2020 PRE-BUDGET SUBMISSION
TO THE HOUSE OF COMMONS STANDING COMMITTEE ON FINANCE

August 1, 2019

U15

UNIVERSITY OF ALBERTA

THE UNIVERSITY OF BRITISH COLUMBIA

UNIVERSITY OF CALGARY

DALHOUSIE UNIVERSITY

UNIVERSITÉ LAVAL

UNIVERSITY OF MANITOBA

MCGILL UNIVERSITY

MCMASTER UNIVERSITY

UNIVERSITÉ DE MONTRÉAL

UNIVERSITY OF OTTAWA

QUEEN'S UNIVERSITY

UNIVERSITY OF SASKATCHEWAN

UNIVERSITY OF TORONTO

UNIVERSITY OF WATERLOO

WESTERN UNIVERSITY

RECOMMENDATIONS

To ensure Canada prospers while mitigating and adapting to the impacts of climate change, The U15 recommends that Budget 2020 make strategic investments in:

- discovering new, innovative low-carbon solutions, building on unique Canadian technological capabilities, geography and vast natural resources;
- training the next generation of workers and innovators for sustainable low carbon/clean tech jobs and businesses; and
- helping our clean tech SMEs develop innovative solutions for domestic and global markets and secure a foothold in these globally competitive and rapidly evolving markets.

Budget 2020 can do this by:

1. Creating the **Clean Future Research and Innovation Fund (CFRIF)**. CFRIF would invest $200 million per year in mitigating and adapting to climate change while creating new business opportunities. The new fund would bring together the research strengths of Canada's universities with strategic investments in knowledge creation, mobilization and commercialization. CFRIF would feature support for research, proof-of-concept support and entrepreneurship training.

2. Creating the **Green Campus Investment and Innovation Fund (GCIIF)**. This $2B Fund would support projects that increase the energy efficiency of university campuses and decrease their carbon footprint. To help accelerate Canadian low carbon and clean tech innovations, the Green Campus Investment and Innovation Fund would feature measures to fuel Canada's low carbon and clean technology industries and workforce.

3. Ensuring that the impact of regulatory or pricing mechanisms do not weaken research universities which play an important role in our country's response to mitigate and adapt to climate change.

4. Continuing to support and enhance the research enterprise by increasing its investments in fundamental research, addressing the full costs of research, and supporting knowledge mobilization, and supporting the operation of state-of-the-art physical and digital research infrastructure, including investments in cybersecurity.

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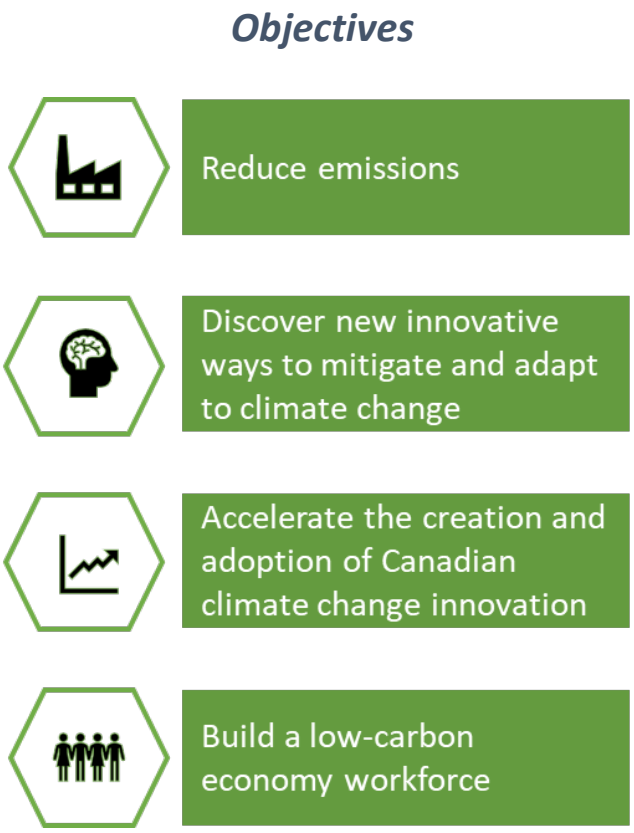
INTRODUCTION

The U15 understands that for Budget 2020, the House of Commons Standing Committee on Finance is interested in receiving submissions that focus on Canada's transition to a low-carbon economy. We believe that Canada's research-intensive universities can play a unique role to ensure that Canada prospers as we mitigate and adapt to climate change and transition to a low-carbon economy.

