



MINING CAPITAL:

HOW CANADA HAS TRANSFORMED ITS RESOURCE ENDOWMENT INTO A GLOBAL COMPETITIVE ADVANTAGE

January 2013



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EXECUTIVE SUMMARY

“Competitiveness in the knowledge-based economy is not about the lowest cost but the highest creativity, and this applies to all sectors, from agriculture to forestry to energy to communications to retail. Competitiveness today is about seizing the opportunities in the dynamic emerging economies, with the new products and services that consumers are seeking, and do so more nimbly and more quickly than our global competitors.”

– Kevin Lynch, Former Clerk of the Privy Council

In an increasingly competitive global economy, Canadian business cannot expect to compete on the basis of low costs. Instead, our global success will require a focus on remaining a strategic niche player that fulfills specific needs. This approach means fostering an innovative private sector with deep links to global supply chains, particularly with emerging economic powerhouses in Asia, Africa and Latin America.¹

In this report, the Canadian Chamber of Commerce examines one resource sector where Canada has succeeded in establishing itself as a world-leading niche player. *The World’s Mining Capital* demonstrates how a strategic focus on resource-based industries like mining can serve Canada well in the fiercely competitive environment of the 21st century. Many Canadians do not realize that Canada is a major mining country and a top 10 producer of 17 key metals and minerals.² The extraction and processing of these materials is an important part of Canada’s industrial sector and an essential source of GDP, jobs and government revenues from coast to coast to coast.

Canada’s claim to being the world’s mining capital goes beyond the simple extraction of metals and minerals in Canada or around the world. Typically, countries are thought to gain a competitive advantage from a resource endowment by moving up the value chain, in other words, by processing raw materials into manufactured goods. However, Canada has leveraged its metal and mineral endowment not just by extracting and processing raw materials, but also by creating and marketing the knowledge of how to effectively and responsibly develop these resources.

The first part of this report describes the global success of the broader Canadian mining industry, which includes not only the core activities of exploration, mine development and operation, mineral processing and site remediation, but also the vast array of suppliers, service providers and professionals that help support miners and prospectors both in Canada and abroad. We are the clear global leader in mining finance, exploration and a global top-five producer of 11 minerals and metals, including potash, uranium, diamonds, aluminum and nickel. Canada is also a strong competitor in mining technologies, and houses the second largest mining supply sector globally. These are all fields that provide productive spillovers into other sectors of the Canadian economy and can help sustain Canada’s competitive advantage.

This report goes on to demonstrate how Canada is home to a number of competitive clusters based in the mining sector that deserve greater recognition not only from Canadians but from the Canadian government as well. Mining is a healthy and growing sector that powers meaningful sectors of the

1 Craig Alexander. “The Canadian disadvantage.” *The Financial Post*, July 2, 2012. <http://business.financialpost.com/2012/07/02/the-canadian-disadvantage/> (accessed July 11, 2012).

2 Mining Association of Canada. *Facts and Figures 2011 of the Canadian Mining Industry*. Ottawa: Mining Association of Canada, 2011.

Canadian economy, delivering results for Canada. It is also one of the few sectors in which we have the expertise, capital and capacity to be world leaders. Toronto is the small-to-medium capitalization finance capital of the world, boasting a unique collection of experts and institutions that draw exploration and mining companies seeking capital from around the world. Vancouver has established itself as a global hub of the exploration sector, running projects in Africa, Asia, South America and Europe as well as in Canada and the United States. Sudbury's emerging mining supply and technology cluster is the "mining superstore" of Ontario, with the potential to become a global leader.

The second part of the report part draws on the insights of 15 leaders in the Canadian mining, financial, and professional services sectors to discuss some of the factors that have helped establish Canada as a global leader in mining. Though initially rooted in the good fortune of our mineral reserves, Canada's global success in mining can be attributed more recently to the emergence of smart policies and innovative private institutions that are tailored to the unique attributes of the mining industry. However, action in five distinct areas is needed to ensure that we maintain this advantage:

1) *Maintaining Canada's pool of uniquely skilled people*

While Canada's competitive strength in mining is founded in its unique pool of qualified people, demographics and the larger skills crisis have transformed what was an advantage into the sector's key challenge. The mining industry is taking action on this front, but there are a number of areas where government support is essential:

- Reduce the administrative burden associated with economic class immigrants and do more to ensure their skills align with the needs of employers. Ensure employers play a key role in the selection process in the new expression of interest approach to immigration.

- Continue to fund initiatives like the NWT Mine Training Society, North Works, the BC Aboriginal Mine Training Association and the Aboriginal Skills and Employment Training Strategy that help to develop the skills Aboriginal peoples need to follow careers in the mining sector. There is also an opportunity to replace the Aboriginal Skills and Employment Partnership with a program that could more effectively achieve the same synergy between the sector and Canada's Aboriginal peoples.
- Create a national database on labour market conditions and disseminate information to high schools and colleges about skills that are high in demand. Support better coordination between universities, colleges, industry, and government to ensure programs are aligned with industry needs and graduates are better able to find meaningful employment.
- Recognize the skills crisis extends to government regulators as well. Implement knowledge-sharing practices to ensure key knowledge is retained as retirements affect the public service expertise in mining regulation and technology.

2) *Staying ahead of the pack on world-leading practices in finance and taxation*

Experts interviewed for this report cited Canada's tax and finance system, which is well-tailored to the nuances of the sector, as a key reason for the mining sector's global success. However, dwindling reserves of metals and minerals as well as the complexity of multiple federal and provincial/territorial policies mean government should take the following actions to ensure Canada continues to lead:

- A targeted exploration tax credit should be developed (over and above the METC) to incent exploration in remote regions of Canada where exploration costs are prohibitive (e.g. the Arctic).

- The CRA should update its 2007 guidelines to clarify which expenses, incurred in the course of conducting community consultations, environmental baseline studies and feasibility studies are eligible Canadian Exploration Expenses.
- Reduce the administrative burden on industry by implementing a federal program for the mining industry which would serve to streamline and harmonize taxes among all the various taxing jurisdictions.
- Sustain and increase government investment in geosciences to help address Canada's mineral reserve crisis and sustain investment in the sector.
- Continue to pursue Foreign Investment Protection Agreements with foreign governments in order to help mitigate political risk to Canadian mining assets abroad and be more aggressive in their application. Not only do these agreements need to be signed, but their active enforcement will go a long way towards protecting Canadian investment.

3) *Setting up the infrastructure and international agreements today to ensure a competitive mining sector tomorrow*

The mining cluster in general depends on physical infrastructure, like roads and power plants, as well as intangible infrastructure, like geosciences, to ensure access to resources at competitive costs. For Canadian firms operating abroad, access to resources is more a function of having the international treaties and agreements in place to prevent foreign governments from backing out of licenses and contracts. Recommendations to maintain this advantage include:

- Continue to invest in the infrastructure necessary to promote growth not only in the mining sector but across the whole Canadian economy. This can be accomplished through increased partnerships with the private sector, other governments and Aboriginal peoples and through the adoption of innovative funding models. These investments will help unlock the resource potential of the North and expand markets for Canada's products. When making these investments, all levels of Canadian government should consider the potential community and commercial benefits when choosing the locations of infrastructure projects.

4) *Becoming the world leader in the development of new mining technology and best practices*

Canada's history of innovation in the mining sector has been a great competitive advantage. In the face of growing competition from low-cost suppliers, deposits that are harder to find and extract and increased expectations on environmental performance, Canada cannot afford to be lower than number one when it comes to mining innovation. The government should:

- Enhance the working relationship with industry and academia through the Canadian Mining Innovation Council by committing funding that will better promote and coordinate mining research in Canada. In addition, work at public research facilities should seek to align with industry needs.
- Allow capital expenditures to be SR&ED eligible.
- Focus public R&D on step-changes that address industry-wide issues.
- Examine its support for mining innovation beyond science and technology and seek to understand barriers and gaps in fostering new business practices relating to areas like community relations, human resource management and marketing.

5) *Social license and an efficient and predictable regulatory environment as emerging areas of competitive advantage for Canadian mining*

Ensuring community buy-in for mining projects around the world has emerged as a critical factor in the success of the industry. There is increasing pressure for governments to regulate firm activity that occurs outside of their borders. With the right support in place, Canadian firms are well-positioned to transform this potential liability into a competitive advantage. The government should:

- Consistently carry out its obligations to consult and, where necessary, accommodate Aboriginal peoples. It should ensure its consultation obligations are adequately funded and establish clear expectations for industry.
- Stay the course on regulatory reform. Officials within relevant federal, provincial and territorial government departments should work closely together and with industry and other stakeholders where appropriate to ensure the intended regulatory outcomes are achieved.
- Take a pro-active approach to promoting Canadian mining internationally. This could be advanced through the creation of a brand of excellence, innovation and social responsibility. By taking a leadership role and promoting the sector, the government would be better placed to ensure the conduct of Canadian firms operating internationally is consistent with this vision.

Canada has managed to transform its resource advantage in metals and minerals into a knowledge advantage in mining that reaches beyond the exploration and extraction of minerals into areas like technology development, finance and other professional services. However, our enduring status as the world's mining capital is not set in stone and requires that industry and government work together to ensure the factors that made us the global leader of the sector are maintained and strengthened. As one interviewee for this paper noted, "hockey and mining are two things Canadians know we are good at."³ When it comes to either activity, we should never expect anything less than first place.



3 Ungad Chadda, (Senior Vice President, Toronto Stock Exchange), Interview by Katrina Marsh, August 8, 2012.

NATURAL RESOURCE CLUSTERS: KEY TO COMPETITIVENESS

What are industrial clusters and why should we care?

Canadians care about competitiveness because it is essential to creating jobs and maintaining the social safety net that Canadians value. Although there is no single definition, competitiveness can be said to refer to an economy's ability to efficiently transform its productive assets into a high standard of living for its citizens. For a country like Canada, which cannot compete as a low-cost producer of mass-market goods, competitiveness is synonymous with innovation: the ability to transform abstract ideas into useful products, processes and services to the benefit of society.⁴

How are the innovative, world-beating industries that lie at the heart of national competitiveness formed? One popular theory suggests that they tend to emerge from industrial clusters: "geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions."⁵ Famous industrial clusters like Silicon Valley or Hollywood include dense networks of firms and specialized suppliers that both compete and cooperate with each other. This ecosystem is often rounded out by supporting institutions like universities, think tanks, standards-setting agencies, trade associations and government bodies.

The advantages a cluster provides an individual firm, such as knowledge, strong relationships and a motivating environment, are often difficult to replicate elsewhere and can confer long-standing advantages (see *Are Clusters the Real Source of China's Manufacturing Advantage?*⁶).

Are Clusters the Real Source of China's Manufacturing Advantage?

China's domination of electronic manufacturing is typically assumed to be based on its low labour costs. However, a story by the *New York Times* suggests there may be more than meets the eye.

In *How the U.S. Lost Out on iPhone Work*, reporters Charles Duhigg and Keith Bradsher argue that the added labour costs to producing in the U.S. were a relatively minor factor in the decision to manufacture the iPhone in China.

Instead, China had several advantages associated with being part of a cluster: access to specialized labour (in this case mid-level engineers), a dense network of suppliers and strategic government support. According to one Apple executive:

"The entire supply chain is in China now... You need a thousand rubber gaskets? That's the factory next door. You need a million screws? That factory is a block away. You need that screw made a little bit different? It will take three hours."

Low labour costs may have made China the factory of the world, but it has built on that initial advantage to create strong manufacturing clusters. These clusters may be key to sustaining China's leadership in manufacturing as its labour cost advantage begins to erode.

4 Kevin Lynch. "The keys to competitiveness? Innovation and productivity." *The Globe and Mail*, November 23, 2011.

5 Michael Porter. "Location, Competition, and Economic Development: Local Clusters in a Global Economy." *Economic Development Quarterly* . 14. no. 1 (2000): 15-34.

6 Charles Duhigg, and Keith Bradsher. "In How the US Lost Out on iPhone Work." *New York Times*. Sec. THE iECONOMY, 01/21/2012 . www.nytimes.com/2012/01/22/business/apple-america-and-a-squeezed-middle-class.html?pagewanted=all (accessed August 1, 2012).

Not Just Nokia: Finland's Success in Mining Supply

Several successful natural resource-based clusters have emerged around the world. Many have successfully leveraged their resource endowment into a knowledge advantage that can multiply the economic benefit of the resource and create high-tech, knowledge economy niches.

For example, Finland's a mining sector accounted for €85 million in exports in 2008. However, the country has also developed a strong mining technology industry. In fact, the Finnish government claims that when an underground mine is established anywhere in the world, 70 to 90 per cent of the required technology comes from either Finland or Sweden. Mining technology accounted for €1.5 billion worth of exports in 2008 and employed almost 40 per cent more people than the core mining industry.

The Finns have managed to transform their relatively modest resource advantage into a strong knowledge advantage. Canada has accomplished a similar feat in many respects, but a stronger focus on the potential of the mining supply sector would leave us well positioned to be a dominant player in the global market.

Importantly, a cluster allows its individual member firms to benefit as if it had greater scale through greater access to key inputs like employees and suppliers, specialized knowledge, public infrastructure and goods. Being part of a successful cluster can also help small firms attract larger customers. While clustered firms are highly competitive, they also cooperate to address issues – such as skills shortages or a lack of key infrastructure – that threaten the competitiveness of the whole.⁷

Clusters also confer another important advantage: the ability to foster innovation. The competition that occurs within clusters provides additional incentives to try new technologies and business practices, while their collaborative aspect facilitates the exchange of ideas.⁸ The relationships and face-to-face contact between competitors, suppliers and service providers help to shine light on opportunities to introduce innovative products, processes or practices. The proximity of suppliers and other partners can help innovators source new materials or equipment more quickly, and makes it easier to get input from a broader range of partners.

Can natural resource industries form the basis of innovative, competitive clusters?

Mining and other natural resource-based industries are recognized as an important source of economic prosperity in Canada, providing income and jobs for communities and energy and materials for industry. However, when speaking of the role of natural resource industries in the competitive and innovative economy of the future, there seems to be two competing streams of thought.

⁷ Michael Porter. "Clusters and the New Economics of Competition." *Harvard Business Review*. November/December (2008): 77-90.

⁸ Porter. "Clusters and the New Economics of Competition."

One stream views natural resources as a “traditional” economic sector that cannot provide the kind of knowledge-intensive, innovative growth that will sustain Canada’s competitiveness into the future. Underlying this point of view is the idea that natural resource production is a low-tech and non-innovative “traditional” sector that contributes little to economic spillovers – knowledge, technology or people who move on from the originating sector to have broader impacts on the economy.⁹ Accordingly, to remain prosperous Canada must transition from its current status as an economy based on natural resource commodity production and mid-value manufacturing towards more knowledge-based industries.¹⁰

However, there is a second school of thought on the role of natural resources in the modern economy. Rather than arguing for the need for Canada to transition away from natural resource-based industries, it contends that there are several reasons why resource-based industries are in fact well-suited to form the basis of a competitive, innovative and knowledge-based economy in Canada (see *Not Just Nokia: Finland’s Success in Mining Supply*¹¹).

For one, too many Canadians do not realize that mining is an innovative, technologically intensive sector. A recent report commissioned by Natural Resources Canada examined the mining sector’s performance on a wide range of innovation indicators and concluded that the overall innovation performance of the core mining industries were strong and improving. Metals and minerals extraction and processing industries were found to be strong innovators, with higher than average performance compared to the Canadian business sector in most indicators (Figure 1). The exceptions were the average number of years of educational attainment and R&D

Measuring Mining Innovation

Part of the metals and minerals extraction industry’s reputation as an innovator is a result of common measures of innovation performance – expenditures on R&D and productivity growth – that are stacked against them in several ways:

Process oriented & capital intensive – Mining firms tend to focus on creating new processes rather than products or services. As a result of their capital-intensive nature, they also tend to innovate by buying the latest machinery and equipment. R&D expenditures do not fully capture innovation that happens through purchasing state-of-the-art equipment or tweaking processes.

Resource Quality – Not all ore bodies or mineral deposits are created equal. Extracting metals and minerals from more marginal deposits often requires greater use of inputs for the same amount of outputs, which can depress productivity growth even when innovative new technologies or processes are being used.

