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The Future of Mining in Canada's North



The Future of Mining in Canada's North
by Gilles Rhéaume and Margaret Caron-Vuotari

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Preface

Mining and its supporting industries will continue to be important economic drivers in many of Canada's Northern regions over the course of the next decade. While great potential for mining development exists, this potential must be approached in a balanced way. This report discusses a number of important factors—and their interrelationship with one another—that must be considered to ensure that both the positive and negative impacts of mining projects are fully understood. The findings from this report provide policy-makers, industry leaders, and communities with insight on steps that can be taken to support the future of sustainable mining in Canada's North.

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ABOUT THE CENTRE FOR THE NORTH

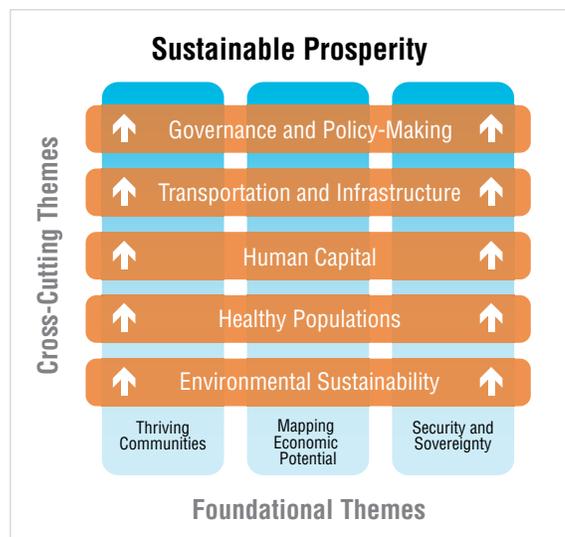
The Centre for the North is a major research initiative of The Conference Board of Canada. The Centre brings Aboriginal leaders, businesses, governments, and community advocates together to identify challenges and opportunities, and to decide how those challenges can be met. Working with Northern stakeholders and some 50 roundtable members, the Centre delivers cutting-edge research and provides a vibrant forum for discussion on issues facing Canada's North.

Vision: Toward a shared vision of sustainable prosperity in Canada's North.

Mission: Through research and dialogue, develop new insights that strengthen the foundation for informed decision-making.

The Centre examines issues from a Northern perspective, seeks to maximize Northern engagement, and prioritizes Northern interests. The Centre looks at issues and opportunities across the North—a vast region that includes the three Northern territories, as well as the northern portions of seven provinces.

To date, the Centre has published a number of foundational and issue-specific reports related to the underlying themes of thriving communities, economic development, and security and sovereignty. The Centre's research agenda is based on a strategic interdisciplinary framework, as illustrated in the exhibit "Sustainable Prosperity."



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(Note: The findings and conclusions of this report are entirely those of The Conference Board of Canada, not of the Centre investors and roundtable members.)

EXECUTIVE SUMMARY

The Future of Mining in Canada's North

At a Glance

- ◆ Mining is the future economic driver of Canada's North. The long-term global demand for commodities is increasing, and Canada is well positioned to take advantage of this opportunity.
- ◆ The overall Northern metal and non-metallic mineral output is expected to grow by 91 per cent from 2011 to 2020, with a compound annual growth rate of 7.5 per cent.
- ◆ This vast economic potential can be realized only if key regulatory, infrastructure, and human resource challenges are met.
- ◆ All factors necessary for mining development must be looked at holistically to ensure that challenges and opportunities are fully understood.
- ◆ Governments, industry, and Aboriginal groups need to coordinate their efforts, and must have better knowledge of their roles and responsibilities to be effective and to avoid duplication of processes.
- ◆ Six recommendations that lay the foundation for the future growth of mining in the North are outlined in the report's conclusion.

Canada's Northern regions have an abundance of natural resources, and the potential economic impacts are vast. Mining exploration and development is expected to be an important driver of many Northern economies over the course of the next decade. The possibilities for growth and development appear to be tremendous. Economic forecasts prepared for this report project that Canada's overall Northern metal and non-metallic mineral output is expected to grow by 91 per cent from 2011 to 2020, with a compound annual growth rate of 7.5 per cent. Put into perspective, the average growth rate for the Canadian economy over that period is forecast to be 21.5 per cent with a compound annual growth rate of 2.2 per cent.

However, mining is a cyclical, non-renewable resource industry. How can this immense potential contribute to the balanced economic growth of Canada as a nation and to the sustainable prosperity of Canada's North? How can mining projects benefit local and Aboriginal communities? And what is needed to ensure that development is carried out in a responsible and sustainable manner to include considerations around the impacts of mine closures? This report examines these questions to provide a better understanding of the impacts—both positive and negative—that major mining projects have, and can have, on the North.

The report outlines the factors that need to be understood and evaluated throughout the life cycle of a mine. These include the regulatory environment, infrastructure needs and gaps, capacity constraints from both a corporate

and a community perspective, issues around employing and retaining skilled labour, environmental stewardship, and deliberations around mine closures.

Understanding these factors and their interrelationship is key to ensuring that the mining potential in Canada's North can be successfully and sustainably realized. Each proponent—whether government, industry, interest organization, or Aboriginal group—must have better knowledge of their roles and responsibilities in order to adequately assess the effectiveness of the current system and, especially, to avoid duplication of processes.

Understanding these factors and their interrelationship is key to ensuring that the mining potential in Canada's North can be successfully and sustainably realized.

Much progress has been made in the past two decades around many of these key challenges, such as the engagement of local and Aboriginal communities and environmental protection. Moreover, despite the global economic crisis, the business climate in Canada has remained stable. Nevertheless, significant challenges undeniably remain. This report identifies a number of issues, including the following:

- ◆ **Improvements to regulatory processes.** Regulatory processes are currently complex and cumbersome, and lack clarity and consistency for all proponents. For example, many project review boards do not have the capacity to ensure project reviews are completed in a timely manner. This presents significant obstacles for investors. This report recognizes that the federal government has taken important steps toward the “one project, one assessment” goal, and that this could lead to greater cooperation and coordination between the federal and provincial/territorial governments. However, Aboriginal governments need to be full and equal participants in decision-making. Challenges still remain with respect to the realization of land claims and self-government agreements and their role in resource management and development.
- ◆ **Inadequate or non-existent infrastructure, including for transportation, energy, and connectivity.** The infrastructure gaps are often the greatest deterrents to mining development in Canada's remote Northern regions.

Many companies must build their own transportation, communication, and/or energy infrastructure, adding significant costs to projects. To ease this financial burden on industry, governments need to invest broadly in Northern infrastructure and make use of public-private partnerships to share risks, costs, and benefits.

- ◆ **Shortage of skilled labour.** The mining industry worldwide is facing an impending labour shortage, and Canada is not immune to this. Younger Canadians from all backgrounds are ignoring mining as a career option. Therefore, mining companies must work to recruit and retain new workers and look to under-represented groups—such as women, new Canadians, and Aboriginal Peoples—as potential sources of labour. Additionally, education and targeted training programs are needed to ensure that local populations are able to benefit fully from employment opportunities.
- ◆ **Engagement of local and Aboriginal communities.** Companies and governments need to begin consultation processes as early as possible in order to provide communities with the tools necessary to make informed decisions. While this is strongly recommended, companies are not obligated to do it. However, mechanisms like impact and benefit agreements (IBAs) can be instrumental in ensuring that a community's needs are met and properly accommodated. Furthermore, ongoing consultation throughout all phases of mining activity—from exploration to mine closure—helps build and foster positive relationships.
- ◆ **Environmental stewardship.** Improved regulations, industry-led initiatives, technological innovations, and traditional ecological knowledge have all contributed to improving the industry's environmental performance. Companies have also worked to minimize their impacts on the land, and mine closure and remediation have come a long way since mining's early days. Despite all of this, many important environmental concerns remain, particularly around the uncertainties of the long-term impacts of mining on flora and fauna.
- ◆ **Clarity around mine closure:** Mining projects can deliver immediate benefits to residents in the form of jobs, higher incomes, business opportunities, and infrastructure. However, communities can be unprepared for mine closure. Robust closure plans should

be in place to help diversify the local economy, especially when the community is reliant on a single resource. Mining companies, governments, and local communities should work together at the outset of a project to provide solutions that will mitigate the impacts of closure.

Each issue presents its own unique challenges and requires solutions and recommended actions in its own right. Looking at these issues from a holistic perspective, the findings of this report suggest the following priority areas for policy development to support the future of sustainable mining in Canada's North.

A TRANSPARENT AND INTEGRATED APPROACH: SUPPORTING THE BUSINESS ENVIRONMENT FOR MINING IN CANADA'S NORTH

The different levels of government—Aboriginal, provincial/territorial, and federal—too frequently work independently, with little coordination among them. Although some work has been done to encourage greater information sharing, it does not appear to be effective. Legislation or practical arrangements that encourage information sharing between proponents and communities, as well as between various levels of government, will go a long way in helping to address some of the existing challenges around issues such as the granting of permits, the involvement and participation of Aboriginal groups, and duplication of processes.

Transparent and open communication between proponents, governments, and communities can provide all parties with the tools they require to make informed decisions. Communities will better understand which types of opportunities and challenges mining projects may provide. A key solution may be to conclude impact and benefits agreements in a more transparent manner. This will allow companies to accommodate local residents' needs, while giving communities the chance to fully participate in negotiations by drawing on other experiences and agreements.

ADDRESSING HUMAN RESOURCES NEEDS

There is currently little understanding around the implications of mining growth in terms of future human resources needs. This report estimates that about 17,000 Northerners¹ will occupy new mining jobs created over the 2011–20 period. Overall, the total employment impact of the additional mining output ranges between 43,000 and 70,000 Northerners over the long-term forecast—jobs that will be created in retail and related industries. Education and training programs are increasingly necessary to provide equal opportunities for local residents working in mining development. While the mining industry has taken the lead in this particular area, multiple levels of government also need to be involved. Adequate funding for these types of programs will have long-term positive impacts not only for individuals but also for Canada as a whole.

ADDRESSING CRITICAL INFRASTRUCTURE GAPS

Mining companies have largely been left to provide their own infrastructure when operating in remote Northern regions. Aging Northern infrastructure limits communities and mining companies from taking advantage of the possibilities offered by resource development. Investments to update and construct modern infrastructure would be helpful to industry, while also greatly benefiting Northern communities. In providing communications, transportation, and energy infrastructure, governments offer communities opportunities to become self-reliant and more resilient. Such critical investments would also put Northern communities on an equal footing with their Southern counterparts and allow for greater prosperity in the North.

1 In this report, Northerners are defined as those living in the northern extents of the seven provinces and in the three territories.

ADDRESSING AND IMPLEMENTING ABORIGINAL LAND CLAIMS AND RESOURCE AGREEMENTS

Aboriginal rights are a reality that governments and industry must acknowledge and respect. However, several regulatory issues and overlaps are affected by the

lack of clear and settled land claims agreements. The settlement of outstanding land claims and resource agreements would help to clarify roles and responsibilities for all proponents. This would also create greater stability and certainty around resource development going forward, while allowing for full and equal participation in development projects in the future.

CHAPTER 1

Introduction

Chapter Summary

- ◆ The future economic growth of the North, and of Canada as a whole, is dependent on natural resource development. Mining is an important part of that future. However, the potential will depend on long-term global trends, creating a favourable business environment, and including and collaborating with Northerners and Aboriginal Peoples.
- ◆ This report provides a comprehensive analysis of mining in Canada's North, from early exploration phases to mine closures. It provides insights on what the mining industry, governments, and communities can do to ensure that Canada's Northern mining potential is achieved in a way that is environmentally sound and that brings the greatest net benefit to Northerners.
- ◆ The report combines quantitative analyses with qualitative discussions of the factors that should be addressed to ensure the future success of mining in Canada's North. The end result is an economic outlook for the mining industry until 2020, supplemented with a comprehensive analysis of the challenges and opportunities faced by the industry and other proponents.

Canada's North has a long history of mining. Mining has created cities that still exist today—such as Sudbury in Ontario, Thompson in Manitoba, and Labrador City in Newfoundland and Labrador—and provided jobs and incomes for Northerners. However, the history of mining is also marked by mines that have closed or been abandoned—creating legacies of environmental problems, struggling communities, and ghost towns. Today, because of stricter regulations, voluntary corporate social responsibility programs, increasing recognition of Aboriginal rights, and technological innovations, mining is quite different than it once was.

Canada's Northern regions will depend on natural resource development as the main source of growth for employment and businesses, and for the generation of incomes. Mining, in particular, could become a major part of that future. This potential will be influenced by several elements, including long-term trends in global markets and world commodity prices, as well as Canada's mining potential and other business factors. It will also depend on the acceptance of mining development by Aboriginal and other Northern communities and the measures taken to address environmental impacts. Together, these factors will determine the future of mining development in Canada's Northern regions.

Although there is great potential for mining development in the North, important steps need to be taken to ensure that this development is carried out in a balanced way. Mining must be approached from a sustainable, long-term perspective. This report provides a comprehensive analysis of all of these elements, from early exploration phases through to mine closure, with a focus on how they influence sustainable mining development in Canada's North. It also provides insights on what the mining industry, governments, and communities can do to ensure that Canada's Northern mining potential is achieved in a way that is environmentally sound and that brings the greatest net benefits to Northerners.

METHODOLOGY

The research for this report included a review of various data and information sources, as well as 34 interviews. Thirteen interviewees represented the mining industry. And, five interviewees were from the service and supply industry; ten were from federal and provincial/territorial governments; and six were Aboriginal and community leaders. The data and information sources and the interviews were then analyzed in order to draw insights. An advisory group volunteered their time to review the findings, provide comments, and suggest changes. The Centre for the North's roundtable members also reviewed the report. All comments and suggestions were considered in finalizing the report; however, the findings, conclusions, and recommendations are those of the Conference Board's Centre for the North.

To complete a long-term mining outlook that included both Northern mining output and employment of Northerners by region, a database needed to be developed, as some types of data were not readily available.

Data regarding the real GDP for the mineral industry do not exist for the Northern regions of the provinces. Therefore, several assumptions were made in developing the historical database and the forecast estimates used in this analysis. The approach used to build the historical database is different from that used for the forecast data. The historical database was built using employment and provincial productivity data. Statistics

Canada uses different surveys to calculate employment data in the territories than those used in the provinces, so the methodology varies slightly.

For the three territories, real GDP data (in 2002 dollars), separated by metal mining and non-metallic mineral mining, are available from Statistics Canada. In years where data were suppressed by Statistics Canada for confidentiality or data quality reasons, the output was estimated based on The Conference Board of Canada calculations of which mines were in production and how much output they were producing.

There is great potential for mining development in the North, but important steps need to be taken to ensure this development is carried out in a balanced way.

To better understand the local impact that mining can have on communities, this report looks at the number of Northerners¹ employed in the mining industry. Employment data for the territories are available from Statistics Canada's Labour Force Survey for the mining industry as a whole. Employment for metal and non-metallic mineral mining was calculated by taking the output shares of those mining sectors and applying them to employment for the whole industry. This assumes constant productivity across types of mineral mining—a sound assumption given that each territory generally specializes in a particular type of mine.

For the seven provinces with Northern regions, real GDP (in 2002 dollars) was estimated in two steps. First, 2011 provincial GDP in metal and non-metallic mineral mining was split into North and South, based on estimated mining activity in those regions. Second, metal and non-metallic mineral mining GDP was estimated using provincial productivity in those sectors and applying that productivity to the Northern employment estimates. These GDP figures were then scaled up over

¹ To better measure the local impact that mining activity can have, this report looks only at the number of people residing in the North and who are employed in the mining industry. The definition of Northerners used for this report is based on that of Statistics Canada's Labour Force Survey.

history to match GDP estimates in 2011. This step was necessary because many people who work in Northern mines are actually residents of the South; therefore, Northern real GDP for the sector would be underestimated if left unscaled.

Provincial employment data for the mining industry as a whole for Northern economic regions are available from Statistics Canada's Labour Force Survey. The total Northern mining employment data were calculated by adding together the mining employment of all economic regions considered to be in Canada's North.

The following steps were applied to exclude oil and gas production data. More detailed mining employment data (separated by metal and non-metallic mineral mining) are available at the provincial level in the Labour Force Survey. The employment shares in the North for the detailed mining types were estimated based on their share of mining activity taking place in each region in 2011. The shares of each type of mining (metal versus non-metallic mineral mining) were then applied to the total employment data to estimate Northern employment by type of mining.

To develop forecasting estimates of mining real GDP (in 2002 dollars) for each territory and the Northern region of each province, The Conference Board of Canada compiled a list of Northern mining projects expected to be in production up until 2020. This list included mine size and the type of mineral to be mined. Assumptions were made as to which projects most likely would be producing output during the forecast period, based on a variety of industry sources and knowledge about regional capacity constraints.

Thus, the forecast is project-based; that is, output and employment levels are projected by estimating the contribution to GDP and employment that each mining project brings. The mineral production estimates were gathered from various industry journals, company estimates, and other sources. The mineral production data were then converted to real GDP estimates. In addition, employment forecasts by mine operation were derived using mining productivity forecasts.

CHAPTER 2

Canada's Northern Mining Potential to the Year 2020

Chapter Summary

- ◆ The successful growth of the Canadian mining industry is tied directly to world markets. Projections show that the demand for commodities will continue to rise over the long term.
- ◆ The economic forecast predicts the doubling of Northern metal and non-metallic mineral output, from \$4.4 billion in 2011–12 to \$8.5 billion in 2020.
- ◆ This chapter includes a detailed forecast of the mining output for the territories and the northern extents of seven provinces. It also looks at the industry's local impact by calculating the number of Northerners employed in mining. The overall economic impact of the growth in mining output will be greater than its own increase in real gross domestic product. Estimates forecast the economic impact of mining on related services and industries at approximately \$9 billion, and the employment impact at 47,000 people.

The future of mining in Canada's North will depend on long-term global trends in demand for mineral commodities and on commodity prices. However, Canada is only one of many countries providing mineral resources to world markets. This chapter examines some of the key players in the global

market competing for mining investments and the position of Canada's North in this global supply space. Within this context, Canada's Northern mining potential to the year 2020 is examined.¹ This comparative analysis ultimately helps to assess the existing potential and the long-term forecast of the North's mining potential.

GLOBAL MARKETS AND LONG-TERM TRENDS

Following the global economic slowdown of 2008–09, world markets for mineral commodities rebounded in late 2009, continuing a long-term trend of growing demand and surpassing supplies of certain minerals around the world. The imbalance between demand and supply has helped fuel commodity prices and exploration investments. Although there are still short-term uncertainties from the outcomes of the ongoing European financial crisis, the long-term outlook for global metal and non-metallic mineral demand looks very promising. Projections indicate that demand will continue to increase over the long term.²

Increased long-term demand for mineral commodities is due especially to rapid industrialization in major developing countries like China, India, and Brazil. This rapid industrialization has been increasing the standard of living

1 The year 2020 was chosen because many mines are set to begin production within this time frame.

2 Kesler, "Mineral Supply and Demand Into the 21st Century," 57.

in these countries³ and is leading to the emergence of a larger middle class. These populations now have the income to purchase goods such as appliances and automobiles, electronics, and housing. Recent studies by the Organisation for Economic Co-operation and Development (OECD) suggest that although Asian countries like China and India currently account for only about one-quarter of the world's middle class, that number could increase to 40 per cent by 2020. This new and rising middle class will no doubt drive the need for new products and the rate of consumption.⁴ Add the application and use of new materials to this mix, and “markets for mineral commodities can expand considerably.”⁵

Mining companies must often address obstacles by constructing transportation infrastructure and by providing training and skills development for the labour force.

This increasing demand and the resulting high commodity prices have pushed mining companies to search for new reserves of mineral deposits. Previously underexplored and unexplored regions are now being re-examined in a new light. As a result “mining companies have extended their reach to some of the world's most precarious regions, including Mongolia, Guinea, the Democratic Republic of Congo, Mauritania, and Afghanistan.”⁶ These exploration operations have extended beyond simply politically hostile regions into geographically challenging regions. In countries such as Canada and Australia, for example, mineral exploration for potential deposits is taking place in various remote locations.

But, the remoteness and isolation of exploration and new mining sites creates a host of challenges for companies. Often, they are confronted with harsh terrain, a lack of infrastructure, and in some cases, the lack of a skilled local labour force. Mining companies must often

address these obstacles by constructing transportation infrastructure and power generation facilities, as well as by providing training and skills development for the labour force.⁷ These factors are explored in greater detail in chapters 3 and 4 of this report.

However, new and innovative technologies and techniques are helping exploration and mining companies overcome some of the geographic barriers. For example, new technologies such as GPS surveying information, three-dimensional data maps, airborne technologies, and down-hole seismic imaging are “allowing companies to locate new deposits not otherwise discoverable with traditional methods.”⁸ And this technology has also allowed for the remote operation of equipment. For instance, in Australia, an operations centre in Perth allows staff to remotely control operations at a mine in Pilbara, about 1,500 kilometres away.⁹

A GLOBAL OVERVIEW OF THE MINING INDUSTRY

Mining, in some form and to varying degrees, occurs in virtually every region of the world. Several countries are dominant players in the global supply of metals and non-metallic minerals. In particular, Australia remains one of the world's largest mineral-producing countries and exporters of minerals. It is “ranked among the top 10 countries in the world in the production of bauxite, coal, cobalt, copper, gem and near-gem diamond, gold, iron ore, lithium, manganese ore, tantalum, and uranium.”¹⁰ Australia's mineral reserves are so vast that it is considered to be entirely self-sufficient with regard to its domestic consumption. This wealth of resources allows Australia to export a large portion of its mineral production. As a result, its economy relies significantly on these exports, “accounting for about 50 per cent of the total value of its exports.”¹¹

3 Deloitte, *Tracking the Trends 2011*, 4.

4 Kharas, *The Emerging Middle Class in Developing Countries*, 6–8, 28.

5 Kesler, “Mineral Supply and Demand Into the 21st Century.”

6 Deloitte, *Tracking the Trends 2011*, 10.

7 Ibid., 9–12.

8 The Mining Association of Canada, *Facts and Figures 2010*, 54.

9 Deloitte, *Tracking the Trends 2011*, 10.

10 U.S. Geological Survey (USGS), “Asia and the Pacific,” 1.2.

11 USGS, “Australia,” 3.2.

China, an emerging economy, has significant resources as well. Not only does it possess many mineral resources, but it also invests heavily in foreign industries to help feed its ever-growing industrial sector with raw materials.¹² China is considered the world's leading producer of many minerals—including aluminum, bismuth, coal, gold, graphite, iron, rare earths, and zinc, among others. Despite its many resources, China still imports a significant amount of mineral commodities, and is viewed as an “export destination of choice.”¹³

Although many African countries possess great resource potential, concerns for safety and stability outweigh any mineral development potential that exists.

Another notable region for mining investment and production is Latin America. Brazil, Argentina, Chile, and Mexico are “among the world's leading producers of base and precious metals and industrial minerals.”¹⁴ In fact, in 2009 there were 16 notable exploration projects under way in Latin America, a sign of the large potential that exists in this region. Results from the Annual Survey of Mining Companies indicate that Colombia's, Chile's, and Brazil's political, economic, and industrial climates encourage mining investments; that in many cases these countries have just begun to discover their potential; and that much more development is likely to occur in the near future.¹⁵

Many investors are also looking to certain African countries for potential mineral deposits. According to the U.S. Geological Survey, “the continent has attracted significant investment in mineral development; this investment was expected to resume flowing to Africa in the future. Africa's mining potential remains significant.”¹⁶ Several countries, like Burkina Faso and Botswana,

ranked high for investment potential among mining companies. However, many other regions in Africa continue to struggle with governance issues, including corruption, political instability, and violence. And although many of these countries possess great resource potential, concerns for safety and stability outweigh any mineral development potential that exists.¹⁷

The countries that form the European Economic Area (EEA), as well as parts of Central Eurasia,¹⁸ are primarily importers of raw materials for their manufacturing industries. Many EEA countries are highly dependent on the import of minerals and metals. This does not mean that the region is completely devoid of mineral production. On the contrary, production of gold in Europe and Central Eurasia made up approximately 16 per cent of total world production in 2010.¹⁹ Many EEA countries are also considerable producers of nickel, copper, zinc, and potash.²⁰ Russia, a large regional and world producer of many minerals and metals, has great resource potential as well. However, the country has had consistent difficulties in maintaining production at its mines and finding reserves that could become sustainable operations. Despite these difficulties, Russia has recently seen rather intense exploration activities for precious metals.²¹ And as demand for many metals and non-metallic minerals increases, many exploration companies are now moving into the Nordic countries. Sweden and Finland, in particular, have become regions of relatively intense exploration for precious metals such as gold and silver.²²

Mining, in varying degrees, also occurs in the United States. Mines are in operation in all 50 states, with the states of Nevada, Arizona, Utah, Minnesota, and Alaska

12 USGS, “Asia and the Pacific,” 1.1.

13 USGS, “China,” 9.1.

14 USGS, “Latin America and Canada,” 1.1.

15 McMahon and Cervantes, *Fraser Institute Annual Survey of Mining Companies 2011/2012*, 26. See the results for each question of the survey.

16 USGS, “Africa,” 1.1

17 McMahon and Cervantes, *Fraser Institute Annual Survey of Mining Companies 2011/2012*, 18. See the results for each question of the survey.

18 The EEA includes the European Union member states, as well as Iceland, Liechtenstein, and Norway. Central Eurasia encompasses many countries that were former Soviet republics. See USGS, “Europe and Central Eurasia” (2010), 1.1.

19 USGS, “Europe and Central Eurasia” (*2010 Minerals Yearbook*), 1.5.

20 Ibid.

21 USGS, “Countries of the Baltic Region,” 4.16–4.19.

22 USGS, “Europe and Central Eurasia” (*2008 Minerals Yearbook*, updated in 2010). See Table 3, “Selected Europe and Central Eurasia Exploration Activity in 2010,” for greater detail.

ranked as the country's top producers.²³ The U.S. is one of the world's largest producers of beryllium and ranks third in gold and copper production.²⁴ However, it relies heavily on imports for many minerals and metals.²⁵ The *Annual Survey of Mining Companies* suggests that while certain jurisdictions in the United States are favourable areas for exploration and production, many challenges and obstacles prevent and even prohibit further mining development in others.²⁶

MINING IN CANADA

How does Canada fit into this world market? Canada has a long history of mining and continues to be a world leader in this regard. It ranks among "the top five global producers for several major minerals and metals."²⁷ Furthermore, Canada is one of the world's most active mining countries. It is the world's largest producer of potash. In 2010, the "country was estimated to rank second in the production of uranium and was among the top five countries in the production of aluminum, cobalt ore, gem-quality diamond, refined indium, nickel ore, [and] platinum-group metals (PGM, ore, and sulphur)."²⁸

Some of Canada's major metal reserves, such as copper, nickel, lead, and zinc, have been in decline since the early 1980s.²⁹ But Canada is still the second-largest producer of nickel in the world, with nickel mines in Northern Ontario, Labrador, Northern Manitoba, and Nunavik. Labrador and Northern Quebec have important iron ore reserves, making this region the third-largest producer of iron ore in the world. Large iron ore deposits that have been found in Baffin Island could boost Canada's

position as an iron ore producer. Canada has the largest reserves of uranium in the world, found mostly in Northern Saskatchewan.³⁰ Gold reserves in Canada bottomed out in 2004 but have increased since then. With the rapid rise of gold prices, new gold mines have been opening up across Canada's North.

Canada continues to attract investments, but is competing with developing economies that can produce many of the same minerals and metals at very competitive rates.

Canada did not have a diamond mining industry until the 1990s, when several diamond mines became operational in the Northwest Territories. In 2011, Canada became the third-largest diamond producer by value in the world and fourth in terms of production. Other minerals, such as chromite in Northern Ontario and rare earth metals in Northern Quebec, Northern Ontario, Northern Saskatchewan, and the Northwest Territories offer additional mining potential. Given these types of minerals, mining projects in Canada attracted around 16 per cent of global investments in 2010.³¹ And with the prices of many commodities rebounding that year from the global economic slowdown, exploration activity has spiked.³²

The Canadian mining industry is primarily export oriented. In 2011, it accounted for 23 per cent of Canada's overall exports, with much of it destined for the United States.³³ Although Canada continues to attract further investments, it is also competing with emerging and developing economies that can produce many of the same minerals and metals at very competitive rates.³⁴

23 U.S. Department of the Interior and U.S. Geological Survey, *Mineral Commodity Summaries 2011*.

24 National Mining Association, *Fast Facts About Minerals*.

25 U.S. Department of the Interior and U.S. Geological Survey, *Mineral Commodity Summaries 2011*.

26 McMahon and Cervantes, *Fraser Institute Annual Survey of Mining Companies 2011/2012*, 14–17, 37.

27 USGS, "Canada," 5.1.

28 Ibid.

29 Natural Resources Canada, *Canadian Minerals Yearbook (CMY): 2009*.

Mines play a vital role in sustaining many of Canada's remote, rural, and Northern economies. The Mining Association of Canada (MAC) estimates that as many as 115 communities are dependent on mining activity

30 Natural Resources Canada, *About Uranium*.

31 The Mining Association of Canada, *Economic Impact*.

32 USGS, "Canada," 5.1.

33 Natural Resources Canada, *Key Mining Facts 2011*.

34 USGS, "Latin America and Canada," 1.1.

for local wealth and economic development.³⁵ The mining industry and companies are also important sources of employment. According to MAC, jobs in mining account for “one in every 55 Canadian jobs.”³⁶ It further notes:

Of the 308,000 people directly employed by mining in 2010, nearly 53,000 worked in Stage 1, mineral extraction. This group included over 23,000 in metal mining, over 22,000 in non-metal mining and over 7,000 in coal mining.³⁷

Salaries in this sector are also very competitive. An employee typically earns \$1,632 per week.³⁸ And in some instances this number may be higher, especially in the Far North where “higher wages help to attract and keep the required workforce.”³⁹

MINING IN CANADA'S NORTHERN REGIONS

A closer look at the producing mines in Canada in 2011 reveals that the majority are found in the northern extents of the seven provinces and three territories. This is due in part to Canada's geological make-up: the Canadian Shield is the largest and oldest geological formation in the country and stretches from the Northwest Territories through to Labrador. A further examination of the primary mineral mining sector⁴⁰ by Northern region indicates that Northern Ontario is by far the largest of all regions. In 2011, mining output accounted for over \$1.7 billion of real GDP in the province. The Northwest Territories was in second place with almost half of Ontario's mining real GDP. (See Table 1.) And the primary mineral mining industries in Northern Newfoundland and Labrador and Northern Quebec produced \$677 million and \$411 million, respectively, of real GDP in 2011. As Table 1 shows, these four regions accounted for more than three-quarters of the total mining output in Canada's North.

