supported by the successful Post-Secondary Institutions Strategic Investment Fund (PSI-SIF) and Knowledge Infrastructure Program (KIP). These programs have enhanced research and learning environments for students, staff and faculty and have a significant positive long-term impact on local economies and GHG emission reduction.

A follow-up funding stream focused on sustainable post-secondary infrastructure renewal would build on the proven impacts of these programs and revitalize aging facilities while contributing to a reduction in carbon emissions, driving clean growth across Canada. In addition to funding, this stream should prioritize intergovernmental co-operation to streamline the process of securing matching funding.

Recommendation: Create a large-scale fund to support the sustainable renewal of post-secondary infrastructure.

INDIGENOUS AND NORTHERN COMMUNITIES

Vulnerable populations disproportionately feel the negative impacts of climate change. As Arctic regions warm at a rate three times greater than the global average, according to the United Nations' Intergovernmental Panel on Climate Change,^v Canada's Indigenous and northern communities are among those at the highest risk of adverse and destructive impacts of environmental degradation and climate change.

As a result of melting and accompanying changes to flora and fauna, these communities are at risk of losing homes, cultural touchstones, traditional knowledge and sustainable living practices that serve as a valuable model for global climate change mitigation and adaptation. It is a moral, socio-economic and environmental imperative to ensure that Canada's Indigenous and northern communities have the capacity, resources and opportunities needed to withstand, and thrive, as environments alter rapidly around them.

Building and fostering meaningful, mutually beneficial partnerships between post-secondary institutions and northern and Indigenous communities helps to build capacity through training and education while facilitating the exchange of knowledge, contributing to diverse and robust research outcomes—particularly in the areas of energy and the environment.

Advancing educational outcomes for First Nations, Métis and Inuit (FNMI) communities is key to addressing persistent conditions of disadvantage. Equipping FNMI youth with the advanced skills and opportunities a post-secondary education provides empowers them to be the next generation of innovators and leaders in their communities, for the benefit of all Canadians.

The Government of Canada has taken important steps to deliver these outcomes—including the ongoing development of FNMI-led post-secondary strategies—but more needs to be accomplished to overcome the barriers to completion of post-secondary education.

Indigenous students—particularly first year students—face barriers to educational attainment, including poor preparedness for higher education, discrimination, alienation and isolation. Indigenous students report lack of support networks, both personal and academic, as a main reason for lack of success.^{vi} These barriers are formidable and require a comprehensive response. Accessible, culturally sensitive supports and bridging programs are necessary to ease the transition into university and improve retention and completion rates for these students.

Universities are improving and expanding services for FNMI students, including tailored mental health and well-being supports, academic advising and program planning, tutoring, formal and informal mentoring, transition and career planning, financial and housing resources, and cultural liaison. However, as Indigenous student enrolment continues to rise, so too does demand for these programs.

The University of Alberta's Transition Year Program provides academic and cultural support—including community building, access to Elders and cultural teachers in the classroom—to FNMI students not prepared to enter a faculty through regular admissions. Applications and admissions are increasing annually as awareness rises, with particular interest in science, technology, engineering and mathematics (STEM) programs. Additional funding for programs of this nature is needed to expand capacity, meet this rising demand and improve the quality of supports offered.

Recommendation: Expand funding for successful university programming and initiatives that support Indigenous student retention and success.

ⁱ Government of Canada, *Canada's Changing Climate Report*, 2019. As accessed at <https://changingclimate.ca/CCCR2019/>

ⁱⁱ OECD, "The contribution of science and innovation to addressing climate change," October 20, 2015. As accessed at <https://www.oecd.org/environment/the-contribution-of-science-and-innovation-to-addressing-climate-change.htm>

ⁱⁱⁱ OECD, *OECD Environmental Performance Reviews: Canada 2017*, December 19, 2017. As accessed at <https://doi.org/10.1787/9789264279612-en>

^{iv} Evidence for Democracy, *Investing in Canadian Climate Science: An Assessment of the State of Canadian Climate Science Based on a Survey of Climate Scientists*, June 26, 2019. As accessed at <https://evidencefordemocracy.ca/en/research/reports/investing-canadian-climate-science>

^v Intergovernmental Panel on Climate Change, *Special Report: Global Warming of 1.5°C*, October 2018. As accessed at <https://www.ipcc.ch/sr15/>

^{vi} Canada Millennium Scholarship Foundation, R.A. Malatest & Associates Ltd., *Indigenous Peoples and Post-Secondary Education—What Educators Have Learned*, January 2004, p. 38.