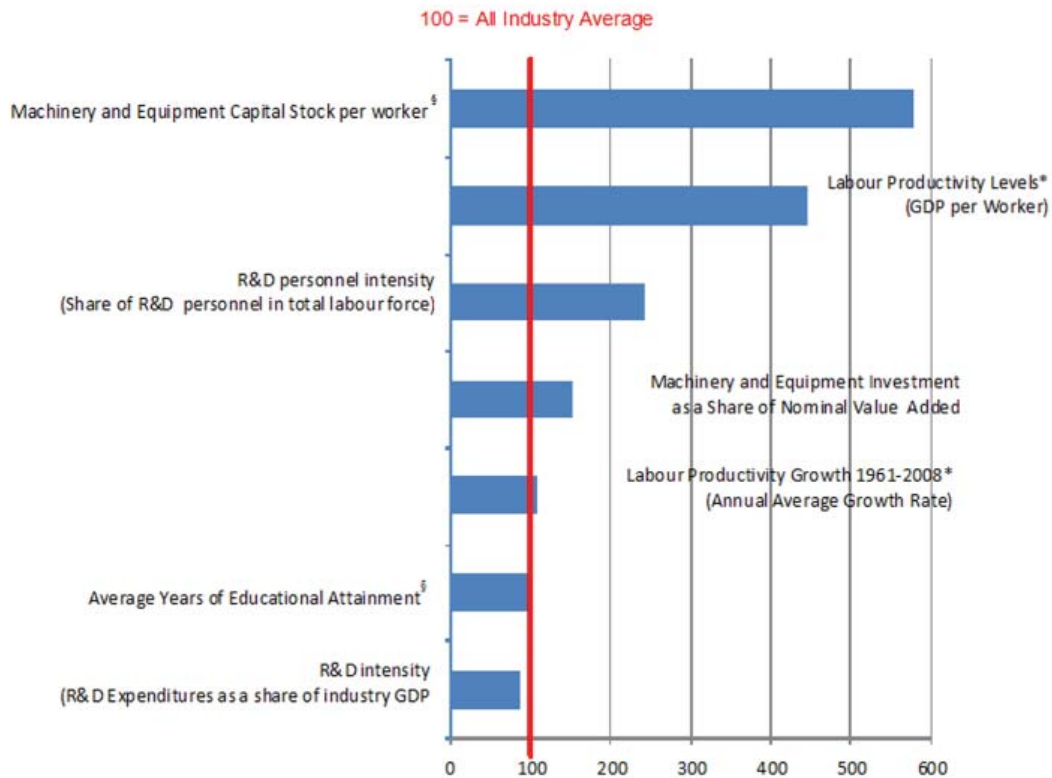
Environmentally focused – Innovation in the mining sector is often to prevent or mitigate the environmental impacts of their operations. This can result in investments that, while they improve the environmental performance of firms, don’t necessarily increase output. In this case, innovation might not lead to increased productivity.

9 Graham A. Davis, and John E. Tilton. “Why the resource curse is a concern.” *Mining Engineering*, April 2008. http://inside.mines.edu/~gdavis/Papers/Mining_Engineering.pdf (accessed July 5, 2012).

10 Richard Hawkins. *Looking at Innovation from a Uniquely Canadian Perspective: The Case for a New Alliance of Practice, Policy and Scholarship*. Ottawa: Institute for Science, Society and Policy, University of Ottawa, 2012.

11 The example of Finland was drawn from Robert Simpson. “British Columbia: World Center of Excellence for Mineral Exploration.” *Mineral Exploration*, 2010. <http://passthrough.fw-notify.net/download/966412/> www.amebc.ca/documents/resources-and-publications/publications/current/MinX-Spring10-web.pdf (accessed August 3, 2012). Figures used in the textbox from the Finnish Mining and Mining technology industries come from the 2010 *Finland’s Minerals Strategy*, published by the Government of Finland.

Figure 1: Index of the Selected Measures of Innovation in the Mining and Manufactured Mineral Industries relative to the Canadian Business Sector, 2008



Source: Canadian Center for the Study of Living Standards, *Innovation in Canadian Natural Resource Industries: A Systems-Based Analysis of Performance, Policy and Emerging Challenges*. June 2012.

Mining includes non-fuel metal and mineral extraction and primary metal, fabricated metal and non-metallic mineral product manufacturing.

§Figures are for 2010 instead of 2008 *Figures include metal and mineral extraction only

intensity, and the latter measure may underestimate the innovativeness of mining firms (see *Measuring Mining Innovation*¹² on the previous page). In addition, mining and oil and gas firms operate in the type of

fiercely competitive and highly globalized environment that is often thought to spur innovation, reporting a greater number of competitors and more international operations than the business sector average.¹³

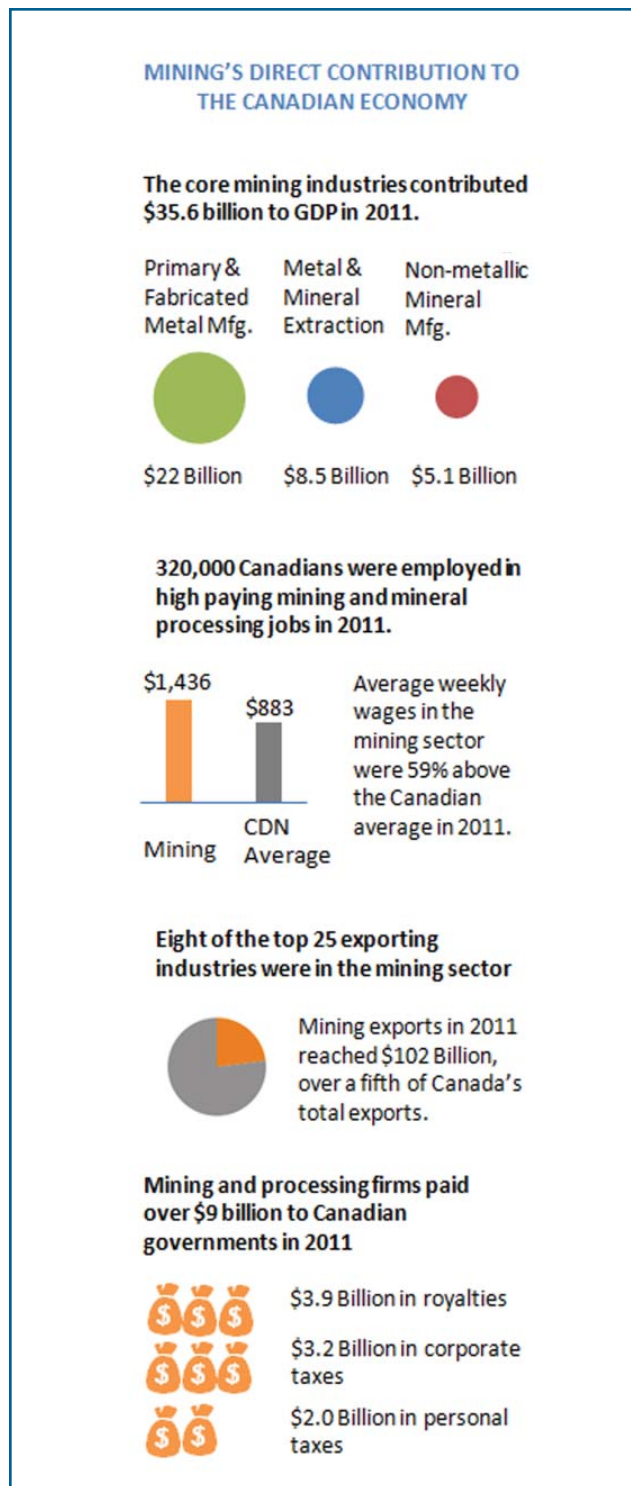
12 This textbox was based on Andrew Sharpe and Blair Long. *Innovation in Canadian Natural Resource Industries: A Systems-Based Analysis of Performance, Policy and Emerging Challenges*. Ottawa: Centre for the Study of Living Standards, 2012. www.csls.ca/reports/csls2012-06.pdf (accessed July 10, 2012).

13 Andrew Sharpe and Blair Long. *Innovation in Canadian Natural Resource Industries: A Systems-Based Analysis of Performance, Policy and Emerging Challenges*.

Second, resource industries have deep links to many other sectors of the economy, creating great potential for positive economic spillovers. According to Richard Hawkins, Canada Research Chair in the Social Context of Technology, natural resource industries typically have extraordinarily long supply chains, relying on a diverse range of suppliers and service providers. Consequently, a broad range of industries – including manufacturing, finance, construction, transport, environmental technologies services, wholesaling and retailing – have significant stakes in production, extraction and processing of natural resources and the mitigation of the environmental impacts of these activities.¹⁴ For instance, the mining sector alone accounted for in excess of 50 per cent of Canada’s rail-freight revenues and 48 per cent of rail-freight volume in 2011.¹⁵

Hawkins also argues that resource firms also have deep value chains – meaning that they have the potential to produce or consume products and services ranging from simple raw materials to very sophisticated value-added technologies and services.¹⁶ Accordingly, resource industries have a high potential to create new forms of value and to support high-value exports in technology and expert services. In the 1990s, Inco responded to the new demands of the high-tech sector by developing an array of new products, such as electromagnetic shielding to prevent interference from electromagnetic waves and radio frequencies and nickel foams to enhance the batteries used in hybrid cars.¹⁷

At the end of the day, what impacts competitiveness are not the industries a country has fostered, but how those industries compete. Canada’s mining and other natural resource industries appear to have many characteristics – particularly long supply chains and deep value chains – that make them as likely to foster innovative competitive growth as ecommerce or biotech, with the added advantage that Canada already has a formidable head start.



14 Hawkins 18

15 Mining Association of Canada. Facts and Figures 2012 of the Canadian Mining Industry.

16 Hawkins 18

17 Natural Resources Canada. Canadian Suppliers of Mining Goods and Services: Links between Canadian mining companies and selected sectors of the Canadian economy, (Ottawa: Government of Canada, 2000).

CANADA'S WORLD-BEATING MINING CLUSTERS

Mining and mining supply in Canada

The real question is not whether the Canadian mining and other natural resource industries can foster innovative, globally competitive clusters with spinoff benefits for other industries; indeed, they already are. Instead, there is the need to better understand how mining-based clusters work and what governments and businesses need to do to ensure Canada is maximizing their capacity to innovate and foster positive spillovers in other sectors.

The core mining sector includes four activities:¹⁸

Exploration and development

This includes all the work that typically goes into discovering economically viable ore or mineral deposits, such as researching new exploration techniques, obtaining permits and resource estimates, assessing feasibility as well as fostering positive community relations.

Extraction

The removal of ore or mineral deposits from the earth is what is generally thought of as mining. Each mine site is unique and will employ a different mix of technologies and techniques to extract metal ores and mineral deposits.

Manufacturing

The mining sector also includes manufacturing activities like primary metal manufacturing (iron, steel and aluminum production) and fabricated metals manufacturing (wire products, cutlery, structural metals) and non-metallic minerals manufacturing (glass and cement).



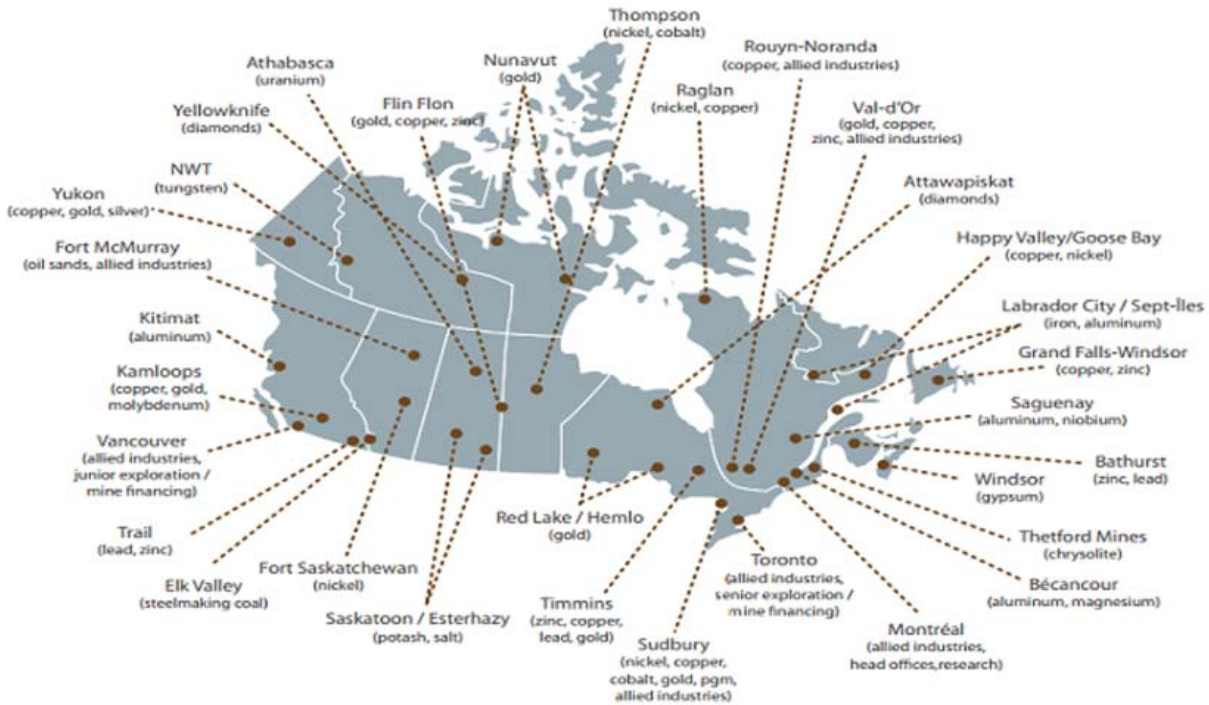
Rehabilitation

The end of a mine's life is increasingly incorporated into the planning process. The process usually requires several technical studies as well as activities like storage, demolition and waste management.

These industries — extraction, primary and fabricated metals manufacturing and non-metallic minerals manufacturing — have significant direct economic benefits (see *Mining's Contribution to the Canadian Economy*).

¹⁸ Minalliance, 100 Innovations in the Mining Industry, (Montreal: Minalliance, 2012) www.minalliance.ca/pdfs/Minalliance_100_innovations_en.pdf (accessed September 4, 2012).

Figure 1: Canadian Mining Industry Clusters



Source: Mining Association of Canada

However, Canada’s mining sector is by no means limited to the country’s resource endowment. The Canadian mining industry is, in fact, highly integrated into the global economy and is one of the few sectors where Canada has a strong external investment presence. In 2010, Canadian mining firms held twice as many assets abroad as they did in Canada (\$129 billion versus \$58 billion).¹⁹ Unlike many other sectors of the Canadian economy, the mining sector’s reach expands beyond the U.S. and into emerging economies: half of Canada’s international mining assets were in Latin America or the Caribbean and a fifth were in Africa.²⁰ Canadian mining firms with operations abroad benefit Canada

through repatriated profits and taxes and, in some cases, by giving Canadian suppliers and services providers a foothold into new markets.²¹

According to the Mining Association of Canada (MAC), Canada boasts at least 36 mining-related industrial clusters across the country (see *Figure 1: Canadian Mining Industry Clusters*). While many of these clusters are focused on extracting Canada’s mineral and metal resources, some of Canada’s strongest mining-based clusters extend beyond the extraction and manufacturing industry to include exploration, suppliers and other allied industries. Mining and other natural resource industries have

¹⁹ Minerals and Metals Sector, Natural Resources Canada, “Canada’s Mining Assets Abroad: INFORMATION BULLETIN, JANUARY 2012.” Last modified March 3 2012. Accessed July 27, 2012. www.nrcan.gc.ca/minerals-metals/publications-reports/4425.

²⁰ Natural Resources Canada, “Canada’s Mining Assets Abroad: INFORMATION BULLETIN, JANUARY 2012.”