With regard to impacts on labour capacity, Ontario's mineral sector leads all other regions. In 2011, approximately 11,155 Northerners were employed in mining in that province. This number accounted for more than half of all Northerners employed in the Canadian mining industry. Newfoundland and Labrador's Northern mining industry employed 2,500 Northerners. The rest of the industry in Canada's North hired fewer Northerners, ranging from 1,970 employees in Saskatchewan to 175 in Alberta.

Exploration activities in these jurisdictions are also significant. Ontario, Quebec, British Columbia, and Nunavut were the leading provinces/territory in terms of mineral exploration expenditures in 2011. Estimates from Natural Resources Canada for 2012 indicate the same four regions continue to lead the rest of the provinces and territories for exploration expenditures, making up 24 per cent, 19 per cent, 18 per cent, and 10 per cent, respectively, of total exploration spending in Canada. Canada continues to be attractive to foreign investors. According to Natural Resources Canada:

Canada continues to be among the world's most open countries in terms of trade and investment flows in mining. There are no noteworthy barriers in place except for some foreign ownership restrictions in uranium, which themselves have been waived in certain instances and which will be waived in instances where reciprocal openness is seen. ... Foreign investment flows—inward and outward—enhance the access of Canadian businesses to new technologies and concepts and to larger markets and production chains.⁴¹

This positive attitude toward Canada and its mining potential is equally reflected for the most part in the Fraser Institute's *Annual Survey of Mining Companies 2011/2012*. The majority of jurisdictions that are part of Canada's North do quite well in the survey's Policy Potential Index. Alberta, Quebec, Saskatchewan, and Yukon rank among the top 10 (from a possible 79 jurisdictions).⁴² Ontario, Newfoundland and Labrador, and Manitoba placed

35 The Mining Association of Canada, *Facts and Figures 2010*, 9. Please note that this total reflects communities across Canada, but not specifically Northern communities.

36 The Mining Association of Canada, *Facts and Figures of the Canadian Mining Industry 2011*, 58.

37 Ibid.

38 Ibid., 60.

39 Ibid.

40 The primary mineral mining sector includes metal and non-metallic mineral mining and excludes mineral fuels (including oil sands) and mining services. It also does not include manufacturing based on mineral commodities.

41 The Mining Association of Canada, *Facts and Figures 2010*, 79–80.

42 In that year's survey, New Brunswick ranked first, but it is not part of Canada's North. Quebec's ranking has declined from first place three years ago to fifth place in the current survey.

Table 1

Canada's Northern Mining Output, Employment of Northerners, and Mineral Exploration Expenditures by Jurisdiction, 2011

Jurisdiction	Northern primary mineral mining output (2002 \$ millions)	Employment of Northerners* in primary mineral mining (000s)	Mineral exploration and deposit appraisal expenditures (\$ millions)
Newfoundland and Labrador	677	2,516	157
Quebec	411	1,580	834
Ontario	1,667	11,155	1,068
Manitoba	172	322	140
Saskatchewan	190	1,970	335
Alberta	131	175	47
British Columbia	155	1,368	645
Yukon	128	500	332
Northwest Territories	732	1,200	94
Nunavut	165	350	536
Total	4,428	21,136	**4,188

*Northerners are defined as those residing in Canada's Northern economic regions.

**Does not represent the Canadian total (\$4,227 million), which includes the Maritime provinces.

Sources: Natural Resources Canada; Statistics Canada Labour Force Survey; The Conference Board of Canada.

within the top 20.⁴³ On the other hand, British Columbia, Nunavut, and the Northwest Territories ranked 31, 36, and 48, respectively, among 79 jurisdictions.

CANADA'S NORTHERN MINING OUTLOOK: 2011–2020

As global demand for minerals is set to increase, and given high levels of exploration activity and historically high commodity prices, Canada's North is well positioned to increase its mining output over the long term. This Northern mining outlook to 2020 examines some of the broader trends discussed above and reviews some of their key underlying assumptions. In particular, continued growth in world demand for metal and non-metallic minerals over the long term is expected, although the current weakness in demand from China and some global economic uncertainty due to the European sovereign debt will persist in the near term. Global constraints on the supply of several mineral commodities will continue

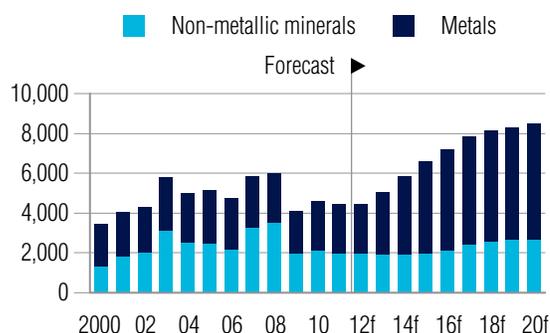
over the long term, maintaining the historically high prices for many of the metals and leading the search for new reserves.

Given the assumptions presented here about continued strong world demand and supply trends, the long-term mining outlook for Canada's North looks very promising.⁴⁴ This forecast assumes that the current business environment in the North will be similar throughout the forecast period, with its present taxation and regulatory regimes and its current trend in addressing the North's infrastructure and skilled labour constraints.

New mines are expected to come into production throughout Canada's Northern regions. Overall Northern metal and non-metallic mineral output is expected to grow 91 per cent from 2011 to 2020, with a compound annual growth rate of 7.5 per cent. Real mining gross domestic product

43 McMahan and Cervantes, *Fraser Institute Annual Survey of Mining Companies 2011/2012*, 10. Manitoba was ranked 9 in the last two years but dropped to 20 in this year's survey.

44 The mining forecast is for its primary sector and does not include the manufacturing part of primary metals, metal fabricated products, and non-metallic mineral products. Although part of manufacturing—such as smelting—is found in Canada's North, many of the manufacturing processes are found in the South.

Chart 1Canada's Northern Mining GDP
(2002 \$ millions)

Source: The Conference Board of Canada.

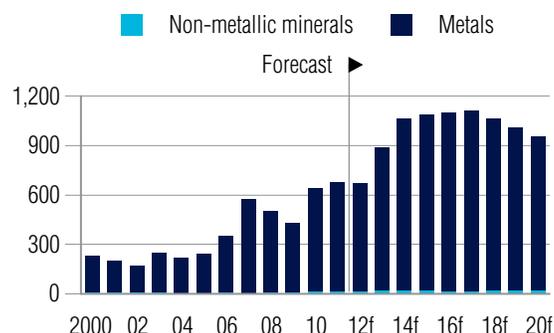
(GDP in 2002 dollars) was \$4.4 billion in Canada's North in 2011 and is expected to reach \$8.5 billion in 2020. (See Chart 1.)⁴⁵

The projected growth rate for mining output in Canada's North is very impressive compared with the long-term average growth rate for the Canadian economy over that forecast period.⁴⁶ The overall economy will expand by 21.5 per cent over 2011–20, for a compound annual growth rate of 2.2 per cent. This economic performance pales in comparison with the 7.5 per cent compound annual growth rate for Northern mining real gross domestic product.

Most of the output growth will come from metal mining production, which is expected to increase by 138 per cent over the forecast period. Meanwhile, non-metallic mineral mining will experience little growth over the medium term until 2016, with the opening of Quebec's Renard and the Northwest Territories' Gahcho Kué diamond mines. This growth will mitigate some of the anticipated declines in diamond production as the Diavik and Ekati mines in the Northwest Territories mature.

45 See the Introduction for the methodology of calculating and forecasting mining output and employment for Canada's North.

46 The Conference Board of Canada, *Canadian Outlook: Long-Term Economic Forecast 2012*.

Chart 2Northern Newfoundland and Labrador's Mining GDP
(2002 \$ millions)

Source: The Conference Board of Canada.

In 2011, there were 21,136 Northerners⁴⁷ employed in metal and non-metallic mineral mining. Given the expected output growth, the sector is expected to experience a net gain of 16,930 additional jobs by 2020. Over 90 per cent of these additional jobs will be in metal mining. Most Northerners involved in the mining industry will be working in various trades, although about 30 per cent will occupy management, professional, and service-related occupations.

Newfoundland and Labrador's Mining Outlook

Northern Newfoundland and Labrador's mining output will expand by 41 per cent from 2011 to 2020—a compound annual growth rate of 3.9 per cent. Northern mining prospects are strong until 2017, when Voisey's Bay operations will move underground. (See Chart 2.) In the medium term, the Iron Ore Company plans to increase production of its Labrador City operations from 4 million tonnes of ore to 26 million tonnes. There are also planned increases in production of the Labrador Iron Mines Holdings' Schefferville area project, and the DSO Project of New Millennium Capital and Tata Steel will ramp up to full production.

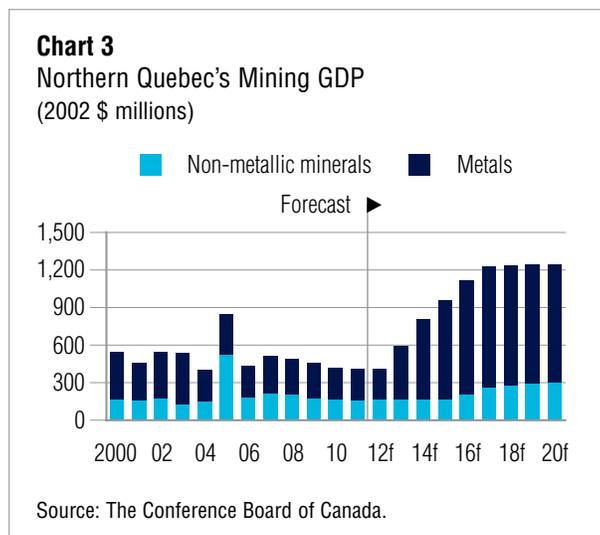
47 To better measure the local impact that mining activity can have, this report looks only at the number of Northern residents employed in the mining industry. The number of Southern residents employed in the Northern mining industry has not been included in the analysis.

The Voisey's Bay nickel mine will shift from open-pit to underground production in the later years of the forecast. Given the impact that this production shift has had on other mines in similar circumstances, a significant drop in that mine's production is expected over 2018–20. This will have a net negative impact on Labrador's overall mining real gross domestic product.

In 2011, there were 2,516 Northern Newfoundland and Labrador residents employed in mining, and by 2015 an additional 1,077 will have jobs in that sector because of the expansion of iron ore mines. By 2020, there will be 3,050 Northern Newfoundland and Labrador residents working in mines, 534 more workers than in 2011. Mining employment is expected to begin a gradual decline starting in 2016 and will extend over the remainder of the forecast period.

Northern Quebec's Mining Outlook

Northern Quebec's mining output fell from 2008 to 2011 because of the 2008–09 economic recession, the exhaustion of reserves in existing mines, and the lack of new projects. Going forward, mining production is expected to pick up strongly, supported by high mineral prices and increased exploration activity. The average annual compound growth rate in mining output is expected to be 13 per cent over the 2011–20 forecast period.



Some of the projects that will contribute to increased mineral production over the forecast period include the Nunavik Nickel copper-nickel mine. Xstrata's Raglan mine will also expand its nickel production. In addition, the Mont-Wright iron ore mine is going to increase production. Two large mines are expected to open in 2014: the Eleonore gold mine and the Bloom Lake iron ore mine. A diamond mine—Stornoway's Renard Diamond Project—is expected to begin production in 2016. This will be the first diamond mine in Quebec. Finally, the smaller Xstrata Bracemac-McLeod zinc and copper mine will open in 2013 and produce for four years.

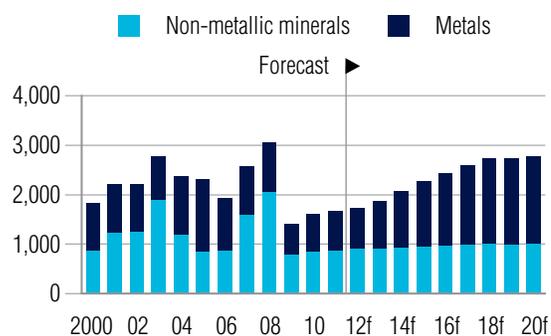
In Northern Ontario, metal mining production, which was weak from 2000 to 2010, will increase substantially.

In 2011, there were 1,580 Quebec Northerners employed in mining. This may seem like a small number given that over 10,000 Quebecers are employed in mining in the province. But Statistics Canada's Labour Force Survey suggests that most of the mining workers in the province reside in the South. However, the new mining projects that are projected over the forecast period will boost job prospects for Northerners by an additional 2,404 positions by 2020. This represents more than a doubling of mine workers who will reside in Northern Quebec.

Northern Ontario's Mining Outlook

Northern Ontario's mining output will expand by 66 per cent from 2011 to 2020 at a compound annual growth rate of 5.8 per cent. Metal mining production, which was weak in the 2000 to 2010 period due to decreasing reserves, will increase substantially over the forecast period. (See Chart 4.) This is due to important new mining developments. The Detour Lake Project is a new gold mine in northeastern Ontario that will begin production in 2013. The Cochenour gold mine is anticipated to start at the end of 2014. The Hammond Reef gold project, located near Thunder Bay, Ontario, is expected to become a major gold mine that will start production by 2016. The Eagle's Nest project in the Ring of Fire is a new nickel, copper, gold, platinum, and palladium mine that is forecast to start production around 2016.

Chart 4
Northern Ontario's Mining GDP
(2002 \$ millions)



Source: The Conference Board of Canada.

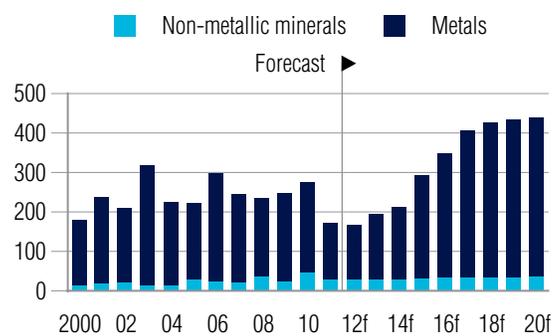
Other notable projects include Vale Inco's revived Totten copper and nickel mine, expected to start production at the end of 2013. The Young-Davidson gold mine will be expanding production over the forecast period. However, Ontario's only diamond mine—De Beers' Victor mine—will close in 2019. Overall, a number of new mines will provide a bright mining outlook for Northern Ontario.

In 2011, there were 11,155 Northern Ontario residents employed in the mining sector, which is more than half of all Canadian Northerners employed in mining. An additional 6,964 Northern Ontario residents will be employed in the mining sector by 2020 due to the growth forecast in metal mining output.

Northern Manitoba's Mining Outlook

While mining output in Northern Manitoba did not expand in the last decade, it will increase by 157 per cent from 2011 to 2020, with a compound annual growth rate of 11.1 per cent. (See Chart 5.) However, mining output is expected to drop in 2012 due to the shutdown of the Hudbay Minerals' Trout Lake zinc and copper mine, which has reached its end of life. Helping to offset the losses somewhat, the new Lalor mine has begun production and will continue to ramp up output over the medium term. The Minago nickel mine project is forecast to be developed and to be in production within the next few years.

Chart 5
Northern Manitoba's Mining GDP
(2002 \$ millions)



Source: The Conference Board of Canada.

Northerners in Manitoba will benefit from this significant mining growth. In 2011, there were 322 Northerners employed in that sector and by 2020, close to 1,000 will have mining jobs.

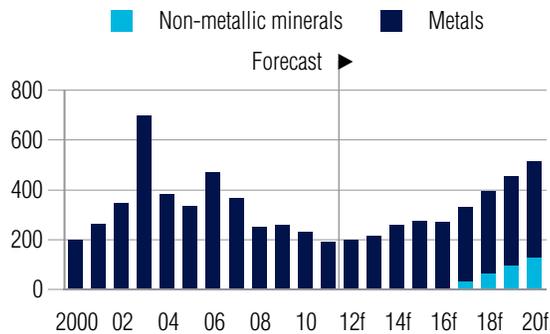
Northern Saskatchewan's Mining Outlook

Northern Saskatchewan's mining real gross domestic product rose in the early 2000s but then began a downward trend until 2011. However, a solid turnaround is expected and real mining production will increase over the forecast period, growing from \$190 million in 2011 to \$388 million in 2020—a 100 per cent increase. (See Chart 6.) The La Ronge Gold project has started and will ramp up production over the next few years. Another gold mine project, Goldfields, is forecast to start production in 2014. The new Cigar Lake uranium mine is under development and will begin production in 2013.

In addition to new metal mines, Saskatchewan will have its first diamond mine, which is assumed to begin operations in 2017. This will contribute significantly to mining output in the outer years of the forecast.

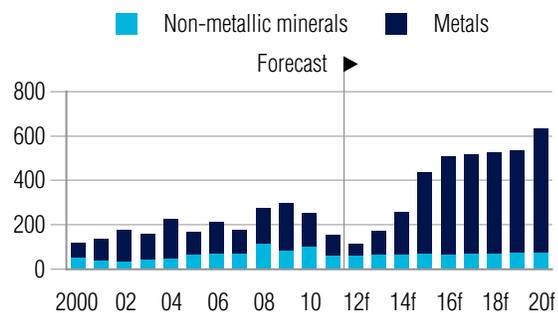
There were 1,970 Northern Saskatchewan mining workers in 2011 and with the projected growth in mining output, the total number of Northerners in the province working in the mining sector will increase to 3,537 in 2020.

Chart 6
Northern Saskatchewan's Mining GDP
(2002 \$ millions)



Source: The Conference Board of Canada.

Chart 7
Northern British Columbia's Mining GDP
(2002 \$ millions)



Source: The Conference Board of Canada.

Northern Alberta's Mining Outlook

In 2011, Northern Alberta's metal and non-metallic mineral real GDP was \$131 million and employed only 171 Northerners. Mining has always been a small industry in that province and given that there are no major projects planned in the near future, a forecast of the industry assumed an annual growth rate of 1.5 per cent for both real GDP and employment, which roughly reflects historical compound growth rates before the recession.

Northern British Columbia's Mining Outlook

Northern British Columbia is expected to see the fastest expansion of mining output out of all the Northern regions over the forecast period. Starting in 2013, mining production will begin a four-year rapid ascent due to the opening of many new mines. (See Chart 7.) Northern British Columbia's mining output will increase by an impressive 300 per cent between 2011 and 2020, with a compound annual growth rate of 17 per cent.

The Terrane Minerals Corporation's Mount Milligan copper and gold project is under construction and will commence full production in 2014. The Avanti molybdenum project is a large mine also forecast to come into operation in the next few years. In addition to these large new mines, other notable projects will start production in the next five years and have an impact on overall

mining output. They include the Red Chris copper and gold mine and an expansion at the Gibraltar copper mine.

It is expected that the Galore Creek gold, silver, and copper mine will start production in 2020, following the completion of the Northwest Transmission Line in 2014. This transmission line will provide a readily available power source, enabling several projects to be economically viable beyond 2020.⁴⁸

Northern British Columbia's mining output will increase by an impressive 300 per cent between 2011 and 2020, with a compound annual growth rate of 17 per cent.

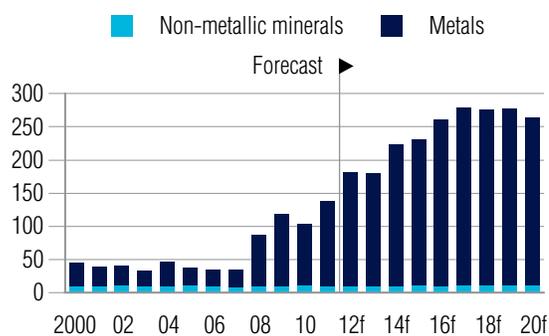
With all of these new mines opening between 2013 and 2020, it is not surprising that employment will shoot up as well. In 2011, there were 1,368 Northern British Columbians employed in mining. By 2020, 4,826 Northern British Columbians are expected to be employed in the mining sector—a net gain of 3,458 jobs.

Yukon's Mining Outlook

Yukon had very little mining activity from 2000 to 2007, but the sector has since gained momentum. Yukon's mining real gross domestic product was only \$26 million in

⁴⁸ BC Hydro, *Northwest Transmission Line Project*.

Chart 8
Yukon's Mining GDP
(2002 \$ millions)



Sources: Statistics Canada; The Conference Board of Canada.

2007 but grew quickly to \$128 million by 2011. From 2012 to 2017, mining output will continue to grow, reaching about \$268 million (see Chart 8), more than doubling output in five years due to a number of new mines coming into production.

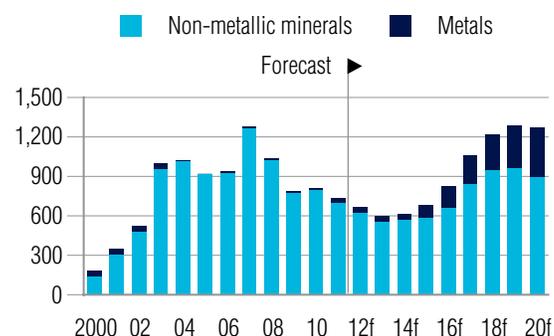
The current forecast includes the Eagle Gold project, which is expected to begin production in a couple of years; and the Carmacks Copper project, expected to commence production around the same time. Phase 1 of the Brewery Creek gold mine is included in the forecast, with production slated for 2014. Minto, Bellekeno, and Eagle Gold are all expected to boost mining output in the initial years of the forecast but are expected to shut down or reduce operations in the later years of the long-term outlook. Still, total production will remain stable over the 2017 to 2020 period because of increased production at the Carmacks copper mine.

In 2011, there were 500 Yukon residents employed in the mining sector. The mining boom will increase mining employment in the territory to 1,282 workers in the later years of the forecast.

The Northwest Territories' Mining Outlook

The Northwest Territories has benefited from the birth and tremendous surge of the diamond mining industry. The industry's output peaked at \$1.28 billion in 2007

Chart 9
The Northwest Territories' Mining GDP
(2002 \$ millions)



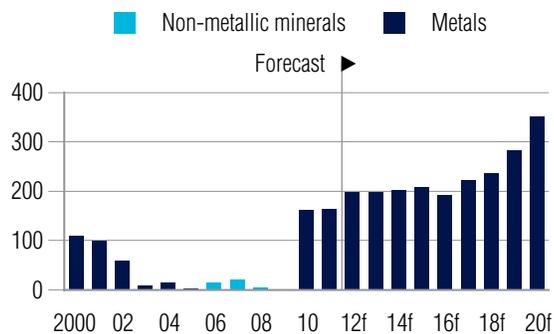
Sources: Statistics Canada; The Conference Board of Canada.

and then fell to \$732 million in 2011 due to a drop in world demand brought about by the recession. (See Chart 9.) Diamond output will continue to decline through 2013 as the Diavik mine goes underground and the Ekati mine reduces output in response to low diamond prices. Production at Diavik is expected to pick up again starting with the development of the new A21 pipe. Furthermore, the Gahcho Kue mine will begin production in 2015 and will mitigate some of the diamond output declines.

Meanwhile, metal mining output will grow substantially due to several new metal developments. Three mines will open in 2015: Fortune Minerals' NICO gold, bismuth, cobalt project; the Prairie Creek lead, zinc, and silver project; and the Yellowknife gold project. Meanwhile, the Cantung tungsten mine will cease operations. In 2017, the territory is expected to begin producing TREOs (total rare earth oxides) at Nechalacho mine by Thor Lake. Overall, the mining industry will reach output levels of \$1.3 billion over the forecast period.

Northwest Territories residents who work in mining peaked in 2007 at 2,200 and then fell to 1,200 by 2011. Going forward, losses at diamond mines will be mitigated by new metal and diamond mines over the next few years. Employment will decline to 700 people by 2014 before increasing to reach 1,322 by 2020.

Chart 10
Nunavut's Mining GDP
(2002 \$ millions)



Sources: Statistics Canada; The Conference Board of Canada.

Nunavut's Mining Outlook

Nunavut had no metal or non-metallic mineral mining output in 2009, but its real mining real GDP increased to \$163 million in 2010 thanks to the opening of the Meadowbank gold mine. For the remainder of the decade, mining output will more than double to reach \$352 million in 2020—a compound annual growth rate of 8.8 per cent. (See Chart 10.) Although the territory faced some setbacks, due in part to the world economic slowdown, mining will be one of the most important economic drivers in the years ahead.

In addition to the Meadowbank mine, the Meliadine gold mine is assumed to open in 2017. In the later years of the forecast, the Meadowbank mine will start winding down production as it approaches the end of its commercially viable activities. This will have a negative impact on overall mining output around the end of the forecast period. However, these effects will be more than offset by the opening of the Mary River iron ore mine. This mine is expected to start production in 2018 and will boost overall mining output in the last two years of the forecast.

In 2011, there were 350 Nunavummiut employed in mining. With the new mining activity expected over the long-term, there will be 790 Nunavummiut working in the mining sector by 2020, an impressive growth rate.

ECONOMIC IMPACT OF FUTURE MINING OUTPUT GROWTH IN CANADA'S NORTH

The impressive expansion outlined above will make an important contribution to the growth of both the Canadian and Northern economy. In addition to the direct impact on these economies, it will also bring additional production in other Northern sectors that will supply mines with equipment, materials, and services. The overall economic impact of the growth in mining output will be greater than its own increase in real gross domestic product. What will the total economic impact of the growth in mining activity be?

For the remainder of the decade, Nunavut's mining output will more than double to reach \$352 million in 2020—a compound annual growth rate of 8.8 per cent.

To answer this question, economists usually use models that help estimate the full impact of new economic activity. The Conference Board of Canada established historical estimates of real GDP for Canada's North,⁴⁹ but no model exists for calculating the GDP for the greater North. The key challenge was to estimate the trade flows between Canada's North and other parts of the world, including Canada's South. Four studies related to mining were examined in order to provide insights on calculating factors that can be used to provide a reasonable range for the total economic impact of additional mining output between 2011 and 2020. These studies also provided employment impacts from which indirect and induced job creation factors could be calculated.

The first study reviewed was one the Conference Board conducted for a territorial government. This study presented a few scenarios: one with no new mining activity and one with a substantial number of new mines being developed and coming into operation. Comparing the results of these scenarios provided implicit total economic impact factors for output and employment.

49 Palladini, *Estimating Economic Activity in Canada's Northern Regions*.

The second study reviewed was of a representative mine. This 2007 study for the Ontario Mining Association estimated the mine's full impact, providing local impact estimates that were used to calculate total economic impact factors.⁵⁰

The third study was released by the Government of Quebec in May 2011.⁵¹ This study provided further information on the economic impact of provincial mining activity on the province.

Finally, the Mining Association of British Columbia released a study in October 2011. This particular study completed by PwC⁵² provided an economic impact analysis of mining in British Columbia from which estimates of total economic impact factors could be derived.

According to the projections in the long-term mining outlook, 16,930 Northerners will occupy new mining jobs at the end of the 2011 to 2020 forecast period.

These four studies were used to derive multiplier factors that were applied to calculate a range of total economic impact estimates—the direct, indirect, and induced impacts—for Canada's North. Using these multipliers, the total economic impact on Canada's North of projected additional mining output over the 2011–20 forecast period will be between \$8.3 billion and \$10.4 billion. The difference in estimates is mainly attributed to how much will be spent on Northern goods and services; not on goods and services imported from the South or other parts of the world. These expenditures include miners, additional workers in these mines, and those in other Northern businesses positively impacted by the growth in mining.

According to the projections in the long-term mining outlook, 16,930 Northerners will occupy new mining jobs at the end of the 2011–20 forecast period. At the

low end of the range, an additional 20,000 Northerners will be employed over this period in non-mining businesses that support additional mining output. In the middle range, an additional 34,000 will be required. At the high end, an impressive 47,000 will have jobs in non-mining businesses impacted by the growth in mining output. The difference between these estimates is due to the variations in Northern jobs that are created to meet the increased level of goods and services that will be produced by Northern businesses. Overall, the total employment impact of the additional mining output ranges between 43,000 and 70,000 Northerners over the long-term forecast.

MINING OUTLOOK VS. MINING POTENTIAL IN CANADA'S NORTH

The mining outlook to 2020 and its total economic impact estimates assume a “business as usual” situation. That is, the fiscal environment and regulatory regimes and approval processes do not change, and the lack of infrastructure and skilled workers in Canada's North remain key challenges for mining companies. This assumes that the business environment does not improve or deteriorate over the forecast period. However, if tax rates increase; regulatory regimes become more cumbersome; or infrastructure and skilled labour challenges are more difficult to resolve than assumed in the forecast, less mining output and fewer jobs will likely result. On the other hand, if the business environment for the mining industry were to improve significantly, additional mines could be developed and production started over or slightly after the forecast period. In other words, the future of mining depends on many variables.

