

# **CAPTURING THE OPPORTUNITY**

**Realizing a Shared Vision for Canada's  
Energy and Mining Sectors**



**Prepared by Natural Resources Canada  
in collaboration with  
Provincial and Territorial Governments**

**Energy and Mines Ministers' Conference  
August 24-27, 2013  
Yellowknife, Northwest Territories**

# **CAPTURING THE OPPORTUNITY**

## **Realizing a Shared Vision for Canada's Energy and Mining Sectors**

**Prepared by Natural Resources Canada  
in collaboration with  
Provincial and Territorial Governments**

**Energy and Mines Ministers' Conference  
August 24-27, 2013  
Yellowknife, Northwest Territories**



Cat. No. M34-16/2013E-PDF (Online)  
ISBN 978-1-100-22612-5

*Aussi disponible en français :*

Saisir l'opportunité : Établir une vision commune pour les secteurs de l'énergie et des mines du Canada

# Table of Contents

---

<b>EXECUTIVE SUMMARY</b>	<b>1</b>
<b>INTRODUCTION</b>	<b>3</b>
<b>EFFECTIVE AND EFFICIENT REGULATORY SYSTEM</b>	<b>6</b>
<b>MODERN, SAFE AND RELIABLE INFRASTRUCTURE</b>	<b>7</b>
<b>ADEQUATE SUPPLY OF LABOUR AND SKILLS</b>	<b>9</b>
<b>EFFECTIVE ABORIGINAL ENGAGEMENT AND PARTICIPATION</b>	<b>11</b>
<b>WORLD-CLASS ENVIRONMENTAL PROTECTION</b>	<b>14</b>
<b>OPEN COLLABORATIVE GEOSCIENCE</b>	<b>17</b>
<b>TARGETED INNOVATION</b>	<b>19</b>
<b>IMPROVED ENERGY EFFICIENCY</b>	<b>21</b>
<b>MORE PROFOUND RESOURCE LITERACY</b>	<b>23</b>
<b>CONCLUSION</b>	<b>24</b>

## Executive Summary

---

The natural resources sector is fundamental to the strength of Canada's economy and the quality of life of Canadians. The sector directly and indirectly supported close to 1.8 million jobs across the country in 2012 and contributed to approximately over 18 percent of the country's nominal gross domestic product. Moreover, the magnitude of the economic benefits associated with potential capital spending of approximately \$650 billion in projects underway or planned over the next 10 years is significant.

In order to fully realize the benefits of Canada's resource endowment, it is critical for Canada to diversify its export markets and support the sector's sustainable growth. While Canada must continue to strengthen its trade relationship with the United States, it must also put in place the necessary conditions to enable the sector to meet growing demand in emerging economies. Emerging economies like China and India are expected to require increasing amounts of energy to power their industrial, residential and transportation sectors, and metals for their manufacturing industries and infrastructure. This projected growth in demand creates both opportunities and challenges for Canada's natural resources sector.

This paper provides an overview of current actions and highlights the potential for collaboration between different levels of government in the following areas: effective and efficient regulatory system; modern, safe and reliable infrastructure; adequate supply of labour and skills; effective Aboriginal engagement and participation; world-class environmental protection; open collaborative geoscience; innovation; energy efficiency; and resource literacy.

The paper speaks to the importance of an **effective and efficient regulatory system** in ensuring timely progress on economically viable major resource projects while protecting the environment and the safety of Canadians. It provides an overview of the Government of Canada's plan for Responsible Resource Development and collaborative work undertaken with provincial and territorial governments in this regard. The plan aims to streamline reviews of major projects by reducing federal-provincial duplication, ensuring more predictable and timely reviews, strengthening environmental protection, and enhancing consultations with Aboriginal peoples.

Current and planned major natural resource projects require investments in **modern, safe and reliable infrastructure**. In this regard, there is a role for federal, provincial and territorial governments in encouraging private sector investment while ensuring development that meets the needs of Canadians and Canada's natural resources sector. Infrastructure can open new regions to development, enable delivery of resources to export markets, support the needs of remote communities and enable labour mobility.

Federal, provincial and territorial governments are taking action through a wide range of programs and collaborative initiatives to ensure an **adequate supply of labour and skills** in the natural resources sector. Collaboration in this area is especially important in light of the forecasted need for 45,000 new workers in the electricity industry by 2016, up to 84,050 workers in the oil and gas industry by 2022, and up to 141,540 workers in mineral exploration, extraction and primary processing industries by 2021 (includes oil sands mining). To meet this growing labour need, the paper identifies additional efforts and collaboration between governments, Aboriginal communities and industry stakeholders in five key areas: under-represented groups; recruitment and retention; skills development; labour mobility; and labour market information.

The natural resources sector is an important private employer of Aboriginal people. Many of the planned projects are located near or passing directly through Aboriginal territories, requiring **effective**

**Aboriginal engagement and participation.** Key areas of challenge that many Aboriginal communities face with respect to participation in resource development include: consultation and accommodation; community and business readiness; skills and employment; and, engagement and partnerships. Moving forward, more work is needed in these areas to ensure that the necessary conditions are in place for Aboriginal communities to be engaged partners, fully benefiting from economic development in the resources sector.

It is critical, from an economic perspective, to ensure Canada's **world-class environmental protection** measures keep pace with the forecasted growth in the natural resources sector. Collaboration between federal, provincial and territorial governments is essential in minimizing risks and mitigating impacts to ecosystems while maximizing economic benefits of Canada's natural resources sector. Collaboration between governments, private sector, academia and civil society can foster an environment of information-sharing on best practices, both domestically and from operations abroad, while providing opportunities for Canada to communicate and demonstrate its commitment to environmental protection.

**Open collaborative geoscience** can contribute to decisions on environmental protection measures and increase the effectiveness of exploration efforts. Moreover, enhancing existing collaboration between different levels of government on open geoscience data is critical to encouraging private sector exploration investment in natural resource development, infrastructure development and land management decisions.

The prospect for growth and global competitiveness in the natural resources sector is also contingent on **innovation**. Research and development efforts in the sector can contribute to accessing new resource deposits, enhancing productivity, and improving the environmental performance of the industry. Partnerships among different levels of government, the private sector and academia can contribute to the development, demonstration and commercialization of Canadian technologies and improve efficiencies in the sector.

**Energy efficiency** improvements can contribute to Canada's economic competitiveness while reducing the environmental footprint of the natural resources sector. Investments in energy efficiency can boost the country's economy while saving Canadians money. It can also spawn technology innovation and create new service sectors in the economy. Federal, provincial and territorial collaboration is key to helping Canada realize its untapped energy efficiency potential.

The availability of high quality data and information is essential to managing Canadian resources effectively. **Resource literacy** helps to make the most of Canada's natural resources by allowing governments to make important, and well-founded, policy and regulatory decisions, contributing to private sector investment decisions, and providing information on Canada's natural resources landscape and its importance to the public at large.

While collaboration among different levels of government and key stakeholders is already underway in addressing challenges facing the sector, more needs to be done to capture the opportunity in Canada's energy and mining sector. Examples of existing collaborative practices between different levels of government are highlighted throughout, yet more needs to be done. The challenges facing Canada's energy and minerals and metals sectors are complex and interconnected. The paper concludes that targeted actions that respect jurisdictional responsibilities and which are supported by strategic partnerships across federal, provincial and territorial governments, industry, Aboriginal groups and the public at large are necessary to ensure that we are **Capturing the Opportunity** in Canada's natural resources sector.



# Introduction



The energy and mining sectors are fundamental to Canada's current and future economic prosperity and the quality of life of Canadians. To fully realize its resource endowment, Canada must diversify its export markets to capture opportunities presented in emerging economies. Collaboration between federal, provincial and territorial governments will be important in addressing challenges ahead and in ensuring the long-term sustainable growth of Canada's energy and mining sectors.

In 2011, Canada's Energy and Mines Ministers agreed to a shared vision for Canada as a recognized leader in secure and sustainable energy supply, use and innovation. Since then, important steps have been taken to realize opportunities in Canada's natural resources sector, including the Government of Canada's plan for Responsible Resource Development.

It was in this context that jurisdictions agreed on the fundamental importance of capital and market growth and diversification for all of Canada's natural resources. In 2012, the important contribution of the natural resources sector was reinforced in a report entitled *Defining the Opportunity: Assessing the Economic Impact of the Natural Resources Sector*, developed collaboratively by Natural Resources Canada and the provinces and territories. This report highlighted the magnitude and dimensions of the economic benefits associated with current and planned natural resource projects.

This document builds on the 2012 report, provides an overview of current actions and highlights potential areas for greater collaboration between different levels of government in order for Canada to capture the opportunity arising from our abundant wealth of natural resources.