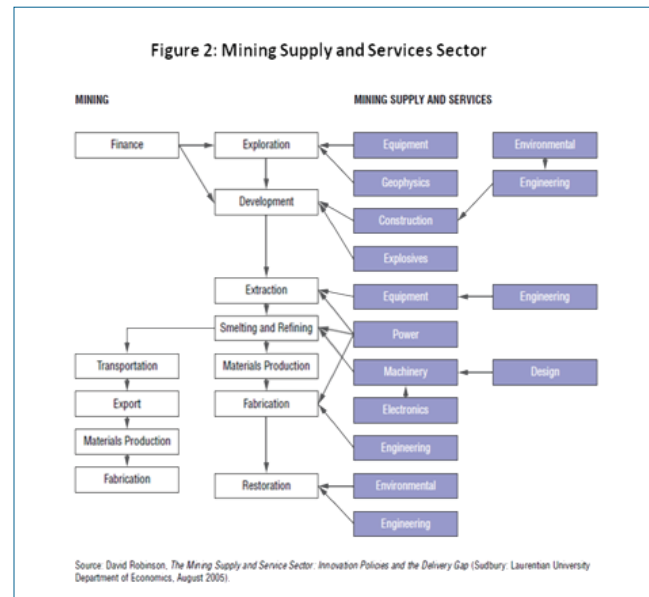
²¹ Ritter, Archibald R. M.. “Canada’s “Mineral Cluster”: Structure, Evolution and Functioning”. Prepared for the Seminario Internacional Sobre Clusters *Mineros En America Latina*, CEPAL/IDRC (27 y 28 de Noviembre): 1-73.

very long supply chains that employ a wide range of industries. Info Mine states that Canada has the second largest mining supply sector after the U.S., with more than 3,000 firms providing goods and services to mining exploration, extraction or manufacturing firms operating in Canada or abroad.²²

Because statistical information is collected on the basis of what is produced rather than how it is used, there are no current and comprehensive statistics on the full size and impact of mining suppliers and service providers in Canada.²³ Due to the lack of reliable data on the sector, the Conference Board of Canada describes mining supply as one of the largest “invisible” industries in the country. The studies that are available suggest that mining supply has a significant economic impact. For instance:

- According to the Canadian Association of Mining Equipment and Service, studies indicate that for every direct job in mining extraction there are between two to four jobs in mining supply.²⁴
- Demand for global mining supply was estimated at US\$47 billion in 2008. Demand for mining supply in both the U.S. and Australia was around US\$5 billion dollars, roughly the same as the forestry and logging’s contribution to Canada’s GDP. No current figures are available for Canada.²⁵
- A study prepared for the Ontario North Economic Development Corporation estimated that Northern Ontario’s mining supply sector produced \$5.6 billion in output and provided 22,000 jobs in 2010.²⁶

- Another study by PriceWaterhouseCoopers found that the mining sector in British Columbia had a direct impact of \$2.7 billion in GDP and 21,000 jobs in 2010. The indirect impacts of the mining supply sector added an additional \$1.3 billion in GDP and another 16,500 jobs to the province.²⁷



The scope of the mining supply and services sector is broad and touches on several knowledge-based or valued-added sectors (see *Figure 2: Mining Supply and Services Sector*). A 2001 report by Natural Resources Canada, the most recent study on the national mining supply sector, found that 90 per cent of mining supply revenues come from the manufacturing, professional, scientific and technical services, wholesale trade, and mineral resource extraction (contract drilling and contract mining) sectors.

22 Mining Association of Canada. *Facts and Figures 2011 of the Canadian Mining Industry*.

23 Gary Svoboda. *Measuring the Mining Supply and Services Sector*. Publication 11-294. Ottawa: Conference Board of Canada, 2011.

24 Jon Baird (Executive Director, Canadian Association of Mining Equipment and Services). Interview by Katrina Marsh, July 9, 2012. For example, the US Mining association states that every coal mining job creates an additional 3.5 jobs elsewhere in the economy.

25 Svoboda. *Measuring the Mining Supply and Services Sector*.

26 Doyletech Corporation. *Northern Ontario Mining Supply and Services Study*. Ottawa: Prepared for the Ontario North Economic Development Corporation, June 2010. www.sse.gov.on.ca/medt/ontarioexports/Documents/English/Northern_Ontario_Mining_Supply_and_Services_Study_Executive_Summary_FINAL.PDF (accessed July 26, 2012).

27 PricewaterhouseCooper. *Economic Impact Analysis: Mining Association of British Columbia*. PricewaterhouseCoopers, October 2011. www.mining.bc.ca/sites/miningassociation/files/Publications/PwCEconomicImpact.pdf (accessed July 26, 2012).

A quarter of specialized mining suppliers were highly educated professionals, including engineers, geologists, geophysicists, and geochemists.²⁸ Canada's strong network of mining suppliers and service providers work in conjunction with the mining industries to create world-leading clusters. While it is true that mining is a key source of prosperity and jobs for Canada's remote communities, the hubs of some of the strongest mining-based clusters, particularly those focused on mining supply and services, have emerged in urban areas. The Natural Resources Canada report referenced above found that almost half of the supply and services firms in Canada were concentrated in just three communities: Toronto, Vancouver and Sudbury.²⁹ Toronto has combined two of Canada's great industrial strengths – finance and mining – to become the key market to raise mining capital. Vancouver is the home to the largest concentration of junior mining exploration firms in the world, helping to establish Canada as the global leader in metal and mineral exploration. In Northern Ontario, Sudbury is emerging as a centre of expertise in underground hardrock mining, with the potential to export not just minerals but the knowhow and technology to extract them.

Toronto: the world's mining finance capital

It is no exaggeration to state that Toronto is the global capital of mining finance. In mining, equity financing is particularly important since the volatility of commodity markets and the inherent risks associated with the industry makes it more difficult for smaller firms focused on exploration to raise capital through banks or bond markets. Canada in

general and Toronto in particular have developed a significant competitive advantage in mining finance by developing a unique pool of expertise on the exploration and early-stage development of mineral resources. Canadians excel at finding metal and mineral deposits and marshalling the resources to put them into production.³⁰

In 2011, the Toronto Stock Exchange (TSX) and the Toronto Venture Stock exchange (TSXV) registered 58 per cent of the world's mining corporations and financed 90 per cent of all global mining equity deals by number and 39 per cent by value (See Figure 3). That same year, the London Stock Exchange, the TSX/TSXV's closest rival for the title of mining finance capital, completed 143 deals, although these include some of the largest deals by value. The Canadian exchange has a truly global reach: almost half of TSX/TSXV-funded projects are located outside of Canada, while the exchange itself had 354 international listings as of June 2012.³¹

Toronto's cluster of firms and institutions help *facilitate* access to capital. Toronto has emerged as the world centre for exploration and development firms hoping to attract analyst attention and investment.³² The cluster consists of financial institutions like the TSX/TSXV, analysts, consultants, law firms and the head offices of mining companies, many of which have few to no operations in Canada but have located in the city to take advantage of the expertise the city offers. Also included are other supporting institutions like the Prospectors and Developers Association of Canada, the University of Toronto's Innovation Centre for the Canadian Mining Industry and York University, which launched a mining-focused MBA in 2011.³³

28 Natural Resources Canada. *Canadian Suppliers of Mining Goods and Services: Links between Canadian mining companies and selected sectors of the Canadian economy*.

29 Natural Resources Canada. *Canadian Suppliers of Mining Goods and Services: Links between Canadian mining companies and selected sectors of the Canadian economy*.

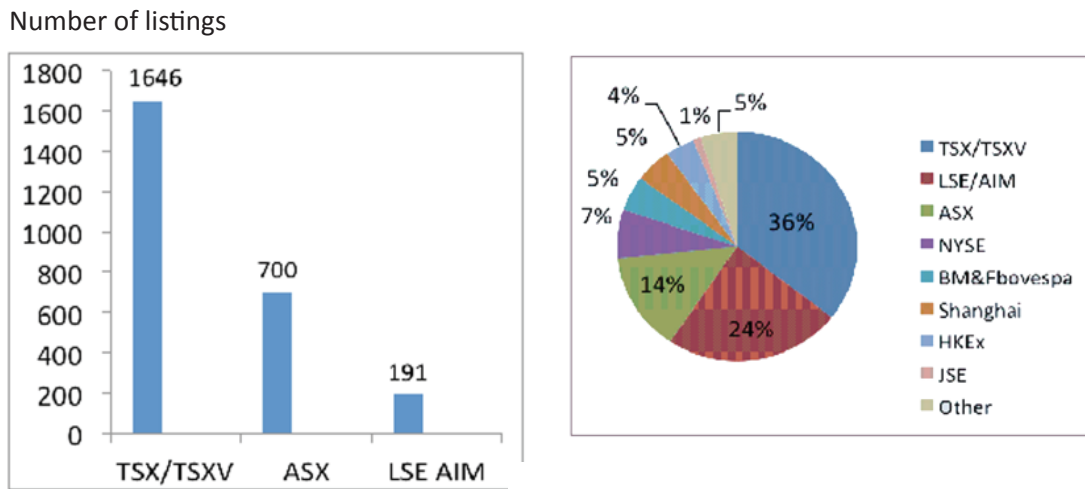
30 Ungad Chadda, (Senior Vice President, Toronto Stock Exchange), Interview by Katrina Marsh, August 8, 2012.

31 TMX, *A Capital Opportunity: Mining*, (Toronto: TMX, 2012).

32 Gordon Bell (Head of the Global Mining and Metals Group RBC Capital Markets), Interview by Katrina Marsh, June 14 2012

33 Schulich School of Business, Schulich School of Business Launches MBA Specialization in Mining, (Toronto: Schulich School of Business Press Release, November 2011) <http://news.yorku.ca/2011/11/28/schulich-school-of-business-launches-mba-specialization-in-mining/> (accessed September 4, 2012).

Figure 3: Global distribution of mining equity financing by listings and value



Source: TMX

Although Toronto may not think of itself as a mining town, the industry has a significant impact on the economy of the city. Toronto is home to over 400 mining and exploration company offices, 30 mining head offices and several hundred mining suppliers that provide jobs and tax revenue for the city.³⁴ Most of the city's largest law firms have an established mining practice focused on helping mining firms secure financing, navigate regulations or conduct mergers and acquisitions. The activities of the mining sector in Toronto have significant spillover benefits for other sectors of the economy, such as hospitality and tourism. For example, the Prospectors and Developers Association of Canada (PDAC)'s 2011 annual conference drew 27,000 participants from around the world and contributed \$72 million to Toronto's GDP.³⁵

Vancouver: home base for mining explorers

Through its bases in Vancouver and Toronto, Canada has emerged as the global leader in mining exploration. Canada is home to around half of the world's 2,400 active mining exploration companies, that accounted for as much as 40 per cent of the \$17.5 billion budgeted by companies for mining exploration in 2011.³⁶ Canadian exploration firms are active in emerging economies in Africa, Latin America and Asia. Canada's success in mining exploration has also translated into a proven ability to attract foreign investment. For the last 10 years, Canada has been the top destination for global mineral exploration, attracting 18 per cent of total worldwide spending.

³⁴ Mining Association of Canada. *A Report on the State of the Mining Industry: Facts and Figures 2009*. Ottawa, Mining Association of Canada 2009. www.mineralengineering.utoronto.ca/Assets/Mineraleng+Digital+Assets/News/Report+on+Cdn+Mining+Industry.pdf?method=1 (accessed September 4, 2012).

³⁵ Prospectors and Developers Association of Canada to PDAC e-News and Activities mailing list, March 21, 2012, No 88, www.PDAC.ca/PDAC/publications/na/120321.htm.

³⁶ Metals Economics Group, "Canada world's top exploration country for ten years." Last modified January 24, 2012. www.metalseconomics.com/media-centre/canada-worlds-top-exploration-country-ten-years.

With 1,200 companies, British Columbia is home to more than half of Canada's mining exploration firms and is the largest concentration of mining exploration firms in the world. Most of these firms are located in Vancouver, and like Toronto, Vancouver has established a community of mining firms, consultants, suppliers and service providers; by one count, 2,400 firms are involved in supplying B.C.'s mining exploration industry. There are also a number of supporting institutions like the Mining Association of B.C., the Association for Mineral Exploration British Columbia, the B.C. Institute of Technology and the University of British Columbia.

Canada's strength in mineral exploration is based in part on the large number of "junior" mining companies, many of which are based in Vancouver. According to the PDAC, while "senior" mining companies derive most of their revenues from the production and sale of metal or mineral commodities, junior mining companies generally have no operations, focusing instead on mineral exploration. They are in essence the venture capitalists of the mining world and grow either by selling any discovered assets to mining seniors or by becoming mid-tier or major firms by entering into production. The community of mining juniors serves as an incubator for larger firms; almost half of the mining companies on the TSX graduated from the TSX venture exchange, which is one way to mark the transition from mining junior to mining senior. These graduated firms represented almost \$90 billion in market capitalization in 2011.³⁷

Like Toronto, Vancouver also has a large annual mineral exploration conference. As with the PDAC, the Association for Mineral Exploration of British Columbia (AMEBC) attracts thousands to AMEBC Roundup every January. The industry is a major contributor to the city and its quality of life. B.C.'s Children's Hospital, for example, has been a major beneficiary through the sector's Mining for Miracles campaign.

Canadian Technology in Space!

Mining is no longer "men with pick axes," but a sophisticated enterprise that increasingly relies on technology to extract and process ores at a reasonable cost. Several Northern Ontario firms are on the forefront of developing mining technology.

Ionic Engineering specializes in automating copper and nickel refineries. For example, Ionic's Kidd Process cathode stripping system is one of the first in the world to use robots in the copper refining process. The firm has designed, built or installed automation systems on every continent.

WipWare is the industry leader in optical granulometry of fragmented material, a system that uses photography and sophisticated software to analyze the size of rocks after blasting. This analysis allows miners to fine-tune blasting to minimize electrical, mechanical, chemical and environmental costs.

For the last 10 years **The Northern Centre for Advanced Technology** has been using its knowledge of mining technology to explore the final frontier. The not-for-profit organization has been working with NASA to develop drilling units and other equipment to allow for subsurface space exploration. These processes will be essential for future space exploration or even human settlements on the moon.

³⁷ Amy Horgan, Christine Marino, David Oliver, and James Lusby. *Junior Mine 2011: Volatility, the new "business as usual"*. PricewaterhouseCoopers, 2011. www.pwc.com/en_CA/ca/mining/publications/junior-mine-review-of-trends-in-tsx-v-mining-industry-2011-11-en-v2.pdf (accessed August 7, 2012).

Sudbury: Ontario's mining superstore

Sudbury has a century of history as a mining centre and over a dozen mines operating within city limits. Over the past decade, the Northern Ontario city has been subtly shifting its focus from being a producer of metals to a creator of mining know-how and technology. This shift has been marked by the rise of an organized Northern Ontario mining technology cluster focused on underground hardrock mining technologies.

Sudbury is home to a broad range of mining related activities. The operations of large mining majors – Vale and Xstrata – serve as anchors for the cluster along with other mining firms.³⁸ Around these firms has grown a network of mining supply and technology firms that, together, contributed almost \$4 billion to the local economy and employed 13,800 people – around eight per cent of the population of Greater Sudbury.³⁹ The city is also home to a concentration of mining education and research. Sudbury is home to the public-private Centre for Excellence in Mining Innovation, the Canadian Mining Industry Research Organization, the Northern Centre for Advanced Technology and Mining and Laurentian University's School of Mining and its eight mining research centres. In addition, industry associations, like the Sudbury Area Mining

Supply and Service Organization, and publications, like the *Sudbury Mining Solutions Journal*, seek to share information and strengthen the links among the cluster's participants.

Drawing on this network of expertise, many Sudbury-area firms are producing advanced technology for the mining sector, including robotic processing systems or even space drills (see *Canadian Miners in Space*⁴⁰). Yet the Sudbury technology cluster has yet to achieve the international success of mining finance in Toronto or exploration in Vancouver. Half of the firms in the cluster rely on sales to two firms, while 81 per cent of the cluster's sales occur within Canada. While there is potential for a significant technology group, the small size and scale of many Northern Ontario mining supply firms is a big impediment to further international expansion. For that reason, the cluster's ability to allow firms to benefit as if it had greater economies of scale could be essential to establishing a truly global industry in the Sudbury area.⁴¹

38 Dick DeStefano (Founder and Executive Director of the Sudbury Area Mining Supply and Service Association), Interview with Katrina Marsh, August 3 2012.

39 Doyletech Corporation. *Northern Ontario Mining Supply and Services Study*. The population of Greater Sudbury was estimated at 160,274 in the 2011 census.