Furthermore, there is greater mining potential in Canada's North than what is presented in the long-term forecast. For example, Northern Quebec has future mining projects in rare earths, lithium, and graphite that have not been included. The Ring of Fire in Northern Ontario also holds greater potential than what is currently projected. Similarly, the territories have a number of promising sites that could be developed over and above those included in the outlook. Important and undeveloped mineral deposits such as uranium, diamonds, and gold still remain in various Northern regions of Canada.

50 Dungan and Murphy, *Ontario Mining*.

51 Ministère des Ressources naturelles et de la Faune, *Profil des retombées économiques des activités et des investissements du secteur minier au Québec*.

52 PricewaterhouseCoopers, *Economic Impact Analysis*.

These examples were not included in the forecast for a variety of reasons. They include competing mining projects in a miner's portfolio that take precedence over those not included in the outlook; significant infrastructure and remote region challenges that cannot be easily overcome; skilled worker shortages that limit the number of new mines that can be developed and come into production; significant delays in regulatory approval processes; and capacity constraints of regulators that limit the number of mines that can be reviewed and approved. Most of these factors relate to the business environment.

Yet, the quality and quantity of mineral resources in a given region are the fundamental reasons for mining activity, whether it is to appraise the resource or develop it. Canada's North has an abundance of underexplored and underdeveloped mineral deposits. According to those interviewed for this report, the biggest factor for future mining development is the vast geological potential. They see Canada's North as an immense, underexplored territory, rich in mineral resources.

But the discovery of important mineral deposits requires significant exploration activity. It can take, on average, 1,000 exploration projects to find a deposit of sufficient quality,⁵³ and even 10,000 projects to find a high-quality deposit that is large enough to be mined.⁵⁴ To this end, governments can help by providing companies with geological maps that provide information on

where deposits might be the most promising. Furthermore, investments in geosciences can be beneficial in many other areas. Geo-mapping can provide important information for land use planning purposes—a key component in gaining approval for new mining development projects in many Northern regions. Geosciences can also help plan for important transportation infrastructure development as well as identifying energy sources.⁵⁵

The federal government has committed \$100 million between 2008 and 2013 for geo-mapping the Arctic, focusing especially on the Northwest Territories and Nunavut.⁵⁶ Provinces also offer geological mapping data for their Northern regions that can be used by exploration companies. These geosciences programs can reduce the risks and costs undertaken by mining exploration companies by increasing their chances of finding significant, high-quality mineral deposits.

Canada's northern geological potential is huge and with adequate geosciences programs and exploration activities, additional large, high-quality mineral deposits are likely to be discovered. But significant mineral deposits and huge geological potential are not in themselves sufficient conditions for mining development, even with projected high commodity prices. The state of the region's business environment, local community acceptance of new mining development, and environmental considerations play key roles in determining whether projects move forward. These elements are explored in greater depth in the following chapters of this report.

53 Cook, *The Odds and Opportunities in the Junior Miners*.

54 Aboriginal Affairs and Northern Development Canada, "Discovery and Advanced Exploration."

55 Natural Resources Canada, *GEM*.

56 *Ibid.*

CHAPTER 3

Business Factors Related to Mining Development

Chapter Summary

- ◆ This chapter examines five critical business factors related to mining development in Canada's North: the corporate fiscal environment; regulatory regimes; Aboriginal rights; infrastructure, supply chains, and market access; and attracting, developing, and retaining skilled workers.
- ◆ The tax burden of Canadian jurisdictions is in the mid-range when compared internationally. However, Canada's complex regulatory system hinders investment in the mining industry. The federal and provincial/territorial governments are taking steps to improve these processes.
- ◆ Further progress is required to clarify Aboriginal rights with respect to resource development, through the settling of land claims.
- ◆ Aging or non-existent transportation, communications, and energy infrastructure are major deterrents for mining investment. The mining industry must often construct the infrastructure it requires.
- ◆ The mining industry will need to attract and retain new employees over the next decade as skill shortages within the industry become more acute.

Many major mining regions in the world offer companies opportunities to invest in new mines, but the level of capital available for such investments is limited. Mining companies must therefore carefully choose where to invest. They must consider a region's business environment, in addition to its geological potential. Furthermore, a mining project must be economically feasible and offer a reasonable rate of return on investment. If a mining project is too costly or too time consuming to develop because of business factors, the project is unlikely to proceed. This chapter examines five critical business factors related to mining development in Canada's North: the corporate fiscal environment; regulatory regimes; Aboriginal rights; infrastructure, supply chains, and market access; and attracting, developing, and retaining skilled workers. While geological potential and global markets are important aspects, the business environment will influence the future of Canada's mining development in a significant way.

CORPORATE FISCAL ENVIRONMENT

The corporate fiscal environment is an important factor that mining companies consider in the evaluation of potential projects. Mining companies pay federal and provincial/territorial corporate income taxes on income net of operating expenses, capital asset depreciation,

and deductions for exploration and development costs. They also pay provincial/territorial mining taxes and royalties on profits or revenues. Overall, they provide much-needed revenue to governments not only directly from corporate income taxes, mining taxes, and royalties, but also indirectly through personal income taxes paid by mining employees, business taxes paid by suppliers to mining companies, and personal income taxes paid by employees of these firms. Governments have a lot to gain from mining development.

However, the fiscal burden on mining companies is a cost factor that is considered in business investment decisions. If it is too high, especially relative to other mining jurisdictions, it can deter investments in Northern regions.

Provinces and territories collect mining taxes and royalties that mining companies pay to governments for the use of Crown lands and extraction of mineral resources.

In 2011, federal and provincial/territorial corporate income tax rates in Canada's Northern regions were between 26.5 per cent in Alberta and British Columbia and 31.5 per cent in Yukon. This range reflects the variance in provincial/territorial corporate income tax rates. In 2012, the federal government reduced its corporate income tax rate by 1.5 percentage points,¹ easing the corporate tax burden across the country.

In addition to the usual corporate expense deductions to calculate net income for tax purposes, mining companies have additional tax credits and deductions due to the high business risks and substantial costs in exploring and developing new mines. To help mining companies raise the necessary financial capital for exploration, tax incentives in the form of flow-through shares are offered to investors in order to provide them with an incentive to invest in these risky ventures. The flow-through shares ensure that investors in mining exploration receive some of their money back through tax deduction. This regime encourages exploration and mine development by providing essential capital.

Provinces and territories collect mining taxes and royalties, which are economic rents that mining companies pay to governments for the use of Crown lands and the extraction of mineral resources. Mining taxes and royalties in Canada are typically based on a mine's net revenue or profit. Mining tax and royalty rates differ between jurisdictions. Some jurisdictions, like Manitoba, Quebec, and Newfoundland and Labrador, have a flat mining tax rate, while the three territories have different rates for different levels of net revenue.

The overall tax burden for mining companies in Canada therefore varies by province and territory. Given the complexity of mining taxes and royalties, comparisons are usually made using a representative mine with assumptions about its type of mineral, size, costs, and life. In a recent PricewaterhouseCoopers study, a hypothetical gold mine with 2 million ounces of gold is assumed to have a 3-year development phase and 10 years of production.² Based on assumptions such as gold prices and costs of development and operations, Table 2 provides a national comparison about the mine's tax burden. The table illustrates that Ontario is by far the least taxed jurisdiction for the hypothetical gold mine, with an overall tax burden of 29.8 per cent of earnings. Newfoundland and Labrador has the highest overall tax burden at 41.2 per cent. The slight variations in federal taxes shown are due to differences in provincial/territorial mining taxes and royalties that are deductible expenses in the calculation of federal taxable income. Consequently, Ontario has one of the highest federal tax burdens and Newfoundland and Labrador the lowest. Provincial/territorial income and mining taxes, including royalties paid to governments, where applicable, are by far the lowest in Ontario of any Canadian jurisdiction, at 13.5 per cent. The highest are found in Newfoundland and Labrador, at 26.6 per cent.

So how does Canada's tax burden compare globally? A study done for The Mining Association of Canada and Aboriginal Affairs and Northern Development Canada in 2008 compared Canadian jurisdictions as well as those in other countries.³ These countries included Australia, Chile, Mexico, Namibia, Peru, South Africa, Sweden,

1 KPMG, *A Guide to Canadian Mining Taxation*, 6.

2 PricewaterhouseCoopers, *Digging Deeper*, 47.

3 Two Ducks Resources, *Comparative Review of the Rate of Royalty in the Canada Mining Regulation*, 37–39.

Table 2
Tax Burden as Share of Pre-Tax Earnings Over Life of Mine
(percentage)

	Federal tax	Provincial/ territorial tax	Total tax burden
Ontario	16.3	13.5	29.8
Saskatchewan	16.4	19.1	35.5
British Columbia	15.7	21.6	37.3
Northwest Territories	15.8	21.8	37.6
Nunavut	15.8	22.2	38.0
Manitoba	15.5	23.7	39.2
Yukon	15.9	24.2	40.1
Quebec	15.0	25.9	40.9
Newfoundland and Labrador	14.6	26.6	41.2

Sources: PricewaterhouseCoopers; The Conference Board of Canada.

and the United States. It analyzed the royalties and overall tax burden as it would apply to two hypothetical mines: a medium-sized base metal mine and a large diamond mine. Each mine was assumed to have an operating life of fifteen years. Various assumptions as to revenues, costs, and rates of return were made, and royalty and income tax rates of the jurisdictions examined were applied. The analysis showed that the overall tax burden of Canadian jurisdictions was in the mid-range of all the jurisdictions analyzed and that they were competitive internationally.

A similar comparative study was done by Natural Resources Canada. It looked at base metal mining, using generic mine models of cash flow yielding different rates of return on investment to calculate average effective tax rates.⁴ Average effective tax rates are the net present value of all taxes paid over the life of a mining project, divided by the net present value of income from that mining project over its life. In this study, the hypothetical mine is assumed to start development in 2012 and start producing in 2016 for a 14-year period. The base case assumes a discount rate of 7.5 per cent to calculate net present value and a real internal rate of return before taxes on the investment at 15 per cent. In

this scenario, Manitoba, Ontario, British Columbia, the Northwest Territories, and Nunavut all have average effective tax rates around 20 per cent. On the other hand, the average effective tax rate percentages range from the mid- to high twenties in the case of Quebec, Newfoundland and Labrador, and Yukon. Alberta and Saskatchewan were not included in the study because of their small to non-existent base metal mining activity. When a 30 per cent real internal rate of return is assumed, Ontario's average effective tax rate fares better than the other provinces and territories. Quebec and Yukon would have the highest average effective tax rates of all Canadian jurisdictions at around 30 per cent.

This study also compared 11 foreign jurisdictions that have important base metal mining operations.⁵ Based on the analysis for average effective tax rates, assuming a 15 per cent real internal rate of return before taxes, the State of Nevada has the most competitive tax regime, followed by Alaska, which has average effective tax rates similar to Manitoba and Ontario. Chile is another very competitive tax regime for base-metal mining and has an average effective tax rate comparable with British Columbia, the Northwest Territories, and Nunavut.

Overall, this study reveals that Canada is as tax competitive as other foreign jurisdictions. In fact, it surpassed eight other foreign jurisdictions that were part of the study. The study also suggests that while Canada's tax burden is less than most countries at all rates of return levels, the differences in average effective tax rates diminish significantly when mines have much higher real internal rates of return. In other words, Canada's tax advantage is more important when mine profitability is lower. This suggests that Canada better supports marginally profitable mines compared with most other countries. This can be an important factor, since the tax burden matters most in cases of low-profit mines.

In addition to paying taxes and royalties, mining companies must post bonds or deposits before a mine is developed in order to ensure that funds will be available for the proper reclamation of a mine at the end of its useful life. These funds can be a few million dollars

4 Natural Resources Canada, "Taxation of Mineral Income 2012."

5 Ibid.

for a small mine to more than a hundred million dollars for a large mine.⁶ These bonds or deposits provide assurances that funds will be available for reclamation by the mining company or, if the mine is abandoned, by governments. According to industry experts interviewed for this research, the duplication in the posting of bonds is an area of concern. There are situations where bonds must be paid to governments as well as Aboriginal groups, adding substantial costs to a mining project. This is an issue that needs to be examined carefully by governments so that appropriate levels of bonds or deposits are made to the appropriate groups.

All in all, even with jurisdictional differences in tax burden, Canada has a competitive fiscal environment relative to other countries. However, while “Canada’s tax environment is favourable to business and in particular to mining activities,”⁷ governments could be tempted to raise taxes, as they will be looking to reduce their deficits. Other countries are already increasing their taxes on mining companies.⁸ The raising of taxes has already begun here in Canada: the province of Quebec recently increased its mining taxes. In 2007, Quebec had the lowest tax burden in Canada for mining companies; today, it has one of the highest in the country. Following its mining tax reform, mining taxes are now calculated on a “mine per mine” basis. Quebec increased its previous tax rate of 12 per cent⁹ to 14 per cent on March 31, 2010, and to 15 per cent on January 1, 2011. The rate was further increased to 16 per cent on January 1, 2012.¹⁰ While it is too soon to say definitively, these increases could negatively affect future mining development in the province. Increases in tax burden could become a future concern for mining companies as they make investment decisions. It would therefore be wise for federal and provincial/territorial governments to maintain their international tax-competitive position.

6 Natural Resources Canada, *Mining Information Kit for Aboriginal Communities*, 78.

7 KPMG, *A Guide to Canadian Mining Taxation*, 3.

8 Deloitte, *Tracking the Trends 2011*, 6–7.

9 PricewaterhouseCoopers, *Digging Deeper*, 36.

10 Ibid.

REGULATORY REGIMES

According to most interviewees for this report, one of the most important deterrents to mining development is the complexity, duplication, overlap, and time-consuming regulatory regimes in Canada. A mine development can occur only if all regulatory requirements are met and the mining company receives the necessary licences and permits. The regulatory regime is an important factor that determines whether or not a mining company can and will invest in a development. It can deter investments if the costs and time of meeting the requirements outweigh the returns that such investments in a new mine would provide. Mining proposals can be refused by a government if regulatory conditions are not met.

Interviewees reported that important deterrents to mining development are the complex, duplicate overlapping, and time-consuming regulatory regimes in Canada.

To be efficient, effective, and fair, a regulatory regime requires various elements. These include:

- ◆ regulations that are clearly understandable to all stakeholders and meet their intended objectives;
- ◆ regulatory processes that are coordinated, non-duplicative, open, transparent, and timely; and
- ◆ regulatory bodies that have clear mandates and the capacity to deliver, remain neutral with respect to economic development, make consistent and predictable decisions, and are accountable for their decisions.¹¹

The regulatory regimes as they apply to mining development in Canada’s North have made progress in achieving these objectives over the years, but there is still significant room for improvement. In particular, regulatory bodies need to ensure that they maintain clearly defined roles and capacity.

11 See Section IV of McCrank, *Road to Improvement*.

AN OVERVIEW OF REGULATIONS APPLYING TO MINING IN CANADA'S NORTH

There are many different federal and provincial/territorial acts that regulate various aspects of mining in Canada's North. According to Canada's Constitution, the provinces are the stewards of natural resources and each jurisdiction maintains its own regulations. The federal government regulates natural resources on Indian reserves and federal Crown lands, as well as aspects of mining activity that relate to the federal jurisdiction. As a result of these jurisdictional issues, each province and territory, and the federal government, uses its own environmental assessment act. These legal frameworks are used to review the environmental and socio-economic impacts

of proposed mining projects. Assessments include public consultation as well as detailed technical studies. The issuing of permits to proceed with mining development is determined based on the impacts assessed through these environmental frameworks. Approvals can include conditions that mining companies must meet.

In addition to environmental assessments, mining companies must comply with a variety of provincial/territorial and federal regulations. Each jurisdiction has its own set of regulations. The regulatory conditions as specified in provincial/territorial mining acts apply to various mining activities, from staking claims and developing a new mine to mining reclamation. Developing a mine and

Nunavut's Regulatory Regime

The Nunavut Land Claims Agreement (NLCA) established much of the regulatory regime governing resource development process in the territory. The NLCA created the Nunavut Planning Commission (NPC), the Nunavut Impact Review Board (NIRB), the Nunavut Water Board (NWB), and the Nunavut Surface Rights Tribunal (NSRT). Each of these organizations plays a role in reviewing resource development projects as part of the regulatory process. Their findings are presented to the federal Minister of Aboriginal Affairs and Northern Development Canada for the decision as to whether the project can proceed as outlined. Where the Minister does not approve a project, the findings are returned to the original proponent with instructions for reconsideration. In some cases, the Minister has authority to vary the original findings and issue a decision without further consultation.¹

The NPC is tasked with developing land use plans by region. These plans are essential to early involvement by Nunavummiut in the management of their lands and resources. They include all the anticipated uses of the lands and are an integral part of the regulatory review process for resource projects. When a resource development project is proposed, an application must be filed with the NPC, which then has the responsibility to review the proposal and make a recommendation on whether or not the project is consistent with the land use plan.² Currently there are two approved regional land use plans in the territory—one

for the North Baffin (Qikiqtaaluk Region) and one for Keewatin (Kivalliq Region). At present, however, the Nunavut Planning Commission has prepared a draft land use plan that would cover the entire territory and would replace the two existing plans.³ Where land use plans for the regions are not yet finalized, the project approval process is overlapping the land use plans process and can make project applications more complex.

Each proposed mining project in Nunavut is referred to the NIRB to determine and analyze the expected impacts. Any project requiring water use (which would typically include all mining projects) requires a licence from the NWB. The NSRT was established to adjudicate disputes between surface rights holders and mineral rights holders about the terms and conditions of access to lands for mineral prospecting and development.⁴

The Northwest Territories Water Regulations currently apply to Nunavut, although the Nunavut Water Board is developing the Nunavut Water Regulations. The governing legislation and regulations require all but residential users of water to have a licence to use surface water or to return water to the environment. Licences may be granted directly by the Board, or a public hearing may be required, with the resulting licence subject to ministerial approval. Water use requires payment of the appropriate fee as described in the regulations.⁵

1 Indian and Northern Affairs Canada, *Exploration and Mining on Crown Lands in Nunavut Guidebook*.

2 Nunavut Planning Commission, *About the Commission*.

3 Nunavut Planning Commission, *Draft Nunavut Land Use Plan*.

4 Aboriginal Affairs and Northern Development Canada, *Nunavut Surface Rights Tribunal*.

5 Nunavut Water Board, *Legislation*.

Sources: Indian and Northern Affairs Canada, *Exploration and Mining on Crown Lands in Nunavut*; Aboriginal Affairs and Northern Development Canada, *Nunavut Surface Rights Tribunal*; Nunavut Planning Commission; Nunavut Water Board.

building related infrastructure can often involve cutting trees and therefore also be subject to provincial forest acts and provincial/territorial land acts that regulate the use of land. Mining operations use and store water and, therefore, mining companies must meet further regulations found in provincial/territorial water acts. The federal government can also be involved if the mining activity impacts fish habitats. This requires meeting conditions outlined in the federal *Fisheries Act*. And if a mine requires transportation infrastructure that will cross navigable streams, the mining company must meet the regulations within the federal *Navigable Waters Protection Act*.

Mining companies must also meet the conditions set out in the federal government's *Explosives Act* and *Transportation of Dangerous Goods Act*, which regulate the transportation and storage of explosives used at mines. Provincial transportation legislation may apply to a mine development if the mine requires construction on or adjacent to a provincial highway. Mining companies must also comply with provincial fire services acts due to storage of fuel. Additionally, any uranium mining must meet regulations set out in the federal *Nuclear Safety and Control Act*. There are also occupational health and safety acts that have standards to protect workers and others that apply to mining. As well, additional federal and provincial/territorial environmental protection acts have their own regulations to protect the environment, such as air, land, and water, from mining activity. A mining company may have to comply with the federal *Species at Risk Act* and the *Migratory Birds Convention Act* if it is likely to have an impact on these animal species.

Clearly, there are many federal and provincial/territorial government agencies and departments that oversee the laws and regulations found in the various legislative frameworks mentioned above. Regulations must be clearly understandable to all stakeholders and meet their intended objectives. There seems to be no issue in the individual regulatory frameworks in meeting these conditions. However, the multitude of acts, laws, and imbedded regulations and the required licences and permits can be a challenge for mining companies in particular. Mining companies have to navigate through the complex list of regulations and must have various

related licences and permits to develop a mine. In recent years, governments have taken steps to help mining companies with these multi-faceted regulatory systems.

REGULATORY PROCESSES

To be efficient, effective, and fair, regulatory regimes must have processes that are coordinated, non-duplicative, open, transparent, and timely. This has been the most challenging aspect of Canada's regulatory regimes as they apply to mining. The issues of duplication and overlap in the regulatory approval of new mines and the lack of clear and transparent timelines have been raised by industry as a major concern.¹² Most of those interviewed for this report mentioned this issue. The lack of coordination between federal and provincial/territorial ministries and agencies, in particular, is a significant part of the problem.

The multitude of acts, laws, and imbedded regulations, and the required licences and permits, can be a challenge for companies mining in Canada's North.

Because regulatory regimes include both federal and provincial/territorial governments, overlapping processes often duplicate the work done by either government. The timelines to trigger and carry out the review processes often differ, adding to the challenges proponents already face. Furthermore, there is uncertainty as to the length of time it takes to review these proposals and, according to many interviewees, it can be excessive. This makes it difficult for mining companies to plan and can add substantial costs to a project.

Over the last decade, federal and provincial/territorial governments have been working to improve environmental assessment processes and their timeliness. Eight out of the 10 provincial/territorial jurisdictions that are part of Canada's North—all seven provinces and Yukon—have environmental cooperative agreements with the federal government for environmental assessments. (See Table 3.) These agreements typically define how the federal and provincial/territorial governments can work together in

¹² The Mining Association of Canada, *Facts and Figures of the Canadian Mining Industry 2011*, 75.

Table 3
Federal/Provincial/Territorial Cooperative Agreements

Jurisdiction	Year
British Columbia	2004
Alberta*	2005
Saskatchewan**	2005
Manitoba	2007
Ontario	2004
Quebec	2010
Newfoundland and Labrador	2005
Yukon	2004

*Alberta had an initial agreement with the federal government in 1993 that was renewed in 2005.

**This 2005 agreement builds on the previous one concluded in 1999.

Source: Canadian Environmental Assessment Agency, Federal-Provincial/Territorial EA Cooperation Agreements. www.ceaa-acee.gc.ca/default.asp?lang=En&n=CA03020B-1#fp.

conducting their assessments. Provisions include a “Lead Party” for each level of government that coordinates its government’s requirements. Information sharing is part of the agreements, to avoid duplication of effort. There is also a provision for the possibility of having joint review panels to conduct single cooperative assessments that would meet the legal requirements of both governments.

In addition to these eight jurisdictions, amendments to the Nunavut Lands Claims Agreement on June 12, 2008, established that environmental assessments will be done by the Nunavut Impact Review Board and that a federal assessment by the Canadian Environmental Assessment Agency will be carried out only under limited circumstances. This change has significantly improved environmental assessments within Nunavut.¹³ The Northwest Territories is the only jurisdiction that does not yet have a cooperative agreement with the federal government or an arrangement similar to Nunavut’s.

THE “ONE PROJECT, ONE ASSESSMENT” APPROACH

Both industry and government agree with the objective of the “one project, one assessment” approach. The Canadian Council of Ministers of the Environment

13 Aboriginal Affairs and Northern Development Canada, *Amendments to the Nunavut Land Claims Agreement*.

endorsed it and in 2009 committed to “reducing federal-provincial duplication in environmental assessment, while ensuring high environmental standards are met.”¹⁴ A 2009 Environmental Assessment Task Group formed by the Canadian Council of Ministers of the Environment examined specific models with the potential to streamline environmental assessment processes while still meeting each jurisdiction’s requirements. They included joint process, delegation, and substitution.¹⁵ All three of these options collect a single set of information to meet the requirements of the environmental assessment of both levels of government, contrary to coordination, where each jurisdiction collects the information it needs and can share it with the other party. The joint-process model has one environmental assessment that can meet all of the requirements and that is jointly implemented by both jurisdictions. An example would be a joint review panel that conducts the assessment of a project.

The Northwest Territories is the only jurisdiction that does not have a cooperative agreement with the federal government or an arrangement similar to Nunavut’s.

The Task Group brought forward five key recommendations to support the establishment of a one project, one assessment approach, as follows:

1. All jurisdictions should ensure that their statutory regimes include a range of models, including joint process, delegation, and substitution, with enough flexibility to address any scenario in which these models may be used.
2. Focused efforts should be made to identify a resolution to issues associated with diffusion of accountability within the current federal framework through the [then] upcoming *Canadian Environmental Assessment Act* statutory review.
3. The environmental assessment process should continue to be led by the best-placed jurisdiction, defined as the “Lead Party.”

14 Canadian Environmental Assessment Agency, “Use of Federal-Provincial Cooperation Mechanisms.”

15 One Project–One Assessment Sub-Group of the CCME Environmental Assessment Task Group, *Potential Models for a One Project–One Environmental Assessment Approach*, 11–16.

4. The level of participation of the Non-Lead Party should be based on the nature and magnitude of the anticipated public concern; the nature and magnitude of the anticipated/potential environmental impacts; the ability of the Lead Party to deliver on (or address) the Non-Lead Party's requirements; and the requirements of Aboriginal consultation processes.
5. In considering the proposed project against these factors, both jurisdictions can decide mutually which model would be most appropriate.¹⁶

A key challenge in adopting the one project, one assessment approach is the timing of when federal and provincial/territorial assessments are triggered. Any major mining project proposal, for instance, triggers a provincial/territorial assessment, given these governments' constitutional rights. But a federal assessment is not necessarily required unless the mining project is subject to the regulations under federal legislation. It could take as long as 18 months for the federal government to decide whether or not a federal assessment is required.¹⁷ Given that amount of time, it is rare that federal and provincial/territorial governments can coordinate their processes even though cooperative agreements were reached. Furthermore, these federal and provincial/territorial cooperative agreements have focused mostly on a coordinated approach, while still having each jurisdiction carry out its own environmental assessment in a cooperative manner.

Timelines that are too long or unclear in the review of mining proposals can be an impediment to mining investments without necessarily offering better environmental protection. Unfortunately, this is often the case in the North. Service standards could be implemented to ensure more timely approvals; such standards would identify the length of time required for each stage of the review process. This would give project proponents and other stakeholders an indication of how long each step is expected to take. The federal government's Major Projects Management Office has established service standards with target timelines in the federal review

of major projects. The overall objective is to reduce the time and resources required for regulatory approvals from an average of four to two years without sacrificing regulatory objectives such as environmental protection. This federal goal was reiterated in 2012 as part of amendments to the *Canadian Environmental Assessment Act* (CEAA).¹⁸

The diffusion of accountability in the current federal environmental assessment process has also led to major coordination challenges and delays in the process. In addition, it contributes to a lack of cooperation between federal and provincial/territorial governments.¹⁹ Amendments made in 2010 to the *Canadian Environmental Assessment Act* centralized the process of comprehensive environmental assessment studies. As a result, the mining industry has already noticed improvements brought by these amendments. According to The Mining Association of Canada:

The change for mining projects is enormous. CEAA assessments are being triggered quickly and, most importantly, at the same time as provincial assessments. For the first time, provincial and federal assessments are synchronized. In addition to eliminating the triggering delay and the misalignment with provincial processes, the Agency is managing assessments, further eliminating confusion over scope and process, and managing consultations.²⁰

Ultimately, no one jurisdiction can decide on the best model to be used in the assessment of a project. It is therefore essential that all parties collaborate in the decision-making process. Coordination is the simplest model that both parties can agree to, since both still do their own environmental assessments. Joint process could be a second option that governments could probably agree on, since the jurisdictions are involved together in the

16 Canadian Council of Ministers of the Environment, *Background*.

17 The Mining Association of Canada, *Submission by The Mining Association of Canada to the Standing Committee on Environment and Sustainable Development*, 2.

18 The *Canadian Environmental Assessment Act* was repealed on July 6, 2012, and replaced by the *Canadian Environmental Assessment Act, 2012*.

19 One Project–One Assessment Sub-Group of the CCME Environmental Assessment Task Group, *Potential Models for a One Project–One Environmental Assessment Approach*, 7.

20 The Mining Association of Canada, *Submission by The Mining Association of Canada to the Standing Committee on Environment and Sustainable Development*, 2.

environmental assessment, such as through joint review panels. It becomes more difficult, however, for both parties to agree on delegation and substitution, since these involve only the jurisdiction most capable of carrying out the assessment. This requires a high level of trust between parties and the elimination of institutional resistance—constraints that have proven difficult to overcome.

REGULATORY BODY CAPACITY

Numerous factors are required for regulatory bodies to work effectively. They must have clear mandates and the capacity to deliver the required services. They must also be able to remain neutral with respect to economic development, make consistent and predictable decisions, and be accountable for their decisions. A lack of clear mandates and capacity, however, creates challenges for regulatory bodies, co-management boards, and Aboriginal governments in meeting the various requirements of regulatory regimes.

The situation in the Northwest Territories serves as an example to illustrate this point. Regulatory boards in this territory do not always have clear mandates by federal and territorial governments. This is because comprehensive land claims agreements do not properly define the roles and responsibilities of these regulatory bodies. The issue has not yet been rectified by current legislation or policy.²¹ Furthermore, there are too many regulatory boards in the territory and members lack proper orientation and training, which make it difficult to ensure that there is no bias in favour of or against resource development.²²

Regulatory capacity is also a key issue in Nunavut. The regulatory bodies are resource constrained, and some interviewees mentioned that investments into building that capacity are required. This is especially important as the system could soon be overwhelmed by the numerous mining development projects advancing in the territory. The review processes absorb many resources, and could result in even longer process timelines should there continue to be a lack of adequate resources. This challenge will also likely be felt in many other Northern jurisdictions,

given the projected growth of mining development proposals across all of Canada's North. Ensuring that regulatory bodies have the capacity to do their jobs properly must be a key goal of all levels of government.

