



FACTS & FIGURES
OF THE CANADIAN MINING INDUSTRY

2014



The Mining Association of Canada
ADVOCACY STEWARDSHIP COLLABORATION

THE MINING ASSOCIATION OF CANADA

The Mining Association of Canada (MAC) is the national organization of the Canadian mining industry. We represent companies involved in mineral exploration, mining, smelting, refining and semi-fabrication. Our member companies account for most of Canada's output of metals and minerals.

MAC's functions include advocacy, stewardship and collaboration. Our goals are to promote the industry's interests nationally and internationally, to work with governments on policies affecting minerals, to inform the public and to encourage member firms to cooperate to solve common problems. We work closely with provincial and territorial mining associations, other industries, and environmental and community groups in Canada and around the world.

DATA AND SOURCES

This annual report reflects currently available data, the majority from 2013, though some from prior years and some from 2014. Dollar amounts are expressed in Canadian dollars unless noted otherwise.

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A SYMBOL OF CANADIAN DEMOCRACY SINCE 1867.

Canada's democracy is about the will of the people, the skills of leaders, and the work of many committed Canadians. Canada's minerals and metals are pleased to help in the background.

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CANADIAN MINING
Part of what makes us special.

A message from the Mining Association of Canada.

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WE'LL HELP CANDIDATES CONNECT WITH CANADIANS.

With an election on the horizon, Canada's minerals and metals are standing by to play a part. Canada is one of the world's top mining countries, and our minerals and metals are part of products of all kinds.

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WE'LL SHOW UP AT EVERY BIG EVENT AND DEBATE.

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WE ARE IN EVERY COMMUNITY.

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GLOBAL. LOCAL. CANADIAN.

Modern aircraft design is about strength, durability and weight. Minerals and metals allow next generation planes to save fuel, fly further, and improve comfort.

Canada is one of the world's top mining countries, and our minerals and metals are found in products of all kinds.

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What will they feel next?

A message from the Mining Association of Canada.

RELIABLE. CLEAN. CANADIAN.

Electricity is such a common part of our lives, it can be easy to take it for granted. Canada is a major producer of uranium, an essential ingredient in carbon-free nuclear energy.

Canada is one of the world's top mining countries, and our minerals and metals are found in products of all kinds.

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What will they feel next?

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SUMMARY OF ECONOMIC CONTRIBUTION AND KEY ISSUES

ECONOMIC CONTRIBUTION

The mining industry contributes greatly to Canada's economic strength. The industry employs more than 380,000 workers across the country in mineral extraction, smelting, fabrication and manufacturing. Proportionally, the mining industry is also the largest private sector employer of Aboriginal peoples in Canada and employment is poised to increase. The industry's \$54 billion contribution to Canada's gross domestic product in 2013 included \$22 billion in mineral extraction, and \$32 billion in mineral processing and manufacturing.

Internationally, Canada is one of the leading mining countries and one of the largest producers of minerals and metals. The industry accounted for 19.6% of the value of Canadian goods exports in 2013, selling a diversified array of minerals abroad. Exports of aluminum, copper, gold, iron and steel, iron ore, nickel, silver, uranium, zinc, diamonds, potash and coal ranged from \$1.5 billion to \$17.7 billion each.

Canada slipped from the world's top destination for exploration spending in 2012 to the second spot behind Australia in 2013. Canada's percentage of global mineral investment dropped from 18% in 2011 to 13% in 2013, which is indicative of the fierce competition for global mineral investment. Canadian exploration spending is focused in many regions, with a strong interest in the North. More than 800 Canadian companies are also very active exploring outside of Canada in over 100 countries.

While mining is important to Canada at the local community level, it also contributes to the economies of large cities. Toronto, for example, is the global hub for mining finance. The Toronto Stock Exchange (TSX) and TSX Venture Exchange were home to 57% of the world's publicly-listed mining companies and traded more than \$200 billion of mining stock in 2013. Together, the two exchanges handled 48% of global mining equity transactions in 2013, and accounted for 46% of global mining equity capital that year. Vancouver features the world's leading cluster of exploration companies, while Montreal is home to major aluminum and iron ore firms.

Edmonton has become a global centre for oil sands expertise and Saskatoon for uranium and potash.

Other evidence of the industry's vast economic reach is that mining accounts for over one-half of all rail freight revenues of Canada's major railways, CN and CP. As well, more than 3,400 suppliers provide expertise to the industry, making significant indirect economic contributions across Canada. A recent survey commissioned by the Canadian Association of Mining Equipment and Services for Export indicates that 913 companies in Ontario alone identify as mining suppliers. Together, they provide 68,000 additional jobs across the province, and generate 1% of provincial GDP and \$1.5 billion in government tax revenue.



Photo: New Gold, New Afton Mine, British Columbia

Mining and its related industries are important contributors to federal, provincial and territorial coffers. According to a recent MAC study, the industry's payments to governments totalled \$71 billion in taxes and royalties over the decade leading through to 2012. Beyond contributions to governments, the average annual pay for a mining worker in 2013 exceeded \$110,000, which surpassed the average annual earnings of workers in forestry, manufacturing, finance and construction by a range of \$31,000 to \$46,000.

In 2013, Canadian mining companies invested \$522 million in research and development (R&D). Mining's investment surpassed that of the motor vehicles and parts sector, and the wood products and paper sector. In 2012, the most recent year for which data is available, the industry employed over 4,700 people in R&D. This is more than the pharmaceutical and forestry sectors, both of which receive extensive financial and policy support from the government.

KEY ISSUES FOR THE CANADIAN MINING INDUSTRY

According to recent MAC research, there are upwards of \$160 billion in potential mineral project investments over the next decade in Canada. This would translate into multiple billions worth of investments in most of Canada's provinces and territories, namely British Columbia, Alberta, Saskatchewan, Ontario, Quebec, Newfoundland and Labrador, Nunavut and the Northwest Territories. These projects may face obstacles and delays, but the figure does suggest the scale of mining-related jobs, supply contracts and tax revenues if these projects come to production. The future of these projects is shaped by many issues, domestic and global, of which five are particularly relevant.

State of the global mining economy. Like our nation's economy, the Canadian mining industry is not immune to global economic trends. The profitability of companies depends in part on the performance of commodity prices, which are subject to market volatility and are driven by global supply and demand. At the outset of the economic recovery, mineral prices increased and remained at favourable levels, despite volatility, through to 2013. Recent uncertainty over the short-term global economic outlook—such as concerns over Eurozone contagion, the softening of Chinese growth, uncertainty over the strength of the US economic recovery, and increased supply for some commodities—caused the buoyant mineral prices of some mined goods to decline in 2014.

Despite challenges, the prevailing view is that the Canadian mining sector's economic prospects remain strong over the medium to longer term. Given the long-term growth projections for China, India and other emerging countries, and assuming a positive investment environment, demand for minerals and metals is likely to remain strong. This is especially true as the consumption patterns of middle classes of developing economies continue to more closely resemble those of industrialized countries.

Canadian investment competitiveness. While elements of Canada's mining tax regime are attractive, recent changes

from the 2012 and 2013 federal budgets will make it more costly for companies to both develop projects and expand existing mines. This is particularly true for remote and northern regions. Innovation and productivity also impact Canadian competitiveness, and the industry faces several challenges in this regard. Challenges discovering new deposits, operating deeper mines, rising energy costs and increasing regulatory requirements are all obstacles that need to be addressed. The OECD has indicated that lagging productivity is one of Canada's most significant economic hurdles. In response to these challenges, the Canadian Mining Innovation Council (CMIC) was formed with the aim of investing mining industry R&D dollars more strategically. The Canadian government can help the industry overcome these challenges by ensuring that Canada remains attractive for new mining investment, and that CMIC receives the funding it needs to build a portfolio of projects that reflects the industry's innovation needs.



Photo: Agnico Eagle Mines, Meadowbank Mine, Nunavut

Canadian regulatory burden. New mines and major expansions must undergo federal reviews and approvals in addition to the review and permitting requirements of their provincial or territorial jurisdiction. Most major mining projects in provinces are subject to the *Canadian Environmental Assessment Act* (CEAA) as well as parallel provincial assessments and, depending on the details of the project and the mine site, they may require approvals under other federal legislation, such as the *Fisheries Act* and the *Navigation Protection Act*.

All three federal Acts were amended in 2012, and amendments have come into force at varying times in the years that followed. A review of the Metal Mining Effluent Regulations (MMER) was also announced in 2012 and is

still ongoing. The full impact of these legislative changes and their consequences remain unknown. It is expected that once fully implemented, there will be an increase in the number of federal approvals required and in the number of mining projects subject to federal environmental assessments.

In addition to the uncertainty created by these legislative changes, industry is concerned about inadequate coordination within the federal government and between federal and provincial processes. The Canadian Environmental Assessment Agency and key departments, such as Environment Canada, Fisheries and Oceans Canada and Transport Canada, must work together to ensure mining projects are reviewed once, and that the various federal requirements, along with Aboriginal and public considerations, are integrated into a unified, robust and timely process with meaningful consultation.

Need for strategic infrastructure investment. The mining industry is the largest customer group of Canada's transportation sector. It is, therefore, important that the sector moves products to market efficiently, at competitive prices and on modern infrastructure such as ports, highways and railways. Capital spending opens up new regions for development by enhancing the economic viability of a host of projects. Conversely, Canada's vast geography, and the substantial cost required to overcome it, can be a barrier to developing remote and northern mining projects.

To better understand these costs, MAC undertook a study that compared the costs of operating in a remote and northern region to a comparable mine in a centrally-located area. The study determined that for base and precious metals, the premium associated with developing and operating a remote and northern mine ranges from 2–2.5 times the cost compared to a similar mine in a southern region. Further, MAC ascertained that 60% of this cost increase is related directly to infrastructure investment.

Mineral investment can help governments and communities achieve public social and economic policy objectives for these regions. As such, MAC recommends the government seriously consider the means at its disposal to advance this nation-building opportunity, specifically tax incentives, infrastructure investments, and public-private partnerships.

The human resources challenge. According to the Mining Industry Human Resources Council (MiHR), the Canadian mining industry will require 121,000 new workers over the next decade. This deficit is compounded by the approaching retirement of the industry's skilled core of workers. By 2024, MiHR forecasts more than

53,000 employees will retire from the sector. As Canada's largest private sector employer of Aboriginal people on a proportional basis, the industry is in a good position to increase Aboriginal employment if the right training and skills programs are developed and maintained. Approximately 1,200 Aboriginal communities are located within 200 kilometres of some 180 producing mines and more than 2,500 active exploration properties. Addressing the human resources challenge will take a large and coordinated effort by the industry, educational institutions and all levels of government in the coming years.



Photo: De Beers, Gahcho Kué Project, Northwest Territories



MINING

ONE INDUSTRY, MANY APPLICATIONS

THE MINING AND MINERAL MANUFACTURING SECTOR—COVERING METAL, NON-METAL AND COAL MINES; OIL SANDS MINING OPERATIONS; AND MANUFACTURING IN THE FORM OF SMELTERS, REFINERIES AND FABRICATION FACILITIES—IS GENERICALLY KNOWN AS THE “MINING INDUSTRY.”

The mining industry is crucial to the everyday life of all Canadians. Mined products are required to build highways, electrical and communication networks, housing, vehicles, electronics and many other items essential to modern life.

Clean energy and “green” products also rely on metals and minerals as building blocks. Water purification systems rely on nickel and a host of rare earth elements. Hybrid cars draw energy from nickel hydride batteries and use far more copper than traditional vehicles. Efficient, lightweight vehicles and aircraft need aluminum as well as lighter composites and alloys involving nickel and other metals. Clean energy sources such as nuclear, solar, wind and hydrogen use a range of minerals and metals in their equipment and processes.

Because the mining industry is vital to daily life, its opportunities, challenges, investments and needs are inseparable from those of broader society. Thanks to the industry’s innovation and investment, Canada has benefited from low-cost mineral and metal products, good jobs, greater wealth and responsible stewardship of natural resources.

SOME CONSUMER PRODUCTS THAT RELY ON MINING

- Batteries (nickel, cadmium, lithium, cobalt)
- Circuitry (gold, copper, aluminum, steel, lithium, titanium, silver, cobalt, tin, lead, zinc)
- Computer and TV screens (silicon, boron, lead, barium, strontium, phosphorus, indium)
- Energy (coal, uranium, oil sands)
- Musical instruments (copper, silver, steel, nickel, brass, cobalt, copper, iron, aluminum)
- Sports equipment (graphite, aluminum, titanium, calcium carbonate, sulphur)
- Vehicles and tires (steel, copper, zinc, barium, graphite, sulphur, bromine, iodine)



— SECTION 1 —

MINING AND THE CANADIAN ECONOMY

Like our nation's economy, the Canadian mining industry is not immune to global economic trends. The profitability of companies depends in part on the performance of commodity prices, which are subject to market volatility and driven by global supply and demand. In turn, the extent to which mining companies contribute to the Canadian economy, be it through direct and indirect employment or taxes and royalties, depends on their ability to operate profitably. Economic forecasts help companies plan their business activities.

GLOBAL ECONOMIC TRENDS

The Bank of Canada downgraded its 2014 global economic growth forecast, from 3.3% in April to 2.9% in July, due to a widespread slowdown in economic activity, investment and trade in the first quarter. Looking forward, the Bank of Canada anticipates growth to rebound at 3.6% and 3.7%, respectively, for 2015 and 2016, which is consistent with earlier projections. Comparable trends are also forecast by the World Bank, while the International Monetary Fund (IMF) projects a rosier picture of global growth in 2014 at 3.4%. Some analysts interpret this as an indication that the global economy is transitioning towards a period of slower and more stable but uneven growth.

EMERGING ECONOMIES

Emerging market demand has continued to slide, but performance has been uneven across countries. From 2010 through 2013, GDP growth from the IMF's Emerging Market and Developing Economies has fallen significantly from 7.6% to 4.7%. Looking forward through 2014, Brazilian and Russian GDP growth is forecast to shrink to 1.3% and 0.2%, respectively, with Russia's forecast reduced significantly in light of recent sanctions. Meanwhile, China's growth, forecast to shrink consecutively through 2015, from 7.7% to 7.1%, remains strong despite settling; while India is forecast to grow from 5.0% to 6.4% over the same period.

Notwithstanding mixed economic growth from economies in transition, mineral prices and the corresponding demand for many mining products have demonstrated staying power, despite volatility and downward pressure in some areas. Some mining executives have been outspoken over the continued strength of the commodity cycle, attributing volatility to oversupply and not to a softening of demand for mining products. This is largely due to the strength of China's growth and the fact that it accounts for approximately 45% of global base metal demand. China also shows comparable percentages for a host of other commodities.

However, as their economic growth slows, emerging economies will become less able to pick up the slack in global economic growth resulting from underperforming advanced economies. Without broader economic revitalization in other leading countries and regions, the slower pace of global economic growth is likely to persist.

PERFORMANCE OF ADVANCED ECONOMIES

Uncertainty over the performance of several of the world's advanced economies continues, affecting the short-term global economic outlook. Concerns over the length of the recession in Europe, mixed views on the effectiveness of Japanese economic reforms, and uncertainty over the strength of the US economic recovery have contributed to weak market confidence and investor hesitancy.

Modest indicators of incremental yet uneven economic improvement have continued year-over-year in the European Union. Eurostat—the European Commission's statistics office—reported growth of 0.3% and 0.2% for the first and second quarters of 2014 for the 28-country union. While still high, improvement was also seen in Europe's unemployment rate, dropping from 12.1% in June 2013 to 11.5% year-over-year. On both measures, however, large discrepancies exist across member states. For example, the

lowest unemployment rates were recorded in Austria (5.0%), Germany (5.1%) and Malta (5.6%), and the highest rates in Greece (27.3%) and Spain (24.5%). Despite challenges, the above trends are seen by some as important—if small—steps towards broader economic recovery and stability.

Japan, the world's third-largest economy, revised its 2014 growth projections downward in July, from 1.4% to 1.2% in the fiscal year ending March 2015. As the country adopts



Photo: Vale, Coleman Mine, Sudbury, Ontario

“Abenomics”—Japanese Prime Minister Shinzo Abe’s policy mix of aggressive monetary easing, fiscal spending and structural reforms—analysts remain uncertain as to the plan’s likelihood for long-term success. While it has raised expectations for better times ahead, a ballooning debt of more than 200% of GDP, and serious demographic issues, means Japan’s challenges remain significant.

Meanwhile, economic performance in the United States remains turbulent. Recent political gridlock, the slowdown in inventory investment, and the expiration of fiscal measures have contributed to US projected growth being revised downward from 2.8% to 1.6% for 2014. The economy seems, however, to have bounced back from a dismal 2.1% decrease in first quarter GDP growth with a robust 4.2% increase in the second quarter. Recent reports of increased wages and business and consumer spending are held by some analysts to be cause for optimism.

IMPACTS ON THE MINING INDUSTRY

Given the market-driven nature of mineral and metal pricing, both global and Canadian mining industries are affected by ongoing global economic uncertainty. According to PwC, the 40 largest mining companies

globally booked record impairments of \$57 billion in 2013, driving aggregate net profits down 72% to their lowest level in a decade. While net profits from emerging market companies were \$24 billion in aggregate in 2013, companies headquartered in developed countries operated at an aggregate net loss of \$4 billion. On the discovery side of the business, access to capital has been particularly challenging for junior mining companies. (See Section 3 of this report for more information.)

Of the top 40 companies globally, eight are Canadian-listed companies, and 11 are members of the Mining Association of Canada. With a shift in focus, many mining companies are re-evaluating their stated positions on the development of new projects, both at home and abroad, and are adopting strategies to reduce costs and maximize cash flows. Despite these adjustments, and downward trends in certain commodities, the prices of many mined products remain above historical averages, enabling companies to operate profitably.

Looking forward, the Canadian mining industry’s economic prospects will likely be strong over the medium and long term. The prevailing view is that the longer-term fundamentals are solid, and that the current period of heightened volatility will pass. As the middle classes of the world’s most populous countries continue to emerge, and as their consumption patterns more closely resemble those of western industrialized countries, growth is likely to return.

This opportunity cannot be taken for granted, however. Decisions regarding regulatory, tax and mineral policy made now will significantly affect Canada’s readiness to capitalize and benefit from these opportunities when they arrive.

MINING’S CONTRIBUTION TO THE CANADIAN ECONOMY

Mining contributes significantly to the Canadian economy. The wages and employment of approximately 383,000 people across the country, taxes and royalties collected by governments, and the capital expenditures required for project development and operation are only some examples of its contribution. Beyond its direct economic impact, the industry also supports many firms and sectors that supply mining with the goods and services it needs to function.

CONTRIBUTION TO CANADA’S GDP

Historically, the value of minerals and metals to Canada’s economy has ranged between 2.7% and 4.5% of the country’s GDP. In 2013, the industry’s contribution remained within this range at 3.4%.

2013 CONTRIBUTION

The extractive industry, which combines mineral extraction with oil and gas extraction, contributed \$113.5 billion, or nearly 7.2%, to Canada's GDP in 2013 (see Figure 1). By this measure, the extractive industry is the fourth largest of Canada's 18 industries, surpassed only by the services, real estate and manufacturing sectors, which rank first, second and third, respectively.

The mining industry as a whole goes beyond extraction to include mineral manufacturing. The mining industry's 2013 contribution to GDP is detailed in Figure 2, which divides industry activity into four stages:

- **Stage 1**, extraction of minerals (metals, non-metals and coal): \$22 billion
- **Stage 2**, primary metal manufacturing (smelting, refining, rolling, extruding, alloying and casting of primary metals): \$14.2 billion
- **Stage 3**, non-metallic mineral product manufacturing (abrasives, lime, cement, glass, ceramics): \$5.2 billion
- **Stage 4**, fabricated metal product manufacturing (forging, stamping and heat-treating to produce reinforcing bars, fabricated wire, cutlery, tools, hardware): \$12.6 billion



Photo: Shell Albian Sands, Muskeg River Mine, Alberta

The output of these four stages in 2013 totalled \$54 billion. By comparison, according to Statistics Canada, the oil and gas extraction sector contributed \$91.5 billion to the GDP. The Canadian Association of Petroleum Producers indicated that on a barrel-per-day basis, approximately 54% of oil extracted in 2013 was from oil sands, the extractive process for which is essentially a surface mining operation at many sites. Support activities for mining and oil and gas contribute an additional \$11 billion to the GDP.

CANADIAN MINES IN 2013

Total mining establishments: 1,262
Metals: 75
Non-metals: 1,187

PROVINCES WITH THE MOST METAL MINES

Quebec: 24
Ontario: 19
British Columbia: 9

MAIN TYPES OF NON-METAL MINES

Sand and gravel quarries: 793
Stone quarries: 275
Peat mines: 73

MINING IN THE PROVINCES AND TERRITORIES

Mineral production values were down in nine of Canada's 13 provinces and territories. For example, the 2013 value of mineral production in Saskatchewan was \$7.2 billion. Although a decrease of approximately \$1 billion over 2011, this value represents a threefold increase over the last decade, indicating significant growth over time, despite year-over-year fluctuations. Similar growth over the last decade was experienced by Ontario, Saskatchewan, British Columbia, Quebec and Newfoundland and Labrador.

REGIONAL DISTRIBUTION OF MINING

Figure 3 illustrates the geographical location of Canada's mining expertise (details in Annex 1). The Northwest Territories is the country's dominant source of diamonds. Leading in the production of gold are Ontario and Quebec. Saskatchewan produces all of Canada's uranium, and has world-class potash reserves. British Columbia is prominent in metallurgical coal production. Newfoundland and Labrador and Quebec produce virtually all of Canada's iron ore. Several provinces have strong copper and nickel production. (For detailed mineral production by province and territory, see Annex 2 and Annex 3.)

Mining also has significant ties to Canada's major cities. Some of the largest Canadian and international mining companies are headquartered or have significant presence in urban centres such as Vancouver (Goldcorp, Teck), Saskatoon (Cameco, PotashCorp), Toronto (Barrick, Vale, Glencore) and Montreal (ArcelorMittal, Iron Ore Company of Canada, Rio Tinto Alcan).

VALUE OF MINING IN 2013

Canada-wide: \$43.6 billion

TOP 4 PROVINCES

1. Ontario: \$9.8 billion
2. Quebec: \$8.2 billion
3. Saskatchewan: \$7.2 billion
4. British Columbia: \$7.0 billion

Vancouver is the global centre of expertise for mineral exploration. Some 1,200 exploration companies are located in British Columbia, most of which are in the greater Vancouver area.

Toronto is the global centre for mining finance. The Toronto Stock Exchange lists 57% of the world's public mining companies, and the city itself is home to several dozen mining company head offices, and several hundred mining suppliers, consulting firms and service providers.

As home to Rio Tinto Alcan, and to significant mining research and education facilities, Montreal holds considerable global expertise in aluminum smelting.

The global emergence of the oil sands over the past two decades has transformed Edmonton and Calgary into centres of expertise in this area, and Saskatoon has risen to the forefront of the uranium and potash sectors.

REGIONAL VALUE OF MINING

Canadian mineral production decreased in 2013—by 7%—from 2012, marking the second consecutive year as global mineral prices fell.

Over the past decade, Newfoundland and Labrador, Saskatchewan and British Columbia have seen their respective shares of Canada's mineral production value grow most significantly (see Figure 4). For example, the national share of Newfoundland and Labrador, an important nickel and iron ore producer, has also risen nearly fivefold over that time period.

A correlation exists between production values and expenditures on resource development. The top four provinces in terms of production value in 2013—Ontario, Quebec, Saskatchewan and British Columbia—also led in expenditures on mineral resource development (see Figure 5). Of the \$15.3 billion invested in mine complex development in Canada, spending in each of

these provinces ranged from \$2.4 to \$4.7 billion, with Saskatchewan in the lead at \$4.7 billion. This suggests that these four provinces will remain vital to Canada's mineral production well into the future.

The three territories together received 19% of total 2013 Canadian spending on exploration and deposit appraisal (the first two columns of Figure 5). This amount, more than three times the territories' share of production value (6.4%), reflects global interest in Canada's northern mineral potential. Despite such interest, however, overall territorial exploration investment decreased significantly in 2013, by 43% year-over-year. This second consecutive annual decrease reflects market realities, and has implications for junior mining firms and their ability to obtain capital for exploration projects.

TAXES AND OTHER PAYMENTS TO GOVERNMENTS

Each year, Canadian governments receive considerable taxes and royalties as a result of mining activity—specifically the first three stages of activity—extraction, smelting and processing—shown in Figure 2. The payments detailed below and in Figure 6 do not reflect the fourth stage of activity (fabricated metal product manufacturing) because some of its outputs, such as cutlery, fixtures and boilers, fall outside the logical boundaries of the mining industry.

MINING PAYMENTS TO CANADIAN GOVERNMENTS TOTALLED \$71 BILLION OVER THE YEARS SPANNING 2003 TO 2012.

2012 PAYMENTS

In 2012, the mining industry, including oil sands mining, paid an estimated \$6.6 billion to federal and provincial/territorial governments (see Figure 6). This total consisted of:

- \$3.0 billion in royalties
- \$1.2 billion in corporate income tax
- \$2.3 billion in personal income tax

Around 40% of this amount went to the federal government and 60% to provincial/territorial governments.

As noted, these payments do not reflect the fourth stage of mining shown in Figure 2. Including this stage would add another \$1.9 billion to the amount industry paid governments in 2011, bringing the total to \$8.5 billion.

It is also worth noting that the oil sands industry pays the Alberta government large sums, as high as \$2 billion in some years, in the form of land sales payments. These sums are not included in Figure 6.

Finally, these payments do not include the significant revenues that governments receive from mining suppliers. By some estimates, adding these suppliers would multiply payments by as much as 2.5.



Photo: IAMGOLD, Westwood Mine, Quebec

PAYMENT TRENDS

Total mineral sector payments to governments peaked in 2008, reaching \$10.5 billion. This was 2.6 times the level in 2003. In 2009, the situation changed dramatically. As a result of the US financial crisis, and reduced metals, oil and potash prices, revenues to governments plummeted by more than one-half, to \$4.9 billion. Total payments to governments recovered to \$7.5 billion in 2010 and continued to increase to more than \$8.3 billion in 2011. The primary reasons for the increase in 2011 were economic. Buoyed by generally higher metals prices and increased production, the value of non-oil sands mineral production rose about 21% in 2011. Corporate pre-tax profits correspondingly increased about 24%.

This recovery trend was broken in 2012. Overall payments to governments fell by 20.7%, or \$1.7 billion, from \$8.3 billion in 2011 to \$6.6 billion in 2012. Most of the loss in corporate income tax revenue appears to be concentrated in the extractive components of the sector: mining and quarrying and oil sands mining. Royalties and mining taxes were lower by 21%, or \$820 million. About half of the decrease occurred

in Alberta as a result of the growing price discount on bitumen. (See Section 2 of this report for more discussion.)

Another factor affecting payments to governments from oil sands mining has been the increased spending on new and expanded oil sands projects. Company investments generally reduce corporate income taxes and provincial royalties when capital deductions and allowances are claimed. The Canadian Association of Petroleum Producers estimated that overall spending on oil sands mining projects increased by more than 30% in 2012 to a total of almost \$11 billion. While these expenditures will eventually generate additional revenues and additional payments to both levels of governments in future years, they can reduce payments in the near term.

British Columbia, Quebec and Ontario also experienced large percentage reductions in mining and royalty payments.

INDIRECT CONTRIBUTIONS TO MINING INDUSTRY SUPPLIERS

The mining industry's economic impact goes far beyond its direct contribution to GDP. For instance, mining accounts for approximately half of Canada's rail-freight revenues and tonnage annually (details in Section 2). Organizations such as CN Rail, CP Rail, and the Ports of Montreal, Quebec and Vancouver depend on a vibrant mining industry.

Supply relationships like these create mutual synergies. For instance, supplier companies play a crucial role in introducing and spreading innovative technologies and ideas within the mining industry.

InfoMine, a mining database, reported in 2013 that more than 3,400 firms in Canada provide technical, legal, financial, accounting, environmental and other expertise to the mining industry. Most of these suppliers are located in Ontario and British Columbia, followed by Alberta, Quebec, Saskatchewan and Manitoba.

NUMBER OF MINING SUPPLIERS IN LEADING COUNTRIES

United States: 5,504
Canada: 3,464
Brazil: 3,375
Australia: 2,364
Chile: 1,853

Source: InfoMine

From 2009 to 2013, 44% (\$157 billion) of global mining equity was raised by the Toronto Stock Exchange (TSX) and the TSX Venture Exchange—more than any other stock exchange in the world. Several thousand Canadian brokers, analysts, exchange workers, consultants, trade finance experts and securities lawyers both support and benefit from the mining industry. (See Section 3 of this report for a discussion on the Canadian investment services sector as a mining supplier.)

TAX POLICY

The Canadian mining industry supports the federal government's reduction of the federal corporate tax rate to 15%. A recent report from the University of Calgary School of Public Policy suggests that Canada has the lowest corporate tax rates in the G7, thus increasing Canada's global attractiveness as a business destination.

Industry is also pleased with the extension of both the Mineral Exploration Tax Credit and the super-flow-through share provision in the 2014 federal budget. Both measures will positively assist financing and exploration efforts and are key to addressing Canada's declining base metal reserves.

Other recent federal mining tax reforms, however, will make it more costly for companies to develop projects and operate, particularly in remote and northern regions, and might push investment to more competitive jurisdictions. The 2012 and 2013 federal budgets indicate a trend in reduced government tax support to the Canadian mining industry as result of the following measures:

- The elimination of the corporate Mineral Exploration and Development Tax Credit
- The elimination of the Atlantic Investment Tax Credit for resources
- The elimination of the Accelerated Cost of Capital Allowance
- The reduction of the Scientific Research and Experimental Development Tax Incentive Program
- The unintended consequences of the foreign affiliate dumping rules
- The rendering of pre-production expenses ineligible for Canadian Exploration Expenses deductions

On the backdrop of a volatile commodities market, and given the already heightened level of remote and northern exploration and rising development and operational costs, these measures have pushed development further away for some projects.

Knowing that any reduction in mining and mineral-related investment will be associated with a reduction in regional and national social and economic benefits, these tax reforms will arguably make it more difficult for government to achieve certain stated public policy objectives. This is particularly true for Canada's remote and northern regions where operating costs are significantly higher and infrastructure is acutely lacking. Having greater access to tax incentives and other government support would help Canada to unlock the mineral potential in these areas, and would enable the federal government to meet its stated public policy objectives for these regions.



Photo: Agnico Eagle Mines, Meliadine Project, Nunavut

FIGURE 1

CANADA'S REAL GROSS DOMESTIC PRODUCT BY INDUSTRY, 2008-2013

(\$ millions)	2008	2009	2010	2011	2012	2013
All industries	1,480,703	1,436,282	1,483,155	1,523,730	1,551,539	1,582,178
Agriculture	19,954	18,927	18,730	19,241	19,385	21,856
Forestry and logging	3,950	3,124	3,608	3,844	3,773	3,935
Fishing, hunting and trapping	1,087	1,066	1,131	1,060	1,128	1,095
Mining (including milling) and quarrying, and oil and gas extraction	108,856	99,540	103,584	107,867	109,213	113,566
Support activities for mining and oil and gas extraction	11,487	8,361	10,328	12,147	11,062	10,962
Electric power, gas and water utilities	37,064	35,999	36,851	37,813	37,947	39,407
Construction	98,958	95,461	102,771	105,947	111,460	112,322
Manufacturing	176,417	152,580	159,994	165,112	167,677	167,138
Trade, wholesale	79,124	74,028	79,555	83,738	84,987	86,380
Trade, retail	80,415	78,503	81,032	82,744	84,282	86,884
Transportation and warehousing	62,560	59,693	61,990	63,880	65,220	66,047
Information and cultural industries	49,325	49,352	50,351	51,272	52,020	52,524
Finance and insurance	97,211	95,881	98,394	99,761	101,815	105,858
Real estate and rental and leasing	172,849	177,812	183,097	189,776	194,899	200,401
Community, business and personal services	203,592	200,258	200,226	203,783	207,679	211,620
Public administration	99,975	104,216	107,371	109,019	109,111	109,094
Health care and social assistance	99,879	101,990	102,877	104,832	106,751	108,392
Educational services	78,000	79,491	81,265	81,894	83,130	84,697

Source: Statistics Canada.

Note: Values at basic prices in 2007 constant dollars.

In all figures, dollar amounts are expressed in Canadian dollars unless noted otherwise.

FIGURE 2

REAL GROSS DOMESTIC PRODUCT, MINING AND MINERAL MANUFACTURING, 2008-2013

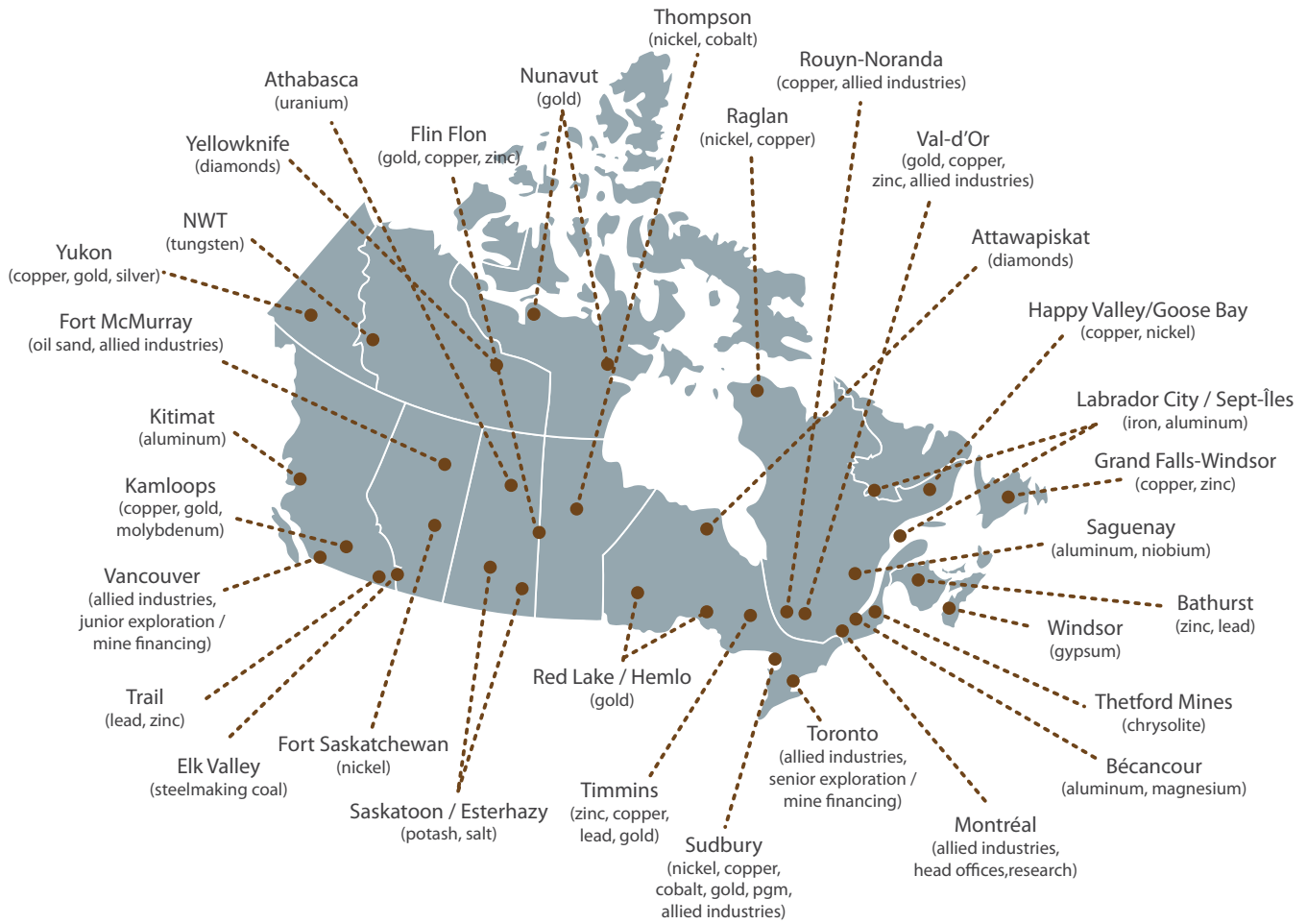
(\$ millions)	2008	2009	2010	2011	2012	2013
Metal mines	16,999	13,187	13,876	15,377	14,925	15,817
Non-metal mines	5,036	3,473	4,477	4,678	4,326	4,490
Coal mines	1,704	1,432	1,627	1,590	1,617	1,716
Total Mining	23,739	18,092	19,980	21,645	20,868	22,023
Primary metal manufacturing	15,096	11,433	13,266	13,741	13,834	14,185
Fabricated metal product manufacturing	13,084	11,182	11,611	12,504	13,106	12,625
Non-metallic mineral product manufacturing	6,206	5,150	5,275	5,442	5,406	5,193
Total Mineral Manufacturing	34,386	27,765	30,152	31,687	32,346	32,003
Oil and gas extraction	85,117	81,448	83,604	86,222	88,345	91,543
Petroleum and coal products manufacturing	6,994	7,410	6,955	6,685	6,845	6,862
Support activities for mining and oil & gas	11,487	8,361	10,328	12,147	11,062	10,962
Total Oil & Gas and Associated Manufacturing	103,598	97,219	100,887	105,054	106,252	109,367

Source: Statistics Canada.

Note: Values at Basic Prices in 2007 Constant Dollars.

FIGURE 3

CANADIAN MINING INDUSTRY CLUSTERS



Source: Natural Resources Canada.