40 The examples for this text box was drawn from an interview with Dick DeStefano and a number of additional sources, including the Ionic Engineering website (www.ionic-eng.com/), Thie WipWare Website (www.wipware.com/index.php) and the Northern Centre for Advanced Technology (www.norcat.org/)

41 Dick DeStefano (Founder and Executive Director of the Sudbury Area Mining Supply and Service Association), Interview with Katrina Marsh, August 3 2012.

BUILDING ON OUR ADVANTAGE: PRESERVE CANADA'S COMPETITIVE EDGE IN MINING

What Canada did right: smart policies and practices account for Canada's success

Canada has managed to leverage its metal and mineral resources into knowledge-based industries by creating world-beating clusters. These clusters are based not only on the core mining activities of exploration, extraction and processing, but also on the skills, services and technology needed to undertake these core activities. This is particularly apparent in two areas of the mining sector where Canada has developed a clear competitive advantage: exploration and finance. There is also the potential for Canada to build upon a strong base in mining technologies to become the global leader of advanced equipment, machinery and processes for the global mining industry.

What accounts for this success? Naturally, Canada's substantial endowment of natural resources is perhaps the key reason Canada has been able to build a knowledge economy based on mining. Natural resources in general and mining in particular have played a key part in the Canadian economy for over 100 years. The diversity of metals and minerals

mined in Canada—including metals like nickel and gold, minerals like potash and diamonds and energy resources like coal—as well as the country's great geological variation, have fostered a breadth and depth of experience in all aspects of the system.⁴² Long experience with mineral and metal exploration and extraction has created a strong mining culture that is extremely confident in operating on the world stage.

However, Canada's success cannot be explained by geographical accident alone. Other jurisdictions have also been blessed with abundant resource endowments or proximity to major markets but have not been as successful in leveraging this basic advantage in the same way Canada has done. Australia's stock exchange does not rival the TSX, while other mining giants like South Africa or Russia have not managed to replicate the global reach of Canadian junior, mid-tier and major firms. Conversely, countries like Sweden and Finland have managed to develop a strong mining supply sector despite not matching Canada's impressive endowment of metals and minerals.



42 Ross Gallinger, (Executive Director, Prospectors and Developers Association of Canada), Interview by Katrina Marsh, August 8, 2012.

Instead, Canada's success is due at least in part to the emergence of smart policies as well as innovative private institutions that are tailored to the unique attributes of the mining industry. Mining operates differently than many other sectors and faces a different set of operational constraints and competitive strategies at each phase of production. Exploration has much in common with research and development-based technology startups, where there are high upfront costs, but the returns are far in the future, if they materialize at all. Conversely, the development of a mine site is extremely capital intensive, requiring significant capital outlays up front and can take from seven to ten years from the time the deposit is first discovered to when production begins.

Other factors that distinguish mining from other sectors are the notoriously volatile nature of commodity prices, which create a constant cycle of boom and bust that increases the risk profile of the industry. Last but not least, the nature of the industry is such that disruptions to the environmental and surrounding communities are unavoidable. Consequently, mining faces regulatory requirements and community expectations to address the environmental impacts of mining operation and the treatment of workers and communities.

Canada has managed to develop a set of resources, policies, infrastructure and institutions that have responded to and work well with the unique aspects of the industry. Canada has been particularly successful in fostering the development of junior mining firms that focus on exploration. The large contingent of junior firms has created a number of key advantages for the Canadian mining sector as a whole.

For one, junior mining firms serve to feed the greater mining industry by selling off their projects to mining majors. Occasionally, they choose to become mine operators themselves, providing economic spin-offs in terms of jobs and tax revenue for governments. Large concentrations of junior

firms in places like Toronto and Vancouver create a critical mass that helps support a concentration of suppliers and ancillary industries.⁴³ These equipment manufacturers, technology developers, consultants, professional services firms and other actors in turn create economic benefit for the Canadian economy far beyond the core mining industry.

Several factors account for Canada's strength in the mining industry in general and in fostering junior mining companies in particular. Among the most important have been:

- A pool of human resources uniquely knowledgeable about the mining sector.
- Financial institutions and tax policies tailored to the nuances of the industry.
- The physical and intangible infrastructure needed to access resources.
- A strong tradition of innovation.

While issues surrounding social license – the need to acquire community support for a project – and international regulation are relatively new factors impacting international competitiveness, they have emerged as another area of potential strength for the industry. The clearer the expectations from a regulatory perspective, the better the ability of companies to manage their operations, plan for future investments, develop new projects and expand existing ones. The establishment of a predictable, consistent and functional regulatory regime that balances business operations with environmental protections to create a reliable regulatory framework would go a long way towards codifying these practices.

However, in many cases these former advantages are now key challenges for the sector. Canada's former strength in fostering mining expertise and talent has transformed into a skills crisis that is one of the most significant constraints on the industry. Governments are pulling back on some of the key policies that

⁴³ Gordon Bell (Head of the Global Mining and Metals Group RBC Capital Markets), Interview by Katrina Marsh, June 14 2012.

have helped support the mining industry's success. New investments in both physical and intangible infrastructure are needed to exploit Canada's resource endowments. Constant innovation is needed to keep Canada's competitive edge sharp as well as deal with increasing concerns over the environmental impacts of the industry. Access to resources and a regulatory regime that effectively protects Canadians without placing undue constraint on industry is becoming increasingly important.

Currently, high commodity prices have led to a boom in the mining industry. However, the cyclical nature of the business means that highly profitable periods are inevitably followed by more difficult times. In order to maintain Canada's competitive edge in mining, as well as to expand these advantages into other areas, both governments and industry should act now to preserve Canada's advantages.

Human resources: maintaining Canada's pool of uniquely skilled people

A key factor in the success of Canada's mining clusters is a labour pool with a unique mix of knowledge and skills. Toronto's status as a mining financial capital is based in part on its assembly of individuals working in financial analysis, law, accounting or a regulatory capacity that have a depth of technical knowledge of the industry.⁴⁴ Canadian prospectors and miners are respected around the world for the breadth of their technical knowledge. The quality of Canada's talent pool is often one of the incentives for firms looking to headquarter in the country.⁴⁵

Boom to Bust in Mining Education

Like the mining industry itself, mining education has undergone periods of boom and bust. A good example is what has been taking place at the University of Alberta's Mining Engineering program over the last several decades.

In the mid-1930s, Mining Engineering had the largest enrollment of all the engineering faculties at the university. After World War II, enrollment peaked as veterans flooded the school.

Although it was considered one of the best of its kind in the world, by the early 1990s, low enrollment was leading the university to consider closing the mining faculty. An Industry Advisory Committee was formed to assist in student recruitment and obtain summer jobs for students. Despite it being a difficult period, industry made a commitment to hire strategically instead of cutting back during bad times, and the program survived.

Today the university's mining program is strong, with 136 undergraduates enrolled in 2010. Its existence is an example of strategic long-term thinking trumping overreactions to short-term circumstances.

⁴⁴ Gordon Bell (Head of the Global Mining and Metals Group RBC Capital Markets), Interview by Katrina Marsh, June 14 2012.

⁴⁵ Mark Ruus (Senior Vice President of Tax, GoldCorp Inc) Interview by Katrina Marsh, August 8, 2012.

In earlier times, Canada's long history and familiarity with mining helped establish a labour pool that was knowledgeable and enthusiastic about the industry.⁴⁶ This was seen in the historical strength of Canadian universities in mining-related fields—a key factor in establishing this unique human capital resource. Several universities, including the University of Alberta, McGill, Queen's, the University of British Columbia and the University of Toronto have mining and metallurgical engineering programs that date back a century or more. The quality of the education and research emerging from these schools helped establish a deep reserve of knowledge and expertise in Canada.⁴⁷

A period of low commodity prices in the 1980s and 1990s had two broad impacts on the Canadian mining sector's pool of human resources. For one, it helped to spur a transfer of this mining knowledge from mining to other sectors. Many geology or engineering students or professionals who could not find work in mining during this period retrained with law degrees or MBAs. They entered fields like finance, professional services or government sectors, helping to establish the pool of individuals with a depth of knowledge in all aspects of the mining industry.⁴⁸ In some cases, downsizing by mining firms helped to establish Canada's mining supply and technology industry. This was the case in Sudbury in the 1980s, when as a cost-cutting measure, Inco guaranteed supply contracts to former employees who left the firm to establish independent businesses. The 50 to 60 businesses that took advantage of this offer formed the basis of what was to grow into the Sudbury mining technology cluster.⁴⁹

Secondly, the era of low commodity prices contributed to today's human resource and skills crisis. Few people entered the industry in the 1980s and 90s, resulting in a lost generation of miners. Currently, the industry faces troubling demographics with a large number of workers close to retirement but few individuals with the skills and experience to replace them.⁵⁰ As large mining projects grow increasingly complex, the lack of experienced individuals is causing errors, cost overruns and delays that are hampering the competitiveness of mining firms.⁵¹

This period also weakened mining education as many universities or colleges eliminated or reduced their mining programs due to a lack of demand (see *Boom to Bust in Mining Education*⁵²). The lack of active recruitment by mining firms has led to a longer-term human resource issue for industry. Mining as a career has fallen off the radar for many students and job seekers, even those from rural areas.⁵³ The core mining sector is also suffering from the same shortage of workers in the skilled trades that is broadly plaguing the Canadian economy. The effects of this shortage are often felt strongly by the mining industry, since many mining operations are in remote locations where it can be difficult to recruit the people with the required expertise.

The skills crisis is the most acute problem facing the mining industry over the short term. Depending on commodity prices, the mining industry will need between 75,000 and 141,000 workers between 2011 and 2021. Fifty per cent to 80 per cent of these hires will be needed to replace retiring workers.⁵⁴ Because

46 Jerry Ho (Manager Tax at Vale Inco). Written Response to questionnaire received July 6, 2012.

47 Gordon Bell (Head of the Global Mining and Metals Group RBC Capital Markets), Interview by Katrina Marsh, June 14 2012.

48 Gordon Bell (Head of the Global Mining and Metals Group RBC Capital Markets), Interview by Katrina Marsh, June 14 2012.

49 Dick DeStefano (Founder and Executive Director of the Sudbury Area Mining Supply and Service Association), Interview with Katrina Marsh, August 3 2012.

50 Mark Daniel (Member of the Board of Directors, Aurico Gold). Interview by Katrina Marsh, June 26, 2012

51 Mark Daniel (Member of the Board of Directors, Aurico Gold). Interview by Katrina Marsh, June 26, 2012

52 Based on unpublished research by Elizabeth Midolo, Project coordinator at the Chamber of Commerce, and notes from the Canadian Chamber of Commerce report on cross-country consultations on the Skills issue.

53 Rene Marion (President and CEO, Aurico Gold). Interview by Katrina Marsh, June 26, 2012

the human resource crisis is a global phenomenon, developing effective solutions in Canada could lead to a significant competitive advantage for the industry. A twofold solution is needed, one that addresses near term and long-term aspects of the issue.

In the near term, where the pool of individuals is effectively set, making the most out of existing workers is essential. Industry-led initiatives to retain and recruit workers are key (see the essay *Addressing the Skills and Labour Shortage: An HR Strategy for the Canadian Mining Industry* on page 27 of this report for some examples). There are, however, areas where the government's role is paramount, particularly in immigration, education and training (particularly of Aboriginal peoples), connecting educators and employers and ensuring the federal government maintains its own expertise as it faces its own demographic challenge.

Attracting qualified immigrants to Canadian mining
Mining is among the most international of professions, meaning that expertise must be sourced from around the world. There are currently three key ways employers in the mining sector and beyond can hire foreign workers:

- The Temporary Foreign Workers Program, which now includes an accelerated labour market opinion that would allow for approval in as little as 10 days.
- The Foreign Skilled Workers Program, which has been recently changed to place more emphasis on younger applicants and less on experience, and where an offer of arranged employment reduces the processing times.
- The Provincial Nominee Program, which gives provincial governments a direct role in the recruitment and selection of potential immigrant workers.

The recent changes to immigration programs, particularly the introduction of an accelerated labour market opinion, were well received by interviewees for this report.⁵⁵ However, for the most part, the current immigration system is not yet effectively matching the skills employers need with the people entering Canada.

More needs to be done to ensure immigrants are well matched with employer needs and applications are processed in a timely fashion for recruitment purposes. An expression of interest system has been agreed upon by federal, provincial and territorial governments, which Citizenship and Immigration Canada (CIC) is planning to implement by the end of 2014. The system would allow interested potential applicants to be in a pool of candidates who could be viewed by CIC and by prospective Canadian employers. Once an employer expressed interest, the applicant could proceed with his/her application. This would help align immigration with labour market needs, while providing more certainty to perspective foreign workers that their skills are actually in demand in Canada.

RECOMMENDATION:

Reduce the administrative burden associated with economic class immigrants and do more to ensure their skills align with the needs of employers. Prioritize the development of the Expression of Interest model by 2015, ensuring close collaboration with the private sector in its development.

Over the medium to longer term, more must be done to ensure Canada's human resource advantage in mining is sustained into the future. Industry is already taking action, developing new recruitment campaigns and supporting educational institutions for mining across the country. However, there are two areas where federal government support could prove to be decisive: the education and training of Aboriginal peoples and support for strategic labour force planning for the industry.

⁵⁴ Mining Industry Human Resource Council, Canadian Mining Industry Employment and Hiring Forecasts, (Ottawa: Mining Industry Human Resource Council, 2011) www.mihrc.ca/en/publications/resources/Employment_HiringForecasts2011_FINALAug4_ENG.pdf (accessed August 16, 2012).

⁵⁵ David Barnes and Micheal Gripe. Written Response to interview questions. Received June 28, 2012.

Aboriginal peoples education and training programs

A lack of skilled workers means that mines must often bring in workers from outside areas. However, given high rates of turnover and the difficulty of recruiting to remote locations, hiring local Aboriginal peoples with ties to the region is the preferred option for many mining operations. Because most Aboriginal communities are located within 200 km of a mining operation or exploration property, they are a natural source for human resources to the Canadian mining sector. Aboriginal communities could also benefit from the high-paying jobs the sector has to offer. The key barriers to greater participation of Aboriginal peoples in the mining sector are the need for more training, a lack of awareness about the opportunities presented by the sector and the need to ensure that workplaces are inclusive of Aboriginal workers.

RECOMMENDATION:

Continue to fund initiatives like the NWT Mine Training Society, the BC Aboriginal Mine Training Association and the Aboriginal Skills and Employment Training Strategy that help to develop the skills Aboriginal peoples need to follow careers in the mining sector. There is also an opportunity to replace the Aboriginal Skills and Employment Program with a program that could more effectively achieve the same synergy between the sector and Canada's Aboriginal peoples.

Connecting education facilities with employers' needs

Currently, mining faculties at universities and colleges are enjoying a renaissance of increased enrollment and expansion.⁵⁶ For instance, the Schulich School of Business has established a Global Mining Management Program, while Western University is expanding its mining law and finance program. Yet despite the current opportunities in the sector, few students consider the possibility of mining as a career. Part of this is due to a lack of awareness of the opportunities, sometimes even among students

in rural areas close to operating mines. Mining programs are also expensive to run and, like the sector itself, are subject to boom and bust cycles depending on the health of the industry. A more coordinated approach to mining education that involves the participation of universities, industry and government could help ensure the sustained development of Canada's pool of mining talent.

RECOMMENDATION:

Create a national database of labour market conditions and disseminate information to high schools and colleges about skills that are high in demand. Support better coordination between universities, colleges, industry and government to ensure programs are aligned with industry needs and graduates are better able to find meaningful employment.

Ensuring government retains its expertise

The potential loss of capacity and expertise due to retirements and demographic change will affect other sectors as well, particularly the federal government where a large number of regulators and scientists are set to retire over the next few years. Several interviewees cited the depth of knowledge of Canadian regulators, auditors and scientists as a significant advantage for the industry. The loss of mining-industry expertise within government will have an impact on industry. For example, one interviewee reported that decisions from less experienced auditors at the Canadian Revenue Agency over interpretations of the tax code were causing unnecessary disputes over areas that were long considered standard practice in the industry.⁵⁷

RECOMMENDATION:

Recognize the skills crisis extends to government regulators as well. Implement knowledge sharing practices to ensure key knowledge is retained as retirements affect the public service expertise in mining regulation and technology.