High turnover rates of personnel in regulatory bodies can also create problems in the administration and enforcement of regulations. Some of those interviewed for this report mentioned that the turnover rate at all levels of government is problematic in getting new mining projects approved and adds more time to the regulatory process. While some turnover is expected, it would be wise for governments and regulatory bodies to ensure adequate training, mentoring, and other knowledge transfer mechanisms so that new recruits can quickly assume their responsibilities and make the regulatory processes seamless.

Regulatory bodies must remain neutral with respect to economic development, make consistent and predictable decisions, and be accountable for their decisions.

Combining capacity building with service standards can go a long way in ensuring effective regulatory boards. Having adequate numbers of qualified and well-trained board members and staff would help ensure that these boards are neutral with respect to economic development; make consistent and predictable decisions; and have enough resources to provide, in a timely manner, regulatory decisions on the many mining proposals they must review.

ADDRESSING REGULATORY CHALLENGES

In recent years, the federal government has been active in addressing problems in its own regulatory processes. The Major Projects Management Office (MPMO) was established in 2007 within Natural Resources Canada to improve the coordination and integration of federal major resource project evaluations, licensing, and permitting, south of the 60th parallel. According to the MPMO:

[It] serves as a single window into the federal regulatory process, and complements the technical discussions between proponents and regulators. The Office provides guidance to project proponents and other stakeholders, coordinates

21 McCrank, *Road to Improvement*, 7.

22 *Ibid.*, 59.

project agreements and timelines between federal departments and agencies, and tracks and monitors the progression of major resource projects through the federal regulatory review process.²³

Since the MPMO opened, greater transparency has taken place with inter-departmental project review agreements and tracking of regulatory processes. Some progress has been made on time taken for federal regulatory project reviews, but there is still substantial room for improvement.

In April 2012, the federal government announced that it will reduce, from 40 to 3, the number of departments and agencies that conduct environmental reviews.

In September 2009, the federal government also established the Northern Projects Management Office (NPMO) as part of the Canadian Northern Economic Development Agency (CanNor). The NPMO carries out functions similar to those of the MPMO for proposed projects north of the 60th parallel. In addition to working with federal departments and regulators, it partners with territorial governments to improve the coordination and communication of regulatory approval processes between levels of government. It is still too early to establish the impact this organization will have on regulatory review effectiveness and timeliness.

As another step forward, the federal government announced in April 2012 that it will reduce from 40 to 3 the number of departments and agencies that conduct environmental reviews.²⁴ In the case of non-uranium mining, only the Canadian Environmental Assessment Agency will now be responsible for carrying out federal environmental assessments. The Nuclear Safety Commission will review uranium mining proposals. As well, the 2012 omnibus Bill C-38 amends the *Canadian Environmental Agency Act* to permit greater use of substitution of provincial environmental assessments for federal assessments. These recent developments will

further improve the federal regulatory approval process and the application of federal and provincial/territorial cooperative agreements—but the agencies will be required to have adequate capacity to carry out their mandates. However, the CEAA will continue to play a limited to non-existent role in Nunavut and the Northwest Territories.²⁵ As mentioned previously, Nunavut has its own unique environmental assessment process, while the Northwest Territories is governed under the *MacKenzie Valley Resource Management Act* (MVRMA). This legislation is currently under review by the federal government.

Overall, the federal government has been taking important steps toward the one project, one assessment goal. These steps should lead to greater cooperation and coordination between the federal government and provincial/territorial governments. To be full and equal participants in decision-making, Aboriginal governments are another layer that will require capacity building and coordination and cooperation with other levels of government.

ABORIGINAL RIGHTS

The recognition of Aboriginal and treaty rights is now a major part of the review of mining project proposals. Given the close proximity of mineral exploration activities and mining operations to Aboriginal communities and that mining activities may take place on Crown lands used by Aboriginal Peoples for traditional, cultural, and spiritual activities, Aboriginal engagement in the review of mining proposals has become a requirement. According to Natural Resources Canada, there are about 1,200 Aboriginal communities within 200 kilometres of mining activities.²⁶

Prior to the 1970s, Aboriginal Peoples were not involved in the decision-making around mining development near or on their ancestral lands.²⁷ Significant Supreme Court of Canada decisions and associated events since the early

23 Major Projects Management Office, *About MPMO*.

24 CBC News, "Ottawa to Slash Environment Review Role."

25 Aboriginal Affairs and Northern Development Canada, *Amendments to the Nunavut Land Claims Agreement*.

26 Natural Resources Canada, *Aboriginal Participation in Mining: Mining Development*.

27 Hipwell and others, *Aboriginal Peoples and Mining in Canada*, 4.

1970s, however, have paved the way to the legal duty of governments to consult Aboriginal Peoples when government decisions may infringe on Aboriginal and treaty rights. This duty cannot be delegated to either industry or a regulatory tribunal,²⁸ although some procedural elements can. For environmental assessments of a mining project, governments request that project developers consult with affected Aboriginal communities as part of the consultation process. Even when a regulatory agency is involved, the Crown retains ultimate responsibility to determine whether adequate consultation has taken place.²⁹ The duty is to consult in a meaningful way and accommodate Aboriginal communities where possible. However, it does not provide Aboriginal Peoples with approval authority or veto rights.³⁰

Aboriginal rights have become a reality that mining companies must recognize as they explore for deposits, plan to develop new mines, and operate and close existing ones. Yet further progress is required on the clarity of Aboriginal rights with respect to resource development and in the review of mining project proposals. Unsettled land claims and specific Aboriginal grievances are other issues that governments must resolve. Some of the interviewees for this report mentioned that mining proposal reviews are sometimes used by Aboriginal groups to pressure governments to take action of these grievances. It was also noted that it becomes difficult to negotiate with Aboriginal groups when—because of overlapping land claims that have not been settled—more than one nation claims the geographic area proposed for the new mine.

Overall, 24 comprehensive land claims agreements have been settled,³¹ of which 22 are in Canada's North. (See Exhibit 1.) The James Bay and Northern Quebec Agreement reached in 1975 was the first comprehensive land claims agreement, or modern-day treaty. It was followed in 1978 by the Northeastern Quebec Agreement. All four Inuit regions of Canada have modern-day treaties,

including Northern Quebec (1975), Inuvialuit (1984), Nunavut (1993), and Labrador (2005).³² There are also 11 First Nations Yukon agreements; and three First Nations have yet to ratify proposed agreements. In addition to the Inuvialuit Agreement, the Northwest Territories has three other comprehensive lands claim agreements with First Nations and Métis peoples. In British Columbia, there is the Nisga'a Final Agreement (2000), and in Quebec, the Eeyou Marine Region Land Claims Agreement (2010).

As they explore for deposits, plan to develop new mines, and operate and close existing ones, mining companies must recognize Aboriginal rights.

There are still significant regions in British Columbia and the Northwest Territories that are not covered by either historical treaties or comprehensive land claims agreements. Yukon and Labrador also have some regions that still need modern-day treaties. Successfully completing negotiations for outstanding Aboriginal land claims is essential to clarify the nature and extent of the duty to consult.

Comprehensive land claims agreements—also known as modern-day treaties—usually include financial compensation, land ownership (both surface and subsurface), participation in resource management, traditional land use (e.g., hunting, fishing, and trapping), protection of Aboriginal culture and the environment, and promotion of economic development. They also create public boards of governance that share resource management between government and Aboriginal groups. Many of these also have terms for self-government.

Self-government agreements “provide greater certainty over rights to natural resources, contributing to a more positive investment climate and creating greater potential for economic development, jobs and growth.”³³ By

28 Ceballos, “Supreme Court of Canada Clarifies ‘Duty to Consult.’”

29 Devlin, *Crown Delegation and the Duty to Consult*, 17.

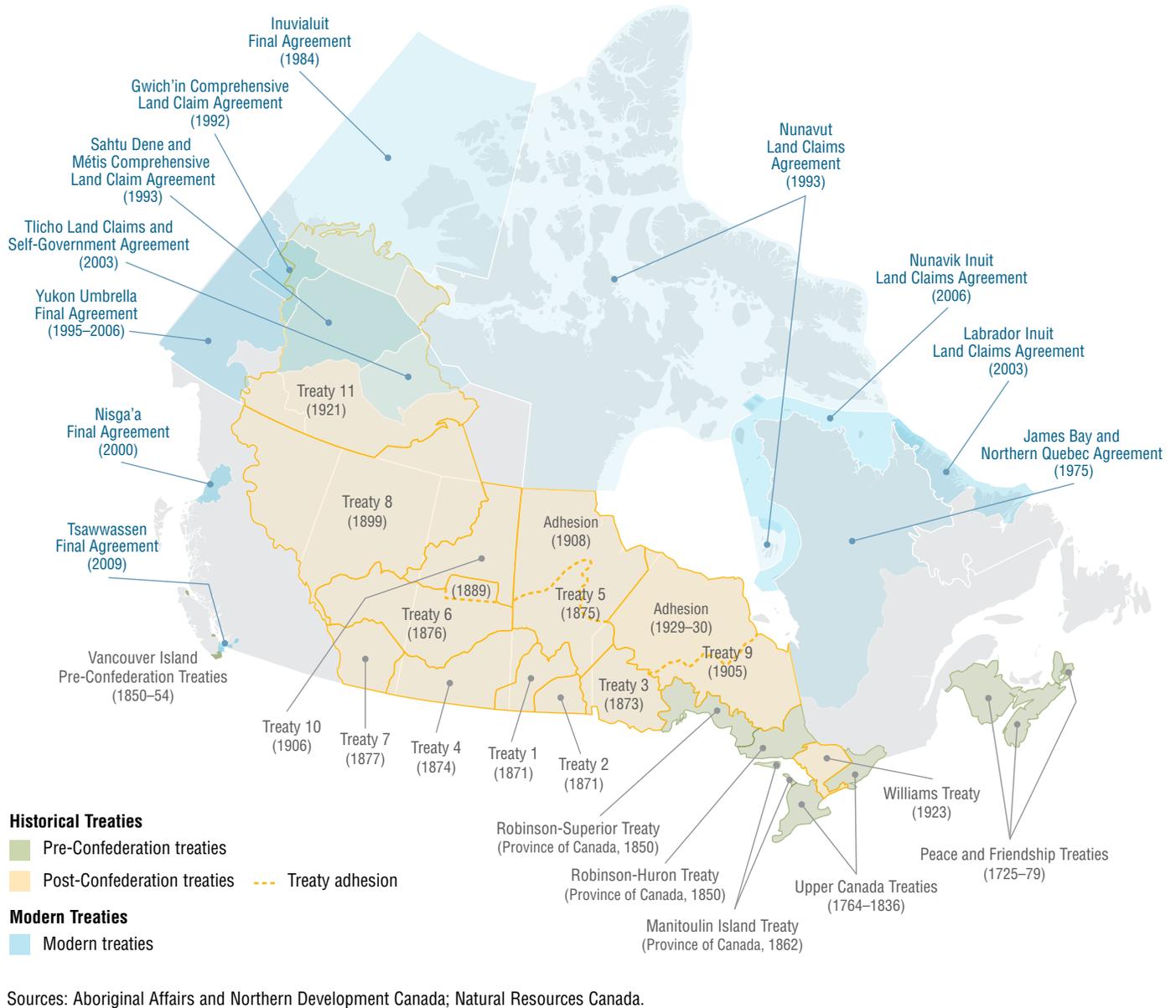
30 Aboriginal Affairs and Northern Development Canada, *Aboriginal Consultation and Accommodation*, 18.

31 Land Claims Agreements Coalition, “Modern Treaties.”

32 Inuit Tuttarvingat, “Economic Development.” Additionally, the Nunavik Inuit Lands Claim Agreement for Quebec and Labrador Inuit was concluded in 2008.

33 Aboriginal Affairs and Northern Development Canada, *Fact Sheet: Aboriginal Self-Government*.

Exhibit 1
Historical and Modern-Day Aboriginal Treaties in Canada



late 2010, there were 16 self-government agreements related to comprehensive land claims and 2 comprehensive self-government agreements with the Sechelt and Westbank First Nations in British Columbia.³⁴ More

than 390 communities represented at 83 tables were at different stages of negotiating self-government agreements.³⁵

34 Aboriginal Affairs and Northern Development Canada, *Fact Sheet: Implementation of Final Agreements*.

35 Aboriginal Affairs and Northern Development Canada, *Negotiation Tables*.

Comprehensive land claims settlements and Aboriginal governments with agreements concerning natural resource rights, along with management with federal and provincial/territorial governments, can provide greater clarity for mining companies than situations where these rights and co-management arrangements are not clearly defined. These are very important steps that can benefit not only Aboriginal communities but also mining companies.

But there are important implementation challenges with land claims and self-government agreements as they relate to mining project proposal reviews. One of the key issues is the lack of adequate human resources and training for land management and environmental assessment boards or committees. This leads to inadequate capacity in reviewing mining project proposals in a timely and effective way. (See page 26, “Regulatory Body Capacity.”)

There are federal and provincial/territorial cooperative environmental assessment agreements, but there needs to be such agreements with Aboriginal governments.

Another challenge can be the lack of clarity around the respective involvement of the three levels of governments (federal, provincial/territorial, Aboriginal) in regulatory processes. Aboriginal governments can have overlapping regulatory mandates with federal and provincial/territorial governments. This can add complexity and amount of time taken in the overall regulatory review and approval processes of mining projects. While there are federal and provincial/territorial cooperative environmental assessment agreements as discussed above, there need to be such agreements with Aboriginal governments.³⁶

A comparison of the three territories reveals important differences regarding regulatory regimes and Aboriginal governments. Currently, Nunavut does not have its own

36 In 2000, the federal government reached such an agreement with the Environmental Impact Review Board (EIRB) for the Inuvialuit Settlement Region.

environmental legislation and relies on the NLCA for the application of environmental assessments. However, it is still negotiating devolution of land and resource management from the federal government. Yukon, on the other hand, achieved this transfer of responsibility in 2003. It also has the Final Umbrella Agreement between its First Nations and the Yukon, and federal governments, simplifying the regulatory process, since it does not differ between Yukon's regions.³⁷ Included in the Final Umbrella Agreement were provisions that formed the *Yukon Environmental and Socio-Economic Assessment Act* (YESAA), which looks at the impacts potential projects may have in the territory. It is a single assessment process for all projects and applies to all levels of government.³⁸

The Northwest Territories faces tremendous challenges. Comprehensive land claims agreements led to the creation of several parallel or duplicate land and water regulatory boards to specifically meet the needs of each Aboriginal land claimant through the Gwich'in Land & Water Board, Sahtu, and Wekhee'zhi groups, and the MacKenzie Valley Land and Water Board for the unsettled claim areas. Consequently, the Northwest Territories has a very complex regulatory regime.³⁹ Furthermore, the transfer of resource management responsibility from the federal government is still being negotiated. Mining and exploration companies have complained about the Northwest Territories' regulatory process and view the Yukon system as more efficient and timely.⁴⁰ The federal government has started discussions on merging the Northwest Territories' regulatory boards into a single board,⁴¹ a move that has found little favour with some Aboriginal groups.⁴²

37 McCrank, *Road to Improvement*, 35.

38 Yukon Environmental and Socio-Economic Assessment Board, *Frequently Asked Questions*.

39 McCrank, *Road to Improvement*, 7–12.

40 Wilson, “Regulatory Headaches Continue for Northern Miners.”

41 CBC News, “Feds to Start Talks on Merging N.W.T. Regulatory Boards.”

42 World News, “NWT Aboriginals Oppose Feds' Plan to Streamline Approvals for Resource Development.”

INFRASTRUCTURE, SUPPLY CHAINS, AND MARKET ACCESS

In addition to fiscal and regulatory regimes that impact mining development, essential infrastructure is a key factor in mining investment decisions. A mine cannot exist without the necessary infrastructure to transport equipment, supplies, and workers to the mine site; commodities to market; and workers back to their home communities. A mining operation also requires energy to power the facilities and equipment. It needs a communication infrastructure to reach out to head office, logistics operators, suppliers, and customers. Mine workers need accommodation, food, and fresh water, as well as health services and recreational activities. Community infrastructure such as education, health care, catering, housing, and recreation in close proximity to a mining operation can benefit mining development. This section examines the state of that infrastructure in Canada's North and explores the ways in which such infrastructure can be developed and financed.

TRANSPORTATION INFRASTRUCTURE NEEDS AND GAPS

In Canada's North, the lack of adequate transportation infrastructure is one of the greatest obstacles to mining development. Most of the interviewees mentioned the lack of transportation infrastructure as a key impediment to mining development. Mining projects require different infrastructure supports at different stages. In the early exploration stage, infrastructure needs are relatively modest. The ability to establish a base near the region to be explored is important. This base must have the necessary living space and provisions for workers and limited equipment. Transportation access for workers at the camp and the required supplies is therefore a key requirement but requires little infrastructure. In most circumstances where mineral exploration is conducted in remote regions, workers and supplies are flown in by aircraft or transported by vehicles using temporary roads.

As a project proceeds through development and becomes an operating mine, the transportation infrastructure requirements expand. Depending on where the mine is located, the required infrastructure can include marine shipping and road or rail access to bring equipment and supplies into the mine site and ship commodities

Ontario's Mining and Far North Acts

In 2009, to ensure greater protection of Aboriginal and land owner rights, Ontario amended its *Mining Act* to change the way that companies stake and explore their claims. Some regulations were implemented on January 1, 2011, while others will be phased-in over the next few years. The Act identifies various sector strategies, such as online map staking to acquire mining claims, and allows sites of Aboriginal cultural significance to be withdrawn from prospecting and staking. Aboriginal consultations are required for exploration plans and permits are needed for early exploration activity. Further amendments in November 2012 ensure that prospectors may earn assessment credits toward their claim by demonstrating through their consultation expenses that they have been working with Aboriginal communities.¹ In addition, a plan to introduce a graduated permitting system would require submitted exploration plans for low-impact activities and permits for moderate-impact activities. The Act also stipulates that there will be no new mine openings in the "Far North" of Ontario without community-based approval of a land use plan unless the project is socially and economically beneficial for Ontario.²

In 2010, the Ontario government passed Bill 191, known as the *Far North Act*. The Act recognizes Aboriginal rights and supports community-based land use planning for the province's Far North, which includes the Hudson Bay lowlands. (See Exhibit.) It aims to protect areas of cultural value and maintain biological diversity and ecological functions. Furthermore, changes to the *Mining Act* have put in place rules concerning land use plans in the Far North. No new mines will be allowed to open unless the community has and is implementing a land use plan. The plans must be made and approved by the community. Four communities have already approved land use plans.³

Ontario's Far North



Source: Ministry of Natural Resources.

- 1 Ontario Ministry of Northern Development and Mines, *Assessment Work Credits*.
- 2 Ontario Ministry of Natural Resources, *Far North Act, 2010*.
- 3 Ontario Ministry of Natural Resources, *Far North Ontario*.

Infrastructure Impediments at Meadowbank Mine

The lack of infrastructure significantly slowed down the development of the Meadowbank gold mine in Nunavut. To service the mine, which is situated 70 kilometres north of Baker Lake, Agnico-Eagle built eight major buildings, a truck shop, a diesel-powered electricity generation plant (26 MW) with a cogeneration heating distribution system, and diesel storage tanks.¹ The company also needed to provide water purification, waste management, and water recycling infrastructure and a landing site for barges. Equipment and supplies for mine construction were transported primarily by water. Somewhat uniquely for Nunavut, Agnico-Eagle also constructed a 110 kilometre all-weather road from Baker Lake to the mine,² over which fuel and other supplies are trucked on a weekly basis, as well as an airstrip to bring in supplies and workers by airplane. In addition, because the mine has only seasonal access for bulk commodities like fuel, the company had to build extra storage for an entire year's inventory, further adding to capital costs. The Meadowbank gold mine is an example of some of the infrastructure challenges that mining companies may face when they plan to develop a new mine in the remote regions of Canada's North.

1 Hatch, "Arctic Conditions a Challenge for Meadowbank Mine."

2 Agnico-Eagle Mines Limited, *2011 Annual Report*, 54.

to market. In cases where mining workers live in communities close by, road access between communities and the mine can be built. In cases of remote mines, air transportation is a requirement to fly workers in and out. The available transportation infrastructure, the cost of new infrastructure required, and the shipping distance to market are critical determinants of mining economics. Some transportation infrastructure investment is inevitable when working in remote regions, but extensive new infrastructure can create a cost burden sufficient to delay or prevent mine development.

Canada's road transportation network was developed primarily around and between major urban centres located in the South. There are over 1 million kilometres of roads, but few extend into Northern regions. Some all-weather roads connect northern cities to the main southern highway system, and mining companies use some of these. For instance, a major road connects Happy Valley-Goose Bay and Labrador City to Baie Comeau, Quebec. Within

Quebec, major roads connect the cities of Radisson, Matagami, Normetal, and Chibougamau to Val d'Or and the Saguenay region with highways to southern destinations. Similar road systems exist in Ontario, Manitoba, Saskatchewan, Yukon, and portions of the Northwest Territories.

However, road infrastructure across the North is not always available. Companies in remote locations must usually build and use winter or all-weather gravel roads to access main road systems or ports. Winter roads limit the time of year that supplies and equipment can be brought in and minerals can be shipped out by surface transportation. Furthermore, climate change is reducing the amount of time that winter roads can be used. As most new mining developments occur in remote regions, it is expected that companies will increasingly rely on winter roads or all-season gravel roads for transportation to and from mine sites.

The available transportation infrastructure, the cost of new infrastructure, and the shipping distance to market, are critical determinants of mining economics.

Another option companies consider for transporting bulk commodities like coal, iron, and base metals is rail infrastructure. In 2010, over 700 thousand carloads of minerals out of a total of over 3.6 million freight carloads were transported by rail.⁴³ Rail transportation crosses the country from east to west and into the United States, with a few railway lines stretching into Canada's North. The rail network is used primarily to transport natural resource commodities to ports and to manufacturing plants in the South. Part of this rail network is relatively close to mines and is used to transport minerals. For example, a rail line from Schefferville, Quebec, and Wabush, Labrador, brings iron ore to the port in Sept-Iles.

In addition to existing railroads, there are proposed rail lines, such as the one to service the Ring of Fire in Ontario's Far North. Cliffs Natural Resources has proposed a railway line and service road to link CN's rail

43 Railway Association of Canada, *2011 Rail Trends*, 20.

system to the chromite mining projects at McFaulds Lake;⁴⁴ and a rail line has been proposed on Baffin Island to eventually transport the territory's major iron ore minerals to port. However, because they remain vulnerable to changes in permafrost, railways may not be an option for some of Canada's more remote regions.⁴⁵ Railway construction must be studied carefully to ensure it is a cost-effective and reliable form of transportation.

As an alternative, when surface transportation is impossible or too costly, marine transportation may be a viable option for remote mines in Canada's North. Marine transportation could serve to bring in equipment and supplies to mining facilities from the South and to ship minerals to southern processing and manufacturing plants. The future Mary River iron ore mine on Baffin Island will lead to the development of a new port to ship iron to market and receive supplies. Unfortunately, marine transportation is at the mercy of sea ice. The shipping season can be as short as one month or as long as five months, depending on the location of the port,⁴⁶ and ships travelling in Arctic waters need to be ice capable. However, climate change could increase the length of time waterways remain free from ice, allowing for longer shipping seasons.

Air transportation is currently used to transport workers and supplies to remote mining facilities. It is an expensive mode of transportation but can be the only option available to bring workers, food, and goods to remote Northern mines. A mining company can build and operate its own airstrip close to the mine when no other air transportation is available nearby. This is the case at all the diamond mines, the Meadowbank gold mine, and the Raglan mine. It will also be the case at virtually all the new mines proposed in Nunavut and the Northwest Territories.

While a few cities have well-established transportation infrastructure to support the mining industry, companies usually have to build their own transportation infrastructure to develop and operate in the North. Given that transportation plays a vital role in determining whether a project

will move forward, greater investments in the necessary infrastructure need to be considered. Government assistance or partnerships between companies and governments can help relieve the financial burden of construction. These types of investments will also serve to make investment in Northern regions more attractive.

ENERGY INFRASTRUCTURE: NEEDS AND GAPS

Some of those interviewed for this report noted that energy supply, particularly power generation, is another key infrastructure requirement and key impediment to mining development in remote regions. So how will companies power their operations if this required infrastructure is not readily available—if available at all—in many regions where future operations will take place?

Air transportation is currently used to transport workers and supplies to remote mining facilities. It is expensive, but can be the only option available to bring workers, food, and goods to remote Northern mines.

For some new mines, local utilities will provide power if the new mine is close to the power grid and the utility has enough load capacity, or if the utility is willing to invest in new infrastructure with the support of provincial/territorial governments. In British Columbia, eight metal mines use BC Hydro power,⁴⁷ and completion of the Northwest Transmission Line in 2014 will provide power to new mines in that part of the province. Hydro-Québec is studying plans to provide power to new mines under Quebec's northern development plan.

The proposed *Growth Plan for Northern Ontario 2009* and *2011* identifies the need to develop opportunities for power generation across Northern Ontario. By expanding the existing power generation network, the province hopes to increase the amount of renewable energy being generated. The Plan also looks at the potential for other sources of energy, and providing remote, off-grid communities with alternatives to diesel fuel. Alternatives include the development of wind energy along lakes

44 Cliffs Natural Resources Inc., *Cliffs Chromite Project*, 18.

45 Bristow and Gill, *Northern Assets*, 13.

46 *Ibid.*, 13.

47 Mining Association of British Columbia, "Mining in BC."

Superior and Huron and the development of biofuels.⁴⁸ These developments could provide mining companies with the power required to sustain any new mining operations in Northern Ontario.

New mines in remote regions often require their own power generation facility because electric utilities are unable to meet their needs. It is not unusual for a mining company to install and maintain a power plant on a remote mining site. For example, the Raglan mine in Nunavik in Northern Quebec depends on its own diesel-powered plant because it is too far north of Hydro-Québec's power grid. All mines in the Northwest Territories and Nunavut also rely on their own power supply, and the Meadowbank gold mine in Nunavut relies on its own diesel-powered plant. The use of diesel, however, incurs additional costs and considerations for companies, such as fuel storage and equipment efficiency. Relying on this particular type of power generation can add substantial costs to a project.

Mining operations close to well-established towns usually have access to existing telecommunications networks, but remote mines must invest in their own.

Energy costs are a major expense for mining operations, representing on average 15 per cent and 22 per cent, respectively, of total operating costs for metal mining and non-metal mining.⁴⁹ In the case of remote mines, energy costs can be substantially higher.⁵⁰ To decrease costs, some companies are turning to renewable energy sources. In one such case, Diavik Diamond Mine in the Northwest Territories is building a wind farm with technology that can operate in minus 40 degrees Celsius. Wind power is expected to reduce diesel energy used by the diamond mine by 10 per cent.⁵¹ Likewise, Goldcorp's

Musselwhite gold mining operation in Northern Ontario has turned to solar power to help heat its buildings.⁵² These renewable resource projects can help reduce costs while contributing to the development of more sustainable operations across the North.

OTHER INFRASTRUCTURE NEEDS AND GAPS

Like transportation and energy, telecommunications infrastructure in remote Northern regions can be a challenge. Mining operations close to well-established towns usually have access to existing telecommunications networks, but remote mines must invest in their own. They usually rely on satellite communications or microwave towers to connect to the outside world. The three diamond mines in the Northwest Territories used satellite communications for years until they collectively supported Northwestel's installation of a series of microwave towers to link them to the telecommunications network in the South.⁵³ Telesat will invest in improving broadband satellite communication in the Territories,⁵⁴ improving communication services used by mining companies in the Arctic region. Part of Quebec's northern development plan is to invest in telecommunications infrastructure in northern parts of the province. This will help to address current gaps to better serve Northern communities and businesses.⁵⁵

Access to broadband has become a necessity in mining operations, and additional infrastructure to provide this service is required. At least part of the investment in broadband infrastructure will need to be made by mining companies. Communications companies with the support of governments, however, could extend reliable broadband communications services in Northern regions where new mines will be developed.

Aside from larger infrastructure projects, more basic infrastructure like housing, fresh water, health care, and recreational facilities are required. While mine sites located in close proximity to established communities

48 Ontario Ministry of Energy and Infrastructure and Ontario Ministry of Northern Development, *Proposed Growth Plan for Northern Ontario*, 15–16.

49 These percentages are based on data provided in The Mining Association of Canada's *Facts and Figures of the Canadian Mining Industry 2011*.

50 Standing Committee on Aboriginal Affairs and Northern Development, *Northerners' Perspectives for Prosperity*, 29–33.

51 Bouw, "Miners Turn to Renewable Energy to Cut Costs."

52 Goldcorp Inc., "Environmental Stewardship, Energy."

53 Hoefer, *Mining in Nunavut*, 25.

54 CBC News, "Telesat to Spend \$40 Million to Expand Broadband in Arctic."

55 Government of Quebec, *Plan Nord*.

can access some of their services, these types of projects can also place additional strain on already limited local resources. Financial and material support from mining companies and governments can ease this burden. Infrastructure projects that not only support the mine but also benefit the community can help bring acceptance of a mining project. On the other hand, remote mining sites do not benefit from established local infrastructure. Companies must therefore construct and provide most of these services for their employees.

