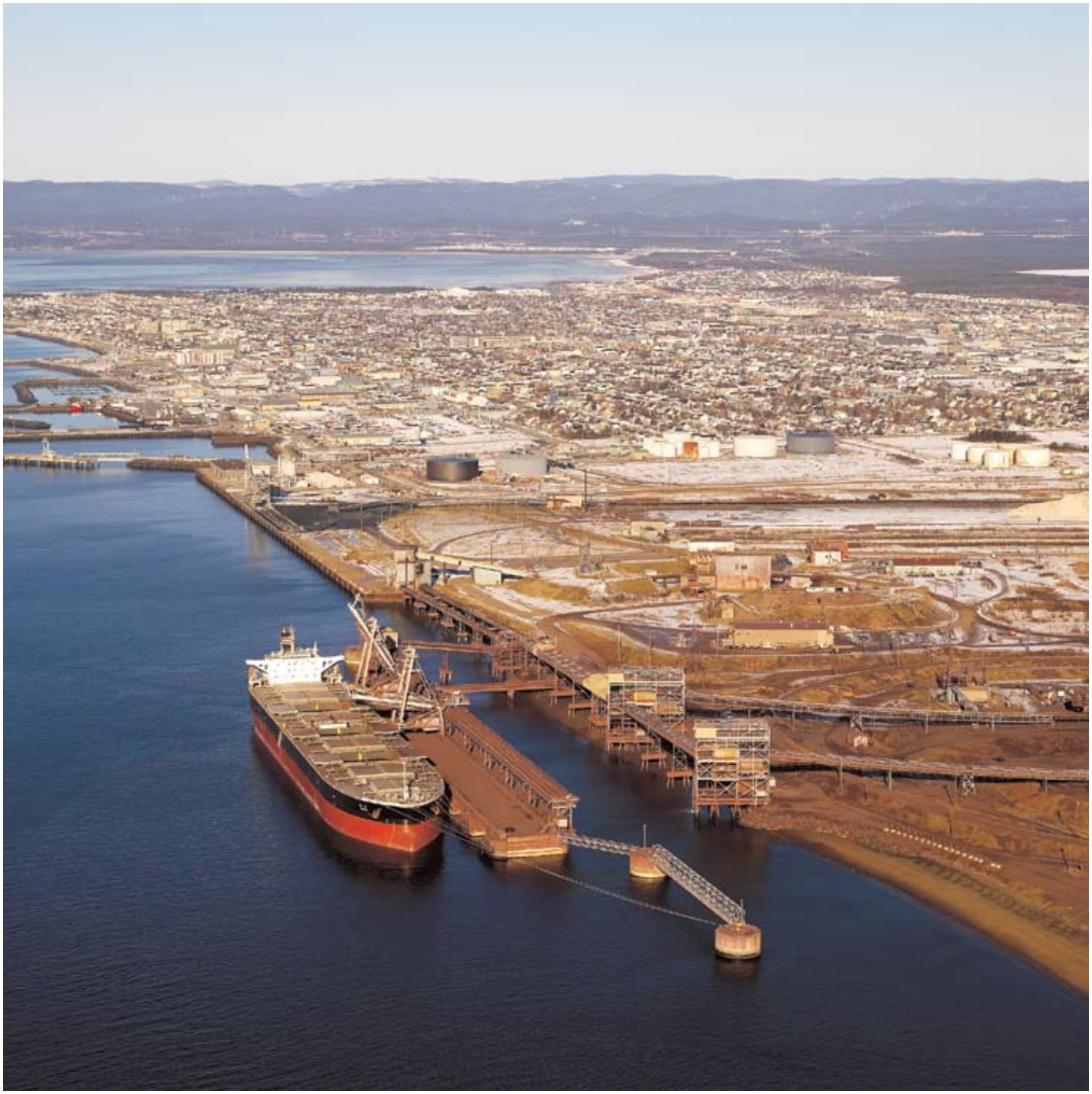
F&F 2011
FACT$ & FIGURE$
OF THE CANADIAN MINING INDUSTRY



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 and other industries, as well as with environmental and community groups across Canada and around the world.

Data and Sources
This annual report reflects currently available data, most of it from 2010, though some from 2011 and 2009. A number of statistical differences occurred in 2002 because of a change from Standard Industrial Classification (SIC) statistics to the North American Industry Classification System (NAICS). Dollar amounts are expressed in Canadian dollars unless noted otherwise.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF ANNEXES

SUMMARY OF ECONOMIC CONTRIBUTION AND KEY ISSUES

ECONOMIC CONTRIBUTION

The mining industry contributes greatly to Canada's economic strength. The industry employs 308,000 workers in mineral extraction and in the value-added smelting, fabrication and manufacturing areas. The industry's $36 billion contribution to Canada's gross domestic product in 2010 included $8 billion in mineral extraction and $28 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 21% of the value of Canadian goods exports in 2010, 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 $1.7 billion to $15.1 billion each.

Canada remained the world's top destination for exploration spending in 2010, hosting 19% of global investment. Australia followed at 12%, the United States at 8% and Mexico at 6%. Canadian exploration spending is focused in many regions, with a strong interest in the North.

One impact of the Canadian industry's global reach is that fully one-half of all rail-freight revenues of CN and CP are generated by mining. As well, 3,215 suppliers provide expertise to the industry, including hundreds of engineering, environmental, legal, financial and equipment companies. According to InfoMine, Canada has the world's second-largest mining supply sector after the United States. Mining is also the largest private sector employer of Aboriginal people in Canada and stands to offer more opportunities to this segment of society.

While mining is important to Canada at the local community level, it also contributes to the economy of large cities. Toronto is a global hub for mining finance; the TSX handled 83% of the world's mining equity transactions in the past five years. 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, Saskatoon for uranium and potash.

Mining and its related industries are important contributors to federal, provincial and territorial coffers. According to a recent study for MAC, the industry paid governments $8.4 billion in taxes and royalties in 2010—up significantly (by 65%) from the economically turbulent year before, though still below the peak of 2008. Including the fourth stage of industry activity, fabricated metal product manufacturing, would add another $1.8 billion to this total.

The average weekly pay for a Canadian mining worker in 2010 was $1,632, which exceeded the wages of workers in forestry, manufacturing, finance and construction by 72%, 70%, 56% and 53% respectively. The wage gap has widened in recent years, reflecting the mining industry's buoyant prices and profitability.

The industry's priority areas for innovation include tailings management, energy efficiency and effective exploration. Canadian mining and metals companies invested $548 million in research and development in 2010, more than the motor vehicle industry. They also employed nearly 8,400 R&D workers, more than the aerospace or pharmaceutical sectors. All of these other sectors receive large amounts of government support, both financial and policy-related.

KEY ISSUES FOR THE CANADIAN MINING INDUSTRY

According to recent MAC research, Canada's mining industry plans to invest $136 billion in projects over the next decade, with multiple billions in each of British Columbia, Alberta, Saskatchewan, Ontario, Quebec, Newfoundland and Labrador, Nunavut and the Northwest Territories. No doubt many projects will face obstacles and delays, but the figure does suggest the scale of mining-related jobs, supply contracts and tax revenues that could lie ahead for Canada. 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. By nature, the mining industry is cyclical. After seven years of record growth, the 2008 recession sharply reduced mineral demand and prices, though increases soon followed through 2009 and 2010, driven by Chinese demand. In mid-2011, with concerns over US and EU debt and inflation in China, market uncertainty returned, as did weaker demand and prices. But short-term swings aside, the longer-term demand for metals and minerals

is expected to grow. China, India and Brazil have the first-, second- and fifth-largest populations in the world, and their economies have grown 9%, 6% and 3% a year (respectively) in the past decade, resulting in higher incomes and a developing industrial and consumer base. According to the World Economic Forum, China's economic growth is projected to be 6%–9% a year from 2020 to 2025; India's will average 6%.

Trade and investment protectionism. Canadian companies operate mines and exploration properties in many high-risk countries. When mineral prices are strong, some foreign governments try to gain more revenue through actions like manipulating licences and permits and tearing up existing contracts. In recent years countries such as Ecuador, Mongolia, Zambia, DR Congo, Argentina, Venezuela, Uzbekistan, Russia, Bolivia and Tanzania have showed signs of such tactics. China has introduced tariff, quota and licensing measures to protect raw materials for its steel and other manufacturers to use. Following a multi-country challenge, the WTO ruled against China's practices in 2011. The Canadian government can mitigate political risks like these by negotiating bilateral investment and trade agreements. Businesses, for their part, need to invest in legal and financial protection to manage international operations in turbulent times.

Canadian regulatory burden. The regulatory environment for Canadian mining is complex and unclear when it comes to approval processes, timetables and responsibilities. The federal environmental commissioner has commented on the overlaps between review agencies, saying there is no evidence that this approach leads to better environmental outcomes. This issue, more than any other, could turn away portions of the $136 billion in proposed investment mentioned above. MAC has called for the environment, fisheries and northern departments and ministries to work with industry and stakeholders to remove needless barriers—regulatory, legislative and operational—to sustainable development. Workable Fisheries Act regulations are needed to protect Canada's fisheries with a compliance process that matches risk. As for air pollutants and greenhouse gas emissions, Canada needs achievable, effective targets and an efficient regulatory system with no duplication between jurisdictions.

The human resources challenge. According to the Mining Industry Human Resources Council, one out of two current industry workers must be replaced in the next decade. This need affects high-skill areas as well—for example, 65% of geoscientists will reach retirement age during the decade. The human resources challenge is greater in mining than in other sectors because the industry typically attracts fewer females, youth and minorities. As Canada's leading private sector employer of Aboriginal people, the industry is in a good position to broaden its relationship with this segment of Canadian workers. The Aboriginal population is relatively young, and over 1,000 Aboriginal communities are located near mining operations, advantages when it comes to filling mining positions. 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.

Need for infrastructure investment. The mining industry is the largest customer for Canada's transportation sector. It is therefore important that the sector move products to market efficiently, at competitive prices and on modern infrastructure. Government investment in infrastructure can open up new regions for development. For example, a power line being built into northern British Columbia will improve the economics of about $15 billion in mineral projects. A planned highway extension in northern Quebec will mean better development prospects for gold, diamond, copper and uranium projects. Lack of infrastructure in northern Canada adds to an already challenging operating environment for companies that face extreme weather conditions. Lack of roads, marine access and power grids can hurt the cost and timelines of potential mining projects.

MINING

ONE INDUSTRY, MANY APPLICATIONS

HIGHLIGHTS

Canada's mining and mineral manufacturing sector--what this report refers to as the mining industry--consists of different segments:

+ Exploration
+ Mining and quarrying
+ Primary metals
+ Fabricated metal products
+ Non-metallic mineral products

The industry covers metal, non-metal and coal mines; oil sands mining operations; and manufacturing in the form of smelters, refineries and fabrication facilities.

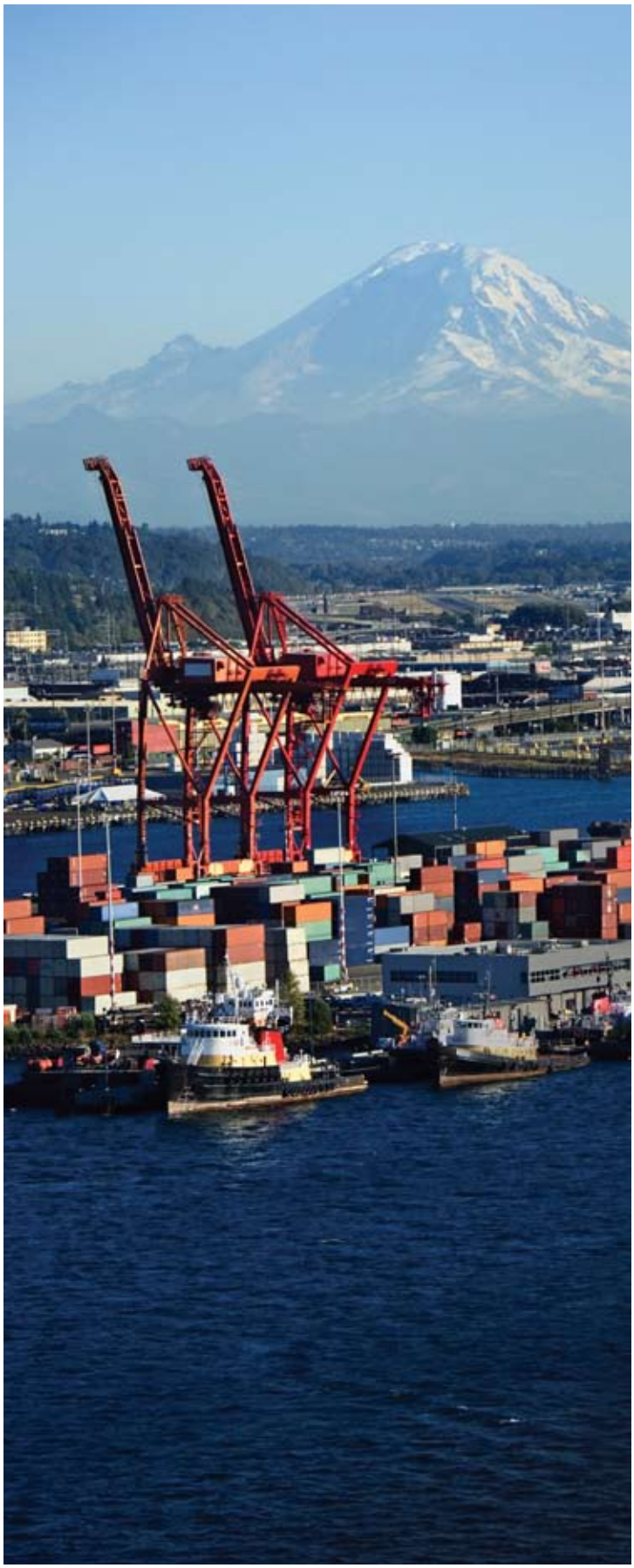
The mining industry touches the everyday life of all Canadians. The products of mining are used to build highways, electrical and communication networks, housing, automobiles, consumer electronics and many other items essential to modern life.

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)

Clean energy and new environmental technologies also use metals and minerals as building blocks. Systems for purifying water rely on nickel and a host of rare earth elements. Hybrid cars draw energy from nickel hydride batteries. 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.



THE ECONOMY

THE MINING INDUSTRY'S CONTRIBUTION TO CANADA

HIGHLIGHTS

+ The mining industry contributed $36 billion to Canada's GDP in 2010.
+ Mineral prices went up significantly in 2010, as did the use of Canadian mine and smelting capacity.
+ There are mining centres in all regions of Canada, including the north, with related expertise in major cities.
+ The mining industry creates jobs and economic growth in more than 115 Canadian communities.
+ Canada has the world's second-largest mining supply sector.
+ The mining industry paid $8.4 billion in taxes and royalties to Canadian governments in 2010.

Mining is a pillar of the Canadian economy. The industry not only adds significantly to the national GDP, it also drives the economic well-being of many regions and communities. Besides its direct contributions, the industry supports many firms and sectors that supply mining with the goods and services it needs to function. A strong mining industry provides jobs and security for many Canadians and a key stream of revenue for governments.

CONTRIBUTION TO CANADA'S GDP

Over the past 20 years, the value of minerals and metals to Canada's economy has ranged between 2.7% and 4.5% of the country's GDP. In 2010 the industry's contribution stayed within this range, at 2.9%.

2010 Contribution

The extractive industry, which combines mineral extraction with oil and gas extraction, contributed $54.0 billion, or almost 4.4%, to Canada's GDP in 2010 (see Figure 1). By this measure, the extractive industry is nearly three times larger than agriculture and thirteen times larger than forestry.

The mining industry as a whole goes beyond extraction to include mineral manufacturing. The mining industry's 2010 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): $8.3 billion.
- **Stage 2**, primary metal manufacturing (smelting, refining, rolling, extruding, alloying and casting of primary metals): $10.3 billion.
- **Stage 3**, non-metallic mineral product manufacturing (e.g., abrasives, lime, cement, glass, ceramics): $5.1 billion.
- **Stage 4**, fabricated metal product manufacturing (e.g., forging, stamping and heat-treating to produce reinforcing bars, fabricated wire, cutlery, tools, hardware): $11.9 billion.

The output of these four stages in 2010 totalled $35.7 billion. In comparison, according to Statistics Canada, the oil and gas extraction sector contributed $39.4 billion to GDP. About 40% of that sector's total relates to oil sands, some of which could be logically classified under mineral extraction.

Economic Trends

Until late 2008 the Canadian economy enjoyed more than a decade of strong growth, low inflation and low interest rates, with GDP increasing about 3% a year. The economy passed the $1 trillion threshold in 2003 and reached $1.35 trillion in 2010.

However, economic growth halted from late 2008 to mid-2009 as unstable oil prices, unsound mortgages, high consumer and corporate debt, and ineffective regulation of the US financial sector triggered a global recession. In 2009 Canada's GDP declined by 2.5%. Across the economy, business capacity reached its lowest level in 27 years.

Besides benefiting rural, remote and northern communities, the mining industry also has strong links to major cities.

During this period, mineral prices fell for most commodities in response to lower global demand. Operations in 32 Canadian mines were closed or suspended (discussed in Section 2). The mining industry's contribution to Canada's GDP fell by 20% in 2009 (see Figure 2).

Global economic growth, led by China, resumed in the final quarter of 2009 and stayed strong through 2010 and the first two quarters of 2011. Mineral prices went up significantly as a result. In response, the use of Canadian mine capacity increased from 50% in mid-2009 to 70% at the end of 2010, while the use of smelting capacity grew from 72% to 80%.

Given the growth projections for China, India and elsewhere, and assuming a positive and efficient

investment environment, the Canadian mining industry should enjoy strong economic prospects in the coming decades. This optimism contrasts with some economic analysts' concerns over the US deficit and debt situation, the debt loads of certain EU countries and inflation in China. The possibility of a double-dip recession—a second recession in the wake of the current recovery—should not be dismissed. (See Section 3 for more about these issues.)

CANADIAN MINES IN 2010
Total mining establishments: 968
Metals: 71
Non-metals: 897

PROVINCES WITH THE MOST METAL MINES
Quebec: 22
Ontario: 18
British Columbia: 12

MAIN TYPES OF NON-METAL MINES
Sand and gravel quarries: 573
Stone quarries: 193
Peat mines: 77

CONTRIBUTION TO PROVINCES AND TERRITORIES

The mining industry is an economic backbone of Canada's provinces and territories, creating jobs and economic growth in more than 115 communities. As a case in point, SJ Research Services estimates that the direct, indirect and induced effects of mining account for 12% of Saskatchewan's GDP. As well, some 1,200 Aboriginal communities are located within 200 kilometres of mineral properties, making mining an economic opportunity for this part of the population.

Regional Distribution of Mining

Figure 3 shows where Canada's mining expertise is clustered (details in Annex 1). Ontario and Quebec are leading gold producers. Newfoundland and Labrador and Quebec produce virtually all of Canada's iron ore. The Northwest Territories is the country's dominant source of diamonds. Saskatchewan produces all of Canada's uranium, and British Columbia is prominent in steelmaking coal production. Several provinces have strong copper and nickel production. (For detailed mineral production by province and territory, see Annex 2 and Annex 3.)

VALUE OF MINING IN 2010
Canada-wide: $41.3 billion

TOP 4 PROVINCES
1. Ontario: $7.7 billion
2. Saskatchewan: $7.1 billion
3. British Columbia: $7.1 billion
4. Quebec: $6.8 billion

While mining is often seen as benefiting rural, remote and northern communities, the industry also has strong links to major cities. Some of Canada's largest companies are based in urban centres such as Vancouver (Goldcorp, Teck), Saskatoon (Cameco, PotashCorp), Toronto (Barrick, Inmet, Vale, Xstrata) and Montreal (ArcelorMittal, Iron Ore Company of Canada, Rio Tinto Alcan).

Toronto is considered the prime global centre for mining finance. The Toronto Stock Exchange lists 58% of the world's public mining companies. Toronto is home to several dozen mining company head offices and several hundred mining suppliers, consulting firms and service providers.

Vancouver is the world's leading centre of expertise for mineral exploration. Some 1,200 exploration companies are located in British Columbia, most in the greater Vancouver area.

MAIN SUPPLIERS TO CANADA'S MINING INDUSTRY

- 143 exploration consulting firms and 85 geotechnical consulting firms
- 242 environmental consulting firms
- 163 management and financial firms, including 60 financial analysis firms
- 70 education and training organizations and 83 health and safety consultants
- 27 drilling/blasting contractors and 154 drilling/blasting equipment companies
- 31 mineral-processing contractors and 187 mineral-processing equipment companies
- 128 crusher/conveyor equipment companies
- 195 excavation and loading equipment companies
- 98 laboratory and appliance equipment companies

Source: InfoMine

Elsewhere in Canada, Montreal is home to Rio Tinto Alcan, a world expert in aluminum smelting, and the city hosts significant mining research and education facilities. The global emergence of the oil sands over the past two decades has sparked the growth of Edmonton and Calgary. Rising uranium and potash prices have brought Saskatoon to the forefront of these industry areas.

Regional Value of Mining

The dollar value of Canadian mineral production increased dramatically in 2010—by 28%—as world mineral prices went up.

The industry supports many firms and sectors that supply mining with the goods and services it needs to function.

Saskatchewan and Newfoundland and Labrador have seen their share of Canada's production value grow most significantly over the past decade (see Figure 4). This increase is in line with higher uranium, potash and nickel prices and production volumes. The national share of the Northwest Territories, an important diamond producer, has also risen and now levelled off, reflecting production volumes and diamond prices.

The top four provinces in terms of production value in 2010—Ontario, Saskatchewan, BC and Quebec—also led in expenditures on mineral resource development (see Figure 5). Of the $8.3 billion invested in mine complex development in Canada, spending in each of these provinces exceeded $1 billion. This suggests that these four provinces will likely remain vital to Canada's mineral production into future decades.

NUMBER OF MINING SUPPLIERS IN LEADING COUNTRIES

- United States: 5,493
- Canada: 3,215
- Brazil: 2,768
- Chile: 1,693
- Australia: 1,340
- South Africa: 1,074
- Peru: 1,023
- United Kingdom: 968
- Argentina: 856
- China: 611

Source: InfoMine

The three territories together received 17% of total 2010 Canadian spending on exploration and deposit appraisal (the first two columns of Figure 5). This amount, roughly three times the territories' share of production value, reflects world interest in Canada's northern mineral potential. Exploration investment in each territory increased dramatically in 2010.

INDIRECT CONTRIBUTIONS: MINING SUPPLIERS

The mining industry's economic impact goes far beyond its direct contribution to GDP. For instance, mining accounts for over half of Canada's rail-freight revenues and port tonnage. Organizations such as CN Rail, CP Rail, the Port of Montreal and the Port of 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 database analyst, reported in 2011 that 3,215 Canadian firms provide technical, legal, financial,

accounting, environmental and other expertise to the mining industry. Most of these suppliers are located in Ontario (1,286) and British Columbia (945), followed by Alberta (519), Quebec (403), Saskatchewan (90) and Manitoba (65).

According to InfoMine, there are 71 mining supply companies in the three territories. As one example, some $3.5 billion in contracts with northern and Aboriginal suppliers has flowed from the EKATI diamond mine during its 13 years of operation in the Northwest Territories.

Section 3 of this report looks at the Canadian investment services sector as a mining supplier. During the past five years, 36% of global mining capital and 83% of global financing transactions were handled through the Toronto Stock Exchange. Several thousand Canadian brokers, analysts, exchange workers, consultants, trade finance experts and securities lawyers benefit from the mining industry.

TAXES AND OTHER PAYMENTS TO GOVERNMENTS

Each year Canadian governments receive considerable payments, in the form of taxes and royalties, as a result of mining activity—specifically the extraction, smelting and processing activities described in the first three stages of 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.

2010 Payments

In 2010 the mining industry, including oil sands mining, paid an estimated $8.4 billion to federal and provincial/territorial governments (see Figure 6).

This consisted of:

- $3.4 billion in royalties
- $3.1 billion in corporate income tax
- $2.0 billion in personal income tax

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

As noted, these payments do not reflect the fourth stage of mining outlined in Figure 2. Including this stage would add another $1.8 billion to the amount industry paid governments in 2010, bringing the total to $10.2 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.

Around 40% of the industry's 2010 payments went to the federal government and the remaining 60% to provincial/territorial governments.

Finally, the payments outlined here 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 (further research is required).

Payment Trends

The total royalties and corporate taxes paid by the industry in 2010 increased significantly—by 65%—from the economically turbulent year before. The movement of these figures during the global recession suggests that Canada's tax and royalty system is working as it should: payments go down during a period of recession and low mineral prices, and go up during buoyant periods.

In another notable trend, the provincial/territorial share of government payments has increased in recent years as a result of growing royalty payments. In the oil sands, for example, many projects have repaid investors' initial capital and have now entered a higher royalty bracket. According to the ENTRANS study that provided the data in Figure 6, Alberta, Saskatchewan, Newfoundland and Labrador, the Northwest Territories and British Columbia receive particularly large portions of their government revenue from mining.

Tax Policy

The Canadian mining industry supports the schedule that would reduce the federal corporate tax rate to 15% by 2012. The industry is pleased with the continuation, in the 2011 federal budget, of the super-flow-through share provision, and with two recent technical clarifications from the Canada Revenue Agency regarding underground mine tangible expenses and exploration consultation expenses. In an age of highly mobile capital, these actions can only strengthen Canada's investment climate.

One area where industry would like to see improvement relates to exploration and development spending near existing mines. Expenses for exploration and development at depth (within existing underground workings) are treated less attractively than similar greenfield costs. As a result, there is less incentive for companies to develop these expensive, yet potentially resource-rich, areas. The industry is in discussion with the federal government on this complex issue.

FIGURE 1

CANADA'S GROSS DOMESTIC PRODUCT, BY INDUSTRY[1], 2005-2010

($ millions)	2005	2006	2007	2008	2009	2010
All industries	1,158,680	1,191,403	1,218,979	1,226,809	1,194,541	1,234,468
Agriculture	19,441	19,351	19,732	21,324	20,469	20,103
Fishing, hunting and trapping	1,119	1,123	1,026	1,022	1,022	1,042
Forestry and logging	6,177	5,896	5,348	4,528	3,735	4,271
Support activities for mining and oil & gas	6,836	7,937	7,159	7,522	5,750	7,842
Mining (incl. milling), quarries and oil & gas extraction	**55,941**	**57,271**	**57,776**	**55,993**	**51,476**	**54,036**
Manufacturing	187,901	185,527	181,348	170,350	151,120	159,137
Construction	66,725	69,462	72,330	75,596	69,256	74,887
Transportation and warehousing	55,235	56,829	57,708	57,978	56,018	58,435
Information and cultural industries	42,039	43,583	44,568	45,372	45,314	45,588
Electric power, gas and water utilities	30,527	30,150	31,598	31,236	29,914	29,818
Trade, wholesale	63,662	66,839	70,107	70,350	66,024	69,463
Trade, retail	64,841	68,822	71,733	73,789	73,518	76,336
Finance and insurance	70,396	75,762	78,794	80,489	81,573	83,527
Real estate and rental and leasing	144,065	147,794	152,614	155,240	159,414	163,964
Community, business and personal services	276,721	285,526	294,233	301,321	302,764	307,963
Public administration	65,115	67,452	69,136	71,226	73,216	74,892

[1] at Basic Prices in 2002 Chained Dollars
Source: Statistics Canada, National Economic Accounts CANSIM Table 379-0027 and Catalogue 15-001-X.