⁵⁶ Based on unpublished research by Elizabeth Midolo, Project coordinator at the Chamber of Commerce,

⁵⁷ Mark Ruus (Senior Vice President of Tax, GoldCorp Inc) Interview by Katrina Marsh, August 8, 2012.

EXPERT ESSAY – Ryan Montpellier, Executive Director, Mining Industry Human Resources Council

Addressing the Skills and Labour Shortage: An HR Strategy for the Canadian Mining Industry

The labour and skills shortage is widely acknowledged as one of the greatest risks facing the future sustainability and growth of the mining industry. MiHR's most-recent analysis shows that over 112,000 new workers will be required by 2021; that 40 per cent of the industry is at least 50 years old; and that one-third of the workforce will be eligible to retire by 2015.

How is MiHR working with industry to fill this talent gap? Since its inception in 1996, MiHR has convened industry to develop stakeholder led human resources (HR) programs that focus on the sustainability of the mining industry. This requires a multi faceted approach: the provision of robust labour market intelligence for industry preparedness; long-term career awareness campaigns for talent attraction; skills recognition to retain talent, and workforce diversification to access new sources of labour.

Labour-market information for industry-planning and preparedness

Providing increased intelligence to industry enables stakeholders to proactively address labour-market challenges such as recruitment, retention, diversification and training. By identifying labour-market supply-and-demand gaps, industry and other stakeholders can take practical measures to ensure that the risks associated with labour shortages (or surpluses) can be mitigated. The model continues to be enriched; the 2012 report will incorporate a labour-supply forecast allowing a deeper level of analysis regarding the gaps in the mining industry's labour market, and highlighting approaches that the industry can take to address gaps.

MiHR also provides regional-level custom analysis. Custom reports are used by the commissioning organization or body to benefit their members and to influence the agenda of local government. In a similar capacity, studies completed in partnership with the Prospectors and Developers Association of Canada and the Canada Mining Innovation Council delve into deeper analysis of the skills-shortage puzzle and empower these organizations to mobilize their members under a common strategy.

Career awareness: long-term talent attraction

Despite the sector's ongoing career-awareness efforts, the average image of mining focuses on the practices of half a century ago and methods long abandoned by mining companies. Consequently, stakeholders have highlighted career awareness as a top priority as they understand that this will help secure the future talent they need.

MiHR is proactive in career awareness, and has undertaken a very long-term attraction strategy for the industry. The *Explore for More: Earth Sciences and Mining Career Outreach Project* aims to increase earth sciences and mining-career awareness through the production and dissemination of a variety of approaches: career resources, *Explore for More Career Kits*, the www.acareerinmining.ca website, and leveraging social media via Twitter, Facebook, and the *Explore for More* YouTube channel.

To achieve a significant impact on this issue, we need to work together as an industry. We can establish more partnerships between employers and training institutions to align requirements for skilled and well-trained workers — including offering work placement and co-op positions.

Industry can also work with organizations like MiHR to reach youth who are making decisions on their future careers.

Skills, recognition and opportunity

Skills recognition is a key component of any staff retention strategy. A recent MiHR survey of mining industry employers revealed that turnover in undesignated occupations is almost twice as high as in other mining-sector positions. Knowing that it can take anywhere from two to five years to train a skilled worker emphasizes that we must act now and invest in workforce development.

Over the course of the past six years, MiHR and industry partners have been developing National Occupational Standards for the undesignated occupational areas of Surface Mining, Underground Mining, Minerals-Processing Operations and Diamond Drilling. These National Occupational Standards form the basis of the *Canadian Mining Certification Program* that was made nationally available in 2012 after pilots were completed across Canada. *The Canadian Mining Certification Program* will be an essential component in increasing and retaining the valuable skills required to keep the mining industry sustainable.

Workforce diversification

Workforce diversification is one way to maximize and make the best use of all available sources of labour. MiHR has been working with industry to address the skills shortage through the attraction, recruitment and retention of diverse talent groups. The recent *Take Action for Diversity* initiative assists employers in their efforts to attract and retain Aboriginal peoples, youth, women, new Canadians, mature/transitioning workers and persons with disabilities. The *Take Action for Diversity* research report can be accessed at www.mihhr.ca and provides a number of recommendations for employers who are creating their own diversity strategies. The initiative continues to track eight companies employing strategies documented in the report, and will be shared for the benefit of all employers in April 2013.

Aboriginal peoples continue to play a critical role in addressing the skills shortage in mining and in turn mining offers career opportunities and economic development in remote regions. When looking at Aboriginal recruitment, one barrier identified by employers is a lack of education and skills required for immediate employment. In response, MiHR partnered with the Assembly of First Nations and other key players to develop *Mining Essentials: A Work Readiness Training Program* for Aboriginal peoples. The national program teaches work readiness skills the mining industry requires to be considered for an entry in the workforce.

Finance and Taxation: Staying ahead of the pack on world-leading practices

The mining industry, and hence the mining sector more generally, is highly sensitive to the related issues of taxation and finance. Mines are located where you find them; accordingly, the cost structure of the industry can be particularly sensitive to the local taxation system.⁵⁸ Conversely, other parts of the business – such as the choice of where to locate a head office, acquire financing or develop new technologies – can easily move to take advantage of favorable tax regimes.⁵⁹ Financing is another key concern. While the process of finding, developing, operating and remediating mine sites is highly capital intensive, costing billions of dollars from start to finish, the riskiness of the industry can make it difficult to find financing at certain points in the process.

In general, Canadian tax policies effectively address the nuances of each phase of the mining cycle – exploration, mine development and operation and remediation – in a manner that helps support the growth of the industry while ensuring that the public sector receives its fair share. The Fraser Institute’s yearly survey of the mining industry ranks five Canadian provinces in the top 10 best policy jurisdictions for mining, with another four in the top 20.⁶⁰ Advantages of the Canadian system include a stable mineral taxation regime and a transparent, consultative process and generous loss carry-back and carry-forward rules.⁶¹ In addition, most income

tax systems allow mining companies to recover significant portions of their capital investment before paying taxes, a key consideration as it can take seven to 10 years from the time a viable deposit is located to the christening of a new mine.⁶²

The Canadian tax and finance system has been particularly successful in fostering a collection of approximately 2,000 junior mining firms – the largest concentration of small-capitalization mining companies in the world – that has given the Canadian mining cluster several competitive advantages in terms of providing a critical mass to support suppliers, specialized professional services firms and technology developers. Junior mining firms generally focus on exploration, the R&D arm of the mining industry. Much like a small technology start-up, exploration is an expensive proposition where the costs are upfront but payoff in the form of revenues is uncertain and occurs years in the future.⁶³ For that reason, banks will often not lend to exploration firms. These firms must instead rely on equity markets for capital. On the market, exploration firms must compete with established companies that are less risky and can offer dividends to investors.⁶⁴ As a result, attracting capital for the search for new mineral and metal resources can be particularly difficult.

The Canadian Mineral Exploration Credit and flow-through shares are two Canadian inventions that have successfully helped exploration firms bridge this key financing gap. Prospectors generally

58 Bonita I. Russell, Daniel Shapiro, and Aidan Vining. “The evolution of the Canadian mining industry: The role of regulatory punctuation.” *Resources Policy*. no. 35 (2010): 90-97.

59 Mark Ruus (Senior Vice President of Tax, GoldCorp Inc) Interview by Katrina Marsh, August 8, 2012.

60 Canadian jurisdictions in the top ten include New Brunswick (1), Alberta (3), Quebec (5), Saskatchewan (6), and the Yukon (10). Canadian jurisdictions in the top twenty include Ontario (13), Nova Scotia (15), Newfoundland and Labrador (16) and Manitoba (20). Fred McMahon, and Miguel Cervantes, *Fraser Institute Annual Survey of Mining Companies 2011/2012*, (Vancouver: The Fraser Institute, 2011) www.fraserinstitute.org/uploadedFiles/fraser-ca/Content/research-news/research/publications/mining-survey-2011-2012.pdf (accessed August 10, 2012).

61 Grant Thornton. Written response to interview questionnaire by Katrina Marsh, August 29, 2012.

62 Grant Thornton. Written response to interview questionnaire by Katrina Marsh, August 29, 2012.

63 Thomas W. King, (Associate Partner, Tax KPMG LLP), interview by Katrina Marsh, August 13, 2012.

64 Thomas W. King, (Associate Partner, Tax KPMG LLP), interview by Katrina Marsh, August 13, 2012.

have large costs related to exploration but no taxable income until they develop a viable mine. The Canadian Mineral Exploration Credit allows prospectors to place exploration expenditures into a special tax-deductible pool that has no expiry date, allowing firms to carry forward the credit until they have taxable income.⁶⁵ The flow-through shares allow prospectors to pass the mineral exploration credit to an investor, who can take advantage of it immediately. In essence, flow-through shares reduce the risk to investing in mining exploration by guaranteeing some return in the form of lower taxes.⁶⁶

Flow-through shares are a Canadian invention that has proven to be a highly successful way to support investment in junior mining firms. The shares account for a significant portion of Canadian mineral exploration financing – up to 60 per cent when add-on credits are available and other financing is difficult to obtain.⁶⁷ They are also a relatively cost effective way to support junior mining companies. A study by the federal Department of Finance that examined the period between 1983 and 1991 found that \$1 of federal tax expenditure channeled through flow-through shares resulted in \$2.60 of mining exploration expenditure.⁶⁸ The policy's impacts from 2000 to 2007 appear to be in a similar range.⁶⁹ Provincial and federal governments have further helped to level the playing field for mining exploration by providing additional tax breaks for investors in exploration firms, like the federal government's introduction of "super" flow-through shares in 2000, which provided investors with an added incentive to invest in mining exploration.

The TSX/TSXV is another important factor for Canada's tremendous success at fostering junior mining firms. The exchange has emerged as a savvy niche player that has implemented practices that has leveraged Canada's unique advantages in mining into domination of small- to mid-range mining deals. While extremely large IPOs will often head to London, the TSX or TSXV is the choice of the vast majority of listings in the under \$10 billion to \$20 billion range.⁷⁰ One reason for this is the great deal of attention the exchanges pay to junior firms. With a global research community of 200+ analysts covering TSX mining companies,⁷¹ it is easier for junior mining firms to capture investor attention. Compared to other exchanges, the TSX and TSXV also have flexible and workable sets of rules for junior mining companies that make it easier for them to get listed on the exchanges.⁷² Similarities between the exchanges' listing standards also allow for easier transition between the TSXV to the TSX, helping companies raise capital at all stages of growth. Between 2000 and 2011, 536 mining firms "graduated" from the TSXV to the TSX. The TSX/TSXV, complemented by Toronto's well developed infrastructure of bankers, lawyers and accountants, has a depth of knowledge that allows them to act as a stepping stone to markets in the U.S. In fact, 40 per cent of the proceeds of mining financing are sourced from the U.S.

Smart government regulation has also helped. For example, National Instrument 43-101 is a strict guideline that sets out how public companies listed in Canada should disclose scientific and technical

65 Thomas W. King, (Associate Partner, Tax KPMG LLP), interview by Katrina Marsh, August 13, 2012.

66 The Northern Miner. "Flow-through shares: a history." *The Northern Miner*, May 17, 2004. www.northernminer.com/news/flow-through-shares-a-history/1000158932/ (accessed August 15, 2012).

67 Robert J. Clark, *Flow-Through Share Financing for Junior Mining Companies Canada's Experience*, (Natural Resources Canada, November 2007).

68 Department of Finance, Government of Canada. *Flow through shares: An Evaluation Report*. Ottawa: Government of Canada, 1994.

69 Robert J. Clark, *Flow-Through Share Financing for Junior Mining Companies Canada's Experience*, (Natural Resources Canada, November 2007).

70 Ungad Chadda, (Senior Vice President, Toronto Stock Exchange), Interview by Katrina Marsh, August 8, 2012.

71 Ungad Chadda, (Senior Vice President, Toronto Stock Exchange), Interview by Katrina Marsh, August 8, 2012.

72 Ungad Chadda, (Senior Vice President, Toronto Stock Exchange), Interview by Katrina Marsh, August 8, 2012.

information on mineral resources. Implemented in the wake of the Bre-X scandal, the codified reporting scheme gives investors reliable technical information on a potential resource while still allowing for resources to gain access to capital. The result has been greater transparency and investor confidence. NI 43-101 is often held up as the global benchmark for regulation.⁷³ In comparison, the U.S. reporting regime does not allow deposits to be classified as “proven” or “probable” reserves until a final feasibility study has been conducted and necessary permits are in hand.

Smart taxation policy and regulation in regards to the mining sector have been a competitive advantage for Canada in the past, and Canada continues to lead in this respect. However, there are reasons not to be complacent. In an era of rapidly changing global and national circumstances, governments need to continually reassess policies and practices to ensure they effectively address current circumstances. In late 2012, for example, the federal government passed the second Budget Implementation Act, and with it the new Foreign Affiliate Dumping (FAD) Rules came into effect. The FAD rules introduce a complex new cross-border taxation regime that may impact foreign-controlled Canadian corporations with foreign operations as well as takeovers of Canadian corporations with substantial foreign operations. Based on the nature of mining operations – with companies needing to go to where the deposits are located – many mining companies may be caught by these new rules, thus adversely affecting the attractiveness and competitiveness of Canada as a destination for mining business.

The industry both acknowledges and respects Finance Canada’s efforts to protect the integrity of the Canadian tax system and recognize the immense challenge of tailoring rules to address debt dumping. Nonetheless, we are concerned that the FAD Rules

may have a negative impact on legitimate commercial activity that has nothing to do with debt dumping or surplus stripping. As above noted, Canada’s capital markets have to date been a mecca for resource companies with foreign projects. These companies often have no Canadian operations and hence no opportunity to dump debt into Canada or surplus strip, yet they may be caught by the FAD Rules. We believe that Finance should consider further amendments to the FAD Rules to ensure that they do not have a detrimental impact on legitimate business activity that could put at risk Canada’s global leadership in mine finance.

Ensuring Canada maintains its advantage in mineral exploration and other aspects of the industry will require the government to update what it considers exploration expenditures in order to reflect realities on the ground. There are a few areas where government action could prove essential to maintaining Canada’s competitive edge:

Update and strengthen the Canada Exploration and Mineral Development Tax Credit

The past 30 years have witnessed a marked decline in proven and probable Canadian mineral reserves in all major base metals, with the dramatic decline in reserves of lead (95%), zinc (85%) and silver (80%). Without sustained and effective exploration, Canadian mineral production will outstrip reserve additions, placing the entire cluster of smelters and refiners, suppliers, professional services and technology developers at risk.⁷⁴ The federal 2012 budget discontinued the Corporate Exploration and Mineral Development Tax Credit, which reduces the risk to investors of investing in mining exploration, creating a more level playing field with other stock. Continued targeted support for mineral exploration is key to ensuring the continued dominance of Canada’s mineral cluster.

⁷³ Orlee Wertheim, Head Business Development – Global Mining, Toronto Stock Exchange), Interview by Katrina Marsh, August 8, 2012.

⁷⁴ Grant Thornton. Written response to interview questionnaire by Katrina Marsh, August 16, 2012.

RECOMMENDATION:

A targeted exploration tax credit should be developed (over and above the METC) to incent exploration in remote regions of Canada where exploration costs are prohibitive (e.g. the Arctic).

Another issue is that the Canadian Exploration Expense, which determines which expenses are eligible for flow-through shares, has been inconsistent in its application. In 2007, the Canada Revenue Agency produced guidelines to help companies ascertain what expenses would be eligible. Discrepancies in the application of the guidelines amongst different CRA auditors has created uncertainty amongst those who utilize the program. Further, exploration firms must increasingly undertake compliance costs related to the Crown's Duty to Consult with Aboriginal communities and environmental regulatory costs. In addition to including the costs associated with these social and environmental requirements, the Canada Revenue Agency should update its 2007 guidelines to clarify and ensure consistency in forthcoming CRA decisions regarding expense eligibility.

RECOMMENDATION:

The CRA should update its 2007 guidelines (provided to the PDAC and published on its website) to clarify what expenses, incurred in the course of conducting community consultations, environmental baseline studies and feasibility studies are eligible Canadian Exploration Expenses.