FINANCING INFRASTRUCTURE

It is clear that there are major transportation, energy, and other infrastructure gaps that must be addressed if new mining developments are to proceed in remote regions of Canada's North. But the costs can be prohibitive, as project costs are substantially higher in Northern regions than in the South.⁵⁶ Difficult terrain, harsh weather conditions, and the high cost of skilled labour and materials are all factors that significantly increase the capital and maintenance expenses of infrastructures associated with remote Northern mines. But who should be responsible for financing and maintaining this infrastructure?

Frequently, mining companies end up paying for the required infrastructures when new remote mines are developed. They fund the construction and maintenance of roads, power generation stations, and other infrastructures. These costs factor into the economics of mining projects and their returns on investments. High commodity prices can make remote Northern mines financially viable despite high infrastructure costs. Nevertheless, these costs can tip corporate investment decisions toward other regions or countries that are more financially attractive and offer promising mining development alternatives.

Sometimes Crown corporations and governments invest in northern infrastructure projects to serve communities that can also sometimes meet, at least indirectly, mining needs. For example, the Ontario Ministry of Northern Development, Mines and Forestry (now the Ministry of

Northern Development and Mines) invested \$648 million in northern highway rehabilitation and expansion, along with \$54 million in passenger transportation services and commercial rail programs.⁵⁷ The *Growth Plan for Northern Ontario, 2011* also recognized the importance of infrastructure support and calls for coordinated, strategic infrastructure investments; a multi-modal transportation system in the province's North; education infrastructure; information and communication technology infrastructure; and energy infrastructure.⁵⁸

Public investments in community infrastructure are sometimes in response to additional mining activity. In one particular example, the Ontario government committed funds to upgrade Kirkland Lake's roads and water infrastructures to meet the needs of its growing population due to increasing employment in mines.⁵⁹ Communities can also benefit when power companies invest in generation and transmission lines for the purpose of mining development. This is the case with BC Hydro's Northwest Transmission Line.

Some of the infrastructure necessary for mining, such as transportation, energy, and communications, can meet the needs of both mining operations and the communities in which mines operate. Furthermore, new mining projects can add additional jobs for Northerners, support local businesses, and provide royalty and tax revenues to governments. Overall, there are social benefits and additional government revenues from mining development that can justify government financial support of necessary infrastructure investments for mining. Infrastructure investments can occur through public-private partnerships. Such public-private arrangements must be carefully defined and implemented so that all parties clearly understand the allocation of risks, costs, and benefits.

56 Bristow and Gill, *Northern Assets*, 2.

57 Ontario Ministry of Northern Development and Mines, *Annual Report 2009–2010*.

58 Ontario Ministry of Infrastructure and Ontario Ministry of Northern Development, Mines and Forestry, *Places to Grow: Growth Plan for Northern Ontario 2011*.

59 Ontario Ministry of Northern Development and Mines, *Improving Municipal Infrastructure in Kirkland Lake*.

ATTRACTING, DEVELOPING, AND RETAINING SKILLED WORKERS

In addition to infrastructure gaps, mining companies often face challenges in attracting, developing, and retaining skilled workers for their remote mines. However, mining companies worldwide will soon be scrambling to find workers to meet the industry's requirements, as skilled workers are becoming increasingly difficult to find while demands for metal and non-metallic minerals are expected to increase. Adding to this ongoing challenge, the industry must also work to fill the void left by retiring workers. One of the biggest threats to growth of the mining industry is the limited available workforce that will lead to a global competition for talent. According to a 2011 Ernst & Young report, skills shortages were seen to be the second-greatest risk to the global mining industry.⁶⁰ Canada is not immune to that risk.

The industry has thus far been able to cope with human resource challenges, but future trends will put additional pressure on current human resources. More intensive recruitment and retention strategies will be required for mining companies to find the needed workforce to operate existing mines and develop new ones. This section will look at current labour force trends and challenges in Canada's mining sector and discuss potential solutions to future labour force shortages.

CURRENT HUMAN RESOURCE TRENDS AND CHALLENGES

Many industries in Canada are coping with the upcoming retirement of Canada's baby boom generation. The mining industry is no exception. The Mining Industry Human Resources Council's (MiHR) latest employment and hiring forecasts state that an aging workforce is one of several major human resource challenges for mining companies. Their report notes that hiring will have difficulty keeping pace with the number of workers retiring: "Retirement rates will therefore have a major impact on hiring requirements in the near future."⁶¹ Nearly 30 per

cent of the mining industry's current labour force⁶² is between the ages of 45 and 64 years.⁶³ Companies will be struggling to keep pace with these demographic changes, as "on average, over a third of [the current workforce] will be eligible to retire in the next five years, with the largest proportion eligible in three to five years."⁶⁴

Attracting and retaining skilled workers will be a challenge for the industry in a future world of scarce human resources. The industry has been able to attract foreign talent to fill some of these current employment gaps, but global competition for skilled labour will intensify. "As talent becomes scarce, competing employers or industries make more attractive offers and the best and brightest tend to become more mobile."⁶⁵ Global competition for skilled labour will result in the scarcity of candidates.

In addition to infrastructure gaps, mining companies often face challenges in attracting, developing, and retaining skilled workers for their remote mines.

Furthermore, according to the long-term forecast developed for this report (see Chapter 2), metal and non-metallic mineral output in Canada's North will grow by 91 per cent by 2020. This growth in mining production will be possible only by hiring a significant number of additional workers. But where will this workforce come from? Based on this report's long-term forecast, an additional 16,930 Northerners will be needed to meet the growth in metal and non-metallic mineral mining output between 2011 and 2020. This number assumes that the proportion of Northerners employed in mining

60 Ernst & Young, *Business Risks Facing Mining and Metals 2011–2012*, 12.

61 Mining Industry Human Resources Council, *Canadian Mining Industry Employment and Hiring Forecasts 2010*, 20–21.

62 This applies to both Northern and Southern Canada, as well as to the larger definition of mining, which includes activities such as smelting and refining. These activities have not been included in the scope of this report.

63 Mining Industry Human Resources Council, *Canadian Mining Industry Employment and Hiring Forecasts 2010*, 20–21.

64 Ibid.

65 Ibid., 16.

remains the same as it is currently. However, this proportion could certainly increase if current labour force constraints in many Northern regions, such as the lack of skilled workers, can be addressed.

On average, Aboriginal workers account for a larger share of the workforce in mining than in other industries. In terms of labour force participation, Aboriginal people account for nearly 7 per cent of mining workers—more than double the national average for Aboriginal people in the overall workforce (slightly above 3 per cent).⁶⁶ However, the potential to hire more Aboriginal people in mining is significant given their younger average age than the national population and the growth in Canadian mining that will occur near Northern Aboriginal communities. But many Aboriginal people lack the education and training to meet the skill requirements of many positions available within the industry.⁶⁷

Women in Mining Canada’s study demonstrated that exploration and mining lack women, and that the number of women who enter this field annually remains low.

Under-represented groups in mining, such as women, youth, and new Canadians, could also be a potential talent pool from which mining companies could draw. However, there have been considerable difficulties in getting such groups to participate in the mining workforce. Significant efforts by mining companies and governments will be required to fill those jobs left behind by retirees and to meet the requirements of the growing mining industry. It will require encouraging more Aboriginal people and under-represented groups to go into mining jobs.

There are a number of human resource strategies that mining companies are using, and will need to undertake, over the coming years to fill their labour force needs.

Filling the Retirement Void

Given the large pool of retirees over the next few years, mining companies can take advantage of mature workers’ knowledge and expertise as those workers prepare to leave the workforce. Senior employees will have a role to play when it comes to mentoring and preparing younger workers for advancement in the industry. Many employers have mentoring programs that pair more experienced workers with younger ones. This allows for knowledge transfer between employees and helps fill some of the gaps left by retiring workers. The MiHR has even recommended that retired workers take on some of the training and development activities the industry offers, thus ensuring “an extended knowledge transfer and mentoring of younger workers after the mature workers retire.”⁶⁸

Attracting New Talent

In addition to having upcoming retiring workers mentor and train younger mining workers, attracting new talent from previously under-represented sectors can provide an additional pool of labour. A 2010 study by Women in Mining Canada demonstrated that women are lacking in exploration and mining, and that the number of women who enter this field annually remains low. The number also remains well below other resource sectors such as oil and gas, hunting and fishing, and forestry.

A key reason for the low female participation rate in mining is women’s perception of the industry; it is still a male-dominated sector with very few female role models. As well, work within the industry is still often viewed as “extremely physical work within a noisy, dirty and harmful environment.”⁶⁹ A survey of female employees done by Women in Mining identified things like inflexible work arrangements that do not suit mothers, child care, and parental leave practices as barriers to women in the industry. Travel to and from remote mining sites can also be barriers for women, especially those who work on rotation and have children.⁷⁰ Taken together, these working conditions can prevent women

66 Mining Industry Human Resources Council, *Canadian Mining Industry Employment and Hiring Forecasts 2010*, 25. These numbers are not limited to mining operations in Northern Canada.

67 Howard, Edge, and Watt, *Understanding the Value, Challenges, and Opportunities of Engaging Métis, Inuit, and First Nations Workers*, 4.

68 Mining Industry Human Resources Council, *Canadian Mining Industry Employment and Hiring Forecasts 2010*, 21.

69 Women in Mining Canada, *Ramp-Up*, 10.

70 *Ibid.*, 13.

from choosing mining as a career option, or force them to leave the sector entirely.⁷¹ The study recommends that more work be undertaken to better accommodate families and retain female workers, while looking for ways to improve its image. Such changes would result in making mining more appealing to women as a career choice.

Youth also present an opportunity to help meet future labour force needs. However, research suggests that youth aren't aware of the various types of careers—such as engineers, geologists, human resource professionals, and trades—offered within the industry. Youth's perceptions of the mining industry were very similar to those expressed by women. As well, young adults are frequently approached too late in their education to consider careers in the field. Youth also find the remote work locations and the lifestyle associated with the industry unappealing, and recruitment is not aimed at youth's interests or behaviours.⁷²

Both these groups represent a rich source of labour potential for the mining industry over the coming decade. While the overall labour force participation rate of women aged 25 to 44 stands at 82.1 per cent,⁷³ they make up only around only 4 per cent of workers in the mining industry.⁷⁴ This offers mining companies a huge opportunity to further promote mining careers to women.

Youth represented 12.7 per cent of the mining workforce and 15 per cent of the total workforce in Canada, according to the 2006 Census.⁷⁵ The mining industry could close that gap and even aim for a larger percentage of youth working in the sector, especially as it offers high-income jobs with many future openings. Aboriginal youth

present the greatest source of potential workers, since they represent a large pool of untapped human resources and, as discussed below, future mines will be located near Aboriginal communities.

In addition to providing career training and initiatives to help students succeed and follow a path to post-secondary education, the mining industry needs to work on improving its image among youth, who still view it as “a ‘dirty,’ ‘unhealthy’ and physically demanding industry.”⁷⁶ By continually reaching out to youth while they are still in high school and promoting the variety of careers available within the industry, mining companies will connect with youth. Interviewees for this report noted that mining companies need to go into high schools, inform students of the skills needed for all types of jobs, and encourage them to finish their high school and pursue paths to post-secondary education. Larger companies such as Diavik provide summer job opportunities for students,⁷⁷ while Agnico-Eagle offers scholarships for students looking to go on to university.⁷⁸ Many other mining companies have also offered scholarships for students.

The mining industry could aim for a larger percentage of youth working in the sector, especially as it offers high-income jobs with many future openings.

Local educational institutions and governments need to work cooperatively with companies to encourage youth to pursue college and trades training related to mining jobs, as this is not frequently considered by students as a potential career option. Hands-on training, work placements, and especially mentorship programs, may be excellent options to reach out to this particular group. Yukon College is presently studying the feasibility of such a program. The Centre for Northern Innovation in Mining (CNIM) would provide training in mining-related activities, technologies, and research. Through

71 Women in Mining Canada, *Ramp-Up*, 25.

72 Mining Industry Human Resources Council, *Take Action for Diversity*, 24–27.

73 Statistics Canada, Table 282-002. Numbers are from 2011. The overall rate refers to all of Canada.

74 Natural Resources Canada, *Canadian Minerals (CMY) Yearbook: 2008*, Section 6.

75 Statistics Canada, *Labour Force Indicators by Age Groups for Both Sexes, 2006 Counts*.

76 Mining Industry Human Resources Council, *Take Action for Diversity*, 25.

77 Diavik Diamond Mine, *Building Northern Communities*.

78 Agnico-Eagle Mines Limited, *Corporate Responsibility*.

partnerships between the college, the government, and industry, CNIM would help the territory prepare a young workforce for a career in mining.⁷⁹

Corporations are also making greater efforts to reach out to new Canadians. New Canadians are often highly skilled in fields related to mining, but many are unaware of potential employment in the field. They also have had difficulty receiving accreditation for prior work and/or training experiences and have come up against other barriers, such as language or the geographic location of some of the mines. New Canadians have mentioned that companies' organizational policies don't always respond to the various cultural backgrounds of new employees, and the lack of diversity within the company's management can deter some potential applicants.⁸⁰ To attract new Canadians to this industry, proponents must work together to improve accreditation and help facilitate the immigration process for workers and their families. New Canadians also felt that awareness training and language training to help them familiarize themselves with Canadian mining terminology would be very helpful.⁸¹

Increasing Aboriginal Participation

Mining companies are struggling to find qualified skilled labour within Northern communities. Geographically speaking, many Aboriginal communities find themselves at an advantage, as they are frequently located very near to exploration and mining projects. (See Exhibit 2.) The Aboriginal population in Northern Canada is also very young. In Northern Saskatchewan and Nunavut, for instance, 34 per cent of that population is under the age of 15, while in the Northwest Territories, 24 per cent is in this same age bracket.⁸² With the number of large new mining projects, Aboriginal communities are well positioned to take advantage of the opportunities they offer.

However, a recent Conference Board of Canada report on Northern labour force capacity explores the difficulties employers face in recruiting skilled labour for open positions. According to the report, "... communities are facing the paradox of businesses operating in their communities with many job openings, but having a population that is not able to take advantage of these opportunities."⁸³ Particularly affected by this paradox are Aboriginal Canadians:

Mining companies have said that the main barriers inhibiting Aboriginal Peoples from participating in the industry are related to lack of experience, inadequate education and training, and the associated training costs [for those] who are often not in possession of the required basic skills.⁸⁴

This is largely due to the fact that in some regions, such as Nunavut, students do not always complete their high school education or move on to post-secondary education. Although graduation rates can vary widely across the North, one-third to one-half of 25- to 64-year-olds do not have a high school diploma.⁸⁵ In Nunavut, only 25 per cent of Inuit students graduate from high school.⁸⁶ Many Northern students do not complete high school for a variety of reasons, including family and social problems, lack of appropriate educational supports, and poor attendance.⁸⁷ And when they do graduate, they find that their education is not on par with that of their Southern counterparts: "Northerners are leaving high school without the skills necessary to transition smoothly into post-secondary schooling."⁸⁸ Many Aboriginal Canadians therefore lack the basic qualifications to find work in the mines.

To help address this, it is standard procedure now for communities to require companies to negotiate impact benefit agreements (IBA) with communities before mine construction begins. Frequently these agreements include

79 Yukon College, *Centre for Northern Innovation in Mining (CNIM) Draft Phase One Feasibility Study*.

80 Mining Industry Human Resources Council, *Take Action for Diversity*, 17–19.

81 Ibid.

82 The Conference Board of Canada, *Kids These Days* and *From the Beginning*. See also Howard, Edge, and Watt, *Understanding the Value, Challenges, and Opportunities of Engaging Métis, Inuit, and First Nations Workers*, 3–5.

83 Martin, *Building Labour Force Capacity in Canada's North*, 1–2.

84 Mining Industry Human Resources Council, *Mining Industry Human Resources Guide for Aboriginal Communities*, 3.

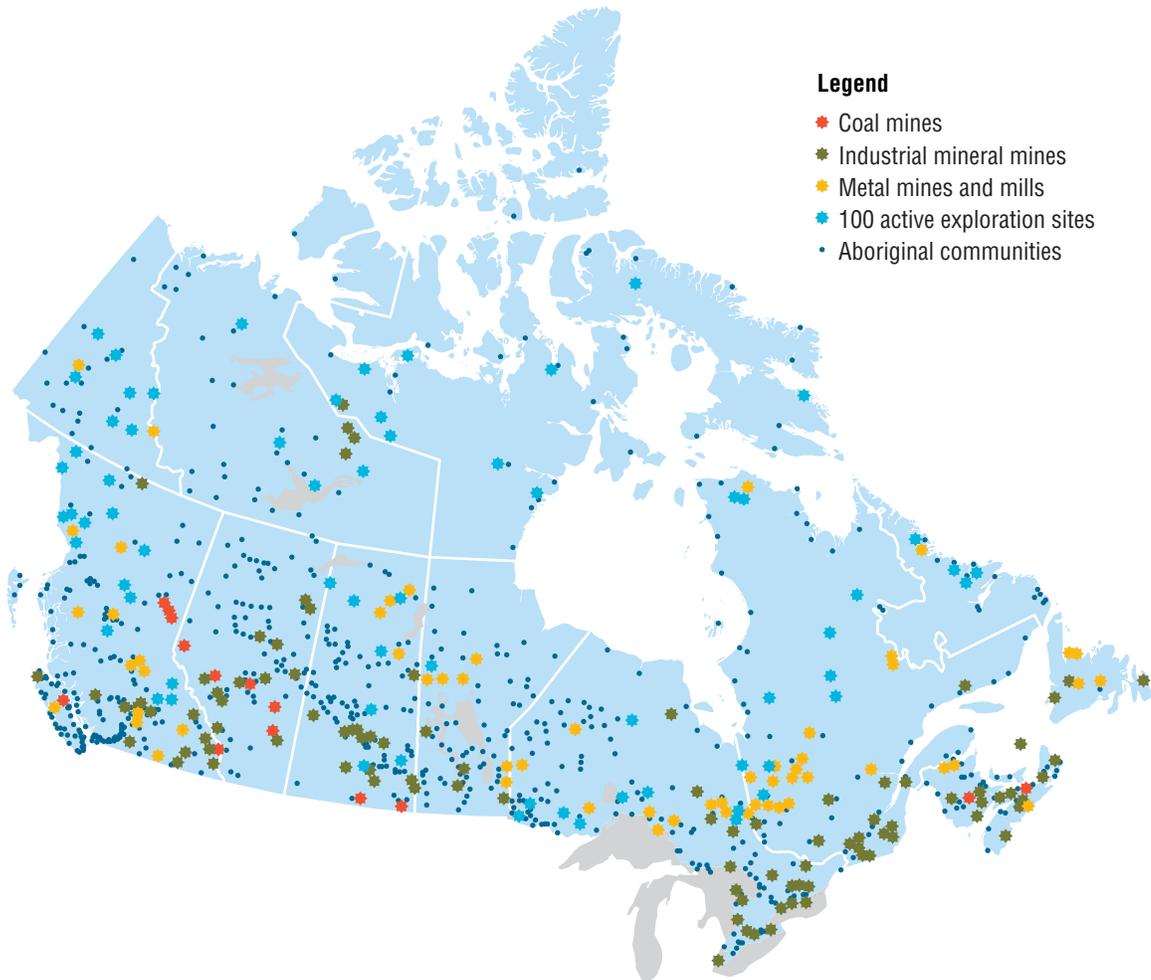
85 Sisco and others, *Lessons Learned*, 5–6.

86 Ibid., 9.

87 Ibid., 11–17.

88 Ibid., 19.

Exhibit 2
Aboriginal Communities and Mining Projects



Sources: Mining Industry Human Resources Council; Natural Resources Canada.

requirements for local employment, provision of services, and scholarship funding. However, low educational attainment levels can greatly limit the community's ability to take advantage of these provisions. Interviewees stated that they lack of an educated workforce is one of the greatest impediments to the industry's ability to hire workers locally. A recent Conference Board report on engaging Aboriginal workers also supports this view. Employers interviewed for the report stated that both

low skill levels and limited work experience can hinder Aboriginal workers from fully participating in the labour force.⁸⁹

This situation makes it very difficult for Northerners to access much of the training offered or enter college programs.⁹⁰ Recognizing this, many colleges in the North have begun to offer preparatory programs. Nunavut Arctic

⁸⁹ Howard, Edge, and Watt, *Understanding the Value, Challenges, and Opportunities of Engaging Métis, Inuit, and First Nations Workers*, 14.

⁹⁰ Sisco and others, *Lessons Learned*, 4–5, 19.

College provides learners with the opportunity not only to finish their high school diploma, but also to take part in several trades preparation programs. These particular programs give students the chance to learn more about the trades programs being offered in the territory and provide pathways to apprenticeships and work in the local mining industry.⁹¹

The Youth in Mining program (YIM) in Nunavut aims to engage youth in mining by providing them with hands-on training, including spending time on-site at Nunavut Arctic College and Agnico-Eagle's Meadowbank mine. The program helps break down some of the barriers between young people and the industry, while exposing them to career options such as the trades.⁹² The company had been sending heavy equipment trainees to southern locations for training,⁹³ but recently purchased, and located at the mine site, a computerized training simulator that allows workers to train on heavy equipment closer to home and in a classroom situation. Other mining companies in the North have also provided similar training programs. The Meadowbank gold mine has had a significant impact on local employment, reducing the unemployment rate in Baker Lake from 40 per cent to just 4.5 per cent by employing 180 Inuit workers (of a total of 499 workers) in the mine.⁹⁴

As well, numerous training programs provide skills training to Aboriginal adults, making them work ready. For instance, the Mining Essentials Work Readiness Training Program for Aboriginal Peoples aims to provide Aboriginal Canadians with the skills to make them job ready over the course of 12 weeks. The program consists of hands-on training, classroom study, and site visits. It is delivered in the community and organized in conjunction with local colleges and training schools, mines, and the Aboriginal community itself.⁹⁵ Piloted in Thunder Bay and Kenora in Northern Ontario and

Hazelton in Northern British Columbia, the program has been successful and will be expanded cross-country.⁹⁶ Interviewees also cited the Mine Training Society in the Northwest Territories as an excellent example of worker training programs. They have had great success in providing local Aboriginal populations with the training needed to be employed in the diamond mining industry.

Quebec's mining industry works closely with Aboriginal communities to ensure labour participation in the sector. To prepare for the anticipated shortage of mining workers, the Government of Quebec outlined a plan to enhance education and training, promote employment in the sector, and provide support for worker adaptation. It also plans to create the Mining Employment Partnership with industry partners, Emploi-Québec and the Ministère des Ressources naturelles et de la Faune to promote jobs within the mining sector, especially in Aboriginal communities. In addition, through Géologie Québec, the government offers Aboriginal youth internships with geological mapping teams to expose Aboriginal youth to the jobs in the mining sector.⁹⁷ The province's northern development plan will develop sector-specific training aimed at business needs and make occupational training more widely available in the northern part of the province. Distance training will also be made available for residents of the province too far away to attend workshops in person.

Although many challenges currently limit the participation of Aboriginal peoples, mining companies and the industry have done much to ensure their inclusion in projects.

All levels of government, communities, and industry have a role to play in increasing the rate of Aboriginal participation in this particular sector. Although significant gains have been made, training needs to continue to target Aboriginal populations specifically. Education

91 Nunavut Arctic College, *Trades Access*.

92 Kivalliq Mine Training Society, *Programs and Applications*.

93 Agnico-Eagle Mines Limited, *Measuring Up*.

94 *Ibid.*, 26.

95 Mining Industry Human Resources Council, *Mining Essentials*.

96 Canadian Institute of Mining, Metallurgy and Petroleum, *HR Outlook*.

97 Ministère des Ressources naturelles et de la Faune, *Preparing the Future of Québec's Mineral Sector*, 43.

and training opportunities need to be supported on an ongoing basis. This practice alone will contribute to increasing the number of skilled labourers in the North.

Furthermore, Aboriginal communities need to see Aboriginal mining employees—especially in the higher levels of management.⁹⁸ Some interviewees stressed the need to move Aboriginal employees into supervisory and managerial roles within the company, as it helps encourage entry-level employees and provides them with career role models. Diavik created an Aboriginal development program to help in this regard. The program provides 160 hours of leadership training and mentoring for Aboriginal workers to ensure they have greater opportunities within the company.⁹⁹

ADDRESSING LABOUR FORCE CAPACITY ISSUES

Besides Aboriginal Peoples, companies could draw from other sources of labour in the future. New Canadians, women, and youth are under-represented within the industry, but could make up a larger share of its workforce. However, much work needs to be done to address the image and perception many of these groups have of the mining industry. By demonstrating greater flexibility with regard to worker integration and work schedules, and showcasing the many career options available, mining companies have a greater chance of successfully recruiting and retaining new employees from these groups.

Women would especially benefit from more flexible work arrangements that are less taxing on mothers and families. Rotation schedules are hard on family cohesion

and dynamics. Greater child care options within communities could provide a solution for mothers who have to leave to work at mining sites. The proverb “It takes a village to raise a child” could inspire a way forward to help mothers who can and want to work in mining.

There are many ways that governments at all levels can work together with mining companies to help overcome some of the obstacles potential recruits see in the industry. In terms of bringing new Canadians on board, it is essential that the federal government work to recognize the credentials of foreign workers. As well, joint partnerships between governments and companies to ensure integration and assist workers with everything from the application process to learning new terminology would help workers better understand the industry. For young Canadians, greater, targeted outreach in high schools, and programs that highlight career options in the mining fields, would certainly help break down many of the misconceptions young people have about the industry, while at the same time broadening their career horizons.

Aboriginal Canadians can be an important and valuable source of labour in the years to come. Although many challenges currently limit their participation, mining companies and the industry as a whole have done much to ensure Aboriginal inclusion in projects. Programs that provide work preparedness training, skills upgrading, and trades training have had positive impacts on communities. The ongoing funding by federal and provincial/territorial governments of programs like mine training societies will continue to ensure that Aboriginal Canadians can participate fully in the local labour force.

98 Mining Industry Human Resources Council, *Take Action for Diversity*, 11–13.

99 Diavik Diamond Mine, *Building Northern Communities*.

CHAPTER 4

Impacts and Benefits of Mining for Northern Communities

Chapter Summary

- ◆ Mining companies must take the time to develop and maintain positive relationships with Aboriginal and Northern communities. This is key to ensuring that relationships are mutually beneficial for industry and communities.
- ◆ Timely, open, and transparent communications are vital for community engagement in the development process. Consultations must begin early on in project development.
- ◆ Impact and benefit agreements are important mechanisms: they ensure that communities receive benefits from mining projects in and around their communities by covering aspects such as employment, business development, skills development, and training.
- ◆ Concrete actions to counter negative impacts associated with mining projects are needed, and must be supported by leaders at all levels to improve net benefits for communities.

Northerners ultimately hope to benefit from mining activity through well-paying jobs, support for local businesses, and the development of vibrant and healthy communities. They are, however, concerned about the potential impacts mining may have on their communities and their way of

life. Aboriginal people want to ensure that mining can coexist with their traditional ways of life such as hunting, fishing, and trapping. There are also concerns that economic development from new mines will impact social cohesion in communities and create social problems. These concerns are often real and must be addressed.

By working together and supporting each others' efforts, communities and industry can achieve this important balance. This requires engaging and accommodating, to the extent possible, local communities that will be affected by mining development. Mining projects in Northern regions today have difficulties proceeding without the support of local communities—particularly Aboriginal communities.

In addition to consulting and negotiating with communities, mining companies and governments need to demystify their mining activities. This includes providing Northerners with adequate and factual information about mining projects. Concerted and meaningful efforts are also needed to alleviate community concerns and respond to community needs as best and as timely as possible. Establishing a good relationship with communities at the outset of mining projects is crucial. It can help build solid trust between industry and communities, with the potential to bridge the gap that often exists between the two parties.

MINING AND NORTHERN COMMUNITIES: TIMES HAVE CHANGED

Canada has a long mining tradition. Until the mid-1900s, mining in Canada took a harvest-type approach. Resources were discovered through the surveying and mapping of previously uncharted territories. Once discovered, these resources were exploited as quickly as possible until the site was depleted, and companies then moved on to another territory. Temporary towns were built around these mining resources and, in many instances, were abandoned once the resource was exhausted.¹

Companies must build healthy relationships with Northern communities. But the process can't be rushed: companies must be willing to work at the community's pace.

Throughout the late 19th century and well into the 20th century, certain regions continued to experience boom and bust cycles, while many mining communities were established and settled in permanence, like Sudbury (in Ontario) and Flin Flon (in Manitoba).² Companies founded communities in close proximity to major deposits, and soon after, secondary sectors that supported mining activity were also established. This “resulted in the development of single-industry resource-dependent communities.”³

In the 1980s, when mining pushed into more remote locations, the fly-in, fly-out model of mining was widely adopted. Companies chose to fly workers from southern regions of Canada into mining sites, instead of building company towns. This resulted in savings for the companies and lowered the costs of closing the mine once the resources ran out. Unfortunately, this method was not always inclusive of Aboriginal communities around

the new mine site, as supplies and labour were brought in from elsewhere. The developments did not economically benefit the regions and “negative social impacts [could] still occur in communities.”⁴

Aboriginal communities in particular have been affected by mining developments. Aboriginal people surrendered much of their traditional homelands through the signing of historical treaties. Although today they maintain their rights to hunting and fishing on uninhabited portions of their traditional territories, they do not necessarily retain the rights to any of the sub-surface resources. The historical development and exploitation of these resources did not happen with the consultation or consent of First Nations communities. As a result, “Aboriginal people have had little say in decision-making regarding mining near or on their ancestral lands, and have borne most of the costs and received none—or only negligible—benefits.”⁵ As noted in the last chapter of this report, it has been only since the Supreme Court of Canada ruled on a few significant cases during the last decade that companies have begun meaningful consultations with Aboriginal communities affected by mining development. Currently, these consultation processes are key factors in the success of mining projects.