FIGURE 2

GROSS DOMESTIC PRODUCT[1] - MINING AND MINERAL MANUFACTURING, 2005-2010

($ millions)	2005	2006	2007	2008	2009	2010
Metal mines	3,837	3,808	3,707	3,755	3,000	3,214
Nonmetal mines	4,348	4,042	4,662	4,627	3,435	4,212
Coal mines	1,019	859	827	820	729	874
Total Mining	**9,204**	**8,709**	**9,196**	**9,202**	**7,164**	**8,300**
Primary Metal manufacturing	12,095	11,961	11,752	11,603	9,138	10,346
Fabricated Metal Product Manufacturing	13,746	14,031	14,072	13,025	11,110	11,884
Non-Metallic Mineral Product Manufacturing	5,820	5,859	5,947	5,614	4,628	5,134
Total Mineral Manufacturing	**31,661**	**31,851**	**31,771**	**30,242**	**24,876**	**27,364**
Oil and gas extraction	40,531	41,571	42,448	40,328	39,279	39,449
Petroleum and Coal Products Manufacturing	3,332	3,204	3,297	3,165	3,105	3,194
Support activities for mining and oil & gas	6,836	7,937	7,159	7,522	5,750	7,842
Total	**91,564**	**93,272**	**93,871**	**90,459**	**80,174**	**86,149**

[1] at Basic Prices in Chained 2002 Dollars
Note: A consequence of using chain indices is that the sum of the chained values for each component of an aggregate does not equal the chained value of the aggregate, in this case, Total Mining.
Source: Statistics Canada, National Economic Accounts CANSIM Table 379-0027 and Catalogue 15-001-X.

FIGURE 3

CANADIAN MINING INDUSTRY CLUSTERS

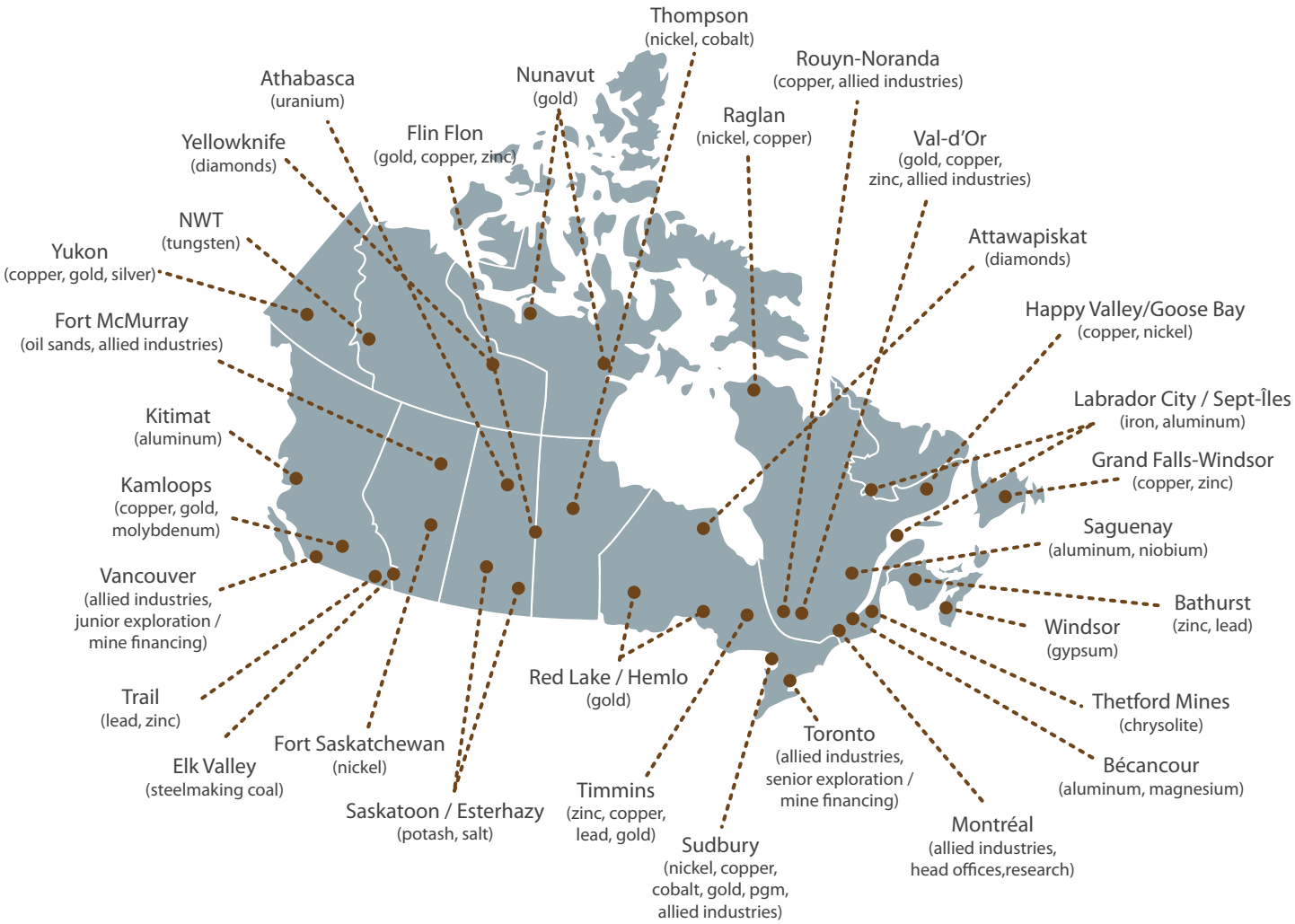


FIGURE 4

CANADA, VALUE OF MINERAL PRODUCTION BY PROVINCE AND TERRITORY, 2000 AND 2010

($ millions)	2000	2010
Newfoundland and Labrador	967,121	4,584,040
Prince Edward Island	5,482	3,437
Nova Scotia	295,249	294,167
New Brunswick	772,546	1,154,581
Québec	3,653,206	6,770,478
Ontario	5,711,381	7,691,650
Manitoba	1,068,806	1,663,506
Saskatchewan	2,282,648	7,083,980
Alberta	1,064,411	2,347,295
British Columbia	2,891,467	7,073,759
Yukon	56,264	284,055
Northwest Territories	681,743	2,032,724
Nunavut	384,597	305,098
Canada	**19,834,922**	**41,288,769**

FIGURE 5

TOTAL CAPITAL EXPENDITURES[1] FOR MINERAL RESOURCE DEVELOPMENT, BY PROVINCE AND TERRITORY, 2010[P]

Province/Territory	Exploration	Deposit Appraisal	Mine Complex Development	Total Expenditures
Newfoundland and Labrador	83,941,515	33,354,591	350,022,002	467,318,108
Nova Scotia	11,962,780	7,640,000	11,727,963	31,330,743
New Brunswick	13,366,504	5,988,504	192,177,603	211,532,611
Quebec	293,969,872	302,719,903	1,500,123,872	2,096,813,647
Ontario	543,461,402	369,628,129	1,181,495,892	2,094,585,423
Manitoba	65,202,580	14,141,494	254,886,165	334,230,239
Saskatchewan	142,308,052	246,675,641	2,720,011,385	3,108,995,078
Alberta	10,434,727	5,326,000	245,356,320	261,117,047
British Columbia	197,677,207	218,349,800	1,155,467,870	1,571,494,877
Yukon	113,218,628	40,858,425	176,830,000	330,907,053
Northwest Territories	46,723,194	40,093,005	304,967,855	391,784,054
Nunavut	172,301,766	100,930,464	181,041,789	454,274,019
CANADA	**1,694,568,227**	**1,385,705,956**	**8,274,108,716**	**11,354,382,899**

p Preliminary

[1] 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. Also includes machinery and equipment and non-residential construction.

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

FIGURE 6

DIRECT REVENUES TO GOVERNMENTS FROM THE MINERAL SECTOR, 2005 - 2010

MINERAL SECTOR EXCLUDING OIL SANDS MINING

	2005	2006	2007	2008	2009	2010
Royalties/Mining Taxes	985	1077	1637	2977	816	1778
Corporate Income Tax	1810	2858	2532	2391	1118	2106
Personal Income Tax	1566	1589	1761	1780	1495	1597
TOTAL	**4361**	**5524**	**5930**	**7148**	**3429**	**5481**
of which federal	2405	3097	2973	2812	1815	2502
of which provincial	1956	2427	2957	4336	1614	2979
- percent share	44.9	43.9	49.9	60.6	47.1	54.3

MINERAL SECTOR INCLUDING OIL SANDS MINING

	2005	2006	2007	2008	2009	2010
Royalties/Mining Taxes	1576	2640	3967	5279	2182	3357
Corporate Income Tax	2393	4005	4213	3204	1118	3068
Personal Income Tax	1731	1784	1970	2046	1805	1981
TOTAL	**5700**	**8429**	**10150**	**10529**	**5105**	**8406**
of which federal	2799	3707	4005	3547	2032	3347
of which provincial	2901	4722	6145	6982	3073	5059
- percent share	50.9	56.0	60.5	66.3	60.1	60.2

Notes: 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.

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

THE ACTIVITIES

PRODUCTION, PROCESSING AND TRANSPORTATION

HIGHLIGHTS

+ Canada ranks among the top five countries in the global production of 12 minerals and metals.
+ The value of Canada's mineral production rose sharply in 2010 (by 31%), reaching $41.2 billion.
+ The development of the oil sands continues to be one of the world's biggest economic stories.
+ Canada has 31 non-ferrous smelters and refineries operating in six provinces.
+ The mining and Canada's rail system have an important relationship—the industry provided 56% of rail-freight revenues in 2010.
+ The mining industry is a major contributor to the St. Lawrence Seaway and other Canadian ports.

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

Being richly endowed with natural resources, Canada ranks among the top five countries in the global production of 12 major minerals and metals (details in Annex 4):

- First in potash
- Second in uranium
- Third in aluminum and titanium
- Fourth in sulphur and nickel
- Fifth in diamonds, platinum group metals, asbestos, molybdenum, salt and cadmium

Canada no longer holds a top-five position in the production of gold, silver, zinc, copper or lead, having been surpassed by other suppliers, including Australia, Russia, the United States, China and Peru.

Production Values

The value of Canadian mineral production shot up in 2010, increasing 31% to reach $41.2 billion (see Figure 7). Metal production rose by one-third from the recession-level value of the previous year, while non-metal production value went up 30%.

The non-metal sector, which grew dramatically in 2008 thanks to buoyant potash markets, remained strong in 2010. The value of coal production has followed suit, strong Asian demand for steel-making coal and rising energy prices, and stimulated investment in new coal mines in British Columbia and Nova Scotia.

Canada's top 10 minerals and metals (see Figure 8) each had 2010 production values over $1.3 billion, with six (potash, coal, iron ore, gold, copper and nickel) over $3 billion. Potash and iron ore showed the greatest value increases in the past year, with strong growth in copper, nickel and diamonds as well (details in Annex 5). Together, the top 10 minerals and metals represented $34 billion in 2010—83% of Canada's total mineral production value.

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

Potash

According to CIBC World Markets, global demand for grain is going up 2% a year, largely to feed animals, while actual acreage under cultivation is going down. Fertilizer made from potash is bridging this global gap by increasing crop yields.

Potash and iron ore showed the greatest value increases in the past year, with strong growth in copper, nickel and diamonds as well.

Potash prices and values have followed a turbulent path in recent years. Although prices will likely increase over the long term, driven by changing diets and agricultural practices in China and India, these countries will also try to keep prices in check. New supply from BHP Billiton and Vale could also serve to dampen prices.

Saskatchewan remains a world leader in potash, a position that will likely be reinforced by the emergence of BHP Billiton as a major player in the province. The company is expected to invest several billion dollars in Saskatchewan's potash industry over the coming years.

Diamonds

Canada has charted a particularly interesting course in diamonds, moving from zero production value to being the world's third-ranked producer in the span of 13 years. During this period the Diavik and EKATI diamond mines (NWT) and two new De Beers mines, Snap Lake (NWT) and Victor (Ontario), all entered production.

The investment conditions surrounding the diamond industry, both in Canada and abroad, are closely linked to the state of the economy. The recession that began in late 2008 lowered demand for luxury goods, triggering a

CANADIAN DIAMOND EXPORTS: A DRAMATIC DECADE

Value in 1998: $0
Value in 2008: $2.8 billion
Current share of global production: 13%
Main destinations: Antwerp and London (for further processing)

40–50% drop in rough diamond prices. Temporary mine shutdowns occurred in most major diamond-producing countries in 2009, including Canada (Snap Lake and Diavik).

On a positive note, the entry into full production of the Snap Lake and Victor projects capped off 40 years of exploration and development efforts for De Beers. Future diamond potential may also exist elsewhere in the territories and in Saskatchewan, where the Fort à la Corne project is among the largest kimberlite fields in the world. As well, Stornoway's Renard project in Quebec has continued to progress in the past year.

In another development, China became the top importer of polished diamonds from Antwerp through the first quarter of 2010, surpassing the United States. China and India will emerge as the dominant forces in global diamond demand over the coming years as their population of middle-class consumers increases dramatically.

Uranium

Forecasting the medium and long-term direction for uranium and nuclear energy is a difficult task.

On the one hand, global demand for uranium has shot up in recent years, as countries have embarked on new nuclear energy programs or expanded existing ones. Estimates from UxC (the Ux Consulting Company) suggest that 260 new reactors could be built worldwide by 2030 (see sidebar). As a result, UxC predicts that global uranium demand could grow by 80% over the next 20 years.

On the other hand, the tragic March 2011 tsunami in Japan, and the resulting damage to nuclear reactors, cast a negative light on nuclear energy. Germany announced that it would close its nuclear reactors by 2022 (though that country has reversed directions on nuclear energy in the past). Many countries are now under political and environmental pressure to shift away from nuclear power towards wind, solar and other energy forms, to the extent that these can meet capacity needs.

NUCLEAR ENERGY PROJECTIONS

- **China**: Foresees a six-fold increase in nuclear energy capacity by 2020.
- **Russia**: Expects to add 2–3 gigawatts of nuclear power a year until 2030.
- **United States**: Has proposed 20 new reactors, extended licences of about 40 existing ones, approved 140 "uprates" (power output increases) in recent decades.

Canada, notably Saskatchewan, is a major player in the world uranium industry. The 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.

Uranium production in Kazakhstan and Africa is expected to increase in the coming decades. Investment

by Uranium One could triple production at Kazakhstan's Karatau mine over the next four years, while Areva's large Imouraren mine in Niger is scheduled for full production in 2012.

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 crude oil prices that rocketed from $20 a barrel in the 1990s to $140 in mid-2008 (and $100 in 2011), made the oil sands economically viable and boosted production to over a million barrels a day. The oil sands have increased wealth and economic activity in western Canada and have created 200,000 jobs, helping to offset jobs lost in manufacturing. The population of Fort McMurray, the hub of oil sands activity, has grown from 6,000 in 1968 to 80,000 today.

Synthetic crude oil accounted for some 27% of Canada's crude oil production volume (31% by value) in 2010, up from 15% a decade earlier (see Figure 9). The absolute value of this increase in synthetic crude production is considerable: from $5 billion in 2000 to $23 billion in 2010. All of this production is from Alberta, though reserves in Saskatchewan are now attracting interest.

Oil sands operating costs run $40 to $50 per barrel, so in late 2008, when oil prices plunged from $140 to about $40 per barrel, the impacts were severe. Expansion projects were delayed or shelved, jobs were lost, government revenues fell and 1.2 million barrels a day in future projects were deferred. However, growth and investment returned through mid-2009 as oil prices rebounded to $70 and then to $100 in mid-2011.

Before the late-2008 downturn, around $100 billion in oil sands investment was expected over the next 15 years, some 40% of it for mining and 60% for in-situ projects. Although the timetable and investment amounts have since been adjusted, they may still come out close to the original figures.

In recent investments, Imperial Oil is proceeding with the first phase of the Kearl oil sands project, a surface mining operation projected to cost $8 billion and produce 110,000 barrels a day by 2012.

The 2009 merger of Suncor and Petro-Canada to form Canada's largest oil company has greatly affected the oil sands sector, generating efficiencies and accelerating projects like the delayed Fort Hills oil sands. Suncor reaffirmed its commitment to the oil sands in June 2010 by announcing plans to sell conventional holdings in the North Sea and the Netherlands.

Other recent investments include Suncor's Voyageur project and Canadian Natural Resources' Horizon project. In July 2010 Cenovus got approval to build an

OIL SANDS PROJECTIONS

- Alberta's deposits are believed to contain 2.5 trillion barrels of bitumen. With current technologies, that would yield 300 billion barrels of synthetic crude—more than the reserves of Saudi Arabia.
- According to Alberta Energy, the province's current lease agreements cover only 20% of potential oil sands areas.
- Alberta's oil sands production is projected to increase from some 1.3 million barrels a day at present to 4.7 million in 2025.
- Some analysts suggest that output could reach 6.3 million barrels by 2035, depending on longer-term economic growth and oil prices.

in-situ test well in the untapped bitumen deposits of the 100-billion-barrel Grand Rapids region.

Although now most of Canada's oil sands output is exported to the United States, future customers could include Asian countries. Enbridge has proposed a dual pipeline between Edmonton and Kitimat, British Columbia, that could move half a million barrels a day to Asian, especially Chinese, markets. Chinese entities have recently put money into the oil sands, including a $5 billion investment in Syncrude and the mid-2011 purchase of Opti Canada for $2 billion. More Chinese investment is expected in the coming years.

The future of Asian countries as customers assumes that the environmental and related challenges surrounding oil sands development can be overcome. These issues, which are attracting wide public and political attention, are discussed in Section 5 of this report.

PROCESSING OF MINERALS

Canada has a large mineral-processing industry, with 31 non-ferrous metal smelters and refineries in six provinces (see Figure 10). Some of these facilities contain both a smelter and a refinery.

WHERE ARE CANADA'S MINERAL-PROCESSING FACILITIES?

- New Brunswick: 1 smelter
- Quebec: 12 smelters, 3 refineries, 1 smelter/refinery
- Ontario: 2 smelters, 3 refineries, 2 smelter/refineries, 1 conversion facility
- Manitoba: 1 smelter/refinery
- Alberta: 1 refinery
- British Columbia: 2 smelters, 1 smelter/refinery, 1 processing plant

Historically, Canada's integrated smelters and refineries accompanied world-class mines and were located inland without access to low-cost marine transport. Now, as local ore reserves become depleted (discussed in Section 3) and the production of base metal concentrate declines, smelters and refineries are moving from integrated production towards the more expensive custom treatment of concentrates from other countries. They are also using more secondary raw materials and scrap feed.

Between this depletion of reserves and greater dependence on imported concentrates, the quantity and value of refined metal production in Canada have become irregular. While production volumes of refined lead and aluminum have held steady over the past five years, those of copper and zinc have gone down (see Figure 11). Refined nickel production increased between 2006 and 2008 with the opening of the Voisey's Bay mine, but declined in 2009 as a major strike at Vale took effect.

Canada's mineral-processing industry needs exploration and domestic production if it is to obtain reliable feedstock and remain competitive.

The ability to source raw materials from domestic mines greatly influences the cost, and therefore profitability, of refining and smelting operations. Canada's mineral-processing industry needs exploration and domestic production if it is to obtain reliable feedstock and remain competitive.

Canada's processing facilities also operate in a global arena, where China and other countries are expanding their processing capacity and competing fiercely for raw materials. In one decade the average capacity of the world's top 10 copper smelters grew from 270,000 to 480,000 tonnes, an 80% increase that risks leaving Canadian facilities in its wake.

The age of some Canadian processing operations, and their ability to meet potential regulatory requirements, also impacts viability. For instance, HudBay Minerals closed its 80-year-old copper smelter in Manitoba in mid-2010.

TRANSPORTATION OF MINING PRODUCTS

Canada's transportation system is critical to the flow of mined and refined products to markets at home and abroad. The mining industry is by some measures the most important customer for Canada's transportation sector, providing it with significant tonnage, especially in bulk commodities such as iron ore, coal, potash and sulphur.

On a global level, the volume of freight carried by the world transportation system is greatly affected by oil prices. As noted by economist Jeff Rubin, the cost of shipping a container from Shanghai quadrupled to $8,000 over the past eight years, and would reach $15,000 in a $200-per-barrel oil scenario, thus diminishing the business case behind investment in China. Even though shipping rates have decreased since the recent recession, if oil prices rise in the coming years, this variable could change investment and global shipping patterns for mining and other industries.

It is interesting to note that Vale has contracted for up to 19 new ships which, when commissioned, will mainly transport Brazilian iron ore to China. By better controlling future freight costs, Vale hopes to gain an advantage over competing firms such as BHP Billiton and Rio Tinto.

Rail

The Canadian rail system relies on the mining industry. Shipments of coal and processed minerals represented 56% of total Canadian rail-freight revenue in 2010 (see Figure 12). In terms of volume, rail became more dependent on mining in 2010, with 50% of its commodity volume coming from mining compared to 44% in 2009.

TOP COMMODITIES CARRIED BY CANADIAN RAIL IN 2010 (BY VOLUME)

1. Minerals and metals: 50%
2. Grain: 13%
3. Forest products: 8%
4. Chemicals: 5%

Source: Transport Canada, Transportation in Canada: An Overview (2010)

Canada's freight rail system operates as a dual monopoly, shared by Canadian National and Canadian Pacific. Communities are often served by only one company, which gives shippers little competitive choice. The 2007 strike of CN conductors highlighted how important rail is to the mining industry. After less than a week, mine sites and processing operations were seriously hampered in their ability to move raw materials in and finished products out to customers.

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, balanced shippers' 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.

As a follow-up to the legislative changes, the federal government recently reviewed rail service by CN and CP, aiming to identify problems, examine best practices and recommend commercial, regulatory or other remedies to improve service. During the review, a key message from MAC and other shippers was that railways should face the same kinds of penalties and disciplines on their service performance as shippers already do.

Rail became more dependent on the mining industry in 2010, with 50% of its commodity volume coming from mining compared to 44% in 2009.

MAC was pleased with the review panel's recommendations and the federal government's response, feeling that the recommendations shift leverage to shippers. Next the government will help set up a process to negotiate a service agreement template, and will create a panel to address logistical concerns and develop railway service metrics for ongoing measurement. MAC will stay involved as the recommendations are acted on.

Some mining companies are in periodic dialogue with the government about the legislation and processes concerning transportation of dangerous goods. The companies' intent is to ensure that these products can move safely and efficiently into and out of mining facilities.

Trucking

According to the federal government report Transportation in Canada (2010), trucks carried $146 billion in Canadian exports in 2010, 10% of which was base metals and articles of base metal. Trucks carried $213 billion in imports to Canada, 8% of which ($18 billion) was base metals and articles of base metal.

Only small amounts of ores and concentrates are traded by truck—around 0.4% of total truck exports and 0.1% of imports.

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

Marine

The mining industry is a major contributor to Canada's St. Lawrence Seaway. According to the 2009 Traffic Report, prepared jointly by the Seaway's management and development corporations, shipments of iron ore, coke and coal represented 37% of total Seaway traffic in 2009. Other mine products (mainly salt) contributed a further 14%.

Mining is also a leading customer at Canadian ports. Mineral products are most important in the St. Lawrence and Great Lakes marine regions and least important in the Atlantic region.

The Port of Montreal handles large volumes of iron ore, copper ore, gypsum and zinc ore. Generally these arrive by ship as inbound cargo and are then transported by rail or truck to the region's copper and zinc smelting and refining facilities.

Coal accounts for 38% of the total volume handled at the Port of Vancouver, which moves shipments to China, Japan and other Asian markets. Fertilizer/potash represents another 11% of the port's volume, and minerals and ores 9%. The volumes of coal and fertilizer/potash handled by the port grew by 25% and 42% respectively in 2010.

Mining also accounts for a sizeable amount of the value of Canadian exports moved by ship to international markets. According to Transportation in Canada (2010), Canada transported $54 billion in industrial exports by ship to non-US countries in 2009. Of that, coal ($5 billion), non-ferrous products and alloys ($5 billion), iron ore ($3 billion), potash ($1 billion) and non-ferrous metals ($1 billion) were the most valuable mining products.

Air

Gold and precious metals, because of their high value and low volume, are potentially suitable for transport by air. According to Transportation in Canada (2009), Canada exported $40 billion worth of products by air that year, $9 billion of which was gold and precious metals. The same year, Canada imported $54 billion by air, $7.5 billion of which was gold and precious metals. Of all traded products, only the machinery sector used air transportation more.

Transportation in Canada (2010) does not report any significant precious metal shipments. This suggests either that they were a one-time occurrence or that air cargo reporting practices have changed.

FIGURE 7

VALUE OF CANADIAN MINERAL PRODUCTION, 2005-2010[1]

($ millions)	2005	2006	2007	2008	2009	2010
Metals	14.6	21.1	26.2	22.6	15.5	20.7
Nonmetals	10.5	10.3	11.6	19.4	11.6	15.0
Coal	2.9	2.9	2.7	5.0	4.4	5.5
Total Mineral Production	**28.0**	**34.2**	**40.6**	**47.0**	**31.4**	**41.2**

[1] at Basic Prices in Chained 2002 Dollars
Note: A consequence of using chain indices is that the sum of the chained values for each component of an aggregate does not equal the chained value of the aggregate, in this case, Total Mining.
Source: Statistics Canada, National Economic Accounts CANSIM Table 379-0027 and Catalogue 15-001-X.

FIGURE 8

CANADA'S TOP TEN METALLIC AND NON-METALLIC MINERAL PRODUCTS[1], BY VALUE OF PRODUCTION, 2000 AND 2010[P]

		2000		2010	
	Unit of Measure	Quantity	$ Value	Quantity	$ Value
Potash (K20)[2]	t	9	1,644	10	5,688
Coal	t	69	1,427	68	5,540
Iron ore	t	35	1,424	37	4,986
Gold	g	153	2,045	97	3,923
Copper	kg	622	1,684	498	3,829
Nickel	kg	181	2,324	149	3,359
Diamonds	ct	2	625	12	2,363
Cement[3]	t	13	1,259	12	1,518
Sand and Gravel	t	239	971	206	1,506
Zinc	t	935	1,567	599	1,343

p Preliminary

[1] Includes coal, as a mineral fuel.
[2] Shipments of potash to Canadian potassium sulphate plants are not included in this table.
[3] Includes exported clinker minus imported clinker.