## OVERVIEW

The economic impact of Canada's natural resources sector cannot be overstated. In 2012, energy, mining and forestry sectors directly represented over 13 percent of Canada's nominal gross domestic product (GDP) and employed 950,000 workers. Through the purchase of goods and services from other

sectors, the natural resources sector indirectly drives GDP and employment in other sectors. This indirect impact represented almost 5 percent of GDP and 850,000 jobs in 2012. All in all, this represented over 18 percent of Canada's GDP and 1.8 million jobs.

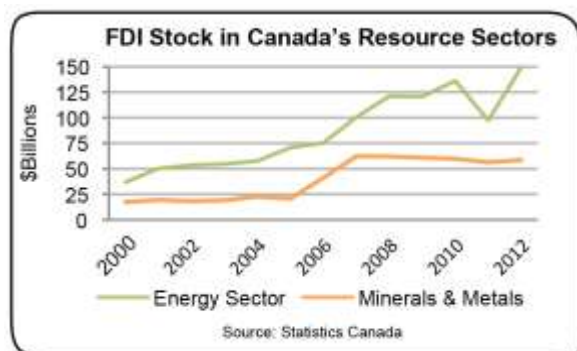
Going forward, the sustainable growth in Canada's natural resources sector will increasingly depend on our ability to address a range of challenges associated with attracting capital and stimulating market growth.

## ATTRACTING CAPITAL

Canada's vast resource wealth, coupled with its open, market-based approach to foreign investment, makes Canada a leading destination for natural resource investment. The sector is a principal driver of foreign investment in Canada, accounting for 34 percent of foreign direct investment stock in 2012. Given that over the next 10 years, approximately \$650 billion in underway or new investment in hundreds of major resource projects is planned across Canada, attracting both foreign and domestic capital will be critical.

In order to attract the capital necessary to realize these opportunities, it is imperative that Canada maintain a competitive advantage. At the same time that new entrants in the natural resources sector have emerged, continued volatility in commodity markets have exacerbated risks associated with capital investments, leading to fierce competition for increasingly scarce capital. Canada must continue to deliver strong economic performance, globally competitive business costs and corporate tax rates, and a stable and

robust business environment. It will also be critical for businesses operating in Canada to have ready access to international markets and access to a highly skilled and educated workforce. Promoting stable and secure two-way trade and investment with other countries is also a priority.



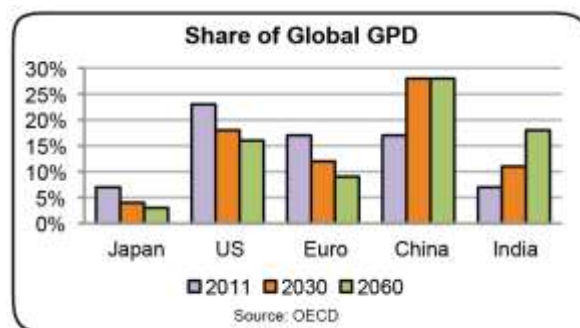
Important advancements are being made to Canada's foreign investment regime in order to provide greater certainty to investors, ensure investments into Canada satisfy expectations for how businesses operate in a free market economy, and support reciprocal treatment abroad for Canadian investors. In December 2012, the Government of Canada clarified its policy regarding state-owned enterprise (SOE) investment in Canada. Investments by foreign SOEs to acquire control of a Canadian oil sands business will, going forward, be found to be of net benefit on an exceptional basis only. SOE transactions throughout the Canadian economy will be carefully monitored, in particular, the degree to which a foreign state is likely to exercise control or influence. Non-controlling minority interests in Canadian businesses proposed by foreign SOEs, including joint ventures, will continue to be welcome in the development of Canada's economy.

### MARKET GROWTH AND DIVERSIFICATION

The current global economic landscape is highly volatile; economic expansion in the United States continues at a gradual pace, Europe remains in recession and emerging economies are experiencing slower than expected growth. Despite these challenging market conditions, the Canadian economy continues to expand, albeit at a modest pace, enjoying one of the best performances among Group of Seven (G-7)

countries over the recovery. Moreover, longer-term trends suggest growing opportunities for Canada's natural resources sector, driven by global demand for energy and minerals and metals in emerging economies, and by a growing global population and middle class.

The OECD projects that the size of the global middle class could increase from 1.8 billion people in 2009 to 3.2 billion by 2020 and to 4.9 billion by 2030, with almost all of this growth (85 percent) coming from Asia. Moreover, China, India and other emerging economies are expected to require increasing amounts of energy to power their industrial, residential and transportation sectors, and metals for their manufacturing industries and infrastructure.



According to the International Energy Agency (IEA), China is the largest energy consumer, surpassing the United States, and India is set to become the 3<sup>rd</sup> largest consumer by 2030. China is both a leading consumer as well as an investor in energy, minerals and metals. India is expected to further contribute to the growing global demand for natural resources in the future as its economy continues to grow. Changing technologies (e.g., solar power, information and communication technology) are also contributing to an increase in demand for many metals.

Canada currently exports the vast majority of its energy to a single customer – the United States is the destination for 99 percent of Canada's crude oil exports and 100 percent of Canada's natural gas exports. Recent technological advancements in drilling and completion techniques, however, have made large-scale oil and gas discoveries in the United States accessible. In fact, the IEA suggests in its 2012



annual report that the United States will be “almost self-sufficient in energy, in net terms, by 2035.”

Canada has been capturing a lower price for its oil and gas than is available in global markets. While the crude price differential has recently lessened, it is difficult to predict if this trend will continue given the various factors that affect oil prices. It is estimated that this price discount cost Canadians about \$13 billion in export revenue in 2012. Canadian natural gas continues to trade well below global market prices. In order to fully capitalize on Canadian oil production, which is forecasted to almost double by 2035, the development of energy infrastructure to meet the needs of the North American market and to deliver oil and gas to tidewater for export to Asian and South American markets is critical.

Similarly, Canada’s minerals and metals sector must maintain and expand its market share in the face of increasing volatility and intense competition. Despite recent volatility in commodity prices, prevailing views suggest the Canadian mining sector’s economic prospects will be strong over the long term. In fact, Canada is one of the leading mining nations in the world, producing more than 60 minerals and metals and among the leading producers and exporters of many key commodities (e.g., potash, uranium, nickel, zinc, cobalt, gold, coal, diamonds, etc.). Strong global demand for commodities (e.g., China and India) and higher marginal costs of production tied to supply constraints have led to a broad-based rise in prices over the last decade. In 2010, the International Monetary Fund’s (IMF) analysis suggested that the base metal markets are in a phase of “increased scarcity” caused by rising demand and tight supplies. In 2012, with a slower than expected global economic recovery, demand for base metals also slowed. In the long term, however, growing demand for commodities can create opportunities for Canada’s minerals and metals resources. The

sector must be able to respond and adapt to rapidly shifting market conditions to stay globally competitive, while maintaining its social license to operate in Canada and abroad.

## MOVING FORWARD

Canada and the United States share the largest bilateral commercial relationship in the world. This inter-dependence benefits the economic prosperity and standard of living of people in both countries, especially in an era of global change. Going forward, it is important to continue to strengthen this trade relationship, as we work together toward common objectives of North American economic prosperity and energy security. At the same time, Canada should also capitalize on opportunities created by emerging economies and seek to attain the maximum value for its natural resources.

The challenges facing Canada’s energy and minerals and metals sectors are complex and interconnected. Targeted actions that respect jurisdictional responsibilities and which are supported by strategic partnerships across federal, provincial and territorial governments, industry, Aboriginal groups and the public at large can contribute to Canada’s ability to capture opportunities in the natural resources sector.

While collaboration among different levels of government and key stakeholders is already underway in a number of key areas, more needs to be done. This document presents some of the key challenges and areas for collaboration that can further enable Canada to realize its natural resource potential, including: an effective and efficient regulatory system; modern, safe and reliable infrastructure; adequate supply of labour and skills; effective Aboriginal engagement and participation; world-class environmental protection; open collaborative geoscience; innovation; energy efficiency; and, resource literacy.

*Canada is fortunate to have one of the largest and most diverse natural resource endowments in the world*

# Effective and Efficient Regulatory System



An effective and efficient regulatory system is essential to ensuring timely reviews of major resource projects, while ensuring strong environmental protection and enhanced consultation with Aboriginal peoples. It also creates a favourable climate for investment and job creation, promotes innovation, and enhances the competitiveness of Canada's resource industries.

To create an effective and efficient regulatory system, in 2012 the Government of Canada launched the plan for Responsible Resource Development – a key element of Canada's Economic Action Plan. The initiative will help position Canada to capitalize on its tremendous resource potential by ensuring Canada's regulatory regime is among the most efficient and competitive in the world. The plan will streamline reviews of major projects by ensuring more predictable and timely reviews, reducing duplication, strengthening environmental protection, and enhancing Aboriginal consultations.