RELATIONSHIP BUILDING: CREATING PARTNERSHIPS AND TRUST WITH NORTHERN COMMUNITIES

Companies must take the time to build healthy relationships with Aboriginal and other Northern communities and earn their trust. The process cannot be rushed; companies must be willing to work at the community's pace.

This is one of the lessons Vale Inco learned at its Voisey's Bay mine site. The local communities had serious concerns about the project, and Vale Inco took the time to understand their perspectives and worked to build suitable resolutions. In this way, the company was able to

1 Natural Resources Canada, *The Social Dimension of Sustainable Development and the Mining Industry*.

2 Ibid.

3 Ibid.

4 Ibid.

5 Hipwell and others, *Aboriginal Peoples and Mining in Canada*, 4.

gain the support it needed: “The Voisey’s Bay development is a better project today because of the time it took to reach the needed agreements.”⁶

Ensuring that relationships are mutually beneficial and provide opportunities for partnerships, and in some cases joint ventures, is also important. This demonstrates a willingness to see a community succeed and build its own capacity and businesses. These partnerships can also help communities achieve their own social or economic goals.⁷ In the case of De Beers’ Snap Lake mine, in the Northwest Territories, the company has invested over \$670 million in joint venture projects with locally owned companies.⁸ Many mining companies are also working closely with local suppliers and workers in Northern communities. As a result, they have become less reliant on importing workers and materials and are actively engaging in training and developing the local workforce, and building local businesses. Interviewees also agreed that joint partnerships and capacity building through other projects such as training and development can foster positive relationships.

By continuing to communicate openly with communities and ensuring that the relationship is flexible, companies are able to build lasting relationships with them. By following through on their commitments, including partnerships and joint ventures, companies are able to build relationships based on trust between themselves and local residents.

OPEN AND TRANSPARENT COMMUNICATION

Communities often find themselves at a disadvantage when industry proposes a project in Northern regions. Interviewees for this report noted that communities are unprepared for mining development. They often have limited knowledge about mining and what it could mean for their community and environment. A lack of common vision and cohesion within the community itself can also leave the community unsure of its position on development. Interviewees also mentioned that

Northerners worry that companies will be dishonest with them about the potential adverse effects their project could have on their communities and traditional lands.

Some groups and organizations have worked to help Northern and Aboriginal communities understand the mining cycle and its implications. Natural Resources Canada, along with the Canadian Aboriginal Minerals Association, The Mining Association of Canada, and several other associations produced the *Mining Information Kit for Aboriginal Communities*. This guide is intended to provide an overview of the mining life cycle, and explain to communities what they can expect during each phase. In doing so, the guide also gives communities the tools they need to participate in the development of the project.⁹ While the guide provides an excellent starting point for communities, it is not enough.

By following through on their commitments, including partnerships, companies are able to build relationships based on trust between themselves and local residents.

Some of the most effective means of communicating with communities about mining projects can be through presentations and open houses at a local level, and as early as possible in the development cycle. Communities need to be given as much information as possible at the outset with regard to mining development, operations, and closure, so that the potential benefits and risks may be fully understood before work begins on-site. Information about mining’s impacts and community rights must be accessible to people from the beginning, to allow them to make an informed decision about whether they support the project in principle. All too often, people receive information too far along in the process and are then able to discuss only how to mitigate impacts.¹⁰

Communication strategies, such as workshops, conferences, and online materials, can certainly facilitate decision-making and relationship building. Larger mining companies have also started using community

6 Vale Inco Canada, “Negotiating Agreements.”

7 Natural Resources Canada, *Mining Sector Performance Report 1998–2008*, 26–27.

8 De Beers Canada, *About the Snap Lake Mine*.

9 Natural Resources Canada, *Mining Information Kit for Aboriginal Communities*, 1–2.

10 Gibson and O’Faircheallaigh, *IBA Community Toolkit*, 92.

liaison officers, who “facilitate information sharing with the community and other stakeholders.”¹¹ These officers can help relay some of the community’s concerns to the company and keep the lines of communication open between all stakeholders.

In providing open and transparent communication, companies help demystify their mining activities. Communities are then able to understand the benefits, potential impacts, and risks that may be associated with a proposed development project. Interviewees noted that communities aren’t always as aware of some of the benefits associated with a new mining project, such as local jobs and incomes that it can generate, skills that it can develop, and much-needed infrastructure that it can provide.

The past decade has seen an increase in the expectation that mining companies liaise with and work on external outreach, and this “has become an increasingly important practice in the Canadian mining industry, both domestically and abroad.”¹² However, this outreach remains entirely voluntary. Proponents are not obligated to provide information sessions for communities in the early stages of project planning and development.¹³

As a result, The Mining Association of Canada developed its Towards Sustainable Mining initiative to ensure its members engage communities that will be impacted by development. Members must measure how well they work with communities and how well they are able to respond to the communities’ concerns and needs. When the initiative began in 2004, there was very little consistency among members in this regard. Now, all members are measured on whether their dialogues are effective and have successfully engaged the communities and whether their response mechanisms to community concerns have been properly established.¹⁴

11 Natural Resources Canada, *Mining Sector Performance Report 1998–2008*, 25.

12 *Ibid.*, 24.

13 *Ibid.*

14 The Mining Association of Canada, *Towards Sustainable Mining: Progress Report 2011*, 16.

CONSULTATION AND CONSENSUS IN ABORIGINAL COMMUNITIES

Mining companies should consult with Aboriginal communities as early as possible in their projects. This could mean as early as the exploration stage. Interviewees observed that the earlier a community is engaged and consulted, the better. According to one interviewee, “It’s never too early to engage Aboriginal communities in dialogue.” Companies will then understand the community’s interests, needs, and issues and will be better able to address them before exploration and development proceeds. It increases the possibility that mining projects will move forward.

Kitchenuhmaykoosib Inninuwig (K.I.) First Nation and Platinex Inc.

It is essential that companies build good community relations and reach agreements from the outset of a project. The case of Kitchenuhmaykoosib Inninuwig (K.I.) First Nation and Platinex Inc. illustrates why this is important. While Platinex had engaged with the community about mining exploration and development on their traditional territories, no agreement or understanding was reached between the community and the company. When the company began exploration and drilling without the community’s consent, K.I. residents protested on the exploration site. The tensions were exacerbated when Platinex continued to work without the community’s support and the case landed in the courts. Platinex’s exploration plans were stalled by protests and legal battles. The project in Northern Ontario was finally abandoned after nearly a decade of litigation and court cases.¹

1 Canadian Business Ethics Research Network, *K.I. vs. Platinex*.

Source: Canadian Business Ethics Research Network, *K.I. vs. Platinex: A “Worst Case” Example of Community Relations*. www.cbern.ca/research/projects/workspaces/cura_project/case_studies/ki_vs_platinex/.

There are many examples of successful agreements between communities and companies. The Diavik Diamond Mine in the Northwest Territories, for example, sought to create a process that was inclusive of all Northern stakeholders, including the Aboriginal community. In the initial exploration phases, Diavik

worked to hold public meetings so that members of the communities could be kept up-to-date on the progress of the project and voice their concerns. The company also worked with local communities to gather and include traditional knowledge in their planning.¹⁵ Today, the mine is in its operational phase and the company continues to consult with the communities and keep them apprised of its work. Through their Socio-Economic Monitoring Agreement, the community and the public at large remain aware of how Diavik is faring around commitments such as local employment and the environment.¹⁶

Impact and benefit agreements (IBAs) have become an important instrument for local communities to receive benefits and address issues from mining activity.

De Beers Canada has also worked successfully with both the Moose Cree First Nation and the community of Attawapiskat, in Northern Ontario. These communities, along with others, had overlapping traditional territories that would be impacted by a proposed diamond mine.¹⁷ De Beers worked with the community of Moose Factory and with the Moose Cree when their traditional territory would be affected by rail and hydro development for the Victor mine, close to Attawapiskat. The company hosted public meetings and consultations with both communities very early in the process, so that they could understand how they could be impacted by the proposed development project. De Beers concluded several impact and benefit agreements (IBAs) in the area, including with the community of Attawapiskat and the Moose Cree First Nation. It has worked to develop a collaborative approach to consultation, so that the relationship between the community and the company continues to remain positive.¹⁸

IMPACT BENEFIT AGREEMENTS: IMPORTANCE FOR ABORIGINAL COMMUNITIES AND MINING COMPANIES

Impact and benefit agreements (IBAs) have become an important instrument for local communities to receive benefits and address issues from mining activity. Today, IBAs are the result of four important steps:

1. The company and the local community must reach an agreement concerning access to lands for exploration purposes.
2. The parties must come to a memorandum of understanding (MoU) about the project. This MoU offers all parties the opportunity to openly discuss any concerns or hopes they may have for the proposed project. While MoU's are not legally binding, they can clarify what needs to happen in order for projects to move forward.
3. If overlaps exist (as in the environmental assessment phase), they are dealt with, or procedures are put in place to deal with them.
4. Once the first three conditions have been met, the IBA can be negotiated.¹⁹

An IBA is described as “[a] contractual agreement, usually between an Aboriginal community or entity and a mining company.”²⁰ IBAs can arise from a mining company’s consultations through their duty to consult. While the Crown is legally responsible for consultations and cannot delegate its duty to consult, proponents (like mining companies) must be able to prove that they have adequately consulted with communities that may experience impacts from a proposed project. IBAs are a tool that communities and proponents can use to ensure that there have been adequate consultations around a proposed project.²¹ They are important because they can “ensure that adequate measures are in place to mitigate the potential negative impacts of major non-renewable resource projects, while providing support to enhance their positive outcomes.”²²

15 Canadian Environmental Assessment Agency, *Backgrounder*.

16 Diavik Diamond Mine, *Community Investment*.

17 Natural Resources Canada, *Mining Sector Performance Report 1998–2008*, 24.

18 Canadian Business Ethics Research Network, *Moose Cree First Nation; De Beers Canada's Perspective*.

19 Gibson and O’Faircheallaigh, *IBA Community Toolkit*, 43.

20 Natural Resources Canada, *Mining Information Kit for Aboriginal Communities*, 91.

21 Gibson and O’Faircheallaigh, *IBA Community Toolkit*, 30.

22 Pulla, *Striking a Balance*, 7.

Mining developments in Canada's North require that communities surrounding the proposed development site be consulted and fully involved in the process. In areas where there are unsettled land claims, IBAs are not legally required for a project to proceed, but they are strongly recommended.²³ However, in regions where claims have been settled—in particular where modern land claims agreements have been concluded—IBAs, or Inuit IBAs (IIBAs) in Nunavut, are necessary for any major resource development project to proceed.²⁴ In the Northwest Territories, for instance, several mechanisms for IBAs exist. Land claims agreements with the Inuvialuit, Sahtu and Gwich'in, and the Tlicho all include provisions for IBAs—but there is no single process for the negotiation of these agreements. The most comprehensive IIBA requirements in the North are a part of the Nunavut Land Claims Agreement (NLCA). The NLCA stipulates that IIBAs must be finalized with affected communities prior to the commencement of any development projects.²⁵

Since communities and their needs are unique, IBAs must be adapted to suit each community's requirements.²⁶ Generally speaking, IBAs may include provisions for:

- ♦ Aboriginal employment opportunities throughout the mine's life cycle (exploration, development, operation, and closure);
- ♦ education and training programs that help community members take advantage of the project;
- ♦ local business development opportunities;
- ♦ scholarships;
- ♦ cultural and social support and programming;
- ♦ environmental management and/or monitoring; and
- ♦ financial provisions, such as annual cash payments or revenue sharing.²⁷

23 Natural Resources Canada, *Mining Information Kit for Aboriginal Communities*, 60.

24 Gibson and O'Faircheallaigh, *IBA Community Toolkit*, 32–33.

25 Ibid.

26 Faille and Dandonneau, *Aboriginal Impact Benefit Agreements*.

27 Ibid.

The provisions found in IBAs are important tools in helping build sustainable communities. In fact, “IBAs have the potential to increase the adaptive capacity, sustainability, and ultimately, the resilience of Northern communities.”²⁸

Challenges in Negotiating and Implementing IBAs

There are undeniably challenges in developing, negotiating, and implementing IBAs. The greatest obstacle, according to interviewees for this report, is building trust with communities. This is especially challenging given the history of non-consultation between the industry and Northern communities.

The confidential nature of these agreements can also pose a substantial challenge. First Nations or industry representatives may include confidentiality clauses in both the negotiation process and the final agreement, and such clauses can limit the private sector's ability to discuss agreements with other companies operating in the area. Interviewees stated that not knowing what arrangements have already been concluded with other companies or industries can be frustrating. There is no point of reference from which to negotiate or to understand what others have already provided for in their IBAs.

Another obstacle can be the lack of community capacity to enter into negotiations with a mining company: communities often do not have the necessary tools, financial capital, or experience to enter into a meaningful consultation process. According to interviewees, the lack of community capacity can significantly affect the community's ability to fully engage and understand the proposed project. This issue creates an additional hurdle for industry, as development projects are delayed until communities organize a negotiating committee, which can take some time. Frequently, the community needs to hire outside experts for negotiations—lawyers or analysts—and this can be financially challenging for communities with tight resources.²⁹

28 Fournier, *Getting It Right*, 16.

29 Ibid.

Moreover, because there is no standard approach to negotiating IBAs, there are no clear guidelines on how the private sector can address these capacity challenges. Communities with little or no experience with major projects have difficulty understanding what they can reasonably expect from IBAs and how to negotiate meaningfully with the private sector. Interviewees noted that mining companies find it challenging to manage a community's expectations and to communicate that the mine cannot be the solution for all the community's economic woes or provide everything the community needs. Some interviewees felt that governments, which typically play no role in the negotiation of IBAs, need to consider partnerships with industry to help address these particular questions.

What Benefits Flow From IBAs?

With mining companies at home and abroad focusing on sustainable development, benefits that are part of impact and benefits agreements can go a long way to helping these communities become self-sufficient later on, especially once the mine has closed. To reap the long-term benefits, communities need to agree on and prioritize their needs. It is critical that a consensus exist within the community, to know which elements need to be supported through the development and implementation of an agreement.³⁰ For example:

... if a community has identified that education and health services are sub-standard because of critical skills shortages in these areas, and that community members have little prospect of gaining and holding industrial jobs until these services are improved, an IBA that focuses heavily on creating employment opportunities in a mining project will be of limited benefit. However, if an IBA creates a substantial, company-funded, scholarship scheme that allows students to study in areas identified as community priorities, the IBA may play a key role in meeting community needs.³¹

It is in this spirit that communities and companies should approach the drafting of an IBA. The provision of education, training, and employment opportunities

30 Gibson and O'Faircheallaigh, *IBA Community Toolkit*, 51.

31 *Ibid.*

The Makivik Corporation and the Raglan Mine in Northern Quebec

The Raglan mine in Quebec has been in operation since 1997 and has brought many economic and social benefits to the local Inuit communities. The agreement provides benefits to the communities closest to the mine; and some benefits are channelled toward the Inuit as a whole through the Raglan Trust via the Makivik Corporation. Originally owned by the former Falconbridge Limited, the mine is now operated by Xstrata Nickel. At the beginning of the mine operation, the Makivik Corporation, which is responsible for the political, social, and economic development of Nunavik, signed an impact benefit agreement (IBA) with Falconbridge. Initially there were some challenges associated with the IBA—for example, the work rotation of four weeks in, two weeks out was stressful for Inuit workers, due to long periods away from their relatives. To better assist workers, the schedule was changed so that employees now work shifts of two weeks on, two weeks off. Special accommodations are made in a hotel-style complex for visiting families, and employee assistance programs assist families in separation. While the company has granted contracts to local communities, few economic spinoff developments have been created. Some language issues also created barriers for employees. Xstrata Nickel now provides Inuit training programs, runs awareness programs in all of Nunavik's high schools, and provides scholarships in mining-related areas. By 2007, Makivik Corporation had received \$32.6 million, while the mine's direct contribution to Nunavik's economy was approximately \$130 million.¹

1 Natural Resources Canada, "Raglan Mine—Quebec," 33–34.

Source: Natural Resources Canada, *Aboriginal Engagement in the Mining and Energy Sectors: Case Studies and Lessons Learned*.

are nearly always included, as they are considered to be important benefits of having IBAs. Communities want to ensure that residents are able to take advantage of opportunities resulting from mining development. Furthermore, "a set number or a percentage of all work positions are reserved for local Aboriginal community members."³²

32 National Aboriginal Health Organization (NAHO), *Resource Extraction and Aboriginal Communities in Northern Canada: Social Considerations*, 3; Gibson and O'Faircheallaigh, *IBA Community Toolkit*, 144.

Many of the positions available to the local workforce, however, are entry-level positions, which do not require a technical education. Interviewees noted that in some instances, these jobs are the first jobs that some workers have ever had in their lives, as work has not always been available in the region. Interviewees also said that mining companies provide as many training opportunities as possible to communities to ensure that they are able to participate, which in turn reduces a company's dependence on workers from outside the area. These training programs are necessary, as residents don't always have the prerequisites needed to obtain any type of employment in the mine.

As well as education, training, and employment opportunities, mining projects can help grow local businesses that can continue to exist once the mine has closed.

With commitments by mining companies to hiring a large percentage of locals, mining companies invest heavily in the development and delivery of training programs. Diavik and De Beers have worked with local communities to provide training programs that are relevant to prospective employees.³³ Interviewees noted that programs like the Mining Essentials program or training developed through the NWT Mine Training Society have been very successful and have proven to be invaluable in the recruitment of residents nearest to the mine site. And although mining is cyclical, these training programs ensure that community members are given transferable skills that will permit them to find other employment once the local mine closes.³⁴

Nevertheless, it can still be difficult for employers to meet the committed number of employees from the local community. Training opportunities arise only when the mine begins operations, and thus there is a shortage of skilled and trained labour at the beginning. Companies

must still rely on labourers from elsewhere until recruits have completed training programs. Furthermore, educational barriers make it very difficult for many Aboriginal employees to move beyond entry-level positions and into more senior ones.³⁵ These realities can limit the benefits that can flow from IBAs.

In addition to education, training, and employment opportunities for local communities, mining projects can also grow local businesses. IBAs provide opportunities for mining companies to source goods and services from the local community, giving its entrepreneurs the chance to create or expand their businesses. By sourcing goods and services through the community, mining companies are helping to build up local capacity, and potentially create sustainable businesses that can continue to exist once the mine has closed. As a result, funds flow back into the community and contribute to its ongoing development. Joint ventures between companies and local businesses can be mutually beneficial, as companies save on the costs of importing materials or goods, and directly contribute to the growth and prosperity of the region. There are many examples of successful economic agreements throughout the North. For example, Diavik has spent over \$2 billion on Aboriginal businesses since construction began in 2000.³⁶ In Labrador, the Voisey's Bay project awarded well over \$500 million in contracts to Aboriginal businesses. Even so, there are sometimes barriers that prevent some smaller local businesses from accessing important mining contracts. Local businesses can lack the skills and expertise required to negotiate these agreements or to provide the required services to mining companies. What's more, a lack of capital in smaller, more remote communities can prevent would-be entrepreneurs from bidding on contracts because they do not have the start-up funds.³⁷ In such situations, governments and, to some extent, companies could help local entrepreneurs by providing training, mentorship, and seed capital.

33 De Beers Canada, *Education and Training*; Diavik Diamond Mine, *Community Investment*.

34 De Beers Canada, "Employees," 37–49.

35 Gibson and O'Faircheallaigh, *IBA Community Toolkit*, 144.

36 Diavik Diamond Mine, *Community Investment*.

37 Gibson and O'Faircheallaigh, *IBA Community Toolkit*, 156–57.

The creation of jobs, local business development, and education and training opportunities has a large social and cultural impact on communities. One of the more obvious benefits is an increased standard of living for many residents. While there can be—and often are—difficulties in transitioning from a traditional to a wage-based economy, for many families a salary can mean the ability to meet basic needs, like shelter, food, and clothing. Interviewees emphasized that this is by far one of the most important social benefits for many. They also noted that this alone can go a long way in building residents' self-esteem and giving them the confidence they need to look for other opportunities later on. As well, a steady wage means that there is much less dependence on social assistance.³⁸ Workers can also afford better accommodations and shelter.

Furthermore, IBAs can be a means to providing communities with much-needed infrastructure. Communities often don't have basic infrastructure such as hospitals, schools, roads, or access to reliable and efficient power sources. Mining companies can address some of these gaps. For example, Agnico-Eagle has helped provide cell phone service to the community of Baker Lake, Nunavut, through the installation, at the company's own cost, of a cell tower.³⁹ The company is also actively working to help build road infrastructure in the territory. Recently, it was given the approval to begin construction on a 13 kilometre road that will link the Meliadine project to the town of Rankin Inlet. The road will be used to ship workers and supplies like fuel and food from the town to the mine site, saving the company close to \$5 million annually over the cost of flying. The road will also create many business opportunities for the town.⁴⁰ De Beers Canada has also worked closely with the communities surrounding its Victor Lake mine in Northern Ontario to help look at the maintenance of local potable water sources and sewage treatment. The company has also worked to set up a monitoring program for mercury levels in the local water supply.⁴¹ Companies invest in other types of infrastructure projects for the

community as well—such as the construction of recreation facilities and baseball fields, as in the case of Baker Lake, Nunavut.⁴²

Through a variety of initiatives and programs, companies support links to the traditional lifestyle and economy of Aboriginal Peoples. For instance, “[a]rrangements are commonly made for employees working on the sites of major projects to harvest at specific, crucial times during the year. . . . The traditional economy—hunting, trapping, and fishing—provides important community and cultural benefits that help to sustain the lifestyles unique to the North.”⁴³ Mining companies also value traditional knowledge and culture, and frequently include support for it in agreements with communities. Agreements often include provisions for the protection of language through courses or special programs; the preservation of important cultural sites; the funding of traditional knowledge studies; and funding for celebrations, events, and activities.⁴⁴

The financial provisions of IBAs and their connection to resource revenue-sharing arrangements are also important elements to discuss. In some instances, these provisions could amount to millions of dollars for Aboriginal communities to use on special projects and community infrastructure-related development. Resource revenue sharing, however, is an extremely complex issue that has multiple political, economic, and jurisdictional implications.⁴⁵ In particular, a significant gap exists between what percentage of resource revenues governments are prepared to share and what Aboriginal groups are expecting and advocating.⁴⁶ From an Aboriginal point of view, “Resource wealth tends to bypass communities as profits go to outside investors, payments go to outside services and suppliers, wages go to outside labour, public revenues go to central governments, and local people are barred from participation by poor education, social and physical infrastructure.”⁴⁷

38 Pulla, *Striking a Balance*, 7.

39 Agnico-Eagle Mines Limited, *Good Neighbour*, 63.

40 Rogers, “Work Starts on New Rankin Inlet–Meliadine Road.”

41 De Beers Canada, “Employees,” 63.

42 Agnico-Eagle Mines Limited, *Good Neighbour*, 53.

43 Pulla, *Striking a Balance*, 8.

44 Gibson and O’Faircheallaigh, *IBA Community Toolkit*, 164–65.

45 Cornish, 2006, i.

46 *Ibid.*, 2.

47 *Ibid.*, 8.

The private sector, however, sees that a greater sharing of public revenues between government jurisdictions and Aboriginal communities would help to provide a stronger and more predictable foundation to support long-term investment in the mining sector. According to one expert, industry's experience has often been "that instead of governments sharing benefits, they deflect aboriginal demands for sharing resource revenues onto industry in the form of equity participation, revenue surcharges, and increased impacts and benefits compensation."⁴⁸ This then leads industry to seek changes to Canada's tax regulations in order to offset its expenses related to negotiating IBAs.⁴⁹

Ultimately, greater efforts are needed to build meaningful tripartite (federal/provincial/Aboriginal) processes. These processes would include transparent and accessible principles and guidelines on resource revenue-sharing arrangements—especially in the historic treaty regions across the North. Lessons can be learned from the implementation of resource revenue-sharing arrangements embedded in modern land claim agreements. In the Northwest Territories, for example, the Inuvialuit, Gwich'in, Sahtu and Tłı̄chǫ settled agreements include surface ownership, with subsurface ownership in some areas. The Gwich'in, Sahtu and Tłı̄chǫ agreements also provide a share of the resource revenues collected on public land throughout the Mackenzie Valley.⁵⁰

ADVERSE EFFECTS OF MINING ON NORTHERN COMMUNITIES

While large mining projects can bring great benefits to Northern communities, they can also create a number of negative impacts. One of the most noticeable relates to the earning of a wage. Several interviewees pointed out that financial literacy is nearly non-existent in many Northern communities. Many workers have not had access to a salary in the past, and many tend to spend all of their earnings without considering that their job may not be a long-term certainty.

48 Cornish, 2006, 12.

49 Ibid., 12

50 Government of the Northwest Territories, 2013.

Mining projects can also exacerbate housing shortages. Many communities already have issues with overcrowded homes, and existing homes are often in desperate need of repair. Local infrastructure, such as sewage treatment, can be insufficient to meet the demands placed on the system.⁵¹ Ultimately, an "... influx of workers can worsen existing housing shortages, inflate house prices and rents, and lower vacancy rates. ... There are few homeless shelters, and as projects lure transient people into communities, the number of homeless is likely to increase."⁵²

There are also potential adverse effects for family cohesion. The shift work and rotation schedule leaves mainly women home alone to care for children and can put a strain on families. NAHO reports that "in extreme cases, workers may not return home between shifts, opting to spend their paycheques gambling or in bars in larger communities. The strain at home can lead to conflicts, family violence, the neglect of children, and family break-ups."⁵³ Increased violence against women and drug and alcohol abuse may also result.⁵⁴

The process would benefit from having a negotiation framework that provides clear guidelines and responsibilities for both the industry and the communities.

A community's social cohesion can also be affected, as many workers and their families may no longer want to or be able to participate in traditional activities or volunteer in the community.⁵⁵ Further tensions can exist between those earning high wages who can afford to purchase home goods, new vehicles, and new harvesting equipment, and those who cannot. Aboriginal communities' sense of sharing can be challenged as the

51 NAHO, *Resource Extraction and Aboriginal Communities in Northern Canada: Social Considerations*, 4.

52 NAHO, *Resource Extraction and Aboriginal Communities in Northern Canada: Social Considerations*, 4.

53 Ibid, 7–8.

54 Pulla, *Striking a Balance*, 7.

55 NAHO, *Resource Extraction and Aboriginal Communities in Northern Canada: Cultural Considerations*, 5–6.

wage economy confronts the traditional economy. For instance, “[p]eople begin to expect payment to attend annual general meetings and to teach traditional skills. In a sense, the cost of social capital in the community increases.”⁵⁶ Mining projects can bring about profound societal changes, and many communities find themselves unprepared to deal with them.

FUTURE STEPS TOWARD IMPROVED NORTHERN COMMUNITY NET BENEFITS

IBAs are important steps to engaging local Northern Aboriginal communities, providing them with opportunities from new mining projects, and addressing their concerns about development in their regions. But improvements can be made in how these agreements are negotiated. The process would benefit from having a negotiation framework that provides clear guidelines and responsibilities for both the industry and the communities. The framework should be flexible and adaptable, so that the individual needs of the communities can be met. Companies and communities are currently left on their own to negotiate these agreements, and a framework could act as a point of reference, especially if the parties are negotiating an agreement for the first time.

There is value in having a more open and transparent process of negotiation and in sharing the terms of the agreements of IBAs. Such a process would allow governments to support the process, especially when there are points of contention. It would also better engage governments early on in helping address issues that the mining company and community are not properly equipped to handle, such as education, health care, and social services.

To help workers transition to a wage economy, governments need to step in to provide financial literacy training. Some mining companies in the North have already implemented these programs, but they would greatly

benefit from government support. This would ensure that financial literacy programs are not limited to one particular site, but are available to all who need them.

To help mitigate the impacts of mining shift work on individuals, families, and communities, companies need to look at how this type of work affects families. Much flexibility is needed to ensure that family cohesion is maintained. As well, companies, governments, and communities need to work together to help family members affected by rotating schedules. This could include, for example, funding for and provision of child care within communities and support mechanisms for extended families that care for children while parents are away on shift work.

Furthermore, community leaders and governments could develop, where appropriate, culturally relevant counselling and social services for issues related to substance abuse or violence resulting from the stresses brought on by economic development. More resources dedicated to public safety in communities would also help in these matters.

The mining industry has taken the lead in helping give communities the economic and social benefits they seek from economic development. But mining companies cannot be expected to assume all of the costs; governments need to step in and help. This is especially evident around infrastructure and public services such as health care and education. Major mining projects offer an opportunity for joint partnerships between companies, governments, and communities, to fund and provide community needs. These partnerships could, for example, finance the capital and maintenance costs of transportation, energy, and communication infrastructures provided to communities; and could take a similar approach for services such as education and health care. Mining companies may assist with the construction or funding of schools, hospitals, and recreational facilities, but government should also participate, possibly by co-funding these capital expenditures and providing the necessary resources to deliver the associated services.

56 NAHO, *Resource Extraction and Aboriginal Communities in Northern Canada: Social Considerations*, 5.

Governments also need to help fund affordable housing options for communities. While mining workers can afford to pay higher housing costs, many community members cannot. This creates a division within the community, adding to fears of social and community disintegration. By providing affordable housing, governments can prevent those who cannot afford housing from being pushed into homelessness and help ensure continuing social cohesion.