Help provide clarity and consistency of the tax code
Administration of tax is as important as the word of the law. Unclear or changing interpretations of the tax code can cause confusion and makes it unnecessarily difficult for firms to comply. Some interview subjects saw a growing problem with inconsistent interpretations at the provincial level, which are causing costly delays for mining firms. Compounding this problem is a lack of a timely appeal process in some jurisdictions, where a lack of experienced staff can cause unnecessary delay on decisions.

An additional problem is inconsistent tax regimes amongst the various levels of government in Canada. Currently, the multitude of tax regimes makes it difficult for foreign players to understand the rules and for Canadian companies to expand operations to other provinces and/or territories. There is often unnecessary overlap, which can result in Canadian producers preparing multiple sets of tax calculations, dealing with multiple filing requirements and having to plan around multiple and sometimes conflicting rules and regulations.⁷⁵

RECOMMENDATION:

Reduce the administrative burden on industry by launching a FPT working group that would explore options that would serve to streamline and harmonize taxes with and among all the various taxing jurisdictions. This program could also promote greater communication on administrative interpretations of tax law.

Access to resources: setting up the infrastructure and international agreements today to ensure a competitive mining sector tomorrow

For firms investing within Canada, physical and other kinds of infrastructure are needed to ensure mining companies have the ability to find, extract and remove ores at a competitive cost. For Canadian firms seeking to invest abroad, access can be limited by investment barriers in foreign countries. The multifaceted question of access to resources has important competitive implications for the broader mining cluster. Like the other areas examined in this section, access to resources has the potential to transform what was once a strong competitive advantage for Canadian firms into a liability.

For instance, infrastructure is a key enabler of Canada's competitiveness in mining and consequently, in forming the basis of the greater mining cluster. The development of large-scale projects like the Canadian Pacific Railway in the 1800s, the St. Lawrence Seaway in the 1950s and hydro-electric dams in the '60s and '70s have been

⁷⁵ Grant Thornton. Written response to interview questionnaire by Katrina Marsh, August 16, 2012.

key factors supporting the success of Canada's mines. A more modern example is the ongoing extension of the Highway 37 transmission line in northeast B.C. that, for a capital cost of \$400 million, will facilitate an estimated \$15 billion in mineral projects.⁷⁶

The mining industry also helps to support the development of infrastructure by acting as a source of demand for large projects, particularly in the transportation sector. The industry continues to be the most important customer for Canada's transportation sector, accounting for 56 per cent of freight rail revenues in 2010 and around 40 per cent of shipping on the St. Lawrence Seaway.⁷⁷ The mining sector helps to provide a business case for infrastructure developments that have large benefits for the economy in general.

However, infrastructure does not refer to roads and power plants alone. More intangible forms of infrastructure, particularly geoscience and mapping activities, are a key support for Canada's mining industry. Founded in 1842, 25 years before the country was formed, the Geological Survey of Canada is the country's oldest scientific organization and one of the nation's first government organizations. The quality of the geological information provided by government has long acted as an advantage for firms seeking to locate and exploit Canada's mineral resources.⁷⁸ An often used rule-of-thumb is that \$1 in government spending on geosciences results in \$5 in private sector exploration.⁷⁹ Just like physical infrastructure, geoscience has become an important public good with benefits well beyond the mining industry. Geoscience is used as a key input to policy formation

on environmental protection, water quality and access, climate change impacts and other pressing public issues.⁸⁰

The international nature of the Canadian mining industry means that foreign direct investment policies in other countries are another important aspect of the access to resource issue. Canadian mining typically accounts for about 10 per cent of Canada's foreign direct investment abroad, amounting for \$617 billion in 2010.⁸¹ Many Canadian mining firms are headquartered in Canada, pay Canadian income tax and yet operate mines in Africa, Latin America or Asia.

While Canada's investment in both physical and intangible infrastructure has supported the general competitiveness of the Canadian economy in the past, investments in both areas have been lacking. In addition, there is the need for government to take action to ensure Canadian mining firms investing abroad can be sure their investments will be secure. There are a number of actions governments can take to achieve these ends:

Continue to support investment in infrastructure spending

There is an undeniable need to invest in new roads, railway lines, ports and power plants to ensure resources can be located and extracted at a competitive cost. Unfortunately, governments around the world are more reluctant to spend on physical infrastructure in times of economic distress. Accordingly, Ernst and Young lists infrastructure access as the third greatest risk to the global mining sector in 2012-13.⁸² In Canada, mining infrastructure is closely tied to issues of economic development for

76 Brendan Marshall (Director, Economic Affairs). Written response to interview questions. August 16, 2012.

77 Mining Association of Canada. *Facts and Figures 2011 of the Canadian Mining Industry*. Ottawa: Mining Association of Canada, 2011.

78 J.M. Duke, Government geoscience to support mineral exploration: public policy rationale and impact, (Ottawa: Prospector and Developers Association of Canada, 2010) <http://PDAC.ca/PDAC/advocacy/geosciences/100909-ministry.pdf> (accessed August 31, 2012).

79 J.M. Duke, Government geoscience to support mineral exploration: public policy rationale and impact.

80 J.M. Duke, Government geoscience to support mineral exploration: public policy rationale and impact.

81 Mining Association of Canada. *Facts and Figures 2011 of the Canadian Mining Industry*.

82 Ernst & Young's Global Mining & Metals Center, Business risks facing mining and metals 2012-2013: Executive Summary, (Ernst and Young, 2012) [www.ey.com/Publication/vwLUAssets/Business_risks_facing_mining_and_metals_2012_-_2013_Executive_summary/\\$FILE/Business_Risks_in_Mining_and_Metals_Executive_Summary.pdf](http://www.ey.com/Publication/vwLUAssets/Business_risks_facing_mining_and_metals_2012_-_2013_Executive_summary/$FILE/Business_Risks_in_Mining_and_Metals_Executive_Summary.pdf) (accessed September 4, 2012).

Northern and remote communities. According to the Canadian Chamber's recent series of roundtables with territorial business people, the lack of physical infrastructure is hard – if not impossible – to deal with. The lack of sufficient and modern infrastructure adds to the cost of doing business and poses formidable logistical challenges to development in the area. Partnerships with governments and the private sector can facilitate cost sharing and other efficiencies that reduce the costs of infrastructure projects.

RECOMMENDATION:

Continue to invest in the infrastructure necessary to promote growth not only in the mining sector but across the whole Canadian economy. This can be accomplished through increased partnerships with the private sector, other governments and Aboriginal peoples and through the adoption of innovative funding models. These investments will help unlock the resource potential of the North and expand the markets for Canada's products. When making these investments, all levels of Canadian government should consider the potential community and commercial benefits when choosing the locations of infrastructure projects.

Invest in non-tangible infrastructure through government geosciences

The need for geoscience is increasingly important as Canada's mineral reserves are shrinking and potential new research is in the relatively unmapped North. Geoscience data in Canada tends to be at a broad level over much of Canada, particularly the North, leading to a high technical risk for exploration and making it difficult to attract investment. Unfortunately, government spending on this key public good has fallen steadily over the past decades. In the 2000s, average annual expenditures on geoscience fell 19 per cent compared to the 1990s and 41 per cent compared to the 1980s.⁸³ The fall in geosciences funding has implications

for environmental protection, water management, climate change adaptation and mitigation and other pressing environmental issues as well. The government has taken some steps to reverse this trend with the announcement of \$100 million to map the North (the GEM Program) in 2008 and accelerated funding of \$8 million in 2009.

RECOMMENDATION:

Sustain and increase government investment in geosciences to help address Canada's mineral reserve crisis and help sustain investment in the sector.

Pursue international agreements to support Canadian investors abroad

Although Canada has a relatively open attitude towards foreign investment, Canadian firms operating abroad are not always accorded the same welcome. The international nature of the mining sector exposes Canadian mining firms to political risks surrounding foreign investment policies in other nations. The period of strong commodity prices has induced some foreign governments into changing or even breaking license agreements or contracts in order to gain more revenue. Ernst and Young lists resource nationalism, a growing sentiment of trade and investment protectionism, as the greatest risk to the global mining sector in 2012-13.⁸⁴ Government can help mitigate this risk by negotiating bi-lateral agreements on investment and trade that help assure Canadian firms the same welcome we accord firms from other nations.

RECOMMENDATION:

The government of Canada should continue to pursue Foreign Investment Protection Agreements with foreign governments in order to mitigate political risk to Canadian mining assets abroad and be more aggressive in their application. Not only do these agreements need to be signed, but their active enforcement will go a long way towards protecting Canadian investment.

83 J.M. Duke, Government geoscience to support mineral exploration: public policy rationale and impact.

84 Ernst & Young's Global Mining & Metals Center, Business risks facing mining and metals 2012-2013: Executive Summary, (Ernst and Young, 2012) [www.ey.com/Publication/vwLUAssets/Business_risks_facing_mining_and_metals_2012_-_2013_Executive_summary/\\$FILE/Business_Risks_in_Mining_and_Metals_Executive_Summary.pdf](http://www.ey.com/Publication/vwLUAssets/Business_risks_facing_mining_and_metals_2012_-_2013_Executive_summary/$FILE/Business_Risks_in_Mining_and_Metals_Executive_Summary.pdf) (accessed September 4, 2012).

Innovation: leading the world in new mining technology and best practices

Innovation is more than just new products or technologies. It also includes any kind of business practice that adds value for the firm or for society as a whole. Like other sectors, mining firms depend on innovation to maintain their competitive edge. Mineral and metal deposits are increasingly difficult to locate, and finding them often requires new techniques and tools.⁸⁵ New technologies, processes or practices can also make previously uneconomical deposits viable and are needed to manage expenses from the rising costs of energy or labour. Over the past few decades, innovation has allowed the Canadian mining industry to become one of the safest industries in the country, improve its environmental impact and maintain cost competitiveness.

Canadians are among the top global leaders in developing or implementing new technology to find or extract resources from underground mines or reduce the environmental impacts of the mining process.⁸⁶ This innovative capacity has been a key factor underpinning the competitiveness of the sector. An example is diamond mining, where modern techniques like geochemistry reverse circulation and age dating and could lead to a major expansion of the industry beyond the Northwest Territories.⁸⁷ Another example is Canada's success in mitigating environmental impacts such as acid mine drainage, an environmental problem relating to highly acidic water that can develop in metal and coal mines and drain into the environment. Acid mine draining represents the largest environmental

liability to industry estimated at \$2 to \$5 billion. A joint government, industry and academic initiative has been working since 1989 to find ways to address the issue and has supported the development of technologies and practices that have reduced this liability by \$400 million.⁸⁸

Compared to other goods-producing sectors, the process to develop new mining technology is becoming increasingly collaborative.⁸⁹ Mining firms still support their own research facilities, but this approach is increasingly rare for a number of reasons. Developing new mining technologies and practices are typically extremely capital intensive, requiring input of anywhere from several hundred millions to a few billion dollars. However, the payoff from these investments is very uncertain and represents an added risk for an industry already facing fluctuating commodity prices.⁹⁰ With so much at stake, large investments in innovation often are not economical for individual firms, however necessary they might be at the industry level.

Accordingly, innovation in the mining sector is being conducted in collaboration with third parties, such as suppliers or academia, meaning that the potential spillovers for other aspects of the economy are significant (see *Collaborating for Greener Mining*). Mining suppliers are a particularly important part of the innovation process. In 2007, CAMESE surveyed 59 of its member companies representing total employment of around 3,000 people. Of that total, 13 per cent worked on the development of new products or technologies for the mining industries, while another nine per cent worked on

85 Tom Haynes (Executive Director, Executive Director, Canadian Mining Innovation Council). Interview by Katrina Marsh, July 3, 2012.

86 Tom Haynes (Executive Director, Executive Director, Canadian Mining Innovation Council). Interview by Katrina Marsh, July 3, 2012.

87 Heffernan, Virginia. "Diamond Discoveries in Canada's North: Modern exploration methods lead to significant discoveries." *Earth Explorer*, August 2008. www.earthexplorer.com/2008-08/Diamond_Discoveries_in_Canada_North.asp (accessed September 4, 2012).

88 Reclamation Research Group, LLC, *Acid Mine Drainage and Effects on Fish Health and Ecology: A Review*, (Montana: Prepared for the U.S. Fish and Wildlife Service, Anchorage Fish and Wildlife Field Office, 2008) www.pebblescience.org/pdfs/Final_Lit_Review_AMD.pdf (accessed September 4, 2012).

89 Public Policy Forum, *Towards a More Innovative Future: Insights from Canada's Natural Resources Sector*, (Ottawa: Public Policy Forum, 2012) www.ppforum.ca/sites/default/files/towards_a_more_innovative_future_eng.pdf (accessed September 4, 2012).

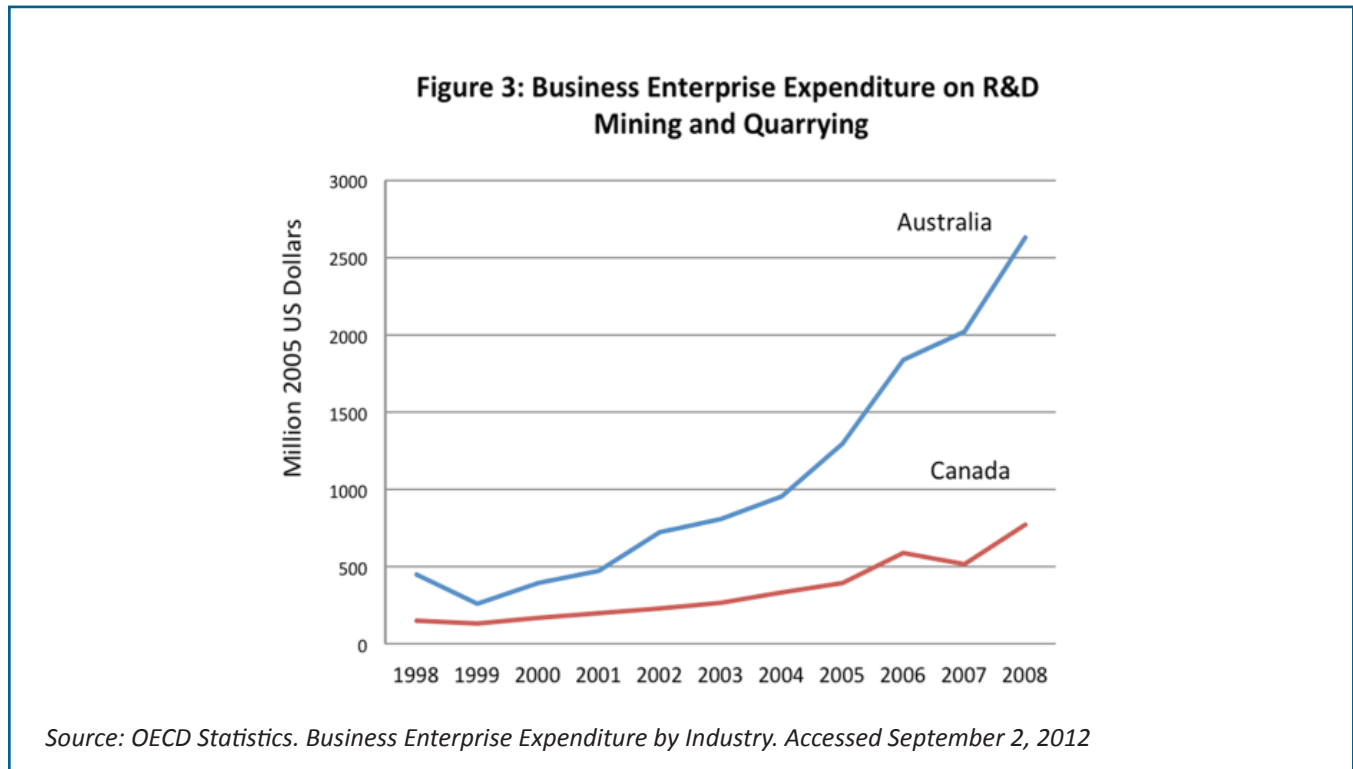
90 Jon Baird (Executive Director, Canadian Association of Mining Equipment and Services). Interview by Katrina Marsh, July 9, 2012.

the commercialization of those technologies.⁹¹ Work done by Canadian mining suppliers can be applied to other industries or other markets. For instance, between 2003 and 2008, Biotecq, a water treatment company based in Vancouver, grew from \$1 million in revenues to almost \$8 million through exporting its technology to miners in the U.S., Australia and China.⁹²

Canada has the potential to dominate mining innovation like it does in financing and exploration, especially in the fields of exploration, mineral processing, mineral extraction and environment. Currently however, while Canada is a leader when it comes to mining technology, it is not *the* leader.⁹³ Unfortunately, aiming for second or third place may not be sufficient to ensure Canada's competitiveness

in global mining.⁹⁴ Mines operating in Canada increasingly face low-cost competition from countries with lower wages and less regard for worker safety or environmental protection. In addition, concern over the social and environmental effects of mining is placing increasing pressure on the industry to reduce or mitigate their impacts or else suffer community opposition or reputational damage. Innovation is key to addressing these forces.

