POSITIONING

NATURAL RESOURCES CANADA'S

SCIENCE AND TECHNOLOGY

IN THE

INNOVATION SYSTEM

Natural Resources Canada (NRCan) is one of the largest performers of research and development among federal science-based departments and agencies.

Further details on NRCan's programs and activities can be found on the Department's Web site at:

http://www.nrcan-rncan.gc.ca/com/index-eng.php

Questions or comments regarding this document may be sent to:

Natural Resources Canada
Science and Policy Integration
580 Booth Street, 20th Floor
Ottawa, Canada
K1A 0E4

Fax: (613) 947-1426
Email: ocs-BureauduSP@nrcan.gc.ca

TABLE OF CONTENTS

Message from the Deputy Minister
Natural Resources Canada

The Federal Government conducts science and technology (S&T) to create economic opportunity and to protect and safeguard Canadians. Natural Resources Canada (NRCan), as one of the largest science-based departments and agencies, plays an important role in supporting the sustainable economic development of the natural resource sectors by creating, using and sharing natural resources and landmass knowledge and by fostering environmental responsibility.

I am pleased to present this document that summarizes our analysis of NRCan's role in the innovation system and how it could better position itself within the evolving S&T landscape. NRCan's future investments and actions will be guided by this knowledge and insight. NRCan will continue its leadership role by adopting a more focused approach that mobilizes natural resource S&T for the economic and social well-being of Canadians.

These findings would have been beyond our reach without the candor, support, commitment and collaboration of NRCan's many stakeholders. You told us that NRCan has the right to be proud of its accomplishments and that its employees are overwhelmingly positively perceived by clients and stakeholders. Nonetheless, you also told us there are things that NRCan could change. Foremost among them is the development of a natural resource S&T vision and strategy within the context of collaborative national and international innovation systems. That is precisely what is and will be happening over the coming months, as NRCan evolves to effectively fulfill its role and mandate over the next decade.

Cassie Doyle
Deputy Minister

Message from Dr. Yvan Hardy, Former Chief Scientist

In November 2005, the Deputy Minister tasked the Office of the Chief Scientist to use a consultative approach to study Natural Resources Canada's (NRCan) science and technology (S&T) contribution to the natural resources and earth sciences sectors. The objectives of this effort were to achieve a clearer understanding of NRCan's role and to provide recommendations on how NRCan could better position itself within the innovation system.

This document is a condensed version of our study. These findings provide a more solid foundation upon which NRCan can build an S&T strategy within the evolving federal S&T landscape.

The participation of members of NRCan's S&T community, the federal community, and other stakeholders in the natural resources innovation system was invaluable to us in this exercise. Your generosity, leadership and commitment, both in this study and during my term as the Chief Scientist at NRCan, help us to better serve Canadians. Thank you for your support.

Message from Geoff Munro, Chief Scientist

This report, a summary of the knowledge, processes and lessons learned from our analysis of international models and of other science-based departments and agencies, is one very important element in the development of the NRCan framework integrating science and policy. As a critical component of that framework, NRCan is developing its own S&T strategy. Aligned with the federal S&T strategy, it will outline how NRCan, as one of the major federal science-based departments and agencies, will fulfill its role and mandate by using S&T to achieve its strategic outcomes of economic development, environmental responsibility and safety, security and governance.

As Chief Scientist, I am committed to ensuring that NRCan leads in the science and policy of natural resources; is a world-class knowledge centre, and is a champion that mobilizes its partners to work together to achieve sustainable solutions. I look forward to working with all the players in the natural resources innovation system as we work toward achieving that vision together.

Introduction

Natural Resources Canada (NRCan) works to ensure the responsible development of Canada's natural resources, including energy, forests, minerals and metals. It also uses its expertise in earth sciences to build and maintain an up-to-date knowledge base of our landmass and resources. NRCan develops policies and programs that enhance the contribution of the natural resources sector to the economy and improve the quality of life of all Canadians.

NRCan furthers these goals by working with organizations in the national innovation system — private sector partners, clients and stakeholders, natural resource-based communities, other federal government departments and other levels of government — that share its interest in the use and sustainable development of the country's natural resource endowment.   And the department has had a great deal of success. For over a century, NRCan has been instrumental in creating and advancing economic and social opportunities across the spectrum of natural resources, as well as ensuring that natural resources strengthen the safety and security of Canadians.

