TRIUMF

CANADA'S NATIONAL LABORATORY FOR PARTICLE AND NUCLEAR PHYSICS

LABORATOIRE NATIONAL CANADIEN POUR LA RECHERCHE EN PHYSIQUE NUCLÉAIRE ET EN PHYSIQUE DES PARTICULES

Owned and operated as a joint venture by a consortium of Canadian universities via a contribution through the National Research Council Canada

Propriété d'un consortium d'universités canadiennes, géré en co-entreprise à partir d'une contribution administrée par le Conseil national de recherches Canada

24 October 2008

Randy Hawes
Chair, Select Standing Committee on Finance and Government Services
Room 224, Parliament Buildings
Victoria, BC V8V 1X4

Dear Chairman Hawes,

We write in response to the Select Standing Committee on Finance and Government Services budget consultation process for Budget 2009. Thank you for the occasion to present to the committee on September 29, 2008. TRIUMF would like to take this opportunity to provide a written summary of our key points

Summary

TRUIMF pursues research that tackles the most compelling questions in particle physics, nuclear physics, nuclear medicine, and materials science—and fosters the practical use of this knowledge for the betterment of British Columbians and the world. Together with its partners, the laboratory is poised to deliver transformative breakthroughs in nuclear medicine, GRID computing and networking, and deployment of "Made in B.C." superconducting radio-frequency technology. However, at this time, there is no coordinated or defined mechanism for support of research and scientific funding in the province. As a result, innovative science projects must stitch together a confusing and ill-fitting quilt of funding for support.

We urge the B.C. Finance Committee to consider forming an explicit Research & Innovation funding program with (a) A long-term budget allocation, (b) Clear mechanisms for identifying, prioritizing, and supporting the best initiatives, (c) Close coordination with already existing mechanisms. TRIUMF is a perfect example of what is possible. B.C. investments have been critical to TRIUMF's success as a laboratory and in attracting federal & international investments exceeding $1 billion to the province. The vision of a dedicated provincial fund for scientific research and capital projects will open doors to discoveries and investigations that were out of our reach even just a few years ago.

Background
TRIUMF is Canada's national laboratory for particle and nuclear physics. It is owned and operated as a joint venture by a consortium of Canadian universities via a contribution through the National Research Council Canada with building capital funds provided by the Government of British Columbia. Its mission is:

- To transfer knowledge, train highly skilled personnel, and commercialize research for the economic, social, environmental, and health benefit of all Canadians; and
- To make discoveries that address the most compelling questions in particle physics, nuclear physics, nuclear medicine, and materials science;
- To act as Canada's steward for the advancement of particle accelerators and detection technologies.

TRIUMF was founded in 1968 by Simon Fraser University, the University of British Columbia (UBC), and the University of Victoria to meet research needs that no single university could provide. The University of Alberta joined the TRIUMF consortium almost immediately. There are currently seven full members and seven associate members from across Canada in the consortium that governs TRIUMF.

Since its inception as a local university facility, TRIUMF has evolved into a national laboratory while still maintaining strong ties to the research programs of the Canadian universities. The science program has expanded from nuclear physics to include particle physics, molecular and materials science, and nuclear medicine. TRIUMF provides research infrastructure and tools that are too large and complex for a single university to build, operate, or maintain.

Since its opening in 1969, the laboratory has received more than $1 billion of federal investment and $40 million from the province of British Columbia. This investment has resulted in more than an additional $100 million of private investment since 2000. The provincial contributions fund the buildings which are owned by UBC and located on an 11-acre site in the south campus.

There are over 350 scientists, engineers, and staff performing research on site which makes TRIUMF one of B.C.'s largest high-technology employers. TRIUMF attracts over 500 national and international researchers every year and provides advanced research facilities and opportunities to 150 students and postdoctoral fellows each year. The laboratory is a common destination after graduation for engineers and technicians because its challenging technical environment ensures competitive training. These highly skilled personnel then move onto to successful careers in other sectors of business. TRIUMF trains the next generation of leaders; it attracts students to Canada to learn from the best. More than 50 students per year participate in on-site internships and co-op programs.