Finally, governments and mining companies need to be aware that communities don't always, and do not necessarily want to, develop at the pace of industry. While communities are often accepting of the benefits major projects can bring, the rapid social changes can create challenges. An outstanding question would be whether mining development can be synchronized with the pace of community development. This would require governments and companies to work together to support community transitions so that communities are fully able to benefit from development projects.

CHAPTER 5

Addressing Environmental Stewardship and the Impacts of Mining

Chapter Summary

- ◆ Historically, mining activities in Northern communities have led to a legacy of environmental degradation, contamination of soils and waterways, and abandoned mines.
- ◆ Regulations and technological advances have done much to mitigate the environmental impacts of mining, but communities still fear the potential adverse effects mining activities can have on traditional hunting and harvesting lands.
- ◆ Governments and industry are working toward environmental sustainability through a variety of legislated and voluntary industry-led programs. Innovation has improved the mining sector's efficiency, health and safety, and environmental performance.
- ◆ The inclusion of traditional ecological knowledge in environmental monitoring plans can help companies plan for and mitigate potential environmental impacts.

water resources are integral to many communities' way of life, culture and, in some instances, subsistence;¹ and mining can impact the North's fragile ecosystem, including through air, land, and water pollution and the disturbance of animal migratory patterns. Ultimately, there is an understanding that "[m]ining has never been, and will never be, environmentally benign."²

The environment and an individual's connection to it are an important aspect of Northerners' identities. By spending time out on the land, for example, Aboriginal Peoples gain much traditional knowledge, and connect to their communities by being involved in traditional activities. Hunting or trapping with other community members "reinforces such cultural values as sharing, ethnic self-identity, the holistic systems of health, and the individual's sense of well-being and self-respect."³

Northern communities in general are also economically reliant on the land and water. Residents use the North's rich flora and fauna resources as part of the traditional wage economy: hunting, trapping, and fishing still provide employment opportunities for Northerners.⁴ Furthermore, Northerners value living in small communities surrounded

Mining exploration, development, and potential economic spinoffs can be very attractive for Northern communities. However, communities struggle with the potential impact of mining projects on their traditional homelands. Land and

1 NAHO, *Resource Extraction and Aboriginal Communities in Northern Canada: Cultural Considerations*, 3.

2 The Mining Association of Canada, *Facts and Figures of the Canadian Mining Industry 2011*, 70.

3 *Ibid.*, 4.

4 Pulla, *Striking a Balance*, 8–9.

by pristine wilderness.⁵ Changes to the natural environment brought on by mining projects can therefore be of concern to Northerners.

Historically, little attention was paid to the effects mining could have on the environment. Over the last two decades, however, governments and companies have worked hard to reduce pollution from mining activity. Investments have been made in new mining processes and technologies, and regulations have been implemented to help protect the environment for current and future generations. But further efforts are required, as there are still environmental issues to be resolved.

MINING AND THE ENVIRONMENT: A HISTORICAL PERSPECTIVE

While mining projects today try to ensure that minimal damage is done to the environment, this hasn't always been the case. Up until the early part of the 20th century, no scientific knowledge was available about the harmful effects of tailings ponds, fuel or oil spills, or air pollution. No links were made between environmental and human health, and few precautions were taken against contamination of water or land resources. This continued well into the middle of the 20th century. There are many well-known examples in the North of abandoned mines that have left lasting environmental impacts. For example, to this day, significant environmental challenges remain in the restoration of the historic Faro mining complex in Faro, Yukon. According to estimates, there are nearly 70 million tonnes of tailings on-site and 376 million tonnes of waste rock that need to be reclaimed. This waste also contains toxins that are believed to adversely affect humans, plants, and animals in the area.⁶

The town of Cobalt in Northern Ontario is another example of the lasting environmental impacts of a Northern mine. When large silver deposits were discovered in Cobalt at the turn of the 20th century, construction and exploitation of the resources happened very

quickly. No planning was done to ensure management of tailings and runoff. Mining continued in this manner until the 1960s, when the last mine closed its doors.⁷ Today, a number of environmental hazards remain: high levels of pollutants such as arsenic, mercury, and cyanide can be found in the soil and in the lakes and streams around former mine sites.⁸

While remediation work is currently being carried out on both of these sites, there are thousands of former mine sites where work has not yet begun. In fact, Natural Resources Canada (NRCan) estimates that there are nearly 10,000 orphaned or abandoned mining sites in Canada today, and all require varying degrees of remediation.⁹ According to NRCan, “the most serious environmental issues posed by abandoned mines are acid rock drainage and metal leaching from underground workings, open-pit mine faces and workings, waste rock piles, and tailings impoundment areas.”¹⁰

Up until the early part of the 20th century, no scientific knowledge was available about the harmful effects of tailings ponds, fuel or oil spills, or air pollution.

Given society's—and consequently the mining industry's—former views on the environment, Northern communities remain hesitant to invite mining projects into their regions. Interviewees noted that environmental concerns remain one of the greatest obstacles in obtaining a community's support for a proposed development. Many examples of abandoned mine sites remain fresh in the collective memory, and assurances of reclamation from companies haven't always translated into concrete action.

In recent decades, the movement for greater environmental stewardship has grown in importance. This is resulting in increased government regulations and voluntary programs

5 Environics Research Group, *SNOW*.

6 Faro Mine Remediation Project, *Project*.

7 Cobalt Mining Legacy, *Introduction*.

8 Cobalt Mining Legacy, *Tailings of the Cobalt Area*.

9 Natural Resources Canada, “Environmental Performance,” *Mining Sector Performance Report 1998–2008*. This number also includes mines in Canada's Southern regions.

10 Ibid.

by industry.¹¹ The mining industry has made substantial improvements in their environmental performance over the last two decades. The release of pollutants into the environment has declined between 72 and 96 per cent in the past 15 to 20 years.¹² For example, arsenic pollution from mining has declined by 79 per cent, while mercury releases have dropped by 96 per cent.

MINING'S POTENTIAL ENVIRONMENTAL IMPACTS

Though great strides have been made to reduce the number and types of impacts that may occur, mining is not benign. The industry continues to work to ensure that soils remain uncontaminated, that tailings and waste are properly contained, and that greenhouse gas emissions are limited.

Tailings are one of the major environmental impacts facing the mining industry today. Tailings are the product of the mineral extraction process. They are composed of various chemicals, finely ground ore, and water, in a muddy mixture called slurry. According to The Mining Association of Canada:

Because the rock has been finely ground, tailings can be very chemically reactive and can pose serious environmental risks from acid rock drainage and the release of toxic metals, and toxic reagents used in processing. The combination of liquids and fine-grained solids make many tailings physically unstable. If left exposed to the air and dried, tailings can also be blown on the wind causing air pollution and washed into waterways, harming aquatic ecosystems.¹³

Tailings often contain harmful contaminants such as mercury, lead, arsenic, cyanide, cadmium, and nickel. And although the industry has reduced the amount of

contaminants, they are still present in tailings. If they are improperly stored or treated, these contaminants can pose a risk to local wildlife, vegetation, and natural bodies of water. Companies will sometimes use local water reservoirs such as lakes as impoundment areas for tailings instead of—or to reduce the cost of—building containment facilities. However, communities and environmental groups have been concerned, as this method may not prove to be secure over the long term.¹⁴

Another issue of significance is the valueless rock generated by operations while the mine is in production. This waste rock must be removed from the land so that mineral or metal resources can be extracted. In the case of open-pit mines, removing the rock affects the land.¹⁵ In some cases, sulphides in the waste rock react with rain and air, creating acidic drainage from the waste rock piles, called acid mine drainage. This acid can dissolve metals in the waste rock and, if not collected and treated, introduce harmful metals into ground water.¹⁶

While tailings management and acid mine drainage issues have come a long way, they continue to be one of the greatest environmental challenges facing the mining industry today. According to Mining Watch Canada:

One of the greatest risks associated with storage of tailings in an impoundment is from failure of the impoundment resulting in a spill of the tailings inside. Because the tailings solids often don't hold together or form a solid mass, if an embankment breaks, the tailings can flow out of the impoundment and travel some distance down-stream creating serious risks to the environment, human safety, and infrastructure such as buildings and roads.¹⁷

Abandoned and orphaned mines also pose these types of threats to the local environment. Because many of the tailings have gone unchecked and uncontained for many decades, heavy metals have leached into the soil and vegetation around the site.

11 Natural Resources Canada, "Environmental Performance," *Mining Sector Performance Report 1998–2008*. This number also includes mines in Canada's Southern regions.

12 The Mining Association of Canada, *Facts and Figures of the Canadian Mining Industry 2011*, 70.

13 MiningWatch Canada, *Two Million Tonnes a Day*, 1.

14 Ibid.

15 Natural Resources Canada, *Mining Sector Performance Report 1998–2008*, 12.

16 MiningWatch Canada, *Two Million Tonnes a Day*, 1.

17 Ibid., 4.

Other issues of environmental concern to the mining industry are air pollution and greenhouse gas (GHG) emissions. Air pollution and GHG emissions primarily result from the use of diesel fuel for heavy equipment on mining sites and for transportation in remote Northern regions. Emissions are also linked to the use of diesel generators on mining sites, which supply power for operations.¹⁸ Mining companies are now looking into alternative energy sources to reduce their dependence of diesel fuel. And although there are “no regulated targets, many extraction operations are improving their capabilities in compressed air, ventilation, metering and energy management.”¹⁹

Air pollution and GHG emissions primarily result from the use of diesel fuel for heavy equipment on mining sites and for transportation in remote Northern regions.

The impact on biodiversity of the total cumulative effects of tailings, air pollution, and emissions is also of great concern. As a recent Government of Canada report on biodiversity states, “[It] is being lost and will come under increasing pressure as land is converted to urban and industrial use [and] the integrity of ecosystems is compromised by industrial pollution”²⁰ Mining companies need to be conscious of the impacts a mining project can have over the course of its life cycle. Environmental assessments and review processes can help identify these adverse effects early on, but they need to be properly monitored, as “inadequate long-term monitoring . . . makes it difficult to evaluate the impact of operations on biodiversity.”²¹

The construction of roads and mine sites, the storage of tailings, and the potential leaching of heavy metals can adversely affect animal populations. Numerous

scientific studies have shown that toxins can appear in the fatty tissues of the traditional food sources of many communities. As well, mining projects can disrupt the traditional migration patterns of some wildlife species, which can in turn cause these species to abandon these migration patterns entirely. Fish habitats may also be disrupted by these industrial activities.²² As a result, communities dependent on traditional foods can be put at risk. Hunting and fishing becomes difficult, as hunters and fishermen must travel greater distances to find food.

APPROACHES TOWARD ENVIRONMENTAL SUSTAINABILITY

Overall, the mining industry has been working hard to limit its environmental impact over the past 20 years. Specifically, “[n]ew scientific research, regulatory systems, oversight, and industry actions have led to continuous improvements in the sector’s environmental performance.”²³ Combined, these steps have led to a significant reduction in the number of harmful effects. But the job is not finished. As mentioned above, ongoing environmental issues will require continued action by industry and governments.

Five categories of measures can be taken to protect the environment and help achieve environmental sustainability. They are:

1. Legislative acts and regulations enforced by regulatory bodies.
2. Market-based measures imposed by government
3. Voluntary programs initiated by industry and companies.
4. Protected areas and the integration of Aboriginal traditional knowledge into land use plans.
5. The use of new mining technologies and processes implemented by industry to address environmental challenges.

18 Natural Resources Canada, *Mining Sector Performance Report 1998–2008*, 15–17.

19 The Mining Association of Canada, *Facts and Figures of the Canadian Mining Industry 2011*, 72.

20 *Canada’s 4th National Report to the United Nations Convention on Biological Diversity*, 133.

21 Natural Resources Canada, *Mining Sector Performance Report 1998–2008*, 18.

22 NAHO, *Resource Extraction and Aboriginal Communities in Northern Canada: Cultural Considerations*, 7. See also MiningWatch Canada, *Mining in Remote Areas*.

23 Natural Resources Canada, *Mining Sector Performance Report 1998–2008*, 12.

LEGISLATIVE ACTS AND REGULATIONS

As mentioned in Chapter 4, federal and provincial/territorial governments review a proposed mining project through environmental assessments. No project can move forward without approval by both levels of government following these assessments.

Once a mining project has been developed and operations begin, the mining company must comply with a set of environmental regulations. Federal and provincial/territorial governments have various environmental protection acts. Within these acts, there are regulations applying to the impact of mining activity on air, land, water, fish, fish habitat, and wildlife. Each province or territory may be regulated by more than a dozen federal and provincial/territorial acts with multiple environmental regulations, setting qualitative and quantitative standards and guidelines that mining companies must meet. With respect to tailings and acid mine drainage, the federal government revised its effluent regulations in 2002, resulting in the *Metal Mining Effluent Regulations* (MMER).²⁴ These regulations are part of the *Fisheries Act*. They “regulate the deposit of mine tailings and other waste matter produced during mining operations into natural fish bearing waters.”²⁵ They force metal mining companies to closely monitor the release of toxins through acid mine drainage at the facility level and set acceptable limits. Compliance rates for the release on cyanide and other harmful toxins such as arsenic, nickel, and zinc are at approximately 99 per cent.²⁶ The federal government plans to expand these regulations to some non-metal mining, including diamond mining.²⁷

However, recent changes to federal regulations could mean less environmental protection in the future. The 2012 federal omnibus Bill C-38 could lead to some small projects being exempt from federal environmental assessments. Furthermore, the legislation makes important changes to the *Fisheries Act*. It would narrow the scope of protected habitats and species only to those related

to human use, whether commercial, recreational, or Aboriginal fisheries. Less protection would be in place for fish habitats. It is still too soon to determine what effect these changes will have on the environment and how they will affect development projects in the future.

MARKET-BASED MEASURES

In addition to acts and regulations, governments can impose market-based measures, such as effluent charges and emission taxes. An effluent charge is a fee that a company must pay to governments to discharge a certain type of pollutant or emission, based on its amount and/or quality. While effluent regulations do not exist in Canada, some U.S. states (e.g., Louisiana, California, and Wisconsin) have effluent fees based on quantity and level of toxicity.²⁸ In Canada, the provinces of British Columbia, Quebec, and Alberta have all imposed carbon taxes. Unfortunately, these taxes are too low to incite companies to reduce their emissions. Beyond these provinces, effluent charges and emission taxes are unpopular measures in Canada. In fact, there are few countries that use such measures. The problems with this type of approach are the ability and willingness of government to set the right charge or tax to meet an environmental target, and the political unpopularity with corporations and the public. Government must set the effluent charge or emission tax at a high enough level so that it provides an incentive for polluters to reduce their environmental impacts to meet environmental targets. If the charge or tax is too low, polluters will find it less costly to pay fines than to invest in technologies to reduce their environmental impact or to change production processes.

Another market-based measure is a cap-and-trade system. It requires that the government set an overall environmental cap or limit and allocate emission permits to industry based on this limit. Companies then have an opportunity to buy and sell these permits among themselves. Such an approach can be cost-effective in meeting environmental targets. This type of system is used both in the United States and throughout the European Union to reduce carbon, sulphur, and nitrogen dioxides

24 Fisheries and Oceans Canada, *Metal Mining Effluent Regulations*.

25 Ibid.

26 Environment Canada, *Summary Review of Performance of Metal Mines Subject to the Metal Mining Effluent Regulations in 2010*.

27 Federal Budget 2012.

28 National Center for Environmental Economics, 4.2.3. *Examples of State Effluent Fees*.

in emissions. In Canada, Quebec²⁹ has joined California in the establishment of a cap-and-trade system for carbon dioxide emissions and others may join as part of the Western Climate Initiative.³⁰ A cap-and-trade system for carbon dioxide emissions could apply to mining activity. Smelting operations and other non-metal-based operations may be the most impacted by these types of measure, as they generate a substantial amount of greenhouse gasses.

VOLUNTARY PROGRAMS INITIATED BY INDUSTRY AND COMPANIES

In addition to government measures, the mining industry has its own environmental stewardship programs. These programs can provide social licences to operate and help companies be good corporate citizens. Mining companies must gain and maintain the trust of communities affected by their activities. Northerners value their natural environment and want to ensure that companies do not pollute local resources. Companies willing to respect local communities are likely to gain greater support for their projects. Voluntary initiatives are especially important, as “[t]he industry’s public image is closely tied to its environmental performance.”³¹ Voluntary environmental stewardship programs can provide a means of minimizing risks of damaging incidents and of taking effective actions to remedy the situation if it occurs.

There are several important voluntary initiatives. The Prospectors & Developers Association of Canada’s (PDAC) *e3* initiative is one. This initiative is a resource that provides guidelines and examples of best practices for exploration activities. It also provides exploration companies with information on community engagement and social responsibility issues through its *e3 Plus* program. PDAC is working on establishing performance objectives and reporting and verification procedures.³²

29 Piette, *Canada*.

30 The Western Climate Initiative is a collaboration of U.S. states and Canadian provinces to reduce greenhouse gas emissions. In addition to Quebec, other participating provinces include British Columbia, Ontario, and Manitoba.

31 Natural Resources Canada, *Mining Sector Performance Report 1998–2008*, 12.

32 Prospectors & Developers Association of Canada, *e3 Plus*, 1–3.

Towards Sustainable Mining Initiative

The Mining Association of Canada’s (MAC) Towards Sustainable Mining initiative is an industry-led environmental initiative to which all MAC member companies must subscribe.¹ It sets performance measures related primarily to the environment. Member companies must report their results every year, and they are verified by an external third party every three years. Highlights from the initiative are available on MAC’s website and in its annual progress report.

The initiative also has a Community of Interest Advisory Panel composed of various stakeholders from Aboriginal groups, civil society institutions, community economic development organizations, labour unions, and mining companies. This panel assesses the implementation of the initiative and progress made and issues its independent statement in the annual progress report.² In 2010, the British Columbia Mining Association was the first provincial association to adopt the Towards Sustainable Mining initiative. This will expand the number of companies applying the initiative’s principles and reporting on its performance measures.

1 The Mining Association of Canada, *Towards Sustainable Mining: Progress Report 2011*, 4.

2 *Ibid.*, 30–33.

Source: The Mining Association of Canada, *Towards Sustainable Mining: Progress Report 2011*.

Another initiative supported by the mining industry, and Canadian Mine Ministers, is the National Orphaned/Abandoned Mines Initiative (NOAMI). Established in 2002, a multi-stakeholder advisory committee was formed to work on issues related to abandoned mine sites. Since its establishment, the NOAMI committee has assisted with many mining remediation projects. It works collaboratively with all levels of governments and several external members.³³

PROTECTED AREAS AND ABORIGINAL TRADITIONAL KNOWLEDGE

In addition to regulations and market-based measures, governments can legally protect geographic areas from industrial activity. In Canada, 100 million hectares of land and 4 million hectares of oceans are protected by federal and provincial/territorial acts to conserve nature,

33 Natural Resources Canada, *Mining Sector Performance Report 1998–2008*, 19.

wildlife, and ecosystems.³⁴ They include national and provincial parks, migratory bird sanctuaries, and wildlife areas that are habitats for species at risk. No industrial activity, including mining, is allowed within these protected areas.

As well, all provinces and territories have land use planning processes that establish where and how economic development, including mining, will take place in Northern regions. The purpose of land use plans is to alleviate potential conflict between stakeholders, such as Aboriginal communities and mining companies, over the use of land. It is important that these plans integrate traditional Aboriginal knowledge of the environment and historical use of the land with natural resource and scientific information.

The mining sector, assisted by environmental technology companies, has devoted sizeable financial resources to finding new technologies and engineering solutions.

A major challenge in establishing protected areas and in developing land use plans is to balance the needs to conserve biodiversity and nature and to protect Aboriginal traditional use of the land and waters with opportunities for resource development. Geo-mapping done by governments can provide valuable information for the establishment of protected areas and in the creation of land use plans.

Mineral exploration requires access to vast geographic space, since it can take up to 10,000 grassroots exploration projects to find one deposit that is economically viable.³⁵ Mineral exploration activity can provide scientific knowledge of deposits that is valuable for the development of land use plans and in the assessment of where protected areas should be established. It is key that governments ensure reasonable access to Northern regions for mineral exploration, since results can be used with other data for land use plans and establishing protected areas.

Additionally, Aboriginal traditional knowledge can be an extremely valuable resource in the management and mitigation of environmental impacts. The integration of traditional knowledge on local fauna and flora from Aboriginal communities can be used to minimize impacts on animal migration routes, mating grounds, or rare plant species. Working with Aboriginal communities in this capacity can also help build trust between the two parties. The Diavik Diamond Mine, for example, integrated traditional knowledge to help the company in the design and implementation of an environmental management plan. The inclusion of traditional knowledge helped Diavik in the management of fish habitat and has led to increased monitoring during caribou migration.³⁶

USE OF NEW MINING TECHNOLOGIES AND PROCESSES

Through innovation, the mining industry has greatly improved its efficiency, health and safety, and environmental performance. The mining sector has devoted substantial financial resources to finding new technologies and engineering solutions, with assistance from environmental technology companies. And research centres, universities, and government laboratories have provided environmental research and technological support over the years to help the mining sector address complex environmental issues. This ongoing research has resulted in a variety of technologies—such as information technology, remote sensing, geographic information systems, robotics, and biotechnology—transforming this sector into a high-technology industry.

The Canada Centre for Mineral and Energy Technology (CANMET) Mining and Mineral Sciences Laboratories, part of Natural Resources Canada, has supported provinces, territories, and industry by providing them with scientific research and advice on a variety of issues, including environmental challenges. Today, much of its research focuses on the sustainable development of Canadian mining resources.³⁷

34 Environment Canada, *Why Create Protected Areas?*

35 Aboriginal Affairs and Northern Development Canada, "Discovery and Advanced Exploration."

36 Natural Resources Canada, *Mining Sector Performance Report 1998–2008*, 18.

37 Natural Resources Canada, *Mining and Mineral Technology*.

Another organization, the Canada Mining Innovation Council, was established in 2007 and incorporated in 2009. It is a network of leaders from academia, governments, companies, associations, and research centres working together to enhance collaboration and improve alignment of resources. Its aim is to help Canada become a “global leader in a socially and environmentally responsible, safe, and productive mining industry through leading-edge research and innovation.”³⁸

Continued commitments to innovation will be critical in meeting and addressing these complex challenges. Mining companies and governments will need to invest substantially in research and development. Research centres, environmental technology firms, and universities will need to coordinate their efforts with the mining sector and governments. Both the Canada Mining Innovation Council and the Green Mining Initiative are steps in the right direction. Yet mining companies will have to be willing and able to implement new technologies and processes that come out of this research and these collaborative efforts.

38 Canada Mining Innovation Council, *Mission & Vision*.

Green Mining Initiative

In 2009, Natural Resources Canada launched the Green Mining Initiative, a multi-stakeholder research program endorsed by the Canada Mining Innovation Council.¹

The initiative has four pillars:

1. Footprint reduction—finding new ways to reduce the quantity of waste and contaminants.
2. Innovation in waste management—focusing on new methods and alternative treatment technologies.
3. Mine closure and rehabilitation—looking into new methods of assessing and mitigating environmental impacts.
4. Ecosystem risk management—developing and implementing effective ways to close, monitor, and reclaim mine sites.²

All four areas are key environmental challenges that the industry still faces. The Green Mining Initiative hopes to make important strides in these areas, thus helping companies remain competitive and establishing greater environmental leadership.³

1 Canada Mining Innovation Council, *Green Mining Initiative*.

2 Canada Mining Innovation Council, *Green Mining Initiative*; Natural Resources Canada, *Backgrounder*.

3 Canada Mining Innovation Council, *Green Mining Initiative*.

Source: Canada Mining Innovation Council; Natural Resources Canada.

CHAPTER 6

Creating a Sustainable Future: What Happens After a Mine Closes?

Chapter Summary

- ◆ Mine closures can greatly impact workers, local businesses, communities, and the environment. To mitigate potential impacts, mining companies must work closely with communities and comply with federal and provincial/territorial legislation when planning for mine closure.
- ◆ Financial bonds posted by companies help ensure that even if the company goes bankrupt, funds exist for remediation and site cleanup.
- ◆ When dealing with mine closures, communities can face many obstacles, ranging from economic downturn to social impacts.
- ◆ Options for economic diversification can be limited for remote communities, meaning some may never fully recover after the closure of a mine.
- ◆ Governments, industry, and community leaders must work together in planning for closure and ensuring a smooth transition.

The mining industry could significantly contribute to the prosperity of Canada's Northern communities over the coming decades. As demand for Canada's minerals and metals continues to increase around the world, and with the proper factors conducive to

mining development in Northern regions, new mines will open and begin to operate across the North. Opportunities created throughout the mining cycle, from exploration to production, can provide local communities with increased prosperity. However, mining is cyclical and a non-renewable resource sector by nature. Eventually, mines close. Closure can greatly impact workers, local businesses, communities, and the environment. Yet mining can still play a vital role in building a sustainable future for Canada's North.

MINIMIZING THE ENVIRONMENTAL IMPACTS OF MINE CLOSURE

The closure of a mine involves the closing, decommissioning, and rehabilitation of the actual mining site itself. Throughout its lifespan, a mine generates a great deal of waste due to the nature of its operations. When it reaches the end of its life cycle, products such as tailings ponds and waste rock must be dealt with in a safe and responsible manner. In the past, mining companies left the site as it was, with little effort to remediate it. Today, companies must submit plans for closure and reclamation of the mine sites to governments before operations even begin. This helps to ensure that the damage inflicted on the land is mitigated, that the land can be restored to its natural state as much as possible, and that potential hazards are dealt with effectively. Mining operations on the land are only temporary, but the effects can last for many decades if not addressed properly. Interviewees for this report explained that

mining companies today take into account the need for sustainable operations and minimizing their impacts over the course of their stay and beyond. This focus on sustainable mining is a cost of doing business not only in Canada but around the world. It is part of the licence to operate and to maintain a positive reputation so that communities and governments will accept mining activity in their regions.

The preparation for the mine's closure and remediation must begin in the mine's planning stages. This is done when the mining company is preparing the environmental impact assessment and relays the company's estimated costs of closure.¹ All Canadian provinces and Yukon have their own acts and regulations with respect to closure planning, while the federal government regulates the closure of mining projects in the Northwest Territories, Nunavut, and on First Nations reserve lands. Closure plans must be approved by the appropriate regulatory boards, which vary by jurisdiction.² Mining legislation in all Canadian jurisdictions "requires mine developers to submit mine closure plans that describe how the site will be rehabilitated throughout its life cycle, how it will be decommissioned when mining activities end, and to post a financial surety to ensure these activities are carried out."³

Closure plans encompass several aspects, including the actual shutdown, the site closure, and post-closure measures, as some sites require long-term monitoring and stabilization. These plans must be approved by government before mining development can begin. Furthermore, government agencies will often issue new permits for the decommissioning of the mine and for site cleanup. They may outline "additional site-specific conditions and methods for reclamation of open pits, underground openings, tailings, and waste rock," and include "an Environmental Effects Monitoring Plan, an assessment

of stability of embankments, a site characterization plan, and financial assurance. Site-specific air and sewage permits may be required for certain jurisdictions."⁴

Closure and remediation plans must be accompanied by financial guarantees such as bonds or deposits. These ensure that funds will be available to rehabilitate the site and that the costs of cleanup and rehabilitation are borne by the company. When the company has completed site cleanup and reclamation, its bond or deposit is returned. If a company is unable or unwilling to clean up the site, the mine is considered orphaned or abandoned, and its liability and clean-up costs are transferred to the respective jurisdiction.⁵

Closure plans encompass several aspects, including the actual shutdown, the site closure, and post-closure measures, as some sites require long-term monitoring.

However, there are obstacles to implementing closure plans. A recent report by the National Orphaned/Abandoned Mines Initiative (NOAMI) notes that regulatory risks, such as a change in procedures as it relates to acceptable mine closure or regulatory overlaps between agencies, can delay plans and create confusion. These regulatory issues can also impose an additional financial burden on companies. Interviewees emphasized the importance of these closure plans, but mentioned the need for greater clarity and frameworks around these activities.

Another potential obstacle to sustainable mine closure is when commodity prices fall dramatically and remain low for an extended period of time. In such circumstances, companies could go into bankruptcy, leaving them without the financial resources or capacity to comply with regulations. Other potential obstacles include environmental alterations due to climate change and natural

1 Natural Resources Canada, *Mining Information Kit for Aboriginal Communities*, 78.

2 Ibid.

3 Natural Resources Canada, *Mining Sector Performance Report 1998–2008*, 20.

4 Ibid.

5 Cowan, Mackasey, and Robertson, *The Policy Framework in Canada for Mine Closure and Management of Long-Term Liabilities*, 4–6.

hazards such as storms that cause acid rock drainage or heavy metal seepage. Such events can be difficult to predict and mitigation hard to plan for. In some instances, parts of the mine site require long-term monitoring. For example, mining companies must ensure that tailings ponds do not leak and that mining shafts remain stable.⁶

Mining companies must review their closure plans and adjust them as necessary when new information and technologies are made available. When mines are at the production stages, new data about the mine site and its surrounding environment may dictate changes as to how these mines can best be remediated. New technologies can also offer better solutions than those proposed before mines were developed. Before they begin the mine closure processes, mining companies must submit changes to their final closure plans to governments for regulatory approval.