As one of the top federal science and technology (S&T) contributors and part of an evolving national system of innovation, NRCan is taking steps to ensure its success continues. In November 2005, the department embarked upon an assessment of its S&T role within the natural resources and earth sciences systems of innovation. The motivation was to gather the knowledge and insight needed to guide NRCan's investments and actions for the next decade, and enable NRCan to be:
- Focused on the *right* S&T (aligned to government priorities);
- Doing it right (excellence);
- Well positioned and linked within the natural resource system of innovation; and
- Recognized for the aforementioned, as well as supported with a stable resource base and adequate scientific infrastructure.

In carrying out this assessment, NRCan studied the evolving international and national landscapes and how various S&T organizations have responded to both common and unique pressures and demands. NRCan also consulted a representative group of its stakeholders to solicit their opinions and gain their insight.

This document summarizes our findings and outlines the next steps in NRCan's development of a strategic S&T framework.

The Approach

The Office of the Chief Scientist gathered and analyzed information between November 2005 and February 2007. Sources included:

1. Dialogue with 85 stakeholders through 60 interviews to gather opinions about how NRCan can maximize its impact on the innovation system;
2. A review of innovation systems in nine advanced countries — Australia, China, Finland, France, Israel, Japan, New Zealand, United Kingdom, the United States of America — and, more broadly, the Organisation for Economic Co-operation and Development (OECD) to identify trends and attributes of an effective innovation system;
3. An exploration of the experiences of five other science-based departments and agencies — Agriculture and Agri-Food Canada; Defence Research and Development Canada; Fisheries and Oceans Canada; Environment Canada; and the National Research Council; and
4. A study of the evolution of the Federal Government's S&T landscape and the advice of the federal S&T advisory community — especially the Council of Science and Technology Advisors — to identify significant past, present and possible future policy directions for S&T in Canada.

Stakeholder Advice

NRCan is overwhelmingly positively perceived. Many stakeholders consider the S&T conducted at NRCan to be world class and feel that it plays an essential role in the innovation system. The rapport between NRCan employees and stakeholders is generally viewed as positive. NRCan's capacity to consult and listen to its innovation system stakeholders is perceived to be a strong asset.

The advice heard most often from stakeholders is that **NRCan should act as a whole, rather than as a number of different sectors**. This will ensure NRCan, with leadership and support at the highest levels, integrates science with policy to deal more effectively with horizontal policy issues.

Furthermore, **there needs to be a vision of a linked S&T system with collaboration, both national and international, at its core**. An integrated science and policy vision must include a commitment to S&T that focuses on government priorities and makes strategic choices to refine its scope.

Another important insight is that stakeholders believe that **NRCan should focus on and lead breakthroughs that are high-risk and potentially high-return**. This would not be limited to basic research and development, but would include working with partners to usher

> Quote from a Stakeholder:
>
> The goal for the Federal Government is to lead, innovate and engage partners. It's about creating a balance, having a vision, creating policy while building the strength of partners.

promising ideas through successive innovation phases.

Stakeholders suggested that NRCan could play the role of "facilitator," helping industry address gaps in receptor capacity.

Stakeholders also believe that **NRCan should favour public good S&T**. NRCan's public-good role extends to scientific advice in support of regulatory processes, the development of codes and standards, and public policy development. While it is not necessary that government perform all public good S&T, it must **provide a clear direction and strategy plus ensure stable and adequate funding**. Stakeholders feel that **NRCan should move away from "fee for service"** because it detracts from the pursuit of public good and support of new and emerging priority research areas.

To achieve this new research agenda, stakeholders feel a multi-disciplinary approach and human resource skills are needed. **NRCan must take advantage of opportunities to cluster, or physically or virtually co-locate, with partners**.   Interviewees agreed that **NRCan would need to address any barriers to implementation**.

Finally, most stakeholders believe that NRCan has the most complete knowledge of natural resource S&T, placing it in an ideal position to share information with all stakeholders and to convince decision makers and Canadians of S&T's value to society. NRCan's knowledge of natural resource S&T, plus its other knowledge assets, such as commodity expertise, statistical data collections, and economic analysis capacity, give it a sizeable, sustainable, competitive advantage in the marketplace of natural resource ideas and innovation. Still, many say they know little about what NRCan does and that it **should improve its capacity to communicate**.