TRIUMF is recognized as an award-winning Centre of Excellence, having received the NSERC Synergy award twice for its partnerships with companies and more recently a Centre of Excellence in Commercialization and Research (CECR) award for its new spin-off company, Advanced Applied Physics Solutions, Inc. (AAPS), which will identify and commercialize industrial applications in medical accelerator technologies, the mining industry, and new materials. TRIUMF has partnered with leading Canadian organizations, such as the BC Cancer Agency (BCCA), the Leading Edge Endowment Fund (LEEF), and the Pacific Parkinson's

Research Centre (PPRC). Most notably, a 30-year commercial partnership between TRIUMF and MDS Nordion has put Canada at the global forefront for the development and production of medical isotopes used in the diagnosis and treatment of disease. TRIUMF developed the technology to create the isotopes and subsequently arranged a licensing agreement with MDS. Currently, there are 90 highly qualified staff on the TRIUMF campus working to produce 2.5 million patient doses of medical isotopes for MDS Nordion annually, contributing about 15% of Canada's isotope production. This partnership has emerged as one of the great academic-commercial success stories, and is recognized around the world.

TRIUMF's research programs in nuclear medicine also support BCCA. More than 5,000 patients have been scanned using medical-isotope compounds produced at TRIUMF. These life-saving diagnostic scans have improved the treatment plans for more than 70% of patients; the scans lead to targeted treatment plans that result in better results at lower costs. Recent estimates place the cost savings of the improved treatment plans as high as $20,000 per patient. Scientists at TRIUMF and BCCA are collaborating on next-generation research, too. Earlier this year, the first patient in Canada was imaged at BCCA using a new compound (EF5-^{18}F) developed at TRIUMF. The compound is used to assess whether a cancer tumuor is hypoxic and therefore determents if radiation therapy would be an effective treatment option.

The Opportunity at TRIUMF

TRIUMF's operations are supported primarily through contributions from the Government of Canada through National Research Council Canada. This support is augmented by national research programs such as the Canada Foundation for Innovation, Natural Sciences and Engineering Research Council, and the Canadian Institutes for Health Research. The 2005-2010 NRC contribution alone to TRIUMF is more than $222 million.

As part of its planning to develop the next request for five years of federal funds and to position its research programs at the leading edge for the next decade, TRIUMF has identified a set of strategic opportunities that build on the superb international scientific reputation of the laboratory:

- Lead B.C., Canada, and the world in the emerging nuclear-medicine revolution;
- Exploit new "superconducting accelerator" technology developed in B.C. for world-class research in particle and nuclear physics, production of medical isotopes, and environmental remediation; and
- Capitalize on the global opportunity in GRID computing & networking technology.

These opportunities will require public investments in capital infrastructure projects at TRIUMF. The construction of this new infrastructure, a new beam tunnel, a nuclear-medicine building, and a new CERN-compatible purpose-built data and computing centre, will ensure continued and growing employment at B.C.'s largest technology employer and stimulate an estimated additional private investment of as much as $500 million over the next decade. This new infrastructure has a short lead time with construction beginning in 2009 and will take maximum advantage of new operational federal funding as part of the next five-year plan beginning in 2010. An accelerated provincial capital investment will make the best possible case for TRIUMF's 2010-2015 operating-budget request of $328 million to the Government of Canada.

Call for Action

The B.C. Research and Innovation (R&I) Strategy "Local Excellence, Global Impact" prepared nearly two years ago identified priority investment areas (life sciences, clean technology, high technology, and natural resources) and promised actions such as "Support research and innovation through strategic and partnered investments." A mechanism for implementing the vision in the R&I strategy document is missing. A solution has been delayed by the transfer of Research & Innovation responsibilities from the Ministry of Advanced Education to the Ministry of Technology, Trade, and Economic Development without clear reconciliation of the relevant budget authorities.

Moreover, present practice in the province for investment in capital-intensive research and innovations appears to rely on competing for one-time funds, year-by-year, opportunity-by-opportunity. Not only does this practice reduce the chances for a strong return on investment through a portfolio strategy, but it also inhibits the development of new initiatives that break the mold of current institutional structures. R&I opportunities arise from a broad variety of sources in British Columbia, often from networks of partners or public R&D institutions. Opportunities that transcend a single institution suffer. Multiple-partner initiatives—the ones that are most innovative—suffer the most. For instance, TRIUMF's initiatives are strongly supported by the B.C. universities but are not wholly contained within any one of them. Opportunities for combined provincial and federal investments are likewise difficult to exploit.

We believe that the future of B.C.'s knowledge economy depends on the successful development of a funding mechanism for the province's R&I strategy. TRIUMF is but one example of what is possible when these hurdles are overcome, and B.C. will need more success stories as we move into the highly competitive world of 2010 and beyond.

Sincerely,

Nigel S. Lockyer
Director

Timothy I. Meyer
Head, Strategic Planning and Communications