The Polaris mine in Nunavut is a good example of successful site rehabilitation. When the mine closed in 2002, the communities of Grise Fiord and Resolute Bay assisted the company in the rehabilitation of the mine site. Consultations with these communities ensured that the company took into account the future uses of the land and its historic importance to the residents. Much of the on-site infrastructure was decommissioned, but plans were made for ongoing monitoring of water and soil contaminants. The site remediation, along with the monitoring programs provided jobs for local residents, further aiding the transition of these communities.⁷

Examples of the successful closure and rehabilitation of international mine sites could also serve as models for Canadian mine sites in the future. In 2006, for instance, Xstrata Zinc closed its Reocín mine in Spain, which had been in operation for nearly 150 years. The company worked to meet—and exceed—all regulatory requirements relating to closure. An ongoing water monitoring program ensures that local water sources remain uncontaminated and that there are no issues

with soil contamination. Much of the former mine site was turned over to the local community. A soccer field was constructed, and office buildings will be repurposed and used for local educational institutions. As well, the tailings pond will be used as a landfill site.⁸ This successful reclamation effort demonstrates what companies could do here in Canada as mines are reaching their end-of-life cycle.

Natural Resources Canada's Green Mining Initiative can also help provide innovative solutions when dealing with closures. The initiative hopes to “look at technologies for mine rehabilitation, habitat restoration and ecological reclamation, and climate change adaptation by the mining industry.”⁹ This work could potentially address some of the challenges proponents face with rehabilitation.

UNDERSTANDING THE IMPACTS OF MINE CLOSURE ON NORTHERN COMMUNITIES

Interviewees for this report discussed the need to engage the local community in mining closure and work cooperatively to mitigate damages. This community engagement is important not only for environmental management but also for the socio-economic impact that mine closures have on local communities.

When a mine is in operation, local communities can benefit immensely from the opportunities the mine offers. Hired residents earn high incomes working for a mining company. Local businesses grow, thanks to contracts to provide supplies and services for the mining operation. They also benefit from the purchase of goods and services by residents who earn incomes through mining. As local firms grow, they provide jobs to residents, who benefit from earning wages. Local communities can also take advantage of transportation infrastructure, and occasionally energy and communications infrastructure associated with mining in their region. Mining companies

6 Cowan, Mackasey, and Robertson, *The Policy Framework in Canada for Mine Closure and Management of Long-Term Liabilities*, 4–20.

7 Natural Resources Canada, *Mining Information Kit for Aboriginal Communities*, 87.

8 Xstrata, *Xstrata Zinc's Successful Mine Closure After 147 Years of Operation*.

9 Natural Resources Canada, *Green Mining Initiative to Reduce Mining's Environmental Footprint*. See also Natural Resources Canada, *Sustainable Development*.

can help local communities acquire much-needed infrastructure such as health care facilities, schools, and recreational amenities.

But when the mine exhausts its resources and production is no longer economically viable, it must close. As discussed in previous sections, many Northern communities have historically been adversely affected by mine closure and abandonment. The financial implications of mine closure on a community can be dramatic and, in some instances, can linger for many years. A mine closure can have deep and immediate impacts on the mine's employees and their families. While workers often expect the mine will eventually close, many are unprepared when it does. The transition for laid-off workers can be difficult for reasons other than the loss of good incomes. Mine closure can lead to stress and anxiety for workers, as many are unsure what will happen next.¹⁰ Obviously, this can be especially difficult for workers in remote areas, as there is often only one mine that supports the local economy.

After a mine closes, infrastructure—such as roads and communication towers—may remain, but communities may not have the financial capacity to maintain it.

Aboriginal workers can find the closure of the mine particularly difficult. Many have chosen to work at the mine because of its proximity to their communities. This allows them to participate in cultural and traditional activities and to retain their close attachment to the land. However, when the mine closes, the choices can be extremely stressful, especially if there are no jobs in their communities other than those in the traditional economy of hunting, fishing, and trapping.

Local businesses are equally impacted by the mine closure. Firms that have depended on the mine as their major or only client must find new business opportunities, or close as well. Those that supplied goods and services to local residents see their revenues drop as

mining workers lose their jobs or move elsewhere. These local businesses may be forced to lay off their own employees. They may even have to close if they cannot find enough business to replace that from the mine. This is especially noticeable when the region is dependent on a single mine.

In many instances, infrastructure such as roads and communication towers may remain after the mine closes, but communities may not have the financial capacity to maintain it. Eventually the infrastructure deteriorates and becomes unusable unless funding can be found. This is especially true for a community reliant on a single mine that shuts down permanently. Unless it finds other economic development opportunities or government support, the community is faced with crumbling infrastructure that it once benefited from.

It is important for mining companies and governments to understand the full socio-economic implications of mine closure. It is essential that mining companies plan and act on environmental matters; and they must also consider the impacts that mine closure will have on local communities. Governments also need to understand the full implications of closure on local communities faced with a legacy of socio-economic problems. These are issues that government may need to help resolve.

Consultation by a mining company early on—at the exploration stage and before mine development occurs—as well as throughout the mine's development and operational stages is a factor critical to success. Consultation needs to continue during the closure planning process and the execution of these plans. Enough lead time must be given so that the community can prepare. The company must also consult with all key stakeholders in the local community in order to understand its issues, needs, and possible opportunities and should carry out a social impact assessment of the mining closure. Companies like Barrick¹¹ and De Beers,¹² for example, carry out such assessments and integrate them with their environmental assessments as part of their mining closure planning processes.

10 Mining Industry Human Resources Council, *Mining Workforce Transition Kit, Module 2*, 8–10.

11 Barrick, *Community*.

12 De Beers, *Planning for Closure*.

The community and the mine's workers need to be given sufficient lead time about the mine closure, as companies must consider the issues of employee turnover and morale. Low morale can impact productivity. For short-life mines, 12 months notice seems appropriate;¹³ for mines that have been in existence for decades, much longer lead times should be considered.

IDENTIFYING COMMUNITY BUSINESS OPPORTUNITIES AND CHALLENGES AFTER CLOSURE

A community's needs and potential opportunities depend on the region's resource development potential, available infrastructure, residents' employability skills and work experience, entrepreneurial capacity, and leadership. All these factors play a critical role for local communities as they define their future following closure.

Geography and geology will always play a determining role in a Northern community's ability to create a sustainable and prosperous future. If a community finds itself in a geologically rich region, the potential exists for more mining developments in the future. Should exploration projects find viable reserves, an existing mine could extend its life or future mines could be developed in the area. However, the region could also face the boom-bust cycle of many mines opening and eventually closing around the same period of time.

The staggering of mine openings in a region rich with mineral deposits could provide an alternative to this situation. This would provide long-term economic security and stability to local communities. It would also allow communities, governments, and companies to plan for the future. As well, mining companies would benefit from a long-term supply of local skilled workers and alleviate the problems of labour shortages. Sometimes the timing of mining investments just happens to stagger mine openings. However, it is likely that mining companies will be interested in developing their own deposits in a geologically rich region around the same period of time when commodity prices are high. How

can competing companies be encouraged to collaborate and coordinate their investment decisions in such circumstances? Can governments play a role? Will the capacity constraints of regulators in environmental assessment processes stagger these new mines anyway because they cannot assess all mining projects at the same time? These are some of the questions that need further analysis by region to explore whether or not staggering new mining developments is feasible.

The community and the mine's workers need to be given ample lead time about a mine closure, as companies must consider the issues of employee turnover and morale.

Furthermore, mining communities in geologically rich regions that already have a skilled workforce, local businesses with experience supplying to mining companies, and infrastructure conducive to mining, can find themselves in an excellent position to achieve long-term prosperity. As one mine is planning for closure, new mines could be developed. Governments need to promote the natural, human, and infrastructure assets that a region with such communities can offer to prospective mining companies.

Geography also plays a role in looking at economic development options beyond mining. If a Northern community no longer has important mineral deposits but is endowed with forests, fertile land, or other natural assets that can be developed, it has the opportunity to transform itself from a mining community to another resource-based community such as lumber, agriculture, or commercial fisheries. Proper planning of an eventual mine closure can provide such a community with the opportunity to develop other forms of natural resources. It would require seeking new forms of corporate investments, possible retraining of its local workforce, and a refocus of its businesses. Governments would need to step in and help the community in its transformation and possible economic diversification. This support could include community funding and promotion to targeted industrial sectors. As part of its closure plan, the mining company could offer seed funding for local businesses that want to invest in other potential resource sectors.

13 Laurence, *Optimising Mine Closure Outcomes for the Community*, 10.

Communities such as Sudbury are blessed by their geography and rich geology, and have successfully sustained local wealth after the closure of some of their mines. For example, other mines in the greater Sudbury area have opened and so mining activity is still part of the Sudbury economy. The city has become an important hub for mining technology research and development, and has been able to attract and retain skilled and talented workers for this area. Sudbury also provides supplies and services for the mining sector. It is a well-established urban centre, capable of supporting the demands of new mining developments and with much of the necessary infrastructure in place.¹⁴

Some remote Northern communities that lack sustainable economic opportunities can't recover from a mine closure.

However, a community that has no other potential mining projects within the region and that lacks other types of natural resources that can feasibly be exploited will have great difficulty finding other business opportunities as significant as the mine. Similarly, if the community is remote and has little infrastructure, it will be challenging for it to find any form of new economic opportunities.¹⁵ But a community with imagination, strong leadership, access to reliable transportation and broadband communication infrastructure, and government support can often overcome the lack of natural resource assets. Communities need leaders and entrepreneurs who are willing to seek out new and innovative opportunities for their communities. All proponents—the mining company, governments, and community leaders—must work together to help find and foster these innovations. The mining company or governments need to support these undertakings financially to have a chance of success. For example, Elliot Lake in Northern Ontario was successfully able to reinvent itself as a retirement community and all-season tourism destination after uranium mines in the area closed.¹⁶ It

14 MiningWatch Canada, *No Rock Unturned*, 17.

15 Provincial and Territorial Departments Responsible for Local Government, Resiliency and Recovery Project Committee, *Facing the Challenge of Industry Closure*, 23.

16 MiningWatch Canada, *No Rock Unturned*, 17.

had committed local leadership and provincial government support.¹⁷ Likewise, Goldcorp closed its San Martin mine in Honduras but helped local communities with alternative economic opportunities such as the opening of the San Martin Ecology Centre as an eco-tourism venue. It also helped develop agri-businesses in the region.¹⁸

Rankin Inlet in the Kivalliq Region is a community that began as a mining town in the late 1950s. The mine closed in 1962, leaving the town a diesel generator and limited infrastructure. Remediation at the mine only occurred in the 1990s, but the town's entrepreneurial spirit helped it transition into other economic activities, and government has made it its centre for Kivalliq Region. With a population of just under 2,500 today, Rankin Inlet's economy includes government services, Inuit crafts, transportation services for the region, and fishing.¹⁹

However, because of a lack of sustainable economic opportunities, some remote Northern communities will not be able to recover from a mine closure. They will either become ghost towns or they will seek ways to continue to sustain themselves with traditional activities such as hunting, fishing, and trapping and, in some cases, government support. For example, Uranium City in Northern Saskatchewan was a booming town up until the 1980s. However, when all mining activity ceased, the town had nothing left to rely on. Today, nearly 30 years after the mines closed, the town of a handful of residents is hopeful it can reinvent itself as an eco-tourist destination.²⁰ But the isolation of this community, which has all-year access only by air, a winter road that operates for only about a month each year, and crumbling infrastructure, makes it extremely difficult to find new economic opportunities.²¹

17 Provincial and Territorial Departments Responsible for Local Government, Resiliency and Recovery Project Committee, *Facing the Challenge of Industry Closure*, 34–35.

18 Goldcorp Inc., "Understanding Mine Closure."

19 Rankin Inlet, *Rankin Inlet History*.

20 Provincial and Territorial Departments Responsible for Local Government, Resiliency and Recovery Project Committee, *Facing the Challenge of Industry Closure*, 60–61.

21 Ibid.

A community should plan for the eventual closure of the mine and examine other economic development options. It should explore economic diversification, develop and implement strategies to further exploit its natural regional resources, or investigate other goods and services it can produce and sell. It needs the support of governments and mining companies to develop and implement economic development plans. And if no viable economic future exists after all options have been examined, such communities must prepare themselves for the inevitable loss of economic activity and population. It may return to its pre-mining roots, perhaps with improved infrastructure and social services inherited from the mine operations, but it will need initial support from the mining company and ongoing help from governments to meet the social needs of residents.

THE ROLES OF MINING COMPANIES AND GOVERNMENTS IN MINE TRANSITION

A mining company plays an important role in helping communities plan for the eventual mine closure, and in assisting in its transition. It starts while mining development and production occur, by building up local capacity. The company can support the education of local youth and help them stay in school; develop the employability skills and work experience of the local workforce by employing them at the mine site; and encourage entrepreneurship by giving contracts to local suppliers and mentoring local business owners. These businesses also hire people who gain skills through their work experience. The mining company can also build essential infrastructure that benefits the local community. All of these actions taken while the mine is in operation will create human capital and infrastructure assets that the community can use as it transitions into other economic opportunities.

Furthermore, IBAs can play an important role in assisting the transition of Aboriginal communities after a mine closes. Clauses included in these agreements could provide funds that support community projects or new local infrastructure projects. As well, provisions could be made to give Aboriginal communities the financial resources, through revenues or investments, to support new business ventures.

The mining company should also engage community leaders in the development of its own closure plans. By working together with the community, the company will gain an appreciation of the challenges and opportunities the community will face and will be better positioned to determine the level of assistance it can offer. In alignment with the mining company's closure plans, the community can develop its own plan for the eventual mine closure, exploring possible economic opportunities and identifying the requirements to realize these.

If the mining company leaves the transportation, energy, and communication infrastructure in place after the mine closes, it could assist the affected communities in attracting new forms of investment.

The public and private sectors can work in conjunction with other local businesses to find alternative and secondary industries, including those related to closure, decommissioning, and reclamation efforts.²² New business opportunities can arise from community economic diversification plans, and the mining company can provide partial funding to help start these business ventures. This “works especially well in developing communities where the cost of this initiative is small but the potential sustainability gains are significant.”²³

Leaving transportation, energy, and communication infrastructure for the communities could assist them in attracting new forms of investment. An inventory of the infrastructure that will remain needs to be conducted in consultation with community leaders and be included as part of the closure plans. Company homes can be offered to the community or sold on the real estate market, if one exists, as the mine begins to shut down and personnel leave. But in order to prevent a rapidly declining real estate market in the community, these homes should be made available progressively.²⁴

22 Natural Resources Canada, *Mining Information Kit for Aboriginal Communities*, 81–83.

23 Laurence, *Optimising Mine Closure Outcomes for the Community*, 10.

24 *Ibid.*, 1–2.

Governments also play an important supporting role in community transition. They can assist the community in developing and implementing economic diversification plans. Provincial/territorial governments could provide funding to help build new businesses and support them in accessing markets. These businesses, if successful, would give the community opportunities to be self-sustaining, requiring less social assistance by governments in the future.

Even as they are preparing to leave, mining companies often assist workers after a mine closure to continue building positive relationships with the community.

Funds should also be made available for the first few years after closure to help the community maintain remaining infrastructure, until it is able to maintain them on its own. Governments should even consider building new infrastructure such as all-season roads, where feasible, or broadband communications, if lacking, that could open the community to new business opportunities.

ASSISTING MINING WORKERS WITH CLOSURE

Mining workers must assess their options as a mine prepares to close. Workers close to retirement may be in a financial position to live off their investments and pension incomes. They often choose to stay in the local community, as they have built their lives there.²⁵ But others must inevitably find jobs in the local community or elsewhere, or remain unemployed. Younger and highly qualified workers may find work at other mine sites or in other sectors in the region or elsewhere. Other workers may choose to pursue studies outside of their community and will leave the town. The fly-in, fly-out model may also be viable for some workers and their families, since mining companies no longer establish permanent cities and towns around a mine site. The remote location of

today's mining developments means that this type of arrangement is becoming more common, although it is disruptive to families. Relocation services, whether to other mines or sectors, could be immensely useful.

Aboriginal workers who have lost their jobs due to mine closure may return to work in the traditional economy, as they had previously sustained themselves and their communities by hunting, fishing, and trapping.²⁶ Others may have the opportunity to find work at other mine sites, thanks to the fly-in, fly-out arrangements. Some may have to leave their communities and even their families behind for extended periods of time to work in other regions. Leaving their community and their ancestral land to find work in other regions can be difficult.

Skills learned through an employee's current work can be useful in helping them find jobs at other mine sites, or may be transferrable to other sectors. Mining companies can also assist employees during the mining closure process in a number of ways. They can help identify new career opportunities and provide out-placement services. Retraining and skills upgrading programs, coupled with educational opportunities, could be beneficial. Mining companies often support these types of initiatives as a way of continuing to build positive relationships with the community, even as the companies are preparing to leave.²⁷

Some companies aid employees in finding employment at their other mines. For example, Barrick Gold Corporation offers job opportunities at its other operations, where possible.²⁸ At Xstrata Zinc's Reocín mine in Spain, the company helped employees find work at other mines the company owned, either locally or elsewhere in the world.²⁹ Mine closure, decommissioning, and reclamation can provide jobs for some workers. Companies need trades people to dismantle and remove equipment; heavy equipment operators to move earth and waste rock; tree

²⁵ MiningWatch Canada, *No Rock Unturned*, 17.

²⁶ *Ibid.*, 10.

²⁷ Mining Industry Human Resources Council, *Mining Workforce Transition Kit, Module 1*, 6–7.

²⁸ Barrick, *Community*.

²⁹ Xstrata, *Xstrata Zinc's Successful Mine Closure After 147 Years of Operation*.

planters; and site security.³⁰ There are also jobs in water sampling and analysis and in constructing drainage systems.³¹ While these opportunities may be temporary, they can help workers in their transition. Some employment opportunities may be longer lasting. Ongoing environmental monitoring of the mine site and ongoing water treatment may be required. Local employees may be best suited to carry out these functions because of their proximity and their knowledge of the area and mine site.

Not only the mining company should be responsible for helping mine workers in their transition; governments also have a key role to play. In addition to providing education and skills upgrading programs, governments can provide job search assistance. For workers willing to work outside their home region, they could provide financial support for travel expenses related to job search and for relocation expenses. Governments could also promote the local pool of skilled mining workers to mining companies worldwide, especially since there will be a growing shortage of that skilled workforce.

A SUSTAINABLE FUTURE FOR MINING IN CANADA'S NORTH?

Is it possible to create a sustainable future for mining in Canada's North? While it may seem unattainable in view of the finite economic life of mines and their environmental impacts, the answer can be positive if the following condition is met: proper action is taken to ensure environmental sustainability throughout the mining life cycle, including closure, decommissioning, and reclamation. Moreover, closure plans for local communities need to be developed collaboratively and then executed in order to diversify local economies.

30 Natural Resources Canada, *Mining Information Kit for Aboriginal Communities*, 88.

31 *Ibid.*

Not all Northern communities will be able to achieve a sustainable prosperous future from a single mine. Sustainable prosperity will occur only in Northern regions that are blessed with rich natural resource assets that can be developed. Communities may be able to prosper if they have, or can build, adequate infrastructure to exploit economic opportunities beyond natural resource sectors and have access to markets to sell goods or services. After the mine closes, these communities must also retain their well-educated, skilled workforce and entrepreneurs.

If, after all efforts have been made, economic diversification is found to be impossible for a Northern community, the choices will be difficult. The community's economy will decline after the mine closes and skilled workers will leave. Some residents may decide to retire in their community, and small businesses that supply local residents may be able to survive. But the community will ultimately need government support to maintain infrastructure and provide social assistance and services. One option that may be extremely beneficial for communities is adopting a fly-in, fly-out arrangement so that mine workers can continue to live in their Northern communities while they work in other regions. However, mining companies and governments will need to mitigate the impact of shift work from fly-in, fly-out arrangements on workers, their families, and communities.

Mining companies, local communities, and governments must work together to achieve a bright, sustainable future for Canada's North, its environment, and its residents. A sustainable and prosperous future is not a given unless there is strong leadership, commitment, and determination in seeking the best solutions to a range of concerns: addressing environmental issues related to all stages of mining; building capacity in local communities; and providing socio-economic benefits while mines are developed and operated. In the end, this requires a sustained and meaningful effort to develop and implement successful closure plans for local communities.

Conclusion and Recommendations

Chapter Summary

- ◆ Communities and industry can benefit enormously from Canada's mining potential through responsible and sustainable practices. However, all proponents must work together to address outstanding challenges.
- ◆ Addressing some—or all—of the priorities can significantly improve the outlook for the future of mining in Canada, for the industry and communities alike.
- ◆ Findings suggest six key areas for policy recommendations to support future sustainable mining development in Canada's North:
 - Supporting a competitive business environment for the mining industry;
 - Tackling infrastructure gaps and needs;
 - Supporting recruitment initiatives aimed at women, new Canadians, youth, and Aboriginal workers;
 - Conducting meaningful community consultations and ensuring the implementation of Aboriginal land claims and resource development agreements;
 - Improving regulatory processes and personnel turnover in government regulatory bodies; and
 - Ensuring further investments in geoscience.

It is clear that the long-term trend in global demand and commodity prices looks promising for mining development in Canada's Northern regions. Although short-term uncertainties resulting from the outcomes of the global financial crisis are affecting some world markets, the long-term outlook for global metal and non-metallic mineral demand will likely be strong. This demand in the growth trend is due in part to the rapid industrialization and rise of the middle class in countries such as China and India.

It is obvious that the long-term trend in global demand and commodity prices looks very promising for mining development in Canada's Northern regions.

Increasing demand and the resulting high commodity prices have pushed mining companies to search for important, new mineral deposits in more remote regions. Previously underexplored regions are now being considered as areas to be explored for mineral reserves, while previous reserves are being re-examined for new potential. Canada's Northern regions stand to benefit from this exploration activity and possibly from future mining development.

However, for communities and industry to benefit from this enormous potential, several key actions need to be taken to ensure that development happens in a responsible and sustainable way. Much progress has been made over

the past several decades with regard to key challenges, such as community engagement and environmental protection. Likewise, the business climate in Canada has been very stable, allowing for a greater openness for development. But it is undeniable that great impediments remain. All proponents and stakeholders must work cooperatively to overcome these challenges and bring about a truly sustainable and prosperous future for the North's communities.

RECOMMENDATIONS

Several important areas must be addressed in order to create or maintain the necessary conditions for more responsible mining development in Canada's North. Addressing some, or all, of these priorities can significantly improve the outlook for the North's—and Northerners'—future. Taking action will also ensure that communities are given the opportunity to thrive, and that the natural environment will be protected for future generations. The following recommendations should be considered in light of the observations outlined above and the broad context of Canada's mining potential provided in this report.

A TRANSPARENT AND INTEGRATED APPROACH TO SUPPORTING A COMPETITIVE BUSINESS ENVIRONMENT FOR THE MINING INDUSTRY IN CANADA'S NORTH

Global demand for minerals and levels of exploration activity in Canada's North continue to be high. Supporting a competitive business environment in the North is crucial in positioning Canada well in terms of increasing its mining output over the long term. This requires a transparent and integrated approach to addressing key challenges. For example, legislation or practical arrangements that encourage information sharing between proponents and communities as well as between various levels of government will go a long way in helping to address some of the challenges around issues such as the granting of permits, mine closure, environmental protection, the involvement and participation of Aboriginal groups, and duplication of processes. Furthermore, transparent and open communication among proponents, governments, and communities can provide all parties with the

tools they require to make informed decisions and help to demystify mining development. Communities will better understand what types of opportunities and challenges mining projects may provide, as well as the potential long-term impacts on the environment. A key solution may be to conclude impact and benefits agreements in a more transparent manner. This will allow companies to accommodate local residents' needs, while giving communities the chance to fully participate in negotiations by drawing on other experiences and agreements.

GREATER EMPHASIS ON ADDRESSING INFRASTRUCTURE GAPS

The lack of adequate infrastructure is biggest major obstacle to mining development in Canada's North. The lack of transportation infrastructure, in particular, is a key impediment to mining development. Mining projects require different infrastructure supports at different stages. Since transportation plays a vital role in determining whether a project will move forward, greater investments in the necessary infrastructure need to be considered. Government assistance or partnerships between the public and private sector can help relieve the current financial burden of construction costs placed on mining companies. These types of investments will also serve to make investment in Northern regions more attractive.

Power generation is another key infrastructure requirement and a key impediment to mining development in Canada's remote North. New mines in these regions often rely on their own power generation facility because local electric utilities are unable to meet their needs. The reliance on diesel, however, incurs substantial costs and considerations for companies. To decrease these costs, some companies are turning to renewable energy sources. For example, Diavik Diamond Mine in the Northwest Territories is building a wind farm with technology that can operate in minus 40 degrees Celsius. Wind power is expected to reduce diesel energy used by the diamond mine by 10 per cent. Likewise, Goldcorp's Musselwhite gold mining operation in Northern Ontario has turned to solar power to help heat its buildings. These renewable resource projects are examples of possible ways to reduce energy costs while contributing to the development of more sustainable operations across the North.

INCREASED SUPPORT FOR RECRUITMENT INITIATIVES FOCUSING ON WOMEN, NEW CANADIANS, YOUTH, AND ABORIGINAL WORKERS

Mining companies worldwide will soon be scrambling to find skilled workers to meet the industry's requirements, as demand for metal and non-metallic minerals are expected to increase. The limited available workforce will lead to a global competition for talent and a potential challenge for mining companies operating in Canada's North. The potential to hire more Aboriginal people in mining is significant, given their younger population demographics and the growth in Canadian mining that will take place near many Northern Aboriginal communities. But many Aboriginal people lack the education and training to meet the skill requirements of many positions available within the industry. Under-represented groups, such as women, youth, and new Canadians could also be a potential talent pool from which mining companies can draw.

The roles of Aboriginal governments in the review of mining project proposals and the development of these projects need to be acknowledged and respected.

There have been considerable difficulties in getting such groups to participate in the mining workforce. Significant efforts by mining companies and governments will be required to encourage more Aboriginal people and under-represented groups into available mining jobs. This will include efforts by the public and private sector to provide the required education and training to workers when needed. Providing greater child care options within communities could provide a solution for mothers who have to leave to work at mining sites. And recognizing the credentials of foreign workers is crucial for encouraging new Canadians to accept jobs in this sector. As well, partnerships between the public and private sectors to ensure worksite integration and to assist workers with everything from the application process to learning new terminology would help workers better understand the industry. For young Canadians, increased, targeted outreach in high schools and programs that highlight career options in the mining field would help break down many of the misconceptions young people have about the industry, while broadening their career horizons.

MORE EFFORTS TO BUILD MEANINGFUL COMMUNITY ENGAGEMENT, AND IMPLEMENT ABORIGINAL LAND CLAIMS AND RESOURCE DEVELOPMENT AGREEMENTS

Building trust between mining companies and Northerners requires engaging and accommodating to the greatest extent possible local communities affected by mining development. In addition to consulting and negotiating with Aboriginal communities, mining companies need to demystify their mining activities. This includes providing Aboriginal and non-Aboriginal Northerners with adequate and factual information about mining projects. Ensuring ongoing, concerted, and meaningful efforts to alleviate community concerns and to respond to community needs as best and as timely as possible is also necessary. An important step in establishing positive relationships with Northern communities is to begin consultations at the outset of mining projects and to continue with frequent and respectful communications throughout the life of the project.

Respectful and meaningful engagement also means that governments and industry must address and respect Aboriginal rights. These rights are a reality that mining companies must recognize at all levels of operation, from exploring for deposits to the closing of exhausted mines. However, further progress is required on implementing Aboriginal land claims and resource agreements with respect to development. In particular, the roles of Aboriginal governments in the review of mining project proposals and the development of these major resource projects need to be acknowledged and respected. This will also help to clarify overlapping regulatory mandates between Aboriginal, federal, and provincial/territorial governments, ultimately working toward reducing the complexity and amount of time taken in the overall regulatory review and approval processes of mining projects.

REDUCE THE HIGH TURNOVER RATES OF PERSONNEL IN GOVERNMENT REGULATORY BODIES

The high turnover rates in government regulatory bodies and departments create problems in the administration and enforcement of regulatory regimes and in getting new mining projects approved. The resulting capacity constraints also add more time to regulatory processes and approvals. Having adequate numbers of qualified and well-trained board members and staff helps to ensure that regulatory review boards are neutral with respect to

economic development. It also enables these boards to make consistent and predictable decisions and have sufficient resources to provide regulatory decisions in a timely manner. While some turnover is to be expected, it would be wise for governments and regulatory bodies to ensure that adequate training, mentoring, and other knowledge transfer mechanisms are in place so that new recruits can assume their responsibilities as seamlessly as possible.

FURTHER GOVERNMENT INVESTMENTS TO GATHER GEOSCIENCE DATA IN SUPPORT OF MINERAL EXPLORATION

The discovery of important high-quality mineral deposits large enough to be mined requires significant exploration activity. Governments can assist the private sector in their

mineral exploration activities by sharing geological information on the most promising deposit locations. The federal government, for example, committed \$100 million between 2008 and 2013 for geo-mapping in the Arctic, focusing particularly on the Northwest Territories and Nunavut. Likewise, provinces and territories have significant geological data for their Northern regions that can be used by exploration companies. Increased access to data can help the private sector reduce the risks and costs associated with exploration activities and increase their chances of finding significant high-quality mineral deposits.

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APPENDIX A

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Centre for the North

Purpose

The main purpose of the Centre for the North is to work with Aboriginal leaders, businesses, governments, communities, and educational institutions to achieve a shared vision of sustainable prosperity in the North.

Key Objectives

- Examine the full range of challenges and opportunities related to sustainable prosperity and then develop policies and strategies that take into account the interrelationships among the factors.
- Engage First Nations, Inuit, and Métis leaders and communities to ensure that their voices are incorporated into the dialogue and analysis on the full range of issues.

Our Goal . . .

. . . is, through research and dialogue, to provide policy-makers and others with new insights that strengthen their foundation for informed decision-making.

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