FIGURE 4

VALUE OF CANADIAN MINERAL PRODUCTION BY PROVINCE AND TERRITORY, 2003 AND 2013

Province/Territory	2003			2013 ^P		
	(\$ millions)	(%)	Rank	(\$ millions)	(%)	Rank
Ontario	5,690.4	28.3	1	9,824.2	22.5	1
Quebec	3,563.2	17.7	2	8,223.0	18.9	2
Saskatchewan	2,276.6	11.3	4	7,169.2	16.4	3
British Columbia	2,887.3	14.4	3	6,989.2	16.0	4
Newfoundland and Labrador	845.2	4.2	8	3,996.7	9.2	5
Alberta	1,218.1	6.1	6	2,360.4	5.4	6
Northwest Territories	1,666.7	8.3	5	1,670.8	3.8	7
Manitoba	892.2	4.4	7	1,337.2	3.1	8
New Brunswick	702.5	3.5	9	656.1	1.5	9
Nunavut	34.6	0.2	11	626.8	1.4	10
Yukon	33.6	0.2	12	495.0	1.1	11
Nova Scotia	263.2	1.3	10	248.1	0.6	12
Prince Edward Island	4.0	...	13	3.7	...	13
Total Canada	20,077.6	100.0		43,600.5	100.0	

Sources: Natural Resources Canada; Statistics Canada.

^P Preliminary; ... Amount too small to be expressed.

Note: This table includes the production of coal but excludes the production of petroleum and natural gas. Numbers may not add to totals due to rounding.

FIGURE 5

TOTAL CAPITAL EXPENDITURES FOR MINERAL RESOURCE DEVELOPMENT, BY PROVINCE AND TERRITORY, 2013^P

Province/Territory / (\$)	Exploration	Deposit Appraisal	Mine Complex Development	Total Expenditures
Newfoundland and Labrador	44,810,996	59,150,238	711,437,724	815,398,958
Nova Scotia	7,951,185	4,009,000	10,240,019	22,200,204
New Brunswick	19,708,547	8,652,013	158,119,693	186,480,253
Quebec	192,345,302	135,565,053	2,379,545,614	2,707,455,969
Ontario	308,958,488	291,234,720	1,800,822,431	2,401,015,639
Manitoba	57,199,477	486,500	338,833,422	396,519,399
Saskatchewan	147,767,254	63,723,806	4,453,730,509	4,665,221,569
Alberta	6,582,652	13,636,893	182,930,565	203,150,110
British Columbia	163,847,731	336,226,239	1,947,031,573	2,447,105,543
Yukon	67,189,591	22,710,845	89,923,476	179,823,912
Northwest Territories	30,067,663	59,919,136	318,444,631	408,431,430
Nunavut	158,999,237	111,222,163	586,573,062	856,794,462
CANADA	1,205,428,123	1,106,536,606	12,977,632,719	15,289,597,448

Source: Natural Resources Canada, based on the Federal-Provincial-Territorial Survey of Mineral Exploration, Deposit Appraisal and Mine Complex Development Expenditures.

^P Preliminary.

Note: Includes on-mine-site and off-mine-site activities. Includes field work, overhead costs, engineering, economic, pre-feasibility, feasibility, and environmental studies, and land access costs. Expenditures for mine complex development include machinery and equipment and non-residential construction.

FIGURE 6

DIRECT REVENUES TO CANADIAN GOVERNMENTS FROM THE MINERAL SECTOR, 2003–2012

Revenues (\$ millions)	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Total
Royalties/Mining Taxes	586	1,336	1,576	2,640	3,967	5,279	2,187	3,176	3,880	3,060	27,687
Corporate Income Tax	1,773	1,943	2,393	4,005	4,213	3,204	1,083	2,408	2,437	1,244	24,702
Personal Income Tax	1,732	1,732	1,731	1,784	1,970	2,047	1,687	1,861	1,987	2,277	18,808
TOTAL	4,090	5,011	5,700	8,429	10,150	10,529	4,957	7,445	8,304	6,581	71,197
-of which federal	2,609	2,760	2,799	3,707	4,005	3,547	1,905	2,963	3,045	2,471	29,811
-of which provincial	1,481	2,251	2,901	4,722	6,145	6,982	3,052	4,482	5,259	4,110	41,385
Provincial share (%)	36.2	44.9	50.9	56.0	60.5	66.3	61.6	60.2	63.3	62.5	58.1

Source: ENTRANS Policy Research Group study for the Mining Association of Canada.

Note: Most royalty estimates are provided on a fiscal year basis, while the estimates for corporate and personal income taxes are for calendar (taxation) years. The federal share includes federal corporate income and capital taxes, federal personal income taxes paid by mining employees and mining royalties generated in the Northwest Territories and Nunavut. The provincial share includes all royalties and mining taxes to provinces and to the Yukon, provincial corporate income and provincial personal income taxes paid by mining employees.

THE ACTIVITIES PRODUCTION, PROCESSING AND TRANSPORTATION

CANADA'S STRENGTH IN MINING RESTS ON THE ABILITY TO PRODUCE AND PROCESS MINERALS COMPETITIVELY AND TO TRANSPORT PRODUCTS EFFICIENTLY TO DOMESTIC AND INTERNATIONAL MARKETS. THESE PRODUCTION, PROCESSING AND TRANSPORTATION ACTIVITIES FORM THE BASE THAT ALLOWS THE INDUSTRY TO STAY GLOBALLY COMPETITIVE AND EXPAND ITS CANADIAN INVESTMENTS.

PRODUCTION OF KEY MINERALS

Richly endowed with natural resources, Canada ranks among the top five countries in the global production of 11 major minerals and metals (details in Annex 4):

- First in potash
- Second in uranium and cobalt
- Third in aluminum and tungsten
- Fourth in platinum group metals, sulphur and titanium
- Fifth in nickel and diamonds

Canada no longer holds a top five position in the production of gold, silver, zinc, copper, molybdenum, or cadmium, having been surpassed by other countries, including Australia, Russia, the United States, China, Mexico and Peru. However, for these and other major minerals and metals, Canada still remains in the top 10 countries in global production.

PRODUCTION VALUES

In 2013, the value of Canadian mineral production retreated for the second consecutive year, down from its record high of \$50.9 billion in 2011, and decreasing by 5% to \$43.6 billion year-over-year (see Figure 7). Metal, non-metal and coal production values all dropped by 1.7%, 4.2% and 22%, respectively. At \$23.2 billion and \$15.8 billion for metal and non-metal production, respectively, the 2013 totals mark a two-fold increase over the past decade.

Canada's top 10 minerals and metals (see Figure 8) each had production values of more than \$1.4 billion in 2013, with five (potash, coal, gold, iron ore and copper) over \$4 billion. Values for all 10 commodities fell year-over-year, with potash, copper, coal, nickel and diamonds falling for the third consecutive year. This trend suggests a recent drop in demand for both industrial and non-industrial mineral products, or a global supply glut for certain commodities that is pushing prices down, or some combination of the two (details in Annex 5). Together, the top 10 minerals and metals represent \$37 billion—a \$2 billion dollar decrease year-over-year—and 85% of Canada's total mineral production value in 2013.

The following paragraphs discuss market developments surrounding a few key minerals.

CANADIAN MINERAL PRODUCTION IN 2013

Metals: \$23.2 billion
Non-metals: \$15.8 billion
Coal: \$4.6 billion
TOTAL: \$46.9 billion

URANIUM

In September 2014, Japan's Nuclear Regulation Authority (NRA) gave the go-ahead for two reactors at the Sendai plant in southern Japan to resume operation. These

reactors—along with the majority of Japan's other 46 nuclear reactors—have been idle since the 2011 earthquake and tsunami. This catastrophic event damaged the Fukushima Daiichi nuclear plant and resulted in a meltdown. The extent to which the NRA's decision signals a softening in Japanese anti-nuclear sentiment remains uncertain. However, the NRA's green light to the Sendai plant indicates the country is taking steps to resume nuclear power generation.

Kyushu, the operator of the two Sendai reactors, is required to gain the consent of local communities before the restart can begin. This consultation process, likely to be required for the future restarts of all other Japanese reactors, will provide a better picture of how willing the Japanese are to re-embrace nuclear power generation.

Following the Fukushima incident, global sentiment about nuclear energy shifted, with several countries indicating their intentions to phase out nuclear power generation. Despite these policy shifts in some countries, others continue to pursue the expansion of their nuclear power generating capacity.

As of August 2014, 29 countries were safely operating 435 nuclear power reactors, while 14 countries were constructing an additional 72 new nuclear plants, of which 29 are in China and 10 are in Russia. Some analysts have suggested that 260 new reactors could be built worldwide by 2030. This trend is reinforced by concern over air pollution, the carbon friendly nature of nuclear power, and concerns over energy security.

The New Policies Scenario, in the OECD's World Energy Outlook 2013, forecasts a 66% increase in global nuclear power generation contribution from 2011 to 2035, with the nuclear share of global electricity supply holding steady at 12%. This indicates that nuclear energy is forecast to grow consistently with overall demand for electricity. The largest gross capacity additions are in China, where the country is forecast to add 114 GWe (gigawatt electrical) during the projection period. This increase represents 38% of global new nuclear capacity and signals a steadily growing demand for uranium in the years to come.

Canada, notably Saskatchewan, is a major player in the world uranium industry. Cameco's McArthur River mine in northern Saskatchewan is the world's largest and highest-grade uranium deposit, with an average ore grade of 21% and annual production of around 8,200 tonnes of uranium oxide. A positive outlook in world uranium demand bodes well for Canada's prominence in this mining sector. Recent bi-lateral trade agreements, including the Canada-India Nuclear Cooperation Agreement, and the Canada-European

Union Comprehensive Economic and Trade Agreement (CETA) will open new markets in Canada and abroad for uranium miners. CETA, if ratified, would see the elimination of trade regulations on European companies that restrict foreign ownership in any Canadian uranium project from exceeding 49%. (See Section 6 of this report for more discussion.)

OIL SANDS

The development of the western Canadian oil sands is one of the world's biggest economic stories in recent decades. Technological advances, combined with elevated crude oil prices, made the oil sands economically viable to develop, boosting production from 100,000 barrels a day in 1980 to over 1.9 million barrels a day in 2013.

Canada has the third-largest oil reserves in the world, and 97% (168 billion barrels) of Canada's reserves (173 billion barrels) are in the oil sands. The majority (81%) of world oil reserves are owned or controlled by national governments.

OIL SANDS PROJECTIONS

- Alberta's deposits are believed to contain two trillion barrels of bitumen—up to four times more than the conventional oil reserves in Saudi Arabia. With current technologies, that would yield 315 billion barrels of synthetic crude.
- Alberta ranks third, after Venezuela and Saudi Arabia, in terms of proven global crude oil reserves.
- Twenty percent of oil sands reserves are close enough to the surface to be mined (above 70 metres or 200 feet).
- Oil sands investment will generate \$2.1 trillion in economic activity across Canada over the next 25 years (2010 to 2035).
- Alberta's oil sands production is projected to increase from some 1.9 million barrels a day in 2012 to 4.8 million barrels a day in 2030.
- New oil sands investment is expected to grow employment from 75,000 jobs in 2010 to 905,000 in 2035.
- For each oil sands-related job created in Alberta, approximately one indirect job and one induced job will be created in the rest of Canada.

Only 20% of total world oil reserves are accessible for private sector investment, 56% of which are found in Canada's oil sands. Given this ratio, foreign direct investment in this sector has been increasing and foreign interest is anticipated to continue in the coming years.

According to a recent IHS report, jobs from the oil sands are expected to grow by 58% from 2014 through 2025, representing a total of 753,000 jobs. The contribution of the oil sands to the Canadian GDP is expected to nearly double to \$171 billion in 2025, and is comparable to adding an economy the size of Saskatchewan's to Canada. This represents an increase of more than 100% in government revenues from the total effect of oil sands investment in Canada: from \$28 billion in 2012 to \$61 billion in 2025.

Synthetic crude oil accounted for nearly 27% of Canada's crude oil production volume (32% by value) in 2013, up from 10% a decade earlier (see Figure 9). The absolute value of this increase is considerable: from \$6.7 billion in 2003 to \$32.5 billion in 2013. Currently, all of this crude oil production is in Alberta, though reserves in Saskatchewan have attracted interest in recent years with the issue of special exploratory permits for provincial Crown land.

POTASH

Potash plays a central role in helping feed the world's growing population, as approximately 95% of world potash production is used as fertilizer. According to the Food and Agriculture Organization of the United Nations, agricultural production needs to increase by 60% by 2050 to meet the rising demand for food. This rising food demand is linked to projections of global population reaching 9.6 billion by 2050, according to a recent UN study. These trends indicate that fertilizer made from potash will play an even greater role in increasing crop yields to meet this demand.

Since Russia's Uralkali quit the Belarusian Potash partnership in July 2013, uncertainty in the global trade of potash has increased, causing speculation about what market impacts may result. Recent reports suggest that Uralkali, the world's biggest potash producer, will continue prioritizing volumes over price. Uralkali CEO, Dmitry Osipov, is reported to see "no urgent need" to re-enter the trading partnership with rival Belaruskali, the breaking of which led to an over-supplied market that pushed prices down. At the time of writing, year-over-year monthly average prices had dropped over \$100 per tonne, from \$393 per tonne to \$287 per tonne for the month of August 2014.

With 10 world-class potash mines in production, Saskatchewan is the world's second largest producer and exporter of the product. Saskatchewan's position as a world

leader will likely be reinforced by the emergence of BHP Billiton as a major player in the province, which is moving into the second of a three-year commitment to invest US\$2.6 billion to develop the Jansen Potash Project. Analysts estimate that after \$3.8 billion is spent by the end of 2016, another \$10 to \$11 billion will be required for construction. Robust mining investments such as this contribute significantly to the local, provincial and national economies.

PROCESSING OF MINERALS

Canada has a large mineral-processing industry, with 30 non-ferrous metal smelters, refineries and conversion facilities in six provinces (see Figure 10). Some of these facilities contain both a smelter and a refinery.

CANADA'S MINERAL-PROCESSING FACILITIES

- **New Brunswick:** 1 smelter
- **Quebec:** 10 smelters, 3 refineries, 1 refinery/secondary smelter
- **Ontario:** 2 secondary smelters, 3 refineries, 2 smelter/refineries, 1 smelter/processor, 1 conversion facility
- **Manitoba:** 1 smelter/refinery
- **Alberta:** 1 refinery
- **British Columbia:** 1 smelter, 1 secondary smelter, 1 smelter/refinery, 1 processing plant

Canada's integrated smelters and refineries were built in proximity to world-class mines, located inland, without access to low-cost marine transport. As local ore reserves increasingly become depleted (discussed in Section 3) and the production of base metal concentrate declines, smelters and refineries are transitioning from integrated production to the more expensive custom treatment of concentrates imported from other countries. Additionally, they are also using more secondary raw materials and scrap feed.

The quantity and value of refined metal production in Canada have become irregular due to the depletion of reserves and greater dependence on imported concentrates. Figure 11 shows the production volumes for refined metals over the past 10 years: lead has held steady; aluminum has increased; and copper, nickel, cobalt, cadmium and zinc have decreased.

The competitiveness of Canada's mineral-processing industry depends largely on the ability to secure reliable sources of feedstock from domestic mines—a supply that, in recent years, has gone into decline. Importing feedstock from abroad greatly influences the cost and profitability of domestic refining and smelting operations. If the industry is to remain competitive, enhancing domestic levels of mineral production through requisite investment in exploration is essential.

Other factors influence the competitiveness of Canada's mineral-processing industry. Canada's processing facilities operate in a global arena, where China and other countries are expanding their capacity and competing fiercely for raw materials. The cost of electricity is also a factor in some Canadian jurisdictions. Given the energy-intensive nature of these value-added processes, high-cost power jurisdictions dampen the competitiveness of existing operations and can deter future investment. Finally, the age of some Canadian operations, and their ability to meet potential regulatory requirements, also affects viability. In the face of these combined factors, the downstream Canadian mining industry risks being left behind unless strategic actions are taken to ensure its longevity.

TRANSPORTATION OF MINING PRODUCTS

Canada's logistics supply chain is critical to the flow of mined and refined products to both domestic and international markets. The mining industry is the largest industrial customer group of Canada's transportation sector, providing it with considerable tonnage, especially in select bulk commodities such as iron ore, coal, potash and sulphur.

The fallout of the Lac-Mégantic disaster has been a watershed in rail management and regulation. The response to the derailment has resulted in additional restrictions on the transportation of dangerous goods, which affect both railways and shippers. Additionally, Transport Canada, the Canadian Transportation Agency and the House of Commons Standing Committee on Transportation, Infrastructure and Communities have undertaken policy, regulatory and legislative reviews and consultations on the adequacy of Canada's third-party liability and dangerous goods regimes.

The mining industry recognizes that it has a role to play in ensuring the accurate classification and stewardship of its products. The industry and MAC members, notably through commitments made in the Towards Sustainable Mining initiative, invest considerably in emergency response, crisis management and material stewardship.

The industry has responsibilities beyond classification, however. Mining companies are responsible for ensuring mineral products are securely loaded on rail cars while the cars are in their custody. This requires companies to undertake appropriate loading procedures to ensure the cargoes are safe for transit when a railway takes over the care, custody and control of the cars for transport.

TOP COMMODITIES CARRIED BY CANADIAN RAIL IN 2013 (BY VOLUME)

1. **Minerals and metals: 46%**
2. **Grain: 11%**
3. **Forest products: 10%**
4. **Chemicals: 6%**

Source: Transport Canada, Transportation in Canada: An Overview (2013).

The Canadian mining industry prides itself on its safety culture, and has participated in the reviews and consultations mentioned above. While consultations remain ongoing at the time of writing, MAC has advocated for a fact-based and historical analysis to ensure that any reforms undertaken are proportional to risk.

RAIL

As the largest shipper by both freight revenue and volume shipped, the mining industry is the Canadian rail system's most significant customer. In 2013, shipments of coal, iron ore and other minerals and metals represented 52% of total Canadian rail freight revenue (see Figure 12). In terms of volume, the mining industry accounted for 46% of total tonnage moved in 2013, which is the largest single volume share of all industries that ship by rail.

Canada's rail freight system operates primarily as a dual monopoly, shared by CN and CP—Canada's only Class I railways. Communities and businesses are often served by only one of these companies, which gives rail customers little competitive choice. Mining operations are frequently captive to only one railway given the remoteness of their locations.

In 2008, the *Canada Transportation Act* was amended to better protect shippers from potential abuse of market power by railways. The changes, supported by MAC and the Canadian mining industry, improved the balance between rail customers' interests (lower rates, better service) with those of rail companies (higher rates, more profit)

by strengthening the ability to arbitrate disputes over rail fees and ancillary charges. While these measures were an improvement, challenges persisted in the relationship between railways and rail customers.

As a follow-up to these legislative changes, the federal government reviewed rail service by CN and CP in 2010, aiming to identify service problems, examine best practices, and recommend remedies to improve service. Despite the Rail Freight Service Review panel's recommendations, the federal government's commitment to table legislation to enact a shipper's right to a service-level agreement fell short, as specific service provisions were not legislated in Bill C-52, the *Fair Rail Freight Service Act*.

The inadequacy of Bill C-52—which passed into law in June 2013—resulted in continued rail service failures later in 2013 and into 2014. These service failures, experienced across all rail-shipping sectors, resulted in Bill C-30, the *Fair Rail for Grain Farmers Act*, which enacted narrow grain-sector-specific legislative measures without any consultation. While miners remain sympathetic to the plight of the grain industry, this fragmented approach to addressing a systemic issue could further exacerbate long-standing service issues. As the largest single-customer group of Canada's Class I railways, and accounting for over 20% of Canada's export value, miners require a reliable logistics supply chain to compete internationally.

One of the challenges of the preferential measures enacted in Bill C-30 is that volume commitments to one sector result in an allocation of rail capacity at the expense of all other sectors—a “robbing-Peter-to-pay-Paul” scenario that does not address the systemic nature of rail service challenges experienced by all shipping sectors.

A large obstacle for rail customers and public policy makers is the inability to adequately assess the nature of rail service and capacity challenges due to a lack of transparency and availability of railway performance data. Collecting and publishing railway data, as permitted under sections 50 and 51 of the *Canada Transportation Act* is already done to some degree for the agriculture sector. Making this information available to all parties would not only enhance transparency in the transportation system, but would also improve relations between shippers and transportation service providers, avoid unnecessary and costly disputes, and provide government with the tools necessary to identify, assess, and resolve existing challenges.

In response to the rail service failures that occurred over 2013 and 2014, the government launched the 2015 statutory review of the *Canada Transportation Act* earlier

than required in June 2015. This gives MAC another opportunity to engage on this important issue. While the rail component of the mandate focused on the shipment of grain by rail, MAC will engage in the review and communicate the real need for a rebalancing of the commercial relationship between shippers and railways.



Photo: Rio Tinto/Iron Ore Company of Canada, Labrador City, Newfoundland and Labrador

TRUCKING

Trucking plays a smaller yet important role in moving mining products. This, for the most part, has to do with the sheer volume of mined materials needing shipment, the remote location of many mining operations, and the factors that determine the economic viability of freight shipment by rail versus truck.

According to the federal government's report, *Transportation in Canada* (2013), trucks carried \$162 billion in Canadian exports in 2013, 11% of which (\$17.1 billion) were mining-related products. Trucks carried \$250 billion in imports to Canada, 8% of which (\$21 billion) were mining-related products.

Another key role trucking plays in the mining industry is the delivery of mining supply inputs to mine sites, such as fuel for operations. Mining sites that do not have access to rail rely on truck and ship for these materials.

Note: There is no detailed information about domestic truck shipments by commodity.

MARINE

Mining is also a leading customer of Canadian ports. In 2013, the Port of Montreal handled large volumes of iron ore

and salt, among other mineral products, such as fertilizer, gypsum and scrap metal. Total mined products accounted for 3.2 million tonnes, or 48%, of the port's dry bulk cargo shipments for the year. Generally, these arrive by ship as inbound cargo and are then transported by rail or truck to the region's smelting and refining facilities.

Beyond Montreal, the mining industry is a major contributor to Canada's St. Lawrence Seaway. According to the 2013 *Traffic Report*, prepared jointly by the Seaway's management and development corporations, shipments of iron ore, coke and coal represented 42.8% of total seaway traffic in 2013, with total mining products accounting for nearly 54% of total volume.

Coal accounted for 41% of the total volume handled at the Port of Vancouver in 2013, which moves shipments to China, Japan and other Asian markets. Fertilizer/potash represents another 10% of the port's volume, and minerals and ores another 9%. All told, mining products account for 57 million metric tonnes, or nearly 62%, of the port's volume.

Mining also accounts for a sizeable amount of the value of Canadian exports moved by ship to international markets. According to *Transportation in Canada (2011)*, Canada transported \$60.5 billion in industrial exports by ship to non-US countries in 2010. Of that, non-ferrous products and alloys (\$7.3 billion), coal (\$5.7 billion), iron ore (\$2.7 billion), non-ferrous metals (\$2.1 billion) and potash (\$2 billion) were the most valuable mining products.

Internationally, the International Maritime Organization (IMO) regulates conventions that govern pollution and safety practices at sea. Recent changes to the IMO's MARPOL Convention and the International Maritime Solid Bulk Cargoes Code will have implications for the way mining companies ship their products.

PIPELINE

The North American energy landscape is changing rapidly. Historically, Canadian oil companies have shipped the majority of their product to the United States, which was reliant on imports to meet oil demand.

Using hydraulic fracturing to produce oil and gas from shale and tight rock formations is transforming the United States from a net energy importer to a self-sufficient energy producer, with a rapidly declining import burden. Meanwhile, growth in global oil demand has shifted to Asia, with China surpassing the United States as the world's largest oil importer.

This shift in demand presents a challenge for Canadian oil companies, as existing oil transportation infrastructure does not offer opportunities to access global markets.

There are costs associated with the inadequacy of Canada's existing pipeline network to meet the global demand shift to Asia. Declining US demand together with insufficient pipeline capacity and transportation bottlenecks in the US Midwest are driving down the price for Canadian crude oils relative to other crude oils. A 2013 Canada West Foundation report estimates that this crude oil "discount" is costing the Canadian economy between \$30 and \$70 million a day in foregone economic activity.

To address this situation, Canada must develop new pipeline and port infrastructure to reach markets in Asia, the US Gulf Coast, eastern Canada, and the US seaboard markets.



Photo: ArcelorMittal Mines Canada, Port-Cartier Industrial Complex, Quebec

FIGURE 7

VALUE OF CANADIAN MINERAL PRODUCTION, 1999-2013^P

(\$ billions)	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013 ^P
Metals	9.7	11.0	10.4	10.4	9.7	12.4	14.6	21.1	26.2	22.6	15.5	21.4	25.6	23.6	23.2
Non-metals	7.3	7.4	7.6	7.9	8.9	10.3	10.5	10.3	11.6	19.4	11.6	14.7	17.8	16.5	15.8
Coal	1.5	1.4	1.6	1.6	1.5	1.6	2.9	2.9	2.7	5.0	4.4	5.5	7.5	5.9	4.6
Total Mineral Production	18.5	19.8	19.6	19.9	20.1	24.4	28.0	34.2	40.6	47.0	31.4	41.6	50.9	45.9	43.6

Sources: Natural Resources Canada; Statistics Canada.

^P Preliminary.

Note: This table includes the production of coal but excludes the production of petroleum and natural gas. Numbers may not add to totals due to rounding.

FIGURE 8

CANADA'S TOP TEN METALLIC AND NON-METALLIC MINERAL PRODUCTS BY VALUE OF MINERAL PRODUCTION, 2003 AND 2013^P

Unit of Measure	2003		2013 ^P		
	Quantity (millions)	\$ Value (millions)	Quantity (millions)	\$ Value (millions)	
Potash (K ₂ O) ¹	t	9.2	1,609	10.1	6,103
Coal	t	62.1	1,493	68.3	4,636
Gold	g	140.9	2,307	124.1	5,899
Iron ore	t	33.3	1,281	42.8	5,334
Copper	kg	541.1	1,300	613.5	4,630
Nickel	kg	155.5	2,136	214.7	3,357
Diamonds	ct	10.8	1,588	10.6	1,964
Cement ²	t	14.2	1,497	11.8	1,556
Sand and Gravel	t	244.5	1,123	228.0	1,748
Stone	t	124.5	1,024	152.5	1,467

Sources: Natural Resources Canada; Statistics Canada.

^P Preliminary.

¹Shipments of potash to Canadian potassium sulphate plants are not included in this table.

²Includes exported clinker minus imported clinker. Data include shipments by producers regardless of their industrial classification.

FIGURE 9

PRODUCTION OF SYNTHETIC CRUDE OIL BY OIL SANDS MINING PLANTS, ALBERTA AND CANADA, BY QUANTITY AND VALUE, 1998-2013

	Synthetic Crude Oil (000's of m ³)	Total Crude Oil and Equivalents (000's of m ³)	Synthetic Crude as % of Total	Synthetic Crude Oil (\$000)	Total Crude Oil and Equivalents (\$000)	Synthetic Crude as % of Total
ALBERTA						
1998	17,870.8	94,676.2	18.9	2,313,518	9,734,475	23.8
1999	18,766.9	89,065.5	21.1	3,252,547	13,727,829	23.7
2000	18,608.0	89,136.1	20.9	5,188,916	21,687,681	23.9
2001	20,260.6	89,364.5	22.7	4,995,003	17,734,825	28.2
2002	25,494.6	89,885.1	28.4	6,455,743	19,778,759	32.6
2003	25,028.8	95,311.4	26.3	6,777,342	22,187,602	30.5
2004	26,661.9	101,007.0	26.4	8,570,468	27,767,704	30.9
2005	21,932.5	98,878.7	22.2	9,213,624	33,282,754	27.7
2006	28,764.2	106,017.8	27.1	14,831,145	38,498,843	38.5
2007	39,900.2	108,853.3	36.7	18,012,945	42,130,415	42.8
2008	38,020.7	108,322.4	35.1	25,214,415	62,941,690	40.1
2009	44,330.8	112,937.7	39.3	19,043,537	43,934,049	43.3
2010	45,917.6	122,081.0	37.6	23,375,070	55,028,049	42.5
2011	50,042.4	130,045.0	38.5	30,930,600	69,572,385	44.5
2012	52,455.2	143,873.9	36.5	28,588,084	69,346,737	41.2
2013	54,328.1	152,873.2	35.5	34,382,129	78,942,076	43.6
CANADA						
1998	17,870.8	128,400.3	13.9	2,313,518	12,940,149	17.9
1999	18,766.9	122,287.0	15.3	3,252,547	18,698,282	17.4
2000	18,608.0	127,769.2	14.6	5,188,916	30,523,595	17.0
2001	20,260.7	128,951.0	15.7	4,995,003	24,911,953	20.1
2002	25,494.6	136,969.8	18.6	6,455,743	29,956,080	21.6
2003	25,028.8	144,813.2	17.3	6,777,342	33,610,498	20.2
2004	26,661.9	149,159.6	17.9	8,570,468	40,639,940	21.1
2005	21,932.5	146,207.9	15.0	9,213,624	49,159,801	18.7
2006	28,764.2	161,434.0	17.8	14,831,145	63,649,683	23.3
2007	39,900.2	160,448.3	24.9	18,012,945	62,919,592	28.6
2008	38,020.7	158,950.4	23.9	25,214,415	91,757,005	27.5
2009	44,330.8	158,100.4	28.0	19,043,537	61,558,676	30.9
2010	45,917.6	167,774.9	27.4	23,375,070	76,165,360	30.7
2011	50,042.4	175,701.8	28.5	30,930,600	95,686,517	32.3
2012	52,455.2	189,129.9	27.7	28,588,084	94,074,453	30.4
2013	54,328.1	200,877.4	27.0	34,382,129	105,938,612	32.5

Source: Statistics Canada.

FIGURE 10

NON-FERROUS SMELTERS AND REFINERIES IN CANADA, 2013

Owner	Operation	Type of facility	Location	Outputs
New Brunswick				
Glencore plc	Brunswick	(Sm.)	Belledune	Pb, Ag, Bi
Quebec				
Rio Tinto Alcan Inc./Aluminium Austria Metall Québec/Hydro Aluminum a.s./Société générale de financement du Québec/Marubeni Québec Inc. (Alouette)	Alouette	(Sm.)	Sept-Îles	Al
Alcoa Inc.	Baie-Comeau	(Sm.)	Baie-Comeau	Al
Rio Tinto Alcan Inc.	Grande-Baie	(Sm.)	Grande-Baie	Al
Rio Tinto Alcan Inc.	Laterrière	(Sm.)	Laterrière	Al
Rio Tinto Alcan Inc.	Vaudreuil Works	(Ref.)	Jonquière	Alumina
Rio Tinto Alcan Inc.	Arvida	(Sm.)	Arvida	Al
Rio Tinto Alcan Inc.	Alma	(Sm.)	Alma	Al
Alcoa Inc.	Deschambault	(Sm.)	Deschambault	Al
Alcoa Inc./Rio Tinto Alcan Inc.	Bécancour	(Sm.)	Bécancour	Al
Glencore plc	CCR	(Ref.)	Montréal-Est	Cu, Au, Ag, Se, Te, Ni, PGM
Newalta Income Fund	Sainte-Catherine	(Ref.), (Sec. Sm.)	Sainte-Catherine	Recycled Pb
Glencore plc	General Smelting Company of Canada	(Sec. Sm.)	Lachine	Recycled Pb
Glencore plc/Noranda Income Fund	Canadian Electrolytic Zinc Limited (CEZinc)	(Ref.)	Valleyfield	Zn, Cd, S*
Glencore plc	Horne	(Sm.)	Noranda	Cu, Au, Ag
Ontario				
Royal Canadian Mint	Ottawa	(Ref.)	Ottawa	Au, Ag, Cu, PGM
Cameco Corporation	Port Hope	(Con. Fac.)	Port Hope	U
Vale SA	Port Colborne	(Ref.)	Port Colborne	Electrolytic Co, PGM, Co oxide
Tonolli Canada Ltd.	Mississauga	(Sec. Sm.)	Mississauga	Recycled Pb
Aleris International, Inc.	Mississauga	(Sec. Sm.)	Mississauga	Recycled Zn
Johnson Matthey Limited	Brampton	(Sm.), (Ref.)	Brampton	Au, Ag, Recycled Pb
Glencore plc	Sudbury	(Sm.), (Pl.)	Sudbury	Ni, Cu, Co, Au, Ag, PGM
Vale SA	Copper Cliff complex	(Sm.), (Ref.), (Pl.)	Sudbury	Ni, Cu, Au, Ag, Se, Te, PGM, S*
Cameco Corporation	Blind River	(Ref.)	Blind River	U

FIGURE 10
NON-FERROUS SMELTERS AND REFINERIES IN CANADA, 2013

Owner	Operation	Type of facility	Location	Outputs
Manitoba				
Vale SA	Manitoba	(Sm.), (Ref.)	Thompson	Ni, Cu, Co
Alberta				
Sherritt International Corporation/General Nickel Company S.A. (The Cobalt Refinery Company Inc.)	The Cobalt Refinery Company Inc.	(Ref.)	Fort Saskatchewan	Ni, Co, Cu sulphide, ammonium sulphate
British Columbia				
Teck Resources Limited	Trail	(Sm.), (Ref.), (Pl.)	Trail	Zn, Pb, Bi, Cd, In, Ge, Au, Ag, S*
Metalex Products Ltd.	Richmond	(Sec. Sm.)	Burnaby	Recycled Pb
Thompson Creek Mining Limited/Sojitz Moly Resources Inc. (Endako)	Endako	(Pl.)	Fraser Lake	Mo trioxide
Rio Tinto Alcan Inc.	Kitimat	(Sm.)	Kitimat	Al

Source: Natural Resources Canada.

Note: Included are operations that produced in 2013.

(Sm.) Smelter

(Ref.) Refinery

(Sec. Sm.) Secondary smelter

(Pl.) Plant

(Con. Fac) Conversion facility

S* Sulphuric acid

FIGURE 11

CANADIAN PRODUCTION OF SELECTED REFINED METALS, 2004-2013^P

Metals	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013 ^P
Aluminum	2,592,160	2,894,204	3,051,128	3,082,625	3,120,148	3,030,269	2,963,210	2,987,964	2,780,556	2,967,364
Cadmium	1,880	1,727	2,090	1,388	1,409	1,299	1,357	1,240	1,286	1,313
Cobalt	4,673	4,618	4,555	4,883	4,899	4,358	4,145	5,317	5,322	4,068
Copper	526,955	515,223	500,463	453,453	442,050	335,896	319,618	273,761	275,990	321,511
Lead	241,169	230,237	250,464	236,688	259,094	258,854	273,017	282,589	279,150	284,351
Nickel	151,518	139,683	146,899	153,647	167,732	116,909	105,413	142,445	139,800	136,991
Zinc	805,438	724,035	824,464	802,103	764,310	685,504	693,014	662,151	648,614	651,634

Sources: Natural Resources Canada; Statistics Canada.

^P Preliminary.

FIGURE 12

CRUDE MINERALS AND PROCESSED MINERAL PRODUCTS TRANSPORTED BY CANADIAN RAILWAYS, 2002-2013

(million tonnes)	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Total Freight Volume ¹	238.7	235.1	251.2	260.7	258.7	255.7	244.4	212.9	235.4	250.8	253.5	268.0
Total Crude Minerals	108.0	107.1	106.9	112.8	108.0	112.0	111.9	85.0	107.6	109.8	103.4	112.0
Total Processed Mineral Products	24.8	23.3	27.2	27.3	27.9	27.7	27.6	21.7	24.6	26.5	27.3	28.3
Total Crude and Processed Minerals	132.8	130.3	134.0	140.0	135.9	139.8	139.4	106.7	132.3	136.4	130.7	140.3
(%)												
Crude Minerals and Processed Mineral Products as a Percentage of Revenue Freight	55.6	55.4	53.4	53.7	52.5	54.7	57.1	50.1	56.2	54.4	51.6	52.4

Source: Statistics Canada.

¹ Total freight volume reflects revenue freight, which refers to a local or interline shipment from which earnings accrue to a carrier. Total crude minerals include coal, but not oil and gas. Totals may not add due to rounding.

THE MONEY

RESERVES, PRICES, FINANCING, EXPLORATION AND INVESTMENT

THE FIVE MAIN MONETARY ASPECTS OF THE CANADIAN MINING INDUSTRY—RESERVES, PRICES, FINANCING, EXPLORATION AND CAPITAL INVESTMENT—ARE BY NATURE INTERRELATED. GLOBAL PRICES INFLUENCE COMPANY CONFIDENCE AND, THEREFORE, EXPLORATION AND CAPITAL INVESTMENT. COMPANIES NEED SUITABLE FINANCING TO BACK THEIR EXPLORATION AND INVESTMENT PROGRAMS. GOVERNMENT INVESTMENTS IN GEOLOGICAL MAPPING ARE CLOSELY LINKED TO MINERAL EXPLORATION AND, THEREFORE, TO RESERVE LEVELS.

CANADIAN RESERVES

The past 30 years have seen a marked decline in proven and probable Canadian mineral reserves in all major base metals (see Figure 13 and Annex 6). Since 1980, the most dramatic decline has been in lead (97%), zinc (83%) and silver (79%) reserves, while copper (37%) and nickel (65%) reserves have fallen significantly as well.

While the long-term trend marks a significant decline for many commodities, recent years have shown positive growth for certain commodities. Since 2009, gold, silver, zinc and copper reserves have increased, with copper levels not seen since the early 1990s and gold at record levels.

The recent recovery in proven and probable gold, silver, zinc and copper reserves correlates to an increase in buoyant metal prices for certain commodities in recent years, and the corresponding increases in targeted exploration for these metals. While improvement in reserve levels of certain metals is a welcome change, it is unlikely that this is the beginning of a longer-term trend that will broaden to include a greater variety of metals and minerals. Recent commodity price fluctuations, and the corresponding difficulties junior miners are facing in raising capital, indicate continued concern over the depletion of proven and probable reserves for the majority of Canada's deposits will remain.

Consistent investment over time is needed to reverse the long-term decline in proven and probable reserves for a variety of key metals. To ensure the Canadian mining industry maintains its competitive advantage in this crucial area, the federal government should continue to invest in geosciences and strengthen policies that provide incentives for exploration spending.

MINERAL AND METAL PRICES

Mineral and metal prices are affected daily by global economic events. Prices for mined products are driven largely by the strength and performance of major economies. China, in particular, buys approximately 45% of the world's base metals, up from just 5% in the 1980s. As well, as a means of controlling exports of key commodities, China stockpiles iron ore, aluminum, copper, nickel, tin, zinc and oil when prices are low, making it difficult for analysts to forecast prices for minerals.

