



Canadian Association
of Physicists

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2018 August 3

A Pre-Budget Submission from the Canadian Association of Physicists
to the HOUSE OF COMMONS STANDING COMMITTEE on FINANCE

RECOMMENDATIONS

Recognizing that Canada has taken important steps to increase the budget for science and innovation with last year's budget, we strongly encourage the committee to fully implement all of the April 2017 report of Canada's Fundamental Science Review (the Naylor Report)¹ recommendations at the earliest opportunity, with particular emphasis on:

- Continuing to implement the annual increase for support of fundamental research;
- Increasing the number and value of existing CFI IOF and NSERC RTI programs for the renewal of aging research equipment;
- Increasing support for Canada's major research facilities, ensuring adequate funding is available for those facilities requiring funding renewal, particularly those funded through federal mechanisms other than CFI (such as TRIUMF's request for \$320M for its next round of five-year operational funding that flows through the National Research Council; or the Canadian Neutron Initiatives' request for \$124M over 7 years to rebuild and operate a Canadian program for materials research and innovation, following the closure of the NRU reactor at Chalk River earlier this year.
- Redefining the 40/60 ratio for major research facility (MRF) funding within CFI to a more appropriate 60/40 ratio
- Moving forward as quickly as possible with the establishment of a coordinated approach for the management of Canada's MRFs from conception/approval, building, and operations through their lifespan to decommissioning and, if appropriate, establishment of a replacement facility for the supported research programs

¹ <http://www.sciencereview.ca/eic/site/059.nsf/eng/home>

Introduction:

The House of Commons Standing Committee on Finance is seeking expert consultation as it develops its economic strategy for 2019. The Committee is interested in receiving written submissions and oral testimony on the topic of Economic Growth: Ensuring Canada's Competitiveness. Specifically, the focus of submissions and testimony should be on what steps the federal government can take to support and/or encourage Canadians and their businesses to grow the economy in the face of a changing economic landscape.

Who We Are: The CAP, with 1700 members, is Canada's national association for physicists working in industry, academia and government across all sub disciplines of physics. The CAP strives to unleash the full potential of physics and physicists for the benefit of Canada. The CAP is recognized and respected for its science and technology expertise, and has testified at House of Commons Committees, including the Standing Committee on Industry, Science and Technology for a study on the "State of Disruptive Technologies" on June 9, 2015.

We look forward to working with your Committee to help grow Canada's economy and increase its competitiveness through judicious infusions of funding for scientific research, education and, training.

Background:

In considering the questions asked in the Finance Committee's June 2018 press release, the CAP submits that both will be addressed if the federal government substantially increases Canada's investments in its intellectual infrastructure. Canada's international competitiveness and capacity for sustained innovation depend on balanced support of research, including discovery-driven fundamental research. Fundamental research is critical for Canada to compete in identifying and developing technologies that are transformative, the so-called "disruptive technologies."

In June 2016, the Government of Canada announced the appointment of a review panel on Federal Support for Fundamental Science. Headed by David Naylor of the University of Toronto, the Panel included university and funding agency administrators, industry leaders, and Canada's most recent Nobel Laureate, physicist Art McDonald of Queen's University. The Panel's mandate was to undertake "a review of the federal system of supports for extramural research."

The Panel's report (the Naylor Report), released in April 2017, documents Canada's declining support of fundamental research, defines the real needs in this area, and outlines a concrete path forward to meet that need. Over the past 15 years Canada's research funding as a percentage of GDP has declined from 2% to 1.6% while that of virtually all other major nations grew. Canada has taken important steps to increase the budget for science and innovation with last year's budget. **We strongly encourage the committee to fully implement the Naylor Report recommendations to increase support for research that will attract and retain Canada's best talent and have positive impacts in Canada.** This will develop a strong base that is essential for building a resilient

and innovative workforce that will help drive Canada's entrepreneurs, businesses, and international collaborations. We make this statement in parallel with many other Canadian organizations including the Partnership Group for Science and Engineering (PAGSE), the Canadian Consortium for Research (CCR), and the Association of Canadian Early Career Health Researchers (ACECHR).

