



TOWARDS A SUSTAINED
& SUSTAINABLE PROSPERITY:

The importance of universities in Canada's COVID-19 response & post-pandemic economic recovery

Submission made by McGill University to the
House of Commons Standing Committee on Finance

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McGill

Summary of Recommendations:

1. **Rebooting the Canadian economy:** make a targeted investment in early stages of innovation, especially to better equip universities with the resources to scout, develop and bring to market new technologies and commercially promising ideas.
2. **Create a Green Campus Infrastructure and Innovation Fund (GCIIIF)** to help achieve universities' – and Canada's – carbon neutrality objectives and allow universities to act as drivers for the clean-tech innovation ecosystem by increasing the demand for new homegrown technologies.
3. **Invest in universities' digital infrastructure to develop:**
 - a. technology-enhanced education for increased access through flexible learning environments, and
 - b. robust, cybersafe networks to protect our data and intellectual property and to ensure that our research benefits all Canadians.

Overview

McGill University welcomes the opportunity to provide input to the House of Commons Standing Committee on Finance during the pre-budget consultation process.

The COVID-19 pandemic has demonstrated the important role played by universities in the health and well-being of Canadians. Universities are contributing to national and international efforts to **develop a vaccine, conducting research on drug therapies and population immunity, and working with industry to set up domestic supply chains for medical equipment and strengthen Canada's sanitary and economic resilience**. As centres of knowledge and information, and as drivers of innovation, universities are central in the response to COVID-19 and the post-pandemic economic recovery.

McGill is grateful for the Government of Canada's support to the university community as part of its COVID-19 Economic Response Plan. In this submission, we put forward three recommendations that we believe will build on this support, while enhancing Canada's ability to emerge from this crisis stronger and more resilient. These recommendations touch upon support for stimulating innovation, for greening Canada's research infrastructure, and for equipping our universities with next-generation digital tools. Our submission complements those submitted on behalf of the university sector by Universities Canada and the U15.

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Investing in stimulating innovation

Knowledge created by scientists and scholars is destined to find its way out of universities and into the hands of those who will transform it into applications, bringing technological breakthroughs to market, adopting evidence-based policies or promoting best practices and behavioural changes.

This has been especially critical in our national response to the current sanitary crisis, in the race for a vaccine, a treatment and a better overall understanding of COVID-19 and of its social impacts. The research sector also plays a key role in equipping Canada with the industrial capacity to domestically source medical equipment (PPE, test kits, ventilators) and in addressing the challenges around food security at local and national levels. The same is valid for the transition to a low-carbon economy, where the technological race in the international knowledge economy is fierce, and the potential

for long-term economic growth significant. In all sectors, Canada's sustained and sustainable prosperity relies on our capacity to transform discoveries into commercial successes.

But bringing innovations to market is a complex process requiring strong collaboration between universities, governments and the private sector. While university researchers focus on early stage high risk R&D, industry needs more mature tested technologies that can perform well in the marketplace. Given the difficult economic situation in which many industrial

sectors find themselves today, we expect that corporations and investment funds will be even more risk-averse in their R&D investments, at least for some time. We believe that, more than ever, the Canadian government has a role to play in funding the critical early stages of maturation, thus helping bridge the gap between discovery and market readiness.

McGill University supports U15's recommendation to increase Canada's gross expenditures in research and development to 2% of GDP. We recommend that this additional investment be directed to increase universities' capacity and agility to detect, develop and accelerate new technologies and commercially promising ideas.

The Canadian government has put forward a number of important initiatives and programs in recent years to boost innovation, whose returns could be significantly amplified by reinforcing the links among key players, particularly among those in top research institutions and those in the innovation marketplace. The ability to provide support to researchers in identifying the right levers to mature their emergent technologies is key to increasing our capacity and agility to bring discoveries to market. Universities are best placed to scout promising innovations on their own campuses, and provide researchers the links to industrial partners, entrepreneurs and potential investors. McGill University thus recommends that the Government of Canada provide universities with additional funding specifically targeting technology transfer and commercialization through increasing the universities' capacity to scout discoveries and connect them to the innovations ecosystem

RECOMMENDATION:

1. Make a targeted investment in early stages of innovation, especially to better equip universities with the resources to scout, develop and bring to market new technologies and commercially promising ideas.