Responsible Resource Development will reduce duplication between federal and provincial review processes with the ultimate objective of "one project, one review". Provincial environmental assessment processes can now be substituted for federal processes, provided the provincial process can meet federal requirements. The plan also puts in place clear and predictable timelines for reviews, which would have to be completed within a maximum of two years.

But it is not just about developing resources efficiently – it's about developing them responsibly. The changes introduced by Responsible Resource Development strengthen environmental oversight by focusing resources on major projects and by introducing new measures to strengthen compliance and enforcement and to strengthen pipeline and marine safety. For example, for the first time, substantial financial penalties would be imposed for non-compliance with conditions set by environmental assessments. New administrative monetary penalties were also introduced to increase pipeline safety. Penalties for each day out of compliance with rules and

regulations range up to \$25,000 for individuals and up to \$100,000 for corporations.

Responsible Resource Development also reinforces the Government's whole-of-government approach to integrate Aboriginal consultations into the new environmental assessment and regulatory processes. Federal Budget 2012 also provided \$13.6 million to support Aboriginal consultations. Together, these changes will ensure more meaningful consultation processes. The plan promotes positive and long-term relationships with Aboriginal communities in order to facilitate greater participation of Aboriginal people in the direct and indirect benefits of new resource projects. These and other measures will ensure that Aboriginal groups are more fully engaged in the environmental assessment and regulatory permitting process from beginning to end and that possible impacts on their potential or established Aboriginal or treaty rights are given due consideration in decision-making.

There are a number of collaborative efforts currently underway between different levels of government in improving the effectiveness and efficiencies of Canada's regulatory system, including: advancement of the Alberta-Canada Regulatory Improvement Initiative; finalizing an agreement with British Columbia to provide clarity on the regulatory framework for liquefied natural gas facilities; implementation of an Aboriginal consultation process agreement with Ontario; development of a Memorandum of Understanding with Nova Scotia to harmonize regulatory responsibilities and processes for marine renewable energy projects; and alignment of northern regulatory regimes with those in the south, pursuant to the *Northern Jobs and Growth Act*. Furthermore, in collaboration with interested

provinces, the Government of Canada will continue to seek opportunities to substitute provincial environmental assessments that meet the substantive requirements of the

*Canadian Environmental Assessment Act* for federal assessments. In this way, the objective of “one project, one review” will be put into practice.

#### EXAMPLE OF COLLABORATIVE PRACTICE

**British Columbia:** In March 2013, the Government of Canada and the Government of British Columbia took a groundbreaking step toward “one project, one review” by signing the first Memorandum of Understanding (MOU) on the substitution of environmental assessments (EA). Under the MOU, the Government of British Columbia will conduct the environmental assessment for projects that have been approved for substitution; however, both governments will reach separate EA decisions. As of June 2013, the federal government has approved 5 projects for substitution: the Sukunka Coal Mine, the Carbon Creek Coal Mine, the Echo Hill Coal Mine, the LNG Canada Export Terminal, and the Arctos Anthracite Coal Mine.

## Modern, Safe and Reliable Infrastructure



Modern, safe and reliable infrastructure (including direct project infrastructure such as pipelines and enabling infrastructure like ports, rail and roads) is essential in supporting the development and diversification of Canada’s markets. It can open new regions to development and support the movement of workers and materials. It can also help address community needs, including jobs and economic growth in rural and remote regions.

Canada’s natural resources sector is a heavy user of existing transportation infrastructure (e.g., 72.6 percent of rail carload traffic in 2012 and 71.4 percent of international marine shipping in 2011). Downstream fabricators and manufacturers of value-added products also depend on roads, railroads and ports to transport materials and products. Some regions with important resource endowments already have well-developed infrastructure networks. However, current resource activity coupled with anticipated development is putting pressure on existing infrastructure. Investments in new transportation networks are especially important in enabling access to “land-locked” resource endowments in areas like the North. The development of export infrastructure that enables the delivery of natural resources to tidewater is also critical to supporting the expansion and diversification of Canada’s export markets and helping to realize the full potential of Canada’s resources.

realization of the North’s full economic potential. In rural and remote regions, the relationship between infrastructure and resource development is symbiotic. In the North, in particular, the presence of enabling infrastructure to access a given deposit can enable access to other natural resources, creating multi-mine clusters and accelerating development. In addition, in a landscape that is already difficult to navigate, factors such as a warming climate further emphasize safe and reliable infrastructure requirements in the North. Investment in public infrastructure, including transportation, broadband and electricity, can also foster regional development and improve the quality of life in Canada’s remote regions. These investments can indirectly contribute to housing development and health care, create energy options, provide transportation links, and access to drinking water.

The lack of transportation, electricity, and other enabling infrastructure presents barriers to the

Canada’s Northern Strategy highlights the need to build critical infrastructure for a stronger economy, cleaner environment and prosperous

communities. There are opportunities for public-private partnerships with benefits to communities as well as the natural resources industries. Researchers in the federal government are working with their territorial and industry colleagues to help northerners adapt. Using geoscientific expertise, scientists are helping reduce risk to and develop adaptation solutions for land-based and coastal transportation infrastructure, including specialized maps on alternatives to ice-road sections in the North.

There are also already a number of initiatives in support of infrastructure development in Canada. Infrastructure programs under the first federal Building Canada Plan (\$33 billion over seven years ending in 2014), indirectly support natural resources development through a number of project categories, including: national highways, local roads and regional airports, short-line railways, green energy and digital connectivity. The Plan also featured more direct support by facilitating improvements to global trade linkages through the Gateways and Border Crossing Fund and the Asia-Pacific Gateways and Corridor Initiative.

The new Building Canada Plan, announced in Budget 2013, includes funding of \$53 billion over 10 years. A large portion of this Plan (\$32.2 billion) is committed to the Community Improvement Fund, designed to support the building of roads, public transit and other community infrastructure across Canada. In addition, \$14 billion of the Plan supports major economic projects of national, regional and local significance.

Strategic infrastructure investments can be informed by data on current and projected infrastructure needs of the natural resources sector and based on evolving market demand, the impact of moving more commodities through existing networks, and an assessment of potential costs as well as social and economic benefits of investments in infrastructure development. Furthermore, ongoing research and development (R&D) will also be important

in enhancing the efficiency, safety and sustainability of future infrastructure networks and in addressing emerging system challenges relating to increased commodity flows. Although transportation infrastructure is crucial for the efficient flow of resource sector materials and goods to their end destinations, it is also of utmost importance that all levels of government work together to ensure the safety and reliability of these networks through rigorous oversight and to minimise the risks to Canadians from the transportation of sensitive materials.

The private sector has traditionally invested in infrastructure development to extract, and in some ways to transport, natural resources. Governments also have a role by encouraging, where possible, broader economic and social benefits related to infrastructure development. Governments also have a role in the enforcement of environmental and safety regulations.

As a means to gather information, the Federal-Provincial-Territorial Working Group on Markets and International Trade circulated a series of questions to federal, provincial and territorial officials on the current state of energy transportation in Canada as well as possible challenges and opportunities. Ongoing cooperation and coordination between jurisdictions on the regulation of the development and maintenance of energy transportation in Canada was identified as key to ensuring the sustainability and effectiveness of a growing transportation system.

There is a strategic role for federal, provincial and territorial governments to address challenges facing infrastructure development and provide targeted funding that attracts and leverages necessary investments by the private sector. Different levels of government can also play a central role in encouraging private sector investment while ensuring the development of modern, safe and reliable infrastructure that meets the needs of Canadians and Canada's natural resources sector.

### EXAMPLES OF COLLABORATIVE PRACTICES

The CANMET Materials Technology Laboratory (CANMET-MTL) is Canada's principal federal research and development laboratory for metals research, including materials for use in automotive applications, clean energy including nuclear power generation, major infrastructure such as pipelines, defence and eco-materials. CANMET-MTL is well known for its pilot-scale facilities for metallurgy, supporting innovation in steel, aluminum, magnesium and other metals, alloys and composite materials for nearly 70 years. At its facilities in Hamilton, Ontario and satellite lab in Calgary, Alberta, CANMET-MTL assesses the strength, fracture, and corrosion properties of the advanced steels and other materials that are planned for use in pipelines, including the technology for field welding, to the extent that these control pipeline integrity and long-term reliable performance. Specific areas of research include frontier energy pipelines, reliability of new and existing energy pipelines, pipelines for hydrogen, carbon dioxide and biofuels, and pipeline security and integrity monitoring.