Figure 14 illustrates the strong growth in mineral prices from 2000 to 2007, the dramatic decline for most metals in late 2008 and the robust rebound of prices through 2011. Recent pricing trends for some commodities reflect market volatility, and have been trending downward, while others have trended upward. As of August 2014, for example, the prices of iron ore, gold and uranium have dropped nearly \$61 per tonne, \$275 per ounce, and \$26 per pound,

respectively, since 2011. On the other hand, zinc, nickel and aluminum have risen year-over-year.

The general consensus is that demand for mineral products should be favourable over the medium to long term. Rising incomes and increased prosperity in developing countries associated with industrialization and urbanization will continue to drive global demand. With the gradual emergence of India and its demand for minerals and metals—which some speculate will overtake China by 2050—the mining industry should generally enjoy favourable commodity prices despite anticipated periods of market volatility.

FINANCING

Canada is the leading global centre for mining finance. The Toronto Stock Exchange (TSX) is home to 57% of the world's public mining companies and traded more than \$200 billion of mining stock in 2013. Of the firms listed on the TSX, 331 are mining companies. These firms, together valued at \$229.6 billion, raised \$5.6 billion in equity capital in 2013. TSX-listed mining companies mainly deal in gold, uranium, copper, silver, nickel, iron ore, zinc, and molybdenum.

The TSX is also home to the Venture Exchange (TSX-V), which gives emerging companies efficient access to capital while offering investors a regulated market for venture

COMMODITY-SPECIFIC PRICE TRENDS

Gold. After 11 consecutive years of strong performance, and a one-day high of US\$1,923 per ounce in September 2011, the price of gold has steadily declined over the last two years. From a monthly average of \$1,744 per ounce in September 2012, to \$1,295 per ounce in August 2014, gold has decreased 25%. Contributing to this downward pressure is persistent anticipation among investors that the US Federal Reserve will taper its quantitative easing stimulus program. This event will result in increased interest rates, enhancing the competitiveness of other investment options relative to gold. To date, however, the stimulus program continues despite the price of gold having fallen.

Nickel. The price of nickel has been volatile in recent years. From a monthly average of \$12.88 per pound in February 2011, the price of the base metal dropped more than half to \$6.20 per pound in November 2013. From this recent low, nickel rallied back to a monthly average of \$8.43 per pound in August 2014, only to retreat again to \$7 per pound toward the end of October. Several factors contribute to this volatility. Indonesia, accounting for 25% of the global nickel supply, implemented a ban on exports of mineral ore in January 2014 that pushed prices upward. To counteract rising prices, China likely shifted consumption to pre-existing domestic stock piles of the base metal, reducing global demand, causing downward pressure on prices. Looking forward, however, as global stock piles of nickel shrink and export bans persist, upward price pressure on nickel is likely to resume in the short term.

Potash. Since Russia's Uralkali quit the Belarusian Potash partnership in July 2013, uncertainty in the global trade of potash has increased, causing speculation about what market impacts may result. Spot prices of potash bound for overseas markets have fallen from US\$417.50 per pound (prior to Uralkali's exit from its marketing partnership with the Belarusian Potash Company) to \$287 per tonne for the month of August 2014. Recent reports suggest that Uralkali, the world's biggest potash producer, will continue prioritizing volumes over price. Uralkali CEO, Dmitry Osipov, is reported to see "no urgent need" to re-enter the trading partnership with rival Belaruskali, the breaking of which led to an over-supplied market that pushed prices down. Belarus would like to restore the marketing arrangement with Uralkali, which would bode well for global potash prices in the future.

Zinc. Year-over-year average monthly zinc prices have increased 24% from \$0.86 per pound to \$1.06 per pound in August 2014. Part of this increase can be attributed to a reduction in global supply of the metal resulting from the closure of Glencore's world class Brunswick mine. The closure of additional zinc mines, scheduled for the middle of 2015, may drive prices up further. Another factor is increased demand for construction materials, which zinc's galvanising capability renders stronger and longer lasting. The International Lead and Zinc Study Group estimates that Chinese apparent demand rose 7.6% last year versus 3.4% in the US and 4% in Japan. With buoyant consumption forecast to outstrip supply, zinc prices are being forecast to increase in coming years.

**LISTED MINING COMPANIES
(END OF 2013)**

- On the TSX—Toronto: 1,618
 - Senior TSX companies: 331
 - Venture Exchange companies: 1,287
- On the ASX—Australia: 782
- On the LSE-AIM—London: 180

investments. The 1,287 mining companies listed on the TSX-V in 2013 were valued at \$10.8 billion, and together they raised \$1.3 billion in equity capital in the same year—under one-fifth of the overall total of equity raised. This represents a significant decline year-over-year, when the value of junior mining companies was \$19.8 billion, and the capital raised was \$2.8 billion. Junior mining companies are currently facing challenges in raising capital, which is further discussed below.

GLOBAL FINANCING

The global mining industry raised \$15.1 billion in equity in 2013. While less than half of the \$31.7 billion raised worldwide in 2011, and less than a quarter of the sum raised at the height of the economic boom, the amount represents a five-fold increase over the \$3.1 billion raised in 2000, and a slight increase year-over-year (see Figure 15). Although the recession's effects on the global mining industry were relatively short-lived in many respects, recent volatility has presented challenges for some miners.

From 2008 through 2012, the TSX and the TSX-V accounted for 39% of the value of global mining equity financings, raising nearly \$72 billion. In 2013, 48% of all global mining equity financings were done on the two exchanges, and together, these comprised 46% of the equity capital raised globally for the same year (see Figure 16).

The large proportion of public financings conducted on the TSX reflects the exchange's appeal to both junior and senior business players. The TSX-V's unique ability to efficiently handle equity financings in the \$1 million to \$5 million range is one reason why Canadian companies lead the exploration business.

TSX-listed mining companies have a strong global focus. As of December 2013, TSX and TSX-V companies were involved in 8,269 mineral projects worldwide (see Figure 17), about half of them in Canada and half elsewhere. Most of the projects involve exploration, and very few will turn into operating mines. However, the locations do illustrate the prime areas of mining interest.

EXPLORATION

The goal of exploration is to locate large, high-grade reserves with minimal disturbance to the ground and the environment. Technological advances, including GPS surveying, airborne technologies and down-hole seismic imaging, have enabled companies to locate new deposits previously beyond discovery using traditional methods. Like research and development, exploration requires healthy levels of investment over the long term for success.

Exploration and subsequent mine development are required to maintain healthy reserve levels. If this does not happen, the value-added aspects of Canada's mining industry—including smelting, refining and manufacturing—will diminish over time, and national and regional economies that benefit from strength in these sectors will weaken.

EXPLORATION AND DEPOSIT APPRAISAL IN CANADA

The financial health of the mineral exploration sector can be measured by spending on exploration and deposit appraisal. Gauging spending levels also assists in predicting the future of Canada's mineral production. Natural Resources Canada, which provides the numbers below, defines the two kinds of spending as follows:

- **Exploration expenditures:** Spending on activities up to and including the first delineation of a previously unknown mineral deposit.
- **Deposit appraisal expenditures:** Spending on activities that bring a delineated deposit to the stage of detailed knowledge required for a production feasibility study.

The two expenditures combined are generically called "exploration spending."

**BREAKDOWN OF TSX AND TSX-V
MINING PROJECTS BY LOCATION**

- Canada: 52%—4,310 projects
- Latin America: 18%—1,471 projects
- United States: 13%—1,058 projects
- Africa: 7%—575 projects
- Australia: 4%—293 projects
- Asia: 3%—281 projects
- UK and Europe: 3%—281 projects

Sources: InfoMine, TSX/TSX-V Market Intelligence Group

In 2013, exploration investment fell year-over-year by 41% to \$2.3 billion (see Figure 18). Spending intentions for 2014 anticipate investment levels to drop even further to \$2.1 billion for the year, approaching the low of \$1.9 billion seen in 2009 during the financial crisis. Significantly lower than the sector's spending intentions reported earlier in the year, investor confidence was adversely influenced by the steep decline in the price of gold and the sharp focus of major miners on improving their balance sheets.

Another major issue is the persistent challenges that junior mining companies face in raising capital. According to SNL Metals Economic Group (SNL), 2013 global mineral exploration budgets dropped by 30%. Research undertaken by the Prospectors and Developers Association of Canada indicates that the limited amount of financing that did take place on the TSX-V in 2013 was primarily for very small amounts. Over 50% of all financings in 2013 were for \$500,000 or less (compared to 13% in 2010). A significant portion of all financings was barely enough for companies to remain solvent – 12% of financings in 2013 were for \$100,000 or less, compared to only 0.5% in 2010. According to PwC, the total cash generated from junior financing activities in Canada fell by 34% in 2013, after a 52% drop in 2012. Almost 60% of Canadian-listed juniors had working capital balances under \$200,000 as of May 2014.



Photo: Canadian Zinc Corporation, Prairie Creek Mine, Northwest Territories

One consequence of these financing challenges is exploration's share of the pie is shrinking relative to deposit appraisal, indicating a shift toward defining known deposits and away from the riskier discovery of new ones. Until recently, exploration has historically occupied a larger share of total spending. Spending intentions for 2014 indicate the continued reversal of this trend with the largest spread yet between the two types of spending, with exploration

accounting for 36% of total exploration budgets, and deposit appraisal the other 63% (see Figure 19).

ALLOCATION OF INVESTMENT BY MINERALS AND METALS

Precious metals attracted the lion's share of Canadian exploration spending again in 2013, accounting for 48% overall (see Figure 20). Year-over-year, however, the amount allocated to precious metals exploration dropped over 40%, largely due to significant price fluctuations for gold, which began in late 2012.

Between 2002 and 2012, iron ore saw the most dramatic jump in exploration spending, rising 85-fold over the decade, with many projects located in Newfoundland and Labrador and northern Canada.

Base metal exploration's share of total investment edged up year-over-year from 17.4% in 2012 to 18.3% in 2013, despite the amount invested having dropped year-over-year from \$630 million to \$423.8 million. This trend reflects the depletion of Canadian base metal reserves already discussed. Currently, the replenishment of reserves is not keeping pace with global demand for these highly important metals. Without sustained and effective exploration, Canadian base metal production will outstrip reserve additions. This will have profound implications for the communities and people who benefit from the economic opportunities the industry directly and indirectly generates.

Coal exploration has also seen dramatic increases over the past decade, a large percentage of which has taken place in British Columbia, with its high-quality metallurgical coal deposits. The "Ring of Fire" region in northern Ontario, west of James Bay, is attracting large exploration investment for a variety of minerals and metals. In Quebec, the revived Plan Nord aims to attract billions of new mineral investment in the northern regions of the province. Such development would enhance the economic viability of significant nickel, cobalt, platinum group metals, zinc and iron ore developments.

INTERNATIONAL EXPLORATION

Globally, Canada has been a top destination for mineral exploration investment for the last 35 years. Canada dropped to second place in 1992, surpassed by Australia, but regained the top position in 2004 and remained there until 2013. Australia has once again overtaken Canada as the world's leading destination for mineral investment.

SNL has tracked world mineral exploration since 1989. Based on data from nearly 3,500 companies, SNL

determined that worldwide exploration investment in 2013 fell to US\$15.2 billion—a 29% decrease from 2012. Exploration figures for iron ore are excluded from the above figures, and would have increased the 2013 total by an estimated US\$1.74 billion. In 2013, Canada experienced a 41% decrease in allocations over 2012. This was the largest decrease experienced by any of the regions tracked by SNL for the second year in a row. With iron ore exploration budgets included, Australia has taken over the top spot, with 16.5% of worldwide exploration budgets as opposed to Canada's 12.5%. Australia's attractiveness as a destination for investment has increased recently with its introduction of a flow-through share mechanism to bolster investment in early stage exploration in Australia. This, combined with decreases in Fraser Institute rankings for many Canadian jurisdictions, should sound a warning for Canadian policy makers that all may not be well for Canadian exploration.

CANADA'S ROLE IN GLOBAL EXPLORATION SPENDING IN 2013

- More than 800 Canadian companies are actively exploring outside Canada in over 100 countries.
- Canadian-headquartered companies accounted for nearly one-third of global exploration budgets in 2013.

Sources: SNL Metals Economic Group, Natural Resources Canada.

Only a handful of major discoveries and projects will come into production within the next five years. The industry is still paying for the period of low exploration spending in the 1990s and early 2000s. The dramatic rise in this spending during the 2000s was offset to some extent by the rising costs of drilling, assaying, geosciences expertise, fuel and other inputs. As well, regulatory and infrastructure challenges are lengthening the time it takes for new discoveries to develop into producing mines. The decrease in global exploration spending in recent years will further decrease the rate at which major discoveries are made.

This gap is slowly closing, however, as a strong cohort of Canadian projects, from the start of a pre-feasibility study to a production commitment, are in the pipeline. More than 100 advanced stage exploration projects have been identified over the period 2011-2014. These projects and others contribute to the \$160 billion in potential mining investment Canada could see over the next five to 10 years.

INVESTMENT

CAPITAL SPENDING

Capital spending is a barometer of how confident managers and investors are about current production capacity and future demand. Capital spending enables improvements such as:

- New mine construction and increases to existing mine capacity
- Process and technology improvements
- Modernization and expansion of smelters and refineries
- New product lines
- Mill improvements
- Energy retrofits
- Environmental improvements

Government and business capital spending also opens up new regions for development. The ongoing extension of the Highway 37 transmission line in northeast British Columbia is a good example of long-term strategic infrastructure investment. Notably, this capital cost of \$400 million will enhance the economics of an estimated \$15 billion in mineral projects, with one project already built—the \$450 million, 300-person Red Chris mine owned by Imperial Metals. Similarly, the extension of the Monts Otish Highway in northern Quebec would improve future prospects for the development of gold, diamond and copper projects in the surrounding region.

In 2013, capital spending in the Canadian mining industry totalled \$18.3 billion, down 23% from the previous year (see Figure 22). More than \$15 billion in capital investment is projected for 2014, partially reflecting weakening prices for several commodities.

Although capital spending covers all four stages of the industry, some 90% is typically invested in the first two stages, extraction and smelting/refining. Within Stage 1, around two-thirds of capital spending goes towards construction and one-third towards machinery and equipment. Within Stage 2, the ratio is reversed, with about one-fifth of spending directed to construction and the rest to machinery and equipment.

Spending on repairs, most of which falls into the machinery and equipment category, is not included in Figure 22. The data available for expenditures on repairs also lags capital expenditure data by one year. As an approximation, adding repair costs (which in 2012 were about \$4.1 billion) to the above capital (\$18.3 billion) and exploration (\$2.3 billion)

spending produces roughly \$24.7 billion in Canadian mineral development investment in 2013.

Figure 22 also shows capital investment in the oil sands, where spending was \$32.6 billion in 2013 and is projected to reach \$33.4 billion in 2014. These levels of investment surpass pre-recession peaks. One interpretation is that some of the announced oil sands projects and expansions that were affected by the recession have come back online. Inadequate pipeline capacity for the movement of both oil and diluents to and from the oil sands may, however, inhibit planned expansions of bitumen production. (See Section 2 of this report for more discussion.)

Combining hard rock and oil sands mining capital investments, the Canadian mining industry invested \$62.6 billion in capital and repair expenditures in 2013.



Photo: Syncrude Canada, Oil Sands Facility, Alberta

CURRENT AND FUTURE INVESTMENTS

Saskatchewan produces one-third of the world's potash, drawing on mines that are over 40 years old. Several new projects, however, are either in development or have been identified for future development. Vale Potash Canada's \$3 billion Kronau project advanced to final feasibility stage in August 2014. The Kronau Project is Vale's first potash project in Canada. In August 2013, BHP Billiton announced that it would invest US\$2.6 billion in its Jansen project over the next three years, signalling a stronger project development commitment.

In New Brunswick, Atlantic Potash Corp. continues to explore the Millstream potash deposit, with findings justifying further exploration and deposit appraisal. The company estimates upwards of \$3.8 billion will be needed to bring the mine into commercial production. Canada holds 50% of the world's known potash reserves, and only New Brunswick and Saskatchewan currently produce it.

In northern Saskatchewan, Cameco's Cigar Lake project is the world's second largest high-grade uranium deposit, with grades 100 times the world average. With proven and probable reserves of more than 216.7 million pounds of U_3O_8 , at an average grade of 18.3%, the mine began production in summer 2014. Production is expected to reach up to one million pounds of uranium concentrate this year and increase to its full production rate of 18 million pounds by 2018.

There is still potential in the Canadian diamonds sector, despite the decline in exploration spending in recent years. Stornoway's Renard Diamond Project, located near the Otish Mountains in north-central Quebec is well on track to becoming Quebec's first diamond mine with construction having begun in July 2014. The Chidliak project on Baffin Island offers promise, while the Gahcho Kué project in the Northwest Territories recently received environmental assessment approval with construction anticipated to begin in 2016. (See Section 5 of this report for more discussion on Canada's regulatory regime.)

Recent mine openings in Canada include Vale's Totten Mine in Sudbury, Ontario and Baffinland's Mary River Mine in Nunavut. The Totten Mine began production in February 2014, with full production expected in 2016 at which point the mine should produce 2,200 tonnes per day of copper, nickel and precious metals for 20 years. The Mary River operation, one of the world's richest and largest iron ore deposits, contains roughly 365 million metric tonnes of high-grade ore that can be shipped directly without requiring processing that produces tailings.

All together, nearly \$160 billion worth of mining-related projects have been proposed for Canada in the coming years (see Annex 7). These include billions of dollars in proposed projects for British Columbia, Alberta, Saskatchewan, Ontario, Quebec, Newfoundland and Labrador, Nunavut and the Northwest Territories. Of particular note is the high interest in northern Canada. Several gold and iron ore projects are proposed for Nunavut, and gold, diamond and rare earth projects are in the works for the Northwest Territories.

FIGURE 13

CANADIAN RESERVES OF SELECTED MAJOR METALS, 1980–2011

Metal Contained in Proven and Probable Mineable Ore¹ in Operating Mines² and Deposits Committed to Production³

Year	Copper (000 t)	Nickel (000 t)	Lead (000 t)	Zinc (000 t)	Molybdenum (000 t)	Silver (t)	Gold (t)
1980	16,714	8,348	9,637	27,742	551	33,804	826
1985	14,201	7,041	8,503	24,553	331	29,442	1,373
1990	11,261	5,776	5,643	17,847	198	20,102	1,542
1995	9,250	5,832	3,660	14,712	129	19,073	1,540
2000	7,419	4,782	1,315	8,876	97	13,919	1,142
2003	6,037	4,303	749	6,251	78	9,245	1,009
2004	5,546	3,846	667	5,299	80	6,568	787
2005	6,589	3,960	552	5,063	95	6,684	958
2006	6,923	3,940	737	6,055	101	6,873	1,032
2007	7,565	3,778	682	5,984	213	6,588	987
2008	7,456	3,605	534	5,005	222	5,665	947
2009	7,290	3,301	451	4,250	215	6,254	918
2010	10,747	3,074	400	4,133	254	6,916	1,473
2011	10,668	2,936	247	4,807	256	6,953	2,044

Source: Natural Resources Canada, based on company reports and the federal-provincial/territorial survey of mines and concentrators.

¹ No allowance is made for losses in milling, smelting and refining. Excludes material classified as "resources."

² Includes metal in mines where production has been suspended temporarily.

³ Excludes metal in placer deposits because reserves data are generally unavailable.

Note: One tonne (t) = 1.1023113 short tons = 32 150.746 troy oz.

FIGURE 14

METAL PRICES, 2000 TO AUGUST 2014

Metal Prices	2000	2007	2009	2010	2011	2013	Aug. 2014	00-Aug 14 (%)
Aluminum (\$/lb)	0.70	1.20	0.76	0.98	1.09	0.84	0.92	31
Copper (\$/lb)	0.82	3.23	2.34	3.40	4.00	3.33	3.16	285
Gold (\$/oz)	279	697	973	1,230	1,568	1,410	1,295	364
Uranium (\$/lb)	8.29	98.81	47.00	48.00	56.26	38.58	30.62	269
Nickel (\$/lb)	3.92	16.88	6.50	9.85	10.39	6.34	8.44	113
Zinc (\$/lb)	0.51	1.47	0.75	0.98	1.00	0.87	1.06	108
Iron Ore	12.45	36.60	105.30	125.90	153.00	135.36	92.61	644

Source: Index Mundi

Note: Table denotes yearly prices as well as actual price as of August 2014. The final column indicates percentage growth in prices between 2000–2014.

FIGURE 15

MINING EQUITY RAISED—TORONTO STOCK EXCHANGE, 2000–2013

(value in US\$ billions)

Equity Raised	2000	2007	2008	2009	2010	2011	2012	2013
Worldwide	3.1	50.3	46.6	65.9	29.6	31.7	14.8	15.1
TSX exchanges	1.1	17.6	8.3	22.2	17.8	12.5	10.3	6.9
Percentage of worldwide total on TSX	36.0	35.0	18.0	34.0	60.0	39.4	70.0	46.0

Source: Gamah International, compiled by Toronto Stock Exchange.
Note: All values as at December 31, 2013.

FIGURE 16

GLOBAL MINING FINANCING, 2013

Exchange	TSX Venture Toronto	LSE–AIM London	ASX Australia	JSE Japan	HKEx Hong Kong	NYSE New York
Mining equity financings	1,409	180	1,351	0	1	3
Capital raised (C\$ billions)	6.9	0.733	3.4	0.0	0.381	0.710
Market value (C\$ billions)	240.4	515.6	392.0	356.2	375.9	926.4
New listings	73	12	18	1	1	10
Mining issuers listed	1,618	190	782	50	55	132

Source: Gamah International, compiled by the Toronto Stock Exchange.
Note: All values as at December 31, 2013.

FIGURE 17

GEOGRAPHIC REACH OF TSX-LISTED COMPANIES, DECEMBER 2013

Location of Mineral Projects	Number	Percent
Canada	4,310	52
Latin America	1,471	18
United States	1,058	13
Africa	575	7
Australia	293	4
Asia	281	3
United Kingdom and Europe	281	3
Total	8,269	100

Sources: InfoMine, TSX/TSXV Market Intelligence Group, compiled by the Toronto Stock Exchange.

FIGURE 18

MINERAL EXPLORATION AND DEPOSIT APPRAISAL EXPENDITURES BY PROVINCE AND TERRITORY, 2006-2014ⁱ

Province / Territory / (\$ millions)	2006	2007	2008	2009	2010	2011	2012	2013 ^p	2014 ⁱ	% Change From 2013 to 2014
Newfoundland and Labrador	100.8	148.0	146.7	54.9	105.2	156.8	199.9	104.0	84.1	- 19.1
Nova Scotia	11.0	23.5	21.4	9.0	16.7	13.7	14.6	12.0	13.6	13.6
New Brunswick	13.4	35.8	32.7	8.1	17.1	27.1	28.0	28.4	33.9	19.6
Quebec	295.1	476.4	526.1	379.3	511.6	833.9	620.7	327.9	374.3	14.2
Ontario	346.5	571.7	799.3	536.2	853.4	1,067.7	961.5	600.2	528.0	- 12.0
Manitoba	52.9	102.6	152.1	97.8	83.5	140.0	105.6	57.7	51.8	- 10.2
Saskatchewan	235.6	314.0	430.7	311.0	299.4	334.6	411.1	211.5	194.5	- 8.0
Alberta	18.7	11.8	20.8	8.3	15.2	47.3	35.2	20.2	18.9	- 6.4
British Columbia	344.2	470.6	435.4	217.1	374.4	645.1	734.1	500.1	512.0	2.4
Yukon	106.4	144.7	134.0	90.9	156.9	331.7	233.2	89.9	97.7	8.7
Northwest Territories	176.2	193.7	147.7	44.1	81.7	93.8	108.7	90.0	71.5	- 20.5
Nunavut	210.6	338.0	432.6	187.6	256.7	535.7	422.5	270.2	166.5	- 38.4
Total	1,911.5	2,830.8	3,279.5	1,944.4	2,771.9	4,227.4	3,875.1	2,312.0	2,146.8	- 7.1

Source: Natural Resources Canada, based on the Federal-Provincial-Territorial Surveys of Mineral Exploration, Deposit Appraisal and Mine Complex Development Expenditures.

^p Preliminary; ⁱ Intentions.

Notes: Includes on-mine-site and off-mine-site activities. Includes field work, overhead costs, engineering, economic and pre- or production feasibility studies, environment, and land access costs. Numbers may not add to totals due to rounding.

FIGURE 19

MINERAL EXPLORATION AND DEPOSIT APPRAISAL EXPENDITURES BY TYPE OF COMPANY, 2006-2014ⁱ

Type of Co.	2006	%	2007	%	2008	%	2009	%	2010	%	2011	%	2012	%	2013 ^p	%	2014 ⁱ	%
Junior	1,238.0	64.8	1,904.4	67.3	2,117.8	64.6	1,110.7	57.1	1,547.0	55.8	2,049.1	48.5	1,847.0	47.7	943.0	40.8	779.5	36.3
Senior	673.5	35.2	926.5	32.7	1,161.7	35.4	833.7	42.9	1,224.9	44.2	2,178.3	51.5	2,028.1	52.3	1,369.0	59.2	1,367.3	63.7
Total	1,911.5		2,830.8		3,279.5		1,944.4		2,771.9		4,227.4		3,875.1		2,312.0		2,146.8	

Source: Natural Resources Canada, based on the Federal-Provincial-Territorial Surveys of Mineral Exploration, Deposit Appraisal and Mine Complex Development Expenditures.

^p Preliminary; ⁱ Intentions

Note: Includes on-mine-site and off-mine-site activities. Includes field work, overhead costs, engineering, economic and pre- or production feasibility studies, environment, and land access costs. Totals may not add due to rounding.

FIGURE 20

CANADIAN EXPLORATION AND DEPOSIT APPRAISAL SPENDING BY TARGET, 2003 AND 2013^p

	2003		2013 ^p	
	\$ millions	% of Total	\$ millions	% of Total
Precious metals	316.4	46.1	1,113.5	48.2
Base metals	137.0	20.0	423.8	18.3
Iron Ore	1.3	0.2	111.3	4.8
Non-metals (excluding diamonds)	12.9	1.9	117.5	5.1
Other metals	14.5	2.1	167.4	7.2
Uranium	30.8	4.5	165.6	7.2
Coal	5.1	0.7	133.5	5.8
Diamonds	168.8	24.6	79.3	3.4
Total	686.7	100.0	2,312.0	100.0

Source: Natural Resources Canada, based on the Federal-Provincial-Territorial Surveys of Mineral Exploration, Deposit Appraisal and Mine Complex Development Expenditures.

^p Preliminary

Note: Includes on-mine-site and off-mine-site activities. Includes field work, overhead costs, engineering, economic and pre- or production feasibility studies, environment, and land access costs. Totals may not add due to rounding.

FIGURE 21

TOP COUNTRIES/REGIONS BY NON-FERROUS EXPLORATION BUDGETS, 2013

Country/Region	%
Canada	13
Australia	13
Sub-Saharan Africa	8
United States	7
West Africa	6
Mexico	6
Pacific Islands	6
Chile	6
Peru	5
Russia	5
China	4
Europe	4
Brazil	3
Former Soviet Union/Mongolia	2
Rest of the world	12
Total	100

Source: Metals Economic Group.

FIGURE 22

CAPITAL EXPENDITURES IN THE CANADIAN MINING INDUSTRY, 2008 - 2014ⁱ

(\$ millions)	2008	2009	2010	2011	2012	2013 ^p	2014 ⁱ
Stage 1 - Total Mineral Extraction	8,587	7,078	10,015	13,566	18,213	13,452	11,456
Metal ore mineral extraction	5,244	4,204	6,260	9,246	11,872	7,978	6,319
Non-metallic mineral extraction	2,533	2,453	2,985	3,232	5,108	4,715	4,367
Coal mining	810	422	770	1,088	1,234	759	771
Stage 2 - Primary Metal Manufacturing	1,918	1,176	2,087	3,221	4,202	3,700	2,902
Stage 3 - Non-Metallic Mineral Product Manufacturing	787	671	868	764	682	534	588
Stage 4 - Fabricated Metal Product Manufacturing	846	896	720	824	632	702	748
Total Mining and Mineral Processing	12,138	9,821	13,690	18,375	23,729	18,388	15,693
Non-conventional oil extraction (oil sands)	20,663	10,551	17,155	22,591	27,152	32,677	33,436

Source: Statistics Canada.

^p Preliminary

ⁱ Intentions

Note: Totals may not add due to rounding.

THE PEOPLE

EMPLOYMENT, COSTS AND INNOVATION

THE CANADIAN MINING INDUSTRY IS A GLOBAL LEADER IN CAPITAL INVESTMENT, FINANCING AND INNOVATION. THOUGH CAPITAL IS EASIER TO ALLOCATE IN BOOM TIMES, THE INDUSTRY HAS ALSO INVESTED DURING LESS PROSPEROUS PERIODS. IN THE 1990s, FOR EXAMPLE, MINING INVESTED IN NEW, AUTOMATED TECHNOLOGIES THAT ENHANCED THE ECONOMIC VIABILITY OF PROJECTS BY LOWERING PRODUCTION COSTS. THE KEY TO MAXIMIZING INVESTMENTS LIKE THESE IS A READY SUPPLY OF SKILLED INDUSTRY WORKERS.

MINING INDUSTRY EMPLOYMENT

According to Natural Resources Canada definitions and data from Statistics Canada, the mining industry employed 383,140 people in 2013, accounting for 1 in every 47 Canadian jobs (see Figure 23). As of 2012, Statistics Canada has published a more comprehensive measure of employment that includes self-employment and employment in the territories. This change results in a truer reflection of the number of Canadians employed in the mining industry.

OVERALL EMPLOYMENT NUMBERS

In 2012, 63,775 of the 383,140 people directly employed in mining worked in Stage 1, mineral extraction (see Figure 23). Including approximately 33,000 in metal mining, 22,000 in non-metal mining and 8,000 in coal mining (see Figure 24), the overall number of people employed in Stage 1 has increased by more than 20% since 2007.

Since 2007, the number of Stage 2 jobs in primary metal manufacturing, also known as smelting and refining, has decreased by 18% (see Figure 23). This is due to technological advancements, the aging and closure of Canadian facilities and more foreign competition for feedstock to process.

STUDY FINDS ONTARIO'S MINING SUPPLY SECTOR IS TWICE THE SIZE THAN PREVIOUSLY THOUGHT

A new economic impact survey uncovered new employment information for the mining supply and services industry, which the Conference Board of Canada has called a "hidden" sector. The study, conducted by PwC for the Canadian Association of Mining Equipment and Services for Export is based on the activities of 913 companies that considered themselves mining suppliers in 2011.

This industrial sector provides equipment, supplies and services to the global mining industry. Its economic impacts are significant, representing 68,000 jobs across Ontario, and contributing 1% to Ontario's GDP and \$1.5 billion in government tax revenues. These jobs are estimated to have generated nearly \$4.6 billion in salaries and wages.

In the oil sands extraction sector (not shown in Figures 23 or 24), data for 2012 show that Suncor and Syncrude directly employed more than 14,000 and 5,000 people, respectively, in mining and oil and gas activities. Additionally, available figures for 2013 indicate that Shell's oil sands operations' mining and upgrading business employs more than 3,000 people. These figures do not include indirect employees, which number in the thousands.

Employment statistics for mining and oil sands change rapidly because of industry growth, globalization and other trends. Recent mergers and acquisitions have changed the landscape of Canadian mining; some companies have been acquired or no longer report separate employment figures.

As noted in Section 1 of this report, more than 3,400 companies in Canada supply goods and services to the mining industry, adding many more indirect jobs. According to Statistics Canada definitions, support activities for mining employed 20,870 people across Canada in 2013. This figure does not paint a true picture of mining supply employment as it does not reflect the many mining support services that are crucial to the mining sector.

WOMEN IN MINING

A 2014 report by the Mining Industry Human Resources (MiHR) Council found that while female participation in mining grew by 70% from 1996 to 2011, women only account for 17% of the mining workforce. These numbers are well below women's current labour force participation rate, which is 48%.

Still, mining outperforms other resource sectors in the employment of women. In 2012, women represented just 7% of the forestry sector workforce and 14% of the fishing industry workforce. However, mining continues to lag behind other resource sectors in this respect, with women representing 30% of the total workforce in the oil and gas sector and 24% in the utilities sector.

MiHR is currently undertaking research to further understand the contributions and barriers to entry of women and Aboriginal people in the mining industry. This research, funded in part by Employment and Social Development Canada, will help identify human resources challenges to fostering a more diverse workforce, as well as solutions for mining stakeholders as they develop strategies to increase employment rates among underrepresented groups.

EMPLOYMENT OF ABORIGINAL PEOPLE

Proportionally, the mining industry is the largest private sector employer of Aboriginal Canadians. According

to Statistics Canada, the number of Aboriginal people employed in the mining sector increased by 14% to 10,300 people from 2007 to 2012.

There are also significant opportunities for Aboriginal workers in the oil sands. According to the Oil Sands Developers Group, as of 2010, more than 1,700 Aboriginal people held permanent jobs in oil sands operations in northeast Alberta—a number that excludes Aboriginal employment in the construction sector on which oil sands projects heavily rely. From 2002 to 2011, Aboriginal companies earned more than \$6 billion through business development with the oil sands industry. As an example, the Fort McKay Group of six companies—completely owned by the Fort McKay First Nations—works extensively with oil sands companies, and earns more than \$100 million in annual revenue.

Potential for increased Aboriginal employment remains strong. Approximately 1,200 Aboriginal communities are located within 200 kilometres of some 180 producing mines and more than 2,500 active exploration properties. Aboriginal people across the country are, therefore, ideally situated to access employment opportunities in the mining industry. Further, approximately half of all Aboriginal people are under the age of 25. By 2017, the number of Aboriginal men and women aged 20 to 29 is expected to increase by more than 40%—four times higher than the growth rate for the same age group in the general population. Training to develop the requisite skills is critical to access well-paying mining jobs.

NEED FOR WORKERS AND SKILLS

The mining industry, both in Canada and abroad, faces a number of human resources challenges in the next decade. MiHR's 2014 report, *Canadian Mining Industry Employment and Hiring Forecasts*, estimates that the Canadian mining industry will need to hire 121,000 new workers over the next decade to 2024. These hiring requirements represent more than half of the current workforce, according to MiHR's definitions, and stem from the need to replace retirees and fill new positions to meet baseline production targets (see Figure 25).

This shortage is compounded by the wave of the industry's skilled core of workers who are retiring. By 2024, MiHR forecasts more than 53,100 employees will retire from the sector, which represents nearly 25% of the industry's current workforce. This will result in a significant loss of industry knowledge and experience.

Updated data from Statistics Canada's 2011 National Household Survey indicates that the mining industry's

workforce is attracting an increased share of young professionals. For example, the 25–34 age group makes up approximately 25% of the mining workforce compared to only 20% in the Canadian workforce. This shift in demographics will lead to an entirely new set of challenges, with relatively inexperienced workers replacing seasoned workers, particularly in the high turn-over trades and production occupations. This places additional onus on industry to work collaboratively with government and educational institutions to ensure that new entrants to the industry have the skills required in the high-demand jobs within mining. In addition, companies need to ensure that

THE HUMAN RESOURCES CHALLENGES OF THE CANADIAN MINING INDUSTRY ARE REACHING A POINT OF CRISIS. TO ADDRESS THIS CRITICAL ISSUE, A LARGE AND COORDINATED EFFORT BY THE INDUSTRY, EDUCATIONAL INSTITUTIONS AND ALL LEVELS OF GOVERNMENT IS NEEDED.

new employees have the opportunity to learn from more experienced employees during training programs and on the job to gain valuable workplace experience.

The mining industry comprises 66 core mining occupations, and needs new workers for all of them. Among those required are geoscientists, metallurgists, mining engineers and geologists, as well as workers skilled in computer technology, information management, mechanical repair, heavy equipment operation and other areas. Because today's mining industry relies on advanced technologies, much of the demand is for highly educated and skilled workers.

It is also important to note that competition for skilled workers is fierce both within Canada and beyond. In fact, companies in other countries are actively recruiting Canadian graduates and workers, making retention challenging and recruitment highly competitive.

Various actions have been proposed to address the mining skills shortage in Canada:

- Promote the industry to youth, Aboriginal people and non-traditional worker groups.
- Develop programs that bring back retired workers, retain older workers and increase mentoring.

- Improve education programs and employer-provided training.
- Introduce standards for key occupations to facilitate domestic worker mobility and skills recognition.

The federal government has taken some steps to help address this problem. Recent measures include the introduction of the Canada Job Grant program to help meet training needs in high-demand fields. On the immigration front, the government has introduced an expression of interest system for the Federal Skilled Worker category and has moved to a “just-in-time” approach for recruiting and fast-tracking the applications of skilled workers. This year, Employment and Social Development Canada (ESDC) provided \$3.5 million in funding to MiHR to enhance its Labour Market Information program, which tracks the industry's hiring needs. The funding will also support MiHR in its research into underrepresented groups in the industry, and in its efforts to make mining career information more widely available to job seekers. ESDC has also recently provided new funding for MiHR to help connect new Canadians and immigrants with careers in the mining sector.

MiHR has also been expanding its suite of National Occupational Standards for mining and further enhancing the Canadian Mining Certification Program.

WORKPLACE SAFETY AND HEALTH

In mining, safety comes first. As a core industry value and practice, Canadian mining companies invest significant time and effort in developing and maintaining a positive safety culture in all aspects of their operations, diligently working with their employees and safety inspectors to reach the goal of “zero harm.”

All mine sites have on-site professionals dedicated to safety and health in the workplace. Larger mines have numerous specialized safety trainers on site; smaller mines often contract out safety training to specialist companies.

Labour unions and industry associations have played a key role in improving worker safety and health by encouraging the sharing of best practices, developing industry standards and providing third-party verification of safety programs. MAC members, through the Towards Sustainable Mining (TSM) initiative, for example, make commitments in both safety and health management and crisis management. (See Section 5 for more on TSM).