A McGill research spin-off to provide Canadians with domestically sourced COVID-19 test kits

At the onset of the COVID-19 pandemic, a group of McGill researchers, led by **Martin Schmeing** and **Don van Meyel**, has worked tirelessly to produce a COVID-19 test kit that performs as well as the industry gold-standard, thus achieving in a few months what biomedical industries took years to design.

In collaboration with the National Research Council (NRC), McGill's Innovation and Partnerships team has applied for a patent on this McGill-made test kit and licensed the technology to a start-up company, **Canadienzyme**, which is now very well placed to ensure ample supply of domestically sourced test kits for COVID-19. Furthermore, the commercial relevance of this start-up extends far beyond the current crisis, as these test kits can be adapted to detect many other diseases as common as the flu, or as critical as Ebola. The benefits of Canadienzyme to Canada's economy are twofold: it ensures Canada's independence from international supply chains, and it breaks the ground for establishing a Canadian industrial stream in a field previously occupied by foreign companies.

The success of Canadienzyme is as much that of our world-class researchers and the infrastructure and long-term support that they have benefitted, that of the innovation programs, and especially NRC's for the pre-pilot stage, and that of McGill's Innovation and Partnerships team, which provided the crucial nimble support that enabled such a rapid response. Thanks to the significant investments in fundamental and applied research that the federal government has made, our labs are full of such innovations that await the same level of support to boost Canada's economy.

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Investing in greening Canada's university research infrastructure to help achieve carbon neutrality

Infrastructure is a necessary component of innovative research and development, and for training the next generation of scientists and researchers. In addition, investment in infrastructure provides broad economic stimulus to Canada's communities.

With a \$2 billion investment over two years (2016-2018), the Government of Canada's Post-Secondary Institutions Strategic Investment Fund (SIF) dramatically enhanced research capacity, supported the attraction of new talent and provided a better educational experience for the highly skilled workers of tomorrow. It also generated significant economic benefits and supported job creation in more than 190 communities across Canada. Investing in university infrastructure upgrades and retrofits

could be an important element of Canada's post-pandemic economic recovery. We support the U-15's recommendation to create a Green Campus Infrastructure and Innovation Fund (GCIIF). This \$2B fund would support projects that increase the efficiency of university campuses and decrease their carbon footprint, while allowing higher education institutions to act as early adopters of the very technologies that their researchers contribute to creating.

As the U-15 notes, there is currently an estimated \$5B worth of shovel-ready campus infrastructure projects with significant impacts on universities' energy efficiency. At McGill, this represents numerous projects to be deployed over the next 20 years (see box). In addition to the short-term impact of stimulating the Canadian economy, these projects will:

- » contribute to achieving universities' – and Canada's – carbon neutrality objectives;
- » allow universities to act as drivers for the clean-tech innovation ecosystem by increasing the demand for new homegrown technologies.

RECOMMENDATION:

2. **Create a Green Campus Infrastructure and Innovation Fund (GCIIF)** to contribute to achieving universities' – and Canada's – carbon neutrality objectives and allow universities to act as drivers for the clean-tech innovation ecosystem by increasing the demand for new homegrown technologies.

McGill's roadmap for a green, carbon neutral campus

At McGill, **67%** of carbon emissions are related to building energy.