STRATEGIC CONTEXT

Climate change is one of the largest challenges facing humanity today. It has the potential to disrupt economies and societies around the world. It will have an impact on how we live, on our health and on our food supply. We are now past the point where we can prevent, let alone reverse climate change. The impacts of climate change will be felt by our children and our children's children. See Appendix A.

Immediate actions must be taken to slow and reduce the impacts of climate change. It is equally clear that we do not have all the solutions to mitigate and adapt to the effects and impacts of climate change. Nor do we have the skilled workforce needed to address these challenges and prosper through this transition. Given these realities, Canada must make strategic investments in research, innovation and training if we are to minimize the threats and maximize the opportunities created by climate change.



THE ROLE OF RESEARCH UNIVERSITIES

Research universities have three core elements that can contribute to Canada's low-carbon economy and future prosperity. Research universities:

- Educate and train the workforce and leaders of tomorrow based on the latest research.
- Undertake cutting-edge research into natural, technical, and social phenomena.
- Operate large campuses with a similar array of residential, commercial and recreational facilities to those found in small or mid-sized cities.

Individually each of these aspects of a research university presents opportunities to help mitigate and adapt to climate change. However, we believe a much more powerful opportunity can be found when those elements are brought together. The proposals in this document do just that – they bring together the learning, research and operational aspects of research universities to discover new ways to reduce our carbon footprint, train the next generation of green economy workers and innovators and help our green economy SMEs compete globally.

IMPACT THROUGH RESEARCH

The struggle to mitigate and adapt to climate change is one that will span generations. As a result, it is important that we equip future generations with the knowledge and skills they need to thrive in the face of this challenge. University research achieves this by involving students in cutting-edge research – simultaneously creating the talent and discoveries needed to address these global challenges. We can further increase the impact of these discoveries through an effective knowledge mobilization strategy.

Accordingly, The U15 recommends that Budget 2020 create the **Clean Future Research and Innovation Fund (CFRIF)**. CFRIF would invest $200 million per year in mitigating and adapting to climate change while creating new business opportunities. The new fund would bring together the research strengths of Canada's universities with strategic investments in knowledge mobilization and commercialization.

Projects supported by CFRIF must relate to climate change mitigation and/or adaptation. CFRIF would have two streams:

- **Foundational Knowledge Stream**. Projects funded under this stream would address the technical and social issues related to specific climate change mitigation/ adaptation challenges and opportunities. The objective of these projects would be to fill existing knowledge gaps and explore the most promising applications (i.e. Technology Readiness Level (TRL) 1 or 2[1]). Projects could involve multi-disciplinary research teams as well as non-academic organizations.

- **Innovation Acceleration Stream.** The Innovation Acceleration Stream would provide innovators with the resources necessary to turn the ideas developed under the Foundational Knowledge Stream into scalable organizations or businesses and increase the likelihood those enterprises succeed. This stream would provide robust entrepreneurship training and proof-of-concept funding[2]. The proof-of concept funding would allow teams to turn basic research into working solutions (i.e. TRL 3 or 4[3]). The entrepreneurship training would be modeled on the United States' Innovation Corps program[4].

This approach will ensure that Canada increases the proportion of the workforce with graduate degrees – an area where Canada is well below the OECD average. Since climate change is a long-term challenge, we need to invest in developing the researchers and innovators who will build on today's discoveries and innovations in the years and decades to come.

IMPACT THROUGH GREENING OF CAMPUSES

Canada's universities consist of an extensive network of labs, classrooms, residences and offices. Some of the buildings are new, high-efficiency buildings. Many of these new buildings are the result of recent federal infrastructure investments. Although universities have been working at greening older facilities, the reality is that there are still many opportunities for significant efficiency upgrades.