**West-East:** Alberta, Quebec and New Brunswick have been working together to find ways to economically move crude oil from Western Canada to the East in a safe and environmentally responsible manner. This would improve access of Eastern Canadian refineries to Western Canadian oil, provide potential for increased value added upgrading, and allow for trans-shipment to international markets in the Atlantic Basin and beyond. Today, refineries in Quebec and New Brunswick import nearly all their oil from overseas. Integrating more Canadian oil into their feedstock could lower the operating costs for these refineries, support local jobs and enhance the competitiveness of the Eastern Canadian refining sector. Two pipeline projects have been proposed to bring Western Canadian oil to Eastern Canada: a re-reversal of the Enbridge Line 9 pipeline (300,000 bpd) and the TransCanada Energy East Pipeline Project (1.1 million bpd). Together, these two projects could bring as much as 1.4 million barrels per day of oil into Eastern Canada, thus extending the benefits of Western oil development across Canada. Both projects would be subject to federal approval through the National Energy Board.

## Adequate Supply of Labour and Skills



The natural resources industries collectively and individually face significant labour market challenges in pursuing hundreds of resource development projects across Canada. Given the complexity and projected persistence of these challenges, collaboration between federal, provincial and territorial governments, Aboriginal communities and industry can contribute to attracting skilled labour and preparing the workforce for current and emerging opportunities in the resources industries.

In general, Canada has well-functioning labour markets. However, for certain key occupations, a supply-demand imbalance is emerging which has implications for the natural resources sector and, potentially, the Canadian economy. Labour market challenges (i.e., labour supply, skills development, training, etc.) are, indeed, one of the most pressing issues currently facing Canada's natural resources sector. Increasing project activity, coupled with the need to attract labour to address retirements and attrition represents significant labour supply-demand challenges for the sector.

According to existing analyses by the sector councils, it is estimated that 45,000 new workers will be needed by 2016 in the

electricity industry. Labour market needs in the oil and gas industry range between 62,450 and 84,050 by 2022. Meanwhile, labour market needs in the mineral exploration, extraction and primary processing industries range between 112,020 and 141,540 by 2021. As many resource development projects take place in rural or remote areas, these hiring requirements often translate into significant regional labour supply and demand imbalances. Adding to the challenge is the fact that the natural resources sector competes for skilled workers and professionals not only with other areas of the Canadian economy (e.g., forest sector, ship building industry), but also at a global scale.



Projected Labour Demand in Canada's Natural Resource Industries <sup>i</sup>			
Region	Electricity (by 2016)	Oil and Gas (by 2022) <sup>ii</sup>	Mining (by 2021) <sup>iii</sup>
BC	N/A	3,090-4,110	10,460-13,100
Alberta		53,805-72,700	58,500-78,260
Saskatchewan		2,615-3,450	
Manitoba		2,925-3,770	15,810-16,910
Ontario			20,710-22,860
Quebec			3,400-5,890
Atlantic			3,020-4,660
Territories			
Canada	45,000	62,450-84,050	112,020-141,540

Source: Sector Council data published as of June 2013.  
Notes: (i) The lower limit corresponds to projected labour demand in a baseline scenario; the upper limit corresponds to projected labour demand in an expansionary scenario.  
(ii) Analysis conducted by BC in February 2013 by Grant Thornton indicates projected labour demand in the range of 2,400 to 75,200, reflecting the LNG activity anticipated in the province through 2021.  
(iii) Correspond to labour market needs in mineral exploration, extraction and primary processing only. Includes oil sands mining.

Labour market challenges are often complex and multi-jurisdictional. While a wide range of programs and collaborative initiatives are already in place to address these issues, opportunities exist for governments, Aboriginal communities and industry to collaborate further by directing additional efforts in five key areas:

### UNDER-REPRESENTED GROUPS

Increasing the participation of under-represented groups in the labour market, in particular women and Aboriginal people, could contribute to addressing labour shortages. There are opportunities for collaboration between governments, Aboriginal communities and industry stakeholders to continue to invest in measures that support progress in this area, including addressing the barriers (e.g., educational attainment rates, cultural considerations) that currently exist for Aboriginal Canadians.

### RECRUITMENT AND RETENTION

Industry should take a leadership role in attracting and retaining skilled workers through a range of in-house programs. At the same time, progress to ensure the rapid and transparent recognition of foreign credentials could contribute to addressing this issue by

helping new and established immigrants become more fully integrated into the Canadian workforce. However, since the Canadian education system is expected to remain the primary target for recruiting skilled workers in Canada, collaboration with educational institutions could ensure that students are aware of the job opportunities in the energy and mining sectors. Furthermore, skilled post-secondary students will be important in ensuring an adequate supply of labour and skills.

### SKILLS DEVELOPMENT

Developing and upgrading skills has become critical as demand for certain occupations intensifies. Industry-led initiatives will be particularly essential to ensure that training programs respond to labour market needs. In addition, ongoing and improved collaboration between governments and industry could help to foster participation in and completion of apprenticeship programs.

### LABOUR MOBILITY

Improving labour mobility both across jurisdictions and economic sectors is critical to addressing labour and skills shortages particularly in the skilled trades not already covered by the Red Seal program. There are opportunities for governments to work with industry stakeholders to ensure the transferability of skills and to design occupational standards that are recognized throughout Canada.

### LABOUR MARKET INFORMATION

The importance of improving career awareness through reliable and timely information on labour needs by occupation, region, industry and time period cannot be overstated. Better labour market information can contribute to an improved understanding of current and future regional labour market conditions and trends, identifying the appropriate targets and methods for skills development.

Energy and mines departments might lack the program and policy mandate to address labour market challenges. In this context, it will be



important, in order to close the gaps described above, to maintain connections with lead departments and maximize communication

between federal, provincial and territorial governments as well as with industry, Aboriginal communities and other stakeholders.

#### EXAMPLES OF COLLABORATIVE PRACTICES

The Interprovincial Standards Red Seal Program was established more than 50 years ago as a partnership between the Government of Canada, the provinces, and the territories to provide greater mobility for skilled workers across Canada. Through the program, tradespersons are able to obtain a Red Seal endorsement on their provincial/territorial certificates by successfully completing an interprovincial Red Seal examination. The program acknowledges their competence and ensures recognition of their certification throughout Canada without further examination. The program also encourages harmonization of provincial and territorial apprenticeship and training programs by developing and maintaining standards of qualifications. To date, 55 trades are included in the Red Seal Program.

**Saskatchewan:** Northern Career Quest was established in 2009 as a partnership between provincial and federal governments, industry, and educational institutions. The program covers the full spectrum of supports and services for Aboriginal people interested in pursuing a career in the mining industry in Northern Saskatchewan. Program elements include wage subsidies for apprentices and funding for professional development for existing employees. The initial success of the program in creating more than 1,450 jobs has been recognized, with program funding recently being renewed through the federal Skills and Partnership Fund (\$7.9 million), and the government of Saskatchewan Ministry of the Economy (\$1.5 million).

## Effective Aboriginal Engagement and Participation



The opportunities opening up for Aboriginal people to participate in economic development through the natural resource sectors are unprecedented, with many of the planned projects over the next 10 years located near – or passing directly through – Aboriginal territories. Capturing the resource opportunity will require building relationships to support Aboriginal Canadians in becoming full partners in developing Canada's resources.

Resource development plays an important role in the economic and social well-being of hundreds of Aboriginal communities across the country. The sector is an important private employer of Aboriginal people in Canada. In 2012, 8.3 percent of the working Aboriginal population was directly employed in the natural resources sector, or approximately 32,000 Aboriginal people.

Many potential natural resource projects are located near or pass directly through Aboriginal territories. In fact, 110 out of the 111 projects currently under review by the Major Projects Management Office and the Northern Projects Management Office involve Aboriginal rights or interests. Moreover, a majority of current and

planned major resource opportunities are situated within 100 kilometres of Aboriginal communities, including: the Ontario Ring of Fire; the Northern Gateway Pipeline; potash and other mineral investments in Saskatchewan; and mining development in Northern Quebec.

Furthermore, Aboriginal land base and control over surface and subsurface resources is growing through treaty land entitlements, land claims and self-government agreements. To date, 26 modern treaties and self-government agreements have been concluded with Aboriginal groups, with another 67 comprehensive land claims and self-government agreements being actively

negotiated with more than 300 Aboriginal groups. Many of these agreements cover areas rich in resources.

The population of Aboriginal people living in many resource-rich areas is both young and rapidly growing, in sharp contrast to the overall demographic trend in Canada. Indeed, 33 percent of the Aboriginal workforce is between the ages of 15 and 34 compared to 26 percent for all of Canada. The Aboriginal population is growing almost twice as fast as the Canadian population, and is projected by 2026 to have increased by 47 percent over 2011 levels. In fact, Aboriginal population growth is expected to account for Canada's entire core working age population growth between 2011 and 2021.<sup>i</sup>

With both a growing land and resource base and a growing population of individuals located in resource-rich regions, the opportunities for Aboriginal people to reap the benefits from resource development have never been greater. That said, many Aboriginal communities face challenges with respect to participation in resource development in four key areas: consultation and accommodation; community and business readiness; skills and employment; and, engagement and partnerships.

