

## 2007 Brief to the House of Commons Standing Committee on Finance

### Canadian Foundation for Climate and Atmospheric Sciences

August 15, 2007

#### Executive Summary

The economic strategies of many nations today are based on innovation-led economic development, supported by research and by tax incentives. Canada's national prosperity relies heavily on science and technology – on the generation and use of knowledge, on human and natural resources and on a favourable fiscal and legislative environment. Global environmental issues have introduced a new dimension requiring government action on public safety, development, and risk and cost management.

The mission of the federal government is first and foremost to ensure 'a prosperous and secure country with a clean, healthy environment'; actions to achieve this are based on principles of *Accountability, Security, Environmental Protection and Strong Economic Management*. The current Brief is focused on environmental protection - both protection of the environment and protection from the environment. This focus encompasses climate change and related public security; its approach emphasizes strong economic management and accountability and requires the means to make informed choices, to build resilience and minimize costs.

Climate action is of growing importance. Economic models suggest that without action the "costs and risks of climate change will be equivalent to losing 5% of global GDP each year, now and forever."<sup>1</sup> Canada cannot afford this. Nor can it afford to miss out on the substantial business and employment opportunities associated with action. Ultimately Canada's tax system will have to support the cost of both action and inaction. Scientific facts and analyses are required to support policy development and regulatory action on environmental standards. The tax system also requires a solid base of information for decisions on whether and when to subsidize, regulate, tax or apply incentives; and what options will provide the most effective return in terms of long-term prosperity.

On 17 May, 2007 Prime Minister Harper released Canada's science and technology policy: *Mobilizing Science and Technology to Canada's Advantage*. The **Canadian Foundation for Climate and Atmospheric Sciences** (CFCAS), which is mentioned in the strategy, is an important ally in implementing it. CFCAS enhances Canada's scientific capacity by funding the generation and distribution of knowledge in areas of national importance and policy relevance, through focused support for excellent university-based research in climate and atmospheric sciences. CFCAS grants help generate much of the climate knowledge needed in our 'knowledge society'. They also support the education and training of next generation atmospheric and climate scientists. A 2007 evaluation declared CFCAS highly effective, efficient and well run.

CFCAS urges the government to ensure that Canada's tax system provides the resources necessary to respond to environmental contingencies, and to adapt to the changes that already affect our economy.

**Recommendation 1: That the Federal Government enhance research support for air quality, extreme weather and other climate sciences, by increasing support targeted to these areas;**

**Recommendation 2: That the Government use the Canadian Foundation for Climate and Atmospheric Sciences to deliver the support to the academic community;**

**Recommendation 3: That funding initially be at the level of \$25 million per year for 10 years.**

<sup>1</sup> Stern Review: The Economics of Climate Change, 2006

## 1. Introduction

A prosperous Canada means one that is well informed, efficient and able to compete and thrive in a global economy. Canadians' choices for economic activities depend on the resources available to them and a legislative environment that allows effective mobilization of the resources. These activities also require solid information for informed choices that maximize economic opportunities while protecting society.

Poor air quality, floods, severe wind and rain events, coastal storm surges, hazardous seas and forest fires all have major impacts on human health and can result in loss of life. They are also costly in economic terms. United States government analyses<sup>2</sup> have concluded that weather and climate-sensitive industries account for about 25% of the US Gross Domestic Product (GDP) and industries directly affected by weather and weather-related events (e.g., agriculture, construction, energy, transportation, and outdoor recreation) account for nearly 10% of GDP. We lack such detailed analyses in Canada but one study has conservatively estimated the value of weather-dependent industries in Canada in the range of \$100-300 billion annually.

The federal Science and Technology policy has identified threats and risks from natural disasters and how science and technology can be instrumental in modelling and predicting natural disasters and helping us prepare for, and respond to, these events.

Our response to the question of "The tax system the country needs for a prosperous future" will focus on the importance of a solid knowledge base for decisions on whether and when to tax, subsidize, regulate or provide incentives; and what options will provide the most effective return to Canadians in terms of long-term security and prosperity. The knowledge base is essential if we are to avoid higher costs in the future.