Due to the collaborative nature of the innovative process in the natural resource sector, success requires a systematic approach that increases linkages between the various stakeholders. Four areas in particular could help propel Canada to the leadership position in global mining innovation.



91 Jon Baird (Executive Director, Canadian Association of Mining Equipment and Services). Interview by Katrina Marsh, July 9, 2012

92 Export Achievement Awards. Mining the Middle Kingdom, "Profiles of the 2009 Winners of Canada Export Achievement Awards." Accessed September 4, 2012. www.exportawards.ca/exportawards/pacific.html.

93 Tom Haynes (Executive Director, Executive Director, Canadian Mining Innovation Council). Interview by Katrina Marsh, July 3, 2012.

94 Tom Haynes (Executive Director, Executive Director, Canadian Mining Innovation Council). Interview by Katrina Marsh, July 3, 2012.

Improved coordination and support for mining innovation

While mining innovation increasingly depends on collaboration, Canada's approach to mining innovation has remained uncoordinated. There are around 40 different mining research organizations spread across Canada, many of which operate in silos.⁹⁵ This has resulted in a failure to link industry needs with public and private sector R&D capacity, unnecessary competition among researchers and a lack of knowledge about Canada's research capacity, which in some cases has led to companies looking abroad for research support.⁹⁶

Several experts interviewed for this report felt that Canada was not keeping up with competitor companies in laying the ground work for leadership in mining innovation, either by providing sufficient support or by taking a leadership role to better coordinate efforts. There was a perception that the government was doing much more to support the forest product sector, despite its relatively smaller contribution to the economy. Australia was often cited as an example of a country that was successfully linking research to industry needs through better coordination and more targeted industry support. Initiatives like the Collaborative Research Centre for Mining, a government industry partnership that was launched in 2003, are considered to be effective in supporting the competitiveness of the industry. Firms operating in Australia have generally invested more in R&D expenditure than Canadian firms, which has led to a growing gap between the two mining nations over the last decade (see Figure 3). In 2007, government, industry and academic researchers formed the Canadian Mining Innovation Council (CMIC). The group focuses on promoting collaborative approaches to increase productivity and foster breakthrough solutions to industry needs. While the work of the CMIC was widely praised by the experts interviewed for this report, there was a sense that more needed to be done in order to ensure Canada's leadership in mining innovation. In the oil sands sector, the recent formation of Canada's Oil Sands Innovation Alliance (COSIA), composed of 14 active companies in Canada's oil sands, is another good example of industry collaboration on innovation.

RECOMMENDATION:

Enhance the working relationship with industry and academia through the Canadian Mining Innovation Council by committing funding that will better promote and coordinate mining research in Canada. In addition, work at public research facilities should seek to align with industry needs.

All capital expenses to be eligible for the Scientific Research and Experimental Development Tax Credit

The Scientific Research and Experimental Development (SR&ED) tax credit is the principal tool the federal government uses to support innovation. The 2012 federal budget reduced the investment tax credit from 20 per cent to 15 per cent and excluded investments on account of capital. As mentioned in part one of this report, much of the innovation in the mining sector occurs through purchases of innovative new equipment and machinery. The elimination of capital from SR&ED eligibility fails to recognize the unique aspects of innovation in the resource sectors and could adversely impact the ability of firms to raise much needed startup capital for new projects.

RECOMMENDATION:

The federal government should allow capital expenditures to be SR&ED eligible.

Focus public research on breakthrough solutions

Innovations that find completely new ways to address problems or create value for the firm are particularly difficult to achieve. Barriers include the complex nature of the challenges the innovation addresses, the need for sustained long-term funding to find solutions and the high level of risk involved. For those reasons, public laboratories can play a key role in fostering breakthrough in technology or business practices that affect the industry as a whole, particularly in dealing with the environmental and social impacts of operation. An example of this type of approach is the Green Mining Initiative that was launched in 2009 to promote the environmental performance of the industry.

⁹⁵ Jon Baird (Executive Director, Canadian Association of Mining Equipment and Services). Interview by Katrina Marsh, July 9, 2012

⁹⁶ www.cmic-ccim.org/en/about/cmic_history.asp

RECOMMENDATION:

The federal government should continue to focus public science and technology development on breakthrough innovations that address industry-wide issues.

Recognize that innovation is not just science and technology

Too often in Canada, innovation is equated with science and technology development. While these are important components, innovation can also refer to new business practices. Innovation in practices to develop relations with local and Aboriginal communities and human resources are increasingly necessary to address some of the most pressing problems facing the mining industry. For Canadian mining suppliers, often smaller-technology oriented firms, help with marketing to new countries or industries can be key to establishing Canada as a global technology leader.⁹⁷

RECOMMENDATION:

The federal government should examine its support for mining innovation beyond science and technology and seek to understand barriers and gaps in fostering new business practices relating to areas like community relations, human resource management and marketing.

Vale Clean AER Project: One of Ontario's Largest Ever Environmental Investments

Many players in the mining industry are responding to growing public and government concern over the environmental impacts of their operations by implementing innovative new programs. An example is Vale's Clean AER (Atmospheric Emissions Reduction) program that was launched in the spring of 2012.

The \$2 billion initiative will reduce sulphur dioxide emissions at Vale's Copper Cliff smelter in Sudbury by 70 per cent and dust and metal emissions by 35 to 40 per cent. The reduction will put the facility well below the government regulated emissions limit. The project will also have economic benefits for the local community. Clean AER will create an estimated eight million person-hours of employment and \$400 million a year of construction value, 40 per cent more than the total value of building construction in Sudbury in 2011.

There are no direct cost advantages from the project; in fact, the finished facility will cost \$11 million more a year to run.

⁹⁷ Dick DeStefano (Founder and Executive Director of the Sudbury Area Mining Supply and Service Association), Interview with Katrina Marsh, August 3 2012.

Social license and an efficient and predictable regulatory environment: emerging areas of competitive advantage for Canada's mining cluster

Human resources, finance and taxation, infrastructure and innovation are traditional areas of strength for Canadian mining that are becoming barriers to the competitiveness of the sector. However, Canadian mining also faces relatively new challenges to its competitive position. "Social license" to operate is the idea that mining firms must gain and maintain the cooperation and support of the communities in which they operate. There are ample cases to suggest that without community buy-in, mining projects can suffer costly conflict and delays as well as reputational damage that can hamper a firm's ability to attract employees or investors. The ability for a firm to engage with Aboriginal and local communities is increasingly being considered by investors, with some financial analyst using it as a proxy for the quality of a firm's management.⁹⁸

Social license issues have become increasingly prominent within the last few decades, evolving into a critical factor to business success. Canadian mining firms operating both in Canada and abroad are well situated to become leaders in developing partnerships and practices that will transform social license from a competitive liability to a competitive advantage. Compared to many other jurisdictions, Canada has strong environmental laws and a good foundation in developing new environmental technologies (see *Vale's Clean AER Project*⁹⁹). It is for this reason that prominent groups such as the Mining Association of Canada are launching initiatives designed to develop a framework to enhance fiscal transparency in the sector. Many mining firms are also developing innovative partnerships with Aboriginal groups or community relations processes that are leading to win-win situations for all stakeholders. In fact, some Canadian mining firms

are already using excellence in community relations and environmental protection as a competitive strategy, seeking to become the partner of choice for communities located near mineral and metal resources.¹⁰⁰

Social license from local communities and the broader public is not the only way that a mining firm's social and environmental performance could impact competitiveness. Increasingly from certain segments of society, there is pressure on governments to regulate the behaviour of firms operating abroad. The manifestation of this pressure can take different forms. In Canada, for example, the most well known example was a private member's bill, *Bill C-300: An Act Respecting Corporate Accountability for the Activities of Mining, Oil or Gas Corporations in Developing Countries*. The bill sought to give the government authority to investigate complaints against mining, oil and gas companies and withhold public money from offenders. The Canadian Chamber, amongst others, opposed Bill C-300 on the grounds that it would have institutionalized a process for launching unproven accusations against Canadian extractive companies and established a duplicate process for dealing with complaints against Canadian mining, oil and gas companies.

RECOMMENDATION:

The government can and should take a proactive approach to promoting Canadian mining internationally. This could be advanced through the creation of a brand of excellence, innovation and social responsibility; by taking a leadership role and promoting the sector, the government would be better placed to ensure the conduct of Canadian firms operating internationally is consistent with this vision.

While C-300 did not pass, the new international reality is that domestic and international enforcement laws on issues like corruption are being more

⁹⁸ Simon MacMahon, Irene Sosa, and Kathryn Morrison, *Sustainability and Materiality in the Mining Sector*, (Ottawa: Jantzi Sustainalytics, 2011) www.sustainalytics.com/sites/default/files/sustainability-and-materiality-mining-final_1.pdf (accessed September 3, 2012).

⁹⁹ Vale's Clean AER Project Groundbreaking Celebrations. Quick Facts. June 22, 2012

¹⁰⁰ Gordon Bell (Head of the Global Mining and Metals Group RBC Capital Markets), Interview by Katrina Marsh, June 14 2012.

rigorously applied (see Grant Thornton Essay on page 41 for a discussion of the impact of international anti-corruption legislation on firms). Businesses need to take a leadership role in obtaining and maintaining a social license and in ensuring compliance with domestic and international laws. However, governments have a role to play in ensuring Canadian businesses are operating in an environment where they can transform environmental and social performance into a competitive advantage.

Stay the course with regulatory reform by ensuring the intended outcomes are achieved

The Canadian mining industry is governed by dozens of federal, provincial and territorial acts and regulations. To deal with this complexity, Canadian companies, as well as domestic and foreign investors, rely on governments to provide clear information about requirements, approval processes, timelines and responsibilities.

Recently, the 2012 budget introduced legislation to implement system-wide improvements for achieving the goal of “one project, one review” in a clearly defined time period. The government initiated these measures with the understanding that a modern regulatory system is critical to attracting investment and jobs in Canada. The regulatory reform package focuses on four major areas:

- Making the review process for major projects more predictable and timely
- Reducing duplication and regulatory burden
- Enhancing environmental protection
- Enhancing Aboriginal consultation

Uncertainty remains, however, over how some of these changes will be implemented, and how relevant federal, provincial and territorial authorities will work in partnership to enact the new legislation. For example, industry would like clarity on how the fisheries and pollution prevention provisions of the Fisheries Act will work together in practice, and whether the Act will be predictable and proportionate to risk.

Although questions concerning implementation of the new regulatory provisions remain, it is widely held that the recent changes have the potential to lead to positive improvements. To ensure these intended outcomes are achieved, officials within relevant federal, provincial and territorial government departments should work closely together, and, where applicable, with industry and stakeholders. Better collaboration among these parties will ensure a smooth, efficient and effective transition to the new regulatory model.

RECOMMENDATION:

Officials within relevant federal, provincial and territorial government departments should work closely together, and, where applicable, with industry and stakeholders to ensure the intended regulatory outcomes are achieved. Better collaboration among these parties will ensure a smooth, efficient and effective transition to the new regulatory model.

Greater clarity on government processes for Aboriginal and community consultation

Federal and provincial governments have a constitutional duty to consult Aboriginal groups. Although many mining firms are taking proactive measures to establish strong partnerships with Aboriginal groups, ultimately duty to consult is a government responsibility. Currently there is a lack of clarity on the who, how, why and when of Aboriginal consultations on mining and other types of projects, leading to confusion and frustration among all stakeholders. When conflict does arise, the courts are often the only recourse.

RECOMMENDATION:

The federal government should consistently carry out its obligations to consult and, where necessary, accommodate Aboriginal peoples. It should ensure its consultation obligations are adequately funded and establish clear expectations for industry.

EXPERT ESSAY – Sandy Boucher, Senior Investigator Grant Thornton

Anti-corruption Legislation: The Rules of the Game Have Changed

Bribery is a common business practice in emerging economies. Requests for bribes from government officials are often made to foreign entities wishing to obtain the necessary permits, licences and other permissions required to operate their business overseas. The global business community is taking great strides to crack down on this practice. Many countries have implemented legislation to stop bribery at home and abroad – including the U.S. through the Foreign Corrupt Practices Act (FCPA) and the UK with the Bribery Act (UKBA). In Canada, the Corruption of Foreign Public Officials Act (CFPOA) has been on the statute books since 1999, but in the past year we have seen a dramatic surge in investigations and prosecutions.

Recent high profile cases have shown that the environment is changing and that it is essential that Canadian companies understand the specifics of Canadian law. In addition, Canadian companies with international operations or that are raising capital in the U.S. or the U.K. for example, may also be subject to those countries' legislation if they are active in that market.

Ignorance is no longer bliss

Getting caught off-guard by corruption allegations is an expensive and time consuming exercise that can have a serious impact on a company's financial position and reputation. Even companies that are subsequently cleared have to spend significant sums in legal and investigation fees and such events are a significant distraction from managing the core business. Recent prosecutions have resulted in very large fines and penalties, probation orders and even jail time for individuals found to be in breach of the law. In some instances, such as with the UKBA, the very fact that a company does not have an anti-corruption policy in place can get it into trouble. Businesses have a lot to lose, the costs of a corruption incident are sobering enough, but added to this are the hidden costs such as those for remediation and damage control, recruitment and training. Reputational damage can be even more costly, being perceived as tainted by corruption can drive away clients, financing may become more expensive and a range of other organizations and individuals that are important to a business may be unwilling to cooperate.

Minimizing the risk

Companies in all industries are being urged to take action and work effectively to prevent corruption and bribery. The steps that a company must take have been clearly laid out in a number of jurisdictions around the world. Led by the Organisation for Economic Cooperation and Development (OECD) as well as governments, the courts and NGOs such as Transparency International (TI), a global template for accepted best practices and preferred compliance methodologies which rise above specific local legal requirements is developing. The salient points include corruption risk assessments, the development of policies and procedures to prevent corruption and the creation of an environment where such activities are seen to be unacceptable. Companies are also advised to have a clear understanding of the anti-corruption legislation in all of the countries where they operate.

Canadian anti-corruption legislation

Canada has recently been commended by Transparency International for its enforcement efforts in the fight against corruption. The RCMP's Anti-Corruption Unit now has more than 30 active cases and has laid charges in at least four cases. The 2011 conviction of Niko Resources was a watershed in Canadian enforcement history. Since then, the execution of search warrants at Blackfire Exploration and SNC Lavalin and the subsequent charging of two former SNC Lavalin executives under the CFPOA have underlined the government's determination to change the way that Canadian companies operate abroad. This is a dramatic turnaround from a year ago when TI described Canada as "one of the worst offenders" for lack of progress in enforcing the OECD Anti-Bribery Convention.

Despite the improvement in enforcement, there still remain a number of areas where criticism of Canada from the OECD and TI remains unanswered. TI has stated that Canada remains "the only OECD member that does not provide nationality jurisdiction, which presents a serious obstacle to enforcement." The 2011 OECD progress

report also raised this issue and identified three other areas where improvement is needed. In fact, the government introduced Bill C-31 in 2009, which proposed to amend the CFPOA by clarifying that it applies to Canadian individuals acting outside of Canada. It also included provisions to apply the CFPOA based on the nationality principle, which would allow certain offences committed outside Canada to be prosecuted as if they had occurred in Canada. This bill died on the order paper, so it is important that this and other amendments to the law are enacted as soon as possible.

Another issue raised in the OECD report is the fact that the CFPOA only applies to bribes for the purpose of obtaining or retaining an advantage of business carried out in Canada or elsewhere "for profit." The OECD Working Group has recommended that Canada amend the foreign bribery offence so that it is clear that it applies to bribery in the conduct of all international business, not just business "for profit."