#### **CONSULTATION AND ACCOMMODATION**

A lack of certainty around the roles and responsibilities of participants in Crown consultations and the scope of such consultations continues to exist. Aboriginal groups and proponents are seeking clarity on when the Crown's duty is triggered, how the environmental assessment and regulatory process is used as a vehicle for consultation, and why this approach is necessary to address the potential impacts of Crown conduct for projects on Aboriginal or treaty rights. Aboriginal groups with unsettled land claims are further concerned that they cannot support resource development projects without prejudicing the outcomes of their land claims. Approximately 40 percent of the major economic projects currently under regulatory review are located in areas with unsettled land claims.

The federal government, in collaboration with key partners, has made significant progress in working to meet its responsibilities by improving the coordination, meaningfulness, efficiency and consistency of Aboriginal-Crown consultations for major resource projects.

#### **COMMUNITY AND BUSINESS READINESS**

A lack of access to sufficient capital as well as poor business and financial literacy also create obstacles to Aboriginal participation in business opportunities created by the natural resources sector. Many Aboriginal communities also face challenges around a lack of physical and social infrastructure, particularly in remote and other isolated communities, which are not connected to transportation corridors and electricity grids. Problems of inadequate housing and overcrowding, safe water supplies, poor nutrition, family violence, drug and alcohol abuse, mental health and suicide, all strongly contribute to a community's ability to engage on economic development.

There are a number of programs that support Aboriginal business readiness, including: Access to Capital Program, Aboriginal Business Development Program, and institutions like the First Nations Financial Management Board. In Budget 2013, the Government of Canada also included \$155 million over ten years to support investments in community infrastructure.

#### **SKILLS AND EMPLOYMENT**

Persistent issues of poor educational outcomes and mismatches between project needs and skill base continue to challenge Aboriginal participation. In 2006, First Nations men and women living on reserve had labour force participation rates of only 55.7 and 48.5 percent, respectively. In the same year, the high school completion rate for Aboriginal people aged 15 and older was only 56.4 percent – 20.6 percent lower than the completion rate for non-Aboriginal Canadians.<sup>ii</sup> Advances in natural resource extraction and processing technologies only serve to compound the issue as resource jobs require more and more sophisticated levels of education and training. This is made clear by the fact that there remains a significant gap in

earnings between Aboriginal and non-Aboriginal workers in natural resources. In the mining sector for example, Aboriginal workers earn approximately \$18,000 less each year than their non-Aboriginal counterparts – a difference that can be attributed, in large part, to Aboriginal people holding less skilled jobs. Given their jurisdiction over Crown lands and the development of natural resource wealth, trade and commerce, and education and training, the role of provincial and territorial governments as well as industry is substantial.

Aboriginal Skills and Employment Training Strategy and the Skills and Partnerships Fund are designed to encourage Aboriginal participation in skills training. Federal Budget 2013 also provided \$250 million in Aboriginal education and skills training measures.

#### **ENGAGEMENT AND PARTNERSHIPS**

Issues of engagement and partnership are both critical for consultation to be regarded as meaningful and legitimate by the community, and for support for community and business readiness for natural resource projects. There is evidence to suggest that negotiated agreements between Aboriginal groups and industry, such as Impact and Benefit Agreements, are in some cases too weak to support partnerships, and that engagement is not happening early enough in the planning process.

In March 2013, the Government of Canada appointed Douglas Eyford as the Special Federal Representative on West Coast Energy Infrastructure. Mr. Eyford is currently engaging Aboriginal communities, industry and provincial

and local governments in British Columbia and Alberta to identify options for increasing Aboriginal participation in west coast energy infrastructure. Mr. Eyford will deliver a final report to the Prime Minister on November 29th, 2013.

Collaboration between federal, provincial and territorial governments can contribute to building relationships with Aboriginal people and help to ensure communities are well positioned to take advantage of opportunities in the natural resources sector. Whether it be new revenue sharing deals being struck, to the growing expressions of interest to increase Aboriginal equity participation, to the many successful examples of Aboriginal entrepreneurship, to the promising results of the Skills and Partnerships Fund, Aboriginal communities are increasingly participating in natural resource opportunities. Replicating these successes in other clusters of opportunity across the country will be key.

That said, more work is needed to overcome challenges and close gaps so that Aboriginal communities can become engaged partners and share fully in the jobs, growth and prosperity of resource development. This calls for a proactive approach that seeks to build relationships and helps to ensure communities with high opportunity are well positioned when it comes time to put shovels in the ground. Strengthening relationships between Aboriginal people, industry and governments can lead to long-term, broad-based benefits for Aboriginal communities from major regional resource development clusters.

## EXAMPLES OF COLLABORATIVE PRACTICES

**British Columbia:** British Columbia initiated revenue sharing on major new mine projects and expansions through Economic and Community Development Agreements (ECDAs) in 2009, achieving the first revenue sharing agreement for the New Afton Mine project in 2010. British Columbia was the first province in Canada to commit to directly sharing provincial mineral tax revenues from mines with First Nations. British Columbia has concluded ECDAs related to various new mine and expansion projects, including some for the largest mine projects in the province: New Afton, Mt Milligan, Elk Valley Coal, Mt Polley, Highland Valley Copper and Copper Mountain.

**Alberta:** An example of entrepreneurship can be seen in Fort McKay First Nation, which has grown from a single janitorial contract with an oil sands producer in 1986 to become the largest Aboriginal business partner in the oil sands, with 2008 earnings of over \$120 million. The effects of this growth on the community are clear. By 2005, median earnings in Fort McKay were approximately \$2,000 more than the Alberta median. Unemployment in the Fort McKay First Nation community is now under 5 percent.

**Northwest Territories:** The Government of the Northwest Territories (GNWT) unveiled its Aboriginal government engagement strategy, “Respect, Recognition, Responsibility” in June 2012. As issues affecting Crown-Aboriginal relations grow more and more complex, the GNWT continues to pursue cooperative Memorandum of Understanding (MOU) agreements with each Aboriginal government in the Northwest Territories (NWT). The most recent MOU, signed with the Akaitcho Territory Government on May 23, 2013, formalizes the government-to-government relationship, and outlines a renewed understanding of the importance of working together for the benefit of constituents. Under the MOU, formal government-to-government meetings will occur twice annually. Areas for discussion will include: economic development that will allow Akaitcho citizens to benefit from all aspects of the Northern economy; management of air, land, water and wildlife; employment, skills development and training; and, creating effective social programs, specifically in health services, education, elder support, income support, housing, policing and justice. The intended outcome is for improved, formal government-to-government relations with all Aboriginal governments in the NWT to help synchronize services and improve the quality of life for all citizens.

<sup>1</sup> AANDC’s Aboriginal Population, Household and Family Projections 2001 – 2026 (Medium Growth Scenario) and Statistics Canada’s 2005-2056 Population Projections (catalogue no. 91-520SCB).

<sup>2</sup> e.g., National Aboriginal Economic Development Board (2012) “Increasing Aboriginal Participation in Major Resource Projects”; Public Policy Forum (2012) “Building Authentic Partnerships”; Conference Board of Canada (2012) “Understanding the Value, Challenges and Opportunities of Engaging Métis, Inuit and First Nations Workers”; Centre for the Study of Living Standards (2012) “Aboriginal Labour Market Performance in Canada 2007-2011”.

## World-class Environmental Protection



Resource exploration, extraction and processing result in disturbances to ecosystems which must be mitigated. Moreover, as reserves are depleted, there will be increasing pressure to develop energy and mineral and metal resources in environmentally sensitive frontier regions. Collaboration between federal, provincial and territorial governments is essential in minimizing and mitigating environmental impacts of resource development while maximizing economic benefits of Canada’s natural resources sector.

Efforts are ongoing to ensure that Canada’s natural resource endowment is developed responsibly to maximize value to Canada and Canadians. Canada is also helping to foster

sustainable development and responsible environmental practices in countries where Canadian extractive sector companies operate.

It is critical for Canada to promote existing efforts in these areas.

This includes communication and engagement in Canada and abroad to brand Canada as a global leader in responsible resource development. We must better communicate Canada's world-class environmental protection regime and its commitment to enhancing and strengthening that regime. Canada is also committed to reducing greenhouse gas (GHG) emissions by 17 percent from 2005 levels by 2020 – a target aligned with the United States. It is estimated that actions to date will bring Canada halfway to meeting this target.

Canada is implementing a sector-by-sector approach to reducing GHG emissions in major-emitting sectors. Regulations are in place to address emissions from the electricity and transportation sectors – two of the largest sources of Canadian emissions – and Canada is moving forward to develop regulations for other major emitting sectors including oil and gas. Already, between 1990 and 2011, Canada has reduced emissions per barrel of oil produced in the oil sands by 26 percent. Environmental requirements also address water quality, air quality, and restoring disturbed land to a natural state. The oil sands are now subject to world-class environmental monitoring and reporting.