Together with sharing S&T knowledge and information, stakeholders said that **NRCan should provide a leadership role in the innovation system**. **Stakeholders expect NRCan and the Government of Canada to lead the innovation system in three key ways: through facilitation; by establishing networking mechanisms; and by becoming a knowledge centre.**

Observations

International

NRCan studied innovation systems in Australia, China, Finland, France, Israel, Japan, New Zealand, the United Kingdom, and the United States, as well as, more broadly, in the OECD. The purpose of this analysis was to learn from these countries and to identify any best practices that could be applied at NRCan.

> Innovation systems are complex, interrelated, continuously evolving and one size does not fit all.
>
> Today's innovation system has a more diverse and demanding set of stakeholders— the scientific community, government, business sector and civil society—who expect faster and more concrete responses.

All countries face similar economic and social challenges. For example, demographic changes are causing complex and far-reaching societal, economic and geo-political

pressures that will have a profound impact on the strength and capacity of innovation systems. Like Canada, other countries are already experiencing, or will soon experience, a shortage of highly qualified personnel. Nonetheless, each country has responded with its own unique combination of national S&T strategy, funding, tax measures and streamlined regulations to create favourable conditions for innovative S&T. There is much at stake since countries that are able to forecast and quickly exploit opportunities arising from societal demands, or from S&T with applications that are not initially obvious, will be more successful and will develop competitive advantage.

The role of government and the ways in which institutional structure can maximize S&T investment were also reviewed. Findings include:

- A top-down approach in which government sets the direction is favoured.
- Governments are increasing their involvement in S&T to:
    o support fundamental research; and
    o serve and support public good;
- Line departments rarely perform S&T—specialized organizations have been created for this purpose;
- Decisions on direction and funding are clearly separated from the performance of S&T; and,
- The three pillars — industry, academia, and government — of the innovation system work in close collaboration.

> Finland's success is based on flexibility: the public and private sectors have been able to adjust and take advantage of opportunities afforded by the new techno-economic environment. Intense inter-organizational cooperation is an essential feature of the Finnish innovation system. Support for industrial and sectoral R&D, regionalization, and significant structural and operational changes at universities have been key to the government's R&D growth strategy.

National

The federal S&T community is composed of central agencies, science-based departments and agencies and horizontal committees, each with specific roles and responsibilities. The Canadian federal S&T landscape has had a complex evolution, extending over decades and involving numerous national and international stakeholders.

Figure 1: Evolution of Federal S&T Landscape
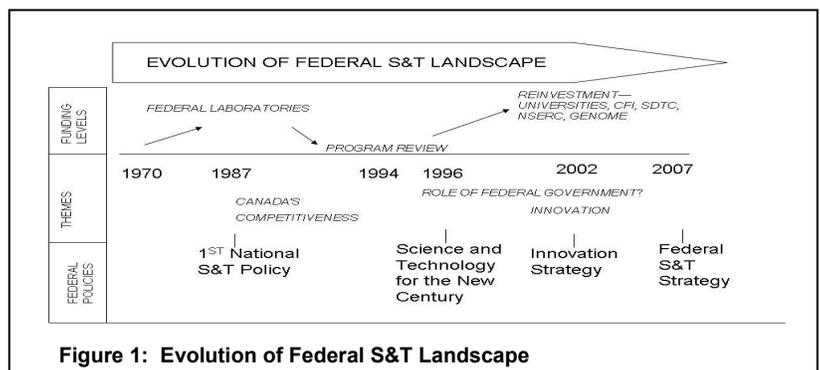
(See Figure 1). It has also been a catalyst for change in several science-based departments and agencies.   For example, Agriculture and Agri-Food Canada, Defence Research and Development Canada, Fisheries and Oceans Canada, Environment Canada, and the National Research Council have recently prepared S&T strategies to re-align, re-focus and reorganize science within their organizations. The strategies

address three key concerns: S&T governance systems and structures; ensuring access to a highly skilled workforce; and effective collaboration and stakeholder engagement.