Note: Data include shipments by producers regardless of their industrial classification.

Source: Natural Resources Canada; Statistics Canada - Catalogue No. 26-202-X.

FIGURE 9

PRODUCTION OF SYNTHETIC CRUDE OIL BY OIL SANDS MINING PLANTS, ALBERTA AND CANADA, BY QUANTITY AND VALUE, 1998-2010

	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	17,870.80	94,676.20	18.88	2,313,518.00	9,734,475.00	23.80
1999	18,766.90	89,065.50	21.07	3,252,547.00	13,727,829.00	23.70
2000	18,608.00	89,136.10	20.88	5,188,916.00	21,687,681.00	23.90
2001	20,260.60	89,364.50	22.67	4,995,003.00	17,734,825.00	28.20
2002	25,494.60	89,885.10	28.36	6,455,743.00	19,778,759.00	32.60
2003	25,028.80	95,311.40	26.26	6,777,342.00	22,187,602.00	30.50
2004	26,661.90	101,007.00	26.40	8,570,468.00	27,767,704.00	30.90
2005	21,932.50	98,878.70	22.18	9,213,624.00	33,282,754.00	27.70
2006	28,764.20	106,017.80	27.13	14,831,145.00	38,498,843.00	38.50
2007	39,900.20	108,853.30	36.66	18,012,945.00	42,130,415.00	42.80
2008	38,020.70	108,322.40	35.10	25,214,415.00	62,941,690.00	40.10
2009	44,330.80	112,937.70	39.25	19,043,537.00	43,934,049.00	43.35
2010	45,917.60	122,081.00	37.61	23,375,070.00	55,028,049.00	42.48
CANADA						
1998	17,870.80	128,400.30	13.92	2,313,518.00	12,940,149.00	17.90
1999	18,766.90	122,287.00	15.35	3,252,547.00	18,698,282.00	17.40
2000	18,608.00	127,769.20	14.56	5,188,916.00	30,523,595.00	17.00
2001	20,260.70	128,951.00	15.71	4,995,003.00	24,911,953.00	20.10
2002	25,494.60	136,969.80	18.61	6,455,743.00	29,956,080.00	21.60
2003	25,028.80	144,813.20	17.28	6,777,342.00	33,610,498.00	20.20
2004	26,661.90	149,159.60	17.87	8,570,468.00	40,639,940.00	21.10
2005	21,932.50	146,207.90	15.00	9,213,624.00	49,159,801.00	18.70
2006	28,764.20	161,434.00	17.82	14,831,145.00	63,649,683.00	23.30
2007	39,900.20	160,448.30	24.87	18,012,945.00	62,919,592.00	28.60
2008	38,020.70	158,950.40	23.92	25,214,415.00	91,757,005.00	27.50
2009	44,330.80	158,100.40	28.04	19,043,537.00	61,558,676.24	30.94
2010	45,917.60	167,774.90	27.37	23,375,070.00	76,165,360.00	30.69

r Revised

Source: Statistics Canada

FIGURE 10

NON-FERROUS SMELTERS AND REFINERIES, 2010[1]

Owner	Operation	Type of facility	Location	Outputs
New Brunswick				
Xstrata Zinc Canada (Brunswick)	Brunswick	(Sm.)	Belledune	Pb,Bi,PM
Quebec				
Alcoa Inc.	Baie-Comeau	(Sm.)	Baie-Comeau	Al
Alcoa Inc.	Deschambault	(Sm.)	Deschambault	Al
Alcoa Inc./Rio Tinto Alcan Inc.	Bécancour	(Sm.)	Bécancour	Al
Newalta Income Fund	Sainte-Catherine	(Ref.), (Sec. Sm.)	Sainte-Catherine	Recycled Pb
Rio Tinto Alcan Inc.	Alma	(Sm.)	Alma	Al
Rio Tinto Alcan Inc.	Arvida	(Sm.)	Arvida	Al
Rio Tinto Alcan Inc.	Beauharnois	(Sm.)	Beauharnois	Al
Rio Tinto Alcan Inc.	Grande-Baie	(Sm.)	Grande-Baie	Al
Rio Tinto Alcan Inc.	Laterrière	(Sm.)	Laterrière	Al
Rio Tinto Alcan Inc.	Shawinigan	(Sm.)	Shawinigan	Al
Rio Tinto Alcan Inc. (Vaudreuil)	Vaudreuil	(Ref.)	Jonquière	Alumina
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
Xstrata Copper Canada (CCR)	CCR	(Ref.)	Montréal-Est	Cu, Au, Ag, Se, Te, Ni, PGM
Xstrata Copper Canada (Horne)	Horne	(Sm.)	Noranda	Cu, PM
Xstrata Zinc Canada	General Smelting Company of Canada	(Sec. Sm.)	Lachine	Recycled Pb
Xstrata Zinc Canada/Noranda Income Fund	Canadian Electrolytic Zinc Limited (CEZinc)	(Ref.)	Valleyfield	Zn,Cd, S*
Ontario				
Cameco Corporation	Fuel Services Division	(Con. Fac.)	Port Hope	U
Cameco Corporation	Fuel Services Division	(Ref.)	Blind River	U
Johnson Matthey Limited	Brampton	(Sm.), (Ref.)	Brampton	Au, Ag, Recycled Pb
Royal Canadian Mint	Ottawa	(Ref.)	Ottawa	Au, Ag
Vale Inco Limited	Copper Cliff complex	(Sm.), (Ref.), (Pl.)	Sudbury	Ni,Cu, Au, Ag, Se, Te, PGM, S*
Vale Inco Limited	Port Colborne	(Ref.)	Port Colborne	Electrolytic Co, PGM, Co oxide
Aleris International, Inc.	Mississauga	(Sec. Sm.)	Mississauga	Recycled Zn

NON-FERROUS SMELTERS AND REFINERIES, 2010[1]

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

Source: Natural Resources Canada, Map 900A.

[1] in operation, as of December 31, 2010.

(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, 2004-2010[P]

Metals	2004	2005	2006	2007	2008	2009	2010p
Aluminum [1]	2,592,160	2,894,204	3,051,128	3,082,625	3,120,148	3,030,269	2,963,210
Cadmium	1,880	1,727	2,090	1,388	1,409	1,299	1,357
Cobalt [2]	4,673	4,618	4,555	4,883	4,899	4,358	3,682
Copper	526,955	515,223	500,463	453,453	442,050	335,052	315,636
Lead [3]	241,169	230,237	250,464	236,688	259,094	258,854	273,017
Nickel	151,518	139,683	146,899	153,647	167,732	116,909	98,718
Zinc	805,438	724,035	824,464	802,103	764,310	685,504	693,014

Source: Natural Resources Canada; Statistics Canada - Catalogue no. 26-202-X

p Preliminary
[1] Production of molten metal excluding metals added (30 919 t in 2009 and 45 359 t in 2010).
[2] Does not include cobalt oxide.
[3] Includes secondary lead.

Note: These data are not comparable to data for Primary nonferrous Metal Smelting and Refining Industries on the Survey of Manufacturers.

FIGURE 12

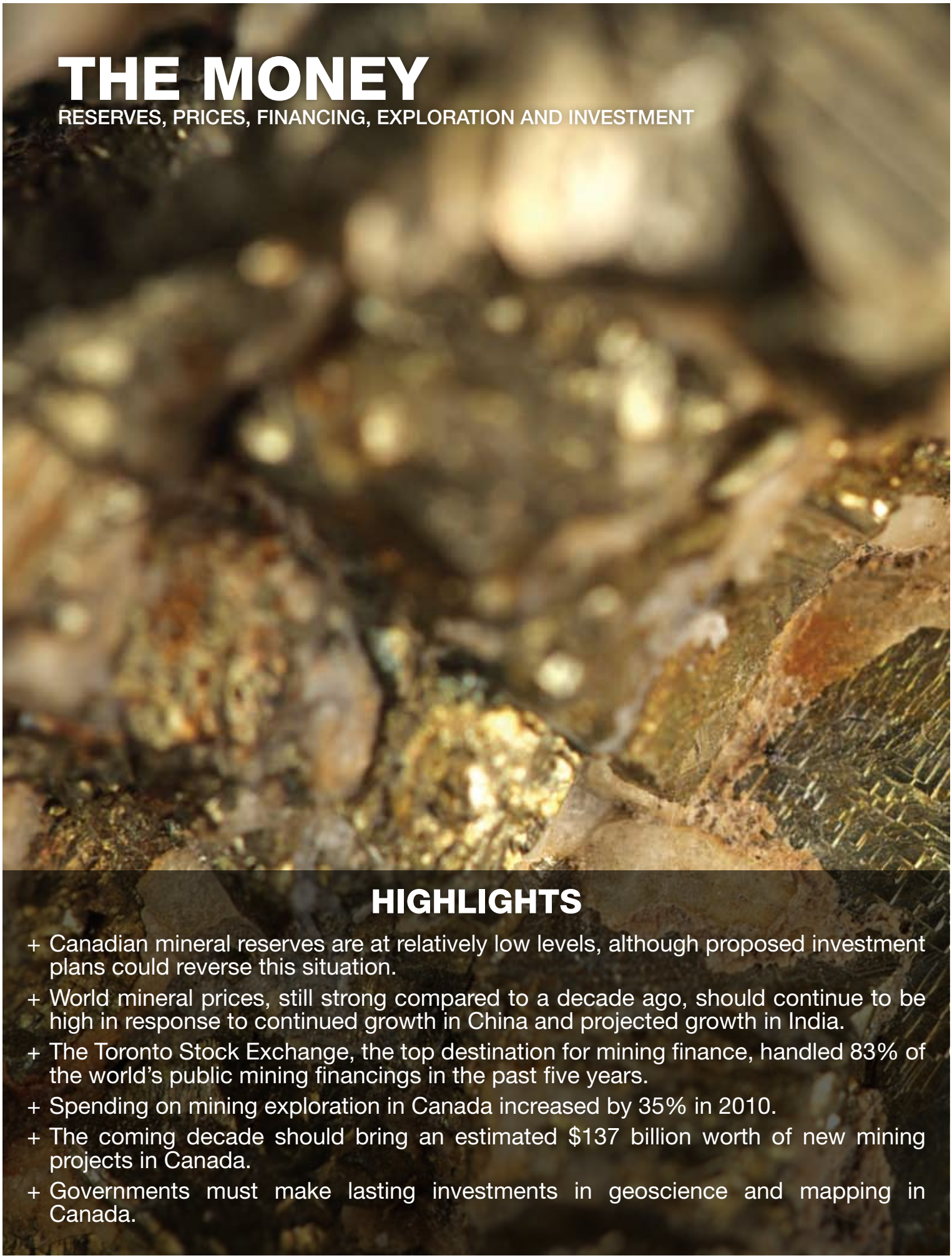
CRUDE MINERALS AND PROCESSED MINERAL PRODUCTS TRANSPORTED BY CANADIAN RAILWAYS, 2005-2010

(MILLION TONNES)	2005	2006	2007	2008	2009	2010
Total Revenue Freight [1]	260.7	258.7	255.7	244.4	212.9	235.4
Total Crude Minerals	112.8	108.0	112.0	111.9	85.0	79.9
Total Processed Mineral Products	27.3	27.9	27.7	27.6	21.7	52.5
Total Crude and Processed Minerals	140.0	135.9	139.8	139.4	106.7	132.3
(%)						
Crude Minerals and Processed Mineral Products as a Percentage of Revenue Freight	53.7	52.5	54.7	57.1	50.1	56.2

[1] Revenue Freight refers to a local or interline shipment from which earnings accrue to a carrier.

Notes:
Total Crude Minerals include coal, but not oil and gas.
Numbers may not add due to rounding.

Source: Statistics Canada, catalogue no. 52-001-XIE.



THE MONEY

RESERVES, PRICES, FINANCING, EXPLORATION AND INVESTMENT

HIGHLIGHTS

+ Canadian mineral reserves are at relatively low levels, although proposed investment plans could reverse this situation.
+ World mineral prices, still strong compared to a decade ago, should continue to be high in response to continued growth in China and projected growth in India.
+ The Toronto Stock Exchange, the top destination for mining finance, handled 83% of the world's public mining financings in the past five years.
+ Spending on mining exploration in Canada increased by 35% in 2010.
+ The coming decade should bring an estimated $137 billion worth of new mining projects in Canada.
+ Governments must make lasting investments in geoscience and mapping in Canada.

The five main monetary aspects of the Canadian mining industry—reserves, prices, financing, exploration and capital investment—are by nature interrelated. Global prices, for example, 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 reserve levels.

CANADIAN RESERVES

Over the past 25 years, there has been a marked decline in proven and probable Canadian mineral reserves in all major base metals (see Figure 13 and Annex 6). The most dramatic decline—some 80%—has been in lead, zinc and silver reserves, while copper and nickel reserves have fallen by more than half. Gold reserves in 2009 were around half of 1996 levels.

Without sustained and effective exploration, Canadian mineral production will outstrip reserve additions. The country's smelters and refiners will be forced to rely on imported raw materials, placing the domestic mining industry at risk, competitively and strategically.

Without sustained and effective exploration, Canadian mineral production will outstrip reserve additions.

On the positive side, exploration investment, which had reached historically high levels in Canada before the recent economic downturn, went up again in 2010. As well, Canada remains the world's top destination for mineral exploration.

If there is consistent investment over an extended period, and if there is new geological mapping, the industry could see a significant increase in proven and probable reserves. To that end, the federal government should continue to improve policies that foster exploration spending and capital investment in new mines, expansions and modernizations.

MINERAL AND METAL PRICES

Global economic events have a direct and daily impact on mineral and metal prices. Prices are driven largely by the strength of the US and Chinese economies. China, in particular, imports over $100 billion in metals a year and buys some 30% of the world's base metals, up from a 5% share in the 1980s. As well, China often controls exports of key minerals, stockpiling iron ore, aluminum, copper, nickel, tin, zinc (and oil) when prices are low. These practices make it difficult for analysts to forecast prices for minerals and marine shipping.

When the global recession began in late 2008, many mining companies cut production due to significant price declines. For example, some 20 zinc smelters worldwide curtailed production in late 2008 and early 2009. In Canada 32 mining operations closed or scaled back in these months.

The economic recovery since mid-2009 has been driven largely by Chinese demand; recovery in the United States and Europe has stayed sluggish. As a result, companies in many sectors beyond mining (autos, pharmaceuticals, electronics, lumber) are seeing more of their profitability come from Chinese sales. The high-profile debt situations facing the US and several European countries are only exacerbating the growth challenges in those regions.

Figure 14 illustrates three stories: the strong growth in mineral prices from 2000 to 2007, the dramatic decline for most metals in late 2008, and the strong rebound of prices for aluminum, zinc, nickel and copper through 2010.

In the medium term, according to most mining analysts, mineral prices should stay strong. A number of factors underlie this prediction: continued development in China, a depreciated US dollar, aging western infrastructure and challenges facing new mining projects worldwide. With the gradual emergence of India and its demand for minerals and metals—which could, over time, match China's—the mining industry may enjoy an extended boom in commodity prices.

Another factor influencing these projections is that even though China is now the largest consumer of all major metals, its consumption per person is still low compared to that in developed Asian and Western economies. For example, although 1,200 cars are added to the streets of Beijing every day, there are still only about 10 cars per 100 people in China, versus 76 in the US. Similarly, there are 76 personal computers per 100 people in the US, versus 4 in China. Though not definitive benchmarks of China's economic development, similar gaps exist in many metal-intensive areas.

Another variable that may support high mineral prices in the medium and longer term involves the challenge of moving new discoveries into commercial production. For instance, because of under-investment in new copper mine capacity in the 1990s when prices were down, refined supplies will likely not meet future global demand. Anglo American's CEO has estimated that 20 new world-scale copper mines are needed to fill projected demand. There are four such mines operating today.

According to Scotiabank, other supply-side factors that could affect mineral prices include growing resource nationalization in some developing countries and moves by many governments to increase royalty rates. (The latter issue is discussed in Section 6 of this report.)

FINANCING

Canada is the leading global centre for mining finance. The Toronto Stock Exchange (TSX) is home to 58% of the world's public mining companies and traded $416 billion in mining stock in 2010. TSX mining companies mainly deal in gold, potash, uranium, copper, silver, nickel, iron ore, coal and diamonds.

Of the senior firms listed on the TSX, 353 are mining companies. These firms, together valued at $521 billion, raised $12.5 billion in 2010. Ten of them—Barrick, PotashCorp, Goldcorp, Teck, Kinross, Cameco, Agrium, Silver Wheaton, Agnico-Eagle and Ivanhoe—are valued at over $10 billion each.

The TSX is also home to the Venture Exchange, which gives emerging companies efficient access to capital while offering investors a regulated market for venture investments. The 1,178 mining companies listed on the Venture Exchange in 2010 were valued at $42 billion,

COMMODITY-SPECIFIC PRICE TRENDS

- Gold. Although most demand relates to jewellery, gold also serves as a store of wealth. Prices are being driven by geopolitical uncertainties such as the deficit and debt crisis facing the United States and some EU countries and the political situation in the Middle East and North Africa. Gold prices continued to rise during the 2009 recession and the 2011 debt crises, reaching US$1,876 an ounce in August 2011. A 2010 Mining Journal reports that gold demand in China, the world's second-largest market, has gone up 13% a year over the past five years and is expected to double in the next decade. Because of supply constraints, some analysts forecast prices of $5,000 to $10,000 an ounce over the next decade (though it is also easy to find analysts with bullish forecasts).
- Copper. This remains a bellwether commodity, with demand tied to economic growth and consumption of wire, piping, electronics and vehicles. Analysts are closely watching copper, particularly to see whether the 70% price increases since 2009 are sustainable.
- Uranium. Spot prices reached US$99 a pound in 2007 (up from US$8 in 2000), driven by global demand and production difficulties in Australia. Prices fell during the first half of 2008 but have settled at around US$50, still six times higher than a decade ago. The enduring strength of uranium prices has heated up exploration interest in Saskatchewan and other regions, including Argentina and Peru.
- Iron ore. Prices for this commodity were traditionally set through contractual agreements between lead suppliers and customers. However, in recent years this system has largely been replaced by spot market pricing. The shift brings greater transparency and is more aligned with a steel system, where prices are reset daily. According to Index Mundi, iron ore prices have risen 12-fold over the past decade, driven by Chinese steel demand. This has led to a jump in interest and investment in the Labrador Trough, the iron ore belt that extends through northern Quebec and Labrador.
- Steelmaking coal. Chinese steel demand has also driven steelmaking coal prices, which have gone up 40% in the past year and tripled over the past decade. This has expanded interest and investment in several projects in British Columbia.
- Potash. Prices have followed a turbulent path in recent years. Scotiabank reported a spot potash price of $490 a tonne in mid-2011, up 30% from the end of 2010. Chinese demand remains strong; Brazil and India also have large import needs. Canpotex, the export arm of North America's largest potash producers, agreed in mid-2011 to supply India with potash for $470 a tonne through the final quarter of 2011, and $530 a tonne in the first quarter of 2012.

four times the market value of two years earlier. Together they raised $5.3 billion in equity capital in 2010.

Companies listing on the TSX must meet National Instrument 43-101, a disclosure standard increasingly seen as the global benchmark for mining disclosure.

Global Financing

The TSX is the top destination for financing international mining projects. The global industry completed over 11,000 public financings in the past five years, 83% of them (36% by value) handled on the TSX exchanges (see Figure 15). London, the number two exchange, depends on three companies—BHP Billiton, Anglo American and Rio Tinto—for much of its mining market capitalization. There have been some large single-equity financings on the Sao Paulo and Shanghai exchanges in recent years, but they are rare and depend on just a few companies' plans.

The large proportion of public financings conducted on the TSX reflects the exchange's appeal to both junior and senior business players.

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

The mining industry raised $29.6 billion in equity worldwide in 2010 (see Figure 16), less than half the amount in 2009. This decline mainly reflects the record levels of capital raised in each of the previous three years. The recession's effects on the global mining industry were relatively short-lived: a late-2008 decline was followed by a timely rebound in demand from China and elsewhere.

LISTED MINING COMPANIES (END OF 2010)

On the TSX-Venture—Toronto: 1,531
- Senior TSX companies: 353
- Venture Exchange companies: 1,178

On the ASX—Australia: 666
On the LSE-AIM—London: 145

TSX-listed mining companies have a strong global focus. As of August 2011, TSX companies, including those listed on the Venture Exchange, were involved in 10,110 mineral projects worldwide (see Figure 17), about half of them in Canada and half elsewhere. Most of the projects involve exploration; very few will turn into operating mines. However, the locations do illustrate the prime areas of mining interest.

Regulation of Financing

For Canada to continue as a leader in mining finance over the long term, it must, among other things, have in place the most efficient securities regulatory regime possible.

The mining industry agrees with this sentiment in the 2006 federal budget: "Canadians would be best served by a common securities regulator that administers a single code, is responsive to regional needs, and has a governance structure that ensures broad provincial participation." To force the issue, the federal government

NUMBER OF MINERAL PROJECTS HANDLED BY TSX COMPANIES (AUGUST 2011)

- South America: 258 in Peru, 228 in Argentina, 150 in Brazil, 137 in Chile
- Africa: 81 in Tanzania, 76 in South Africa, 69 in Mali, 59 in DR Congo, 48 in Burkina Faso
- Asia: 79 in China (down from 125 in 2008)
- Russia and India: 35 and 3 respectively (minimal presence due to uneven receptiveness to foreign exploration)

proposed legislation to create a national regulator in May 2010. At the same time, the government asked the Supreme Court to clarify federal legislative authority in this area. A decision is expected within the year.

EXPLORATION

The aim of exploration is to locate large, high-grade reserves with minimal disturbance to the ground and the environment. New technologies, including GPS surveying, airborne technologies and down-hole seismic imaging, are allowing exploration companies to locate new deposits that could not be discovered through traditional methods. Exploration, like research and development, requires healthy levels of investment for long-term success. Exploration and subsequent mine development are required to keep reserve levels high. If this does not happen, the value-added aspects of Canada's mining industry will diminish over time, and national and regional economies will suffer.

Exploration and Deposit Appraisal in Canada

Spending on exploration and deposit appraisal is a sign of how financially healthy the mineral exploration sector is. It also helps predict Canada's future 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.

Combined, the two expenditures are generically called "exploration spending."

The most recent estimates (see Figure 18) place Canadian exploration spending at $2.6 billion in 2010, up 35% from the previous year thanks to the global industry rebound since the recession. Exploration expenditures accounted for 55% of the 2010 total, deposit appraisal expenditures for 45%. Exploration spending intentions for 2011 estimate a further increase to $3.2 billion.

Precious metals continued to attract the lion's share of Canadian exploration spending in 2010, at 52% (see Figure 19). Given the strong price of gold during and since the recession, spending directed to precious metals will likely increase further in 2011.

Actual dollar spending climbed between 2002 and 2010 in every area of exploration except diamonds. Uranium saw the most dramatic jump: the absolute amount spent rose six-fold, and several hundred exploration projects are in play, mainly in Saskatchewan and Newfoundland and Labrador. In the "other" category, spending on potash exploration has gone up significantly because of buoyant prices and the quality of Saskatchewan's resource. Coal exploration spending also rose in 2010, especially in British Columbia.

> Exploration, like research and development, requires healthy levels of investment for long-term success.

The "Ring of Fire" region in northern Ontario, west of James Bay, is attracting large exploration investment in chromite as well as in diamonds, copper, nickel and platinum. In Quebec the provincial government's

NUMBER OF SENIOR TSX COMPANIES ACTIVE IN EACH REGION (2010)

Canada: 176
United States: 103
South America: 86
Africa: 71
Mexico: 59
Australia: 48
Asia: 44
UK/Europe: 30
Central America: 20
Russia/CIS: 15

25-year Plan Nord aims to attract over $80 billion of new investment in mineral development. Nickel, cobalt, platinum group metals, zinc and iron ore show particular promise.

The share of exploration and deposit appraisal spending invested in Canada's three territories is three times larger than their share of mineral production value. This reflects world interest in Canada's northern mineral potential, especially in gold, base metals, iron ore and diamonds.

As for the companies that undertake exploration, junior firms typically account for 50% to 65% of spending. Recent data show this trend holding steady, with juniors spending 55% of exploration dollars ($1.5 billion) in 2010 and projected to spend 56% ($1.8 billion) in 2011 (see Figure 20). The strong junior presence suggests that federal and provincial flow-through share programs have succeeded in stimulating investment by firms that can take advantage of the incentives.

Precious metals continued to attract the lion's share of Canadian exploration spending in 2010, at 52%.

An important harmony exists between junior and senior mining companies. The latter often acquire the properties or assets of the former in circumstances where capital is needed to move through the stages of mine feasibility, development and construction.

International Exploration

Globally, Canada has been the number one destination for investment in mineral exploration for 18 of the past 32 years. Canada dropped to number two in 1992, surpassed by Australia, but regained the top position in 2004 and has remained there ever since.

The Metals Economic Group (MEG), a mining information company, has tracked world mineral exploration since 1989. Based on data from 3,200 companies, MEG determined that worldwide exploration investment in 2010 totalled US$11.2 billion, a 50% increase from 2009. This jump restored two-thirds of the amount that had disappeared in the 2008 recessionary year. Uranium exploration, not included in the above figures, would add another US$0.9 billion to the 2010 total.

The two countries that usually attract the largest exploration budgets, Canada and Australia, headed the list again in 2010, with 19% of global exploration money being spent in Canada and 12% in Australia (see Figure 21). There has been a general increase in the number of companies willing to explore in higher-risk countries because of the possibility of finding large deposits. (International investment and risk are discussed in Section 6 of this report).

Gold was the target of 51% of worldwide exploration budgets in 2010 (see Figure 22). This was up considerably from the 39% share of two years earlier, reflecting the upward trend of gold prices.

CANADA'S ROLE IN GLOBAL EXPLORATION

- Canadian companies account for about 40% of global exploration spending, the largest share of all nations.
- An estimated 800 TSX-listed companies are exploring outside Canada in over 100 countries.
- Canadian firms account for the largest share of exploration spending in Canada, the United States, Central and South America, Europe and, most recently, Africa.

Sources: Metals Economic Group, Natural Resources Canada

The share of global exploration spending on diamonds has declined for eight years straight and is at its lowest level in 20 years. Africa and Canada have been the largest recipients of diamond exploration spending in the past decade, each receiving around $2 billion during the period.