MAC MEMBERS WIN 2014 JOHN T. RYAN NATIONAL TROPHIES

Canada Trophy for Metal Mines:

Barrick Gold Corporation, Hemlo Operations (Williams Mine), Marathon, Ontario

Since 1985, Barrick has been extracting and producing gold at its world class Williams mine. The site is part of Barrick’s Hemlo mining complex located 40 kilometres east of Marathon, Ontario. Since the start of production, the mine has produced 11 million ounces of gold. The site employs 455 people and has built a reputation for safe operation. Williams mine has received the John T. Ryan Regional Award Trophy in previous years, but this year marks the first time the site has received the National Award. At Barrick’s Williams mine, the intention is to continue operating in the safest possible manner, with passion, commitment and strong leadership, ensuring zero harm.

Cameco Corporation, McArthur River Mine, Northern Saskatchewan

The McArthur River mine site is located in northern Saskatchewan on the southeastern portion of the Athabasca Basin, approximately 620 kilometres north of Saskatoon. It is an underground uranium mine that contains the world’s largest known high-grade uranium deposit. The McArthur River operation is extremely proud to have been recognized for its safety performance, which is made possible by people at all levels of the operation working together to create a workplace culture that values safe execution of its work plans.

Canada Trophy for Coal Mines:

Teck Resources Limited, Greenhills Operation, Elkford, British Columbia

A team of approximately 650 employees work together to make the Greenhills operation successful. Greenhills safety culture depends upon the spirit of openness, cooperation and personal commitment to safety performance of all its employees. Safety is a value that is deeply embedded in the operation. As a result, Greenhills has consistently been among one of the safest mines in British Columbia. This is the third John T. Ryan Trophy for the Greenhills operation.

Source: Canadian Institute of Mining, Metallurgy and Petroleum.

THE JOHN T. RYAN TROPHIES

Mining Safety Appliances (MSA) Canada began sponsoring a mine safety trophy in 1941. Named the John T. Ryan Trophies in honour of the company’s co-founder, the trophies have since become the most prestigious safety awards in the Canadian mining industry. They are still sponsored by MSA Canada and are presented nationally and regionally in three mining categories: metal mines, coal mines and select mines. The trophies are awarded annually by the Canadian Institute of Mining, Metallurgy and Petroleum to the Canadian metalliferous mine, coal mine and select mines that had the lowest accident frequency per 200,000 hours worked during the previous year.

Mining safety statistics can be an invaluable tool for tracking the effectiveness of safety programs and driving improvements, whether for a safety manager working on site or for industry discussions on safety regulations. Ensuring that safety statistics are useful requires not

only that existing figures and analyses are made easily accessible, but that the people and organizations compiling the statistics understand the information needs of safety professionals.

KEY COSTS

Mining companies have limited control over the revenue side of their statement of return because mineral prices are generally set through international trading and exchanges. To remain competitive, companies rigorously work to control their costs.

WAGES

The Canadian mining industry boasts the highest wages and salaries of all industrial sectors in Canada (see Annexes 8 and 9 for details). The average annual pay for a mining worker in 2013 exceeded \$110,000, which surpassed

the average annual earnings of workers in forestry, manufacturing, finance and construction by a range of \$31,000 to \$46,000 for those sectors.

This wage gap has remained relatively consistent in recent years. In remote regions or in situations where workers rotate, higher wages help to attract and retain the required workforce.

WORK STOPPAGES

A total of two strikes and lockouts affected the mining industry in 2013 (see Annex 10). This was down by seven over 2012, and marks a 99% reduction in lost person days over 2012. Miners are pleased to see the reduction in labour interruptions, signalling better workplace relations with their employees and unions, as well as unaffected productivity of their operations.

OVERALL PRODUCTION COSTS

Mining operations incur significant production costs. To put them into perspective, Leighton Holdings notes that a single mining truck tire on the spot market costs more than a Porsche or a Miami condo.

The industry's three main production costs—wages, energy (fuel and electricity), and materials and supplies—totalled \$3.8 billion, \$2.4 billion and \$6.9 billion, respectively, in 2012, the most recent year for which data are available (see Figure 26). Together, these figures constitute a 10% increase (over \$1.3 billion) in the cost of mining in Canada year-over-year. Further, it is worth noting that these numbers do not include the costs for coal mining, valued at \$6.7 billion in 2011, for which Statistics Canada did not report data in 2012. Wages accounted for 11% of the industry's total 2012 production value, while energy accounted for 7% and materials and supplies represented 19% of the total value.

REMOTE AND NORTHERN REGIONS

Lack of infrastructure, sparse or no population, and often extreme seasonal temperatures make remote and northern regions in Canada high-cost jurisdictions in which to build and operate a mine. Frequently, companies that seek to develop mining projects in remote and northern regions are required to build the infrastructure they require for operation. Historically, this infrastructure has included: power generation such as hydroelectric dams and transmission; transportation infrastructure such as ports, road and railways; and airstrips and on-site accommodation for fly-in fly-out employees.

These additional costs constitute a northern premium that companies and industries operating in centrally-located

jurisdictions generally do not incur. With better access to a mode of transportation for mining re-supply and bringing product to market, a community where a workforce can live, and access to the power grid, the mining cost differential between jurisdictions with these attributes and those without can be significant. A company's requirement to build infrastructure in the north that would already be built and accessible in the south accounts for a large portion of the increased costs.

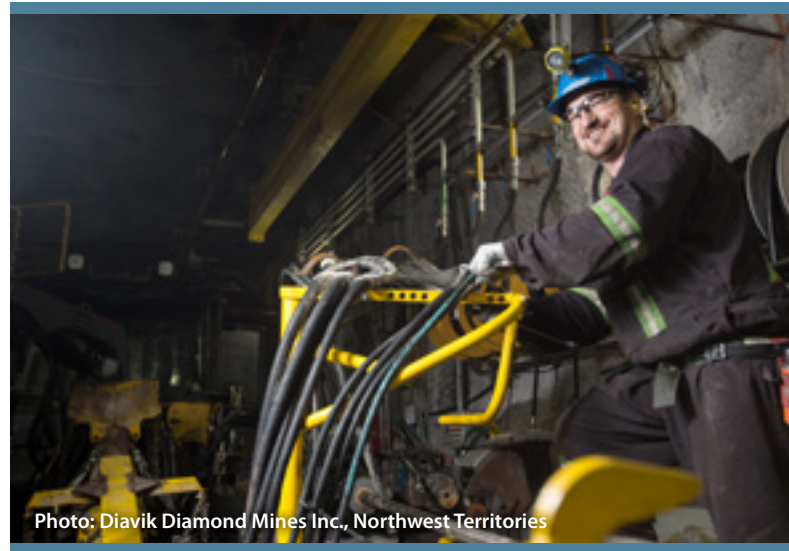


Photo: Diavik Diamond Mines Inc., Northwest Territories

To better understand these costs, MAC undertook a study that compared the costs of operating in a remote and northern region relative to the costs of operating a comparable mine in a centrally-located jurisdiction. MAC determined that for base and precious metals, the premium associated with developing and operating a remote and northern mine ranges from 2 to 2.5 times the cost relative to a comparable mine in a southern region. Further, MAC determined that 60% of this cost increase is related directly to infrastructure investment.

Acknowledging that the future of mining lies increasingly in remote and northern Canada, and the natural synergy that resource development has with governments' stated social and economic policy objectives, there is significant potential to work together for the benefit of Canadians. To support this goal, MAC has recommended that the federal government support northern mining investment by providing investment and infrastructure-related tax relief.

INNOVATION

Innovation is a broad theme, and relevant statistics are not always current or easy to compare. The information presented below indicates that Canadian mining embraces

innovation, but that Canada faces a challenge in facilitating a robust environment in which to foster innovation and enhance research and development (R&D).

While the industry invests millions each year in R&D, Canada underperforms compared to its peers. At risk is Canada's ability to attract new investment as other jurisdictions offer more attractive innovation environments.

PRODUCTIVITY

The industry believes that government research funding mechanisms are not aligned and do not provide support commensurate with the industry's innovation needs, priorities and contributions. With approximately 7,000 government programs involved in the assessment of projects and distribution of funds, it is easy to see how strategic innovation investments could be lost in the delivery process.

Recent reporting on Canada's overall performance affirms this view. The Conference Board of Canada maintains that, despite a decade or so of innovation agendas and prosperity reports, Canada remains near the bottom of its peer group on innovation, ranking 13th among the 16 peer countries. Further findings conclude that more innovative countries are passing Canada on measures such as income per capita, productivity and the quality of social programs.

The OECD has indicated that lagging productivity is one of Canada's most significant economic hurdles. Specifically, a recent study explains that Canada's multifactor productivity (MFP) has been stagnant for decades, and has been declining since 2002. MFP infers technological advancement by holding that innovation improvements account for the increase in output from a fixed level of labour and capital inputs. Since 1980, the United States has improved its MFP by 40%, while Canada's has decreased by 4%.

TECHNOLOGY

The various stages of mining require different levels and types of technology:

- **Exploration.** The main challenge is to locate large, high-grade reserves while limiting disturbance to the ground and the environment. Technologies such as GPS surveying, three-dimensional data maps, airborne technologies and down-hole seismic imaging are enabling companies to find deposits they could not have discovered using traditional methods. Together with the Canadian Mining Innovation Council, a number of companies and researchers have adopted an innovation strategy dedicated to improving exploration technologies.

- **Extraction.** Much of Canada's remaining base metals are likely located two kilometres or more beneath the surface. This situation presents cost and operational challenges. In response, the industry has invested in remote-operated equipment, automated loading and transportation systems, robotics and seismic mapping. With these technologies, companies can mine at a greater depth and keep mines open that would otherwise close. Tailings management is another vital technological area for oil sands companies, and for base metal miners and processors (discussed in Section 5).
- **Smelting and refining.** There have been no transformative technological advances in this area over the past 20 years. Traditional pyrometallurgical operations, which draw on thermal treatment, and newer hydrometallurgical operations, which draw on electricity and chemistry, continue to be adjusted and improved. The aim is to extract the most metal using the least energy and producing the fewest emissions possible. Similar gradual improvements have occurred in iron ore pelletizing. As for particulate matter emissions, established technologies such as baghouses and electrostatic precipitators are still being used.

In the coming years, the industry will continue to focus on energy management and carbon emissions. This trend will be driven by higher energy costs and by the potential introduction of new greenhouse gas regulations for the industry by the federal government. New regulations could affect the viability of some older processing facilities in Canada.

RESEARCH AND DEVELOPMENT

In 2013, Canadian mining and metals companies invested \$522 million in R&D (see Figure 27). Mining's investment surpassed that of the motor vehicles and parts sector, the pharmaceutical sector, and the wood products and paper sector. In 2012, the most recent year in which data is available, the industry employed 4,736 people in R&D (see Figure 28). This is more than the pharmaceutical and forestry sectors, which both receive extensive financial and policy support from the government.

Canadian mining must address a number of challenges if it is to remain a world leader in innovation and research. First, the mechanisms currently employed primarily fund research at academic institutions that do not necessarily have bearing on industry-generated innovation needs and priorities. This "push versus pull" scenario can lead to good science, but not always relevant innovation and commercialization. Second, Canada's minerals sector innovation continuum is fragmented due to a lack of

WHO IS INVESTING IN R&D?

RESEARCH Infosource, a corporate R&D database, ranked seven mining and oil sands companies among the top 100 private sector R&D investors in Canada in 2013:

- No. 18: Syncrude Canada—\$157.2 million
- No. 20: Vale Canada—\$132 million
- No. 50: Novelis Inc.—\$43 million
- No. 69: Molycorp Canada—\$22.9 million
- No. 78: Teck Resources Limited—\$19 million
- No. 83: Rio Tinto Iron & Titanium—\$17 million
- No. 85: ArcelorMittal Dofasco—\$19.9 million

national scale coordination of government and industry research and development and innovation (RDI) funding. As well, the sector lacks the ability to effectively network and focus Canada’s minerals RDI community and integrate mineral industry service providers into its innovation continuum.

In response to these challenges, the Canadian Mining Innovation Council (CMIC) was formed with the aim of investing mining industry R&D dollars more strategically. A non-profit organization comprising representatives from industry, academia and government, CMIC is Canada’s national mining innovation ecosystem. With more than 80 members, CMIC is designed to enhance industry’s global competitiveness through collaboration and alignment of resources in education, research, innovation and commercialization, and recognizes the mining industry’s need to compete more intelligently in the global market.

CMIC is in discussions with government agencies on how best to support the industry’s innovation priorities, especially in the areas of tailings management, energy efficiency and effective exploration. CMIC recently received funding from the Natural Sciences and Engineering Research Council. These funds, in addition to industry contributions, will help facilitate crucial exploration research. The organization is also seeking funding from the federal government to help build projects that more fully reflect the industry’s needs.

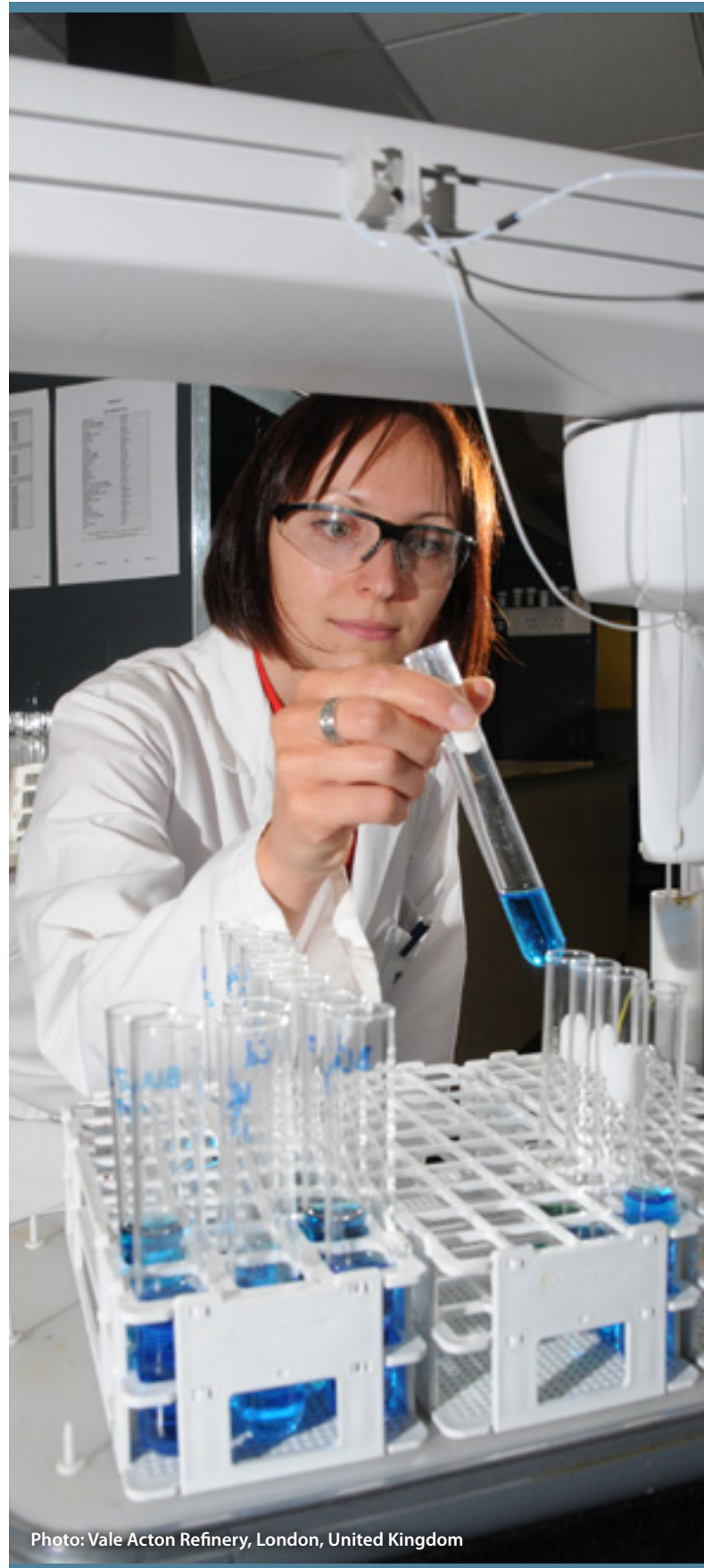


Photo: Vale Acton Refinery, London, United Kingdom

FIGURE 23

EMPLOYMENT IN THE CANADIAN MINING AND MINERAL MANUFACTURING INDUSTRIES, 2007-2013

(Number of Employees)

Year	Mining and Quarrying NAICS 212	Support Activities for Mining NAICS 21311B	Non-metallic Mineral Product Manufacturing NAICS 327	Primary Metal Manufacturing NAICS 331	Fabricated Metal Product Manufacturing NAICS 332	Total Mining, Support Activities, and Mineral Processing
2007	51,870	18,665	58,845	87,800	200,070	417,250
2008	55,120	21,435	56,155	87,895	187,640	408,245
2009	49,135	17,790	53,145	68,060	168,070	356,200
2010	53,495	20,300	56,120	73,005	165,935	368,855
2011	58,955	22,770	56,965	74,875	169,420	382,985
2012	64,140	21,210	57,090	73,995	171,280	387,715
2013	63,775	20,870	57,440	71,970	169,085	383,140

Source: Statistics Canada, System of National Accounts Labour Statistics.

NAICS: North American Industry Classification System.

Note: Prior to 2012, Natural Resources Canada relied on Statistics Canada's Survey of Employment, Payrolls and Hours (SEPH) for employment data. Statistics Canada now publishes a more comprehensive measure of employment that includes self-employment and employment in the territories. Part of the System of National Accounts – Labour Statistics, this value is based on raw data from SEPH, the Labour Force Survey (LFS), and Administrative Databases (T-4, Five-year census).

FIGURE 24

EMPLOYMENT IN THE MINERAL EXTRACTION STAGE, 2007-2013

Year	Metal Mines	Non-metal Mines	Coal	Total
2007	28,035	18,740	5,095	51,870
2008	27,935	21,500	5,685	55,120
2009	24,185	19,700	5,250	49,135
2010	26,415	20,945	6,135	53,495
2011	30,580	21,255	7,120	58,955
2012	32,410	22,890	8,840	64,140
2013	33,230	22,310	8,235	63,775

Source: Statistics Canada, System of National Accounts Labour Statistics.

NAICS: North American Industry Classification System.

Note: Prior to 2012, Natural Resources Canada relied on Statistics Canada's Survey of Employment, Payrolls and Hours (SEPH) for employment data. Statistics Canada now publishes a more comprehensive measure of employment that includes self-employment and employment in the territories. Part of the System of National Accounts – Labour Statistics, this value is based on raw data from SEPH, the Labour Force Survey (LFS), and Administrative Databases (T-4, Five-year census).

FIGURE 25

CANADIAN MINING INDUSTRY EMPLOYMENT AND HIRING FORECAST SCENARIOS, 2014-2024

	Net Change in Employment	Retirement	Non-Retirement Separation	Cumulative Hiring Requirements
Contractionary	2,980	50,730	46,000	99,685
Baseline	19,130	53,100	48,930	121,150
Expansionary	29,973	55,170	50,800	135,910

Sources: Mining Industry Human Resources Council; Canadian Mining Industry Employment and Hiring Forecasts, 2014.

FIGURE 26

SELECTED COSTS OF PRODUCTION IN THE MINERAL INDUSTRY¹, 2012

By Industry	Establishments Surveyed (number)	Wages for Production and Related Workers (\$000)	Fuel and Electricity (\$000)	Materials and Supplies (\$000)	Value of Production (\$000)
Metal Ore Mining	76	2,592,097	1,560,116	4,985,128	23,019,462
Non-metallic Mining and Quarrying	1,172	1,201,018	799,318	1,874,755	12,384,379
Coal	..	..	..	..	..
Total Mineral Industry	1,248	3,793,115	2,359,434	6,859,883	35,403,841

¹ Excludes the oil and gas extraction industry.

Note: Coal statistics are not available for 2012. Statistics Canada did not collect coal data. - ..

Numbers may not add due to rounding.

Value of Production vs. Mineral Production: Value of Production is for mining activity only and wouldn't include all costs related to shipping etc. that are included in Value of Shipments (or Mineral Production).

Sources: Natural Resources Canada; Statistics Canada - Cat. No. 26-201-X

FIGURE 27

R&D EXPENDITURES BY MINING AND SELECTED INDUSTRIES, 2011–2013

(\$ millions)	2011 ^P	2012 ^P	2013 ^P
Industry			
Mining and related support activities	136	140	141
Primary metals–ferrous	43	37	33
Primary metals–non-ferrous	167	161	99
Fabricated metal products	211	185	186
Non-metallic mineral products	75	60	63
Total	632	583	522
Other sectors			
Oil and gas extraction	909	1,104	853
Motor vehicles and parts	251	240	218
Wood products and paper	143	206	F
Machinery	636	588	651
Aerospace products and parts	1,308	1,455	1,393
Pharmaceutical and medicine	507	502	509
Total manufacturing	7,577	7,434	7,159
Total all industries	16,545	16,153	15,353

Source: Statistics Canada, Catalogue no. 88-202-X.

Note: The projected figures in the Catalogue are revised annually by Statistics Canada and can therefore differ year-over-year.

F denotes "too unreliable to be published."

^P Preliminary

FIGURE 28

NUMBER OF PERSONS ENGAGED IN R&D, 2012^P

	Professionals	Technicians	Other	Total
Industry				
Mining–extraction	282	152	82	516
Primary metals–ferrous	218	x	x	278
Primary metals–non-ferrous	278	139	63	480
Fabricated metal products	1,503	1,205	236	2,945
Non-metallic mineral products	291	196	31	517
Total	2,572	1,692	412	4,736
Other sectors				
Oil and gas extraction	908	247	91	F
Motor vehicles and parts	1,147	682	147	1,975
Wood products and paper	563	601	143	1307
Machinery	3,864	2,547	430	6,841
Aerospace products and parts	3,547	X	X	7,294
Pharmaceutical and medicine	1,822	719	790	3,332
Total manufacturing	35,211	15,154	6,081	56,445
Total all industries	88,959	32,954	10,243	132,156

Source: Statistics Canada, Catalogue no. 88-202-X.

^P Preliminary

F denotes "too unreliable to be published"

X denotes "suppressed to meet the confidentiality requirements of the Statistics Act"

THE ENVIRONMENT

SUSTAINABLE DEVELOPMENT AND SOCIAL RESPONSIBILITY

REMOVING ORE FROM ROCK AND PROCESSING AND REFINING IT INTO PURE METAL POSES SIGNIFICANT TECHNICAL AND ENVIRONMENTAL CHALLENGES. THE CANADIAN MINING INDUSTRY IS COMMITTED TO RESPONSIBLE ENVIRONMENTAL STEWARDSHIP, AND CONTINUALLY SEEKS METHODS TO IMPROVE PROCESSES, REDUCE FOOTPRINTS AND ENHANCE SOCIAL AND ENVIRONMENTALLY RESPONSIBLE PRACTICES.

Environmental and social considerations are increasingly well integrated into mine planning and management. Furthermore, resource development and environmental conservation are not mutually exclusive, but can be achieved by effective regulation and responsible resource management. For example, a mine built today is obligated by Canadian law to provide financial assurance that it can be reclaimed when operations cease, and mine closure plans must be prepared and accepted by government authorities before construction. While mining has a relatively small, localized footprint, the impacts on the local area can be significant and should be managed responsibly over the life of the mine. MAC's Towards Sustainable Mining (TSM) initiative is an example of how resource development can co-exist with environmental conservation, and how partnerships can be fostered between mining companies and communities.

In recent decades, the industry has made great strides in reducing mining's environmental impacts through the actions of individual companies, government regulations and stewardship initiatives like TSM. Together, corporate social responsibility, progressive regulations and the adherence to a host of voluntary standards have earned Canadian mining a global reputation for leading social and environmental practices.

ENVIRONMENTAL STEWARDSHIP

The Canadian mining industry has made significant progress in its environmental performance by participating in a host of domestic and international initiatives. MAC member companies, which account for the majority of Canada's mining production, have dramatically reduced their releases to the environment over the past 15 to 20 years (see Figure 29). Releases of major substances such as mercury, nickel and copper have dropped more than 99%, a result of companies investing in cleaner processes in response to voluntary initiatives and regulations.

Internationally, an array of sustainability and social licence initiatives affect the Canadian mining industry. Companies seeking project financing are now required to apply rigorous environmental and social standards set by organizations such as the International Finance Corporation, Export Development Canada, the World Bank and commercial banks that have adopted the Equator Principles. Firms dealing in dangerous substances abide by the Basel Convention and the International Cyanide Management Code (as well as *Canada's own Transportation of Dangerous Goods Act*). The practices of many companies are guided by the United Nations Global Compact, the Extractive Industries Transparency Initiative, the Kimberley Process, ISO 14001 certification and other sustainability programs. For a more detailed overview of how MAC member companies apply international standards and programs, see Figure 30.

Domestically, companies are engaged in a variety of stewardship programs, including TSM, the Mine Environment Neutral Drainage Program (MEND) and the National Orphaned/Abandoned Mines Initiative (NOAMI).

TOWARDS SUSTAINABLE MINING

TSM is an award-winning performance system that helps mining companies evaluate and manage their environmental and social responsibilities. TSM is MAC's commitment to responsible mining and every member company commits to implementing it as a condition of membership for their Canadian facilities. Many companies have voluntarily applied it at their international sites as well. Since its establishment in 2004, participation in TSM has grown steadily and, recently, the Mining Association of British Columbia and the Quebec Mining Association have adopted the initiative for their members.

TSM includes a set of tools and indicators to drive performance and ensure that key mining risks are managed responsibly at mining facilities. By adhering to the principles of TSM, mining companies demonstrate leadership through:

- Engaging with and supporting local communities
- Driving world-leading environmental practices
- Committing the resources and leadership to promote the safety and health of employees

TSM's main objective is to enable mining companies to meet society's needs for minerals, metals and energy products in the most socially, economically and environmentally responsible way. The program's core strengths are:

- **Accountability**—TSM reporting at the facility level of their Canadian operations is mandatory for members.
- **Transparency**—Annual reporting is conducted against 23 indicators with independent verification.
- **Credibility**—TSM includes ongoing consultation with a national Community of Interest Advisory Panel to improve industry performance and shape TSM for continual advancement.

Currently, TSM sets out performance indicators and targets in six areas:

- Tailings management
- Energy use and greenhouse gas emissions management
- Aboriginal and community outreach
- Crisis management planning

- Biodiversity conservation management
- Safety and health

Each year, MAC produces a *TSM Progress Report* detailing the facility-level performance of participating companies. TSM assessments take place at the facility level to ensure that management systems are in place, with results externally verified every three years. In 2014, 62 facilities were assessed.

Below is a summary of results for three areas that pertain to environmental stewardship: tailings management, biodiversity conservation management, and energy use and greenhouse gas emissions management. For a more complete overview of industry performance, please refer to the *2014 TSM Progress Report*, which is available on the MAC website.



Photo: Teck Resources Limited, Greenhills Operation, British Columbia

TAILINGS MANAGEMENT

Tailings impoundments are necessary components of mining activity, and it is crucial that they be managed responsibly to protect human safety and the environment.

TSM's tailings management protocol goes beyond adherence to technical standards and contains five performance indicators. These indicators are designed to confirm whether a facility has implemented a system for responsible tailings management. This protocol seeks to ensure that facilities have a formal policy in place, have developed and implemented a tailings management system, have assigned accountability to the company's CEO or COO, and have developed operation, maintenance and surveillance manuals for all tailings impoundments. Facilities must also conduct annual reviews of their management systems and report the results of this evaluation to their accountable executive officer to meet the requirements of this protocol.

Since 2006, significant improvement has been made across all indicators (see Figure 31). With our members, MAC developed guides that are used around the world. These guides outline how mining companies can safely operate tailings facilities by adhering to best practices in tailings management.

While the Canadian mining industry is recognized as a global leader in tailings management, the breach of the Mount Polley tailings dam indicates there is still work to do. At the time of writing, investigations into the cause of the breach remained ongoing. MAC will ensure that findings from these investigations are taken into account with its tailings guidance, and that any applicable lessons are incorporated to strengthen TSM where appropriate.

Beyond TSM, oil sands operators are making measured progress in tailings management. The Oil Sands Tailings Consortium (OSTC) was founded in 2010 when seven of Canada's largest oil sands mining companies agreed to share tailings research and technology in a unified effort to advance tailings management. In March 2012, the OSTC became part of Canada's Oil Sands Innovation Alliance (COSIA), which is discussed in more detail below.

BIODIVERSITY CONSERVATION MANAGEMENT

Mining conducted in consultation with communities of interest can co-exist with biodiversity conservation. Conserving biodiversity through all stages of a mine's life cycle is an industry priority and helps to maintain a company's privilege to operate.

PROMISING TECHNOLOGY FOR OIL SANDS TAILINGS

Managing tailings in the oil sands is a key environmental concern for the mining industry. Oil sands operators are working hard, using technology to reduce reclamation times. TRO_{TM}, developed by Suncor Energy, involves adding a polymer flocculent to fine tailings, which allows water to be released and tailings to dry more quickly. The technology has been in use at Suncor since mid-2010, and other firms are now partnering with Suncor in this area.

The TRO_{TM} process is expected to accelerate the rate of land and tailings reclamation and, in the years ahead, reduce the number of tailings ponds at Suncor's present mine site. Suncor is sharing proprietary rights to its TRO_{TM} process through its collaboration with member companies in Canada's Oil Sands Innovation Alliance.

The TSM biodiversity conservation management protocol consists of three indicators that set out expectations for mining companies with respect to conserving biodiversity. The protocol seeks to confirm that mining facilities have made formal commitments to manage biodiversity at their sites, that action plans for significant biodiversity aspects are implemented, and that biodiversity conservation reporting systems are in place to inform decision making and to communicate the performance of facilities publicly.

MAC members started reporting on this protocol in 2012 on an aggregate basis and, in 2013, facility-level reporting on this protocol began. While 2013 aggregate results indicate improvement across all three indicators year-over-year, it is clear there is still work to be done to improve performance going forward (see Figure 32), as is typically the case with a new protocol.

The number of facilities assessed at a Level A or higher for demonstrating commitment and executive-level accountability for managing biodiversity conservation nearly doubled year-over-year, increasing to 60% in 2013 from just 33% in 2012.

ENERGY USE AND GREENHOUSE GAS (GHG) EMISSIONS MANAGEMENT

Improving energy efficiency and reducing GHG emissions are priorities for the Canadian mining industry to limit impacts on the environment and to help reduce operational costs at mine sites.

The energy use and GHG emissions management protocol has three indicators that seek to confirm whether a facility has established a comprehensive system for energy use and GHG emissions. For this protocol, a facility must show its management system includes assigned accountability from senior management, and that it has a process in place to ensure energy data are reviewed regularly and are well integrated into operator actions. Facilities are also expected to provide energy awareness training, and have systems in place to track and report energy use and GHG emissions data for both internal and external reporting. Finally, in TSM's spirit of continuous improvement, this protocol seeks to confirm that facilities establish and meet targets for their energy use and GHG emissions performance.

Recently, MAC commissioned an independent consultant to review the TSM results for energy use and GHG emissions management to understand why performance results were improving more slowly than expected. As a result of this review, MAC revised the protocol to ensure that it was better at driving performance improvements. This condensed the indicators to three versus the original six.

For this reason, 2013 serves as a new base year for the revised protocols (see Figure 33).

ENERGY EFFICIENCY AND GHG EMISSIONS

Energy and GHG emissions policy issues are visible and important to Canadians. Dramatic climate events and the extensive media coverage that follows them have made this issue top of mind for many people around the world. The following offers a whole-of-industry perspective on energy use and GHG emissions that extends beyond TSM reporting.

IN 2013, 85% OF FACILITIES REPORTED A LEVEL A OR HIGHER FOR IMPLEMENTING COMPREHENSIVE ENERGY USE AND GHG EMISSIONS TRACKING AND REPORTING SYSTEMS FOR INTERNAL AND PUBLIC REPORTING.

MINERAL EXTRACTION

According to the Canadian Industrial Energy End-Use Data and Analysis Centre, direct emissions from Canada's operating metal and non-metal mines accounted for just 0.91% of the country's total GHG emissions in 2012 (see Figure 34).

Despite having no federally regulated targets, many extraction operations are improving their capabilities in compressed air, ventilation, metering and energy management. Canadian mining companies are also actively involved in innovation initiatives to find fuel efficiencies for large mobile equipment, such as a project currently being undertaken by Shell Canada and Caterpillar to develop a liquefied natural gas engine for haul trucks. Investment in these areas is a priority for the industry as older and deeper mines require more energy to access and extract the same amount of ore. Mines in northern Canada face a special energy challenge because of the lack of electrical grid capacity, making them more reliant on more expensive fossil fuel than their centrally located counterparts. As a result, some mines are less able to lower their carbon emissions due to the remoteness of their locations and the infrastructure challenges they face.

METAL SMELTING AND REFINING

Processing minerals and metals is an energy-intensive activity. The industry's base metal smelters, iron ore pellet plants and oil sands operations have generally been categorized as "large emitters" in past federal policies.

The most energy-intensive players in the mining sector, smelting and refining facilities, have greatly improved their energy use and GHG intensity over the past two decades. Despite volatility, the primary metal smelting and refining sector brought down the energy required per unit produced from 50.4 terajoules per kilotonne of output in 1990 to 40.7 in 2012—a 19% improvement (see Figure 34). The sector cut its total direct GHG emissions from three megatonnes of CO₂e in 1990 to 2.3 megatonnes in 2012, a 23% reduction.

OIL SANDS

About 20% of the oil sands reserves are close enough to the surface to be mined, while about 80% are accessible through in-situ treatment. While mining causes a larger land disturbance, in-situ methods are generally more energy intensive. According to a 2012 IHS CERA report, well-to-wheels GHG emissions from oil sands crude oil average 11% higher than the average crude oil refined in the United States, with oil sands mining in the lower range and in-situ processes in the higher emissions range. Well-to-wheels emissions include those produced during crude oil extraction, processing, distribution and combustion in an engine.

Despite the higher GHG emissions per barrel, direct emissions from the oil sands themselves contribute a relatively small amount to global anthropogenic GHG emissions. According to the Canadian Energy Research Institute, the most recent estimate of global GHG emissions in the Intergovernmental Panel on Climate Changes' 5th Assessment Report is for 2010, where approximately 49 gigatonnes of CO₂ were emitted. Canada's 2014 National Inventory Report stated that 699 megatonnes were emitted in 2010. Of this, 52 megatonnes came from oil sands activity and accounted for 8.7% of Canada's GHG emissions.

While this is a sizeable contribution to Canada's GHG emissions, Canada is a small contributor to total global emissions, accounting for approximately 1.4%. At approximately 0.1% of total global emissions in 2010, even a drastic decrease in the emissions from the oil sands sector will do relatively little to reduce world GHG emissions in the absence of significant reduction efforts from other countries and industries.

Oil sands production has a track record of continuous improvement in emissions reduction. Between 1990 and 2012, GHG emissions associated with every barrel of oil sands crude produced have been reduced by 28%. For oil sands mining, GHG emissions reductions have been driven through innovations such as hydrotransport and efficiency improvements in bitumen extraction, upgrading,

CANADA'S OIL SANDS INNOVATION ALLIANCE

The recent formation of Canada's Oil Sands Innovation Alliance (COSIA) is a good example of industry collaboration on environmental issues. COSIA brings together 13 of the largest companies involved in Canada's oil sands, representing almost 90% of oil sands production, and focuses on performance improvements for four key environmental challenges: tailings, water, land and greenhouse gas emissions. Member companies have agreed to break down some of the barriers of funding, intellectual property and human resources that sometimes impede the discovery and implementation of breakthrough technologies in these areas. COSIA is building and expanding on the progress made in recent years by several industry research and development organizations. By setting clear environmental goals, and working together to achieve real solutions, this new and larger alliance is taking collaboration and sustainable development to the next level.

and natural gas-fired cogeneration for electricity and steam. With the advancement of steam-assisted gravity drainage about a decade ago, technical improvements have continually enhanced the steam-to-oil ratio, increasing the efficiency of this process. Despite reductions in the energy intensity of each barrel of oil produced, the absolute level of GHG emissions has grown as oil sands production volumes have increased.

Other options for lowering emissions include the potential application of nuclear power to supply electricity and steam and the implementation of large-scale carbon capture and sequestration (CCS). While benefits from each of these options could significantly reduce GHG emissions, there are challenges with their implementation. Alberta has no experience with nuclear power and has no nuclear infrastructure, and the oil sands projects are located far away from each other, making it difficult to transport steam from a central location. CCS technology is still maturing with only a couple of operations in the world. Views of the technology are also mixed. In Alberta this year, Premier Jim Prentice called into question the merits of the technology. Meanwhile, Saskatchewan made history in October 2014 by launching the world's first commercial-scale carbon-

capture and storage operation at a coal-fired power plant. The success and functionality of Saskatchewan's CCS operation in the coming years could affect future carbon sequestration investment decisions the world over.

Technology improvements and efforts to find alternative power will continue into the future as individual companies and the industry as a whole focus on reducing their environmental footprint.

MINING AND NATURAL GAS

Recent developments in natural gas have caught the attention of miners. Technological advances in gas extraction have boosted supply through new finds and increased access to known deposits. Due to market developments in North America, gas prices remain low compared to Europe and Asia. As a cleaner fuel, it also has a smaller GHG footprint than diesel. This places natural gas in a good position to help miners reduce both their energy costs and carbon and other emissions when it is viable to switch.

In the North American market, the price of natural gas had an average monthly price in 2013 of US\$3.72 per million BTU based on Henry Hub, which is less than when the fuel opened in 2000 at US\$4 per million BTU. By comparison, diesel had an average monthly price of US\$21.80 per million BTU in 2013, a near six-fold increase over the price of natural gas. To appreciate this price increase, consider a mine that consumes an average of 2.2 million litres of diesel each month. On a strict price comparison, given approximately 36,500 BTU per litre of diesel, by switching to natural gas the energy cost savings for this one operation would near \$1.5 million per month (approximately \$18 million annually) at 2013 average prices.