Currently there is an estimated $5B worth of shovel-ready campus infrastructure projects with significant energy efficiency/green campus elements. These needs range from the expansion of

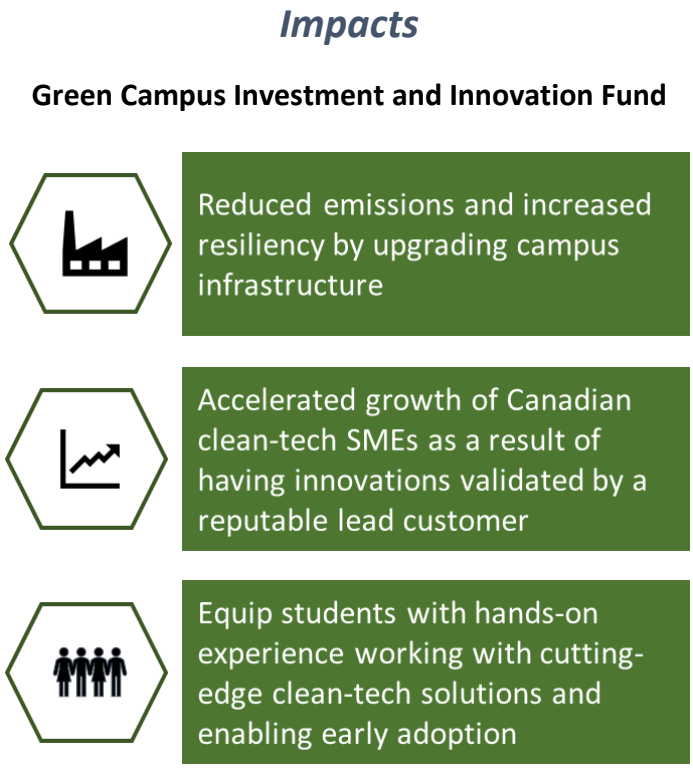
[1] TRL Level 1 – Basic Principles Observed and Reported; TRL Level 2 – Potential Application Validated

[2] Successful innovation acceleration projects that have a commercial orientation should be well positioned for support from Sustainable Development Technology Canada's SD Tech Fund.

[3] TRL Level 3 – Proof-of-Concept Demonstrated, Analytically and/or Experimentally; TRL Level 4 – Component and/or Breadboard Laboratory Validated

[4] https://www.nsf.gov/news/special_reports/i-corps/

bioenergy facilities to retrofitting old residences and buildings to enhanced food waste recovery. To capitalize on this opportunity and directly reduce Canada's environmental footprint, we recommend that Budget 2020 create the **Green Campus Investment and Innovation Fund (GCIIF)**. This $2B Fund would support projects that increase the efficiency of university campuses and decrease their carbon footprint.



To help accelerate Canadian clean tech innovation, the Green Campus Investment and Innovation Fund would feature an **Innovation Acceleration Supplement**. The Innovation Acceleration Supplement would encourage institutions to be a lead customer for a new product or service from a Canadian SME. The supplement would also encourage universities to involve students in the implementation and testing of innovations. Having a university as a lead customer would help Canadian clean tech and green economy innovators establish credibility with potential investors and customers. Involving students and researchers in the deployment and testing would help build our country's next generation of clean-tech workers by giving students significant hands-on experience in the deployment of new technologies.

Regulatory Impact on Universities

As governments introduce regulatory or pricing mechanisms to reduce our greenhouse gas emissions, it is essential that they consider and address the impacts on universities. Universities, especially research universities, are subject to a wide range of regulations. This regulatory environment constrains their ability to undertake some emission reduction measures and limits their ability raise revenues to offset new capital or increased fuel costs. We encourage all governments to be mindful of this to ensure that regulatory or pricing mechanisms don't inadvertently weaken institutions which are an important part of our country's response to climate change.

Continue Building on a Strong Foundation

The ability of research universities to make this critical contribution requires a strong foundation. It is important that Budget 2020 continues to build on Canada's research foundation, by:

a) enhancing support for fundamental research,

b) ensuring that we address, once and for all, the full costs of research,
c) investing in knowledge mobilization, and
d) supporting the operation of state-of-the-art physical and digital research infrastructure, including cybersecurity.