To achieve our goal of **reaching carbon neutrality by 2040**, and specifically tackle the reduction of the carbon footprint of our infrastructure, we have equipped ourselves with a four-step green infrastructure roadmap covering the 2010-2030 period:

1. **Reduce energy use**, for example through HVAC upgrades, lighting retrofit, peak power demand management using geoexchange and thermal mass, and more stringent design requirements
2. **Recycle energy**, for example by implementing smart energy grids and increasing powerhouse energy efficiency
3. **Transition energy systems**, for example by converting powerhouse boilers and deploying renewable energy systems
4. **Procure renewable energy**, for example by allocating performance-based contracts for energy projects and procure renewable natural gas.

Many of the infrastructure projects covered by this roadmap are both shovel-ready and shovel-worthy. They have the capacity to deliver results on McGill's carbon footprint as early as 2025.

3



Investing in digital infrastructure for accessible and cybersafe universities

At the onset of the COVID-19 crisis, McGill and other Canadian universities had to pivot rapidly to offer online learning to tens of thousands of students, allowing them to complete the academic year.

In agreement with the public health agencies recommendations and to support Canada's efforts to limit the spread of COVID-19, McGill will be offering courses primarily online in the Fall 2020 semester. The shift to online learning has translated into significant needs for the implementation of effective educational technologies, including online learning and advising software and tools.

The pandemic has forced us to adapt our delivery mode. While these changes have translated into additional costs, they have also highlighted the potential of technology-enhanced learning

environments to fill the accessibility gaps, and to increase our capacity to deliver our programs to students from all walks of life. As much as it has strained our resources, the pandemic has also been an incredible opportunity to rethink how we bring to society a more diverse and agile workforce.

Investments in the area of remote learning should not only be seen as mitigation mechanisms to ensure the continuity of higher education activities during the pandemic, but as a powerful tool to operate a profound shift into a new phase of Higher Education, characterized

by more flexible learning conditions rooted in inclusion and wellness (mental health), and connected to the specific needs of our communities.

Technology-enhanced education allows tailored approaches to the learners' needs. Taking the variety of these needs into consideration is especially important as we are currently seeing how the COVID-19 crisis has affected specific groups more than others, and considering the rising awareness of systemic hurdles for Black, Indigenous and People of Color (BIPOC) students. McGill is deeply committed to identifying and lifting these hurdles and recognizes that true sustainable innovations are born by the multidirectional sharing of diverse perspectives.

As the government looks at ways to support Canada's economic recovery, investing in digital infrastructure for technology-enhanced education is a key area to foster a diverse and agile workforce, equipped with the skills to recover from this crisis and to adapt to future labour market shifts. It is worth noting that these sector-specific investments have to be paired with investments in countrywide high-speed internet coverage, so that Canadians can access the same high-end learning experiences whether they live in big cities or in remote communities.

Enhanced digitalization of our activities is also a powerful tool for Canada's best and brightest minds to have a global impact and increase our country's share in the international knowledge market. But as research collaboration intensifies, so does the need to ensure these collaborations work in tandem with Canada's economic and security interests. To achieve this balance, researchers need to be equipped to pursue research opportunities with "eyes wide open" – with the awareness, risk-specific knowledge, and tools to adopt strong cyber practices.

While the need to harden university cybersecurity infrastructure isn't new (Universities Canada made it an element of their 2020 pre-budget brief), the COVID-19 crisis has



highlighted cybersecurity vulnerabilities. More than ever, increased cybersecurity investment is essential to conducting research in today's dynamic geopolitical environment. Up-to-date cyber infrastructure and a culture of awareness among researchers and students is important in creating a secure research ecosystem. Not only will this help protect Canadian research from outside threats, it will also secure university-business collaborations – ensuring Canada's research investments benefit all Canadians.

This is why McGill University also calls on the federal government to allocate specific funding for the purchase of new university cybersecurity equipment, and their operating costs, and protect our country's intellectual property.

RECOMMENDATION:

3. **Invest in universities' digital infrastructure to develop:**
 - a. **technology-enhanced education** for increased access through flexible learning environments, and
 - b. **robust, cybersafe networks** to protect our data and intellectual property and to ensure that our research benefits to all Canadians.