Stornoway Diamond Corporation's Renard Diamond Project is a recent example of a mining company embracing the natural gas opportunity. In October 2013, the company announced positive results from a feasibility study on the viability of a power plant fuelled by liquefied natural gas, demonstrating substantial benefits in terms of annual operating costs and environmental emissions compared to a diesel genset option. Highlights of the study include:

- Annual operating cost reductions of between \$8 million and \$10 million over the initial 11-year mine life, representing a mine-life cost savings of \$89 million, or 6.6%
- Incremental capital cost of only \$2.6 million over the cost of diesel gensets, representing a net payback of four months

- An estimated reduction in GHG emissions of 43%, with significant reductions in NO₂ and SO₂

For many mines, however, there are other considerations. Given that natural gas prices are subject to volatility—such as winter price spikes—questions over the viability of switching require detailed analysis. In many situations, miners face similar challenges in accessing natural gas as they do with other diesel-replacing alternatives. In remote areas, particularly in the North, no direct transmission or distribution pipeline network exists—and building one would be a capital-intensive investment. Maritime transportation of natural gas is also expensive as it requires ships and unloading and storage facilities—a compounded challenge as very little port infrastructure currently exists and all-weather road systems are scarce.

Natural gas technologies, however, continue to improve, and incrementally enhance the fuel's usability for miners. Some natural gas generation technologies have been designed to retrofit existing diesel systems, making a fuel switch less capital intensive. From an end-use perspective, progress has been made towards the development of liquid natural gas engines for heavy vehicles. As well, partnerships have formed to co-develop natural gas technology for off-road equipment, such as mining trucks, enhancing the viability of fuel switching for a mining fleet.

MINING AND RENEWABLE ENERGY

Renewable energy technologies and their economics continue to improve. Renewable power is appealing to miners because it has the potential to reduce energy costs and environmental impacts while enhancing energy security and strengthening a company's privilege to operate.

From 1999 to 2011, the annual bill for energy required for mining processes more than doubled, costing Canadian miners \$2.4 billion in 2012. This cost increase can largely be explained by the remote location of many Canadian mines, the lack of regional energy infrastructure, and the resulting dependence on diesel. From 1999 to 2013, the average price of oil increased tenfold, from roughly US\$10 to more than US\$100 per barrel. Heightened transportation costs have also increased the price per unit of delivered fuel, pushing the cost of generation for some remote mines up to \$0.30 per kilowatt hour.

Given the heightened cost of powering mining operations, miners are giving the benefits of renewable technologies greater consideration. The levelized cost of electricity (LCOE) for wind, solar photovoltaic, concentrated solar power and some biomass technologies has steadily decreased,

enhancing their competitiveness, particularly for off-grid generation. A recent International Renewable Energy Agency report noted that the average LCOE for wind, solar and biomass technologies in North America was \$0.08, \$0.16 and \$0.08 per kilowatt hour, respectively.

While attractive, these average prices do not account for additional capital costs associated with remote development. They also vary based on the quality of the renewable resource. Just as miners need to go where the viable deposits are located, renewable generation is contingent on the strength and reliability of the renewable asset. This restriction prevents renewable generation from becoming an industry-wide energy solution, no matter how improved the technology is.



Photo: Glencore, Wind Turbine at the Raglan Mine, Quebec

But for mines that have access to a viable renewable asset, diversifying energy portfolios with a reliable intermittent power source that simultaneously offsets their reliance on diesel has benefits that may merit the investment. Recent examples include Diavik Diamond Mine, IAMGOLD's Rosebel Mine in Suriname, and Glencore's Raglan Mine in Quebec.

GHG EMISSIONS TRENDS AND POLICIES

According to a recent report by the Intergovernmental Panel on Climate Change, global GHG emissions have continued to increase over the past four decades despite a growing number of climate change mitigation policies. The report also states that emissions have increased more rapidly in recent years than at the beginning of this time period. In fact, total GHG emissions were the highest in human history from 2000 to 2010, reaching 49 gigatonnes of carbon dioxide equivalent.

MINERS PUT ENERGY INTO RENEWABLE POWER

In the summer of 2014, after five years of research and preparation, Glencore had a pilot 3-megawatt wind turbine installed at its Raglan Mine. The mine is located on the Ungava Peninsula in Nunavik, Quebec, roughly 1,800 kilometres north of Montreal and historically was 100% reliant on diesel generation. The 3-megawatt turbine is expected to offset diesel dependence by 5%, or approximately 2.4 million litres annually.

The project holds the promise of significant cost savings and emissions reduction. At Raglan Mine, energy typically accounts for approximately 20% of total operating costs. If the wind turbine pilot proves successful, Glencore will consider installing additional turbines that could generate a total of 9 to 12 megawatts of energy, reducing the mine's overall diesel consumption by up to 40%.

This project is another example of industry innovation, as it incorporates three storage technologies— a flywheel, batteries, and a hydrogen storage loop with an electrolyzer and fuel cells— in addition to the wind turbine. As a result wind penetration will increase from 15 to 25% to an anticipated 35 to 55%. These measures enhance the turbine's generation capacity, enabling the company to better leverage the power of wind at the mine site.

As inscribed in the Copenhagen Accord, Canada's current GHG emissions reduction targets are aligned with the United States, and commit Canada to an economy-wide target of a 17% reduction in emissions from 2005 levels. A recent audit report by the Commissioner of the Environment found that Canada is unlikely to meet this target.

Given Canada's turbulent history with climate change policy, it is questionable whether a price will eventually be attached to carbon emissions in Canada and the United States, either through a cap and trade program or through a carbon tax, even though there has been a great deal of talk about the merits and demerits of both approaches.

Recently, however, a climate change deal was signed between the United States and China, committing both

countries to unique country-specific targets. The deal marks the first time that China acknowledges that it must cap and eventually reverse its emissions—a significant statement for the world's largest GHG emitter. Some believe this deal represents a challenge to Canada. Given that Canada's two largest trading partners have reached this agreement leads some analysts to suggest there may be greater impetus for Canada to follow suit.

Recent examples of measures the Canadian government has taken to tackle climate change include steps to reduce GHG emissions from heavy-duty vehicles, regulations to reduce carbon dioxide emissions from the coal-fired generation of electricity, and, most recently, regulations governing the use of industrial boilers. As a component of these targeted actions, it is expected that regulations will be developed for both the oil and gas sector and the mining sector.

Regardless of the scope of the Canadian climate change policies being implemented, or the shape they may take, it is important for any federal policy on GHG emissions to engage all Canadians in the solution and avoid overlap with existing or developing provincial policies. Otherwise, complicated regulatory and reporting systems could result, causing unnecessary duplication. Industry needs clear and consistent regulatory processes if it is to make the right investments in abatement technologies and emissions management systems. The federal government should also avoid a "one size fits all" approach, and should focus on the facilities and regions that will deliver real environmental benefits.

THE CLEAN ENERGY ECONOMY

Around the world, demand for environmental goods and services is on the rise, reflecting concerns over climate change. Promising technology areas include low-carbon energy, energy storage, carbon capture and storage, green buildings and materials, clean vehicles and renewable energy.

This cleaner society depends on metals and minerals as building blocks. Hybrid vehicles, for example, draw energy from nickel hydride batteries. Catalytic converters, which reduce air pollution from vehicles, require platinum, rhodium and cerium. Rechargeable batteries are made from lithium, and solar cells require gallium, indium and germanium. Water purification systems rely on nickel and rare earth elements. The fuel efficiency of aircraft has improved by 70% over the past 40 years because of materials like aluminum, and next-generation technologies will be based on even lighter composites.

Minerals and metals are essential for developing clean energy, whether the source is nuclear, wind or hydrogen. Wind turbines, for example, are made from nickel alloys. So are the gas turbines, shafts and fuel injectors used in small biogas projects (including some Clean Development Mechanism projects in India). Because nickel is strong and resists corrosion, it is well suited to air pollution reduction hardware and renewable energy infrastructure.

Despite debates over the scale of global oil supply—ranging from “peak oil” at one end of the spectrum to abundant supply at the other—projections for coal and shale gas supply extend centuries into the future. As for oil shale, there are hundreds of known deposits across dozens of countries, and estimated reserves are in the trillions of barrels. Therefore, while the world may well move towards cleaner energy in the coming decades, the change will not necessarily be driven by lack of traditional energy supply.

COAL'S ROLE IN A SUSTAINABLE SOCIETY

Coal is required to make steel. About 770 kilograms of steelmaking coal are required to produce 1 tonne of steel, and more than 700 million tonnes of steelmaking coal are used each year in global steel production. Steel is used to create the infrastructure and other materials Canadians use every day. For example, steel is crucial for:

- **Public transportation**—Approximately 30,000 tonnes of steelmaking coal was required to build Vancouver's Canada Line. This 19-kilometre rapid transit line currently accommodates more than three million passenger trips through Vancouver per month.
- **Personal recreation**—Approximately 1.1 kilograms of steelmaking coal are required to build the average bicycle frame.
- **Alternative energy**—Approximately 100 tonnes of steelmaking coal is necessary to produce the steel to build the average wind turbine.

Source: Teck Resources Limited.

RECYCLING AND E-WASTE

E-waste is one of the fastest-growing waste streams in the world and includes items such as mobile devices,

computers, monitors, televisions and DVD players, among other electronic equipment. The lifespan of computers in developing countries, for example, has dropped significantly in recent years, and mobile devices frequently have a lifespan of less than two years. As consumers and businesses favour disposable technology and a shorter life cycle for electronics, the amount of e-waste generated is increasing. In 2011, for example, Canadians possessed over 31 million electronic devices.

A large portion of e-waste can be recycled, components of which can be recovered as “urban ore.” E-waste recycling involves reprocessing obsolete or unwanted electronics that have exhausted their re-use potential and would otherwise be disposed of in landfills. From 50,000 mobile phones, Electronics Product Stewardship Canada estimates that approximately 1 kilogram of gold, 400 grams of palladium, 10 kilograms of silver, and 420 kilograms of copper can be recycled. By recycling these items, valuable materials are kept out of landfills and can produce new products using resources that do not need to be mined.

It is estimated that the world's supply of end-of-life electronics offers a material resource of 40 million tonnes annually, from which a variety of component materials can be recycled. Propelling these efforts internationally is the Basel Convention, which controls the export of hazardous waste and requires e-waste to be treated as close to its origins as possible. The Convention, which entered into force on May 5, 1992, now has 181 parties, 53 of which are signatories, including Canada and the European Union.

While e-waste recycling programs have increased across Canada in recent years, more awareness is needed among Canadians of the options available for recycling old electronics. As well, the future of metal and e-waste recycling in Canada depends partly on how far government regulations go in requiring manufacturers and consumers to take responsibility for the life cycle of the products they use.

ABORIGINAL RELATIONS AND BENEFIT AGREEMENTS

Mining companies have developed progressive relationships with many Aboriginal communities. Given the proximity of many Aboriginal communities to mining operations, and the large number of Aboriginal youth, there is significant potential to create stronger and mutually beneficial partnerships between Aboriginal Canadians and the mining industry.

Proportionally, the mining industry is the largest private sector employer of Aboriginal people in Canada.

E-WASTE RECYCLING IN CANADA

RECYCLABLES:

- Electronic waste—TVs, desktop and portable computers, mobile phones and devices, certain medical and monitoring devices, stereos, printers, DVD players, cameras, and audio and video game consoles.

URBAN ORE:

- Metals—Zinc, lead, germanium, indium, cadmium, arsenic, mercury, copper, gold and silver.

COMPANY IN THE FOREFRONT:

- Glencore’s Horne smelter in Rouyn-Noranda, Quebec, is Canada’s only remaining copper smelter. The operation processed more than 127,000 tonnes of recycled material in 2010, yielding over 35,000 tonnes of metals. The smelter uses precious metal-bearing recyclables as feedstock to make 99% anode copper. The Horne smelter recently doubled its e-waste recycling capacity.

This can be partly attributed to the nearness of 1,200 Aboriginal communities to mining operations. Most of these communities are located within 200 kilometres of approximately 180 producing mines and more than 2,500 active exploration properties. This geographical proximity makes for strong connections, but more can be done to enhance relationships between industry and Aboriginal communities. (See Section 4 of this report for more discussion.)

Over the past decade, the Canadian mining industry has increasingly embraced the signing of impact benefit agreements (IBAs) or other agreements (such as community and impact benefit agreements, community benefit agreements, and community participation agreements) between mining companies and Aboriginal peoples. Such agreements have helped proponents garner local support for their projects. While earlier agreements typically contained provisions for employment and training, more recent ones have also tended to address business opportunities through set-aside contracts and joint ventures, social and cultural considerations, environmental monitoring, funding arrangements, dispute resolution

mechanisms, and direct payment and resource-sharing provisions, among other arrangements.

Since the groundbreaking 1974 Strathcona Agreement, Natural Resources Canada estimates that 335 bilateral agreements (IBAs or other agreements at the exploration stage) have been signed for 198 mining projects in Canada, and that 265 of them remain active.

Progressive agreements, such as the EKATI mine project agreement in the Northwest Territories and the Raglan agreement in Quebec, can provide Aboriginal communities with jobs, skills training, profit sharing and environmental benefits. Agreements between Vale and Labrador’s Innu and Inuit people include sections on training, employment, contracting, financial benefits, environmental matters and dispute settlement. The partnership between the Government of British Columbia and the Stk’emlupsemc of the Secwepemc Nation (SSN) sees the provincial government sharing revenues from New Gold’s New Afton mine directly with the SSN, in addition to New Afton’s separate agreement with the same bands. This government-to-government agreement broke new ground in Aboriginal and natural resources public policy, providing the confidence and mutual benefit needed for mining projects to move forward. Since then, other revenue-sharing agreements have been struck between the Government of British Columbia and First Nations communities across the province.

While the relationship between mining companies and Aboriginal Canadians has largely been positive, several public policy issues currently create uncertainty for both groups. Mining companies operating in Canada have seen an increasing level of complexity related to the Crown’s duty to consult. This complexity is largely reflected in the different policy responses by federal, provincial and territorial governments as to what the actual “trigger” is for consultation, how the consultation process will unfold, who will lead the process, what procedural aspects are delegated to companies, and what support exists for the parties involved. Added to this is the frequent duplication and lack of coordination of effort by both levels of government on consultation activities for the same project.

The Canadian mining industry believes that the Supreme Court of Canada’s June 2014 decision regarding the Tsilhqot’in First Nation provides some additional clarity on how Aboriginal land title is established and reaffirms the Crown’s right of infringement of titled land when compelling public objectives exist.

ABORIGINAL PERSPECTIVE ON BENEFIT AGREEMENTS

Aboriginal economic development corporations (EDCs) are the economic and business development arm of a First Nations, Métis or Inuit government, and are a major economic driver in Aboriginal communities. In 2011, the Canadian Council for Aboriginal Business published a survey of 50 EDCs across Canada. Of those surveyed, 32% of respondents stated they had benefited from IBAs through community-negotiated provisions for contracting and subcontracting to local Aboriginal businesses. Participants in the survey noted that IBAs ensured that members of their communities could gain access to employment and training opportunities, and that EDCs gained first access to all contracting opportunities.

REGULATORY ENVIRONMENT

Developing and operating a mine in Canada requires compliance with a multitude of federal and provincial or territorial legislative and regulatory requirements. Some of these requirements are specific to mining, while many more apply generally to environmental protection and the health and safety of workers and the public. 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.

New mines and major expansions must undergo federal reviews and approvals in addition to the review and permitting requirements of their provincial jurisdiction. Most major mining projects are subject to the *Canadian Environmental Assessment Act* (CEAA) and, depending on the details of the project and the mine site, they may require approvals under other federal legislation, such as the *Fisheries Act* and the *Navigation Protection Act*.

All three federal Acts were amended in 2012. A review of the Metal Mining Effluent Regulations (MMER) was announced at the same time and is ongoing. The CEAA 2012 came into force in July 2012, and its Regulations Designating Physical Activities were amended in October 2013. Amendments to the *Fisheries Act* came into force in November 2013. Amendments to the *Navigable Waters Protection Act*, changing it to the *Navigation Protection Act*, came into force in April 2014. Several key aspects of

these legislative changes and their consequences remain unknown. It is expected that once fully implemented, there will be an increase in the number of federal approvals required and in the number of mining projects subject to federal environmental assessments. A recent review of the CEAA registry indicates the number of mining projects requiring review relative to other industrial sectors is significant (see Figure 35).

In addition to the uncertainty created by the legislative changes, industry continues to be concerned about inadequate coordination within the federal government and between federal and provincial processes. The Canadian Environmental Assessment Agency and key departments, such as Environment Canada, Fisheries and Oceans Canada and Transport Canada, must work together to ensure mining projects are reviewed once, and that the various federal requirements, along with Aboriginal and public considerations, are integrated into a unified, robust and timely process with meaningful consultation

To assist in all aspects of this process, departments must have the capacity and expertise to work with the mining industry to expeditiously and clearly interpret the new regulations, and provide effective guidance on the implementation of the new requirements in a reasonable and timely way.

To ensure the intended outcomes are achieved, officials within relevant federal, provincial and territorial government departments must 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.

The Major Projects Management Office (MPMO) was set up to coordinate the many agencies and departments that review major resource projects. Funding for the MPMO was renewed at \$54 million over two years in the 2012 federal budget, with an additional \$13.6 million over two years to support consultations with Aboriginal peoples. The funding is up for renewal, and MAC strongly supports its renewal to ensure that the coordination of project approvals can both continue and improve.

FIGURE 29

MINING INDUSTRY RELEASE OF SUBSTANCES TO THE ENVIRONMENT, BASE YEAR TO 2012

	Base Year	2005	2008	2009	2011	2012	% Change Base- 2012
Cadmium	130.1	30.9	19.9	23.4	5.5	6.4	95%
Arsenic	319.5	81.0	110.0	66.4	38.5	25.2	88%
Copper	976.0	352.6	313.9	270.3	222.8	152.4	84%
Lead	1,843.9	198.8	214.5	194.1	115.3	52.8	97%
Mercury	28.2	1.8	2.5	1.1	0.4	0.4	99%
Nickel	1,372.0	392.8	212.9	119.8	138.3	150.6	89%
Zinc	3,014.6	405.3	403.9	554.1	257.6	264.3	91%

Sources: MAC Member Companies, TSM Progress Report 2014.

Note: The air/water pollutant releases are tonnes per year and are primarily associated with the operation of metal smelters and oil sands upgraders. Data is drawn from industry submissions to the federal government's National Pollutant Release Inventory (NPRI). Base year varies by company though it is generally around 1993.

FIGURE 30

MAC MEMBER COMPANY APPLICATION OF INTERNATIONAL STANDARDS AND PROGRAMS

INTERNATIONAL INITIATIVES

MAC MEMBER COMPANY APPLICATION OF INTERNATIONAL STANDARDS AND PROGRAMS

*Applied at international operating facilities.

**TSM is applied at international facilities, but results are not reported publicly.

MAC MEMBER COMPANY APPLICATION OF INTERNATIONAL STANDARDS AND PROGRAMS	Industry Sustainability Initiatives			Management System Standards		International Voluntary Initiatives			Reporting, Disclosure and Transparency Standards			Financing Standards	Listed on Socially Responsible Investing Indices		Commodity Specific Standards			
	MAC Towards Sustainable Mining*	ICMM Sustainable Development Framework	WGC Conflict Free Gold Standard	ISO 14001: EMS Standard	OHSAS 18001	UN Global Compact	Extractive Industries Transparency Initiative	Voluntary Principles on Security and Human Rights	OECD Guidelines for Multinational Enterprises	AA 1000	Global Reporting Initiative	Carbon Disclosure Project	Water Disclosure Project	IFC Social and Environmental Performance Standards	Dow Jones Sustainability Index	Jantzi Social Index	Responsible Jewellery	International Cyanide Code	Kimberley Process

COMPANIES / BUSINESS UNITS HEADQUARTERED IN CANADA WITH INTERNATIONAL OPERATIONS

Agnico Eagle Mines Ltd.	X									X	X			X		X	X	NA	
Barrick Gold Corporation		X		X		X	X	X		X	X	X	X	X			X	NA	
IAMGOLD Corporation	X		X	X	X		X	X		X	X		X		X			NA	
Kinross Gold Corporation						X	X	X		X	X			X	X		X		
HudBay Minerals Inc.**	X			X	X		X	X		X	X	X	X				NA	NA	NA
First Quantum Minerals Inc.	X					X	X	X			X		X				NA	NA	NA
Teck Resources Limited **	X	X		X		X	X	X		X	X	X	X	X	X	X	NA	NA	NA
Vale (Base Metals)		X				X	X			X	X	X					NA	NA	NA
New Gold Inc.**	X		X	X	X	X	X			X	X						X	X	NA
Eldorado Gold				X	X					X	X							X	

COMPANIES HEADQUARTERED OUTSIDE OF CANADA WITH CANADIAN OPERATIONS

Glencore		X	NA	X	X	X	X			X	X	X		X			NA	NA	NA
De Beers Canada Inc.**	X	X		X	X	X	X	X	X	X	X		X				X	NA	X
Newmont Mining Corporation		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	NA	NA	NA
Rio Tinto		X		X	X	X	X	X		X	X	X	X	X			X	X	X
ArcelorMittal				X	X		X			X									

Sources: MAC Member Companies, TSM Progress Report 2014.

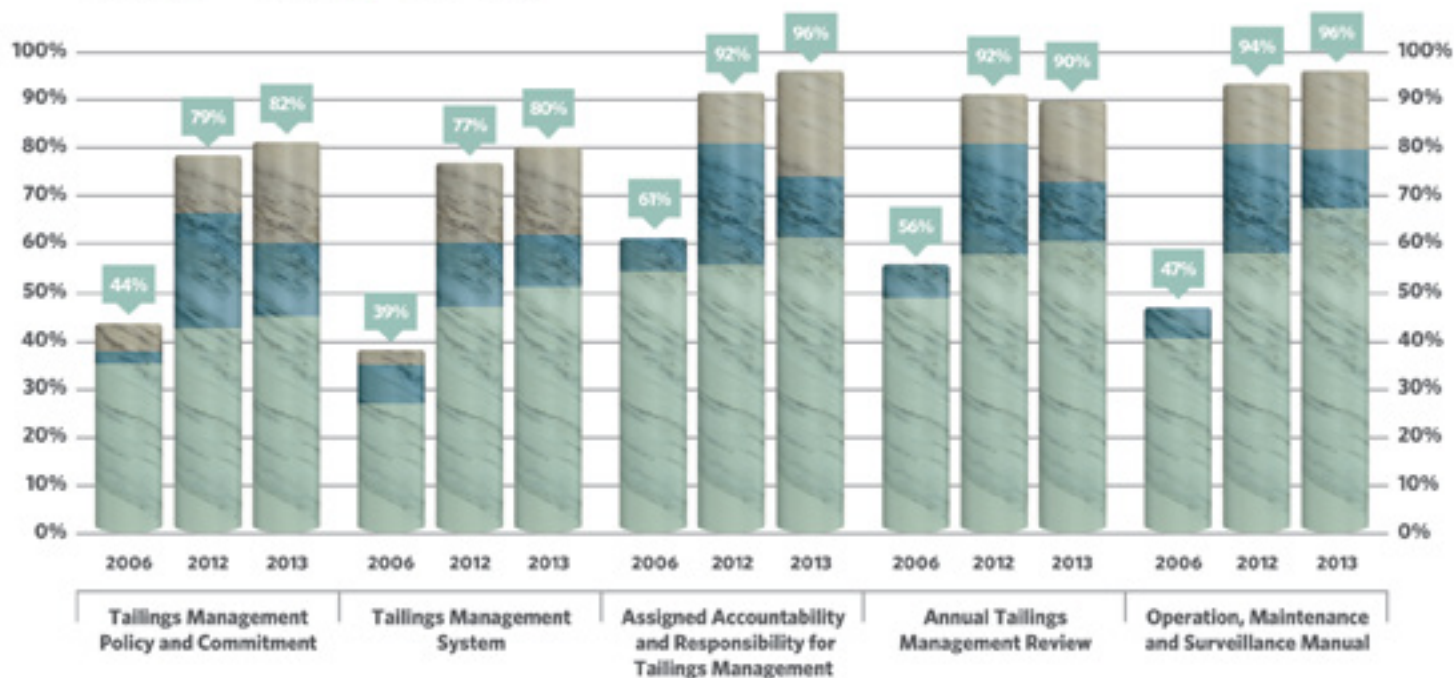
FIGURE 31

TSM TAILINGS MANAGEMENT

TAILINGS MANAGEMENT

PERCENTAGE OF FACILITIES AT LEVEL A OR HIGHER 2006, 2012 AND 2013

Level A ● Level AA ● Level AAA ●



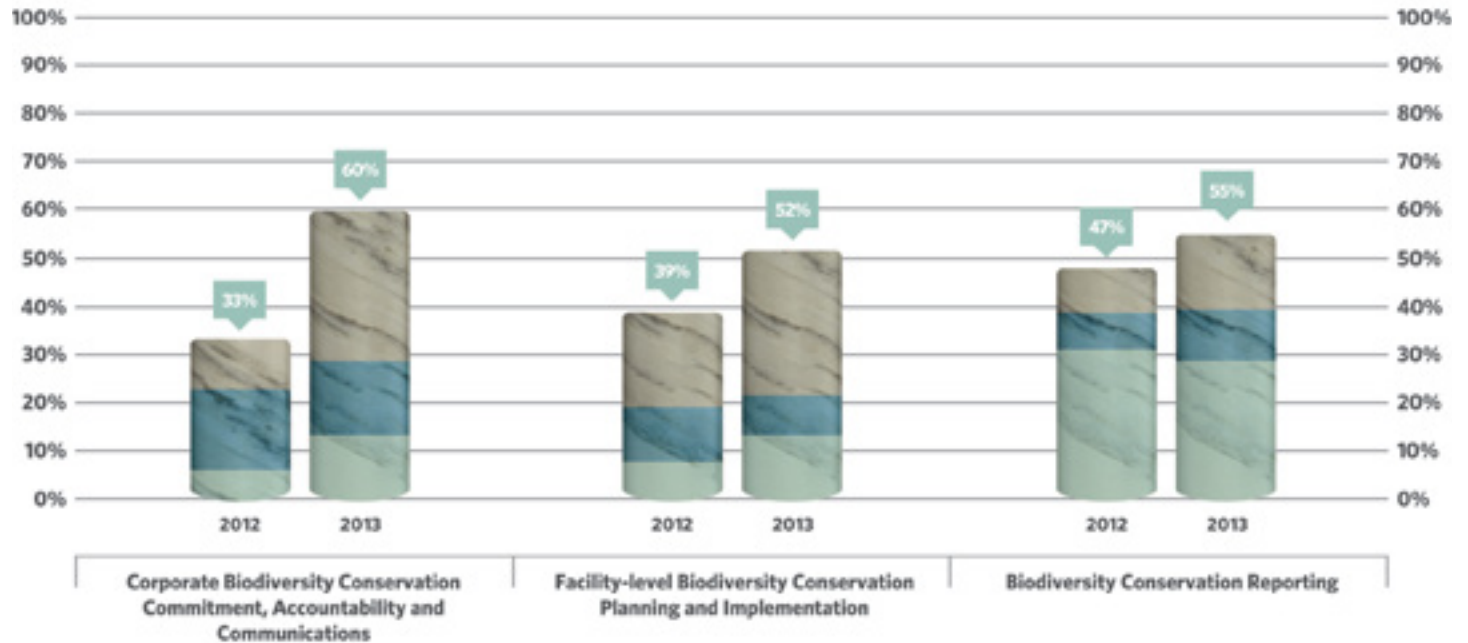
Sources: MAC Member Companies, TSM Progress Report 2014.

FIGURE 32

TSM BIODIVERSITY CONSERVATION MANAGEMENT

BIODIVERSITY CONSERVATION MANAGEMENT PERCENTAGE OF FACILITIES AT LEVEL A OR HIGHER 2012 AND 2013

Level A ● Level AA ● Level AAA ●



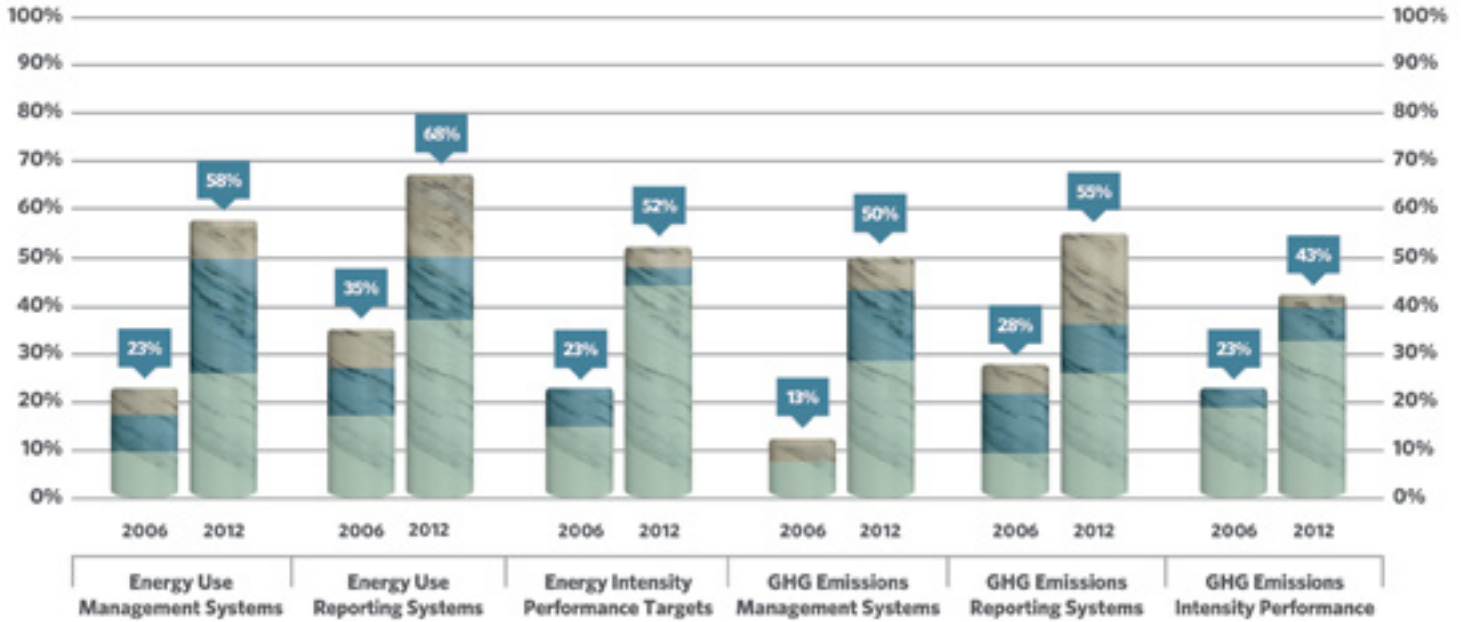
Sources: MAC Member Companies, TSM Progress Report 2014.

FIGURE 33

TSM ENERGY USE & GHG EMISSIONS MANAGEMENT

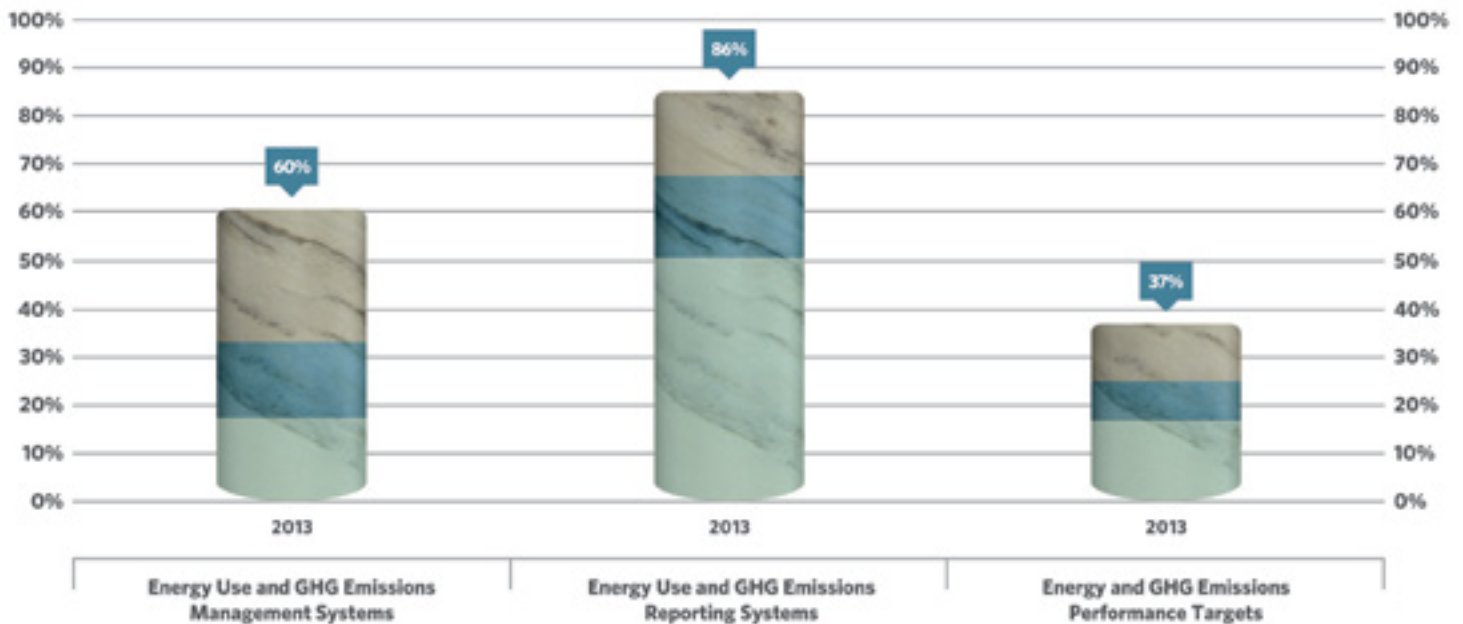
ENERGY USE AND GHG EMISSIONS MANAGEMENT PERCENTAGE OF FACILITIES AT A LEVEL A OR HIGHER 2006 AND 2012

Level A ● Level AA ● Level AAA ●



ENERGY USE AND GHG EMISSIONS MANAGEMENT PERCENTAGE OF FACILITIES AT A LEVEL A OR HIGHER 2013

Level A ● Level AA ● Level AAA ●



Sources: MAC Member Companies, TSM Progress Report 2014.

FIGURE 34

MINING INDUSTRY ENERGY AND GHG EMISSIONS DATA, 1990 AND 2012

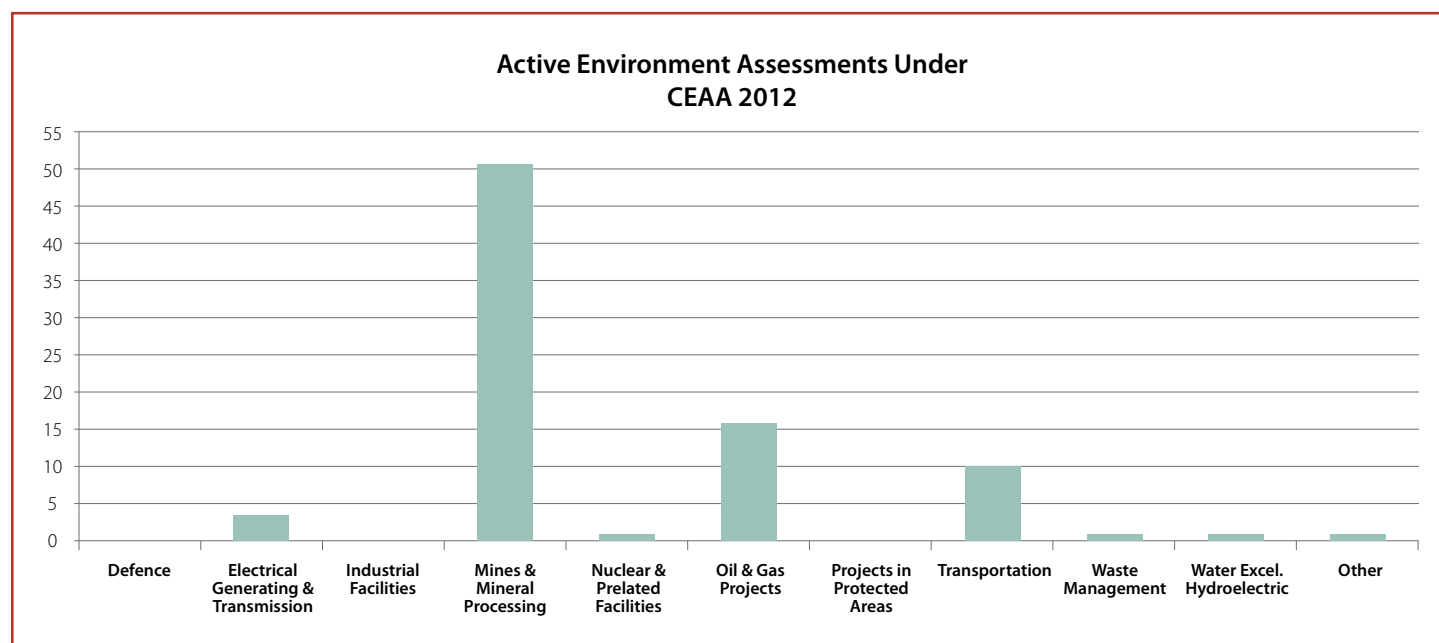
	1990	2012
Canadian economy		
Canadian energy use (PJ)	9,608	11,500
Energy used by broader industry (PJ)	2,400	3,279
Canadian GHG emissions (mt)	592	705
Direct GHG emissions by all industries (mt)	99.1	129.4
Metal and non-metal mining		
Total energy use (PJ)	143	147
Share of Canadian energy use (%)	1.48	1.28
Direct GHG emissions (Mt CO ₂ e)	5.63	6.05
Direct share of Canadian GHG emissions (%)	0.95	0.86
Primary metal smelting and refining		
Total energy use (PJ)	77	59
Share of Canadian energy use (%)	0.8	0.51
Energy per unit (TJ/kt)	50.4	40.7
Direct GHG emissions (Mt CO ₂ e)	3.04	2.33
Direct share of Canadian GHG emissions (%)	0.51	0.33

Source: Canadian Industrial Energy End-Use Data Analysis Centre (CIEEDAC) Report, 2014.
Note: Smelting and refining data are for non-ferrous metals. Also does not include aluminum.

