THE UNIVERSITY OF BRITISH COLUMBIA

Submission to the House of Commons
Standing Committee on Finance

2020 Pre-Budget Consultation:
"Climate Emergency: The Required Transition to a Low Carbon Economy"

2 August 2019

The University of British Columbia

Recommendations

Recommendation 1

Continue to strengthen Canada's research ecosystem through:

a) Continued foundational investments, guided by the recommendations of the Fundamental Science Review, with an emphasis on interdisciplinary and international research, early career researchers, and graduate students.
b) Targeted funding for climate change-related initiatives and other high-impact research, including the development of a specialized research and innovation fund and a national quantum strategy.

Recommendation 2

Make forward-thinking investments in low-emission campuses and communities by:

a) Investing in a dedicated post-secondary campus green infrastructure program.
b) Investing in a rapid transit line extension to UBC.

Introduction

As affirmed recently by the House of Commons, Canada faces a climate emergency. In the coming decades, climate change is increasingly likely to cause significant global economic and social disruption alongside accelerating ecological degradation. In addition, Canada faces unique and pressing challenges with our country experiencing irreversible warming at twice the global rate. Addressing this emergency will require understanding and rethinking our relationship with the planet, and we will need new ideas and technologies that rapidly enable a low-carbon society and help us adapt to an uncertain future.

Canada's universities are playing a global leadership role, making significant contributions to humanity's ability to understand, prevent, mitigate, and adapt to climate change. UBC is proud to have been ranked number one among the world's universities in 2019 for taking urgent action to combat climate change, reflecting both our success in reducing our own climate impact and our role as an agent of change, from conducting foundational climate research, to educating future sustainability leaders, to building solutions-oriented partnerships with the private sector, NGOs and governments that foster sustainability beyond our campuses.

Federal investment in research and students has been a key enabler of UBC's success in its vision of inspiring people, ideas, and actions for a better world. In particular, recent historic investments in Canada's research ecosystem in Budgets 2018 and 2019 are reinvigorating fundamental research. New initiatives are supporting early career researchers and promoting equity, diversity, and inclusion in the academy. Our graduate students are benefitting from new investments in scholarships and extended parental benefits, and we have seen improvements in the accessibility of higher education as student loan interest rates have been reduced and supports for Indigenous students and for students with disabilities have increased substantially. Finally, significant investments in work-integrated learning are improving career development and the student experience.

All of these issues, particularly further supports for Indigenous students and research partnerships with Indigenous communities, require the continued attention of the federal government. This submission, however, is limited to UBC's recommendations for new investments in university research, talent development, and infrastructure as they relate to the Committee's consultation theme of accelerating Canada's transition to a low-carbon economy.

UBC supports a vibrant societal conversation about the kind of world we live in, informed by an understanding of the ecological, social, and economic consequences of our individual and collective actions. We believe addressing the climate emergency is the right thing to do ethically and in terms of social justice, and offers the possibility of a better life for people and the planet. UBC welcomes the opportunity to shape and contribute to Canadian and global climate solutions, and we urge the federal government to close the gap to meeting Canada's commitments under the Paris Agreement and to lead global efforts to limit warming to the scientifically-based 1.5°C target.

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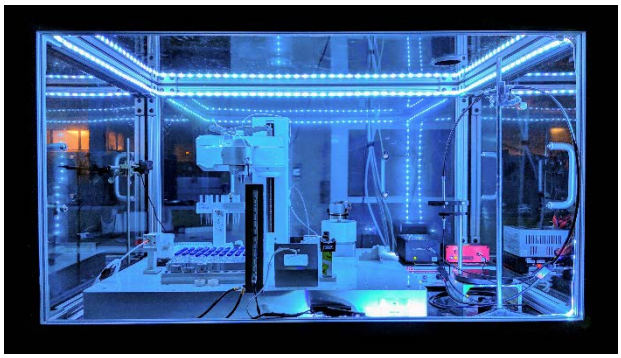
Decades of research across disciplines underpins our ability to measure, model, and adapt to climate change. However, much remains to be explored and developed to find and enact solutions to this growing global challenge.

Climate change involves complex interactions between many aspects of the world around us and a wide range of human activities, necessitating an interdisciplinary and international approach. Understanding climate change, its impacts, and potential responses requires integration of knowledge across disciplines, including the physical, social, biological, health, and engineering sciences. As Budget 2018 notes, "some of the most innovative and impactful research outcomes arise when researchers step beyond their traditional fields of study and beyond country borders to bring together different expertise and perspectives."

The fight against climate change will require expanding our basic understanding of the world and generating new and unexpected discoveries. In addition to addressing climate change, fundamental research is also critical to mitigating known impacts – devastating wildfires, for example – and those impacts that are as yet unknown. This necessitates sustained investments in fundamental research across all fields, particularly in ways that encourage interdisciplinary research and international partnerships. In particular, UBC supports further investments in international research collaboration, as proposed in the Universities Canada pre-budget submission, to ensure that Canada can fully participate in world-leading, interdisciplinary, international research on climate change and other pressing global issues.

UBC was pleased to see Budgets 2018 and 2019 heed the recommendations of the Fundamental Science Review (FSR) and make historic investments in Canadian science and research. The FSR is the most thorough and comprehensive roadmap for Canadian research produced in decades, and UBC recommends that the federal government follow the long-term plan for increased investment set out in the report. While many recommendations have been addressed, further action is required in Budget 2020.