The report also raised a concern that as the Canadian case load mounts, the government must urgently provide the additional resources needed to prosecute them. This not only means funding for police investigators, prosecutors and judges but should also include consideration of other legal tools which can assist in the management of resources and cases.

One idea that is gaining traction in the UK is the use of Deferred Prosecution Agreements against corporations; these have been used extensively in the U.S. in FCPA investigations. The U.S. system entails the use of settlement agreements between the prosecution and defendant corporations in which the company is fined but granted amnesty from prosecution in exchange for fulfilling certain corruption compliance and other requirements.

The Canadian government has made significant progress in its fight against corruption, particularly in the mining sector; we should expect further enhancements to the program and more prosecutions which are likely to force companies to take the law seriously.

CONCLUSION

The global economic landscape is changing dramatically. The rise of emerging nations, demographic changes in industrialized economies and the relentless march of technological change will make the pace and volatility of global growth very different from the previous decades. Canada, a relatively small and open economy, does not have the brawn to shape these global economic forces to its advantage. Accordingly, it must have the brains to adapt to them.

The products that emerge from the mining sector are as old as human civilization; the processes to extract them are space age. Leveraging our endowment of natural resources to create world-beating, knowledge intensive sectors is one path Canada can take to ensure the continued competitiveness, and hence prosperity, of our economy.

This paper outlined one sector where Canada is effectively pursuing this strategy: the Canadian mining sector. The competitiveness of this sector goes beyond our ability to extract materials from the earth, although that is a key part. Canada has built on its double advantage of being a resource economy *and* a knowledge economy to develop world-beating industries that can create sustainable prosperity for all Canadians. We compete on world markets not only by selling mining commodities and products to the world but also mining know-how.

Canadian mining hubs like Toronto, Vancouver and Sudbury should be counted with Hollywood and Silicon Valley as examples of competitive clusters

where the various firms and organizations that compose the sector both cooperate and compete to create formidable competitive advantage. Our strength in finance helps to foster an army of junior mining firms, resulting in a real strength in global mining exploration.

Through the inventiveness of industry and smart government policies, Canada has managed to transform its geological luck into prosperity for generations of its people. With the right policies and programs in place, Canada will continue to be the world's mining capital for years to come.

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ANNEX-CANADIAN CHAMBER OF COMMERCE RESOLUTIONS ON THE MINING SECTOR

Applying the Accelerated Capital Cost Allowance to All Mining and Resource

Processing investments

Accelerated Capital Cost Allowance (ACCA) has been a feature of mining sector taxation in Canada for decades to encourage investment and value-added processing. Capital cost allowance rules specify the rate at which capital assets can be expensed annually. ACCA allows the normal costs of capital to be deducted as fast as income from the project will allow rather than deferring the deductions over time. As corporations recover their initial investments sooner, ACCA reduces the investment risk associated with the mine or project, thus improving the overall economics of the project.

In the 2007 federal budget, Finance Minister Jim Flaherty grandfathered ACCA for oil sands assets in project (both mining and in-situ) phases that commenced major construction prior to March 19, 2007 and announced that for other projects that have begun construction, companies could claim ACCA until 2010; the rate would be gradually reduced between 2011 and 2015. The timing for this decision was unfortunate. The ACCA for oil sands provided a significant boost for this costly industry, and companies had announced investments of \$150 billion in spending before oil prices collapsed. The elimination of the ACCA coincided with a plunge in the price of oil as well as the ongoing threat of significant new costs to combat environmental issues including climate change.

Although the federal government eliminated the ACCA for oil sands, at the same time it introduced an ACCA for investments in manufacturing machinery and equipment. Originally intended to be available for two years, the ACCA for manufacturing machinery and equipment was extended for a further year in 2008 and in response to the economic crisis,

last year the federal government extended the ACCA for machinery and equipment for a further two years until 2012. Clearly the government understands the power of the ACCA as an inducement to further investment.

As times remain competitive, ACCA needs to remain in place as a key component of a strategy that encourages investment in resource industries and gives Canada a competitive edge. As Greenfield projects, new upgraders in Canada are more costly especially with the higher construction (labour and material) costs as well as the need to develop supporting public and private infrastructure.

Competing locations in the U.S. (e.g. the U.S. Gulf Coast and the U.S. Midwest) enjoy the benefits of existing infrastructure. They are also shielded from the inherent high cost of transporting heavy barrels through the averaging down of regulated pipeline tariffs based upon depreciated capital invested in pipelines constructed years ago at lower historic costs.

Alberta also has in place a rigorous environmental and socio-economic public interest tests for major energy projects operated through the Energy and Utilities Board's regulatory process. This process extends the lead-time and upfront costs of projects.

In addition to the uneven playing field created by applying the ACCA to manufacturing machinery and equipment and not to oil sands mining and upgrading, the ACCA has not been available for merchant upgraders or for additional value-added processing such as petrochemicals and refining. This means, for example, that some upgraders operating are eligible (those with common ownership and processing feedstock from a particular mine or in situ project) and some are not (those purchasing bitumen on the open market), creating a further disincentive or barrier to investment in upgrading capacity.

However, Alberta's case is not exclusive and many other mining industries, such as those involved in diamond, uranium, nickel mining are capital intensive, face competition from other jurisdictions, and considerable higher operating costs due to labour and regulatory controls. Faced with these challenges, seizing the new economic opportunities will require our governments to implement fiscal policies like the ACCA that encourage rather deter investment.

RECOMMENDATIONS

That the federal government:

1. *Retain Accelerated Capital Cost Allowance for oil sands and mining projects in Canada.*
2. *Extend Accelerated Capital Cost Allowance to resource processing investments, including upgraders/ other high conversion capacity investments and shared processing infrastructure, and other resource conversion equipment used in diamond, nickel, uranium and other mining operations.*

Support Future Mineral Exploration and Mining in Canada

Mineral exploration and mining are mainstays of Canada's economy, particularly in northern and remote regions. Canada's mining industry accounts for approximately 20 per cent of Canada's annual goods exports and generally three to four per cent of Canada's GDP. The industry employs 320,000 Canadians in mineral extraction, processing and manufacturing.

The Prospectors and Developers Association of Canada (PDAC) is a national organization with more than 10,000 members representing the range of companies and individuals in mineral exploration and development. Its individual members include prospectors, geoscientists, consultants, mining executives, students and people working in the

drilling, financial, legal and other supporting fields; it provides valuable information and advice on mining issues. According to the PDAC, mineral reserves that sustain mining have fallen dramatically over the past 25 years, threatening the future of the industry. The only way to replace the reserves is by mineral exploration (research and development). It is essential that policies initiated by the federal government to encourage exploration continue and that tax rules are reviewed to ensure they reflect the needs of the current economic environment.

Canada dominates the global mineral exploration industry, with financing provided through the TSX and its venture exchange for projects in over 100 countries. Exploration is the lifeblood of the mining industry at home and abroad, and Canada needs to continue to attract a significant share of global exploration investment to projects within its borders.

According to the Mining Association of Canada, the Canadian mining industry paid \$5.5 billion (\$8.4 billion when including the oil sands) to the federal, provincial and territorial governments in 2010, a significant increase from \$5.1 billion the preceding year. The exploration and mining industry generates thousands of high-skilled, high-paying jobs across Canada. In remote regions this is particularly important. As an example of the impact that a new mine can have on a region, the Meadowbank gold mine, which opened in Nunavut in 2010, has provided approximately 500 new jobs and contributed almost 12 per cent of the GDP of Nunavut.

However, the future of mining in Canada is threatened by an inability to replace the mineral reserves at the same pace that they are being extracted; reserves of base metals are close to their lowest levels in years and gold reserves are far below their highs. Due to the fragile state of the global economy there is downward pressure on companies' share prices and their ability to raise high-risk financing.

Canadian initiatives such as flow-through share financing and the federal Mineral Exploration Tax Credit (METC), provincial exploration incentives and public geoscience research help to create the conditions that make Canada the world's leading destination for mineral exploration investment. This is important to consider as project costs are rising as a result of exploration, development and production taking place in more complex ore bodies, deeper lying deposits with lower grades and more remote locations.

As costs rise, financing becomes more critical. New mines are essential to Canada's economic growth; however, mineral deposits that are capable of supporting commercial development occur very rarely and are difficult and costly to find. With respect to exploration and equity financing, flow-through shares and the METC offer individual Canadian investors an additional incentive to support higher risk ventures.

Metals Economics Group (MEG) reports that, in 2011, Canada led all countries with 18 per cent of the world's mineral exploration spending (Australia is second with 13 per cent). The TSX/TSXV is first in equity capital raised for mining and first in listed mining companies with 58 per cent (1,629) of the world's total. According to Raw Materials Group (RMG), Canada is second only to Australia in mining investment. The Mining Association of Canada reports that Canada's mining industry plans to invest \$140 billion in projects over the next decade.

As Metals Economics Group stated in its March 2012 World Exploration Trends, risk capital-dependent junior companies have accounted for close to half of annual mineral exploration spending in recent years and "the state of equity markets plays a key role in shaping trends and strategies in the exploration industry." MEG reports that equity markets "struggled in the second half of 2011, and the pace of exploration financings fell back to the levels of late 2009 and early 2010." "As the pace of exploration

financings weakened in late 2011," MEG says, "many juniors have had trouble raising the funds needed to sustain or increase exploration spending in 2012."

The mineral exploration tax credit was introduced in 2000 at a time when it was very difficult to raise financing for mineral exploration even using the flow-through share system. The credit provided a 15 per cent tax credit on top of the 100 per cent tax deduction for Canadian Exploration Expense (CEE). Several provinces added their own harmonized incentives. This system called "Super Flow-Through" by the industry provided the incentive needed to attract investors. The METC was reintroduced in 2006 and subsequently renewed for two years. It has since been extended on a yearly basis. Despite industry requests for the 2012 federal budget to make it permanent, in the March 2012 budget, the METC was again extended for an additional year to March 31, 2013. This system has been in place for over a decade and has helped ensure that Canada continues to attract the greatest share of global exploration (Canada is currently first among countries with 19 per cent of the world's exploration investment).

The METC and flow-through share financing continue to serve a critical role as they allow junior companies to raise needed capital, keep investment in Canada and sustain grassroots exploration activity in remote and northern regions where transportation and field camp costs are high.

In the June 2011 federal budget, it was estimated that the extension of this measure for an additional year would result in a net reduction of federal revenues of \$90 million over the 2011-12 to 2012-13 period. However, in an average year, the METC investors collectively provide companies with \$400 million in new financing to be spent on grassroots exploration in Canada. The money has to be spent in Canada, thereby ensuring that if a mine is discovered, the jobs and associated economic opportunities benefit Canadians directly.

In addition to market uncertainty, Canadian mineral exploration companies face increased operating costs. These include compliance costs related to the Crown's Duty to Consult with Aboriginal communities and increased environmental regulatory costs (i.e. federal, provincial and territorial policies that establish new permitting conditions for companies beyond the existing regulations and community engagement practices). The PDAC believes that most of these costs should qualify for renunciation as CEE under flow-through share arrangements.

The situation is urgent, as without sufficient investor support, companies will carry-out less exploration causing an impact on service companies and individuals, particularly those in rural, northern and Aboriginal communities. In addition, the sustainable replacement of Canada's mineral reserves will be at risk.

To support responsible exploration and development, the Canada Revenue Agency needs to clarify the current CEE guidelines to allow companies to manage new costs associated with government and societal requirements. This will improved corporate social responsibility and environmental practices by exploration companies.

Communities located near where the exploration is taking place, which are often northern and Aboriginal communities, will be better informed and more involved in mineral exploration, resulting in additional employment and business opportunities. Companies and Canada Revenue Agency auditors will have greater certainty regarding the eligibility of costs related to exploration.

RECOMMENDATIONS

That the federal government:

- 1. Make the Mineral Exploration Tax Credit (METC) permanent, as it has been repeatedly renewed since 2000, which would provide greater certainty to the exploration industry and investment community.*
- 2. Encourage good corporate social responsibility and environmental practices by undertaking a review, in consultation with industry, of the tax rules governing the extent to which community consultation and environmental compliance costs are eligible for the Canadian Exploration Expense (CEE) deduction.*

SUMMARY OF RECOMMENDATIONS

Reduce the administrative burden associated with economic class immigrants and do more to ensure their skills align with the needs of employers. Ensure employers play a key role in the selection process in the new expression of interest approach to immigration.

Continue to fund initiatives like the NWT Mine Training Society, the BC Aboriginal Mine Training Association and the Aboriginal Skills and Employment Training Strategy that help to develop the skills Aboriginal peoples need to follow careers in the mining sector. There is also an opportunity to replace the Aboriginal Skills and Employment Partnership with a program that could more effectively achieve the same synergy between the sector and Canada's Aboriginal peoples.

Create a national database of labour market conditions and disseminate information to high schools and colleges about skills that are high in demand. Support better coordination between universities, colleges, industry and government to ensure programs are aligned with industry needs and graduates are better able to find meaningful employment.

Recognize the skills crisis extends to government regulators as well. Implement knowledge sharing practices to ensure key knowledge is retained as retirements affect the public service expertise in mining regulation and technology.

A targeted exploration tax credit should be developed (over and above the METC) to incent exploration in remote regions of Canada where exploration costs are prohibitive (e.g. the Arctic).

The CRA should update its 2007 guidelines (provided to the PDAC and published on its website) to clarify what expenses, incurred in the course of conducting community consultations, environmental baseline studies and feasibility studies are eligible Canadian Exploration Expenses.

Reduce the administrative burden on industry by launching a FPT working group that would explore options that would serve to streamline and harmonize taxes with and among all the various taxing jurisdictions. This program could also promote greater communication on administrative interpretations of tax law.

Continue to invest in the infrastructure necessary to promote growth not only in the mining sector but across the whole Canadian economy. This can be accomplished through increased partnerships with the private sector, other governments and Aboriginal peoples and through the adoption of innovative funding models. These investments will help unlock the resource potential of the North and expand the markets for Canada's products. When making these investments, all levels of Canadian government should consider the potential community and commercial benefits when choosing the locations of infrastructure projects.

Sustain and increase government investment in geosciences to help address Canada's mineral reserve crisis and help sustain investment in the sector.

The government of Canada should continue to pursue Foreign Investment Protection Agreements with foreign governments in order to mitigate political risk to Canadian mining assets abroad and be more aggressive in their application. Not only do these agreements need to be signed, but their active enforcement will go a long way towards protecting Canadian investment.

Enhance the working relationship with industry and academia through the Canadian Mining Innovation Council by committing funding that will better promote and coordinate mining research in Canada. In addition, work at public research facilities should seek to align with industry needs.

The federal government should allow capital expenditures to be SR&ED eligible.

The federal government should continue to focus public science and technology development on breakthrough innovations that address industry-wide issues.

The federal government should examine its support for mining innovation beyond science and technology and seek to understand barriers and gaps in fostering new business practices relating to areas like community relations, human resource management and marketing.

The government can and should take a proactive approach to promoting Canadian mining internationally. This could be advanced through the creation of a brand of excellence, innovation and social responsibility; by taking a leadership role and promoting the sector, the government would be better placed to ensure the conduct of Canadian firms operating internationally is consistent with this vision.

Officials within relevant federal, provincial and territorial government departments should work closely together, and, where applicable, with industry and stakeholders to ensure the intended regulatory outcomes are achieved. Better collaboration among these parties will ensure a smooth, efficient and effective transition to the new regulatory model.

The federal government should consistently carry out its obligations to consult and, where necessary, accommodate Aboriginal peoples. It should ensure its consultation obligations are adequately funded and establish clear expectations for industry.

Retain Accelerated Capital Cost Allowance for oil sands and mining projects in Canada.

Extend Accelerated Capital Cost Allowance to resource processing investments, including upgraders/other high conversion capacity investments and shared processing infrastructure, and other resource conversion equipment used in diamond, nickel, uranium and other mining operations.

Make the Mineral Exploration Tax Credit (METC) permanent, as it has been repeatedly renewed since 2000, which would provide greater certainty to the exploration industry and investment community.

Encourage good corporate social responsibility and environmental practices by undertaking a review, in consultation with industry, of the tax rules governing the extent to which community consultation and environmental compliance costs are eligible for the Canadian Exploration Expense (CEE) deduction.

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