In the "other" category, silver, potash and rare earths are the largest exploration targets. Interest in lithium and rare earth elements quadrupled global exploration spending in this area in 2010 versus the previous year.

In spite of high global exploration spending in the half-dozen years before the late-2008 downturn, it is of concern that only a handful of major discoveries and projects will come into production in the next five years. There are various reasons for this predicament. The industry is still paying for the low exploration spending of the 1990s and early 2000s. The dramatic rise in this spending through the 2000s was offset to some extent by the rising cost of drilling, assaying, geoscience

expertise, fuel and other inputs. As well, environmental and infrastructure challenges are lengthening the time it takes for new discoveries to develop into producing mines.

Recent years have made it clear that the world's easiest mineral reserves have been found and that future reserves will be increasingly difficult to locate and develop.

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 like these:

- 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

Capital spending by governments and business also opens up new regions for development. The extension of the Highway 37 transmission line in northeast British Columbia is a good example of the value of investing in public infrastructure. This $400 million capital expenditure will improve the economics of about $15 billion in mineral projects. The planned extension of the Monts Otish Highway in northern Quebec will mean better development prospects for gold, diamond, copper and uranium projects in that region.

In 2010 capital spending in the Canadian mining industry totalled $12.6 billion, up 30% from the previous year (see Figure 23). A comparable increase is projected for 2011.

In 2010 capital spending in the Canadian mining industry totalled $12.6 billion, up 30% from the previous year.

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 on construction and the rest on machinery and equipment.

Spending on repairs, most of which falls into the machinery and equipment category, is not included in Figure 23. Adding repairs (which in 2009 cost about $2.2 billion for Stage 1 and $2.4 billion for the other three stages) to the above capital ($12.6 billion) and exploration ($2.6 billion) spending produces roughly $19.8 billion in Canadian mineral development investment in 2010.

Figure 23 also shows capital investment in the oil sands, where spending was $11.2 billion in 2010 (two-thirds on construction, one-third on machinery and equipment). Oil sands investment is projected to reach $14.3 billion in 2011. These levels, though very high, are below the

LARGEST CAPITAL INVESTMENTS IN 2010

Metals sector

- Gold/silver mines—$2.1 billion
- Copper/zinc mines—$940 million
- Nickel/copper mines—$870 million
- iron ore mines—$700 million

Non-metals sector

- Potash industry—$2.4 billion
- Diamond industry—$350 million

Coal sector

- Capital spending—$620 million

peaks seen in 2007–08. The Canadian Energy Research Institute estimates that $200 billion in announced oil sands projects and expansions were affected by the 2008 recession and the drop in oil prices.

Current and Future Investments

Saskatchewan produces one-third of the world's potash, drawing on mines that are all over 40 years old. A new mine, Potash One's Legacy mine, is expected to open in 2013. Other companies, including BHP Billiton, are conducting exploration in the province, no doubt influenced by strong potash prices.

In northern Saskatchewan, the Cigar Lake uranium project, delayed by flooding problems, is scheduled to start production in 2013.

There is still potential in the Canadian diamonds sector, despite the decline in exploration spending in recent years. The Chidliak project on Baffin Island, the Gahcho Kue project in the Northwest Territories and the Aviat diamond field in Nunavut all offer promise.

In December 2009 a project update from Stornoway tripled the tonnage and diamond count of the Renard deposit in central Quebec. Strengthened by the provincial government's commitment to fund an access road to the Otish Mountains region, Quebec could become the next region to enter diamond production in Canada.

All together, $137 billion worth of mining-related projects have been proposed for Canada in the coming years (see Annex 7). That includes billions of dollars in proposed projects for each of 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. Also notable is that BHP Billiton relocated its Vancouver diamonds and specialty products office to Saskatoon in 2011 as part of its commitment to develop major potash projects.

Government Investment in Geoscience

Mineral exploration is like looking for a needle in a haystack. Government investment in geological surveying helps the industry determine where the haystacks may be.

For companies conducting exploration, it makes sense to spend their high-risk dollars in areas where good geological data are available. It is estimated that every dollar invested in a basic geological survey triggers five dollars in exploration spending by the private sector and boosts the likelihood of discovering commercial-scale deposits. For those reasons, government investment in geoscience today will pay economic dividends in the future.

Funding for basic geological science in Canada has declined in recent decades at all levels of government (see Figure 24). Spending fell by about half between 1988 and 2007—from $98 million to $50 million for the federal government and from $74 million to $33 million for the provincial/territorial governments.

Every dollar invested in a basic geological survey triggers an estimated five dollars in exploration spending by the private sector.

This drop in geoscience spending is a troubling trend for the mining industry. The situation is so dire that nearly three-quarters of Nunavut—73%—is either unmapped or has inadequate geological maps, and until recent budget increases would not have been fully mapped for another 80 years. The challenges are similar in other Canadian regions, particularly in the north. Given the high interest in diamonds, uranium, base metals and other northern resources, it is unclear how the public good is served by such under-investment, which only weakens

Canada's readiness for northern development and sovereignty.

In recent years MAC has worked with federal, provincial and territorial governments to support federal reinvestment in geoscience that would be matched at the provincial level. In its 2008 budget, the federal government announced the Geo-mapping for Energy and Minerals (GEM) program, a $100 million investment over five years. The funding is supplemented by some provincial increases, and the program is guided by the National Geological Surveys Committee (which represents the federal, provincial and territorial governments).

Roughly three-quarters of the GEM spending is directed towards investment in the three territories and one-quarter towards the provinces. The investment, classed as a "temporary" allocation of funds, is a positive development for the industry in the medium term. However, a more sustained approach would be to increase the permanent appropriation for GEM.

The federal Targeted Geoscience Initiative (TGI) is a parallel, though smaller, program aimed at geoscience for base metals around existing camps. The 2010 federal budget renewed the TGI for two years, providing $12 million to focus on developing new ways of exploring for deeper mineral deposits. Ideally, the TGI would be rolled into the GEM to create a permanent geoscience investment.

Investment in geoscience is essential to attract mining investment regardless of the country. In a notable example, in 2007 Madagascar released airborne geophysical data, covering large tracts of land, to the private sector for purchase. The result was keen interest from mining companies that wanted to gauge potential for gold, heavy mineral sands, bauxite, iron ore and coal. In its meetings with foreign delegations, MAC highlights investment in geological mapping as an economic building block for national governments.

FIGURE 13

CANADIAN RESERVES OF SELECTED MAJOR METALS, 1980 - 2009

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)
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
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

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 2011

Mineral Prices	2000	2007	2008	2009	2010	Aug/'11	'00-'11
Aluminum ($/lb.)	0.70	1.20	1.17	0.76	0.98	1.13	61
Copper ($/lb.)	0.82	3.23	3.15	2.34	3.40	4.02	390
Gold ($/lb.)	279	697	872	973	1225	1876	572
Uranium ($/lb.)	8.29	98.81	63.17	47.00	48.00	50.50	509
Nickel ($/lb.)	3.92	16.88	9.57	6.50	9.85	9.51	143
Zinc ($/lb.)	0.51	1.47	0.85	0.75	0.98	0.98	92

Source: Scotiabank Commodity Price Index
Notes: Table denotes average yearly prices as well as actual price as of August 2011. The final column indicates percent growth in mineral prices between 2000 and mid-2011.

FIGURE 15

GLOBAL MINING FINANCING, 2006 - 2010

(value in US$ billion)

Exchange	Financings	%	Value	%
TSX – Toronto	9336	83	78	36
LSE-AIM – London	782	7	55	25
ASX – Australia	963	9	28	13
NYSE – New York	20	-	13	6
HKEx - Hong Kong	13	-	9	4
BOVESPA – Brazil Sao Paulo	1	-	11	5
Shanghai	3	-	11	5
JSE - Japan	6	-	2	1
Other	109	1	8	4
Total	**11216**	**100**	**218**	**100**

Source: Gamah International, cumulative figures for 2006-2010, Compiled by TMX Group.

FIGURE 16

MINING EQUITY RAISED – ROLE OF TORONTO STOCK EXCHANGE, 2000-2010

(value in US$ billion)

Mineral Prices	2000	2002	2005	2006	2007	2008	2009	2010
Worldwide Equity Raised	3.1	8.4	9.7	26.5	50.3	46.6	65.9	29.6
Equity Raised on TSX Exchanges	1.1	2.2	4.0	10.1	17.6	8.3	22.2	17.8
Percent of Worldwide Total on TSX	36	26	41	38	35	18	34	60

Source: Gamah International, compiled by Toronto Stock Exchange

FIGURE 17

GEOGRAPHIC REACH OF TSX-LISTED COMPANIES, AUGUST 2011

Location of Mineral Projects	Number	Percent
Canada	5161	51
United States	1279	13
South America	1062	11
Africa	702	7
Mexico	618	6
Asia	383	4
Australia, NZ, PNG	373	4
UK/Europe	316	3
Centr.Amer, Caribbean	137	1
Russia/CIS	79	~1
Total	**10110**	**100**

Source: InfoMine, compiled by TSX, August 2011.

FIGURE 18

MINERAL EXPLORATION AND DEPOSIT APPRAISAL EXPENDITURES[1], BY PROVINCE, 2005 - 2011

Province	2005 ($ millions)	2006 ($ millions)	2007 ($ millions)	2008 ($ millions)	2009 ($ millions)	2010[p] ($ millions)	2011[i] ($ millions)	% Change From 2010 to 2011
Newfoundland and Labrador	48.7	100.8	148.0	146.7	54.9	109.3	126.8	16.0
Nova Scotia	6.5	11.0	23.5	21.4	9.0	16.9	19.4	14.8
New Brunswick	10.1	13.4	35.8	32.7	8.1	19.3	25.0	29.5
Quebec	205.1	295.1	476.4	526.1	379.3	482.6	559.7	16.0
Ontario	294.0	346.5	571.7	799.3	536.2	801.0	938.7	17.2
Manitoba	52.9	52.9	102.6	152.1	97.8	79.3	76.8	- 3.2
Saskatchewan	133.9	235.6	314.0	430.7	311.0	262.9	271.5	3.3
Alberta	6.6	18.7	11.8	20.8	8.3	14.3	14.4	0.7
British Columbia	218.1	344.2	470.6	435.4	217.1	341.3	493.7	44.7
Yukon	54.0	106.4	144.7	134.0	90.9	149.6	256.3	71.3
Northwest Territories	96.3	176.2	193.7	147.7	44.1	84.7	83.0	- 2.0
Nunavut	178.7	210.6	338.0	432.6	187.6	263.8	322.8	22.4
Total	**1 304.8**	**1 911.5**	**2 830.8**	**3 279.5**	**1 944.4**	**2 625.0**	**3 188.0**	**21.4**

Source: Natural Resources Canada, Based on the Federal-Provincial-Territorial Surveys of Mineral Exploration, Deposit Appraisal and Mine Complex Development Expenditures (current dollars)

[1] 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.
p Preliminary
i Intentions
Note: Numbers may not add due to rounding.

FIGURE 19

CANADIAN EXPLORATION AND DEPOSIT APPRAISAL SPENDING[1], BY TARGET, 2002 AND 2010[P]

	2002		2010	
	millions $	% of Total	millions $	% of Total
Precious metals	212.8	37.1	1365.0	52.0
Base metals	138.8	24.2	500.4	19.1
Diamonds	161.6	28.2	111.3	4.2
Uranium	30.1	5.2	181.4	6.9
Other	30.1	5.2	466.9	17.8
Total	573.4	100.0	2625.0	100.0

p preliminary

[1] 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.

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

FIGURE 20

MINERAL EXPLORATION AND DEPOSIT APPRAISAL EXPENDITURES[1] BY TYPE OF COMPANY, 2004-2011[1]

Type of Company	2004	%	2005	%	2006	%	2007	%	2008	%	2009	%	2010p	%	2011i	%
Junior	600	51	801	61	1,238	65	1,904	67	2,118	65	1,111	57	1,450	55	1,782	56
Senior	578	49	504	39	674	35	927	33	1,161	35	834	43	1,175	45	1,406	44
Total	**1,178**	**100**	**1,305**	**100**	**1,912**	**100**	**2,831**	**100**	**3,279**	**100**	**1,944**	**100**	**2,625**	**100**	**3,188**	**100**

[1] 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.

Note: Numbers may not add due to rounding.
p Preliminary; i Intentions.

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

FIGURE 21

TOP TEN COUNTRIES BY EXPLORATION BUDGETS, 2010

(as % of worldwide exploration)

Country	%
Canada	19
Australia	12
United States	8
Mexico	6
Peru	5
Chile	5
Russia	4
China	4
Brazil	3
Argentina	3
Rest of World	31
Total	**100**

Source: Metals Economics Group, 2011

Note: Top 10 countries (of 123) account for 69% of world total of $US11.2 billion

FIGURE 22

WORLDWIDE EXPLORATION SPENDING, BY TARGET, 2002-2010

(as % of worldwide exploration)

	2002	2010
Target	%	%
Gold	48	51
Base Metals	29	33
Diamonds	13	3
Platinum Group	4	2
Other	6	11
Total	**100**	**100**

Source: Metals Economics Group, 2011

Note: 2100 companies "with exploration budgets" invested $US10.7 billion

FIGURE 23

CAPITAL EXPENDITURES IN THE CANADIAN MINING INDUSTRY, 2007-2011

($ Millions)	2007	2008	2009	2010[p]	2011[i]
Stage 1 - Total Mineral Extraction	6,832	8,587	7,078	9,327	11,546
Metal ore mineral extraction	3,874	5,244	4,204	5,559	8,187
Non-metallic mineral extraction	2,553	2,533	2,453	3,151	2,603
Coal mining	405	810	422	618	756
Stage 2 - Primary Metal Manufacturing	1,558	1,918	1,176	1,818	3,049
Stage 3 - Non-Metallic Mineral Product Manufacturing	969	787	671	719	648
Stage 4 - Fabricated Metal Product Manufacturing	793	846	896	783	839
Total	**10,152**	**12,138**	**9,821**	**12,647**	**16,082**
Non-conventional oil extraction (oil sands)	16,816	20,663	10,551	11,226	14,343

Source: Statistics Canada, Catalogue 61-205.

Note: Totals may not add due to rounding.

FIGURE 24

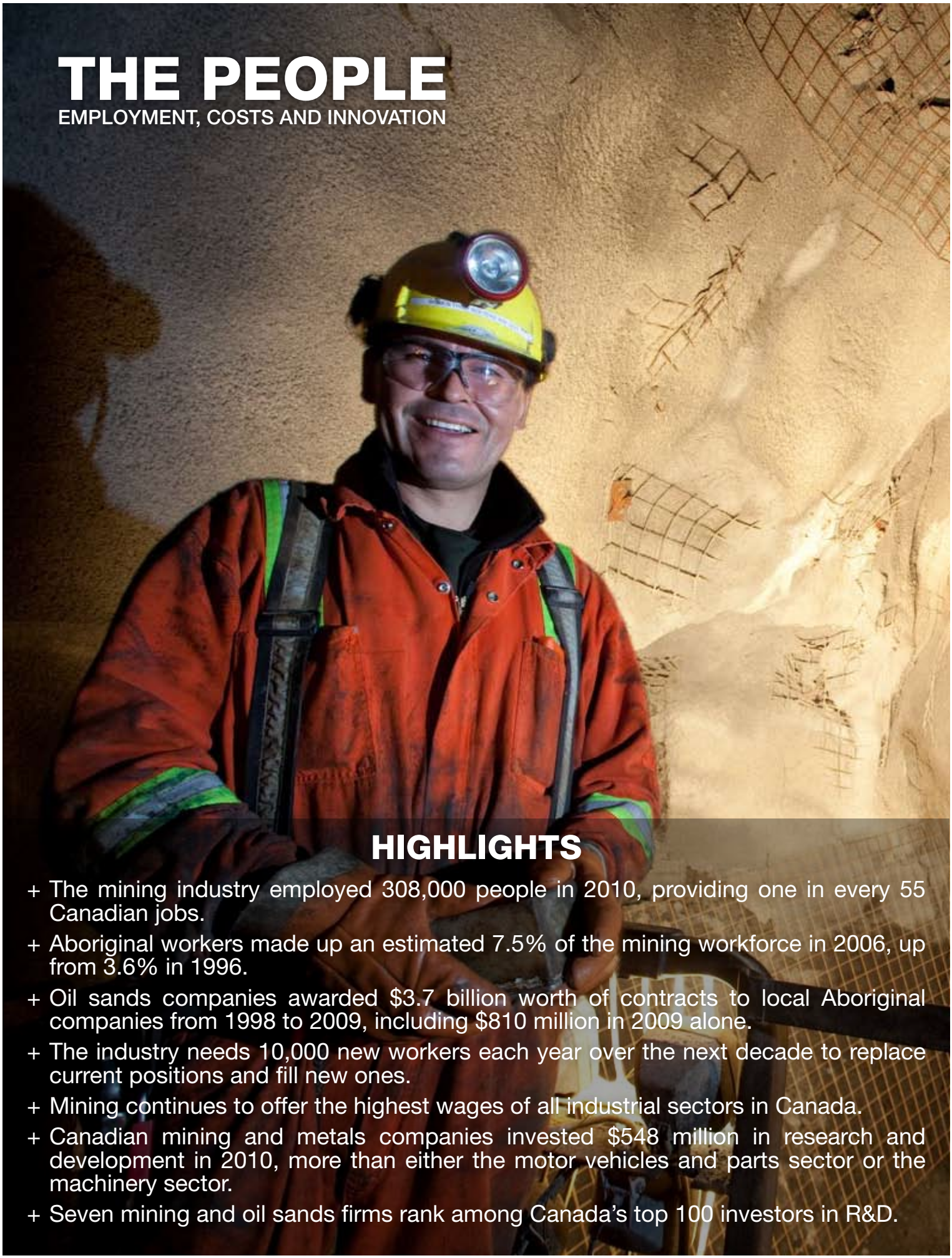
GEOSCIENCE SPENDING IN CANADA, 1988-2008

Year	Provincial-Territorial	Federal	Total
1988	74	98	172
1991	64	85	149
1994	48	79	127
1997	44	52	96
2000	46	44	90
2003	41	49	90
2004	39	46	85
2005	36	47	83
2006	33	50	83
2007	33	51	84
2008	na	53	na

Source: Natural Resources Canada, Geological Survey of Canada.

THE PEOPLE

EMPLOYMENT, COSTS AND INNOVATION



HIGHLIGHTS

+ The mining industry employed 308,000 people in 2010, providing one in every 55 Canadian jobs.
+ Aboriginal workers made up an estimated 7.5% of the mining workforce in 2006, up from 3.6% in 1996.
+ Oil sands companies awarded $3.7 billion worth of contracts to local Aboriginal companies from 1998 to 2009, including $810 million in 2009 alone.
+ The industry needs 10,000 new workers each year over the next decade to replace current positions and fill new ones.
+ Mining continues to offer the highest wages of all industrial sectors in Canada.
+ Canadian mining and metals companies invested $548 million in research and development in 2010, more than either the motor vehicles and parts sector or the machinery sector.
+ Seven mining and oil sands firms rank among Canada's top 100 investors in R&D.

Historically, the Canadian mining industry has been viewed as a leader in capital investment, financing, innovation and skills. Though capital is easier to commit when prices are buoyant, the industry has also invested during less prosperous times. In the 1990s, for example, mining introduced new technologies and automated business procedures, investments that helped turn previously uneconomic deposits into viable projects by lowering production costs. The key to maximizing investments like these is a ready supply of skilled, well-paid industry workers.

MINING INDUSTRY EMPLOYMENT

Total employment across the Canadian economy in 2010 averaged 17 million workers, with 4 million in the goods sector and 13 million in services. The mining industry employed 308,000 people, accounting for one in every 55 Canadian jobs (see Figure 25).

Overall employment numbers

Of the 308,000 people directly employed by mining in 2010 (see Figure 25), nearly 53,000 worked in Stage 1, mineral extraction. This group included over 23,000 in metal mining, over 22,000 in non-metal mining and over 7,000 in coal mining (see Figure 26).

The past decade has seen a steep decline in jobs (41%) in Stage 2, primary metal manufacturing (smelting and refining, see Figure 25). This is due to technological advancements, aging Canadian facilities and more foreign competition for feedstock.

In the oil sands extraction sector (not shown in Figures 25 or 26), data for 2011 show that Suncor employs 12,076 in mining and oil and gas activities, and Syncrude employs 5,580.

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; various companies have been acquired or no longer report separate employment numbers.

As noted in Section 1 of this report, another 3,215 companies supply goods and services to the mining industry, adding many indirect jobs to the picture. Recent estimates suggest that a multiplier of 2.5 might show the industry's complete economic impact (though more research is needed).

Gender-specific statistics are outdated and difficult to get, but even so, it is clear that the industry employs relatively few women. The Mining Industry Human Resources Council (MiHR) estimates that 14% of mineral extraction and processing workers are female. The low number of female engineers is one reason why this number is low. Female enrolment in Canadian engineering programs is under 20%, and women represent only around 10% of the country's 160,000 licensed engineers. These numbers are especially

MINING COMPANIES THAT EMPLOY OVER 1,000 PEOPLE (EXCLUDING OIL SANDS)

Barrick 20,867
Novelis 11,600
Teck 9,100
Kinross 7,500
Pan American Silver 7,100
First Quantum 6,904
Goldcorp 6,847
Sherritt 6,817
High River Gold 5,241
IAMGOLD 5,213
Yamana Gold 4,513
Eldorado Gold 4,438
Alcoa Canada 3,900
Cameco 3,300
Agnico-Eagle 3,243
Centerra Gold 3,125
Iron Ore Company of Canada 2,206
Golden Star 2,120
SEMAFO 2,018
Quadra FNX 1,902
QIT-Fer et Titane 1,800
Lundin Mining 1,500
HudBay 1,490
New Gold 1,191
Inmet 1,100

Note: includes employees at international operations
Source: Financial Post Top 500 rankings, 2011

low given that women make up 60% of the student body in Canadian universities and half of the Canadian workforce.

Employment of Aboriginal People

According to the most recent census data, 4,515 Aboriginal people worked in the mining extraction sector in 2006, up 43% since 1996. Aboriginal workers made up an estimated 7.5% of the mining workforce in 2006, versus 3.6% in 1996. Those numbers were roughly double the proportion of Aboriginal people in the overall Canadian workforce in those years.

Over the same period (1996–2006), the number of Aboriginal mining workers in the Northwest Territories increased more than five-fold (from 100 to 560) as diamond mine development took hold. According to mine site data, Aboriginal employment reached 850 in 2008, one-quarter of the total employment in the NWT diamond mines.

The period saw similar increases in Aboriginal mining workers in Newfoundland and Labrador (40 to 350), British Columbia (360 to 650), Saskatchewan (630 to 930) and Ontario (410 to 780).

There are also many Aboriginal workers in the oil sands. As of 2010, over 1,600 Aboriginal people held permanent operations jobs in the sector. Oil sands companies awarded about $3.7 billion worth of contracts to local Aboriginal companies from 1998 to 2009, including $810 million in 2009 alone.

There is still potential to increase the number of Aboriginal workers in mining. Canada's Aboriginal population is growing at double the rate of the non-Aboriginal population, and over 1,000 Aboriginal communities are located near mining operations. Some of the worker shortages discussed in the next section could be filled through training and skills enhancement of Canada's Aboriginal people. (This issue, along with the related topic of impact benefit agreements, is discussed in Section 5 of this report).

> *"The energy and mining industries may provide a critical path to prosperity for an impoverished but rapidly growing segment of the Canadian population, so long as all parties work together."*
>
> – Shawn Atleo, National Chief, Assembly of First Nations, in a June 2011 speech

Need for Workers and Skills

The mining industry, both in Canada and abroad, faces a serious human resources challenge in the next decade. In Australia, for example, where mining employment has gone up by almost two-thirds in five years, it was estimated (pre-recession) that the industry would need 70,000 more workers by 2015.

As for Canada, MiHR's 2010 report Canadian Mining Industry Employment and Hiring Forecasts suggests that the industry must hire 10,000 new workers each year for the next decade to replace existing workers and fill new positions—in other words, to meet baseline production targets. According to MiHR definitions, this means replacing about one out of every two present employees in the next decade.

This need comes at a time when the skilled core of the industry, including some 65% of geoscientists, is reaching retirement age. Teck Resources, as one example, estimates that up to half its British Columbia workers will retire over the next five years. Ernst & Young projects that 40% of the industry's workforce will retire by 2014. In virtually all skill categories, the number of Canadian mining workers over age 50 is two to five times greater than the number below age 30.

Meeting the mining industry's human resources challenges will take a large, coordinated effort by the industry and all levels of government.

Because today's mining industry relies on advanced technologies, much of the demand is for highly educated workers. The industry needs geoscientists, metallurgists, mining engineers and geologists, as well as workers skilled in computer technology, information management, mechanical repair, heavy equipment operation and other areas.

On the supply side, there are further hurdles to overcome. Mining has historically had difficulty recruiting women, visible minorities and immigrants. A 2010 MiHR study estimated that Canadian universities in the coming year would graduate one-third fewer mining engineers than the industry needed. In 2008 the Globe and Mail

reported that there would be 1,200 Canadian geology graduates that year to fill 9,000 positions.

This situation is compounded by the fact that companies in other countries are actively recruiting Canadian graduates and workers. As well, several university mining programs in the United States closed or scaled back in the past decade, following the industry downturn of the 1990s. Various actions have been proposed to address the mining employment issue 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.

Meeting the human resources challenges that the mining industry is facing will take a large, coordinated effort by the industry and all levels of government.

KEY COSTS

Because mineral prices are generally set through international trading and exchanges, mining companies have limited control over the revenue side of their income statement. To stay competitive, they must therefore control their costs.

Wages and Strikes

Canadian mining is a high-value industry, a fact reflected in its wages and salaries, the highest of all the country's industrial sectors (see Annexes 8 and 9 for details). Average weekly pay for a mining worker in 2010 was $1,632, which surpassed the earnings of workers in forestry, manufacturing, finance and construction by 72%, 70%, 56% and 53% respectively.

This wage gap has only widened in recent years. In remote regions or in situations where workers rotate—both often the case with mining—higher wages help to attract and keep the required workforce.

A total of 16 strikes and lockouts affected the mining industry in 2010 (see Annex 10). This was up by five over 2009, though fewer person-days were involved. The heavy impact of strikes and lockouts over the past two years reflects labour disputes at Vale in the Sudbury and Voisey's Bay regions. These disputes were resolved in 2011.

The industry's three main production costs are wages, energy (fuel and electricity), and materials and supplies.

The numbers in Annexes 10 and 11 indicate that about 3.4% of mining workers were involved in strikes and lockouts in 2009 (this number does not reflect the fourth stage of mining, fabricated metal product manufacturing). In contrast, less than 1% of the general Canadian workforce took part in such actions.