Widespread misinformation, about Canada's environmental record, recent changes to the review process for major resource projects, and the environmental performance of the oil sands, is negatively influencing public perception. In this light, developers may face diminished social license, which may impact natural resource projects, including energy infrastructure development. Stakeholder engagement, ongoing dialogue with international partners, and public outreach activities are a few mechanisms that can disseminate facts on natural resources development in Canada.

We must do more to demonstrate Canada's commitment to world-class standards and performance with sound decision-making that is

supported by credible science. We must also continue to improve the sector's performance and strengthen environmental protection measures to the highest standards. In this light, it is critical to ensure that environmental protection keeps pace with the forecasted growth in natural resource exploration and development. Proactive measures to address social and environmental concerns at an early stage can also contribute towards public acceptance and ultimate success of projects over the long-term.

A number of new measures have also been put in place to strengthen Canada's marine and pipeline safety regime, including double hulled tankers, and improved navigation tools that assist ships moving through our waters. The Government of Canada has also increased the number of oil and gas pipeline inspections by 50 percent annually and doubled the number of annual audits. New fines have also been introduced for companies that break environmental laws.

In addition, the Government of Canada recently announced measures to ensure that Canada has a world-class tanker safety regime including, an expert panel to review spill response requirements and the liability compensation regime, scientific analysis of the properties of diluted bitumen and additional measures for prevention (e.g., port governance, navigational aids, surveillance and monitoring) and response (e.g., incident command system). The expert panel was appointed in March 2013 and has begun its research and consultation activities. It is expected to meet with provincial and territorial governments, industry stakeholders and key Aboriginal organizations, and seek input from First Nations in coastal areas. The Panel's first report to the Minister of Transport on the regime south of 60° N latitude is expected in November 2013, followed by a second report to the Minister of Transport on a regime in the Arctic and a national hazardous and noxious substances regime, by September 2014.

Growing demand for natural resources, pressures to develop resources in remote and



environmentally sensitive frontier regions further necessitates ongoing leadership in environmental protection.

Collaboration between federal, provincial and territorial governments, industry, non-governmental organizations and academia is essential in ensuring the responsible development of Canada's natural resources and to develop the necessary science in support of sound policy and land-use decisions. It can foster an environment of information-sharing on best practices, both domestically and of

lessons learned from Canadian operations abroad.

Moving forward, it is necessary to communicate the importance of Canada as a secure and reliable supplier of natural resources and reiterate Canada's commitment to environmental protection, including marine and pipeline safety. The misconceptions about the oil sands and the resource sector more broadly must be countered by providing facts on Canada's extraction, development and transportation practices, which are among the best in the world.

### EXAMPLES OF COLLABORATIVE PRACTICES

**Northwest Territories:** Over the past five years, Natural Resources Canada's Mineral and Energy Resource Assessment (MERA) reports and mineral economic analysis provided sufficient justification to exclude certain areas of moderate to high mineral potential prior to the expansion of Nahanni National Park Reserve and the creation of Nááts'ihch'oh National Park in the Northwest Territories. The MERA process ensured that the park initiatives did not eliminate all future opportunities to explore and develop certain mineral resources and in particular, strategically important tungsten resources.

**Alberta:** In February 2012, the Government of Canada and the Government of Alberta announced the Joint Canada-Alberta Implementation Plan for Oil Sands Monitoring. The plan commits to a scientifically rigorous, comprehensive, integrated, and transparent environmental monitoring program for the region. It enhances the monitoring of water, air, land and biodiversity in the oil sands by sampling more sites for more substances more frequently. Data gathered through this new system will be easy to access and publicly available online, through the Joint Canada-Alberta Oil Sands Monitoring Data Portal. The portal is a one-window source about the environmental impacts of oil sands development in the area, and will focus on the cumulative effects of development on the oil sands region's air, water, land, climate change and biodiversity/wildlife. The portal has both an interactive map display and a data library.

**British Columbia/Alberta:** FracFocus.ca was developed by the British Columbia Oil and Gas Commission to facilitate the disclosure of hydraulic fracturing fluid information in Canadian jurisdictions. Adoption of the site supports Alberta's participation in the New West Partnership. In December 2012, Alberta's Energy Resources Conservation Board, now the Alberta Energy Regulator, updated its well drilling and completion data filing requirements to enhance reporting requirements for fluids used in hydraulic fracturing operations. Albertans have access to data from newly drilled and completed wells reported under the new rules, posted online since January 1, 2013 through the FracFocus website ([www.fracfocus.ca](http://www.fracfocus.ca)).

**British Columbia:** British Columbia introduced legislation in May 2012 to allow provincial laws and regulations to apply to major commercial and industrial projects on federal Indian Reserve Land. The First Nations Commercial and Industrial Development Act (FNCIDA) Implementation Act, implements the federal government's FNCIDA initiative, which seeks to regularize development on Indian Reserves. Through the federal FNCIDA and the new provincial legislation, agreements and regulations will be put in place that fill regulatory gaps and apply provincial legislation to specified reserves, while creating greater certainty for investment capital and government regulation. Two projects have been brought forward at this time: the proposed Liquefied Natural Gas (LNG) facility on a Haisla Nation reserve near Kitimat; and, a proposed commercial and residential development on Squamish Nation reserve lands in the Lower Mainland.



# Open Collaborative Geoscience



Publicly available and accessible geoscience knowledge increases the effectiveness of exploration efforts and encourages private sector exploration investment. An open, transparent and collaborative approach to geoscience data helps industry manage investment risks, informs land-use planning, helps to attract project financing and drives innovation.

Reliable and accessible public geoscience can stimulate domestic and foreign capital investments by providing information on Canada's natural resource potential. In fact, there is a strong correlation between open geoscience and private sector investment in the natural resources sector, with returns in public investment estimated at up to five times that of private sector exploration.<sup>i</sup>

Many jurisdictions are investing in geoscience knowledge to stimulate industry investments in the natural resources sector. In particular, Australia, the United States and the Nordic countries are surpassing Canada in providing geoscience information needed to stimulate resource exploration investment. The United States Geological Survey recently completed a \$262 million, 5-year mineral resource program to provide geoscience information, resulting in an increase in private sector investment activity, particularly in Alaska. Australia's Offshore Energy Security Program also completed a 5-year, \$75 million investment to develop public geoscience knowledge which delivered a return of \$625 million in committed frontier exploration investments, with an additional \$1 billion for secondary work programs. In November 2012, Australia further committed \$114 million over its forward estimates to improve its understanding of the country's onshore and offshore resource base.

Canada must continue to invest in geoscience research and innovation to stimulate development and provide a positive investment climate, especially in the North. Natural resources are the principal source of economic growth in the North and key to economic prosperity and wellbeing of Canada's northern communities. Federal, provincial and territorial governments can help reduce investment risks

of exploration activities in a vast, remote region where exploration costs are comparatively high. Efforts to successfully incorporate geoscience knowledge of the current and future physical states of the North can also reduce the risk of premature infrastructure degradation and failure. Building infrastructure and addressing environmental performance through baseline studies, monitoring and informed land-use planning depend on strategic action on the part of all implicated actors, working in collaboration to target areas of resource potential. Open collaborative geoscience can also contribute to an improved understanding of the cycle and processes involved in transport of contaminants from the oil sands to the environment, as well as understanding baseline geochemistry and geochemical processes associated with priority areas for mineral development.

The responsibility to provide public geoscience is shared among federal, provincial and territorial surveys under the terms of the Intergovernmental Geoscience Accord, which was first signed by ministers in 1996 and most recently renewed at the 2012 Energy and Mines Ministers' Conference. Natural Resources Canada's Geo-mapping for Energy and Minerals (GEM) program is delivered in full alignment with the Accord. Moreover, projects under GEM have been planned and executed in close collaboration with territorial and provincial governments. The program provides the geoscience knowledge necessary to guide investment decisions by private sector exploration companies as well as to inform land-use decisions by governments. GEM focuses on characterising the regional geological context which provides frameworks to establish whether the geological formations have a high or low likelihood of resource potential. Data produced federally through

GEM are made available online in digital format using standards developed under the GeoConnections Program.

There are a number of additional geoscience programs in support of natural resources development in Canada. For example, the Targeted Geoscience Initiative is designed to develop a better understanding of entire mineral systems and provides industry innovative approaches for deep exploration, maximizing yield in existing mining camps and increasing exploration efficiency in new potential mining districts. The Geoscience for New Energy Supply Program (GNES) is developing scientific and technical knowledge to reduce exploration risks for shale-hosted hydrocarbons, and in northern frontier basins. GNES successfully initiated collaborative efforts with federal, provincial and territorial resource assessment agencies to develop new, shared

best-practice methodologies to better assess the oil and gas resource potential of shale hosted reservoir plays. Better identification of geologic factors controlling high potential deposits (“sweet spots”) can help industry in identifying likely locations to invest and explore. This information can also inform decisions pertaining to future infrastructure needs and land-use management to help protect groundwater and ecosystems.