The investments made by successive governments, over the years, have positioned research universities to make the contributions identified previously. However, without continued investment, the contribution research universities can make will erode over time. It is important to recognize that while we have been encouraged by recent investments in Canada's research ecosystem, our international competitors have been increasing their investments faster than we have. Budget 2020 provides an important opportunity for the federal government to ensure we don't fall behind.

CONCLUSION

Climate change is a challenge unlike any we have faced before, and the stakes could not be higher. However, in rising to this challenge there is also considerable opportunity for Canada. As countries around the world race to limit the impacts of climate change, Canadian research universities are well positioned to be an important element of Canada's climate change strategy.

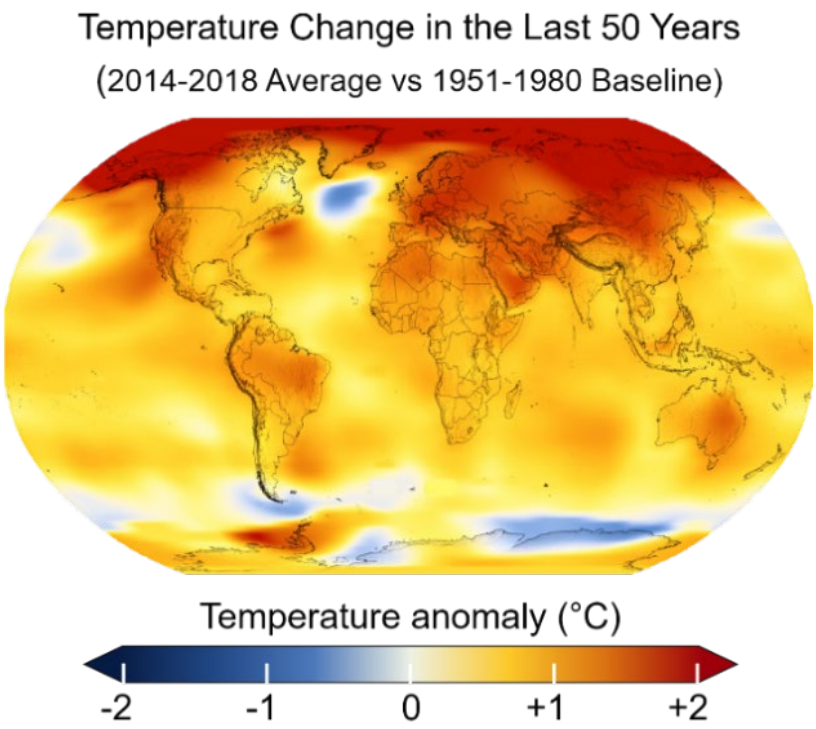
This submission recommends a set of investments strategically targeted at the intersection of the research and teaching missions of Canada's research universities. With these investments, Canada's research universities can respond to the climate change imperative while fueling Canadian innovation and the growth of globally competitive companies. This strategic approach is a key enabler of a globally competitive low-carbon economy.

The ability for universities to make this kind of strategic contribution is dependent on having strong, world-class research universities. In Canada, that capacity has been built by investments by successive governments. However, there remains real, unmet needs within the higher education research system. Compounding this challenge is the reality that other countries are increasing their own investments in research faster than Canada is. As much as Budget 2020 provides the opportunity to prosper while tackling climate change, it should equally be used to make important investments in the key elements that support our research enterprise.

Appendix A

"Climate change is the challenge of our generation."

Charles Bolden, NASA – April 2014



NASA - Goddard Institute for Space Studies

Between 1948 and 2016, Canada has warmed by 1.7 °C, about 2x global warming

Northern Canada has warmed by 2.3 °C, about 3x global warming

Environment and Climate Change Canada, 2019


UNIVERSITY OF
ALBERTA


UBC


UNIVERSITY OF
CALGARY


DALHOUSIE
UNIVERSITY


UNIVERSITÉ
LAVAL


University
of Manitoba


McGill


McMaster
University


Université
de Montréal


uOttawa


Queen's
UNIVERSITY


UNIVERSITY OF
SASKATCHEWAN


UNIVERSITY OF
TORONTO


UNIVERSITY OF
WATERLOO


Western
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