Canadian firms also deal with labour relations issues internationally and can face pressures common to other mining companies in the region where they operate. For example, in mid-2011 some 1,200 workers at a large Freeport-McMoRan copper mine in Peru went on strike; 8,000 workers at a large Indonesian mine did the same. Base and precious metal miners in Peru, Chile,

Bolivia and Indonesia all struck in 2011 seeking better conditions and larger profit shares.

Overall Production Costs

Operating a mine involves high 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.

Mining companies in Canada and abroad faced mounting production costs for many years leading up to the 2008 recession. This was particularly true in the oil sands, where intense investment put upward pressure on labour supply and wages throughout Canada's resource economy. Since the recession, these costs are thought to be on a more solid footing.

The industry's three main production costs—wages, energy (fuel and electricity), and materials and supplies—totalled $2.9 billion, $1.8 billion and $5.4 billion respectively in 2009, the most recent year for which data are available (see Figure 27). Wages equalled 11% of the industry's total production value, energy 7% and materials and supplies 19%. These shares were all up slightly from the previous year. Internationally, projects costs sometimes rise because of delays. In mid-2011, for example, Sherritt announced a nine-month delay in developing its nickel-cobalt project in Madagascar, with costs expected to rise by 16%. (The theme of international risks is discussed in Section 6 of this report.)

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. The industry is increasing its productivity, using advanced technologies and investing in research and development.

However, if Canada is to remain a world leader in mining innovation and research, the industry must push the innovation envelope. In particular, R&D needs to increase and become more consistent and coordinated throughout the country.

Productivity

Productivity is a measure of the efficiency of inputs—people, capital and natural resources—that go into creating an output. In Canada, during the decade 1997–2006, productivity growth in the first three stages of mining exceeded that of Canadian industries overall (see Figure 28). In Stage 2, primary metal manufacturing, productivity grew at more than twice the rate of Canadian manufacturing as a whole.

Productivity comparisons with other countries should be drawn carefully. US data for the same decade suggest that Canada's productivity growth in the first three stages of mining outstripped that of the United States.

In Canadian mining, productivity can be affected by mineral prices. According to a 2009 study by the Centre for the Study of Living Standards, when prices are high, companies will go further to extract resources, mining deeper and into more marginal rock areas. This willingness can boost profits but lower productivity in terms of output per hour.

Technology

Different stages of mining require different levels and kinds of technology.

- **Exploration**. The main challenge is to locate large, high-grade reserves while disturbing the

ground and the environment as little as possible. New 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 begun an R&D strategy dedicated to improving exploration technologies.

- **Extraction**. Much of Canada's remaining base metals inventory is likely located two kilometres or more below the surface. This situation presents cost and operational challenges. The industry has responded by investing in remote-operated equipment, automated loading and transportation systems, robotics and seismic mapping. With these technologies, companies can exploit deposits at 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 more 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 being to extract the most metal using the least energy and producing the least emissions possible. Similar gradual improvements have occurred in iron ore pelletizing. ArcelorMittal Mines, for example, is making its Quebec pelletizing operations more energy-efficient and hopes to cut greenhouse gas emissions by 30%. As for particulate matter emissions, established technologies such as baghouses and electrostatic precipitators are still being used.

In the coming years, mining in Canada and abroad will likely focus more on energy management and carbon emissions. This trend will be driven by higher energy costs and by the possible introduction of new greenhouse gas regulations, taxes and trading systems. New regulations could affect the viability of some older processing facilities in Canada.

Canadian oil sands projects after 2011 are already required to invest in one emerging area, carbon capture and sequestration (CCS). Although governments have invested research funds in this area, and several demo projects have been identified, the evolution and viability of CCS technology are issues that could remain unclear for many years.

Research and Development

Canadian mining and metals companies invested $548 million in R&D in 2010 (see Figure 29), more than either the motor vehicles and parts sector or the machinery sector.

Mining supply sectors also spend on R&D. Simulator equipment company CAE, for example, together with the Quebec government, made a $274 million R&D commitment to the mining and heavy equipment sector in 2009. Simulator technology is valuable in an

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 2009:

- No. 13: Suncor—$200 million
- No. 33: Vale Inco—$64 million
- No. 37: Syncrude—$56 million
- No. 42: Novelis—$47 million

This list has changed in recent years because of the recession as well as mergers and acquisitions. Examples:

- Alcan invested $250 million in 2006, then appeared to drop to $58 million in 2007 in the form of Rio Tinto Alcan. No 2009 figure is reported in the database.
- Teck invested $32 million in 2007, then dropped to $15 million in 2009 as the company addressed serious financial issues.

In contrast, Inco's investments held steady through the recession and since the company's acquisition in 2006. Inco invested $68 million (as CVRD Inco) in 2006 and $64 million (as Vale Inco) in 2009.

industry where machinery and equipment are used to the maximum and are seldom available for operator and driver training.

Despite this R&D spending, Canadian mining must address a number of challenges if it is to remain a world leader in innovation and research:

- Canadian research efforts are often ad hoc, spread among centres based in colleges and universities.
- Support from federal entities such as NSERC (Natural Sciences and Engineering Research Council) and Sustainable Development Technology Canada remains under-explored.
- R&D investments by most Canadian mining companies are relatively modest and inconsistent.
- Support through the signature federal initiative, the Scientific Research and Experimental Development (SR&ED) tax incentive program, is also modest (reasons include poor relations with federal revenue officials and weak claim and appeal processes).

MAC has conveyed these and other views to the federal panel examining Canada's innovation challenges. MAC has also noted that the mining industry employs 8,379 people in R&D (see Figure 29)—more than either the aerospace or pharmaceutical sectors, which both receive extensive financial and policy support from government.

Partly in response to these challenges, the Canadian Mining Innovation Council (CMIC) was created in 2008. This network of industry, academic and government leaders is intended to strengthen mining research excellence across Canada. Its main objectives are to increase mining research, innovation and commercialization, and to boost the supply of qualified graduates from mining and earth sciences faculties.

The 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.

FIGURE 25

EMPLOYMENT IN THE CANADIAN MINING AND MINERAL MANUFACTURING INDUSTRIES[1], 1998-2010

(Number of Employees)

Year	Mining and Quarrying NAICS 212	Non-Metalic Mineral Product Manufacturing NAICS 327	Primary Metal Manufacturing NAICS 331	Fabricated Metal Product Manufacturing NAICS 332	Total Mining and Mineral Processing
1998	60,090	52,166	100,957	165,626	378,839
1999	57,353	53,286	100,529	173,072	384,240
2000	56,698	56,440	104,253	183,246	400,637
2001	51,231	53,719	91,185	184,269	380,404
2002	47,893	51,423	90,322	181,096	370,734
2003	47,391	51,329	85,402	180,561	364,683
2004	45,986	51,403	79,703	176,439	353,531
2005	46,689	51,304	78,731	176,068	352,792
2006	48,830	53,701	80,681	179,728	362,940
2007	52,877	52,807	78,802	175,091	359,577
2008	58,506	52,707	69,107	171,126	351,446
2009	52,429	48,711	59,413	147,808	308,361
2010	52,532	49,687	61,098	144,485	307,802

[1] Excludes oil and gas, and services incidental to mining.
NAICS, North American Industry Classification System.

Source: Statistics Canada.

FIGURE 26

EMPLOYMENT IN THE MINERAL EXTRACTION STAGE, 1998-2010

Year	Metal Mines	Nonmetal Mines	Coal	Total 2011
1998	32,354	19,431	8,304	60,089
1999	29,555	19,987	7,812	57,354
2000	29,468	20,031	7,199	56,698
2001	25,564	19,524	6,143	51,231
2002	22,585	19,497	5,811	47,893
2003	21,810	20,224	5,357	47,391
2004	21,374	19,907	4,705	45,986
2005	21,196	20,456	5,037	46,689
2006	22,007	21,487	5,336	48,830
2007	23,850	23,183	5,844	52,877
2008	28,074	23,988	6,443	58,505
2009	24,286	21,775	6,369	52,430
2010	23,311	22,051	7,170	52,532

Source: Statistics Canada, Survey of Employment, Payroll and Hours (SEPH).

FIGURE 27

SELECTED COSTS OF PRODUCTION IN THE MINERAL INDUSTRY [1], 2009

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	64	1,621,450	932,494	3,517,113	14,876,523
Nonmetallic Mining and Quarrying	942	901,641	638,667	1,387,390	8,783,699
Coal	23	408,082	269,810	464,425	4,185,819
Total Mineral Industry	**1 029**	**2,931,173**	**1,840,971**	**5,368,928**	**27,846,041**

[1] Excludes the oil and gas extraction industry

Notes:
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).

Numbers may not add due to rounding.

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

FIGURE 28

R&D EXPENDITURES BY MINING AND SELECTED INDUSTRIES, 2006 - 2010

($ million)	2006	2007	2008	2009	2010
Mining – extraction	68	59	41	34	47
Primary Metals – nonferrous	255	299	254	195	211
Fabricated Metal Products	230	250	236	236	223
Non-Metallic Mineral Products	76	77	60	61	67
Total – Mining and Metals	**629**	**685**	**591**	**526**	**548**
Others Sectors:					
Oil and Gas Extraction	663	603	994	648	F
Motor Vehicles and Parts	608	506	401	336	306
Wood Products and Paper	691	376	328	F	F
Machinery	576	543	520	521	520
Aerospace Products and Parts	972	912	990	889	966
Pharmaceutical and Medicine	1,085	1,045	738	761	768
Total Manufacturing	**8,850**	**8,407**	**7,300**	**7,296**	**6,929**
Total All Industries	**16,474**	**16,644**	**15,792**	**15,202**	**14,808**

Source: Statistics Canada, 88-202-X.

Notes: The figures in the 2010 Catalogue have been revised by Statistics Canada and hence differ from figures in previous editions of Facts & Figures. In mining extraction, the figures were reduced while they were increased in primary metals. F denotes "too unreliable to be published".

FIGURE 29

NUMBER OF PERSONS ENGAGED IN R&D, BY INDUSTRY, 2008

	Professionals	Technicians	Other	Total
Mining – extraction	145	115	38	298
Primary Metals – nonferrous	564	446	102	1,112
Fabricated Metal Products	2,175	2,537	1,113	5,825
Non-Metallic Mineral Products	500	428	216	1,144
Total – Mining and Metals				
Other Sectors:				
Oil and Gas Extraction	1,001	NA	NA	NA
Motor Vehicles and Parts	1,864	1,297	703	3,864F
Wood Products and Paper	940	958	446	2,344F
Machinery	3,978	3,648	1,175	8801
Aerospace Products and Parts	2,644	1,229	736	4,609F
Pharmaceutical and Medicine	2,252	1,100	1,325	4,677
Total Manufacturing	**39,908**	**22,794**	**11,054**	**73,756**
Total All Industries	**90,303**	**47,173**	**21,450**	**15,8926**

Source: Statistics Canada, 88-202-X.

F denotes "too unreliable to be published".

THE ENVIRONMENT

SUSTAINABLE DEVELOPMENT AND SOCIAL RESPONSIBILITY

HIGHLIGHTS

+ MAC members have cut their releases of major substances significantly, by 72% to 96% over the past 15 to 20 years.
+ The mining industry is building a strong relationship with the Aboriginal community, with progressive agreements at the company and industry level.
+ Energy efficiency is an issue for today's older, deeper mines and for northern mining operations.
+ The metal smelting and refining sector has greatly reduced its GHG emissions intensity since 1990.
+ Canada's oil sands face a GHG challenge that, while significant, is far outweighed by the coal emissions challenge faced by many US states.
+ Progress towards cleaner energy in the next decade will depend on the availability of metals and minerals, essential building blocks for many clean technologies.
+ Canada's regulatory environment must be streamlined to remove overlaps and unnecessary obstacles to sustainable development.

Mining has never been, and will never be, environmentally benign. Removing ore from rock, when the ore may make up less than 1% of the volume, poses technical and environmental challenges. So does turning raw concentrate into the 99.99% pure metal needed to produce cell phones, aircraft, solar energy equipment, medical equipment and a host of other products used by businesses and citizens.

Environmental performance is a top priority for Canadian mining. So is the ability to address social issues within a sustainable development framework. The industry's great strides in recent decades, whether driven by regulations or MAC's Towards Sustainable Mining initiative, have earned Canadian mining a global reputation for leading-edge social and environmental practices. The industry is working on mineral projects and benefits with Aboriginal people, playing a part in the new clean energy economy and keeping on top of regulatory challenges.

PROGRESS THROUGH TSM AND OTHER INITIATIVES

Thanks to initiatives such as those discussed below—whether voluntary or mandatory, domestic or international—the Canadian mining industry has made great progress in its environmental performance.

MAC member companies, which account for most of Canada's mining production, have dramatically reduced their releases to the environment over the past 15 to 20 years (see Figure 30). Releases of major substances have dropped between 72% and 96%, a result of companies investing in cleaner processes in response to voluntary initiatives and regulations.

As Figure 30 shows, results in the past few years have been mixed, with decreases in some areas and increases in others where industry may have reached the limits of current technology. Natural variations in the metal content of feedstock can also affect results from one year to the next.

Towards Sustainable Mining

Launched in 2004, MAC's Towards Sustainable Mining (TSM) initiative addresses the mining industry's social licence to operate. MAC members are required to participate in TSM and to adopt its annual reporting requirements, including having their performance externally verified. The initiative won MAC the Globe Foundation's Industry Association Award for Environmental Performance in 2005.

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

- Tailings management
- Energy use and greenhouse gas emissions management
- Aboriginal and community outreach (formerly external outreach)
- Crisis management planning
- Biodiversity conservation management
- Safety and health

For details of companies' performance under TSM, see MAC's annual Towards Sustainable Mining Progress Report (available at www.mining.ca).

Other initiatives

Canadian mining firms are involved in other domestic environmental initiatives. Two examples are MEND (Mine Environment Neutral Drainage) and NOAMI (National Orphaned/Abandoned Mines Initiative). MAC is also contributing to federal consultations on new air pollutant targets and possible regulations for baseline industrial emissions.

MAC members are required to participate in TSM and to adopt its annual reporting requirements.

An array of international sustainability and social licence initiatives affect the Canadian mining industry. Companies seeking project financing are guided by the rules of Export Development Canada, the World Bank, the International Finance Corporation 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

MAINTAINING BIODIVERSITY
A recent addition to the lineup of TSM performance areas, biodiversity conservation management will help improve activities such as mine and facility closure. De Beers, for example, began closure planning before even opening its Snap Lake and Victor diamond mines in the Northwest Territories and northern Ontario. Working with Laurentian University, the company compiled a baseline of local plant and animal species and created a site restoration plan for each mine area. Such detailed planning makes sure that when the mines close, biodiversity will continue to flourish.

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 Voluntary Principles on Security and Human Rights, the Kimberley Process, ISO 14001 certification and other sustainability programs.

Recycling and E-Waste

Metal recycling is an issue that warrants more public attention in Canada. The amount of e-waste is increasing by around 4% a year, according to Environment Canada, as consumers and businesses favour disposable technology and a short turnaround time for computers, cell phones and other electronics.

Besides the volumes disposed of, e-waste is a concern because of the metals and other potential pollutants released once protective casings are broken. Recycling of e-waste tends to get greater attention internationally. The Basel Convention, for instance, controls the export of hazardous waste and requires e-waste to be treated as close to its origins as possible. Canada ratified the convention, which places obligations on participating countries, in 1992. The convention now has about 170 signatories, including the European Union.

The EU has dealt with this waste issue for many years and has passed directives requiring all e-scrap to be recycled. Now the EU is considering standards that would oblige each member state to collect 85% of the waste it generates in order to address loopholes in the Basel Convention.

Countries like China, where scrap metal is a major input in manufacturing, tend to have an ingrained culture of recycling and reuse.

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 life cycle management of the products they produce and consume.

ABORIGINAL RELATIONS AND IMPACT BENEFIT AGREEMENTS

The mining industry needs to have a strong, progressive relationship with the Aboriginal community. Mining is the largest private sector employer of Aboriginal people in Canada, and the numbers employed have only been growing. Given the nearness of many Aboriginal communities to mining operations, and the high proportion of Aboriginal youth, there is potential to draw upon these human resources in greater numbers.

Some provincial governments are revising their mining legislation to clarify the requirements for consultation between mining companies and Aboriginal groups. Ontario, for example, recently amended its mining act to modernize its map-staking system and to set up a consultation process for exploration and mining.

CANADIAN MINING AND E-WASTE
Mining companies are in a good position to help Canada face its e-waste challenges.

- Teck is using furnace and metallurgical processing equipment to process e-scrap at its facility in Trail, British Columbia. Zinc, lead, indium and cadmium are among the metals being recovered. The leftover plastic and wood are used to generate energy and steam, and the waste silica and iron go into producing cement.
- Xstrata, at its Horne smelter in Rouyn-Noranda, Quebec, uses precious metal–bearing recyclables as feedstock to make 99% anode copper. The Horne smelter recently doubled its e-waste recycling capacity.
- Several facilities in Canada recover lead from scrap car batteries and use it to produce refined lead and alloys.

At the industry level, MAC signed a groundbreaking memorandum of understanding with the Assembly of First Nations in 2009. MAC has improved the TSM framework to guide company actions and reporting in the area of Aboriginal relations.

A strong relationship with Aboriginal people is just as important at the company level. Beyond following laws and regulations, and going through environmental review

processes, companies generally reach formal bilateral agreements with affected Aboriginal groups to help mining projects move forward. These impact benefit agreements (IBAs), as they are often known, are usually signed by mining firms and Aboriginal communities. They may contain commitments in such areas as education, training, jobs, business contracts and financial payments. IBAs have also been developed for pipeline, hydroelectric and oil sands projects.

Some agreements, such as the EKATI mine project agreement in the Northwest Territories and the Raglan agreement in Quebec, can provide Aboriginal groups with jobs, training in literacy and other areas, profit-sharing and environmental benefits. Agreements between Vale Inco and Labrador's Innu and Inuit people include sections on training, employment, contracting, financial benefits, environmental matters and dispute settlement. These commitments provide the confidence and mutual benefit needed for mining projects to move forward.

According to Natural Resources Canada, a total of 171 projects, mostly in mineral exploration and development, involve agreements between businesses and affected Aboriginal groups. Of these, 27 agreements concern producing mine sites with IBAs. Large companies are generally involved, such as Barrick, Vale, Syncrude, Diavik, BHP Billiton, De Beers, Cameco and Xstrata.

ENERGY EFFICIENCY AND GHG EMISSIONS

Energy and greenhouse gas (GHG) policy issues have become more visible and more important in Canada in recent years. Media coverage of dramatic climate events, strong growth in the oil sands and frequent global summits have lent momentum to these front-page issues.

ABORIGINAL INVOLVEMENT IN BUSINESS

Aboriginal communities are becoming more involved in Canada's business activities. According to a 2011 TD Bank study, income earned by Aboriginal households and businesses doubled over the past decade. The increase, from $12 billion in 2001 to an estimated $24 billion in 2011, and projected to reach $32 billion in 2016, largely reflects the recent global commodities boom. The portion of this income that came from businesses rose from 35% to 37% over the decade, while the portion from government transfers fell from 38% to 31%.

Mineral Extraction

Canada's 220 operating mines (metal and non-metal) together account for just 0.5% of the country's total GHG emissions. The federal government has therefore decided to focus clean air and GHG targets on the relatively few smelters, refineries and pelletizing facilities whose emissions are higher.

Despite having no regulated targets, many extraction operations are improving their capabilities in compressed air, ventilation, metering and energy management. Investment in these areas is a priority for MAC and the industry when dealing with Natural Resources Canada on energy efficiency. In recent years MAC and NRCan funded the preparation of a detailed guidance document for energy and GHG management, as well as related workshops, to help companies in their efforts to improve.

The energy required per unit of extracted metal ore has remained fairly stable since 1990 (see Figure 32). Among the difficulties facing mine sites now is the fact that today's older and deeper mines require more energy to access and extract the ore. Mines in northern Canada face a special energy challenge because of the lack of electrical grid capacity. The Diavik and EKATI diamond

operations, for example, both depend on fuel oil being brought in over a winter ice road and are therefore less able to lower their carbon emissions. These mines have been designed with energy efficiency in mind.

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. (Oil sands operations fall under the oil and gas sector in the government's framework.)

Canada's 220 operating mines (metal and non-metal) together account for just 0.5% of the country's total GHG emissions.

The most energy-intensive players in the mining sector, smelting and refining, have greatly improved their energy and GHG intensity over the past two decades. The primary metal smelting and refining sector brought down the energy required per unit from 50 terajoules per kilotonne of output in 1990 to 37 in 2007—a 26% improvement (see Figure 31). The sector cut its GHG emissions from 4.0 kilotonnes of CO_2e per kilotonne of output in 1990 to 1.3 in 2009—an intensity improvement of 68%. While some of this improvement comes from switching fuels and investing in efficiency, much is due to lower emissions of sulphur hexafluoride, a high-warming-factor GHG associated with magnesium production.

Given that it took this sector 19 years to improve GHG intensity by 68% (3.5% per year), it is clear that the target proposed under the 2007 federal "Turning the Corner" strategy—18% improvement from 2007 to 2010—would have been unachievable. Companies would have likely had to pay into a technology fund to meet targets (especially in the absence of any viable emissions trading scheme).

Oil Sands

The oil sands face particular GHG challenges. Production from the Alberta sites is projected to soar from 1.5 million barrels a day to 4.7 million in 2025 and as much as 6.3 million by 2035. Assuming current technology, this could increase greenhouse gas emissions four-fold. The ongoing shift to more in-situ treatment of bitumen could also raise energy use and GHG emissions (while reducing tailings volumes).

The GHG situation facing Alberta and Canada, while serious, is placed in perspective by the similar or greater coal emissions challenge faced by 30 US states (see Figure 33). Of these states, 15—Texas, Missouri, Illinois, Indiana, Ohio, Kentucky, Tennessee, Alabama, Georgia, Florida, Ohio, Michigan, West Virginia, Pennsylvania, and North Carolina—face larger energy-related GHG challenges than do Canada's oil sands. This puts the debate about trade barriers against "GHG-intensive oil," advanced by some NGOs in the United States and Canada, in a more realistic context.

One option for improving the oil sands' GHG intensity is to develop nuclear power plants in Alberta to supply electricity and steam. Although some industry players have discussed this possibility, there are major obstacles. For one, Alberta has no history with nuclear energy and no infrastructure. For another, the oil sands projects are located far away from each other, making it difficult to transport steam.

A second option, one that could mean major improvements in GHG intensity, is to introduce large-scale carbon capture and sequestration (CCS) systems. Future oil sands projects (after 2011) are required to invest in this area. However, CCS technology is in its infancy, with only a couple of operations in the world, and the cost of developing controlled underground repositories could be extremely high. Still, the technology is being examined in Canada, the United States and elsewhere, and governments are allocating significant funding towards the idea.

GHG Emissions Policies

It is important that any federal policies on GHG emissions engage all Canadians in the solution. Past federal plans, such as Turning the Corner in 2007 (mentioned above), have left over half of Canadian GHG emissions untouched, arguably for political reasons, and have therefore placed a heavy competitive burden on industry.

PROMISING TECHNOLOGY FOR OIL SANDS TAILINGS

Managing tailings in the oil sands is a key environmental concern for the mining industry. Thanks to a promising new technology for tailings management, reclamation times could be greatly reduced—by some estimates, from 40 years to seven. The technology, which involves adding a polymer flocculent to fine tailings, allows water to be released and tailings to dry more quickly. The technology has been in use at Suncor since mid-2010. Other firms are now partnering with Suncor in this area.

In recent years, with the failure of the Copenhagen Summit and other setbacks, it has become unclear whether the world will see any real progress in climate change policy. US Congress has spent years exchanging modest proposals between the House and Senate, and at the state level, the western climate initiative lost momentum when some states withdrew. In Canada the climate change plans of 1990, 1995, 2000, 2002, 2005 and 2006 have come and gone, and the government's 2007 plan has been deferred pending US developments.

With such policy inertia, it is questionable whether a price will eventually be attached to carbon emissions in Canada and the US. Designing a cap and trade system is difficult, as the European Union's Emissions Trading System (ETS) has shown. The system's broad allocation of free permits and special exemptions caused the ETS to collapse at one point and continues to affect the system's design and function. The ETS example sets a poor precedent for any Canadian/US system that could emerge.

GHG EMISSIONS—A GLOBAL PERSPECTIVE

China is now commissioning one new coal-fired power plant every few weeks, with soot, ash and GHG emissions the inevitable result. China's GHG emissions growth each year is more than Canada's total annual emissions from all sectors. In value-added areas like aluminum smelting, China has upped its processing capacity in recent years, drawing on the country's underpriced coal-fired electricity. In MAC's view, development in China and other competing countries needs to take place within a global GHG framework, using the cleanest possible technologies.

More likely for Canada are smaller yet perhaps more effective actions, such as better fuel standards for cars and trucks. The Canadian government is moving along this path, while also proposing tighter standards for coal-fired power generation. Canadian regulations for oil sands emissions and large industrial emitters may also be considered in the coming year.

Any broad shift from coal to shale gas in the United States or other countries would also, over time, do much to reduce global GHG emissions. However, the fracking fluids and processes involved in such a shift bring their own environmental issues.

THE CLEAN ENERGY ECONOMY

Around the world, demand for environmental goods and services is on the rise. The most promising technology areas, according to a survey by Climate Change Business Journal, are 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 70% in 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.

Minerals and metals are essential for developing clean energy, whether the source is nuclear, wind or hydrogen.

Despite debates over the scale of global oil supply—ranging from "peak oil" at one end of the spectrum to "800-year supply" at the other—projections for coal and shale gas supply extend centuries into the future. As for oil shale, there are some 600 known deposits in 30 countries, and estimated reserves approach three trillion 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.

In the interim, for Canadian mining, the availability of reliable, well-priced energy is a key driver of investment. As a case in point, a concentrator/furnace investment near a proposed chromite mine in Ontario's Ring of Fire region could reportedly be viable with power prices at $0.04 per kilowatt hour, but not at a higher figure. If regions want these types of economic development, political leaders and policy makers must ensure that the industrial energy supply is stable, long-term and competitively priced.

REGULATORY ENVIRONMENT

The Canadian mining industry is governed by many federal, provincial and territorial acts and regulations. Dealing with their complexity is challenging, as there are overlaps and inconsistencies among them. Some lack compliance mechanisms, or their interpretation is unclear or changing.

In the last year, the industry has seen important improvements in the *Canadian Environmental Assessment Act*. In 2009, the federal environmental commissioner had commented on the many overlaps between government review agencies, and on the absence of evidence of this approach leading to better environmental outcomes. As discussed in Section 6 of this report, overlaps and inefficiencies can weaken Canada's status as a destination for capital investment.