FIGURE 35

ACTIVE ENVIRONMENTAL ASSESSMENTS UNDER CEAA 2012¹

Project Category	Active Environmental Assessments Under CEAA 2012
Defence	0
Electrical Generating & Transmission	3
Industrial Facilities	0
Mines and Mineral Processing	51
Nuclear and Related Facilities	1
Oil and Gas Projects	16
Projects in Protected Areas	0
Transportation	10
Waste Management	1
Water Excl. Hydroelectric	1
Other	1
Total	84



Source: Canadian Environmental Assessment Agency

Note: ¹ The Canadian Environmental Assessment Act, 2012, came into force in July 2012. The above is accurate as at October, 2014.

THE WORLD

INTERNATIONAL MARKET ACTIVITIES AND DEVELOPMENTS

CANADIAN EXPLORATION AND MINING COMPANIES ABROAD HAVE A SIGNIFICANT PRESENCE BEYOND CANADA'S BORDERS. WORLD MARKET CONDITIONS SHAPE THE INDUSTRY, AS DO GLOBAL TRADE AND INVESTMENT POLICIES.

CANADIAN MINING'S INTERNATIONAL PRESENCE

Canadian mining companies operate in more than 100 countries around the world. According to Natural Resources Canada, the value of Canadian mining assets abroad reached \$144.2 billion in 2012, accounting for almost 65% of total Canadian mining assets (see Figure 36). By comparison, this figure is nearly double that of Canadian mining assets at home, which amounted to \$76.1 billion.

As a geographic indicator, five of the top 10 locations for Canada's international assets were Latin American countries, and three were African countries. While some countries attract more mining investment than others, in 2012, Canadian companies were active in 43 of Africa's 55 countries, and in every Latin American country.

There are significant annual investments associated with these assets. In fact, companies listed on the Toronto Stock Exchange (TSX) and the Venture Exchange (TSX-V) raised \$969 million in equity capital for Latin American mining projects in 2013, and \$801 million for African mining projects for the same year. Despite these investments, Canadian mining companies are facing increasing competition from other mining jurisdictions operating internationally, such as Australia and China.

CANADIAN DIRECT INVESTMENT ABROAD

Canadian direct investment abroad (CDIA), and mining's share of that, is an indicator of the industry's international

CANADIAN MINING ASSETS ABROAD IN 2012

In 2012, of the 1,786 companies researched:

- 1,699 (95%) were identified as having mining assets in 2012
- 26 (2%) had mining assets with a value in excess of \$1 billion
- 164 (10%) had revenues
- 875 (52%) had interests outside of Canada
- 646 (38%) had mining assets in at least two countries

Source: Natural Resources Canada.

presence. CDIA totalled \$779 billion in 2013, a 10% increase over 2012 (see Figure 37). Of that, the metallic minerals and metal products sector accounted for \$81.4 billion, or 10%. It is noteworthy that the annual outward flow of the metallic minerals and metal products sector is comparable to the value of domestic Canadian mining assets.

The sector's share of CDIA has held steady at about 10% over the past decade, down from 15% in the 1990s. In the last three years, the percentage has dropped below the 10% threshold. Given the fairly consistent level of CDIA from the metallic minerals and metal products

sector over the past decade, the relative decline can be attributed to large CDIA increases by other sectors.

HOST COUNTRY INVESTMENT

Beyond measuring inflows and outflows of industry capital, the impact of a mine's horizontal value chain on local communities and host countries' national GDP is considerable. This value chain significantly exceeds the taxes and royalties paid to governments, and could help reshape the dialogue around resource nationalism by more clearly identifying mining's economic contributions (see below for more discussion on resource nationalism).

It has been estimated that between 60% and 80% of all money spent in building and operating a mine remains in the host country through wages and local procurement. This estimate is supported by a 2013 World Gold Council report, *Responsible Gold Mining and Value Distribution*, which found similarly high levels of spending remaining in the country. The report surveyed almost 100 gold mines around the world, including several from Canada, and found that out of \$55.6 billion in total expenditures, at least \$44.7 billion (or 80%) was paid out in the country where the operation was situated. Further research into the nature and extent of horizontal flows would be valuable.

INTERNATIONAL TRADE STATISTICS

Despite showing a trade deficit in the third and fourth stages of mining in 2013, the sector as a whole maintained a surplus of \$17 billion. A near fivefold increase from a decade earlier, this surplus indicates a healthy global demand for Canadian mineral products (see Figures 38 and 39). The mining sector in Canada is one of the few sectors that consistently makes a positive contribution to Canada's balance of trade, totalling \$154 billion since 2003.

EXPORT

The value of Canada's mineral and metal exports increased by 3% between 2007 and 2013. Despite falling nearly 10% over the previous year, exports of mineral products for the first three stages of mining remained robust in 2013, at \$75 billion, which is on par with pre-recession levels. Stage 4 exports totalled \$11.7 billion, nearly unchanged from 2012. All told, exports reached \$86.9 billion for all four stages, or 20% of the total value of Canada's exports (see Figure 40).

Approximately half of Canada's mineral and metal exports by value were destined for the United States in 2013, with iron and steel, aluminum, gold, silver, potash, copper, zinc

CANADIAN MINING INDUSTRY—EXPORTS AT A GLANCE IN 2013

Total industry exports: \$86.9 billion

- Metals: \$67.9 billion
- Non-metals: \$13.1 billion
- Coal: \$5.8 billion

Percentage of total Canadian goods exported: 19.6%

Top Five Mineral Exports

	1998 (\$billions)
Iron and steel	10.0
Aluminum	7.1
Gold	3.4
Coal	2.5
Copper	2.5

Top Five Mineral Exports

	2013 (\$billions)
Gold	17.7
Iron and steel	12.1
Aluminum	8.8
Coal, thermal and metallurgical	6.1
Potash and potassium	5.8

Source: Natural Resources Canada. More information in Annex 11.

and nickel holding the largest values (see Annex 11). The European Union is a leading destination for Canadian gold, iron ore, nickel, uranium and diamonds. Other destinations, including China, buy significant volumes of copper, iron ore, coal and potash.

IMPORTS

Imports for all four stages of mining remained high in 2013, totalling \$72.9 billion, down only slightly from 2011's record high of \$76.6 billion. Stages 1, 2 and 3 moved slightly downward, while Stage 4 inched upward. Of Canada's total mineral imports by value in 2013, approximately 50% came from the United States, which equalized the balance of trade between the two countries for minerals and metals. Other regions such as South America and Africa accounted for upward of 30% of imports (see Annex 12).

THE CANADIAN TRADE REGIME

The Canadian mining industry boasts a significant international presence. Its reliance on international market demand for many of its products makes the

industry a major stakeholder in the programs and services that Canada's Department of Foreign Affairs, Trade and Development offers to companies operating abroad. But Canadian mining operations also require a consistent and predictable domestic investment regime so they can plan their business strategies and finance their projects.

Canada remains among the world's most open countries in terms of trade and investment in mining, and has no notable barriers except for some foreign ownership restrictions in uranium, which have typically been waived in cases where reciprocal openness is seen. When it comes to minerals and metals, Canada has one of the most open markets in the world.

THE CANADIAN TRADE AGENDA

The Canadian trade regime is expanding aggressively, giving Canadian miners greater flexibility to expand into

BEHRE DOLBEAR'S RANKING OF COUNTRIES FOR MINING INVESTMENT IN 2014

Behre Dolbear highlights countries whose policies and business conditions promote investment growth in the mining sector. Ranking is based on seven criteria:

- The country's economic system
- The country's political system
- The degree of social issues affecting mining in the country
- Delays in receiving permits due to bureaucratic and other issues
- The degree of corruption prevalent in the country
- The stability of the country's currency
- The competitiveness of the country's tax policy

The top five countries in 2014 are:

Ranking	2014 Rating	2013 Rating	Difference
1. Canada	61.6	54.3	-7.3
2. Australia	60.3	56.3	4.0
3. United States	54.6	41.7	12.9
4. Chile	54.1	51.0	3.1
5. Mexico	46.0	43.1	2.9

new and emerging markets, or export their products more freely to an increasing number of destinations. MAC and the mining industry support the following policy developments and, where appropriate, provide input to Canadian policy makers and negotiators.

Comprehensive Economic and Trade Agreement (CETA) with the European Union.

In August 2014, Canada and the European Union completed the text of the agreement, which allowed translation and the final legal review to begin. Upon implementation, the new agreement will eliminate 98% of Canadian and EU tariffs and phase out most remaining tariffs over time. Of specific interest to the Canadian mining industry is the elimination of the following tariffs:

- Aluminum and aluminum products, from rates averaging 6.3%, with peaks of 10%
- Nickel and nickel products, from rates of up to 3.3%
- Non-ferrous metals, including copper, zinc, lead and tin, from rates averaging 3.1%, with peaks of 9%
- Iron and steel and iron or steel products, from rates of up to 7%

The agreement also expands into areas of investment, labour mobility and enhanced regulatory cooperation, as well as lifts ownership restrictions on uranium. CETA is the first bilateral trade agreement in which Canada has included provisions on regulatory cooperation. By fostering cooperation earlier in the regulatory process, differences in approaches between Canada and the European Union may be reduced, resulting in fewer barriers to trade once regulations are in place.

Canada-Korea Free Trade Agreement. On March 11, 2014, the governments of Canada and South Korea signed a new free trade agreement; Canada's first with a south pacific country. Of specific interest to the Canadian mining industry is the agreement's reduction in tariffs, which are currently upward of 8% for metals including iron, aluminum and nickel. In 2012, the total value of Canadian mineral exports to South Korea exceeded \$1.8 billion. By value, coal is the most significant mining product exported, amounting to more than \$1.1 billion in 2012, followed by aluminum, copper, nickel and zinc.

Freer trade with Central and South America. Canadian mining's presence in this region is one reason why Canada is moving towards more liberal trade relations. Since 2006, free trade agreements with Peru (2009), Panama (2013), Colombia (2011), and Honduras (2014) have come into force, while negotiations are ongoing

with Guatemala, Nicaragua, El Salvador and the Dominican Republic.

Strategic Free Trade Agreements. Canada has entered into three bilateral or multilateral free trade negotiations with India, Japan and the Trans-Pacific Partnership (TPP), which have the potential to significantly augment the Canadian trade landscape. If successfully concluded, these three agreements combined would connect Canada in a trade and investment capacity with approximately two billion people. Given the scope of the TPP, the size of Japan's economy, and the long-term growth projected for India, these partnerships will help diversify Canada's current heavy reliance on US markets.

THE CANADIAN INVESTMENT REGIME

Foreign investment gives Canadian businesses easier access to new technologies and ideas, and enhances connectivity to larger markets and production chains. Ensuring that two-way flows of capital remain fair and open is essential. Negotiating safeguards for industry investment abroad, while enabling foreign investment into Canada, are key.

FOREIGN INVESTMENT PROMOTION AND PROTECTION AGREEMENTS

A Foreign Investment Promotion and Protection Agreement (FIPA) is a bilateral agreement aimed at protecting and promoting foreign investment through legally binding rights and obligations. At the time of writing, Canada has 28 FIPAs in place, has concluded negotiations with eight additional countries, and remains engaged in ongoing negotiations with 11 other countries.

While the enforcement components of FIPAs are rarely used, the mere existence of a FIPA provides foreign governments with a set of rules and expectations for fairness and transparency, and gives investors additional confidence. The speed with which the government has negotiated these agreements has helped facilitate industry investment in key destinations.

CANADA-CHINA FIPA

On September 9, 2012, Canada's Minister of International Trade and Minister for the Asia-Pacific Gateway, Ed Fast, and China's Minister of Commerce, Chen Deming, signed a FIPA between the two nations. Given China's rapidly expanding economy and increasing opportunities for foreign direct investment (FDI), China as a destination for Canadian investment is likely to be significant. The

stock of Canadian direct investment in China was valued at \$4.9 billion at the end of 2013. The stock of FDI into Canada from China was \$16.6 billion at the end of 2013.

INVESTMENT IN AFRICA

Since 2010, the Canadian government has concluded, signed or brought 19 FIPA negotiations into force, 12 of which are with African countries. A further three of the 10 FIPA negotiations currently in negotiation are with African countries. In recent years, many African countries have been seeking to benefit from their natural resource endowments, and have become more open to new mining investments and the expansion of existing mining projects. Some of the major resources mined in Africa are iron ore, diamonds, gold, platinum, uranium, copper and coal.



Photo: IAMGOLD's Village Market Gardening Initiative, near the Essakane Mine, Burkina Faso

While significant opportunities for strong partnerships exist between mining companies and their host countries, challenges must be overcome to ensure projects can develop in ways that enable the host community, country and company to benefit (for more discussion, see Corporate Social Responsibility below).

FOREIGN DIRECT INVESTMENT

The amount of foreign direct investment in Canada (FDIC) in the metallic minerals and metals products sector leaped from \$21.1 billion in 2006 to \$60.6 billion in 2008 and has stayed in that range ever since (see Figure 38). In 2013, the sector's share of FDIC bumped upward to \$66.4 billion. This figure represents 10% of the Canadian total, which is up from the 5–7% seen during the 1990s, reflecting recent foreign acquisitions and Canada's openness to foreign direct investment.

RECENT CANADIAN TRADE DEVELOPMENTS

THE GLOBAL MARKETS ACTION PLAN – EXTRACTIVE SECTOR TRADE STRATEGY & RENEWED CSR STRATEGY

In November 2014, the federal government announced the Extractive Sector Trade Strategy and renewed the Corporate Social Responsibility (CSR) Strategy, now called Doing Business the Canadian Way, as part of the Global Markets Action Plan. Taken together, these two strategies signal that Canada supports and promotes a strong and vibrant Canadian mining sector both at home and abroad. With these strategies, the Government of Canada is also setting a high bar for corporate responsibility performance.

EXTRACTIVE SECTOR TRADE STRATEGY

This new strategy focuses on removing trade barriers through negotiating trade agreements, increasing the knowledge of trade commissioners to better connect Canadian companies with opportunities in other countries, and positioning Canada as a partner of choice for investing abroad. The Extractive Sector Trade Strategy recognizes that Canadian companies that are strong and successful abroad create jobs and opportunities throughout Canada. Moreover, Canada's technical expertise in the natural resources sector positions it well in helping developing nations effectively manage their resource development and wealth. Building capacity is critical to ensuring countries—and their citizens—can realize the economic and social benefits that flow from responsible resource development.

CSR STRATEGY: DOING BUSINESS THE CANADIAN WAY

With the release of the updated CSR Strategy, the federal government has re-committed its efforts to ensure that Canadian companies adopt the highest CSR standards and practices while operating abroad. The strategy includes a number of elements that help Canadian mining companies apply best practices to ensure they are managing environmental impacts and engaging with local communities. Additionally, the Government of Canada has taken steps to strengthen the Office of the Extractive Sector CSR Counsellor and the OECD National Contact Point to help resolve disputes that may arise between communities and Canadian mining companies.

By setting high expectations of companies for their social and environmental practices and strengthening Canada's international dispute resolution mechanisms, the CSR Strategy enhances Canada's position as a global leader in the extractive sector. It will help guide Canadian mining companies in their work with communities to better realize the economic and social benefits of natural resource development, such as local procurement opportunities. The strategy will also provide host governments and investors with the confidence they need to make Canadian mining companies partners of choice in developing mineral resources.

CORPORATE SOCIAL RESPONSIBILITY

Over the past few decades, developing countries have opened up their economies to mineral exploration and development. In the process, Canadian mining companies have often encountered challenging circumstances, such as weak national and local governments, corruption and poverty.

Healthy dialogue continues over the need for more effort to ensure that mining projects in the developing world respect human rights, the environment, and public health and safety. As one of the world's most successful mining countries, Canada has an important role to play in this area.

The Canadian mining industry has actively sought new skills and developed new partnerships in order to improve its performance in the face of these challenges. The result is a very different industry now than existed 20 years ago. By acknowledging its challenges and devoting resources to learning how to address them, the industry is changing the way it does business.

TRANSPARENCY OF MINING PAYMENTS

MAC, in partnership with governments and other stakeholders, has made important contributions to global mining practices. The most notable contribution in 2014 comes from the work of the Resource Revenue Transparency Working Group (RRTWG), a collaboration between MAC, Publish What You Pay-Canada, the Natural Resources Governance Institute, and the Prospectors and Developers Association of Canada. Over a period of two years, the group developed recommendations for Canada's adoption of legislation that would require the mandatory disclosure of payments to governments from mining activities.

POLICY ENVIRONMENTS FOR MINING INVESTMENT

An annual Fraser Institute survey, released in March 2014, asked 690 mineral exploration and development companies which regions (of 112 listed) have the best policy environments for mining investment. Here are some of the results:

- Canadian jurisdictions placed among the world leaders with political stability and security being important variables.
- The top 10 jurisdictions were Sweden, Finland, Alberta, Ireland, Wyoming, Western Australia, New Brunswick, Nevada, Newfoundland and Labrador and Norway.
- Saskatchewan (12) and Yukon (19) were in the top 20 spots.
- The bottom 10 scorers were Kyrgyzstan, Venezuela, Philippines, Mendoza and La Rioja in Argentina, Angola, Zimbabwe, Ivory Coast, Indonesia and Madagascar.

Many of the RRTWG's recommendations are reflected in the recently-introduced *Extractive Sector Transparency Measures Act*, tabled by the Government of Canada in October 2014. The legislation brings Canada in line with other jurisdictions like the United States and the European Union. It enables Canada to better contribute to the global fight against corruption in resource rich countries that are producing minerals, but may not be sharing that wealth with their citizens.

Through the legislation, Canadian mining companies will be required to disclose payments made to host governments, resulting in a credible source of data that citizens can use to hold their governments accountable. The goal is to ensure local communities are benefitting from the mining activities taking place in their region.

The Act does present a few key challenges that need to be addressed. The most prominent concern for industry relates to equivalency, the practice of allowing companies to submit a report to a Canadian regulator that was prepared and filed for another jurisdiction, such as the United States. As currently written, the Act does not provide enough assurance that equivalency will be fully incorporated. The RRTWG felt strongly that equivalency must be a core principal of Canada's transparency regime to not only ease the reporting

burden on companies, but to ensure that the reporting remains consistent in the cases where companies are required to report in multiple jurisdictions. Similar to the issue with equivalency, the Act also does not provide enough assurance that reporting will be required at the project level.

Although not a silver bullet in ending all instances of corruption, the transparency legislation is an important step towards it. But Canada needs to get the new Act right so that it works for all parties involved, especially the companies filing the reports and the citizens using that information to hold their governments accountable for the management of revenues from the mining sector. As such, MAC will continue to work with the federal government in addressing its concerns to ensure the *Extractive Sector Transparency Measures Act* can achieve its goals.

TOWARDS SUSTAINABLE MINING

MAC's Towards Sustainable Mining (TSM) initiative has also attracted international attention recently (see Section 5 of this report for more information). While participation in TSM is mandatory for all MAC members for their Canadian operations, several of our member companies have proactively adopted the program for their international operations. Specifically, IAMGOLD Corporation, First Quantum Minerals, and Agnico Eagle Mines are publicly reporting their TSM performance at their sites overseas. Furthermore, individual countries are expressing interest in TSM as a means of enhancing the responsible mining practices of their respective national mining industries.

Beyond TSM, MAC members subscribe to as many as 17 different international standards, addressing issues such as human rights, climate change, labour, environment, anti-corruption and community development (see Figure 30). These include the United Nations Global Compact, Voluntary Principles on Security and Human Rights, the International Finance Corporation's Performance Standards on Environmental and Social Sustainability, the Global Reporting Initiative and the Extractive Industries Transparency Initiative. Each of these standards requires public reporting and independent assurance to verify that what the company reports is accurate.

INTERNATIONAL MARKET AND POLICY DEVELOPMENTS

Mineral products are strategically important to countries with large or growing infrastructure and manufacturing

sectors. Many countries and governments earn needed revenues from the industry. Recent years have brought some interesting developments in the world market for mining and its products.

STRONG GLOBAL DEMAND, WITH CYCLICAL REALITIES

The cyclical nature of the mining industry is never far from the surface, even during strong economic times. Companies try to even out the cycles by seeking quality properties, managing their risks and keeping a balanced mix of opportunities to provide some flexibility in the face of market fluctuations.

Ups and downs in market demand, despite being perennial in the world of mining, present challenges for mining companies trying to decide where, when, how much and how quickly to invest in exploration, project development or mine expansions.

Cyclical realities aside, demand for metals and minerals is expected to grow in the medium and long term. China and India are the most populous nations in the world, and the second and ninth largest economies globally by nominal GDP. They are also among the top three largest economies based on purchasing power parity. Even though their growth has moderated in recent years, it has remained strong in both countries, despite volatility. They continue to have an appetite for minerals and metals that will only increase, especially because their per capita usage of many metal-intensive products is still relatively low.

Automobile consumption, for example, serves as a measure of demand for mining products because of its metal intensity. According to the most recently available World Bank data (2010), there are only 58 motor vehicles (including cars, buses and freight vehicles) for every 1,000 people in China, and only 18 for every 1,000 people in India. By comparison, the United States has 797 motor vehicles for every 1,000 people, with comparable numbers for other western industrialized countries. In 2012, the populations of China and India were 1.35 billion and 1.24 billion, respectively. Using the above indicator as an approximation, both China and India combined possess 196.8 million motor vehicles, compared to the 250 million vehicles in the United States. Should China and India approach US vehicle density, an additional 1.87 billion vehicles would be required between the two countries.

Ducker Worldwide observes that the average light vehicle in 2010 weighed 3,863 pounds, and was

composed of 65.5% (2,530 pounds) ferrous metal, 8.5% (328 pounds) aluminum, 4% (154 pounds) other metals and 22% (849 pounds) non-metallic materials. By this benchmark, if China and India reached one-third of the vehicle density of the United States, their automobile manufacturing sectors would need 1.57 trillion pounds of ferrous metal, 204 billion pounds of aluminum, and 95 billion pounds of other metals such as lead, zinc, tin and nickel. According to a recent McKinsey report, in 2010, China became the largest automotive market in the world, and is poised to surpass both North American and European markets by 2020, with annual sales forecast to reach 22 million units.

A CHALLENGING CAPITAL ENVIRONMENT

Productivity and capital allocation and access were the top business risks facing mining and metals companies in 2014, according to Ernst & Young. Threatening the long-term growth prospects of major companies and the short-term survival of junior firms, this capital dilemma affects both ends of the mining spectrum.

According to PwC, over the course of 2013, the 40 largest mining companies globally booked record impairments of \$57 billion. These, in addition to the \$40 billion in impairments recorded in 2012, drove aggregate net profits down 72% to their lowest level in a decade, and lowered the companies' collective market capitalization by 23%, or \$280 billion. While net profits from emerging market companies were \$24 billion in aggregate in 2013, companies headquartered in developed countries operated at an aggregate net loss of \$4 billion. Simultaneously, the expectations of both shareholders and host jurisdictions have increased, with greater focus placed on returns to shareholders and value extraction from mineral development for host jurisdictions.

Companies have also made substantial changes in direction. Nearly half of the top 40 companies have replaced their CEOs in the last two years.

Mining companies have largely turned to cost control through productivity enhancements and other measures. There is a strong desire to regain lost productivity to achieve long-term profitability and an adequate return on capital employed. These goals require a whole-of-business response.

Meanwhile, juniors are crunched for cash. Since the economic downturn, investors have generally sought low-risk, short-term yields, rejecting the higher risk nature of exploration investment. These capital challenges have resulted in juniors being restricted from accessing capital,

whereas majors have a significantly reduced appetite to deploy it.

GLOBAL TRADE AND INVESTMENT POLICY

In December 2013, after more than a decade of trade-liberalization negotiations, the World Trade Organization (WTO) experienced a breakthrough when trade ministers clinched a deal in Bali. The “full Bali package” comprises 10 documents that cover issues designed to streamline trade, provide developing countries with more options on food security, and boost trade and development for developing countries. It’s estimated that this will inject US\$1 trillion a year into the world economy, a figure equivalent to the GDP of Indonesia, according to Director-General Roberto Azevêdo. Officials were unanimous in claiming the Bali package had restored some confidence to the WTO’s multilateral trade system and the Doha Round, especially at a time of burgeoning plans for regional or bilateral free trade agreements outside the WTO framework, such as the Trans-Pacific Partnership and the Transatlantic Trade and Investment Partnership.

CARBON TARIFFS

One trade policy measure under discussion is the carbon tariff, where a country applies the tariff against imports from other countries with allegedly weaker greenhouse gas (GHG) emission requirements. Such measures would impose import tariffs or bans on fuels with higher carbon footprints (oil from oil sands being cited most frequently).

One glaring example is the European Union’s attempt, as part of its ambitious efforts to cut carbon emissions, to classify crude produced from oil sands as much dirtier than other fuels.

The European Union’s Fuel Quality Directive (FQD) aims to reduce GHG emissions of fuels by 6% by 2020, compared to 2010 levels. The FQD treats unconventional crudes as higher GHG intensity “feedstocks,” with separate GHG values for oil sands crude oil and select other sources. All other crude oils, including heavy crude, are bundled together as “conventional” crude oil. Oil sands “natural bitumen feedstock” is assigned a GHG value 22% higher than conventional crude oils.

In 2013, ICF International released a report challenging aspects of the methodology that underlie the FQD’s categorization of fuels relative to GHG intensity. Specifically, the report states that “some light and heavy conventional crudes have GHG intensities that are similar or even higher than those of crudes derived from natural

bitumen,” or oil sands oil. The report’s conclusions “do not support the current FQD categorization of feedstock by conventional, natural bitumen and oil shale crude oils.”

In October 2014, the European Commission, seen to be softening its approach, released a proposal that would require petroleum marketers in the 28-nation European Union to reduce the carbon intensity of their fuels, but would not target the oil sands with a specific designation. This adjusted proposal was voted down by a committee of European parliamentarians in December 2014, but remains subject to a full session of the European Parliament in order to pass. It is widely held that getting plenary agreement will be much harder than clearing a committee, meaning the October proposal is likely to pass.

SOVEREIGN WEALTH FUNDS

Arguably the biggest investment policy trend in recent years is the massive spread of sovereign wealth funds (SWFs), investment funds that are owned by governments. Fuelled by natural resource earnings, SWFs have become critical sources of investment funding.

According to the Sovereign Wealth Fund Institute, more than 60 countries now have SWFs. As of December 2014, those assets were valued at more than \$7 trillion—a near \$1 trillion increase year-over-year from 2013. Some SWFs, such as the Alberta Heritage Savings Trust Fund, which is currently valued at \$17.5 billion, are at the sub-national level.

There is considerable policy debate over SWFs. Some analysts are concerned about the funds’ transparency and political orientation, while others support their ability to provide the global economy with liquidity and stability. The Santiago Principles were developed in 2008 to guide SWF practice, although they have been called weak and ineffective.

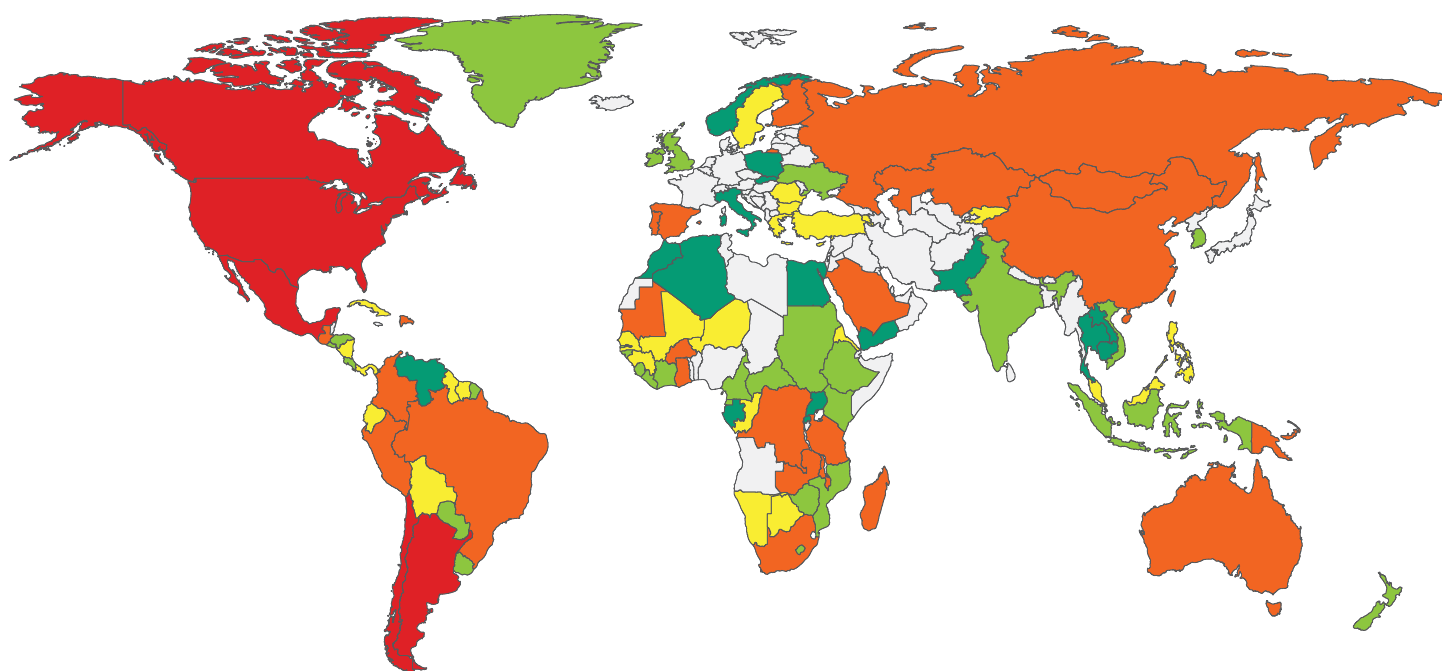
SOVEREIGN WEALTH FUNDS

The Sovereign Wealth Fund Institute ranks SWFs in its regular analysis. The largest in terms of assets are:

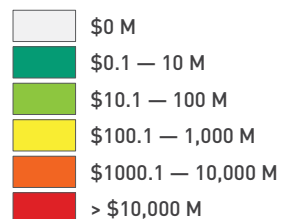
- Norway Pension Fund: \$893 billion
- Abu Dhabi Investment Authority: \$773 billion
- Saudi Arabia’s SAMA: \$757.5 billion
- China Investment Corporation: \$652.7 billion
- China’s SAFE: \$567.9 billion

FIGURE 36

THE GEOGRAPHICAL DISTRIBUTION OF CANADA'S MINING ASSETS, 2012



MINING ASSET VALUE



CANADA
(1379 Companies)
2011 2012
\$67.8 B \$76.1 B

UNITED STATES
(309 Companies)
2011 2012
\$17.0 B \$17.8 B

**CENTRAL AMERICA
AND THE CARIBBEAN**
(30 Companies)
2011 2012
\$8.4 B \$10.9 B

EUROPE
(79 Companies)
2011 2012
\$6.7 B \$9.7 B

ASIA
(80 Companies)
2011 2012
\$15.6 B \$11.7 B

MEXICO
(169 Companies)
2011 2012
\$20.3 B \$20.5 B

SOUTH AMERICA
(243 Companies)
2011 2012
\$44.5 B \$49.8 B

AFRICA
(155 Companies)
2011 2012
\$30.5 B \$22.3 B

OCEANIA
(46 Companies)
2011 2012
\$5.5 B \$6.0 B

Sources: Minerals and Metals Sector, Natural Resources Canada.

Notes: M Millions; B Billions. All amounts are in Canadian dollars. Company counts are for the 2012 reference year and do not add to totals since companies can be active in multiple jurisdictions.

FIGURE 37

METALLIC MINERALS AND METAL PRODUCTS—DIRECT INVESTMENT STOCKS, 1990–2013^P

Direct Investment (\$ millions)	1990	1995	2000	2005	2007	2008	2009	2010	2011	2012	2013
All industries											
Canadian direct investment abroad	98,402	161,237	356,506	452,195	515,294	641,920	629,717	639,911	684,496	711,621	779,292
Foreign direct investment in Canada	130,932	168,167	319,116	397,828	512,266	550,539	572,842	585,107	607,497	633,915	686,256
Metallic minerals and metal products											
Canadian direct investment abroad	13,524	24,466	42,436	56,384	60,831	66,692	73,907	60,420	58,616	62,747	81,453
Foreign direct investment in Canada	9,829	9,553	17,425	21,174	60,672	65,114	59,400	57,681	60,930	58,546	66,422
Percentage of total											
Canadian direct investment abroad	14%	15%	12%	12%	12%	10%	12%	9%	9%	9%	10%
Foreign direct investment in Canada	8%	6%	5%	5%	12%	12%	10%	10%	10%	9%	10%

Source: Statistics Canada, CANSIM Table 376-0052.

Note: The table denotes the amount of outward and inward foreign direct investment in the metallic minerals and metal products sector and the portion this represents of the Canadian total.

^P Preliminary

FIGURE 38

BALANCE OF CANADA'S MINERAL TRADE, 2013

Stage	Domestic Exports (\$)	Total Exports (\$)	Total Imports (\$)	Balance of Trade (\$)
Stage I	27,360,438,285	27,397,092,934	7,231,210,821	20,165,882,113
Stage II	32,780,109,819	33,064,577,849	13,728,820,092	19,335,757,757
Stage III	14,967,739,553	16,169,976,127	20,466,680,658	-4,296,704,531
Stage IV	11,750,474,427	13,460,222,014	31,565,988,708	-18,105,766,694
Total	86,858,762,084	90,091,868,924	72,992,700,279	17,099,168,645

Sources: Natural Resources Canada; Statistics Canada.

As of 2014, Natural Resources Canada no longer includes nitrogen within the minerals and metals trade statistics. Historical data have been revised to reflect this change.

FIGURE 39

VALUE OF CANADA'S MINING AND MINERAL PROCESSING INDUSTRY TRADE, 2003-2013

Year	Domestic Exports (\$ billions)	Total Exports (\$ billions)	Imports (\$ billions)	Balance of Trade (\$ billions)
2003	45.6	47.0	45.0	2.1
2004	53.7	55.5	51.9	3.6
2005	61.0	63.2	56.3	6.8
2006	71.4	74.2	61.6	12.5
2007	80.1	83.6	62.2	21.4
2008	90.2	93.0	68.7	24.3
2009	62.7	65.0	54.7	10.3
2010	80.1	83.1	66.1	17.0
2011	95.8	100.1	76.7	23.4
2012	87.7	90.7	75.1	15.6
2013	86.9	90.1	73.0	17.1

Source: Natural Resources Canada; Statistics Canada.

As of 2014, Natural Resources Canada no longer includes nitrogen within the minerals and metals trade statistics. Historical data have been revised to reflect this change.

FIGURE 40

MINERAL AND MINERAL PRODUCT IMPORTS AND EXPORTS, 2007-2013

(\$ millions)	2007	2008	2009	2010	2011	2012	2013	2013 Percentage of Total
Mineral and Metal Imports								
Stage I	7,778	9,147	6,984	7,709	8,964	8,308	7,231	1.5
Stage II	7,674	9,362	7,742	12,379	15,719	14,266	13,729	2.9
Stage III	19,195	21,389	14,994	18,358	21,393	21,340	20,467	4.3
Stage IV	27,598	28,784	25,020	27,668	30,614	31,189	31,566	6.6
Stage I - IV	62,246	68,682	54,739	66,113	76,690	75,103	72,993	15.3
Metals	52,511	57,379	45,412	55,894	65,750	63,856	61,532	12.9
Non-metals	8,403	9,380	8,116	8,858	9,742	10,034	10,557	2.2
Coal & Coke	1,332	1,924	1,212	1,361	1,198	1,213	903	0.2
Total Imports of Goods	407,301	433,999	365,359	403,701	446,666	462,048	475,579	100.0
Mineral and Metal Domestic Exports								
Stage I	18,092	28,700	19,747	24,533	32,424	29,207	27,360	6.2
Stage II	32,395	30,861	21,876	31,810	36,674	32,303	32,780	7.4
Stage III	16,351	17,264	10,984	13,268	15,534	14,706	14,968	3.4
Stage IV	13,221	13,347	10,084	10,441	11,170	11,534	11,750	2.6
Stage I - IV	80,060	90,173	62,689	80,052	95,802	87,749	86,859	19.6
Metals	66,263	67,119	47,285	61,315	72,680	67,189	67,930	15.3
Non-metals	10,633	16,689	10,324	12,509	14,756	13,793	13,123	3.0
Coal & Coke	3,163	6,365	5,080	6,227	8,366	6,767	5,806	1.3
Total Domestic Exports of Goods	419,944	455,337	334,448	374,015	419,035	427,708	443,464	100.0

Sources: Natural Resources Canada; Statistics Canada.

As of 2014, Natural Resources Canada no longer includes nitrogen within the minerals and metals trade statistics. Historical data have been revised to reflect this change.