For example, today's graduate students and early career researchers will make tomorrow's climate change breakthroughs and lead development and adoption of clean technologies and practices. The FSR identifies that early career researchers are struggling in some disciplines and the need for greater support was highlighted this year by the inaugural competition of the New Frontiers in Research Fund. Although restricted to early career researchers, the competition was inundated with proposals, leading to a base success rate of just 4.4%.



Ada is an AI-driven robotic platform capable of designing, performing and learning from experiments efficiently and autonomously. Natural Resources Canada's Energy Innovation Program recently invested $8 million in this UBC-led, first-of-its-kind project that has the potential to transform the materials discovery process and enable Canada to more rapidly bring new clean energy materials to market.

Graduate education equips a new generation with competencies that are increasingly in demand in the global knowledge economy, forming the broad foundation upon which to nurture innovation across sectors and respond effectively to the climate emergency. Supporting graduate students and ensuring that more Canadians are given the opportunity to pursue advanced studies is essential. While the investments in graduate scholarships contained in Budget 2019 were welcome, Canada continues to remain well behind other advanced knowledge economies in graduate degree attainment (25th of 36 OECD countries).

In addition to continued investments in fundamental research, there is a role for direct funding to support applied research and knowledge mobilization on climate change with promising social impact, innovation, and commercialization effects. The Clean Future Research and Innovation Fund proposed by the U15 Group of Canadian Research Universities is an example of an initiative that would leverage both the research strengths of Canada's universities and the capabilities of business and social sectors. An investment of $200 million per year would allow the fund to kick-start applied knowledge creation, accelerate innovation, increase research collaborations, and boost the commercialization of discoveries.

UBC's Clean Energy Research Centre (CERC) is an interdisciplinary, multi-campus initiative to develop solutions for sustainable energy. The Canada Foundation for Innovation and the BC Knowledge Development Fund recently awarded the CERC $11.6 million to investigate the evolution of transportation, including energy sources, zero emission vehicles, and connected vehicles and infrastructure. Breakthroughs include the first programmable photovoltaic system integrated with fuel production, energy storage, and vehicle refueling or recharging.

Students are also strong agents of change. Created and driven by students, UBC's Climate Hub connects students and community members around organically-generated climate change projects. Its mission is to empower others to take bold climate action for a just future. To support such initiatives,

the government could focus increased investments in undergraduate research toward student teams researching and mobilizing around climate change.

A further opportunity linking research and climate change is to invest in emerging fields that will aid in the transition to a low-carbon future. For example, Canada's strength in quantum research and a promising quantum industry have grown beyond the existing policy and funding environment, necessitating national coordination and mobilization.

With computing power taking up an increasing fraction of the world's energy, quantum computing offers the potential for tremendous long-term energy savings. This was, for instance, the focus of a recent Sustainable Technologies Development Canada grant of $10-million for D-Wave Systems to develop its energy-efficient approach to high-performance computing. This BC-based company emerged out of UBC research labs and is the world's first commercial quantum computer manufacturer.

Beyond computing, quantum technologies have many promising transformational applications touching diverse parts of the economy. If Canada is to remain a leader in quantum science, a national quantum strategy will be required to oversee and enhance existing activities. The US, UK, EU, and China have launched or will soon launch their own quantum strategies, and Canada's competitiveness in this sector is at risk.

Recommendation 2

Make forward-thinking investments in zero-emission campuses and communities by:

a) Investing in a dedicated post-secondary campus green infrastructure program.

b) Investing in a rapid transit line extension to UBC.

Across Canada, university campuses are on the forefront of the move to sustainable, zero-emissions communities. With over 80,000 students, faculty, staff and residents, UBC's campus communities serve as models for the cities of the future, and UBC designs and builds some of the most advanced sustainable infrastructure projects in the world. With the help of key external partnerships, such as UBC's leadership in the UC3 coalition of distinguished North American research universities, UBC is integrating its core research and teaching missions into the university's operations, and the knowledge we produce is having a positive impact beyond the borders of our campuses.

Unfortunately, many facilities at UBC and at universities across Canada need to be rebuilt or retrofitted, and can no longer support world-class teaching and research in their current state. Data from the Canadian Association of University Business Officers shows that across Canada there are over $3.8 billion in shovel-ready university infrastructure projects with significant energy efficiency benefits. UBC's Green Building Action Plan outlines new strategies to achieve net-positive contributions to environmental and human health by 2035, but we need government support to make this a reality.

UBC supports the U15's recommendation for the government to establish a $2 billion Green Campus Investment and Innovation Fund to accelerate campus emissions reductions and test a range of innovative clean technologies. The fund could be designed to encourage partnerships with industry innovators and to promote student involvement in implementing and testing new clean-tech innovations in real-world settings. It would build on the successful 2009 and 2016 federal post-secondary infrastructure investments that reduced the sector's energy consumption and cut greenhouse gas emissions by hundreds of thousands of tonnes.

Continued investment in rapid transit infrastructure is another opportunity with long-term returns in the fight against climate change. The proposed rapid transit extension to UBC's Vancouver campus would increase sustainable transit usage along the entire length of the dense Broadway corridor, reducing congestion, emissions, and air contaminants while improving personal health and wellbeing.

Extension of rapid transit to UBC would boost ridership by more than 54,000 trips per day, reducing lifecycle emissions by 335 kilotonnes. In addition, connecting UBC's Vancouver campus to the region's health and life science precincts, research centres, and innovation and technology hubs promises to drive economic growth, improve housing affordability, and enable the exchange of ideas, innovation, and entrepreneurship.