Canada's Major Projects Management Office, set up to coordinate the many agencies and departments that review projects proposed by industry, has been a positive step. Funding for the office was announced in the 2007 federal budget, which allocated $150 million over five years to improving the regulatory regime. Also positive were changes announced in the 2010 budget that enable the Canadian Environmental Assessment Agency to initiate and manage comprehensive studies. These changes should eliminate delays in initiating federal environmental assessments of a project and improve the management of the assessment process. Moreover, by eliminating delays in launching an assessment, the federal process will start at the same time as provincial assessments, enabling good coordination between the two processes.

While these initiatives do help, regulatory challenges remain. For instance, officials in the environment, fisheries and northern departments and ministries should be mandated to work with industry and stakeholders to remove unnecessary regulatory, legislative and operational obstacles to sustainable development. In particular, greater clarity is needed in the application of the *Fisheries Act*, and workable regulations be put in place, to better protect Canada's fisheries with a compliance process that matches risk.

Regulatory overlaps and inefficiencies can weaken Canada's status as a destination for capital investment.

In the area of climate change, one concern is that federal regulations might emerge where provincial ones already exist or are in the works. The result would be complicated regulatory and reporting systems that duplicate one another. On the greenhouse gas front, industry needs clear and certain regulatory processes if it is to make the right investments. As for air pollution targets and processes, the federal government must avoid jurisdictional overlap and a "one size fits all" approach, and should

focus on the facilities and regions that will deliver real environmental and health benefits. In all areas governments must make sure they have the skills and resources to staff an efficient regulatory system.

Given Canada's declining mineral reserves, it is important that governments consider economic issues before removing large areas of land from development. In 2010, for example, the British Columbia government placed a moratorium on exploration, mining, and oil and gas activity in the province's Flathead Valley—a decision, made with little consultation, that sets a large area aside from resource development. Similarly, a recent Ontario government plan to prevent development in regions of the far north could weaken economic prospects for Aboriginal and non-Aboriginal residents there.

FIGURE 30

MINING INDUSTRY RELEASE OF SUBSTANCES TO THE ENVIRONMENT, BASE YEAR TO 2009

	Base-Year	2003	2005	2008	2009	% Change (Base-09)
Arsenic	319	133	81	110	66	(79)
Cadmium	130	28	31	20	23	(82)
Copper	976	274	353	314	270	(72)
Lead	1,844	297	199	214	194	(89)
Mercury	28	1.4	1.8	2.5	1.1	(96)
Nickel	1,372	260	393	213	120	(91)
Zinc	3,015	467	405	404	554	(82)

Source: MAC Member Companies, TSM Progress Report, 2011

Notes: 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 is generally around 1993.

FIGURE 31

MINING INDUSTRY ENERGY AND GHG EMISSIONS DATA, 1990 - 2009

	1990	1995	2000	2005	2007	2009
Canadian Economy						
Canadian Energy Use (PJ)	9,608	10,155	11,362	11,851	12,477	12,060
Energy Used by Industry (PJ)	2,400	2,533	2,724	2,682	2,695	2,531
Canadian GHG Emissions (mt)	592	642	718	734	747	740
GHG Emissions by Industry (mt)	142	144	161	163	169	176
Metal Ore Mining						
Energy Use – from Electricity (PJ)	47	42	36	37	32	33
Total Energy Use (PJ)	102	91	81	82	79	85
Share of Canadian Energy Use (%)	1.06	0.90	0.71	0.70	0.66	0.70
Energy per Unit (TJ/kt)	0.36	0.34	0.33	0.33	0.34	0.35
Total GHG Emissions (mt CO2e)	3.9	3.6	3.3	3.3	3.5	3.9
Share of Canadian GHG Emissions (%)	0.7	0.6	0.5	0.4	0.5	0.5
GHG Emissions per Unit (t/kt)	14	15	13	13	15	16
Primary Metal Smelting and Refining						
Energy Use – from Electricity (PJ)	31	41	42	36	22	27
Total Energy Use (PJ)	77	84	86	73	66	61
Share of Canadian Energy Use (%)	0.80	0.83	0.75	0.62	0.52	0.55
Energy per Unit (TJ/kt)	50	46	45	42	38	37
Total GHG Emissions (mt CO2e)	6.1	4.9	5.4	3.7	3.4	2.2
Share of Canadian GHG Emissions (%)	1.0	0.8	0.8	0.5	0.5	0.5
GHG Emissions per Unit (kt CO2e/kt)	4.0	2.7	2.9	2.1	2.0	1.3

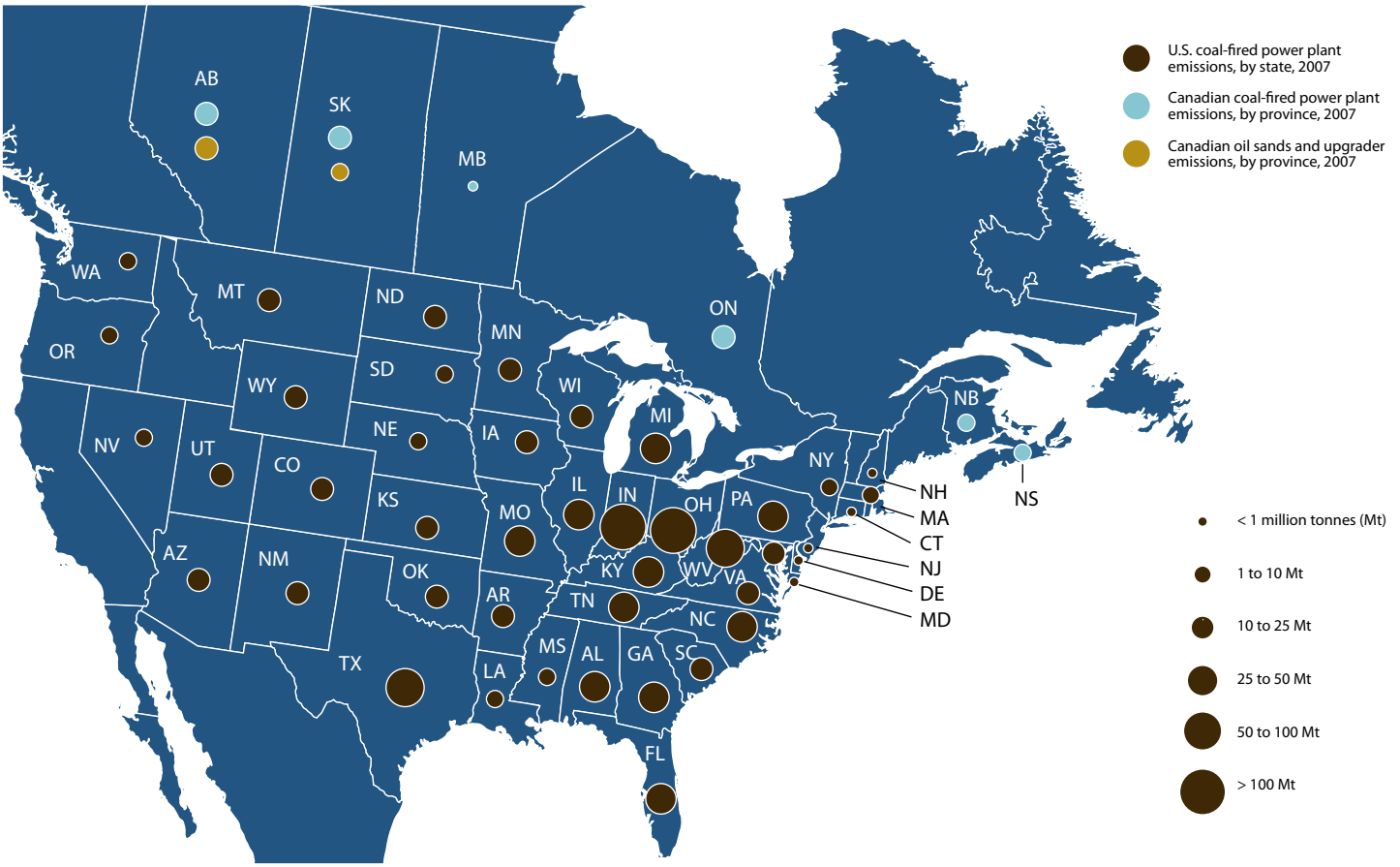
Source: Canadian Industrial Energy End-Use Data Analysis Centre (CIEEDAC) Report, March 2010

Note: Smelting and refining data are for non-ferrous metals. Also does not include aluminum .

GJ–billion. TJ–trillion. PJ–1000 TJ.

FIGURE 32

CANADA AND US – THE GHG CHALLENGE



THE WORLD

INTERNATIONAL MARKET ACTIVITIES AND DEVELOPMENTS

HIGHLIGHTS

+ Canada has the second-most "top 100" mining companies in the world, with 16 companies to China's 18.
+ The metallic minerals and metal products sector represented 9.4% of total Canadian outward investment stocks and 10.3% of inward stocks in 2010.
+ The industry exported $84.5 billion worth of metals, non-metals and coal in 2010--21.2% of Canada's total goods exports.
+ The availability of energy, water and transportation, and the prospect of governments undoing existing agreements, are among the many risks companies face in international mining projects.
+ Sovereign wealth funds, increasingly important sources of investment funding, now have a larger combined value than Germany's economy.
+ Canadian trade policy initiatives with Europe, India, China, the Americas and Africa could improve the mining industry's trade and investment environment over time.
+ Policy measures by China, still the main driver of mineral prices and trends, are shaping the Canadian and global mining industry.

Few Canadian industry sectors are as internationally active as the mining industry. Mining companies are global traders, with multi-billion dollar exports in many areas. About 1,000 Canadian exploration companies operate in other countries, and the industry receives new capital, ideas and opportunities through high flows of inward and outward investment. World market conditions, including imports, exports and investment, shape the industry, as do global trade and investment policies.

FOREIGN INVESTMENT STATISTICS

Canada is still home to the second-most "top 100" mining companies in the world, according to Natural Resources Canada, with 16 companies to China's 18. Historically, Canada's mining industry has had a wide global investment reach, and until recently outward investment levels exceeded inward. This situation has changed in recent years.

Canada's direct investment abroad (CDIA) totalled $617 billion in 2010 (see Figure 33). Of that, the metallic minerals and metal products sector accounted for $58 billion, or 9.4%. The sector's share has held steady at about 10% over the past decade, down from 15% in the 1990s. The relative decline is due to large CDIA increases by the energy and financial services sectors in the past decade.

COUNTRIES WITH THE MOST "TOP 100" MINING COMPANIES
China: 18
Canada: 16
South Africa: 11
United States: 10
Russia: 10

Much of the CDIA invested by Canadian minerals and metals companies is aimed at the United States and Central and South America. This level of CDIA is high relative to the industry's overall size, though the finance/insurance industry has the largest stock of CDIA by a considerable margin.

As for foreign direct investment in Canada (FDIC), the amount invested in the metallic minerals and metals products sector jumped in 2007 to $62 billion and has stayed in the $60 billion range ever since (see Figure 33). In 2010 the sector's share of FDIC was $58 billion, or 10.3% of the Canadian total, up from the 5%–7% range of previous decades. This increase reflects foreign acquisitions in the sector in recent years. Other leading Canadian industries in terms of FDIC stocks include finance/insurance and energy.

INTERNATIONAL TRADE STATISTICS

Generally, the Canadian mining industry shows a large trade surplus in the first three stages of mining and a trade deficit in the fourth stage (fabricated products). In specific commodities, Canada had a 2010 trade deficit in iron and steel, and a trade surplus in copper, gold, aluminum and coal.

Exports

Canadian mining exports have followed a turbulent pattern in recent years. Strong export growth in the first three stages of activity between 2006 and 2008 was followed by a price drop in 2009 and a large decline in export values (see Figure 34). Exports then rose again in 2010, reaching $73 billion for the first three stages, up 30% over the previous year. Stage 4 exports stayed level at around $14 billion a year from 2006 to 2008 before declining to $11 billion.

In 2010 Canada had a trade deficit in iron and steel, and a trade surplus in copper, gold, aluminum and coal.

Some 56% of Canada's metal exports go to the United States, mainly iron and steel, aluminum, gold and copper (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 exports of nickel, copper, iron ore and potash.

Imports

Imports have followed a roller-coaster path much like exports. Import values for the first three stages of mining went up between 2006 and 2008 before falling in 2009

CANADIAN MINING INDUSTRY—2010 EXPORTS AT A GLANCE

Total industry exports: $84.5 billion:

- Metals: $64.0 billion
- Non-metals: $14.3 billion
- Coal: $6.2 billion

Percentage of total Canadian goods exports: 21.2%

Main exports ($1.7 billion to $15.1 billion each):

- Aluminum
- Copper
- Gold
- Iron and steel
- Iron ore
- Nickel
- Silver
- Uranium
- Zinc
- Diamonds
- Potash
- Coal

(Details in Annex 11)

and then rebounding (by 30%) in 2010 (see Figure 35). Stage 4 imports have remained stable. Of Canada's total metal imports in 2010, around 51% came from the United States and 34% from other regions, including South America, Russia and Africa (see Annex 12). These other regions are an important source of copper, gold, iron and steel, and aluminum for Canadian smelters and refineries. Canada ran a $7.6 billion trade deficit in iron and steel in 2010.

INTERNATIONAL MARKET DEVELOPMENTS

Mineral products are strategically important to countries with large or growing infrastructures 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.

Strong Global Demand, with Cyclical Realities

The cyclical nature of the mining industry is never far from the surface, even during robust economic times. Companies try to even out the cycles by seeking quality properties, manageable risks and a balanced mix of opportunities.

As discussed elsewhere in this report, the 2008 recession sharply curbed mineral demand and prices and brought on mine closures, project delays and cuts. This dip was followed in short order by sharp increases in demand and prices through 2009 and 2010, driven by growth in China. In mid-2011 market uncertainty returned, as concerns about US and EU debt and inflation in China dampened demand and prices yet again.

> For the mining industry, the benefits of stronger mineral prices have more than offset the drawbacks of a higher Canadian dollar.

Cyclical realities aside, demand for metals and minerals is expected to grow in the long term. China, India and Brazil are the first, second and fifth most populous nations in the world and rank among the 20 largest economies. These countries, whose economies grew on average 9%, 6% and 3% a year (respectively) over the past decade, have an appetite for minerals and metals that should only increase, especially because their per capita usage of many metal-intensive products is still relatively low.

According to a recent World Economic Forum study, China's economic growth is projected to be 6%–9% a year from 2020 to 2025; India's will average 6%.

CANADIAN MINING INDUSTRY—2010 IMPORTS AT A GLANCE

Total industry imports: $66.5 billion

- Metals: $56.0 billion
- Non-metals: $9.2 billion
- Coal: $1.3 billion

Percentage of total Canadian goods imports: 17.0%

Main imports ($2.0 billion to $20.3 billion each):

- Aluminum
- Copper
- Gold
- Iron and steel
- Silver

(Details in Annex 12)

Governments Seeking More Revenues

With mineral prices generally up during the past decade, many national governments have tried to gain more mining revenues by reviewing or freezing licences, rewriting contracts or suspending the issuance of permits. Facts & Figures 2008 detailed actions proposed or taken in Ecuador, Mongolia, Zambia, DR Congo, Argentina, Venezuela, Uzbekistan and Russia.

In more recent developments, the opposition takeover of the Kyrgyzstan government in April 2010 weakened mining company values there. In February 2010 the youth league of the African National Congress called for 60% of South Africa's mining industry to be nationalized. Similarly, politicians in Bolivia threatened to nationalize some mining assets. Government upheaval in Egypt and Ivory Coast in 2011 caused mining share prices to sink. Actions like these can affect profits, share price and investment, particularly if they are taken without considering the large business costs and risks of international mining projects.

The Oyu Tolgoi mine in Mongolia, proposed by Ivanhoe Mines with a 2013 production timetable, is an interesting case study of the complexities of major projects in developing countries. One of the world's largest copper-gold projects, the mine could put Mongolia among the economic growth leaders in Asia. Mongolia recently elected a pro-development president. However, by mid-2011 there were signs that the government wanted to renegotiate the development agreement yet again, with the aim of securing a greater share of revenues.

The desire to capture more revenues from mining is not limited to the governments of developing nations. In May 2010 the Australian government proposed a new 40% super-profits tax that would also apply to existing operations. Industry sources protested that the sector already contributed over twice its GDP share of the country's corporate income tax, and several firms stalled their investment decisions. The issue contributed to the resignation of Australia's prime minister in June 2010 and to the later agreement to reduce the super-profit tax rate, narrow its scope and increase the profitability threshold.

In Canada a new diamond royalty, proposed by the Ontario government in 2007 without consultation, was viewed by industry as discriminatory, especially on the eve of opening Ontario's first diamond mine. Though the issue has since been resolved, such proposals do send negative signals to the world's mining investment community.

In a similar move, Quebec has raised mineral royalty rates in recent years, reaching 16% of profits in 2012

and moving Quebec from its position as lowest burden province to third-highest. The Alberta government has also changed its oil and gas royalty regime, raising rates as of 2009 but then backing off some changes so as to encourage unconventional extraction techniques.

Some governments, on the other hand, are actively working to attract investment. Jamaica unveiled its first national minerals policy in 2009. Tanzania, Zambia and Colombia, despite difficult investment regimes, are looking to make exploration and development more attractive. The importance of government actions was underscored in South America in 2009, when a tax agreement struck between Chile and Argentina led Barrick Gold to approve the $3 billion Pascua-Lama project, one of the world's prime undeveloped gold projects.

International Competitiveness: Canada and Global Jurisdictions

Energy, water and transportation are key variables that affect the mining industry's competitiveness, and conditions can vary widely from one country to the next. Chile, for example, has problems with water availability and closely monitors water use at mine sites. Energy availability is an issue in northern Chile, and uncertain power supply interferes with mining production in South Africa. Many large investments are needed in transportation infrastructure, such as rail links in Tanzania and highways in northern Quebec. Often the share to be paid by companies versus governments is unclear and requires negotiation.

In Canada some analysts are concerned that the mining industry's competitiveness could suffer because of the lack of clarity and commitment on land access issues at the provincial and territorial level. Government proposals to protect northern lands and amendments to provincial mining laws require the right balance. Imbalance can drive mineral investment to other countries and can stifle development opportunities for Aboriginal and other communities. (These issues are also discussed in Section 5 of this report.) Notably, large US lobbyists such as the Pew Trusts have been working with NGOs against certain economic developments in Canada.

Another competitiveness issue is the value of the Canadian dollar, which has climbed 50% in US dollar terms this decade, driven largely by rising commodity prices and Canada's strength in these areas. For the Canadian industry, minerals are generally priced in US dollars, labour and other costs in Canadian currency, so a rising dollar reduces profitability. However, according to Natural Resources Canada, the benefits to the industry of stronger mineral prices have more than offset the drawbacks of a higher dollar.

NRCan has been doing some broad research to measure Canada's mining competitiveness. Early findings suggest the following:

- Canada is more competitive in the extraction and concentrate stages than in the metal fabrication stage.
- Canadian operations in aluminum and nickel are more competitive than those in copper and zinc.
- The scale of operation matters. Average capacity of the world's top 10 copper smelters has grown from 270,000 to 480,000 tonnes in a decade, an 80% increase that could leave Canadian facilities behind.

BEST POLICY ENVIRONMENTS FOR MINING INVESTMENT

An annual Fraser Institute survey, released in March 2011, asked 494 mineral exploration and development companies which countries (of 79 listed) have the best policy environments for mining investment. Here are some results:

- Canadian jurisdictions placed among the world leaders, with political stability and security being important variables.
- The top 10 jurisdictions were Alberta, Nevada, Saskatchewan, Quebec, Finland, Utah, Sweden, Chile, Manitoba and Wyoming.
- The rankings of Ontario (18) and particularly British Columbia (36) have declined in recent years.
- The lowest-ranked jurisdictions were Honduras, Venezuela, Ecuador, DR Congo, Bolivia, Guatemala, India, Madagascar, Wisconsin, Zimbabwe, Indonesia and Russia.
- In Africa, which has major long-term potential for mineral development, Botswana, Burkina Faso, Mali and Namibia ranked highest for policy environments.

GLOBAL TRADE AND INVESTMENT POLICY

The global trade policy front has been quiet for several years. World Trade Organization discussions have continued intermittently, and while there has been some progress on export subsidies and market access tariffs, the conclusion of the WTO Doha Round seems distant.

Protectionism Trends

Within this trade policy vacuum, there are signs of some key economies growing more protective of their raw material supply. Twice in recent years Russia has arbitrarily halted energy exports to Belarus and Ukraine. Overall investment interest in Russia has cooled, and the number of exploration projects there is limited, as is the number of successes. As noted earlier, Russia falls near the bottom of the Fraser Institute rankings of investment policy regimes. To counter this situation, the Russian government will likely have to play a greater role in financing or bearing the risks of mineral exploration.

There are signs of some key economies (e.g., Russia and India) growing more protective of their raw material supply.

India, concerned that its iron ore reserves might not meet domestic demand, imposed a tax in 2007 aimed at cutting exports of the commodity in half. In April 2011 India increased its export duty on iron ore fines from 5% to 20%. Some Indian states have also imposed iron ore export bans. These restrictions are at least partly due to steel developments in the country. Pohang Iron and Steel and ArcelorMittal are building mills there, and India's steel output is expected to increase five-fold by 2020.

McKinsey & Company estimates that up to $120 billion could be invested in India's coal, aluminum and steel industries by 2015. The image of corruption, bureaucracy and weak investment that plagues India, which ranks 74 out of 79 countries in the Fraser Institute survey, will have to be addressed to secure this scale of financing.

In a sign of India's emergence as an outward investor, Essar Global, which controls the country's largest steel exporter, purchased Canada's Algoma Steel in 2007. India's Tata Steel expects to develop and finance a $5 billion iron ore project on the Quebec-Labrador border with New Millennium. Coal India, a state entity and the world's largest coal producer with some 470 mines, recently acquired coal mine and port assets in Australia.

Carbon Tariffs

One trade policy measure under discussion is the carbon tariff: a tariff that a country applies against imports from other countries that allegedly have weaker greenhouse gas emission requirements. Some environmental groups and US legislators have suggested that fuels with high carbon footprints (oil from oil sands being the most frequent suggestion) should face import tariffs or bans.

While carbon tariffs could gain attention in the coming years, any actions along these lines would likely lead to retaliatory measures, since all forms of energy generation affect the environment. In the United States, for example, 30 states have a coal emissions carbon footprint as large as, or larger than, that of Alberta's oil sands (see Section 5 of this report).

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 record oil prices and earnings, SWFs have become critical sources of investment funding.

THE EXTENT OF SWFs

- Global Insight analysts put the combined value of global SWFs at $4.5 trillion–$5 trillion as of mid-2011, larger than the economies of the United Kingdom, France or Germany.
- By some estimates, global SWF value could reach US$10 trillion in a decade.
- Goldman Sachs estimated in 2008 that $1.8 trillion is shifting from oil consumers to oil producers each year, wealth directed largely to the SWFs of oil-producing nations.
- Sovereign Wealth Fund News ranks 57 SWFs in its regular analysis. The largest in terms of assets:
  - Abu Dhabi Investment Authority: $627 billion
  - Norway pension fund: $570 billion
  - China's SAFE: $568 billion
  - Saudi Arabia's SAMA: $520 billion
  - China Investment Corp.: $410 billion

Over 30 countries now have SWFs—some, such as the Alberta Heritage Fund, at the subnational level. The Middle Eastern Arab states have been actively converting oil revenues to foreign assets. Those assets will reach $2.2 trillion by the end of 2011, according to the Institute of International Finance, with one-third held by SWFs.

There is considerable policy debate over SWFs. Some analysts are concerned about the funds' opaqueness and political orientation; 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.

CANADA'S TRADE AND INVESTMENT POLICY

Canada remains among the world's most open countries in terms of trade and investment in mining. Canada has no notable barriers except for some foreign ownership restrictions in uranium, which have been and will be waived in cases where reciprocal openness is seen. The country's openness to investment was underscored in 2006–07 when Inco, Falconbridge and Alcan were acquired by foreign companies.

Foreign investment, whether it flows in or out, gives Canadian businesses easier access to technologies, ideas, markets and production chains.

Foreign investment, whether it flows in or out, gives Canadian businesses easier access to new technologies and ideas and to larger markets and production chains. Government's main roles, in the industry's view, are to ensure that two-way flows are fair and open, to negotiate investment protection agreements and to keep Canada an attractive place for investment.

Trade Openness Challenged

At times in the past year, Canada's traditional openness was called into question. BHP Billiton's $40 billion takeover bid for PotashCorp in mid-2010 became a major political issue. The premier of Saskatchewan (and several other premiers) opposed the takeover, essentially forcing the hand of Conservative parliamentarians in that province and the Conservative government in Ottawa. The takeover was ultimately rejected as not being in Canada's best interests.

During the 2011 election campaign in Ontario, the provincial NDP proposed a legislative change that would require ore from Ontario to be processed in Ontario. This type of protectionism has been floated in the past, but economic realities have prevailed. Ontario facilities process minerals from Quebec, British Columbia, Newfoundland, Manitoba, the United States, Peru, Chile and Australia, so the province would likely emerge a loser from such trade protectionism.

Positive Developments

MAC and the mining industry support the following policy developments, and where appropriate provide input to Canadian policy-makers and negotiators:

- **Possible economic agreement with the EU**. A background study suggests that trade liberalization between Canada and the European Union could increase Canada's GDP by $12 billion and bilateral trade by 20%. Negotiations towards a comprehensive agreement, announced in May 2009, will prove an extensive undertaking, and meeting the two-year target will be difficult. As of mid-2011 eight negotiating rounds had taken place, with the next scheduled for October 2011.
- **Freer trade with Central and South America.** Canadian mining presence in this region is one reason why Canada is moving towards more liberal

trade relations. After passing legislation to set up a free trade agreement (FTA) with Peru in 2009, and one with Colombia in 2010, the government announced in June 2011 that it would reintroduce an FTA with Panama. In August 2011 Canada concluded FTA negotiations with Honduras and suggested that it was open to resuming talks with Guatemala, El Salvador and Nicaragua at a future date.

- **Negotiation of FIPAs.** Canada is negotiating new or stronger foreign investment protection agreements (FIPAs) with, among others, Tanzania, Madagascar, Mali, Mongolia, Indonesia, Vietnam, Kuwait and China. FIPAs are bilateral agreements that give foreign investors access to independent rules and arbitrators should disputes arise between them and the host government. While the enforcement components are rarely used, the mere existence of a FIPA gives foreign governments a set of rules and expectations for fairness and transparency. Some potential FIPAs, particularly with China, would be very relevant to mining.