In recent years, the advisory community, comprised of the Advisory Council on S&T, the Council of S&T Advisors[1] and the Council of Canadian Academies, has also influenced the federal response to S&T as well as the work of the Office of the National Science Advisor, and key federal S&T committees and boards. The advisory community helped form the core of federal S&T initiatives and helped guide the ongoing transformation of federal S&T and the innovation system.

> Senior political officials and public servants need to *embrace a vision of a linked S&T system and champion collaboration* to ensure that it is adopted as a fundamental component of government S&T culture. Leading by example, they should demonstrate that collaboration is not a "corner of the desk" endeavour constituting "extra" work.
>
> CSTA, *LINKS*, 2005

NRCan's evolution will continue to be influenced by the federal S&T landscape and the federal S&T community.

Common Themes

This section summarizes input from all sources into the most relevant common themes that will help guide NRCan as it re-positions itself in the natural resources and earth sciences innovation system. The six themes are: leadership; vision and commitment to S&T; governance; innovative environment; knowledge, facilitation and communication; and resourcing. No one theme stands alone; they are interrelated. Common to all is the need to adapt to a changing environment. Table 1 provides a summary of key information under each of these themes.

---

[1] With the release of the Federal S&T Strategy, the Advisory Council on S&T, the Council of S&T Advisors, and the Canadian Biotechnology Advisory Committee were merged into the new Science, Technology and Innovation Council.

Summary of Common Themes

• **Leadership**
    o Departmental S&T strategy links to national S&T strategy
    o "Focused" leadership nationally and internationally

• **Vision and Commitment to S&T**
    o One vision
    o Focused S&T priorities as foundation of vision
    o Increased national and international collaboration
    o Embrace a vision of a linked S&T system, with collaboration amongst stakeholders
    o Sustainable government support for S&T, linking science to policy

• **Governance (Accountability)**
    o New approach
    o Shared responsibility among all innovation system stakeholders
    o Recognize government's primary responsibility for public good S&T
    o Unbiased decision making to achieve greater efficiency and effectiveness (no vested interest)

• **Innovative Environment**
    o Stakeholders thrive in their respective role(s) within a linked national S&T system.
    o From basic research to commercialization, the innovation chain features creative links through multi-disciplinary mechanisms.

• **Knowledge, Facilitation and Communication**
    o Government is the catalyst for a thriving innovation system.
    o Share knowledge and information and facilitate networks and relationships across the innovation system disciplines.
    o Facilitate recognition by Canadians of the impact of S&T on national issues.

• **Resourcing**
    o Address barriers to internal and external linkages and to systems of resource management.
    o Address current and emerging needs while maintaining essential S&T.
    o Allocation encourages collaboration, is unbiased and achieves goals effectively.
    o Address issue of human resources

Table 1: Summary of Common Themes

Leadership

Focused leadership is a key theme among all sources. Government leadership at the highest level is required to effectively address science-related priorities and emerging challenges. S&T strategies, demonstrating how these issues will be addressed, exemplify government leadership. Leadership will also ensure that knowledge is diffused, shared and used and that resources are maximized through S&T policy and institutional set-up. Such leadership guides the integration, coordination and networking among all players that is characteristic of innovation systems.

Vision and Commitment to S&T

A department's or government's vision and commitment to S&T is embodied in a S&T strategy. At its core, the vision integrates science and policy. It recognizes that innovation is key to prosperity and aims to mobilize the innovation system to tackle key priorities in a collaborative fashion. The strategy identifies goals and a limited number of S&T priorities and specifies how efforts will support these priorities. Because collaboration, linkages and networking are essential, the strategy features a multi-disciplinary approach. The S&T vision and strategy are dynamic, so they need to be periodically updated and re-focused to reflect adjustments in government priorities and other evolving circumstances. NRCan needs a single, coherent departmental vision for S&T. From this vision, a new S&T strategy, with links to the Federal S&T Strategy, will be created.

Governance (Accountability)

Government funds public good S&T and tends to concentrate the S&T it performs on areas supporting public policy and regulation. The international trend is to separate funding and policy decisions from S&T performance to minimize actual or perceived vested interest, ensure transparency and greater accountability, and to optimize horizontal integration and collaboration. As such, new departmental S&T governance structures will be put in place in which leadership sets corporate and strategic direction for S&T while other high-level groups direct progress by defining specific S&T priorities, managing risk, aligning resources with priorities, and ensuring resources are allocated to those best positioned to perform the S&T. Public good will continue to be a priority.