ANNEX 1

PRODUCING MINES IN CANADA, 2013

COMPANY	MINE SITE	ACTIVITY TYPE	LOCATION	COMMODITY
Newfoundland & Labrador				
Beaver Brook Antimony Mine Inc.	Beaver Brook	(U, C)	Glenwood	Sb
Rambler Metals and Mining PLC	Nugget Pond	(C)	Snook's Arm	Au
Rambler Metals and Mining PLC	Ming	(U)	Baie Verte	Cu, Au
Anaconda Mining Inc.	Pine Cove	(P, C)	Baie Verte	Au
Teck Resources Limited	Duck Pond	(U, C)	Millertown	Cu, Zn
Vale Newfoundland and Labrador Limited	Voisey's Bay	(P, C)	Voisey's Bay	Ni, Cu, Co
Labrador Iron Mines Holdings Limited	James	(P, C)	Schefferville	Fe
Wabush Mines (Cliffs Natural Resources Inc.)	Scully	(P, C)	Wabush	Fe
Iron Ore Company of Canada (IOC)	Carol Lake	(P, C)	Labrador City	Fe
Tata Steel Minerals Canada	DSO (Timmins)	(P)	Schefferville	Fe
Atlantic Minerals Limited	Lower Cove	(P)	Lower Cove	Limestone, dolomite
Iron Ore Company of Canada (IOC)	Plateau Dolomite	(P)	Labrador City	Dolomite
Nova Scotia				
Nova Scotia Power Inc.	Glen Morrison	(P)	Cape Breton	Limestone
Scotia Limestone Limited	New Campbellton	(P)	New Campbellton	Limestone
CGC Inc.	Little Narrows	(P)	Little Narrows	Gypsum
Antigonish Limestone Ltd.	Southside Antigonish Harbour	(P)	Southside Antigonish Harbour	Limestone
Mosher Limestone Company Limited	Upper Musquodoboit	(P)	Upper Musquodoboit	Limestone, gypsum
Lafarge Canada Inc.	Brookfield	(P, Plant)	Brookfield	Limestone
National Gypsum (Canada) Ltd.	East Milford	(P)	Milford	Gypsum
The Canadian Salt Company Limited	Pugwash	(U)	Pugwash	Salt
Sifto Canada Inc.	Amherst	(Solution mining)	Nappan	Salt
Pioneer Coal Ltd.	Point Aconi	(P)	Point Aconi	Coal (thermal)
Pioneer Coal Ltd.	Stellarton	(P)	Stellarton	Coal (thermal)
New Brunswick				
Glencore Canada Corporation	Brunswick	(U, C)	Bathurst	Pb, Zn, Cu, Ag
Le Groupe Berger Ltée	Baie-Sainte-Anne	(P)	Baie-Sainte-Anne	Vermiculite, perlite
Graymont Inc.	Havelock	(P, Plant)	Havelock	Lime, limestone
Potash Corporation of Saskatchewan Inc.	New Brunswick	(U, Plant)	Sussex	Potash, salt
Brookville Manufacturing Company	Brookville	(P, Plant)	Saint John	Dolomitic lime
Elmtree Resources Ltd.	Sormany	(P, Plant)	Sormany	Limestone
Quebec				
Cliffs Natural Resources Inc.	Bloom Lake	(P, C)	Labrador City	Fe
ArcelorMittal Mines Canada Inc.	Mont-Wright	(P, C)	Fermont	Fe
ArcelorMittal Mines Canada Inc.	Fire Lake	(P)	Fermont	Fe
IAMGOLD Corporation	Niobec	(U, C)	Saint-Honoré-de-Chicoutimi	Nb
Glencore Canada Corporation	Raglan	(P, U, C)	Katinniq	Ni, Cu, Co, PGM
Metanor Resources Inc.	Bachelor Lake	(U, C)	Desmaraisville	Au, Ag
Nystar NV	Langlois	(U, C)	Lebel-sur-Quévillon	Zn, Cu, Au, Ag

ANNEX 1

PRODUCING MINES IN CANADA, 2013

COMPANY	MINE SITE	ACTIVITY TYPE	LOCATION	COMMODITY
Richmont Mines Inc.	Monique	(P)	Val-d'Or	Au
Richmont Mines Inc.	Beaufor	(U)	Val-d'Or	Au, Ag
QMX Gold Corporation	Lac Herbin	(U, C)	Val-d'Or	Au, Ag
Glencore Canada Corporation	Bracemac-McLeod	(U, C)	Matagami	Zn, Cu, Au, Ag
Glencore Canada Corporation	Perseverance	(U, C)	Matagami	Zn, Cu, Au, Ag
Agnico Eagle Mines Limited	Goldex	(U, C)	Val-d'Or	Au, Ag
Wesdome Gold Mines Ltd.	Kiena	(U, C)	Val-d'Or	Au, Ag
Maudore Minerals Ltd.	Sleeping Giant	(C)	north of Amos	Au, Ag
Richmont Mines Inc.	Camflo	(C)	Malartic	Au, Ag
Osisko Mining Corporation	Canadian Malartic	(P, C)	Malartic	Au, Ag
Agnico Eagle Mines Limited	Lapa	(U)	Rivière-Héva	Au
Agnico Eagle Mines Limited	LaRonde	(U, C)	Preissac	Au, Zn, Cu, Pb, Ag
IAMGOLD Corporation	Mouska	(U)	Cadillac	Au, Cu, Ag
Hecla Mining Company	Casa Berardi	(U, C)	North of La Sarre, Casa Berardi Twp.	Au, Ag
The Canadian Salt Company Limited	Seleine	(U)	Îles-de-la-Madeleine	Salt
QIT-Fer et Titane inc.	Tio	(P)	Havre-Saint-Pierre	Ilmenite
Le Groupe Berger Ltée	Saint-Modeste	(P)	Saint-Modeste	Vermiculite, perlite
Elkem Metal Canada Inc.	Sitec Inc.	(P)	Petit lac Malbaie	Silica, silicon carbide
Graymont Inc.	Marbleton	(P, Plant)	Marbleton	Limestone, lime
Junex inc.	Bécancour	(solution mining)	Bécancour	Salt
Graymont Inc.	Bedford	(P, Plant)	Bedford	Limestone, lime
OMYA (Canada) Inc.	Saint-Armand	(P, Plant)	Saint-Armand	Calcium carbonate
Holcim (Canada) Inc.	Joliette	(P)	Joliette	Limestone
Graymont Inc.	Joliette	(P, Plant)	Joliette	Lime, limestone
Silco Sands Inc.	Sainte-Clotilde	(P)	Sainte-Clotilde-de-Châteauguay	Silica, ferrosilicon
IMERYS Mica Suzorite, Inc.	Letondal	(P)	Parent, Suzor Twp.	Mica
Timcal Canada Inc.	Saint-Aimé-du-Lac-des-Îles	(P, Plant)	Saint-Aimé-du-Lac-des-Îles	Graphite
Ontario				
Detour Gold Corporation	Detour Lake	(P, U, C)	Matagami	Au
St Andrew Goldfields Ltd.	Holt	(U, C)	Timmins	Au, Ag
St Andrew Goldfields Ltd.	Holloway	(U)	Timmins	Au, Ag
Kirkland Lake Gold Inc.	Macassa	(U, C)	Kirkland Lake area	Au, Ag
St Andrew Goldfields Ltd.	Hislop	(P, U)	Matheson	Au
Brigus Gold Corp.	Black Fox	(P, U, C)	Matheson	Au
Aurico Gold Inc.	Young-Davidson	(P, U, C)	Kirkland Lake area	Au
Glencore Canada Corporation	Nickel Rim South	(U)	Sudbury	Ni, Cu, Co, PGM, Au
Vale	Garson	(U)	Sudbury	Ni, Cu, Co, PGM, Au, Ag, Se, Te
KGHM Polska Miedz S.A.	Podolsky	(U)	Norman Twp.	Cu, Ni
Vale	Stobie	(U)	Sudbury	Ni, Cu, Co, PGM, Au, Ag, Se, Te
Vale	Clarabelle	(C)	Sudbury	Ni, Cu, Co, PGM, Au, Ag, Se, Te
Vale	Copper Cliff North	(U)	Sudbury	Ni, Cu, Co, PGM, Au, Ag, Se, Te
Goldcorp Inc.	Hoyle Pond	(U)	south of Porcupine	Au, Ag
Lake Shore Gold Corp.	Bell Creek	(U, C)	Timmins	Au
Vale	Creighton	(U)	Sudbury	Ni, Cu, Co, PGM, Au, Ag, Se, Te
Goldcorp Inc.	Dome	(U, C)	Timmins	Au

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PRODUCING MINES IN CANADA, 2013

COMPANY	MINE SITE	ACTIVITY TYPE	LOCATION	COMMODITY
Vale	Ellen	(P, U)	Sudbury	Cu, Ni
First Nickel Inc.	Lockerby	(U)	Sudbury	Ni, Cu, Co, PGM, Au, Ag, Se, Te
Vale	Coleman/McCreedy East	(U)	Sudbury	Ni, Cu, Co, PGM, Au, Ag, Se, Te
Glencore Canada Corporation	Fraser	(U)	Sudbury	Ni, Cu, Co, PGM
Glencore Canada Corporation	Strathcona	(C)	Sudbury	Ni, Cu, Co, PGM, Au, Ag, Se, Te
Glencore Canada Corporation	Kidd Creek	(U, C)	Timmins	Cu, Zn, Ag, Se, Te, In, Cd
KGHM Polska Miedz S.A.	Levack/Morrison	(U)	Sudbury	Cu, Ni
KGHM Polska Miedz S.A.	McCreedy West	(U)	Sudbury	Cu, PGM, Au, Ag
Lake Shore Gold Corp.	Timmins	(U)	Timmins	Au
Richmont Mines Inc.	Island Gold	(U, C)	Dubreuilville	Au
Wesdome Gold Mines Ltd.	Eagle River	(U, C)	Wawa	Au
Barrick Gold Corporation	David Bell	(U, C)	Marathon	Au
Barrick Gold Corporation	Williams	(U, P, C)	Marathon	Au
North American Palladium Ltd.	Lac des Iles	(P, U, C)	Thunder Bay	PGM, Ni, Au, Cu, Co
Goldcorp Inc.	Musselwhite	(U, C)	Thunder Bay	Au, Ag
Goldcorp Inc.	Red Lake	(U, C)	Balmertown	Au, Ag
OMYA (Canada) Inc.	Tatlock	(P)	Tatlock	Calcium carbonate
Lafarge Canada Inc.	Bath	(P)	Bath	Limestone
ESSROC Canada Inc.	Picton	(P)	Picton	Limestone (cement)
Holcim (Canada) Inc.	Ogden Point	(P)	Ogden Point	Limestone (cement)
Unimin Canada Ltd.	Blue Mountain	(P, Plant)	Blue Mountain	Nepheline syenite
Unimin Canada Ltd.	Nephton	(P, Plant)	Toronto	Nepheline syenite
St. Marys CBM (Canada) Inc.	Bowmanville	(P)	Bowmanville	Limestone
CGC Inc.	Hagersville	(P)	Hagersville	Gypsum
E.C. King Contracting Ltd.	Owen Sound	(P)	Owen Sound	Dolomitic lime
Lafarge Canada Inc.	Woodstock	(P)	Woodstock	Limestone
Extender Minerals of Canada Limited	North Williams	(U)	North Williams	Barite
St Marys CBM (Canada) Inc.	St Marys	(P)	St. Marys	Limestone (cement)
Sifto Canada Inc.	Goderich	(U)	Goderich	Salt
IMERYS Talc	Penhorwood	(P)	Penhorwood	Talc
Agrium Inc.	Kapuskasing	(P)	Kapuskasing	Phosphate
The Canadian Salt Company Limited	Windsor	(solution mining)	Windsor	Salt
The Canadian Salt Company Limited	Ojibway	(U)	Windsor	Salt
De Beers Canada Inc.	Victor	(P, Plant)	James Bay Lowlands	Diamonds
Manitoba				
Tantalum Mining Corporation of Canada Limited	Tanco	(U, C)	Lac-du-Bonnet	Cs
San Gold Corporation	Hinge	(U, C)	Rice Lake	Au
San Gold Corporation	Rice Lake	(U, C)	Bissett	Au
Vale	Thompson	(U, P, C)	Thompson	Ni, Cu, Co, PGM
Vale	Birchtree	(U)	Thompson	Ni, Cu, Co, PGM
HudBay Minerals Inc.	Snow Lake	(C)	Snow Lake	Cu, Zn
HudBay Minerals Inc.	Lalor Lake	(U)	Snow Lake	Cu, Zn, Au, Ag
HudBay Minerals Inc.	777	(U)	Flin Flon	Cu, Zn, Au, Ag
Graymont Inc.	Faulkner	(P, Plant)	Faulkner	Limestone, lime
CertainTeed Gypsum Canada, Inc.	Amaranth	(P)	Harcus	Gypsum

ANNEX 1

PRODUCING MINES IN CANADA, 2013

COMPANY	MINE SITE	ACTIVITY TYPE	LOCATION	COMMODITY
ERCO Worldwide	Hargrave	(U, Plant)	Hargrave	Sodium Chlorate
Lehigh Cement Company	Mafeking	(P)	Mafeking	Limestone
Saskatchewan				
Claude Resources Inc.	Santoy 8	(U)	Naolin Lake	Au
Claude Resources Inc.	Seabee	(U, C)	Naolin Lake	Au, Ag
Cameco Corporation	Rabbit Lake	(U, C)	Rabbit Lake	U
Golden Band Resources Inc.	Jolu	(C)	Brabant Lake	Au
Golden Band Resources Inc.	Roy Lloyd/Bingo	(U)	Brabant Lake	Au
Cameco Corporation	McArthur River	(U)	north of Key Lake	U
Cameco Corporation	Key Lake	(C)	north of Highrock Lake	U
Potash Corporation of Saskatchewan Inc.	Rocanville	(U, Plant)	Rocanville	Potash
The Mosaic Company	Esterhazy (K-1 and K-2)	(U, Plant)	Esterhazy	Potash, salt
Big Quill Resources Inc.	Wynyard	(P, U, Plant)	Wynyard	Potassium sulphate
Canadian Clay Products Inc.	Wilcox	(P)	Wilcox	Clay, bentonite
The Mosaic Company	Belle Plaine	(U, Plant)	Belle Plaine	Potash, salt
Potash Corporation of Saskatchewan Inc.	Lanigan	(U)	Lanigan	Potash
The Mosaic Company	Colonsay	(U, Plant)	Colonsay	Potash, salt
Potash Corporation of Saskatchewan Inc.	Allan	(U, Plant)	Allan	Potash
Potash Corporation of Saskatchewan Inc.	Patience Lake	(U, Plant)	Blucher	Potash
Saskatchewan Minerals Inc.	Chaplin Lake	(P, Plant)	Chaplin	Sodium sulphate
Potash Corporation of Saskatchewan Inc.	Cory	(U, Plant)	Cory	Potash
Agrium Inc.	Vanscoy	(U, Plant)	Vanscoy	Potash, salt
Sifto Canada Inc.	Unity	(U, Plant)	Unity	Salt
Prairie Mines & Royalty Limited	Bienfait	(P)	Bienfait	Coal (thermal)
Prairie Mines & Royalty Limited	Boundary Dam	(P)	Estevan	Coal (thermal)
Prairie Mines & Royalty Limited	Poplar River	(P)	Coronach	Coal (thermal)
Alberta				
The Canadian Salt Company Limited	Lindbergh	(solution mining)	Elk Point	Salt
Hammerstone Corporation	Steeptank	(P)	north of Fort McMurray	Limestone
Hammerstone Corporation	Aurora	(P)	Fort McMurray	Limestone
Hammerstone Corporation	Muskeg Valley	(P)	north of Fort McMurray	Limestone
Rio Petro Ltd.	Sunnynook	(solution mining)	Cessford	Salt
Suncor Energy Inc.	Fort McMurray West	(P)	Fort McMurray	Limestone
Canexus Chemicals Canada Ltd.	Bruderheim	(solution mining)	Bruderheim	Salt
Calcium Incorporated	Calling Lake	(solution mining)	Calling Lake	Salt
Tiger Calcium Services Inc.	Mitsue	(solution mining)	Slave Lake	Salt
Graymont Inc.	Summit	(P, Plant)	Coleman	Limestone, lime
Graymont Inc.	Exshaw	(P, Plant)	Exshaw	Limestone, lime
Prairie Creek Quarries Ltd.	Cougar Ridge	(P, Plant)	Rocky Mountain House	Limestone
Lafarge Canada Inc.	Exshaw	(P, Plant)	Exshaw	Limestone
Burnco Rock Products Ltd.	Clearwater	(P, Plant)	Clearwater River	Limestone
Graymont Inc.	Fish Creek	(P, Plant)	Nordegg	Limestone
Lehigh Cement Company	McLeod	(P)	Cadomin	Limestone
Prairie Mines & Royalty Limited	Sheerness	(P)	Hanna	Coal (thermal)

ANNEX 1

PRODUCING MINES IN CANADA, 2013

COMPANY	MINE SITE	ACTIVITY TYPE	LOCATION	COMMODITY
Prairie Mines & Royalty Limited	Vesta	(P)	Cordell	Coal (thermal)
Prairie Mines & Royalty Limited	Paintearth	(P)	Forestburg	Coal (thermal)
Prairie Mines & Royalty Limited	Genesee	(P)	Genesee	Coal (thermal)
Keephills Aggregate Company Ltd.	Burtonsville	(P)	Burtonsville	Coal (thermal)
Transalta Corporation	Highvale	(P)	Seba Beach	Coal (thermal)
Sherritt International Corporation	Coal Valley	(P)	Edson	Coal (thermal)
Teck Resources Limited	Cardinal River	(P)	Hinton	Coal (metallurgical)
Grande Cache Coal Corporation	Grande Cache	(P, U)	Grande Cache	Coal (metallurgical)
Suncor Energy Inc.	Millennium and Steepbank	(P)	Fort McMurray	Upgraded crude oil
Shell Canada Energy	Jackpine	(P)	Fort MacKay	Upgraded crude oil
Syncrude Canada Ltd.	Aurora North and South	(P)	Fort MacKay	Upgraded crude oil
Syncrude Canada Ltd.	Mildred Lake	(P)	Fort MacKay	Upgraded crude oil
Shell Canada Energy	Muskeg River	(P)	Fort MacKay	Upgraded crude oil
Canadian Natural Resources Ltd.	Horizon	(P)	Fort MacKay	Upgraded crude oil
British Columbia				
New Gold Inc.	New Afton	(U, C)	Kamloops	Au, Ag, Cu
Copper Mountain Mining Corporation	Copper Mountain	(P, C)	Princeton	Cu, Au, Ag
Huldra Silver Inc.	Merritt	(C)	Merritt	Ag, Pb, Zn
Teck Resources Limited	Highland Valley Copper	(P, C)	Logan Lake	Cu, Mo
Imperial Metals Corporation	Mount Polley	(P, C)	northeast of Williams Lake	Au, Cu
Taseko Mines Limited	Gibraltar	(P, C)	north of Williams Lake	Cu, Mo
Bralorne Gold Mines Ltd.	Bralorne-Pioneer	(C)	Whistler	Au
Thompson Creek Mining Limited	Endako	(P, C)	Fraser Lake	Mo
Nystar NV	Myra Falls	(U, C)	Buttle Lake	Zn, Cu, Au, Ag
Huckleberry Mines Ltd.	Huckleberry	(P, C)	Houston	Cu, Mo, Au
Georgia-Pacific Canada, Inc.	4J	(P)	Canal Flats	Gypsum
Baymag Inc.	Mount Brussilof	(P)	Mount Brussilof	Magnesite (fused), magnesia (products)
CertainTeed Gypsum Canada, Inc.	Elkhorn	(P)	Windermere	Gypsum
Imasco Minerals Inc.	Crawford Bay	(U)	Crawford Bay	Dolomite, limestone
Imasco Minerals Inc.	Lime Creek	(U)	Lost Creek	Limestone
Mighty White Dolomite Ltd.	Rock Creek	(P, Plant)	Rock Creek	Dolomite
Lafarge Canada Inc.	Falkland	(P, Plant)	Falkland	Gypsum
Lafarge Canada Inc.	Harper Ranch	(P, Plant)	Kamloops	Limestone
Absorbent Products Ltd.	Bud	(P)	Princeton	Calcium, clay
Heemskirk Canada Limited	Bromley Creek/Zeo	(P)	Bromley Creek	Zeolite
Absorbent Products Ltd.	Red Lake	(P)	Kamloops	Diatomite, bentonite, leonardite
Industrial Mineral Processors	Z-2	(P)	Cache Creek	Zeolite
Graymont Inc.	Pavilion Lake	(P, Plant)	Pavilion Lake	Limestone, lime
Lightweight Advanced Volcanic Aggregates Inc.	Nazko	(P)	Quesnel	Pumice
Imperial Limestone Co. Ltd.	Van Anda	(P)	Texada Island	Limestone
Texada Quarrying Ltd. (Lafarge Canada Inc.)	Gillies Bay	(P)	Texada Island	Limestone
Ash Grove Cement Company	Blubber Bay	(P)	Texada Island	Limestone
Fireside Minerals Ltd.	Fireside	(P)	Fireside	Barite
Imasco Minerals Inc.	Benson Lake	(P)	Benson Lake	Limestone
Teck Resources Limited	Coal Mountain	(P)	Sparwood	Coal (metallurgical, thermal)

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PRODUCING MINES IN CANADA, 2013

COMPANY	MINE SITE	ACTIVITY TYPE	LOCATION	COMMODITY
Teck Resources Limited	Line Creek	(P)	Sparwood	Coal (metallurgical, thermal)
Teck Resources Limited	Elkview	(P)	Sparwood	Coal (metallurgical)
Teck Resources Limited	Fording River	(P)	Elkford	Coal (metallurgical)
Teck Resources Limited	Greenhills	(P)	Sparwood	Coal (metallurgical)
Peace River Coal Partnership	Trend	(P)	Tumbler Ridge	Coal (metallurgical)
Walter Energy, Inc.	Wolverine-Perry Creek	(P, U)	Tumbler Ridge	Coal (metallurgical)
Walter Energy, Inc.	Brule	(P)	Tumbler Ridge	Coal (metallurgical)
Walter Energy, Inc.	Willow Creek	(P)	Tumbler Ridge	Coal (metallurgical)
Hillsborough Resources Limited	Quinsam	(U)	Campbell River	Coal (thermal)
Yukon				
Yukon Zinc Corp.	Wolverine	(U, C)	Ross River, Watson Lake	Zn, Ag, Cu, Pb, Au
Alexco Resource Corp.	Bellekeno	(U, C)	Keno Hill	Ag, Pb, Zn, Au
Capstone Mining Corporation	Minto	(P, C)	Pelly Crossing	Cu, Au, Ag
Northwest Territories				
North American Tungsten Corporation Ltd.	CanTung	(U, C)	Cantung	W
Diavik Diamond Mines Inc.	Diavik	(U, Plant)	Lac de Gras	Diamonds
Dominion Diamond Corporation	Ekati	(U, Plant)	Lac de Gras	Diamonds
De Beers Canada Inc.	Snap Lake	(U, Plant)	Snap Lake	Diamonds
Nunavut				
Agnico Eagle Mines Ltd.	Meadowbank	(P, C)	Baker Lake	Au

Source: Natural Resources Canada.

(P.) Open-Pit, (U.) Underground, (C.) Concentrator

Note: Excluded operations are clay products, peat, and most construction materials (most stone, sand and gravel). Included are operations that produced during 2012.

ANNEX 2

MINING ESTABLISHMENTS IN CANADA, BY MINERAL, PROVINCE OR TERRITORY, 2013^P

	NL	PE	NS	NB	QC	ON	MB	SK	AB	BC	YT	NT	NV	TOTAL
Metals														
Iron Ore	3	-	-	-	3	-	-	-	-	-	-	-	-	6
Gold & Silver Ore	1	-	-	-	15	13	1	2	-	1	-	-	1	34
Lead-zinc ore	-	-	-	1	-	-	-	-	-	-	2	-	-	3
Nickel-copper ore	1	-	-	-	1	4	1	-	-	-	-	-	-	7
Copper, copper-zinc ore	2	-	-	-	3	1	1	1	-	7	1	-	-	16
Molybdenum	-	-	-	-	-	-	-	-	-	1	-	-	-	1
Uranium	-	-	-	-	-	-	-	3	-	-	-	-	-	3
Other Metals	-	-	-	-	2	1	1	-	-	-	-	1	-	5
TOTAL METALS	7	0	0	1	24	19	4	6	0	9	3	1	1	75
Non-Metals														
Chrysotile	-	-	-	-	0	-	-	-	-	-	-	-	-	0
Diamonds	-	-	-	-	-	1	-	-	-	-	-	3	-	4
Gypsum	-	-	3	-	-	-	1	-	-	1	-	-	-	5
Peat	1	1	1	23	31	1	6	1	7	1	-	-	-	73
Potash	-	-	-	1	-	-	-	9	-	-	-	-	-	10
Salt	-	-	2	-	1	4	-	3	1	-	-	-	-	11
Sand and gravel	2	-	8	11	103	268	20	65	221	94	1	-	-	793
Stone	3	-	17	8	90	101	9	-	22	25	-	-	-	275
Shale, Clay and other refractory minerals	-	-	1	-	2	2	-	1	1	1	-	-	-	8
Other nonmetals	-	-	-	-	3	2	-	1	-	2	-	-	-	8
TOTAL NON-METALS	6	1	32	43	230	379	36	80	252	124	1	3	0	1,187

Sources: Natural Resources Canada; Statistics Canada.

- Nil

^P Preliminary

ANNEX 3

CANADIAN PRODUCTION OF LEADING MINERALS BY PROVINCE AND TERRITORY, 2013^p

	POTASH (K ₂ O) ¹		GOLD		IRON ORE		COAL		COPPER	
	KILOTONNES	\$000	TONNES	\$000	KILOTONNES	\$000	KILOTONNES	\$000	KILOTONNES	\$000
Newfoundland	-	-	693	32,954	19,842	x	-	-	56,229	424,362
Prince Edward Island	-	-	-	-	-	-	-	-	-	-
Nova Scotia	-	-	-	-	-	-	-	-	-	-
New Brunswick	x	x	70	3,333	-	-	-	-	3,187	24,054
Quebec	-	-	35,046	1,666,485	22,928	x	-	-	24,996	188,643
Ontario	-	-	59,217	2,815,839	-	-	-	-	212,165	1,601,211
Manitoba	-	-	4,958	235,744	-	-	-	-	30,442	229,744
Saskatchewan	x	x	2,105	100,076	-	-	x	x	857	6,469
Alberta	-	-	25	1,183	-	-	x	x	-	-
British Columbia	-	-	6,016	286,065	-	-	31,419	3,594,976	266,924	2,014,477
Yukon	-	-	2,795	132,894	-	-	-	-	18,377	138,690
Northwest Territories	-	-	-	-	-	-	-	-	293	2,213
Nunavut	-	-	13,130	624,331	-	-	-	-	-	-
Canada	10,140	6,102,907	124,054	5,898,903	42,770	5,333,922	68,331	4,363,099	613,471	4,629,863

	NICKEL		DIAMONDS		SAND AND GRAVEL ³		CEMENT ²		STONE ⁴	
	KILOTONNES	\$000	000'S OF CARATS	\$000	KILOTONNES	\$000	KILOTONNES	\$000	KILOTONNES	\$000
Newfoundland	60,125	940,177	-	-	3,440	14,847	-	-	9,766	48,138
Prince Edward Island	-	-	-	-	72	669	-	-	x	x
Nova Scotia	-	-	-	-	4,387	33,932	x	x	8,984	86,137
New Brunswick	-	-	-	-	2,694	14,494	-	-	7,370	59,753
Quebec	32,141	502,588	-	-	22,281	123,268	2,421	304,752	41,740	444,542
Ontario	95,333	1,490,725	652	402,288	81,226	496,303	5,048	581,966	55,190	574,772
Manitoba	27,080	423,445	-	-	15,964	83,385	-	-	9,629	80,430
Saskatchewan	-	-	-	-	14,323	98,228	-	-	-	-
Alberta	-	-	-	-	53,353	528,475	x	x	5,401	58,849
British Columbia	-	-	-	-	25,524	231,114	x	x	14,003	109,933
Yukon	-	-	-	-	1,371	10,172	-	-	x	x
Northwest Territories	-	-	9,909	1,561,227	575	4,414	-	-	x	x
Nunavut	-	-	-	-	-	-	-	-	-	-
Canada	214,679	3,356,935	10,562	1,963,515	225,208	1,639,303	11,757	1,556,466	152,512	1,466,856

Sources: Natural Resources Canada; Statistics Canada.

^p Preliminary; - Nil; x Confidential

¹ Excludes shipments to Canadian potassium sulphate plants.

² Mineral production of sand and gravel for Nunavut is included in totals for the Northwest Territories.

³ Includes exported clinker minus imported clinker.

⁴ Shipments of stone to Canadian cement, lime and clay plants are not included.

ANNEX 4

CANADA'S WORLD ROLE AS A PRODUCER OF CERTAIN IMPORTANT MINERALS, 2013^P

		World	Rank of Five Leading Countries				
			1	2	3	4	5
			Canada	Russia	Belarus	China	Germany
Potash (K ₂ O equivalent)	000 t	34,600	10,500	5,300	4,900	4,300	3,000
(mine production)	% of world total		30.3	15.3	14.2	12.4	8.7
			Kazakhstan	Canada	Australia	Niger	Namibia
Uranium (metal content)	t	58,394	21,317	8,999	6,991	4,667	4,495
(mine production) (for 2012)	% of world total		36.5	15.4	12.0	8.0	7.7
			Congo	Canada	China	Russia	Australia
Cobalt (mine production)	t	120,000	57,000	8,000	7,100	6,700	6,500
	% of world total		47.5	6.7	5.9	5.6	5.4
			China	Russia	Canada	United States	UAE
Aluminum (primary metal)	000 t	47,300	21,500	3,950	2,900	1,950	1,800
	% of world total		45.5	8.4	6.1	4.1	3.8
			China	Russia	Canada	Bolivia	Austria
Tungsten (mine production)	t	71,000	60,000	2,500	2,200	1,200	800
	% of world total		84.5	3.5	3.1	1.7	1.1
			South Africa	Russia	Zimbabwe	Canada	United States
Platinum group metals	kg	403,000	222,000	107,000	21,000	20,000	16,200
(metal content)	% of world total		55.1	26.6	5.2	5.0	4.0
			China	United States	Russia	Canada	Saudi Arabia
Sulphur, elemental	000 t	69,000	10,000	9,100	7,300	6,000	4,100
(mine production)	% of world total		14.5	13.2	10.6	8.7	5.9
			South Africa	China	Australia	Canada	Vietnam
Titanium concentrate	000 t	6,790	1,100	950	940	770	500
(Ilmenite)	% of world total		16.2	14.0	13.8	11.3	7.4

ANNEX 4

CANADA'S WORLD ROLE AS A PRODUCER OF CERTAIN IMPORTANT MINERALS, 2013^P

		World	Rank of Five Leading Countries				
			1	2	3	4	5
			Russia	Botswana	D.R.C.	Australia	Canada
Diamonds (precious) ¹	000 carats	130,482	37,884	23,188	15,682	11,729	10,562
	% of world total		29.0	17.8	12.0	9.0	8.1
			Philippines	Indonesia	Russia	Australia	Canada
Nickel (mine production)	000 t	2,490	440	440	250	240	225
	% of world total		17.7	17.7	10.0	9.6	9.0
			China	United States	Germany	India	Canada
Salt (mine production) ²	000 t	280,000	71,000	40,100	18,000	12,000	11,000
	% of world total		25.4	14.3	6.4	4.3	3.9
			China	United States	Chile	Peru	Mexico
Molybdenum (Mo content) ³	t	270,000	110,000	61,000	36,500	16,900	11,000
(mine production)	% of world total		40.7	22.6	13.5	6.3	4.1
			China	South Korea	Japan	Mexico	Kazakhstan
Cadmium (metal) ⁴	t	21,800	7,400	3,900	1,900	1,630	1,400
	% of world total		33.9	17.9	8.7	7.5	6.4
			China	Australia	United States	Russia	Peru
Gold (mine production) ⁴	t	2,770	420	255	227	220	150
	% of world total		15.2	9.2	8.2	7.9	5.4
			China	Australia	Peru	United States	India
Zinc (mine production) ⁴	000 t	13,500	5,000	1,400	1,290	800	760
	% of world total		37.0	10.4	9.6	5.9	5.6
			Chile	China	Peru	United States	Australia
Copper (mine production) ⁵	000 t	17,900	5,700	1,650	1,300	1,220	990
	% of world total		31.8	9.2	7.3	6.8	5.5

ANNEX 4

CANADA'S WORLD ROLE AS A PRODUCER OF CERTAIN IMPORTANT MINERALS, 2013^P

		World	Rank of Five Leading Countries				
			1	2	3	4	5
			China	Australia	Brazil	India	Russia
Iron ore (mine production) ⁵	000 t	2,950	1,320	530	398	150	102
	% of world total		44.7	18.0	13.5	5.1	3.5
			Mexico	China	Peru	Australia	Russia
Silver ⁶	t	26,000	5,400	4,000	3,500	1,700	1,700
	% of world total		20.8	15.4	13.5	6.5	6.5
			China	Australia	United States	Peru	Mexico
Lead (mine production)	000 t	5,400	3,000	690	340	250	220
	% of world total		55.6	12.8	6.3	4.6	4.1
			China	United States	India	Indonesia	Australia
Coal (primary)	000 t	8,694,754	4,025,377	1,016,458	649,644	488,112	463,783
	% of world total		46.3	11.7	7.5	5.6	5.3
			China	United States	Iran	Thailand	Spain
Gypsum (mine production)	000 t	160,000	50,000	16,300	14,000	9,000	7,100
	% of world total		31.3	10.2	8.8	5.6	4.4
			Russia	China	Brazil	Kazakhstan	Canada
Chrysotile (asbestos)	000 t	2,000	1,000	440	300	240	0
(mine production)	% of world total		50.0	22.0	15.0	12.0	0.0

Sources: U.S. Geological Survey (USGS); U.S. Energy Information Administration (USEIA); World Nuclear Association; Kimberley Process

Notes:

^P Preliminary

n.a. Not applicable.

¹ Canada ranked 3rd by value

² Canada tied for 5th

³ Canada ranked 6th

⁴ Canada ranked 7th

⁵ Canada ranked 9th

⁶ Canada ranked 10th

ANNEX 5

MINERAL PRODUCTION OF CANADA, 2009-2013^P

METALLIC MINERALS		2009		2010		2011		2012		2013 ^P	
	Unit	(quantity)	(\$000)	(quantity)	(\$000)	(quantity)	(\$000)	(quantity)	(\$000)	(quantity)	(\$000)
Antimony	t	54	318	x	x	x	x	x	x	76	799
Bismuth	t	87	1,615	91	1,759	136	3,346	110	2,370	35	639
Cadmium	t	322	1,055	2,403	9,644	1,516	4,135	247	500	155	304
Calcium	t	-	-	-	-	-	-	-	-	-	-
Cesium	t	x	x	x	x	x	x	x	x	x	x
Cobalt	t	2,275	102,241	2,644	125,144	3,741	146,768	3,698	114,604	4,002	118,372
Copper	t	470,347	2,766,112	507,883	3,941,677	553,725	4,831,801	560,476	4,453,541	613,471	4,629,863
Gold	kg	96,573	3,448,639	102,147	4,143,067	101,975	5,087,438	106,373	5,704,878	124,054	5,898,903
Ilmenite	000 t	x	x	x	x	x	x	x	x	x	x
Indium	kg	x	x	x	x	x	x	x	x	x	x
Iron ore	000 t	31,728	2,673,757	36,178	5,314,154	35,705	5,505,772	38,892	4,875,068	42,770	5,333,922
Iron, remelt	000 t	x	x	x	x	x	x	x	x	x	x
Lead	t	71,377	140,041	62,397	138,022	62,548	166,003	62,014	127,438	22,267	49,009
Lithium	t	x	x	x	x	x	x	x	x	x	x
Magnesium	t	-	-	-	-	-	-	-	-	-	-
Molybdenum	t	9,116	x	8,524	x	8,543	x	8,936	x	7,618	x
Nickel	t	132,471	2,213,597	156,270	3,509,833	211,417	4,787,323	203,970	3,546,420	214,679	3,356,935
Niobium (Columbium)	t	4,169	x	4,298	x	4,551	x	4,705	x	4,910	x
Platinum group	kg	10,925	258,242	9,864	260,304	22,337	749,572	22,490	644,195	25,186	760,892
Selenium	t	131	7,633	97	8,001	128	17,500	145	16,656	159	12,185
Silver	t	609	328,201	570	381,086	582	658,514	657	659,005	627	508,297
Tantalum	t	29	x	-	-	-	-	-	-	40	12,379
Tellurium	t	16	2,817	8	1,913	9	3,167	10	1,540	12	1,329
Tungsten	t	2,506	48,378	364	7,370	2,466	73,707	2,554	88,436	2,762	99,832
Uranium	t	10,133	1,358,144	9,927	1,230,182	9,017	1,307,174	9,520	1,197,441	7,479	771,528
Zinc	t	669,879	1,265,402	609,567	1,356,287	591,004	1,281,887	601,514	1,171,147	413	809,039
TOTAL, METALLIC MINERALS		..	15,474,941	..	21,358,783	..	25,569,557	..	23,558,411	..	23,170,135

NON-METALLIC MINERALS		2009		2010		2011		2012		2013 ^P	
	Unit	(quantity)	(\$000)	(quantity)	(\$000)	(quantity)	(\$000)	(quantity)	(\$000)	(quantity)	(\$000)
Barite	000 t	16	4,443	21	6,500	x	x	x	x	x	x
Carbonatite	000 t	x	x	x	x	x	x	x	x	x	x
Cement ¹	000 t	10,831	1,413,826	11,523	1,512,624	11,914	1,587,136	12,553	1,621,476	11,757	1,556,466
Chrysotile	000 t	x	x	x	x	x	x	x	x	-	-
Clay products ²	000 t	-	132,902	-	148,907	-	135,422	-	136,502	-	122,881
Diamonds	000 ct	10,946	1,684,304	11,804	2,377,147	10,752	2,509,232	10,529	2,005,764	10,562	1,963,515
Gemstones	t	22	2,759	35	4,966	42	2,941	178	3,217	139	4,092

ANNEX 5

MINERAL PRODUCTION OF CANADA, 2009-2013^P

NON-METALLIC MINERALS		2009		2010		2011		2012		2013 ^P	
	Unit	(quantity)	(\$000)	(quantity)	(\$000)	(quantity)	(\$000)	(quantity)	(\$000)	(quantity)	(\$000)
Graphite	000 t	x	x	x	x	x	x	x	x	x	x
Gypsum ³	000 t	3,568	55,749	3,046	47,771	2,449	34,632	1,832	24,987	2,654	38,267
Lime	000 t	1,613	238,508	1,863	288,787	1,937	294,909	1,965	316,322	1,802	306,682
Magnesite	000 t	x	x	x	x	x	x	x	x	x	x
Marl	000 t	x	x	x	x	-	-	-	-	-	-
Mica	000 t	x	x	x	x	x	x	x	x	x	x
Nepheline syenite	000 t	527	53,354	603	57,304	602	58,377	586	61,892	674	71,110
Peat	000 t	1,214	266,634	1,286	260,664	1,139	213,359	1,277	238,018	1,295	262,700
Phosphate	000 t	x	x	x	x	x	x	x	x	x	x
Potash (K ₂ O) ⁴	000 t	4,297	3,431,147	9,700	5,061,927	10,686	7,569,282	8,976	6,342,562	10,140	6,102,907
Potassium sulphate	000 t	x	x	x	x	x	x	x	x	x	x
Pumice	000 t	x	x	x	x	x	x	x	x	x	x
Quartz (silica) ³	000 t	1,192	47,661	1,503	66,372	1,620	84,280	1,517	85,256	1,690	79,186
Salt	000 t	14,676	578,618	10,278	602,607	12,757	697,404	10,820	487,686	12,436	644,899
Sand and gravel	000 t	201,678	1,361,664	211,342	1,573,968	222,288	1,560,213	239,307	1,822,978	228,010	1,747,527
Serpentine	000 t	-	-	-	-	-	-	-	-	-	-
Soapstone, talc, pyrophyllite	000 t	56	19,701	100	26,125	116	25,244	130	30,249	175	35,403
Sodium sulphate	000 t	x	x	x	x	x	x	x	x	x	x
Stone ³	000 t	153,038	1,503,455	170,664	1,637,757	161,729	1,591,511	152,977	1,559,358	152,512	1,466,856
Sulphur, elemental	000 t	6,435	16,499	6,247	298,990	5,970	637,250	5,594	581,611	5,666	384,739
Sulphur, in smelter gas	000 t	543	77,817	610	70,903	638	116,022	665	132,230	699	132,176
Titanium dioxide	000 t	x	x	x	x	x	x	x	x	x	x
Tremolite	000 t	-	-	-	-	-	-	-	-	-	-
Zeolite	000 t	x	x	x	x	x	x	x	x	x	x
TOTAL, NON-METALLIC MINERALS		..	11,552,034	..	14,699,276	..	17,839,820	..	16,471,421	..	15,794,280

MINERALS FUELS		2009		2010		2011		2012		2013 ^P	
	Unit	(quantity)	(\$000)	(quantity)	(\$000)	(quantity)	(\$000)	(quantity)	(\$000)	(quantity)	(\$000)
Coal	000 t	62,935	4,406,365	68,152	5,540,967	67,113	7,471,408	66,471	5,880,836	68,331	4,636,099
TOTAL MINERAL FUELS		62,935	4,406,365	68,152	5,540,967	67,113	7,471,408	66,471	5,880,836	68,331	4,636,099

TOTAL MINERAL PRODUCTION .. **31,433,340** .. **41,599,026** .. **50,880,785** .. **45,910,667** .. **43,600,514**

Sources: Natural Resources Canada; Statistics Canada.