DEVELOPMENTS IN AFRICA

The number of FIPAs in progress between Canada and African countries reflects Africa's importance as an investment destination for Canadian mining. According to a Natural Resources Canada study, Canadian mining assets in Africa shot up from $6 billion in 2005 to $23 billion in 2010. Madagascar, Mauritania, South Africa, Tanzania and Zambia are the largest recipients. Gold, copper, nickel, uranium and diamonds are the main targets.

- **Possible economic agreement with India.** Canada and India began negotiating a comprehensive economic partnership agreement in November 2010. The second round of talks finished in July 2011, and the next round is planned for fall 2011. The goal is to conclude by 2013. This agreement holds the most potential of all for Canadian mining, given the size and projected growth of the Indian economy and the highly insular, protective nature of India's trade and investment policies at present.

Corporate Social Responsibility

Corporate social responsibility (CSR) is a policy area that is earning more notice nowadays. This is not surprising, what with globalization expanding the reach of company activities and the Internet instantly spreading news about environmental and social issues.

The Canadian government unveiled its CSR policy in 2009. "Building the Canadian Advantage" established the Extractive Sector CSR Counsellor, promoted CSR guidelines and created a CSR Centre of Excellence. The policy complements the dozens of CSR initiatives, programs and guidelines around the world. It also adds to Canadian mining companies' investments in dozens of countries, funding that helps pay for schools, roads, electricity, hospitals, clinics, school breakfast programs, community halls, and child health and nutrition programs.

A private member's bill (Bill C-300), which aimed to add more CSR rules and processes to the current array, went to a vote in the House of Commons in 2010 but was defeated. Partly in response to the bill, MAC created a new committee to address international CSR issues.

CHINA'S TRADE AND INVESTMENT POLICY

Many recent trade and investment policy activities in China are affecting Canada's mining industry.

Trade Measures
China has a copper permitting and export duty system to protect the country's raw materials for domestic use and keep them out of global trading. The United States, the European Union and Mexico have challenged China's export restrictions in nine mineral categories, alleging that by keeping the materials in China, the country is making them available to its steel manufacturers at subsidized rates. In July 2011 the WTO found China's restrictions inconsistent with its WTO commitments. China had 60 days to appeal the ruling. The OECD is examining the issue as well.

In 2009 China's state committee announced that, to speed up industry restructuring, it would consolidate the base metals industry and limit new aluminum projects.

In July 2011 the WTO found China's export restrictions in nine mineral categories inconsistent with the country's WTO commitments.

The government plans to close obsolete smelting facilities in copper, lead, zinc and aluminum and will encourage mergers and restructuring to improve competitiveness. Chinese regulations require new zinc smelters to source at least 30% of their concentrate from their own mine supplies, forcing them to develop or buy into new mines. Similar objectives are in place for lead and copper smelters.

In recent years China has periodically stockpiled iron ore, aluminum, copper, nickel, tin, zinc and crude oil. Those purchases helped to raise global metal prices following the 2008 recession.

Foreign Investment
Investment abroad was once discouraged by Chinese authorities, but this is no longer the case. China held US$3 trillion in foreign exchange reserves as of March 2011.

Besides investing in Africa and seeking opportunities in western countries (discussed below), China is building closer oil supply relationships with Iraq, Iran and Venezuela. Acquisitions of Japanese companies, mainly high-tech, have doubled in the past year. China is also interested in former CIS countries, especially Uzbekistan, where Chinese investors are involved in a gold-silver mine development and a uranium exploration project. Over the past two decades, Chinese organizations have cornered 97% of the global rare earth market, and China pledged in 2010 to reduce rare earth export quotas by 72% in the second half of that year.

EMERGENCE OF RARE EARTH ELEMENTS
Over the past two decades, Chinese organizations have cornered about 97% of the world market for rare earth elements. Western countries are paying more attention to the supply of these elements because of their unique magnetic and spectroscopic properties and their importance in defence, clean energy and communications technologies.
A United States senator proposed legislation in 2010 to create a US defence stockpile of rare earth metals. Molycorp restarted its rare earth mine in California in early 2011. The European Commission has recommended more support for the exploration of strategic metals, including rare earths, and has proposed incentives for more recycling. In Canada several companies are looking to develop rare earth finds in Quebec, the Northwest Territories, Yukon, Ontario, New Brunswick, Manitoba and Saskatchewan.

In recent years China has turned to Africa as a business partner and supplier of raw materials. Africa is now China's leading source of imported oil, with Angola, Sudan, Nigeria and Gabon as major partners. One deal in Angola featured a $2 billion package of loans and aid, including funds for Chinese companies to build railroads, schools, roads, bridges, hospitals and fibre optic networks.

In electricity, China has linkages with South Africa's nuclear power program and has built power stations in Angola, Zambia and Zimbabwe. In minerals, Chinese firms have invested in Zambia and DR Congo, have acquired rights to mine gold and uranium in Zimbabwe, are developing uranium assets in Niger and are building a $2.5 billion iron ore project in Sierra Leone.

According to the African Development Bank, Chinese companies dominate deal making in Africa, accounting for 40% of the corporate contracts signed in 2010 compared with 2% for US companies. South Africa's Standard Bank, the largest bank in Africa, predicts Chinese investment in Africa will reach $50 billion by 2015, up 70% from 2009.

Relations between China and Australia have been tested recently by increased acquisitions and the sentencing of four Rio Tinto employees for bribery and stealing state secrets. Recent Chinese acquisitions and investments in Australia include Minmetals' purchase of OZ Minerals and Wuhan Iron and Steel's takeover of Centrex Metals. Hunan Valin's investment in Fortescue, a large Australian iron ore supplier, is part of China's strategy to rely less on Vale, Rio Tinto and BHP Billiton. China has reportedly invested $56 billion in global iron ore assets to reduce this reliance.

Chinese investment in Canada's mining industry is expected to grow in the coming years. Chinese interests have invested modestly in oil sands assets and have bought minority equity stakes in Kinross and PotashCorp. In July 2009 China Investment Corp., the country's sovereign wealth fund, spent $1.7 billion to acquire 17% of Teck Resources. China Investment Corp. opened an office in Toronto in January 2011 to be closer to new opportunities.

Economic Issues

Debate has arisen within the US Congress and the Obama administration about whether China is manipulating its currency. Some research suggests that the yuan is undervalued by 40% relative to the US dollar and that increasing it would create 1.2 million jobs in the United States. About 130 Congress members wrote the US treasury secretary in 2010 urging punitive duties. In June 2010 the Chinese government sent positive signals about a currency appreciation, and the US held off on pronouncing China a currency manipulator. Yet the matter is still an issue in mid-2011, especially among the protectionist elements in Congress.

Segments of China's low-cost workforce may soon see better working conditions and wages. Through strike action, workers in companies like Honda are getting increases in the 25% range—increases that are becoming more common for workers in the export economy. According to Credit Suisse, in 2011 all Chinese provinces and regions boosted their minimum wage for the second year in a row.

Chinese investment in Canada's mining industry is expected to grow in the coming years.

Demand for workers in China is expected to outstrip supply by 2013, an economic issue that will evolve over the coming decade. The Chinese middle class will likely gain purchasing power, while companies may see their low-cost competitive advantage erode or shift to neighbouring countries.

FIGURE 33

METALLIC MINERALS AND METAL PRODUCTS - DIRECT INVESTMENT STOCKS, 1990 - 2010

	CDIA	Total	%	FDIC	Total	%
1990	13.5	98.4	13.7	9.8	130.9	7.5
1995	24.5	161.2	15.2	9.6	168.2	5.7
2000	42.4	356.5	11.9	17.4	319.1	5.5
2005	56.4	452.2	12.5	21.2	397.8	5.3
2006	58.9	518.8	11.3	38.3	437.2	8.8
2007	57.3	513.1	11.2	61.6	510.1	12.1
2008	66.2	642.0	10.3	65.1	542.7	12.0
2009	64.5	621.2	10.4	59.8	547.6	10.9
2010	58.0	616.7	9.4	58.0	561.6	10.3

Source: Statistics Canada, Cansim Table 376-0038; 2010 figures are preliminary.

Note: CDIA is Canadian Direct Investment Abroad. FDIC is Foreign Direct Investment in Canada. 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.

FIGURE 34

MINERAL AND MINERAL PRODUCT IMPORTS AND EXPORTS[1], 2006-2010[2]

($ Millions)	2006	2007	2008	2009	2010	2010 Percentage of Canada's Total Economy
Total Imports						
Stage I	7,125	7,778	9,147	6,961	7,713	2
Stage II	7,763	7,674	9,362	7,742	12,377	3
Stage III	19,924	19,555	22,002	15,277	18,743	5
Stage IV	27,037	27,598	28,784	25,010	27,727	7
Stage I - IV	61,849	62,605	69,295	54,991	66,561	16
Metals	51,992	52,509	57,377	45,409	55,966	-
Nonmetals	8,332	8,763	9,995	8,392	9,233	-
Coal & Coke	1,526	1,332	1,924	1,190	1,362	-
Total Economy Imports	**397,044**	**407,301**	**433,999**	**365,155**	**403,713**	**-**
Total Exports [1]						
Stage I	16,935	18,171	28,799	19,907	24,626	6
Stage II	25,315	32,570	31,128	22,051	32,445	8
Stage III	18,427	19,746	20,419	13,157	15,609	4
Stage IV	14,851	14,616	14,799	11,302	11,852	3
Stage I - IV	75,527	85,103	95,146	66,418	84,531	21
Metals	60,449	69,407	69,395	49,119	63,984	-
Nonmetals	11,642	12,521	19,290	12,095	14,298	-
Coal & Coke	3,437	3,174	6,461	5,205	6,250	-
Total Economy Exports	**440,365**	**450,321**	**483,488**	**359,866**	**399,434**	**-**

Source: TRAGS, Natural Resouces Canada; Statistics Canada.

Note: For trade purposes, Natural Resources Canada divides the mining and mineral processing industry into stages according to the degree of processing or manufacturing corresponding to the product Harmonized System Classification Code. These four stages include Stage I - Mineral Extraction and Concentrating, Stage II - Smelting and Refining, Stage III - Nonmetals and Metals-Based Semi-Fabricated industries, and Stage IV - Metals Fabricating industries.

Note: Numbers may not add to totals due to rounding.

[1] Total Exports is the sum of Domestic Exports and Re-Exports.
[2] 2006 data was revised by Statistics Canada as of February 2010; 2007, 2008 and 2009 as of February 2011.

ANNEX 1

PRODUCING MINES IN CANADA, 2010[1]

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
Anaconda Mining Inc.	Pine Cove	(P., C.)	Baie Verte	Au
Teck Resources Limited	Duck Pond	(U., C.)	Millertown	Cu, Zn
Vale Inco Newfoundland and Labrador Limited	Voisey's Bay	(P., C.)	Voisey's Bay	Ni, Cu, Co
Cliffs Natural Resources Inc.	Scully	(P., C.)	Wabush	Fe
Iron Ore Company of Canada (IOC)	Carol Lake	(P., C.)	Labrador City	Fe
Hurley Slateworks Company Inc.	Burgoyne's Cove	(P.)	Burgoyne's Cove	Slate
Atlantic Minerals Limited	Lower Cove	(P.)	Lower Cove	Limestone, dolomite
Labrador Inuit Development Corporation	Ten Mile Bay	(P.)	Nain	Anorthosite
Iron Ore Company of Canada (IOC)	Plateau Dolomite	(P.)	Labrador City	Dolomite
Nova Scotia				
Nova Scotia Power Inc.	Glen Morrison	(P.)	Cape Breton	Limestone
Georgia-Pacific Canada, Inc.	Sugar Camp	(P.)	Melford	Gypsum
Georgia-Pacific Canada, Inc.	Melford	(P.)	Melford	Gypsum
CGC Inc.	Little Narrows	(P.)	Little Narrows	Gypsum
Mosher Limestone Company Limited	Upper Musquodoboit	(P.)	Upper Musquodoboit	Limestone, gypsum
Lafarge Canada Inc.	Brookfield	(P., Plant)	Brookfield	Limestone
The Canadian Salt Company Limited	Pugwash	(U.)	Pugwash	Salt
National Gypsum (Canada) Ltd.	Milford	(P.)	Milford	Gypsum
Shaw Resources Ltd.	Nova Scotia Sand and Gravel	(P.)	Nine Mile River	Silica
Fundy Gypsum Company (USG Canadian Mining Ltd.)	Miller Creek	(P.)	Miller Creek	Gypsum
Fundy Gypsum Company (USG Canadian Mining Ltd.)	Wentworth	(P.)	Wentworth	Gypsum
Sifto Canada Inc.	Nappan	(Solution mining)	Nappan	Salt
Black Bull Resources Inc.	White Rock	(P.)	White Rock	Quartz
Greenhills Development Ltd.	Florence	(P.)	Big Pond	Coal
Pioneer Coal Ltd.	Point Aconi	(P.)	Point Aconi	Coal
Pioneer Coal Ltd.	Stellarton	(P.)	Stellarton	Coal
New Brunswick				
Xstrata Zinc Canada	Brunswick	(U., C.)	Bathurst	Pb, Zn, Cu, Ag, Au
Potash Corporation of Saskatchewan Inc.	New Brunswick (Sussex)	(U., Plant)	Sussex	Potash, salt
Graymont Inc.	Havelock	(P., Plant)	Havelock	Lime, limestone
Brookville Manufacturing Company	Brookville	(P., Plant)	Saint John	Dolomitic lime
Elmtree Resources Ltd.	Sormany	(P., Plant)	Sormany	Limestone
Atlantic Silica Inc.	Poodiac	(P.)	Poodiac	Silica

PRODUCING MINES IN CANADA, 2010[1]

COMPANY	MINE SITE	ACTIVITY TYPE	LOCATION	COMMODITY
Quebec				
Consolidated Thompson Iron Mines Ltd.	Bloom Lake	(P., C.)	Labrador City	Fe
ArcelorMittal Mines Canada Inc.	Mont-Wright	(P., C.)	Fermont	Fe
IAMGOLD Corporation	Niobec	(U., C.)	Saint-Honoré-de-Chicoutimi	Nb
Xstrata Nickel Canada	Raglan	(P., U., C.)	Katinniq	Ni, Cu, Co, PGM
Inmet Mining Corporation	Troilus	(P., C.)	North of Chibougamau	Au, Ag, Cu
Metanor Resources Inc.	Barry	(P.)	Barry Twp.	Au, Ag
Metanor Resources Inc.	Bachelor Lake	(C.)	Desmaraisville	Au, Ag
Louvem Mines Inc./Richmont Mines Inc.	Beaufor	(U.)	Val-d'Or	Au, Ag
Alexis Minerals Corporation	Lac Herbin	(U., C.)	Val-d'Or	Au, Ag
Xstrata Zinc Canada	Perseverance	(U., C.)	Matagami	Zn, Cu, Au, Ag
Century Mining Corporation	Lamaque	(U., C.)	Val-d'Or	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
North American Palladium Ltd.	Sleeping Giant	(U., C.)	North of Amos	Au, Ag
Richmont Mines Inc.	Camflo	(C.)	Malartic	Au, Ag
Agnico-Eagle Mines Limited	Lapa	(U.)	Val-d'Or	Au
Agnico-Eagle Mines Limited	LaRonde and LaRonde II	(U., C.)	Cadillac	Au, Zn, Cu, Pb, Ag
IAMGOLD Corporation	Mouska	(U.)	Cadillac	Au, Cu, Ag
Aurizon Mines Ltd.	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.)	Hâvre-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
9184-6808 Québec inc. (LAB Chrysotile)	Black Lake	(P., Plant)	Thetford Mines	Chrysotile
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
St. Lawrence Cement Inc.	Joliette	(P.)	Joliette	Limestone
Graymont Inc.	Joliette	(P., Plant)	Joliette	Lime, limestone
Silco Sands Inc.	Sainte-Clotilde	(P.)	Beauharnois	Silica, ferrosilicon
La Compagnie Bon Sable Ltée	Ormstown	(P.)	Ormstown	Silica
Unimin Canada Ltd.	Saint-Donat-de-Montcalm	(P., Plant)	Saint-Donat-de-Montcalm	Silica
La Compagnie Bon Sable Ltée	Saint-Joseph-du-Lac	(P.)	Saint-Joseph-du-Lac	Silica
Unimin Canada Ltd.	Saint-Canut	(P., Plant)	Saint-Canut	Silica
Suzorite Mica Products 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
Temisca inc.	Saint-Bruno-de-Guigues	(P.)	Saint-Bruno-de-Guigues	Silica

PRODUCING MINES IN CANADA, 2010[1]

COMPANY	MINE SITE	ACTIVITY TYPE	LOCATION	COMMODITY
Ontario				
St. Andrew Goldfields Ltd.	Holloway/Holt	(U., C.)	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
Vale Inco Limited	Garson	(U.)	Sudbury	Ni, Cu, Co, PGM, Au, Ag, Se, Te
Xstrata Nickel Canada	Nickel Rim South	(U.)	Sudbury	Ni, Cu, Co, PGM, Au
Quadra FNX Mining Company Inc.	Podolsky	(U.)	Norman Twp.	Cu, Ni, PM
Vale Inco Limited	Stobie	(U.)	Sudbury	Ni, Cu, Co, PGM, Au, Ag, Se, Te
Vale Inco Limited	Clarabelle	(C.)	Sudbury	Ni, Cu, Co, PGM, Au, Ag, Se, Te
Vale Inco Limited	Copper Cliff North	(U.)	Sudbury	Ni, Cu, Co, PGM, Au, Ag, Se, Te
Goldcorp Inc.	Hoyle Pond	(U.)	south of Porcupine	Au, Ag
Liberty Mines Inc.	McWatters	(P., U.)	southeast of Timmins	Ni
Liberty Mines Inc.	Redstone	(U., C.)	southeast of Timmins	Ni
Vale Inco Limited	Creighton	(U.)	Sudbury	Ni, Cu, Co, PGM, Au, Ag, Se, Te
Goldcorp Inc.	Dome	(U., C.)	Timmins	Au
Vale Inco Limited	McCreedy East/Coleman	(U.)	Sudbury	Ni, Cu, Co, PGM, Au, Ag, Se, Te
Xstrata Nickel Canada	Fraser	(U.)	Sudbury	Ni, Cu, Co, PGM
Xstrata Nickel Canada	Strathcona	(C.)	Sudbury	Ni, Cu, Co, PGM, Au, Ag, Se, Te
Xstrata Zinc Canada	Kidd Creek	(U., C.)	Timmins	Cu, Zn, Ag, Se, Te, In, Cd
Quadra FNX Mining Company Inc.	Levack	(U.)	Sudbury	Cu, Ni, PM
Quadra FNX Mining Company Inc.	McCreedy West	(U.)	Sudbury	Cu, PGM, Au, Ag
URSA Major Minerals Inc.	Shakespeare	(P.)	Sudbury	Ni, Cu, PGM, Au, Co
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

PRODUCING MINES IN CANADA, 2010[1]

COMPANY	MINE SITE	ACTIVITY TYPE	LOCATION	COMMODITY
ESSROC Canada Inc.	Picton	(P.)	Picton	Limestone (cement)
Canada Talc Ltd.	Henderson	(P., U.)	Madoc	Talc, dolomite
St. Lawrence Cement Inc.	Ogden Point	(P.)	Ogden Point	Limestone (cement)
Unimin Canada Ltd.	Blue Mountain	(P., Plant)	Blue Mountain	Nepheline syenite
St. Marys CBM (Canada) Inc.	Bowmanville	(P.)	Bowmanville	Limestone
Hutcheson Sand & Gravel Ltd.	Huntsville	(P.)	Huntsville	Silica
Unimin Canada Ltd.	Midland	(P.)	Midland	Silica
CGC Inc.	Hagersville	(U.)	Hagersville	Gypsum
E.C. King Contracting Ltd.	Sydenham	(P.)	Sydenham	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. Mary's	(P.)	St.Mary's	Limestone (cement)
Unimin Canada Ltd.	Badgeley Island	(P.)	Blue Mountain	Silica
Sifto Canada Inc.	Goderich	(U.)	Goderich	Salt
Rio Tinto Minerals Inc.	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.)	Rice Lake	Au
San Gold Corporation	Rice Lake	(U.)	Bissett	Au
Vale Inco Limited	Thompson	(U., P., C.)	Thompson	Ni, Cu, Co, PGM
Vale Inco Limited	Birchtree	(U.)	Thompson	Ni, Cu, Co, PGM
Crowflight Minerals Inc.	Bucko	(U., C.)	Wabowden	Ni, Cu, Co, PGM
HudBay Minerals Inc.	Chisel North	(U., C.)	Snow Lake	Cu, Zn
HudBay Minerals Inc.	Callinan/777	(U.)	Flin Flon	Cu, Zn, Au, Ag
HudBay Minerals Inc.	Trout Lake	(U.)	Flin Flon	Cu, Zn, Au, Ag
Graymont Inc.	Faulkner	(P., Plant)	Faulkner	Limestone, lime
CertainTeed Gypsum Canada, Inc.	Amaranth	(P.)	Harcus	Gypsum
Lehigh Cement Company	Mafeking	(P.)	Mafeking	Limestone
Saskatchewan				
Claude Resources Inc.	Seabee	(U., C.)	Naolin Lake	Au, Ag
Cameco Corporation	Rabbit Lake	(U., C.)	Rabbit Lake	U
AREVA Resources Canada Inc.	McClean Lake	(P., C.)	Wollaston Lake	U
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

PRODUCING MINES IN CANADA, 2010[1]

COMPANY	MINE SITE	ACTIVITY TYPE	LOCATION	COMMODITY
The Mosaic Company	K-1 and K-2	(U., Plant)	Esterhazy	Potash, salt
Winn Bay Sand Limited Partnership	Hanson Lake	(P., Plant)	Hanson Lake	Silica
Big Quill Resources Inc.	Wynyard	(P., U., Plant)	Wynyard	Potassium sulphate
Canadian Clay Products Inc.	Wilcox	(P.)	Wilcox	Clays, bentonite
The Mosaic Company	Belle Plaine	(U., Plant)	Belle Plaine	Potash, salt
Potash Corporation of Saskatchewan Inc.	Lanigan	(U.)	Lanigan	Potash
Zeox Corporation	Palo	(P., Plant)	Palo	Sodium sulphate
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	(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
Prairie Mines & Royalty Limited	Boundary Dam	(P.)	Estevan	Coal
Prairie Mines & Royalty Limited	Poplar River	(P.)	Coronach	Coal
Alberta				
The Canadian Salt Company Limited	Lindbergh	(Solution Mining)	Elk Point	Salt
Hammerstone Corporation	Steepbank	(P.)	north of Fort McMurray	Limestone
Hammerstone Corporation	Aurora	(P.)	Fort McMurray	Limestone
Rio Petro Ltd.	Sunnynook	(Solution Mining)	Cessford	Salt
Hammerstone Corporation	Muskeg Valley	(P.)	north of Fort McMurray	Limestone
Suncor Energy Inc.	Fort McMurray West	(P.)	Fort McMurray	Limestone
Canexus Chemicals Canada Ltd.	Redwater	(Solution Mining)	Bruderheim	Salt
Calcium Incorporated	Calling Lake	(Solution Mining)	north of Athabasca	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
Lafarge Canada Inc.	Exshaw	(P., Plant)	Exshaw	Limestone
Burnco Rock Products Ltd.	Clearwater	(P., Plant)	Clearwater River	Limestone
Prairie Creek Quarries Ltd.	Cougar Ridge	(P., Plant)	Rocky Mountain House	Limestone
Graymont Inc.	Fish Creek	(P., Plant)	Nordegg	Limestone
Lehigh Cement Company	Mcleod	(P.)	Cadomin	Limestone
Prairie Mines & Royalty Limited	Sheerness	(P.)	Hanna	Coal
Prairie Mines & Royalty Limited	Vesta	(P.)	Cordel	Coal
Prairie Mines & Royalty Limited	Paintearth	(P.)	Forestburg	Coal
Prairie Mines & Royalty Limited	Genesee	(P.)	Warburg	Coal
Keephills Aggregate Company Ltd.	Burtonsville	(P.)	Burtonsville	Coal
Transalta Corporation	Highvale	(P.)	Seba Beach	Coal

PRODUCING MINES IN CANADA, 2010[1]

COMPANY	MINE SITE	ACTIVITY TYPE	LOCATION	COMMODITY
Transalta Corporation	Whitewood	(P.)	Warburg	Coal
Sherritt International Corporation	Coal Valley	(P.)	Edson	Coal
Teck Coal Limited	Cardinal River	(P.)	Hinton	Coal
Sherritt International Corporation	Obed Mountain	(P.)	north of Hinton	Coal
Grande Cache Coal Corporation	Grande Cache	(P., U.)	Grande Cache	Coal
Shell Canada Energy	Jackpine	(P.)	Fort MacKay	Upgraded crude oil
Suncor Energy Inc.	Millennium and Steepbank	(P.)	Fort McMurray	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				
FortyTwo Metals Inc. (Roca Mines Inc.)	MAX	(U., C.)	Trout Lake	Mo
Craigmont Mines Ltd.	Craigmont	(C.)	Merritt	Fe
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
Barkerville Gold Mines Ltd.	QR	(P., U., C.)	southeast of Quesnel	Au
Taseko Mines Limited	Gibraltar	(P., C.)	north of Williams Lake	Cu, Mo
Thompson Creek Mining Limited	Endako	(P., C.)	Fraser Lake	Mo
Breakwater Resources Ltd.	Myra Falls	(U., C.)	Buttle Lake	Zn, Cu, Au, Ag
Northgate Minerals Corporation	Kemess South	(P., C.)	Smithers	Au, Cu
Imperial Metals Corporation	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
Heemskirk Canada Limited	Moberly	(P.)	Golden	Silica
Imasco Minerals Inc.	Lost Creek	(U.)	Lost Creek	Limestone
Mighty White Dolomite Ltd.	Rock Creek	(P., Plant)	Rock Creek	Dolomite
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.)	Red Lake	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.	Mount Meager	(P.)	Mount Meager	Pumice
Imperial Limestone Co. Ltd.	Imperial Limestone	(P.)	Texada Island	Limestone
Texada Quarrying Ltd. (Lafarge Canada Inc.)	Gillies Bay	(P.)	Texada Island	Limestone

PRODUCING MINES IN CANADA, 2010[1]

COMPANY	MINE SITE	ACTIVITY TYPE	LOCATION	COMMODITY
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
Teck Resources Limited	Line Creek	(P.)	Sparwood	Coal
Teck Resources Limited	Elkview	(P.)	Sparwood	Coal
Teck Resources Limited	Greenhills	(P.)	Sparwood	Coal
Teck Resources Limited	Fording River	(P.)	Elkford	Coal
Northern Energy and Mining Inc.	Trend	(P.)	Tumbler Ridge	Coal
Western Coal Corporation	Wolverine	(P., U.)	Tumbler Ridge	Coal (steelmaking)
Western Coal Corporation	Brule	(P.)	Tumbler Ridge	Coal
Western Coal Corporation	Willow Creek	(P.)	Tumbler Ridge	Coal (steelmaking)
Hillsborough Resources Limited	Quinsam	(U.)	Campbell River	Coal
Yukon				
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	(P., U., Plant)	Lac de Gras	Diamonds
BHP Billiton Diamonds Inc.	Ekati	(P., 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

(P.) Open-Pit, (U.) Underground, (C.) Concentrator
Excluded operations are clay products, peat, and most construction materials (stone, sand and gravel).