Innovative Environment

With appropriate leadership, vision, commitment and governance structure in place, an innovative environment that encourages collaboration and networking among all key players can be created. This is characteristic of an innovation system. An innovative environment often means changes in organizational structure or thinking, or a change in the way that players work or relate to each other. There are several possibilities, including participation by civil society and business in priority setting and sometimes co-location so that innovation players physically work together.

A balance must be struck to ensure sufficient S&T capacity and expertise to support government's public good and regulatory roles. Governments can also concentrate on high risk, high-potential return while encouraging industry to more forcefully accept its receptor role. All partners in the innovation system have a responsibility for providing training and mentoring so Canada develops more highly qualified personnel.

Knowledge, Facilitation and Communication

This theme is also about strengthening networks and increasing collaboration to improve knowledge sharing, facilitation and communication. Governments are knowledge centres and have a responsibility to share with stakeholders and the public synthesized knowledge about S&T issues to increase awareness, encourage recognition of the

impact of S&T on national issues, garner support, and allow this knowledge to feed the innovation process. As knowledge centres, governments act as facilitators or catalysts to spur S&T and link innovation players around opportunities. The recognition of the federal community's role as a catalyst for the innovation system and in communicating the importance of science to Canadians prompted the creation of science.gc.ca.

Resourcing

Resourcing requires government to determine the right balance among public good, mandated S&T and current and emerging priority needs. To lead and be an effective contributor to the innovation system, government must maintain adequate capacity and focus its investments accordingly (e.g. infrastructure, assets, human resources, and S&T priority financing).

As witnessed globally, for an innovation system to thrive, government S&T resources must exist separately and also be leveraged with significant university participation and and industry funding.   Collaboration among key innovation system players is necessary to achieve excellent results. One model is competitive government funding programs that are accessible to all players and guided by S&T excellence and relevance. For any model, existing barriers to collaboration, whether fiscal, structural or organizational, must be addressed.

Next Steps

With findings in hand from the assessment of NRCan's S&T position in the innovation system, three major steps have been identified to move the department forward. NRCan has a solid foundation on which to build—including a culture of excellence and collaboration—within the existing federal science policy framework. This framework includes the recently released Federal S&T Strategy that defines Canada's advantages, establishes principles and sets broad S&T priorities.

The first step over the coming months will be to formulate an NRCan S&T strategy. This strategy will be fundamental to NRCan's transformation, articulating our commitment to public good S&T, and taking advantage of the knowledge, processes and lessons learned from analysis of international models and of other science-based departments and agencies. NRCan's strategy will be aligned with the Federal S&T Strategy. Working with focused leadership from a single, coherent vision for natural resources, the strategy will articulate how the department will:
• respond to current and emerging needs;
• enhance the competitive advantage of Canadian companies;
• make Canada a leader in environmental responsibility of natural resource development; and
• strengthen the safety and security of Canadians.

The second step is the adoption of a new governance system that links policy with S&T and establishes mechanisms for priority setting and resource allocation.   An important feature of this governance system will be the separation of policy direction and funding

decisions from S&T performance. In practical terms, this means S&T funding will be allocated to the organization within the innovation system that is best able to perform the S&T.   Such a governance system encourages linkages across the innovation system and fosters S&T excellence.

The third step will be revitalization of the departmental S&T consultative framework. Stakeholders will be engaged to ensure decisions are based on holistic advice, and ongoing feedback will help NRCan adjust its leadership role and responsibilities to reflect changing circumstances. Among other advantages, improved collaboration will permit an increasingly horizontal approach to S&T, better integration of science and policy, greater participation and innovation by stakeholders, and will be key to the development and implementation of NRCan's S&T strategy.

Conclusions

Over the years, NRCan has had to respond to a variety of global, national and stakeholder pressures and it has done well. NRCan has a right to be proud of its accomplishments; it is highly regarded by clients, collaborators and stakeholders for the scientific and technical expertise of its employees and for the S&T knowledge base it possesses. However, by continuing to operate in the same manner, the department was limiting improved effectiveness. Upon assessment, a transformation of the departmental S&T framework and programs has begun under the leadership of the Deputy Minister and senior managers. One of the goals of the transformation is to achieve a more horizontal approach to priorities, policies, programs and operations.