Note: ^P Preliminary; x Confidential; (-) Nil; .. Not available

¹ Includes exported clinker.

² Production values for bentonite and diatomite have been included in clay products.

³ Shipments of gypsum, silica and stone to Canadian cement, lime and clay plants are not included in this table.

⁴ Shipments of potash to Canadian potassium sulphate plants are not included in this table.

Numbers may not add due to rounding.

ANNEX 6

CANADIAN RESERVES OF SELECTED MAJOR METALS, 1978–2011

Metal Contained in Proven and Probable Mineable Ore ¹ in Operating Mines ² and Deposits Committed to Production

Year	Copper (000 t)	Nickel (000 t)	Lead (000 t)	Zinc (000 t)	Molybdenum (000 t)	Silver (t)	Gold ³ (t)
1978	16,184	7,843	8,930	26,721	464	30,995	505
1979	16,721	7,947	8,992	26,581	549	32,124	575
1980	16,714	8,348	9,637	27,742	551	33,804	826
1981	15,511	7,781	9,380	26,833	505	32,092	851
1982	16,889	7,546	9,139	26,216	469	31,204	833
1983	16,214	7,393	9,081	26,313	442	31,425	1,172
1984	15,530	7,191	9,180	26,000	361	30,757	1,208
1985	14,201	7,041	8,503	24,553	331	29,442	1,373
1986	12,918	6,780	7,599	22,936	312	25,914	1,507
1987	12,927	6,562	7,129	21,471	231	25,103	1,705
1988	12,485	6,286	6,811	20,710	208	26,122	1,801
1989	12,082	6,092	6,717	20,479	207	24,393	1,645
1990	11,261	5,776	5,643	17,847	198	20,102	1,542
1991	11,040	5,691	4,957	16,038	186	17,859	1,433
1992	10,755	5,605	4,328	14,584	163	15,974	1,345
1993	9,740	5,409	4,149	14,206	161	15,576	1,333
1994	9,533	5,334	3,861	14,514	148	19,146	1,513
1995	9,250	5,832	3,660	14,712	129	19,073	1,540
1996	9,667	5,623	3,450	13,660	144	18,911	1,724
1997	9,032	5,122	2,344	10,588	149	16,697	1,510
1998	8,402	5,683	1,845	10,159	121	15,738	1,415
1999	7,761	4,983	1,586	10,210	119	15,368	1,326
2000	7,419	4,782	1,315	8,876	97	13,919	1,142
2001	6,666	4,335	970	7,808	95	12,593	1,070
2002	6,774	4,920	872	6,871	82	11,230	1,023
2003	6,037	4,303	749	6,251	78	9,245	1,009
2004	5,546	3,846	667	5,299	80	6,568	801
2005	6,589	3,960	552	5,063	95	6,684	965
2006	6,923	3,940	737	6,055	101	6,873	1,032
2007	7,565	3,778	682	5,984	213	6,588	987
2008	7,456	3,605	534	5,005	222	5,665	947
2009	7,290	3,301	451	4,250	215	6,254	918
2010	8,851	3,074	400	4,133	195	6,480	1,470
2011	10,668	2,936	247	4,807	256	6,953	2,044

Source: Natural Resources Canada, based on company reports and the federal-provincial/territorial survey of mines and concentrators.

Note: One tonne (t) = 1.1023113 short tons = 32 150.746 troy oz.

¹No allowance is made for losses in milling, smelting and refining. Excludes material classified as "resources."

²Includes metal in mines where production has been suspended temporarily.

³Excludes metal in placer deposits because reserves data are generally unavailable.

ANNEX 7

PROPOSED CAPITAL INVESTMENTS BY THE CANADIAN MINING INDUSTRY

Company	Project	Province	(\$ millions)
			Capital Investment
Coal Valley Resources Inc.	Robb Trend Coal Mine Expansion	AB	85
MAXIM Power Corp.	Development of #14 Coal Mine	AB	50
Coalspur Mines Ltd.	Vista Thermal Coal Mine	AB	500
Grande Cache Coal Corporation	Development of #8 Surface Mine and #12 South B2 Underground Mine	AB	180
Canadian Natural Resources Ltd. (CNRL)	Kirby Expansion Phase 1 Oil Sands Project	AB	1,200
Canadian Natural Resources Ltd. (CNRL)	Project Horizon	AB	1,080
Fort Hills Energy Corp. (Suncor Energy Inc. / Total SA / Teck)	Fort Hills Oil Sands Mine	AB	9,600
Imperial Oil Resources / ExxonMobil Canada	Kearl Lake Oil Sands Mine Phase 1	AB	8,900
Shell Canada	Athabasca Oil Sands Project Debottleneck Phase 1 (withouth Pierre River Mine Cap Cost)	AB	2,000
SilverBirch Energy/Teck Resources	Equinox Oil Sands Mine (Lease 14)	AB	2,500
SilverBirch Energy/Teck Resources	Frontier Oil Sands Mine Phase 1	AB	14,500
Suncor Energy Inc. / Total SA	Voyageur	AB	11,600
Syncrude Canada Ltd.	Mildred Lake	AB	3,600
Syncrude Canada Ltd.	Aurora	AB	2,335
Total E&P Canada Ltd. / Suncor Energy Inc.	Joslyn North Mine	AB	6,000
KGHM Ajax Mining Inc.	Ajax Copper-Gold Mine	BC	795
Skyline Gold Corporation	Bronson Slope Metal Mine	BC	258
TTM Resources Inc.	Chu Molybdenum Mine	BC	1,180
Burnco	Aggregate Project	BC	60
Pretivim	Bruce Jack Gold-Silver Mine	BC	664
Canadian Dehua	Gething Coal	BC	1,360
Cardero	Carbon Creek	BC	839
Centremount Coal	Bingay Main Coal Projct	BC	480
New Gold	Blackwater Gold	BC	1,800
Yellowhead Mining Inc.	Harper Creek Copper-Gold-Silver Mine	BC	759
AuRico Gold	Kemess Underground Project	BC	683
Avanti Mining Inc.	Kitsault Molybdenum Mine	BC	794
Seabridge Gold Inc.	KSM (Kerr-Sulphurets-Mitchell) Copper-Gold Mine	BC	5,310
Capstone Mining Corp.	Kutcho Copper-Zinc-Silver-Gold	BC	187
Teck Coal Ltd.	Line Creek Coal Mine Expansion	BC	140
Pacific Booker Minerals Inc.	Morrison Copper-Gold Mine	BC	517
Fortune Minerals	Arctos Anthracite Project (formerly known as Mount Klappan Anthracite Metallurgical Coal Project)	BC	788
HD Mining	Murray River Underground Coal Mine	BC	400
Taseko Mines Ltd.	New Prosperity Gold-Copper Mine	BC	1,000
Teck Coal Ltd.	Quintette Coal Mine	BC	858
Compliance Coal Corp.	Raven Underground Coal Mine	BC	219
Imperial Metals Corp.	Red Chris	BC	320
Anglo American	Peace River Coal	BC	320
Imperial Metals Corp.	Ruddock Creek Zinc Lead Mine	BC	100

ANNEX 7

PROPOSED CAPITAL INVESTMENTS BY THE CANADIAN MINING INDUSTRY

Company	Project	Province	(\$ millions)
			Capital Investment
Copper Fox Metals	Schaft Creek	BC	3,256
Pan Pacific Aggregates Ltd.	Sechelt Carbonate Mine	BC	100
Spanish Mountain Gold Ltd.	Spanish Mountain	BC	756
Columbia Yukon Explorations	Storie molybdenum Mine	BC	390
Hard Creek Nickel	Turnagain Nickel Project	BC	1,357
Western Coal Corp.	Willow Creek Expansion	BC	294
Cline Mining Corporation	Crown Mountain Coal Project	BC	100
Mustang Minerals Corp	Makwa Project	MB	123
Victory Nickel	Minago Nickel Mine	MB	596
HudBay Minerals	Lalor	MB	704
Winston Resources Inc.	Elmtree Property Gold Mine	NB	8
Trevali	Halfmile Mine	NB	338
Northcliff Resources Ltd.	Sisson Tungsten-Molybdenum Mine	NB	579
Vale	Long Harbour Hydromet Plant	NL	2,800
IOC (Rio Tinto operator)	Carol Expansion, phase 1 and 2 only	NL	677
Labrador Iron Mines Holdings	Schefferville area DSO project	NL	140
Rambler Metals and Mining	Ming mine	NL	231
New Millennium/Tata Steel	Schefferville area DSO project	NL	300
Canada Fluorspar	St. Lawrence fluorspar mine reactivation	NL	100
Alderon Resources Corp.	Kami Iron Ore Project	NL	1,270
Glencore	Donkin Coal Project	NS	500
Baffinland Iron Mines	Mary River	NU	750
Mountain Province Diamonds Inc. and De Beers	Gahcho Kue	NWT	550
Canadian Zinc Corporation	Prairie Creek	NWT	160
Avalon Rare Metals	Thor Lake - Nechalacho	NWT	1,200
Fortune Minerals	Nico	NWT	441
Tyhee Resources	Yellowknife Gold	NWT	174
Osisko	Hammond Reef Gold Mine	ON	881
Noront Resources Inc.	Eagle's Nest Multi-metals Mine	ON	609
Vale	Sudbury	ON	3,400
Vale	Clarabelle Mill	ON	200
Vale	Totten Mine	ON	360
Cliffs	chromite mine/smelter	ON	3,300
Kirkland Lake Gold	Expansion	ON	250
Bending Lake Iron Ore	Josephine Cone Mine	ON	900
Rubicon	Gold Lake	ON	214
New Gold	Rainy River Gold Mine	ON	713
Goldcorp	Red Lake	ON	420
Goldcorp	Porcupine	ON	335
Goldcorp	Musselwhite	ON	390
Treasury Metals	Goliath Gold Project	ON	190
Lake Shore	Timmins West gold mine	ON	90

ANNEX 7

PROPOSED CAPITAL INVESTMENTS BY THE CANADIAN MINING INDUSTRY

Company	Project	Province	(\$ millions)
			Capital Investment
Northern Iron	Griffith Iron	ON	900
Glencore	Fraser Morgan Project	ON	119
Glencore	Nickel Rim South	ON	920
Glencore	Errington and Vermillion	ON	350
KGHM International	Victoria Mine	ON	750
North American Palladium	Lac des Iles Mine expansion	ON	100
Stillwater Mining Company	Marathon PGM-Cu Project	ON	351
Goldcorp	Éléonore	QC	1,750
Adriana Resources Inc.	Lac Otelnuk Iron Mine	QC	8,500
Matamec	Kipawa	QC	316
Arriane Resources	Lac à Paul	QC	814
Critical Elements Corp	Rose Tantalum Mine	QC	287
Canada Lithium Corp	Quebec Lithium Mine	QC	202
Mines Aurizon Ltée	Joanna Gold Mine	QC	154
Royal Nickel Corp.	Dumont Nickel Project	QC	1,200
Agnico Eagle Mines Limited	Lapa expansion	QC	6
Stornoway Diamond Corporation	Renard Diamond Mine	QC	752
Champion Iron Mines	Fire Lake North	QC	1,600
Ungava	Hopes Advance Iron Mine	QC	2,850
Mine Arnaud Inc.	Arnaud Apatite Mine	QC	750
Western Troy Capital Resources Inc.	MacLeod Lake Molybdenum-Copper	QC	210
Strateco Resources Inc.	Matoush Project	QC	342
Métaux BlackRock Inc.	BlackRock Vanadium Iron Titanium Mine	QC	600
BHP Billiton	Jansen Potash Mine	SK	14,000
AREVA Resources Canada Inc.	Midwest Uranium Mining and Milling	SK	435
First Potash Ventures	Muskowekwan Potash Mine	SK	2,418
Shore Gold Inc.	Star-Orion South Diamond Mine	SK	2,500
		Total	157,281

Note: The information in this table refers to investments proposed over the coming decade and is drawn from government web sites, company sites and press releases, and is accurate as of July 2013. The progress that will be made on these projects will be affected by market forces. Some will likely be delayed or cancelled, and others perhaps accelerated. Therefore, this list is a work in progress.

ANNEX 8

EMPLOYMENT COUNT AND ANNUAL COMPENSATION IN THE CANADIAN MINING, SMELTING AND REFINING INDUSTRIES, 2007-2013

	Number of Employees (000)	Compensation per Job ¹ (\$)
Metal Mines		
2007	28,035	98,701
2008	27,935	105,728
2009	24,185	121,095
2010	26,415	117,591
2011	30,580	121,643
2012	32,410	126,766
2013	33,230	129,629
Non-metal Mines		
2007	18,740	72,405
2008	21,500	77,573
2009	19,700	78,132
2010	20,945	82,172
2011	21,255	88,035
2012	22,890	112,451
2013	22,310	117,086
Coal Mines		
2007	5,095	103,069
2008	5,685	111,124
2009	5,250	117,796
2010	6,135	112,624
2011	7,120	126,358
2012	8,840	129,894
2013	8,235	145,739
Smelting & Refining²		
2007	66,670	83,006
2008	67,655	80,729
2009	51,310	84,258
2010	55,970	86,149
2011	57,075	88,970
2012	56,105	92,373
2013	54,555	91,249

ANNEX 8

EMPLOYMENT COUNT AND ANNUAL COMPENSATION IN THE CANADIAN MINING, SMELTING AND REFINING INDUSTRIES, 2007-2013

	Number of Employees (000)	Average Weekly Earnings (\$)
Total Mining, Smelting and Refining		
2007	118,540	85,904
2008	122,775	87,272
2009	100,445	93,679
2010	109,465	94,459
2011	116,030	99,704
2012	120,245	108,224
2013	118,330	110,691

Source: Statistics Canada.

¹ Compensation for Smelting and Refining based on weighted average.

² Comprised of NAICS 3311, NAICS 3313, and NAICS 3314.

ANNEX 9

AVERAGE WEEKLY EARNINGS, BY CANADIAN INDUSTRIAL SECTOR, 2007-2013

(\$)	Forestry	Mining, Smelting and Refining ¹	Manufacturing	Construction	Finance & Insurance
2007	61,729	85,904	59,192	54,787	77,165
2008	64,853	87,272	60,475	56,718	74,279
2009	65,671	93,679	60,732	56,410	70,896
2010	67,489	94,459	61,255	57,707	69,310
2011	70,433	99,704	63,966	59,042	71,841
2012	73,338	108,224	66,461	62,076	74,251
2013	79,334	110,691	67,867	64,311	74,999

Source: Statistics Canada.

¹ Based on a weighted average of NAICS 212, 3311, 3313, and 3314.

ANNEX 10

STRIKES AND LOCKOUTS IN CANADIAN MINING AND MINERAL MANUFACTURING INDUSTRIES, 2009-2013

	Work Stoppages	Workers (Maximum)	Person Days Not Worked	Work Days
2009	11	4,874	568,580	120.1
Mining - Total	1	125	8,690	108
Mineral Fuel	.	.	.	.
Metal	1	125	8,690	108
Non-Metal	.	.	.	.
Support Activities	.	.	.	.
Mineral Extraction - Total	10	4,749	559,890	121.3
Non-Metallic Mineral Products	3	163	23,080	109.3
Primary Metals	7	4586	536,810	126.4
2010	17	6,022	567,390	96.8
Mining - Total	3	373	26,890	101
Mineral Fuel	1	168	6720	40
Metal	1	125	19,530	255
Non-Metal	1	80	640	8
Support Activities	.	.	.	.
Mineral Extraction - Total	14	5,649	540,500	95.9
Non-Metallic Mineral Products	7	344	27,020	65
Primary Metals	7	5305	513,480	126.9
2011	10	1,467	176,435	82
Mining - Total	1	125	2,895	23
Mineral Fuel	.	.	.	.
Metal	1	125	2,895	23
Non-Metal	.	.	.	.
Support Activities	.	.	.	.
Mineral Extraction - Total	9	1,342	173,540	88.6
Non-Metallic Mineral Products	3	137	8,380	61.3
Primary Metals	6	1205	165,160	102.2
2012	9	1,701	128,240	58.1
Mining - Total	1	361	10,440	29
Mineral Fuel	.	.	.	.
Metal	.	.	.	.
Non-Metal	1	361	10440	29
Support Activities	.	.	.	.
Mineral Extraction - Total	8	1,340	117,800	61.8
Non-Metallic Mineral Products	.	.	.	.
Primary Metals	8	1340	117,800	61.8
2013	2	62	10	96
Mining - Total	1	1	10	11
Mineral Fuel	.	.	.	.
Metal	.	.	.	.
Non-Metal	1	1	10	11
Support Activities	.	.	.	.
Mineral Extraction - Total	1	61	0	181
Non-Metallic Mineral Products	.	.	.	.
Primary Metals	1	61	0	181

Source: Workplace Information Division, Labour Program, ESDC, November 14, 2013

Note: (.) Nil

ANNEX 11

TOTAL EXPORTS OF MINERALS AND MINERAL PRODUCTS, BY COMMODITY AND COUNTRY OF DESTINATION, 2013

(\$)	United States	European Union	China	Japan	Other Countries	Total
METALS						
Aluminum	7,160,813,196	627,800,531	179,806,186	155,759,329	627,652,810	8,751,832,052
Antimony	337,573	146,334	—	—	17,647	501,554
Barium	—	—	—	—	6,793	6,793
Beryllium	12,195	—	—	—	423	12,618
Bismuth	748,829	—	—	—	—	748,829
Cadmium	379,652	1,763,763	841,389	12,170	60,836	3,057,810
Calcium metals	422,503	9,112	13,203	665	34,736	480,219
Chromium	9,014,321	24,018	—	—	1,700,103	10,738,442
Cobalt	33,379,077	54,025,617	5,522,091	49,020,050	104,920,779	246,867,614
Copper	2,981,740,820	427,869,015	1,096,353,596	830,232,541	758,380,230	6,094,576,202
Gold	4,604,733,165	7,604,736,221	121,963,826	609,992,093	4,805,266,651	17,746,691,956
Iron and steel	10,291,071,731	221,692,699	149,948,771	14,939,815	1,451,294,049	12,128,947,065
Iron ore	288,602,002	1,484,267,396	1,974,952,250	338,588,268	472,319,739	4,558,729,655
Lead	628,349,997	27,986,440	36,738,028	14,087,053	11,216,347	718,377,865
Lithium	25,810	247,784	39,752	—	8,297	321,643
Magnesium and magnesium compounds	43,658,984	1,831,848	5,529,434	35,254	107,100	51,162,620
Manganese	915,723	12,388	52,114	—	269,469	1,249,694
Mercury	101,190	—	—	—	722	101,912
Molybdenum	165,494,919	38,207,145	2,046,216	4,019,396	13,720,469	223,488,145
Nickel	1,085,431,154	1,258,320,176	420,162,445	118,251,208	1,839,879,895	4,722,044,878
Niobium	58,352,030	99,990,209	23,545,710	6,535,479	15,809,678	204,233,106
Platinum group metals	299,429,839	126,027,219	57,930	—	3,070,870	428,585,858
Rare earth metals	8,644,256	791,135	1,030	—	242,094	9,678,515
Selenium	2,073,980	17,076,110	11,544,992	—	4,729,571	35,424,653
Silicon	112,012,818	16,697,983	17,264	65,000	12,231,011	141,024,076
Silver	2,073,371,451	41,117,481	34,672,925	28,287,172	76,900,311	2,254,349,340
Tantalum	942,711	221,634	—	—	68,403	1,232,748
Tellurium	1,366,726	17,896,347	2,204,959	558,754	1,987,708	24,014,494
Tin	51,727,840	3,514,617	638,487	809	562,934	56,444,687
Titanium metal	35,760,806	4,850,255	158,507	118,517	6,105,689	46,993,774
Tungsten	47,579,684	27,973,887	26,125,652	19,134	1,117,082	102,815,439
Uranium and thorium	636,761,948	1,106,748,429	129,122,603	18,608,710	83,456,319	1,974,698,009
Vanadium	159,911,637	127,131,380	69,408,472	41,390,615	91,936,430	489,778,534
Zinc	1,192,823,863	100,358,539	30,935,636	10,460,042	151,900,276	1,486,478,356
Zirconium	4,273,126	2,272,460	—	—	1,155,985	7,701,571
Other metals	3,662,501,508	983,081,980	82,716,010	59,397,688	619,161,201	5,406,858,387
Grand Total	35,642,767,064	14,424,690,152	4,405,119,478	2,300,379,762	11,157,292,657	67,930,249,113
NON-METALS						
Abrasives	235,664,386	13,649,461	14,400,294	4,741,368	21,535,308	289,990,817
Barite and witherite	41,746	—	—	—	—	41,746

ANNEX 11

TOTAL EXPORTS OF MINERALS AND MINERAL PRODUCTS, BY COMMODITY AND COUNTRY OF DESTINATION, 2013

(\$)	United States	European Union	China	Japan	Other Countries	Total
Boron	712,834	220,899	156,487	7,458	1,579,565	2,677,243
Bromine	—	—	1,338	—	2,213	3,551
Cement	539,723,835	3,982,948	1,301,196	327,062	12,209,627	557,544,668
Chlorine and chlorine compounds	154,199,690	438,046	—	3,938	11,198,231	165,839,905
Chrysotile (Asbestos)	2,499,880	31,891	4,444	47,038	1,290,744	3,873,997
Clay and clay products	44,371,559	16,452,984	696,098	76,748	21,357,410	82,954,799
Diamonds	75,205,136	1,515,924,529	316,959	402,842	523,628,606	2,115,478,072
Dolomite	13,276,279	—	—	—	3,851,057	17,127,336
Feldspar	—	160,000	5,245	—	—	165,245
Fluorspar	40,976,026	3,890,124	259,140	—	2,459,320	47,584,610
Glass and glassware products	390,581,566	22,160,464	4,968,683	1,237,288	21,672,122	440,620,123
Granite	27,330,489	167,509	3,133,796	59,305	1,193,257	31,884,356
Graphite	141,808,312	8,651,681	413,890	431,283	8,334,163	159,639,329
Gypsum	64,767,831	528,605	110,678	—	2,323,594	67,730,708
Iodine	3,722,478	1,005,255	—	—	1,449,649	6,177,382
Lime	55,105,030	944	33,741	1,658	171,327	55,312,700
Limestone flux and other limestone	16,615,414	1,144,600	55,668	—	12,468,829	30,284,511
Marble, travertine and other calcareous stones	19,494,729	641,454	123,630	—	484,738	20,744,551
Mica	7,739,411	646,400	383,170	2,234,474	1,016,451	12,019,906
Mineral pigments	130,337,265	2,610,401	1,416,198	693,070	8,586,907	143,643,841
Nepheline syenite	81,135,125	6,634,220	762,378	896,064	2,366,499	91,794,286
Pearls	601,639	—	—	8,975	333,419	944,033
Peat	270,476,698	1,211,476	367,914	10,713,614	20,860,178	303,629,880
Phosphate and phosphate compounds	69,368,650	492,788	134,262	608,727	7,250,280	77,854,707
Potash and potassium compounds	3,204,728,284	23,364,576	394,175,533	111,953	2,226,777,116	5,849,157,462
Salt and sodium compounds	609,144,044	3,190,419	4,989,830	25,633,960	65,663,219	708,621,472
Sand and gravel	47,892,734	26,981	1,825	—	3,019,226	50,940,766
Sandstone	92,411	2,496	—	—	—	94,907
Silica and silica compounds	53,554,794	1,062,677	332,054	272,197	3,568,323	58,790,045
Slate	4,163,248	6,139,611	—	32,896	165,309	10,501,064
Sulphur and sulphur compounds	307,167,059	31,610	80,614,157	119	262,628,895	650,441,840
Talc, soapstone and pyrophyllite	30,288,332	50,079	46,811	89,130	41,008	30,515,360
Titanium oxides	208,769,442	2,129,417	816,810	36,436	3,942,307	215,694,412
Other non-metals	572,469,666	39,256,113	7,751,175	2,738,372	33,602,760	655,818,086
Other structurals	137,945,338	7,471,800	2,680,619	202,531	18,227,749	166,528,037
TOTAL NON-METALS	7,561,971,360	1,683,372,458	520,454,023	51,608,506	3,305,259,406	13,122,665,753
MINERAL FUELS						
Coal	405,166,549	491,713,350	1,454,704,947	1,505,449,692	1,943,710,583	5,800,745,121
Coke	4,675,897	—	—	—	426,200	5,102,097
TOTAL MINERAL FUELS	409,842,446	491,713,350	1,454,704,947	1,505,449,692	1,944,136,783	5,805,847,218
TOTAL MINING EXPORTS	43,614,580,870	16,599,775,960	6,380,278,448	3,857,437,960	16,406,688,846	86,858,762,084

Sources: Natural Resources Canada; Statistics Canada.

Note: (-) Nil

As of 2014, Natural Resources Canada no longer includes nitrogen within the minerals and metals trade statistics. Historical data have been revised to reflect this change.

ANNEX 12

TOTAL IMPORTS OF MINERALS AND MINERAL PRODUCTS, BY COMMODITY AND COUNTRY OF ORIGIN, 2013

(\$)	United States	European Union	China	Japan	Other Countries	Total
METALS						
Aluminum	3,144,002,128	273,179,261	436,814,344	33,381,079	1,465,227,714	5,352,604,526
Antimony	1,234,089	300,413	15,695,528	82,798	45,414	17,358,242
Barium	3,070,605	1,963,048	1,638,000	—	95,040	6,766,693
Beryllium	575,274	9,567	—	—	3,927	588,768
Bismuth	1,645,846	367,319	854,379	—	118,166	2,985,710
Cadmium	4,470,923	5,776,639	13,709,139	21,224	114,807	24,092,732
Calcium metals	55,923,977	2,336,351	745,883	78,888	466,505	59,551,604
Chromium	6,277,301	12,684,051	3,771,397	565,850	50,657,688	73,956,287
Cobalt	16,176,610	6,146,758	29,596	610	10,971,413	33,324,987
Copper	2,011,162,683	154,038,716	147,119,037	35,763,982	697,463,103	3,045,547,521
Gallium	22,802	136,931	292,156	—	1,397	453,286
Germanium	11,006,199	471,178	1,082,471	109	6,045,082	18,605,039
Gold	1,993,679,071	372,754,665	2,490,928	604,121,312	7,718,423,125	10,691,469,101
Hafnium	12,064	—	6,067	—	17,743	35,874
Indium	455,543	62,116	—	—	1,098,614	1,616,273
Iron and steel	14,062,248,533	2,065,797,306	2,477,566,320	910,003,472	3,035,644,513	22,551,260,144
Iron ore	906,717,179	1,751,346	10,484	368	10,767	908,490,144
Lead	433,063,343	30,698,982	46,901,698	34,487,468	155,050,602	700,202,093
Lithium	26,024,076	6,082,359	11,261,074	259,769	38,517,557	82,144,835
Magnesium and magnesium compounds	36,970,052	8,280,187	150,953,943	480,051	12,844,359	209,528,592
Manganese	141,492,909	5,717,283	19,489,192	7,183,837	130,309,628	304,192,849
Mercury	2,382,497	7,838,175	1,076,471	22,798,080	4,757,982	38,853,205
Molybdenum	70,005,874	3,287,000	779,624	848,019	8,893,248	83,813,765
Nickel	214,231,670	219,783,227	10,370,126	335,857	167,573,624	612,294,504
Niobium	6,446,889	2,587,205	255,125	—	46,169,592	55,458,811
Platinum group metals	132,863,679	76,890,682	3,274	41,339	112,823,046	322,622,020
Rare earth metals	426,549	173,957	2,907,277	—	2,054	3,509,837
Rhenium	21,848	—	—	—	—	21,848
Selenium	2,044,354	3,430,878	311,456	63,425	3,066,536	8,916,649
Silicon	11,262,950	5,744,585	48,107,341	—	29,801,070	94,915,946
Silver	708,382,886	246,082,328	41,221,356	155,140,682	1,042,280,875	2,193,108,127
Strontium	34,578	364,206	23	397,568	1,641	798,016
Tantalum	1,150,703	60,685	79,758	118	10,069	1,301,333
Tellurium	1,272,132	636,929	2,631,271	—	4,000,248	8,540,580
Thallium	7,814	—	—	—	—	7,814
Tin	20,479,189	835,472	5,316,172	1,293,625	58,676,830	86,601,288
Titanium metal	88,844,759	37,531,825	11,496,470	211,388	92,001,569	230,086,011
Tungsten	16,896,498	1,489,281	2,708,921	23,349	1,514,018	22,632,067
Uranium and thorium	162,278,060	18,910,223	195,517	1,115	808,483,987	989,868,902
Vanadium	4,075,359	6,651,910	4,648,822	—	8,742,594	24,118,685
Zinc	301,337,064	17,209,482	3,753,300	62,118,812	172,903,597	557,322,255

ANNEX 12

TOTAL IMPORTS OF MINERALS AND MINERAL PRODUCTS, BY COMMODITY AND COUNTRY OF ORIGIN, 2013

(\$)	United States	European Union	China	Japan	Other Countries	Total
Zirconium	39,605,809	2,390,170	375,429	—	1,534,784	43,906,192
Other metals	5,410,932,511	1,236,182,837	2,065,405,600	1,362,882,442	1,993,342,970	12,068,746,360
Grand Total	30,051,214,879	4,836,635,533	5,532,074,969	3,232,586,636	17,879,707,498	61,532,219,515
NON-METALS						
Abrasives	206,713,361	128,053,212	40,801,116	7,633,117	100,473,102	483,673,908
Arsenic	26,149	11,728	77,548	—	22,797	138,222
Barite and witherite	17,101,474	566,054	13,198,885	11	2,423,885	33,290,309
Boron	18,607,365	485,213	3,047,067	—	16,010,544	38,150,189
Calcium (Industrial minerals)	2,928,027	9,040	144	1,041	455,974	3,394,226
Cement	451,974,502	46,715,372	49,714,085	4,474,549	83,065,859	635,944,367
Chlorine and chlorine compounds	71,794,689	4,607,336	5,477,949	1,715,656	1,556,321	85,151,951
Chrysotile (Asbestos)	96,556,901	4,481,235	8,044,100	3,941,940	12,982,170	126,006,346
Clay and clay products	320,468,488	239,160,575	394,277,150	65,574,598	198,543,830	1,218,024,641
Diamonds	106,090,406	63,618,105	3,452,773	2,491	471,389,220	644,552,995
Dolomite	13,547,288	33,620	33,335	—	47,597	13,661,840
Feldspar	715,408	193	—	—	42	715,643
Fluorspar	12,270,538	9,875,288	18,585,129	26,804,613	502,266	68,037,834
Glass and glassware products	1,685,316,709	204,264,846	358,144,440	151,519,581	114,930,530	2,514,176,106
Granite	20,705,382	26,893,069	29,084,168	9,497	80,319,331	157,011,447
Graphite	246,535,850	118,212,290	86,533,846	2,311,607	56,940,518	510,534,111
Gypsum	160,963,444	1,957,490	336,676	2,183,779	1,786,912	167,228,301
Iodine	5,926,534	16,028	1,581	1	21,090,235	27,034,379
Lime	27,548,631	178,097	7,564	—	4,912	27,739,204
Limestone flux and other limestone	30,221,103	133,110	1,030,564	3	703,033	32,087,813
Marble, travertine and other calcareous stones	11,686,791	42,600,142	29,191,763	1,616,549	48,648,603	133,743,848
Mica	5,024,160	2,315,216	185,018	700	707,184	8,232,278
Mineral pigments	125,323,318	32,313,182	4,257,136	1,101,597	13,934,594	176,929,827
Nepheline syenite	130,269	—	—	—	10,354	140,623
Olivine	586,200	200,625	18,513	2,585	664,420	1,472,343
Pearls	9,352,231	1,397,807	14,932,011	28,673	5,667,312	31,378,034
Peat	5,984,346	583,213	76,969	260	3,417,716	10,062,504
Perlite	15,458,343	3,237,800	1	160	131	18,696,435
Phosphate and phosphate compounds	617,688,740	12,660,311	7,526,116	2,792,410	77,540,660	718,208,237
Potash and potassium compounds	77,947,014	6,936,216	4,571,073	192,858	10,190,705	99,837,866
Salt and sodium compounds	407,033,216	31,519,696	36,717,590	19,447,586	92,274,633	586,992,721
Sand and gravel	18,544,101	82,294	524,359	75,089	414,015	19,639,858
Sandstone	1,566,406	480,363	155,241	7,171	5,033,302	7,242,483
Silica and silica compounds	237,715,086	17,542,272	9,989,894	139,842	11,348,730	276,735,824
Slate	2,261,322	180,526	5,394,902	725	2,549,129	10,386,604
Sulphur and sulphur compounds	26,356,885	713,274	1,158,996	—	779,196	29,008,351
Talc, soapstone and pyrophyllite	12,085,316	704,105	75,136	—	281,314	13,145,871
Titanium oxides	191,820,399	44,500,737	10,151,956	4,237,653	14,609,012	265,319,757
Vermiculite	1,001,316	58	38,414	—	3,196,491	4,236,279

ANNEX 12

TOTAL IMPORTS OF MINERALS AND MINERAL PRODUCTS, BY COMMODITY AND COUNTRY OF ORIGIN, 2013

(\$)	United States	European Union	China	Japan	Other Countries	Total
Other non-metals	986,935,553	92,174,707	34,230,687	12,200,080	77,223,062	1,202,764,089
Other structurals	76,741,661	17,958,693	35,632,030	3,086,478	23,094,618	156,513,480
TOTAL NON-METALS	6,327,254,922	1,157,373,138	1,206,675,925	311,102,900	1,554,834,259	10,557,241,144
MINERAL FUELS						
Coal	641,362,618	1,784,829	9,275,815	781,511	190,096,780	843,301,553
Coke	57,649,178	1,214,356	50,067	—	1,024,466	59,938,067
TOTAL MINERAL FUELS	699,011,796	2,999,185	9,325,882	781,511	191,121,246	903,239,620
TOTAL MINING IMPORTS	37,077,481,597	5,997,007,856	6,748,076,776	3,544,471,047	19,625,663,003	72,992,700,279

Source: Natural Resources Canada; Statistics Canada.

- Nil

As of 2014, Natural Resources Canada no longer includes nitrogen within the minerals and metals trade statistics. Historical data have been revised to reflect this change.

THE CANADIAN MINING INDUSTRY AT A GLANCE

	2005	2007	2009	2013
Mining industry GDP (\$ billion)	40.0	41.9	32.0	54.0
Percentage of total Canadian GDP (%)	3.8	3.4	2.7	3.4
Value of mineral production (\$ billion)	27.4	40.6	32.2	43.6
Synthetic crude production value (\$ billion)	9.2	18.0	n/a	34.4
Synthetic crude production (million cubic metres)	21.9	39.9	n/a	54.3
Number of mining establishments	859	766	961	1,262
Mineral extraction employment (thousand)	47	53	52	63,775
Total mining/mineral industry employment (thousand)	353	360	308	380
Mineral exploration/appraisal spending (\$ billion)	1.3	2.8	1.9	2.3
Mining industry capital expenditures (\$ billion)	7.4	10.1	9.8	18.3
Oil sands capital expenditures (\$ billion)	9.8	16.8	10.6	32.6
Stock of foreign direct investment (\$ billion)	21.2	61.6	59.8	66.4
Stock of Canadian direct investment abroad (\$ billion)	56.4	57.3	64.5	81.4

n/a—not available



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