Going forward, enhancing existing collaboration between different levels of government on open geoscience data will play a critical role in support of the natural resources sector. An agreement to renew the Intergovernmental Geoscience Accord marked a commitment among Canada’s geoscience agencies to work collectively to increase core public geoscience knowledge available to all Canadians.

#### EXAMPLE OF COLLABORATIVE PRACTICE

**Nova Scotia:** In 2008 Nova Scotia committed \$15 million to develop an industry-standard resource evaluation (Play Fairway Analysis) of the hydrocarbon potential of the offshore, with the goal of stimulating renewed petroleum exploration activity. The Play Fairway Analysis (PFA) project was designed as a multi-partner collaboration to integrate state-of-the-art industry practices and expertise with regional geoscience knowledge and data. The Geological Survey of Canada, part of Natural Resources Canada, was asked to participate in recognition of its lengthy history of work on offshore geology and petroleum resources. Other participants included the Nova Scotia Department of Energy, the Canada–Nova Scotia Offshore Petroleum Board, local universities, and numerous Canadian and international consultants. The PFA has thus far resulted in \$2 billion of work commitments offshore Nova Scotia by industry.

<sup>1</sup> Attributing a resource discovery to a particular geoscience program is very difficult, given the time frame involved, number of players, and breadth of information used by industry in investment decisions throughout the discovery process. In a study prepared for NRCan, Robert Boulton (1999) concludes that every \$1 in geoscience resulted in \$5 of private sector mineral exploration and in turn \$125 of in situ mineral resource discovery, while Bernknopf et. al. (2007), concluded that every \$1 in geoscience resulted in \$8 in private sector exploration.

# Targeted Innovation



Innovation is at the heart of Canada's prospects for growth and prosperity in the natural resources sector. It is fundamental to increasing productivity, capturing new markets, enhancing economic competitiveness and improving the environmental performance of the industry.

Innovation in the natural resources sector is critical to Canada's economic prosperity and future economic growth. Innovation in the sector is resulting in significant improvements to processes such as extraction technologies and new machinery, which are in turn enabling new resource discoveries and developments.<sup>i</sup> Innovation enlarges the range of natural resource-based opportunities that are available to Canada by providing the means to bridge disparate challenges. For example, advanced technologies for deep mineral exploration can reveal new deposits in existing mining camps, which reduces Canada's overall need for new transportation infrastructure allowing for more targeted investment. Innovation can also contribute to a rigorous understanding of natural hazard processes and the effects of environmental change on the landmass, enable the development of appropriate codes and standards for robust and resilient infrastructure, and protect investments while reducing the costs of recovery from natural or human-caused hazard events. Moreover, state-of-the-art assessments of baseline geochemistry and geochemical processes in areas of resource development can enable the advancement of effective and efficient mitigation and remediation protocols within the end-to-end lifecycle of a project.

A recent study found "the overall innovation performance of the Canadian natural resources sector is strong and has improved in recent years. However, there is still room for improvement, especially in terms of R&D intensity and labour force skills."<sup>ii</sup> The challenges facing innovation in Canada's energy and mining companies are similar to other industries, including a lack of access to capital, domestic and international markets and talent,

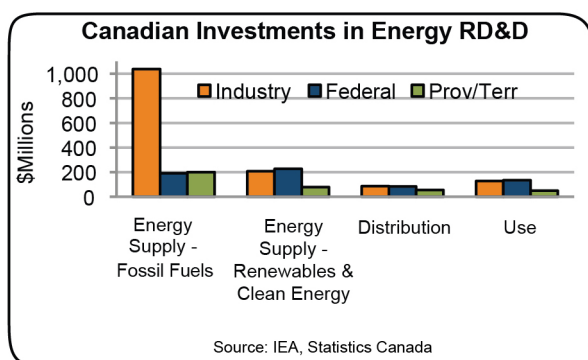
as well as a lack of coordination across governments and actors.

These challenges require the attention of both the private and public sectors. Innovation must be nurtured by a favourable business climate and advanced through deliberate strategies across the innovation cycle. Governments can create an investment environment that spurs innovation and can introduce targeted measures to encourage the widespread deployment of innovative and more efficient technologies. Governments can use a range of instruments, spanning the innovation spectrum. These include non-financial levers such as standards, regulations, government procurement, information and awareness. They also include direct investment through short-term funding (e.g., ecoENERGY Innovation) and indirect measures such as the Scientific Research and Experimental Development Tax Credit. Governments can also use arms-length organizations to support private sector efforts in this area. In its Economic Action Plan 2013, the Government of Canada committed to provide \$325 million over eight years to Sustainable Development Technology Canada to continue support for the development and demonstration of new, clean technologies that create efficiencies for businesses and contribute to sustainable economic development. To date, the Foundation has provided support to over 210 companies across Canada to develop technologies that offer a wide range of benefits from reduced water usage in the oil sands to reducing emissions from natural gas.

Industry is making significant efforts in reducing the environmental impacts of resource development by investing in new technologies and through collaborative research and development efforts. Launched in 2012,

Canada's Oil Sands Innovation Alliance (COSIA), an alliance of oil sands producers, is working together and sharing research to advance collective environmental performance in the areas of tailings, water, land, and greenhouse gas emissions.

Canada is also a leader in the development of clean energy technologies, thereby creating global market opportunities for this new industrial sector as well as helping Canadian mining and energy industries address some of their environmental issues.



In the mining sector, the Canadian Mining Innovation Council (CMIC) provides a network of industry, academic and government leaders whose purpose is to improve the competitiveness of a responsible Canadian mining industry by strengthening mining research excellence across Canada. In May 2013, the Government of Canada announced a 5-year, \$5.1 million investment through a

Natural Sciences and Engineering Research Council's (NSERC) and in support of the CMIC-developed Footprints Project. Industrial partners also pledged \$6.7 million in cash and in-kind contributions over five years, through CMIC. The "Footprints" project represents a pan-Canadian research initiative among 24 leading mining companies and 17 universities from across Canada, to develop more effective tools to find deeply buried or remote ore deposits by following the "footprints" or trace elements of these ores.

At the 2012 Energy and Mines Ministers' Conference, ministers approved an action plan to bolster innovation in the Canadian mining sector by reducing barriers associated with regulatory decision-making that impede adoption of green mining technologies. Furthermore, an intergovernmental working group was created to ensure that uptake of new innovative technologies would not be hindered.

Partnerships among different levels of governments, the private sector and academia can help to advance the development, demonstration and commercialization of Canadian technologies. Collaborative and focused efforts between stakeholders can further Canada's long-term competitive advantage through investments in emerging efficient technologies and products.

## EXAMPLES OF INNOVATIVE PRACTICES

The Government of Canada's Green Mining Initiative supports industry efforts in improving ways to protect and remediate the environment, and to develop new and better alternatives to existing technologies for mineral extraction, mineral processing and environmental reclamation. Canadian Mining Innovation Council is a key supporter of the Green Mining Initiative, co-chairing the Advisory Committee that guides the evolution of the Initiative. The Initiative's success is evident by the development and testing of the first worldwide hybrid vehicles for underground mines (which is now near commercialization), the development of a patented process to successfully recover gold without the use of cyanide, and energy-efficient automated ventilation systems for underground mines.

The U.S.-Canada Clean Energy Dialogue (CED) was launched in 2009 by Prime Minister Harper and President Obama to strengthen bilateral collaboration on clean energy technologies and seek solutions for reducing greenhouse gas emissions to accelerate the transition to a low-carbon economy. The Government of Canada works with provinces and territories in parallel to its engagement with the United States on the CED. For example, Canadian jurisdictions are collaborating on the challenge of integrating renewable power production while maintaining electric reliability. As part of this effort, Canada is undertaking a case study analysis of the use of hydropower as a way to balance intermittent renewable generation, with a particular focus on interregional and international examples. This study is expected to show that hydro reservoirs can effectively act as a large storage mechanism, enabling increased amounts of intermittent power (e.g. from wind farms or solar installations) to be reliably balanced on the system. The study is being produced as part of the CED with provincial government participation, and will help to reinforce the importance of Canadian hydropower for integrating renewables on a cross-border basis.

**Alberta:** The Memorandum of Understanding (MOU) between the Government of Canada (NRCan) and the Government of Alberta builds on a history of collaboration in oil sands heavy oil research and work done by the National Centre for Upgrading Technology, which was created in May 1995, as a research program co-managed by the Governments of Canada and Alberta. This MOU enables a cluster of expertise that fosters collaboration on the sustainable use of the oil sands resource among which industry, academia and other research organizations are encouraged to participate. The research is led by CanmetENERGY-Devon and Alberta Innovates Corporations to help the industry achieve excellence in innovation and the responsible development of the oil sands.