The assessment of NRCan's position in the innovation system has been very illuminating. We have increased our knowledge and understanding of how other countries' innovation systems operate, and how the Canadian system of innovation has evolved. We learned how other science-based federal departments and agencies have responded to challenges similar to those faced by NRCan and from them have taken away valuable lessons. Our stakeholders discussed their current and future expectations for NRCan, and their candid observations and feedback were instrumental in targeting our findings to the natural resources sector.

Now, armed with constructive advice, a wealth of relevant information and guided by the new Federal S&T Strategy, we will work to re-shape NRCan so that it can effectively integrate S&T within its policy objectives. This will equip NRCan to improve the quality of life of Canadians by creating a sustainable resource future.

Acknowledgements

NRCan would like to thank and acknowledge the following individuals for their contributions to the development of this document.

Name	Title	Organization
Alan Winter	President and CEO (also Deputy-Chair CSTA)	Genome British Columbia
André Plourde	Chair, Department of Economics	University of Alberta
Andrew Pape-Salmon	A/Manager, Energy Efficiency and Community Energy Programs	Alternative Energy Policy Branch, Government of British Columbia
Arthur Carty	National Science Advisor	National Science Advisor Office
Bill Thomlinson	Executive Director	Canadian Light Source
Carole Champion	Director, Business Development	Ontario Centres of Excellence Inc., Centre of Excellence for Energy
Chad Gaffield	President	Social Sciences and Humanities Research Council
Christophe Guy	Professor and Director, Department of Research and Innovation	École Polytechnique de Montréal
Colin Hunt	Director of Research and Publications	Canadian Nuclear Association
Craig Murray	Vice-President, Manuf/Value-Added Proc.	Saskatchewan Research Council
Dan Green	Director	Alternative Energy Policy Branch, Government of British Columbia
Dan McGillivray	Acting Managing Director	Ontario Centres of Excellence Inc., Centre of Excellence for Energy
Dave MacLean	Dean, Faculty of Forestry and Environmental Management	University of New Brunswick
David Coleman	Professor and Dean of Engineering	University of New Brunswick
David Lynch	Professor and Dean of Engineering	University of Alberta
Dawn Conway	Executive Director	Canadian Foundation for Climate and Atmospheric Sciences
Denis Brière	Full Professor and Dean, Faculté foresterie et de géomatique,	Université Laval
Don Di Salle	Vice President, Corporate Services	National Research Council
Ed Kennedy	Managing Director/ Director	Canadian GeoProject Centre/ Geomatics Industry Association of Canada
Eliot Phillipson	President and CEO	Canada Foundation for Innovation
Elizabeth Beale	President	Atlantic Provinces Economic Council
Eric Cook	Executive Director	New Brunswick Research and Productivity Council
Geoff Munro	Director General, Science and Programs, Canadian Forest Service	Natural Resources Canada
Gerald Fedchun	President	Automotive Parts Manufacturers Association
Gordon Peeling	President and CEO	Mining Association of Canada
Graham Campbell	Director General, Office of Energy Research and Development, Energy Policy Sector	Natural Resources Canada
Hans Konow	President and CEO	Canadian Electricity Association
Hassan Hamza	Director General, CANMET Energy Technology Centre, Devon, Energy Technology and Programs Sector	Natural Resources Canada