## 2. Policy on Science and Technology

Scientific discoveries and new technologies provide solutions to many of the issues most important to Canadians and enable modern economies to improve competitiveness and productivity; they also enable governments to address public safety challenges and mitigate risks to Canadians. Canada's new science and technology policy: "*Mobilizing Science and Technology to Canada's Advantage*" identified four principles: *Promoting World-Class Excellence; Focusing on Priorities; Encouraging Partnerships; and Enhancing Accountability*. These four principles and the 'knowledge' and 'people' advantages in the strategy are the focus of the remainder of this submission.

## 3. Priorities and Environmental Protection

The federal government has recognized the importance of the environment in several recent policy documents. In March 2007, the *National Water Strategy* was released, emphasizing the importance of water quality and quantity. In April 2007, Environment Minister John Baird announced "*Turning the Corner: an action plan to reduce greenhouse gases and air pollution*". In July, 2007 the Ministers of Environment and Health jointly announced investments to establish the world's first *National Air Quality Health Index* and to expand the *Air Quality Forecast Program* to support the new initiative. International interest in the resources of the Arctic and its seabed is growing as the climate warms and ice cover declines: in August 2007 the Prime Minister announced new investments in Canada's military presence in the Arctic. Each of these initiatives needs a strong scientific foundation and skilled scientists and engineers. Addressing *Environmental protection* is clearly *Focusing on Priorities*.

Canada is committed to significant reductions in the greenhouse gas emissions linked to global climate change. These reductions require an understanding of the relationships between global emissions and

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<sup>2</sup> National Oceanic and Atmospheric Administration, US Dept. of Commerce, 2002

climate change and the impacts on Canada. Scientific information is also needed to answer questions about the ability of the natural environment to adapt to change, where and when climate change becomes 'dangerous' and what conditions trigger rapid irreversible change. The National Roundtable on the Environment and the Economy has been mandated to provide advice on emission reduction strategies for clean air and climate change. The strategies and methods will require world class science, relating local, national and global emissions to climate change. The Air Quality Forecast Program also requires continued scientific input for improvements; and Canadians need better extreme weather forecasts.

Canada also needs a policy aimed at building resilience to climate change and minimizing costs.. The importance of 'informed choices' has been highlighted by the Conference Board of Canada in recent symposia: "*Business Continuity/Preparedness: Planning, Partnership and Participation*" (Toronto, May 2007) which featured a special presentation on "*Climate Change, Natural Hazards and Business Continuity*"; and the "*Intergovernmental Forum on Risk Management*" (Ottawa, September 2007) with a keynote presentation on "*From mitigation to adaptation – what every risk manager needs to know about climate change*". The National Round Table on Environment and Economy recently created an Advisory Committee on Climate Change Adaptation Policy to augment its evaluations of greenhouse gas emission reduction strategies.

#### **4. Priorities and Security**

Weather-related events cause major disruptions in Canada and around the world. On a global basis, the number of disasters where events overwhelmed their communities has risen from 65 per year in the decade of 1960-69 to 470 per year since the beginning of this century. Events such as storms, floods and drought caused more than three-quarters of these disasters. Hazards range from localized, short-lived phenomena such as tornadoes, to events of a few days such as urban smog or snow storms, to seasonal drought over large regions and seasons, to global climate change on scales of decades to centuries.

Severe flooding this summer in the United Kingdom is expected to cost insurance companies over \$7 billion. It will also have serious repercussions on infrastructure, economic growth, food prices and health. The cost of Hurricane Katrina, the most costly natural disaster in U.S. history, is conservatively estimated at \$150 billion U.S. but will have socio-economic repercussions and impacts on the Gulf of Mexico oil industry, as well as the insurance industry, for years to come. The 1998 ice storm in eastern Ontario and Quebec cost a hefty \$5 billion. The Ontario Medical Association has reported that smog resulted in over 5,800 premature deaths and a total economic cost of \$7.8 billion in 2005 in Ontario alone. The costs and impacts of severe weather events on Canadian society are not yet fully understood, so it is imperative that we maintain our investments in acquiring this knowledge, in order to advise and prepare private and public decision-makers so they can address environmental risks. Addressing *Security* is clearly *Focusing on Priorities*.