<sup>i</sup> For example, in North America, technological innovation is unlocking vast unconventional shale oil and gas resources. Technically recoverable reserves are estimated at trillions of cubic feet of shale gas and billions of barrels of shale oil.

<sup>ii</sup> Andrew Sharpe and Blair Long (2012) "Innovation in Canadian Natural Resource Industries: A Systems-Based Analysis of Performance, Policy and Emerging Challenges" Centre for the Study of Living Standards.

## Improved Energy Efficiency



Energy efficiency improvements can contribute to Canada's economic competitiveness while reducing the environmental footprint of the natural resources sector. Energy efficiency helps taxpayers save money, makes our industries more competitive, frees up energy exports, and reduces greenhouse gases and other pollutants.

At the 2012 Energy and Mines Ministers' Conference, ministers agreed that energy efficiency is a low-cost way to help Canadians save money, increase productivity and competitiveness, and contribute to energy

security. Capturing the full potential of untapped energy efficiency requires leveraging the continued cooperation and participation of all levels of government.

In its 2012 World Energy Outlook, the International Energy Agency (IEA) noted that despite current efforts, there remains significant untapped potential for energy efficiency. Moreover, the IEA estimates \$18 trillion of global economic growth and fuel savings are achievable from \$12 trillion of investment in existing energy efficiency technologies.

In 2010, Canadians spent about \$163 billion on energy to heat and cool their homes and offices and to operate their appliances, vehicles, businesses and factories. That is equivalent to 11 percent of GDP. But Canadians would have spent \$32 billion more on energy without the positive impact of energy efficiency improvements made since 1990.

The combined impact of Canada's climate extremes, geography, small population and energy-intensive industrial sector make improving the efficiency of energy use more challenging than in other countries. Nevertheless, Canada's efforts to improve energy efficiency are widely recognized. Nationally, Canada realized a 25 percent improvement in energy efficiency between 1990 and 2010. In 2010, greenhouse gas emissions were 93 megatonnes less than they would have been without advancements in energy efficiency.

In 2011, the IEA assessed that Canada was second only to Germany in its rate of energy efficiency improvement among 16 countries. The IEA also ranks Canada 5<sup>th</sup> of 28 countries for the extent of its implementation of a broad

spectrum of energy efficiency policy recommendations.

Energy efficiency can do more than just save energy and emissions. Investments in energy efficiency boost the country's economy while saving Canadians money. Energy efficiency results in net gains in jobs and government revenue, with the savings invested elsewhere in the economy. It also spawns technology innovation and creates new service sectors in the economy.

Collaboration between federal, provincial and territorial governments in implementing energy efficiencies has, to date, significantly enhanced Canadian competitiveness in the global economy and lowered energy costs for Canadians. Notably, if the current federal, provincial and territorial measures continue to 2020, Canadians could save more than \$2 billion in energy costs in 2020, or more than \$12 billion from 2012 to 2020.

Federal, provincial and territorial governments have made tremendous strides in collaboration and shared best-practices in energy efficiency. Governments can use a wide range of policy instruments to realize Canada's untapped energy efficiency potential, including: standards and labelling requirements through regulations; financial incentives to encourage adoption of energy efficiency technologies and practices; dissemination of information to consumers; and improvements and innovations in technology. Going forward, partnerships among different levels of government and the private sector will continue to play a critical role in helping Canada realize its untapped energy efficiency potential.



### EXAMPLES OF COLLABORATIVE PRACTICES

In 2011, federal, provincial and territorial partners endorsed the new National Energy Code of Canada for Buildings that represents a 25 percent improvement in the energy performance of buildings over its previous iteration, the 1997 Model National Energy Code. Since building codes are within provincial and territorial jurisdiction, strong collaboration has resulted in 12 jurisdictions adopting or adapting Code 2011 or its equivalent. As a result, all new buildings in these jurisdictions will be required to meet the most stringent minimum energy performance standards in North America. Buildings built to Code 2011 in provinces that adopt it are expected to save \$350 million per year in energy costs in 2020. Efforts are already underway on the next improvement to the code for 2015.

In September 2012, NRCan launched the Canadian version of the United States Environmental Protection Agency's SmartWay Transport Partnership. The partnership encourages freight shippers to promote energy efficiency amongst their carriers by offering a standardized measurement and benchmarking system, which allows carriers to track their fuel consumption and to improve their performance annually. Working together, NRCan and provincial transportation, energy and environment ministries are promoting the SmartWay Transport Partnership in order to connect shippers with fuel-efficient carriers in their jurisdictions. Participating Canadian fleets could save approximately 2000-3000 litres of fuel per truck per year, resulting in overall savings of up to 60 million litres of diesel fuel in 2020. Saving fuel improves productivity and helps the bottom line of Canadian freight carriers, reducing overall operation costs by an average of seven percent for participating fleets.

## More Profound Resource Literacy



The availability of high quality resource-related data and information is essential to managing Canadian resources effectively. Sound information helps to make the most of Canada's energy resource advantage by allowing governments to make important, and well-founded, policy and regulatory decisions, contributing to private sector investment decisions, and providing information on Canada's natural resource landscape and its importance to the public at large.

Canada produces a variety of data and information products related to the natural resources sector, including primary data, analytical reports and awareness products. Such information is generated by different levels of government, regulatory authorities, industry associations, think-tanks and non-governmental organizations. The Government of Canada also contributes to natural resources related publications produced by international organizations. These data and information products can inform public and private sector decision-makers on the current and future state of play of Canada's natural resources endowment and market conditions. It also informs public dialogue, helping Canadians to make informed choices, such as increasing their efficient use of energy.

In collaboration with provinces and territories, the Government of Canada surveys Canadian natural resources establishments to obtain data on principal statistics as well as on the value and the volume of Canadian natural resources production. Canada provides toolkits and information bulletins on a wide array of issues related to natural resources, including publications such as bulletins on mineral exploration and deposit appraisal, production and trade, the Fuel Focus Report and the Report to Parliament under the *Energy Efficiency Act*.

While much of the information related to the natural resources sector in Canada is of a high quality, some on-going challenges exist. Specifically, there are issues around comparability and consistency due to different

data sources, and some gaps are present in existing data.

Federal, provincial and territorial officials have worked collaboratively to conduct the first pan-Canadian scan of existing energy data and information across all Canadian jurisdictions in order to better understand data gaps and deficiencies, as well as strengths, in current information systems.

The scan of energy data and information confirmed that there is a vast quantity of energy information across Canada – including some overlap in material that is published across jurisdictions. The scan highlighted the importance of collaboration, given that provincial and territorial jurisdictions, as well as regulatory agencies responsible for overseeing energy markets in Canada, each have their own needs and procedures with respect to data holdings.

Ongoing collaboration can contribute to a consistent and non-duplicative approach in the gathering and dissemination of natural resources-related information. Such collaboration could also strengthen outreach activities, both domestically and internationally, on Canada's resource landscape and development practices as well as on energy use and how it is sourced.

While Canada has made great progress in natural resource literacy, opportunities continue to exist for enhancing information available to decision-makers. Going forward, jurisdictions may wish to identify and consider options for addressing gaps and deficiencies, reviewing data collection tools, and improving the dissemination of energy information in Canada.

#### EXAMPLE OF COLLABORATIVE PRACTICE

Collaboration between federal, provincial and territorial governments has resulted in the design and launch of an energy information mobile website to increase energy awareness and to help avoid inconsistencies in Canada's energy information. Energyinfo.ca is a user-friendly, "one stop shop" for Canadians to attain key energy facts. The structure of the website was jointly developed by federal, provincial and territorial governments, with a goal of providing verified and accurate energy information, relying primarily on data from Statistics Canada and the International Energy Agency. The federal government and the Northwest Territories are working together to formally launch the site at the 2013 Energy and Mines Ministers' Conference (EMMC). Energyinfo.ca will be linked with any web presence that is established for a future EMMC.

The Mining Sector Performance Report is produced in collaboration between the federal, provincial and territorial governments and in consultation with an external advisory committee comprised of representatives from industry, academia, Aboriginal and non-governmental organizations. Released on a triennial basis at the EMMC, the Report provides Canadians information on the sector's economic, social and environmental performance.

## Conclusion

Federal, provincial and territorial governments are playing key leadership roles in ensuring that Canada is well positioned to capture the opportunities arising from Canada's abundant wealth of natural resources. Continued collaboration on shared challenges through specific actions across Canada's federal, provincial and territorial governments, including through the Energy and Mines Ministers' Conference process, is vital for realizing Canada's natural resource potential. Opportunities include making better use of existing intergovernmental working groups under the EMMC process to share information and to enhance existing collaborative efforts.