Ian De La Roche	President and CEO	Forintek Canada Ltd.
Jacob Verhoef	Director GSC Atlantic, Earth Sciences Sector	Natural Resources Canada
Jacques St. Cyr	Executive Director	COREM
James Fyles	Scientific Director/Professor	Sustainable Forest Management Network/ McGill University (also works out of University of Alberta)
Janet Halliwell	Executive Vice President and Chief Operating Officer	Social Sciences and Humanities Research Council
Jean Pierre Martel	Senior Vice President Sustainability	Forest Product Association of Canada
Jean-Claude Mercier	Communications	Forintek Canada Ltd.
Jeffrey Cutler	Acting Co-Director of Research	Canadian Light Source
Jenny Jackman	Director CANMET Mineral Technology Branch, Minerals and Metals Sector	Natural Resources Canada
Jim Fyles	Scientific Director / Associate Professor	Sustainable Forest Network Networks of Centres of Excellence / McGill University
John Marrone	Director General, CANMET Energy Technology Centre, Ottawa, Energy Technology and Programs Sector	Natural Resources Canada
John McLean (representing Jack Saddler, Dean)	Professor, Faculty of Forestry	University of British Columbia
Jorg Beyeler	Director	Nova Scotia Department of Natural Resources
Karin K. Endemann	Executive Advisor, Corporate Services	National Research Council
Ken Mallett	Director, Forest Biology, Canadian Forest Service	Natural Resources Canada
Ken McCready	President / Chair / Member	K.F. McCready and Associates / NRCan Advisory Board on Energy Science and Technology / Ministerial Advisory Council for Science and Technology
Kevin Fitzgibbons	Executive Director	National Science Advisor Office
Kevin Keough	President and CEO	Alberta Heritage Foundation for Medical Research
Mara Kerry	Director of Conservation	Nature Canada
Marc D'Iorio	Director General, Atlantic and Western Canada Branch, Earth Sciences Sector	Natural Resources Canada
Marc Fortin	Assistant Deputy Minister	Agriculture and Agri-Food Canada
Mary Carman	Assistant Deputy Minister, Science and Innovation	Industry Canada
Michael Cleland	President and CEO	Canadian Gas Association
Murray Elston	President and CEO	Canadian Nuclear Association
Murray McLaughlin	Director of Business Development	Canadian Light Source
Nancy Cowan	Managing Director	Ontario Centres of Excellence Inc., Centre of Excellence for Energy
Nicholas Chrisman	Scientific Director	GEOIDE NCE
Normand Lafrenière	Regional Director General, Laurentian Forestry Centre, Canadian Forest Service	Natural Resources Canada
Patricia Dillon	President	Prospectors and Developers Association of Canada
Patrick Curran	Director of Environment Health and Safety	Automotive Parts Manufacturers Association

Patrick Jamison	General Manager	Nexen Inc.
Paul Johnston	President and CEO	Precarn Incorporated
Paul Labbé	Vice-President, Mining and Minerals	Saskatchewan Research Council
Peter Hackett	President and CEO	Alberta Ingenuity
Peter MacQuarrie	Director	Nova Scotia Department of Natural Resources
Peter Nicholson	President	Council of Canadian Academies
Ranga Ranganathan	Director Business Development	Saskatchewan Research Council
Réal Choquette	Network Manager	GEOIDE NCE
Rich Kerr	Chief Engineer	Nexen Inc.
Richard Tobin	Assistant Deputy Minister, Corporate Management Sector	Natural Resources Canada
Rob Scammell	Senior Geologist/Vice Chair/Member	Burlington Resources Canada / Ministry of Natural Resources' Advisory Board on the Earth Sciences / Ministerial Advisory Council for Science and Technology
Robert Mansell	Managing Director	Institute for Sustainable Energy Environment and Economy, University of Calgary
Robert Moses	President/Chair of MNABES/ Chair of MACST	PCI Geomatics Group
Robert Philp	Manager, Strategic Planning Evaluation and Communication, Office of Energy Research and Development, Energy Policy Sector	Natural Resources Canada
Robert Slater	Former Assistant Deputy Minister	Government of Canada (retired)
Ron Dyck	Assistant Deputy Minister, Research Innovation and Science	Alberta Innovation and Science
Sandy Colvine	Associate Director General, Atlantic and Western Canada Branch, Earth Sciences Sector	Natural Resources Canada
Shahrzad Rahbar	Vice President Strategy and Operations	Canadian Gas Association
Suzanne Fortier	President	National Sciences and Engineering Research Council of Canada
Thomas Ellis	Director of Research	Canadian Light Source
Tim Bancroft	Vice President, Sustainable Development, Technology, and Public Affairs	Shell Canada
Tom Brzustowski	RBC Financial Group Professorship in the Commercialization of Innovation	University of Ottawa – former President of NSERC
Tom Hynes	Director CANMET Mineral Technology Branch, Minerals and Metals Sector	Natural Resources Canada
Vicki Sharpe	President and CEO/Member of NABEST	Sustainable Development Technology Canada
Vince Santilli	Planning and Development Officer	Nova Scotia Department of Natural Resources