#### **5. The Canadian Foundation for Climate and Atmospheric Sciences (CFCAS)**

The Canadian Foundation for Climate and Atmospheric Sciences enhances Canada's scientific capacity by funding the generation and sharing of knowledge in areas of national importance and policy relevance, through focused support for excellent university-based research in climate and atmospheric sciences. It supports top academic scientists doing integrated research on the climate system, high-impact weather, air quality, ocean-atmosphere interactions and weather prediction. CFCAS-supported research complements work supported by other granting agencies; and research done in federal departments, leveraging a whole that is greater than the sum of its parts. The research generates results that benefit all Canadians.

CFCAS directly contributes to Canada's *Knowledge Advantage* by supporting research and generating skilled human resources to sustain federal policymaking and services. It has already invested \$109 million in priority research across Canada. The benefits have been impressive. The research partnerships often involve federal, provincial and private sector scientists, fostering technology and knowledge transfer, sharing of facilities and leverage of resources. CFCAS has invested \$28 million in research on ice and snow and the Arctic, and it remains an excellent vehicle for support of research on Canada's North. Its efficiency in delivering targeted research support has been confirmed through independent review.<sup>3</sup>

In contributing to Canada's *People Advantage* CFCAS has supported over 300 researchers and over 700 graduate students, as well as research associates, postdoctoral fellows, technicians and others across Canada. Around \$54 million has been employed in training students and other research personnel, many of whom have gone on to subsequent employment in the public and private sectors, in research agencies, universities and other educational institutions. By 2010, over 2,000 students and research personnel will have received training and experience supported by CFCAS.

To date CFCAS funding has focused on the natural sciences. Coupling studies of natural systems with studies of social-economic impacts and benefits would, however, provide more complete information for government and industry decision-making, and better tools for government services. Appropriate resources would allow CFCAS to collaborate with other research funding organizations on cross disciplinary research, focusing its support on those areas where the synergies would be optimal. Economists and social scientists could work in teams with natural scientists. This would lead to comprehensive and integrated research results for policy development.

## **6. CFCAS Recommendation**

Research underpins innovation and contributes to the training of skilled human resources. Research outputs allow informed choices by governments, businesses and agencies, and increase the efficiency of economic activity in the light of changing environmental conditions. Canadians need this information at the same level of excellence and relevance as other countries. The Government should enhance support for climate research in universities as part of a 'made in Canada' approach to Canada's international competitiveness and security. In recognition of the long-term nature of the issues CFCAS recommends an investment commitment for at least a 10 year period.

**CFCAS recommends an investment of \$25 million per year for ten years, and an expanded CFCAS mandate, to allow support of interdisciplinary work (e.g. studies on environmental and socio-economic costs, impacts and benefits of climate events).** The Government should also expand support of international scientific partnerships and project offices in areas of strategic importance to Canada, and of research for the public good, as done in federal laboratories. An investment of \$250 million in targeted research over 10 years would support research on issues of environmental protection and security, mobilize science and technology to Canada's advantage and contribute significantly to a prosperous, safe and informed future for Canadians.

## **Conclusion**

Climate change, air quality, extreme weather, drought and changing marine and freshwater states affect our economy and must be considered in a comprehensive, integrated way, in the context of Canadian conditions. Canadians need to know their government is able to protect them from major environmental impacts and the government, in turn, must ensure its tax system allows it to do so. Investments must be made in research, but also in contingency plans and adaptation measures: the costs of inaction are simply too high to ignore.

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<sup>3</sup> Interim Program Evaluation for CFCAS – Goss Gilroy Inc., Management Consultants, Ottawa, February 21, 2007