Fundamental Research and Training of Highly Qualified People

Fundamentally, investing in our intellectual infrastructure means training our best and brightest to develop cutting edge technologies that will be required to solve some of the world's most critical challenges. This will only occur if funding for fundamental research, including funding to train the next generation, continues to be increased to the level recommended in the Naylor report. These highly qualified personnel, who are trained at the frontier of knowledge and driven to solve new problems, will take what they have learned into Canadian businesses, transferring this expertise to the private sector, helping Canadian businesses become more innovative, productive, and competitive. Thus, if Canada is to remain a competitive and prosperous nation in the 21st century, it is essential that the government increases support for fundamental and applied research as well as addressing the value and number of graduate scholarships which have not increased in the last decade despite greatly-increased enrollments.

Major Facilities / Big Science

The Naylor Report noted two gaps related to infrastructure operating costs: (i) operating support for large, national-scale Big Science facilities through CFI's MSI Fund, and (ii) support for individual researchers to run and maintain their small-scale equipment".

The Government has made significant, strategic investments in establishing world-class national research facilities that have positioned Canada as an international leader in many areas (e.g., Sudbury Neutrino Observatory which led to the co-awarding of the 2015 Nobel Prize in Physics, TRIUMF – Canada's particle accelerator centre, the Canadian Light Source (CLS) and, up until it was closed recently, the NRU reactor at Chalk River). These facilities support large communities of researchers distributed across Canada and across a broad spectrum of disciplines. While funding for individual research projects carried out within these facilities are available through the granting Councils (NSERC, SSHRC, CIHR), and capital costs are available through the CFI, in some cases there is no specific program to fund their ongoing operational costs (salaries, utilities, infrastructure stewardship and facility maintenance, repair and overhaul), or the requirements of the program that funds these costs are difficult to meet, making the process of funding renewal both complicated and time-consuming. For example, CLS and SNOLAB obtain their operating funds through the CFI-

MSI program, along with matching funds from several other Federal organizations and Provincial awards to the partner universities. The CFI-MSI program should be modified, and increased funding provided, to allow the matching ratio requirement national-scale major research facilities from 40:60 to 60:40².

Equally devastating to the Canadian research landscape are instances where the facility has reached its useful lifetime and there is no mechanism for the establishment and funding of a replacement facility to ensure the continued health of the vibrant Canadian research program (e.g. the neutron scattering research that was being done through the NRU reactor at Chalk River that was shut down this year). A lack of continued access to a viable research facility will most likely lead to a loss of a strong research capacity in that area within Canada. The Government is urged to take steps to ensure the continued viability of this research program in Canada.

For the longer term, the Government needs to ensure that there is a coordinated national system of review for these major facilities and, once established, that adequate funding for the operations of Canada's national research facilities – which accounts for inflation, new infrastructure, future planning, staff growth, and increasing client demand – is made available through their funding providers at the time of renewal. The Government is urged to move forward in a timely manner to implement the recommendation in the Fundamental Science Report to manage its investments in Big Science in a more coordinated manner from conception/approval, building, and operations through their lifespan to decommissioning and, if appropriate, also allow for the establishment of replacement facilities.

The Naylor panel found that “the current level of CFI's Infrastructure Operating Fund (IOF) is insufficient to cover more than a small fraction of the ongoing costs of research infrastructure at a wide range of institutions. This leads to ineffective use of smaller-scale equipment and means that researchers sometimes spend inordinate amounts of time trying to secure funding.” Additional funding should be provided to the CFI to meet the special operating needs of individual researchers with small capital awards.

Conclusion

Implementation of the remaining recommendations outlined in the report from the Fundamental Science Review would help Canadian researchers be as productive as possible in their workplaces and their communities; help Canadian businesses to be more productive and competitive; enhance the well-being of Canadians; and support a strong science culture upon which the development of good policy and programming is based.

² The Naylor panel found that, under the current structure, “some of [Canada's] major facilities had faced financial crises, while others were struggling to assemble operating funds given CFI's 40:60 matching formula”.