[1] Included are operations that produced during 2010

Data compiled by the Minerals and Metals Sector, Natural Resources Canada and the National Energy Board.

ANNEX 2

MINING ESTABLISHMENTS IN CANADA, BY MINERAL, PROVINCE OR TERRITORY, 2010[1]

	NF	PE	NS	NB	QC	ON	MB	SK	AB	BC	YT	NT	NV	TOTAL
Iron Ore	2	-	-	-	3	-	-	-	-	1	-	-	-	6
Gold & Silver Ore	1	-	-	-	15	10	1	1	-	2	-	-	-	30
Lead-zinc ore	-	-	-	1	-	-	-	-	-	-	-	-	-	1
Nickel-copper ore	1	-	-	-	1	6	2	-	-	-	-	-	-	10
Copper, copper-zinc ore	1	-	-	-	1	1	1	-	-	5	1	-	-	10
Molybdenum	-	-	-	-	-	-	-	-	-	2	-	-	-	2
Uranium	-	-	-	-	-	-	-	4	-	-	-	-	-	4
Other Metals	1	-	-	-	2	1	1	-	-	2		1	-	8
TOTAL METALS	**6**	**0**	**0**	**1**	**22**	**18**	**5**	**5**	**0**	**12**	**1**	**1**	**0**	**71**
Chrysotile	-	-	-	-	2	-	-	-	-	-	-	-	-	2
Diamonds	-	-	-	-	-	1	-	-	-	-	-	3	0	4
Gypsum	1	-	4	-	-	-	1	-	-	2	-	-	-	8
Peat	1	1	1	22	38	1	5	1	6	1	-	-	-	77
Potash	-	-	-	1	-	-	-	9	-	-	-	-	-	10
Salt	-	-	2	-	1	4	-	2	1	-	-	-	-	10
Sand and gravel	4	-	13	9	64	220	16	39	151	55	2	-	-	573
Stone	7	-	11	8	69	74	5	0	4	15	-	-	-	193
Shale, Clay and														
Other refractory minerals	-	-	1	-	3	2	-	2	2	-	-	-	-	10
Other nonmetals	-	-	-	-	3	2	-	2	-	3	-	-	-	10
TOTAL NONMETALS	**13**	**1**	**32**	**40**	**180**	**304**	**27**	**55**	**164**	**76**	**2**	**3**	**0**	**897**

[1] as of December 31, 2010
- Nil

Sources: Natural Resources Canada; Statistics Canada.

ANNEX 3

CANADIAN PRODUCTION OF LEADING MINERALS BY PROVINCE AND TERRITORY, 2010[1]

	COAL		POTASH (K2O) [1]		GOLD		IRON ORE		COPPER	
	KILOTONNES	$000	KILOTONNES	$000	TONNES	$000	KILOTONNES	$000	KILOTONNES	$000
Newfoundland	-	-	-	-	166	6718	19907	3106969	46536	357444
Prince Edward Island	-	-	-	-	-	-	-	-	-	-
Nova Scotia	-	-	-	-	-	-	-	-	-	-
New Brunswick	-	-	x	x	219	8838	-	-	8480	65139
Quebec	-	-	-	-	25230	1019248	17000	x	23935	183842
Ontario	-	-	-	-	50197	2027923	-	-	149361	1147244
Manitoba	-	-	-	-	4443	179509	-	-	53225	408819
Saskatchewan	x	x	x	x	1408	56867	-	-	-	-
Alberta	x	x	-	-	29	1167	-	-	-	-
British Columbia	26167	4254082	-	-	5514	222777	94	x	193878	1489179
Yukon	-	-	-	-	2367	95620	-	-	23034	176921
Northwest Territories	-	-	-	-	-	-	-	-	-	-
Nunavut	-	-	-	-	7531	304257	-	-	-	-
Canada	67876	5540415	9788	5688413	97104	3922924	37001	4985729	498449	3828588

	NICKEL		DIAMONDS		SAND AND GRAVEL [2]		CEMENT [3]		URANIUM	
	KILOTONNES	$000	000'S OF CARATS	$000	KILOTONNES	$000	KILOTONNES	$000	KILOTONNES	$000
Newfoundland	40355	909525	-	-	1610	14175	-	-	-	-
Prince Edward Island	-	-	-	-	192	1402	-	-	-	-
Nova Scotia	-	-	-	-	3932	25407	x	x	-	-
New Brunswick	-	-	-	-	3492	17733	-	-	-	-
Quebec	28070	632642	-	-	13104	67635	2643	325249	-	-
Ontario	50701	1142689	778	338400	89159	555970	4811	549779	-	-
Manitoba	29904	673974	-	-	14012	63094	-	-	-	-
Saskatchewan	-	-	-	-	9209	50589	-	-	10152	1232093
Alberta	-	-	-	-	44026	486815	x	x	-	-
British Columbia	-	-	-	-	25387	216090	1677	234048	-	-
Yukon	-	-	-	-	1202	5718	-	-	-	-
Northwest Territories	-	-	10995	2024672	479	1620	-	-	-	-
Nunavut	-	-	-	-	-	-	-	-	-	-
Canada	149030	3358830	11773	2363072	205804	1506248	11692	1518129	10152	1232093

Sources: Natural Resources Canada; Statistics Canada - Catalogue no. 26-202-X

p Preliminary; - Nil; x Confidential

Note: Totals may not add due to rounding.
[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.

ANNEX 4

CANADA'S WORLD ROLE AS A PRODUCER OF CERTAIN IMPORTANT MINERALS, 2010

			Rank of Five Leading Countries				
		World	1	2	3	4	5
			Canada	Russia	Belarus	China	Germany
Potash (K_2O equivalent)	000 t	33000	9,500	6,800	5,000	3,000	3,000
(mine production)	% of world total		28.8	20.6	15.2	9.1	9.1
			Kazakhstan	Canada	Australia	Namibia	Russia
Uranium (metal content)	t	53663	17,803	9,783	5,900	4,496	3,562
(mine production)	% of world total		33.2	18.2	11.0	8.4	6.6
			China	Russia	Canada	Australia	Brazil
Aluminum (primary metal)	000 t	41400	16,800	3,850	2,920	1,950	1,550
	% of world total		40.6	9.3	7.1	4.7	3.7
			South Africa	Australia	Canada	China	India
Titanium concentrate	000 t	5800	1,120	1,070	700	600	420
(Ilmenite)	% of world total		19.3	18.4	12.1	10.3	7.2
			United States	China	Russia	Canada	Germany
Sulphur, elemental	000 t	68000	9,900	9,400	7,100	7,000	3,800
(mine production)	% of world total		14.6	13.8	10.4	10.3	5.6
			Russia	Indonesia	Philippines	Canada	Australia
Nickel (mine production)	000 t	1550	265	232	156	155	139
	% of world total		17.1	15.0	10.1	10.0	9.0
			Russia	Botswana	Congo, DRC	South Africa	Canada
Diamonds (precious)	000 carats	133121	34,857	22,018	20,166	13,668	11,804
	% of world total		26.2	16.5	15.1	10.3	8.9
			South Africa	Russia	Zimbabwe	United States	Canada
Platinum group metals	kg	380000	211,000	111,000	15,400	15,100	14,900
(metal content)	% of world total		55.5	29.2	4.1	4.0	3.9
			Russia	China	Brazil	Kazakhstan	Canada
Chrysotile (asbestos)	000 t	1970	1,000	350	270	230	100
(mine production)	% of world total		50.8	17.8	13.7	11.7	5.1
			China	United States	Chile	Peru	Canada
Molybdenum (Mo content)	t	234000	94,000	39,000	56,000	12,000	91,000
(mine production)	% of world total		40.2	16.7	23.9	5.1	38.9

CANADA'S WORLD ROLE AS A PRODUCER OF CERTAIN IMPORTANT MINERALS, 2010

			Rank of Five Leading Countries				
		World	1	2	3	4	5
			China	United States	Germany	India	Canada
Salt (mine production)	000 t	270000	60,000	45,000	16,500	15,800	14,000
	% of world total		22.2	16.7	6.1	5.9	5.2
			China	Korea	Japan	Kazakhstan	Canada
Cadmium (metal)	t	22000	5,600	3,200	1,900	1,700	1,500
	% of world total		25.5	14.5	8.6	7.7	6.8
			China	Peru	Australia	India	United States
Zinc (mine production)[1]	000 t	12000	3,500	1,520	1,450	750	720
	% of world total		29.2	12.7	12.1	6.3	6.0
			Congo	Zambia	China	Russia	Australia
Cobalt (mine production)[2]	t	88000	45,000	11,000	6,200	6,100	4,600
	% of world total		51.1	12.5	7.0	6.9	5.2
			China	Australia	United States	South Africa	Russia
Gold (mine production)[3]	t	2500	345	255	230	190	190
	% of world total		13.8	10.2	9.2	7.6	7.6
			China	Iran	Spain	United States	Thailand
Gypsum (mine production)[3]	000 t	146000	45,000	13,000	11,500	9,000	8,500
	% of world total		30.8	8.9	7.9	6.2	5.8
			China	Australia	United	Peru	Mexico
Lead (mine production)[3]	000 t	4100	1,750	620	400	280	185
	% of world total		42.7	15.1	9.8	6.8	4.5
			Chile	Peru	China	United States	Australia
Copper (mine production)[3]	000 t	16200	5,520	1,285	1,150	1,120	900
	% of world total		34.1	7.9	7.1	6.9	5.6
			Peru	Mexico	China	Australia	Chile
Silver[4]	t	22200	4,000	3,500	3,000	1,700	1,500
	% of world total		18.0	15.8	13.5	7.7	6.8

Sources: Natural Resources Canada, from World Nonferrous Statistics and the Canadian Minerals Yearbook; U.S. Geological Survey (USGS).
n.a. Not applicable.
1 Canada ranked 6th
2 Canada ranked 7th
3 Canada ranked 9th
4 Canada ranked 10th

ANNEX 5

MINERAL PRODUCTION OF CANADA, 2007-2010[P]

		2007		2008		2009		2010p	
	Unit	(quantity)	($000)	(quantity)	($000)	(quantity)	($000)	(quantity)	($000)
METALLIC MINERALS									
Antimony	t	162	990	111	731	54	318	x	x
Bismuth	t	137	4,442	71	1,918	87	1,615	91	1,768
Cadmium	t	293	2,396	313	1,976	322	1,055	278	1,126
Calcium	t	-	-	-	-	-	-	-	-
Cesium	t	x	x	x	x	x	x	x	x
Cobalt	t	4,761	344,675	4,809	440,913	2,275	102,241	2,119	102,425
Copper	t	577,545	4,418,220	584,003	4,329,801	470,347	2,766,112	498,449	3,828,588
Gold	kg	102,211	2,460,623	94,909	2,835,318	96,573	3,448,639	97,104	3,922,924
Ilmenite	000 t	x	x	x	x	x	x	x	x
Indium	kg	x	x	x	x	x	x	x	x
Iron ore	000 t	32,774	2,502,500	32,102	4,063,452	31,728	2,673,757	37,001	4,985,729
Iron, remelt	000 t	x	x	x	x	x	x	x	x
Lead	t	69,851	193,626	87,127	236,115	71,377	140,041	58,224	128,850
Lithium	t	x	x	x	x	x	x	x	x
Magnesium	t	-	-	-	-	-	-	-	-
Molybdenum	t	6,819	x	8,229	x	9,116	x	8,261	x
Nickel	t	244,539	9,795,249	246,197	5,713,003	132,471	2,213,597	149,030	3,358,830
Niobium (Columbium)	t	4,337	x	4,400	x	4,169	x	4,419	x
Platinum group	kg	21,925	530,932	22,764	618,547	10,925	258,242	9,612	251,546
Selenium	t	144	10,760	191	13,933	131	7,633	79	6,448
Silver	t	829	384,399	709	364,295	609	328,201	543	350,323
Tantalum	t	55	4,509	53	x	29	x	-	-
Tellurium	t	14	1,206	20	4,526	16	2,817	8	1,602
Tungsten	t	2,718	57,244	2,795	61,862	2,506	48,378	-	-
Uranium	t	9,100	2,525,775	8,703	953,858	10,133	1,358,144	10,152	1,232,093
Zinc	t	594,113	2,069,890	704,780	1,408,149	669,879	1,265,402	598,701	1,342,887
TOTAL, METALLIC MINERALS		**. .**	**26,247,356**	**. .**	**22,594,378**	**. .**	**15,474,941**	**. .**	**20,727,037**
NONMETALLIC MINERALS									
Barite	000 t	9	2,929	9	3,344	16	4,443	22	6,700
Carbonatite	000 t	x	x	x	x	x	x	x	x
Cement [1]	000 t	14,462	1,785,293	13,604	1,733,146	10,831	1,413,826	11,692	1,518,129
Chrysotile	000 t	x	x	x	x	x	x	x	x
Clay products [2]	000 t	..	208,136	..	187,774	..	132,902	..	156,554
Diamonds	000 ct	17,144	1,799,714	14,523	2,369,266	10,946	1,684,304	11,773	2,363,072
Gemstones	t	67	4,630	51	5,851	22	2,759	22	2,387
Graphite	000 t	x	x	x	x	x	x	x	x

MINERAL PRODUCTION OF CANADA, 2007-2010P

		2007		2008		2009		2010p	
	Unit	(quantity)	($000)	(quantity)	($000)	(quantity)	($000)	(quantity)	($000)
Gypsum [3]	000 t	7,562	111,650	5,819	83,023	3,568	55,749	2,717	41,004
Lime	000 t	2,134	273,418	2,046	273,316	1,613	238,508	1,913	311,087
Magnesite	000 t	x	x	x	x	x	x	x	x
Marl	000 t	x	x	x	x	x	x	x	x
Mica	000 t	x	x	x	x	x	x	x	x
Nepheline syenite	000 t	690	61,746	646	54,864	527	53,354	581	58,534
Peat	000 t	1,282	232,537	1,231	238,510	1,214	266,634	1,262	288,068
Phosphate	000 t	x	x	x	x	x	x	x	x
Potash (K_2O) [4]	000 t	11,085	2,814,563	10,379	7,662,373	4,297	3,431,147	9,788	5,688,413
Potassium sulphate	000 t	x	x	x	x	x	x	x	x
Pumice	000 t	x	x	x	x	x	x	x	x
Quartz (silica) [3]	000 t	1,987	68,462	1,938	74,872	1,192	47,661	1,171	52,788
Salt	000 t	11,970	442,845	14,224	537,273	14,676	578,618	10,820	658,374
Sand and gravel	000 t	243,096	1,496,737	241,591	1,690,944	201,678	1,361,664	205,804	1,506,248
Serpentine	000 t	-	-	-	-	-	-	-	-
Soapstone, talc, pyrophyllite	000 t	79	26,480	64	22,314	56	19,701	96	24,522
Sodium sulphate	000 t	x	x	x	x	x	x	x	x
Stone [3]	000 t	149,982	1,402,915	153,556	1,488,290	153,038	1,503,455	147,643	1,390,657
Sulphur, elemental	000 t	7,456	224,537	6,880	2,116,017	6,435	16,499	6,355	299,257
Sulphur, in smelter gas	000 t	696	31,345	746	148,456	543	77,817	593	66,816
Titanium dioxide	000 t	x	x	x	x	x	x	x	x
Tremolite	000 t	-	-	-	-	-	-	-	-
Zeolite	000 t	-	-	x	x	x	x	x	x
TOTAL, NONMETALLIC MINERALS		. .	11,588,310	. .	19,372,019	. .	11,552,034	. .	15,021,317
MINERAL FUELS									
Coal	000 t	69,131	2,735,202	67,750	4,985,956	62,935	4,406,365	67,876	5,540,415
TOTAL MINERAL FUELS		69,131	2,735,202	67,750	4,985,956	62,935	4,406,365	67,876	5,540,415
TOTAL MINERAL PRODUCTION		**. .**	**40,570,868**	**. .**	**46,952,353**	**. .**	**31,433,340**	**..**	**41,288,769**

Sources: Natural Resources Canada; Statistics Canada - Cat. No. 26-202 XIB

– Nil; . . Not available; p Preliminary; x Confidential.

[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.

Notes:
Numbers may not add to totals due to rounding. Confidential values are included in totals.
Data include shipments by producers regardless of industrial classification.

ANNEX 6

CANADIAN RESERVES OF SELECTED MAJOR METALS, 1978- 2009

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

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.

ANNEX 7

AVERAGE WEEKLY WAGES & SALARIES IN THE CANADIAN MINING, SMELTING & REFINING INDUSTRIES [1], 1999-2010

	Number of Employees (000)	Average Weekly Earnings ($)	Total Weekly Wages for Group ($)
Metal Mines			
1999	30	1,123	33,197,654
2000	29	1,169	34,447,503
2001	26	1,180	30,166,031
2002	23	1,140	25,753,450
2003	22	1,194	26,051,173
2004	21	1,244	26,598,019
2005	21	1,241	26,302,116
2006	22	1,263	27,784,718
2007	24	1,363	32,504,450
2008	28	1,428	40,095,006
2009	24	-	-
2010	23	1,537	35,820,149
Non-metal Mines			
1999	20	883	17,641,326
2000	20	944	18,913,270
2001	20	977	19,072,605
2002	20	908	17,696,452
2003	20	1,000	20,231,887
2004	20	1,040	20,708,655
2005	20	1,067	21,829,825
2006	21	1,023	21,981,201
2007	23	1,204	27,904,913
2008	24	1,247	29,907,279
2009	22	1,243	27,072,858
2010	22	1,311	28,906,215
Coal Mines			
1999	8	1,127	8,803,733
2000	7	1,205	8,672,923
2001	6	1,160	6,992,147
2002	6	1,104	6,294,681
2003	5	1,193	5,775,555
2004	5	1,294	5,880,595
2005	5	1,292	6,505,537
2006	5	1,269	6,773,465
2007	6	1,428	8,342,427
2008	6	-	-
2009	6	-	-
2010	7	-	-

AVERAGE WEEKLY WAGES & SALARIES IN THE CANADIAN MINING, SMELTING & REFINING INDUSTRIES [1], 1999-2010

	Number of Employees (000)	Average Weekly Earnings ($)	Total Weekly Wages for Group ($)
Smelting & Refining			
1999	21	1,034	22,136,900
2000	23	1,035	23,902,202
2001	20	1,055	19,878,873
2002	17	1,096	18,301,864
2003	15	1,128	16,608,772
2004	14	1,202	17,185,481
2005	14	1,205	17,379,680
2006	16	1,158	18,789,433
2007	17	1,274	21,472,798
2008	13	1,300	17,112,623
2009	13	1,275	16,675,202
2010	14	1,349	18,541,170
Total Mining, Smelting and Refining			
1999	79	1,038	81,779,612
2000	80	1,077	85,935,898
2001	71	1,088	76,109,656
2002	64	1,055	68,046,447
2003	62	1,115	68,667,387
2004	60	1,171	70,372,751
2005	61	1,178	72,017,159
2006	65	1,158	75,328,817
2007	70	1,294	90,224,587
2008	72	-	-
2009	66	-	-
2010	66	-	-

- Unavailable
Note: Numbers may not add due to rounding.

[1] Number of employees is based on the North American Industry Classification System (NAICS); 2122 Metal Ore Mining, 2123 Non-Metallic Mineral Mining and Quarrying, 2121 Coal Mining, 3314 Non-Ferrous Metal (except Aluminum) Production and Processing.

Source: Statistics Canada.

ANNEX 8

AVERAGE WEEKLY EARNINGS, BY CANADIAN INDUSTRIAL SECTOR, 1995–2010

($)	Forestry	Mining, Smelting & Refining[1]	Manufacturing	Construction	Finance & Insurance
1995	697.64	980.13	711.97	748.83	719.52
1996	745.69	1,007	733.06	767.56	769.49
1997	786.46	1,004	751.95	786.91	801.64
1998	766.33	1,044	770.47	781.44	820.45
1999	773.42	1,083	781.99	782.63	824.82
2000	810.15	1,107.84	796.25	808.06	845.54
2001	815.52	1,126.29	799.33	790.11	x
2002	809.81	1,127.14	818.51	819.64	851.57
2003	847.06	1,197.52	838.15	847.87	877.1
2004	894.01	1,260.09	862.53	846.38	886.93
2005	883.89	1,274.69	896.28	877.34	920.68
2006	902.28	1,283.99	904.63	900.32	950.9
2007	907.41	1,398.03	940.61	961.15	998.52
2008	935.84	1,486.26	949.57	1,014.5	1,001.39
2009	853.28	1,529.29	917.07	1,048.51	1,035.97
2010	948.38	1,631.72	960.43	1,066.08	1,049.45

r Revised; x Confidential
[1] Based on a weighted average of Mining (Except Oil and Gas) and Non-Ferrous Metal (except Aluminum) production and processing, North American Industry Classification System (NAICS) codes 212 and 3314.

Source: Statistics Canada

ANNEX 9

STRIKES AND LOCKOUTS BY CANADIAN SECTOR, 2007–2010[P]

	2007			2008		
	Strikes and Lockouts	Workers Involved	Duration in Person-Days	Strikes and Lockouts	Workers Involved	Duration in Person-Days
Agriculture	–	–	–	–	–	–
Logging and forestry	–	–	–	–	–	–
Fishing and trapping	–	–	–	–	–	–
Mining	6	1,433	45,580	2	662	17,880
Utilities	3	187	3,120	3	347	5,070
Oil and Gas Extraction	–	–	–	–	–	–
Construction	16	16,329	222,282	4	60	1,930
Manufacturing	46	11,930	652,015	55	6,368	315,620
Wholesale and retail trade	10	749	19,630	35	1,818	77,280
Transportation and warehousing	24	10,313	158,380	11	14,287	114,820
Information and culture	7	1,801	105,670	5	1,039	56,870
Finance, insurance and real estate	7	462	13,240	6	187	13,950
Education, health and social sciences	49	12,218	173,160	27	12,264	118,560
Entertainment and hospitality	28	3,124	88,380	30	3,211	133,350
Public administration	10	7,006	289,250	9	1,048	20,310
Total, all industries	**206**	**65,552**	**1,770,707**	**187**	**41,291**	**875,640**

	2009			2010		
	Strikes and Lockouts	Workers Involved	Duration in Person-Days	Strikes and Lockouts	Workers Involved	Duration in Person-Days
Agriculture	–	–	–	–	–	–
Logging and forestry	–	–	–	–	–	–
Fishing and trapping	–	–	–	–	–	–
Mining	1	205	22,400	1	205	22,400
Utilities	2	2,842	14,210	2	2,842	14,210
Oil and Gas Extraction	–	–	–	–	–	–
Construction	–	–	–	–	–	–
Manufacturing	42	9,120	853,720	42	9,120	853,720
Wholesale and retail trade	30	1,859	80,770	30	1,859	80,770
Transportation and warehousing	12	5,574	112,440	12	5,574	112,440
Information and culture	3	314	7,360	3	314	7,360
Finance, insurance and real estate	10	821	23,420	10	821	23,420
Education, health and social sciences	19	8,495	95,060	19	8,495	95,060
Entertainment and hospitality	19	2,084	130,460	19	2,084	130,460
Public administration	16	35,741	763,530	16	35,741	763,530
Total, all industries	**154**	**67,055**	**2,103,370**	**154**	**67,055**	**2,103,370**

p Preliminary - Nil
Source: Human Resources and Social Development Canada, Workplace Information Directorate.

ANNEX 10

STRIKES AND LOCKOUTS IN CANADIAN MINING AND MINERAL MANUFACTURING INDUSTRIES, 2008-2010

	2008			2009		
	Strikes and Lockouts	Workers Involved	Duration in Person-Days	Strikes and Lockouts	Workers Involved	Duration in Person-Days
MINING	**1**	**635**	**17,240**	**1**	**205**	**22,400**
Metals	1	635	17,240	1	205	22,400
Nonmetals	–	–	–	–	–	–
Mineral fuels	–	–	–	–	–	–
Support activities	–	–	–	–	–	–
MINERAL MANUFACTURING	**14**	**1,507**	**47,960**	**10**	**4,749**	**559,970**
Primary metals	8	959	21,150	7	4,586	536,890
Nonmetallic mineral products	6	548	26,810	3	163	23,080

	2010		
	Strikes and Lockouts	Workers Involved	Duration in Person-Days
MINING	**3**	**373**	**26,890**
Metals	1	125	19,530
Nonmetals	1	80	640
Mineral fuels	1	168	6,720
Support activities	–	–	–
MINERAL MANUFACTURING	**13**	**5,612**	**531,260**
Primary metals	6	5,268	504,240
Nonmetallic mineral products	7	344	27,020

- Nil

Source: Human Resources and Social Development Canada, Workplace Information Directorate.

ANNEX 11

TOTAL EXPORTS OF MINERALS AND MINERAL PRODUCTS, BY COMMODITY AND COUNTRY OF DESTINATION, 2010

($000)	US	European Union (EU-27)	Japan	Mexico	Other Countries	Total
METALS						
Aluminum	7,475,351,846	615,264,050	225,371,476	239,495,678	704,948,139	9,260,431,189
Antimony	341,299	297,773	33,495	1,034	14,402,033	15,075,634
Barium	85,180	-	-	-	159,911	245,091
Beryllium	44,948	13,046	-	-	372,892	430,886
Bismuth	996,496	51,322	-	-	347	1,048,165
Cadmium	652,265	4,552,868	-	-	3,598,075	8,803,208
Calcium metals	316,384	44,124	-	-	468,586	829,094
Chromium	10,532,488	1,795,938	-	868,140	77,867	13,274,433
Cobalt	25,943,451	64,264,911	66,178,051	-	185,757,267	342,143,680
Copper	2,838,903,890	351,338,080	651,436,446	2,248,170	1,426,229,386	5,270,155,972
Gold	5,508,543,121	8,490,289,916	74,896,640	20,955,782	1,036,835,775	15,131,521,234
Iron and steel	10,719,088,280	375,099,670	25,839,260	380,107,243	1,205,993,745	12,706,128,198
Iron ore	488,323,422	1,277,092,597	76,686,284		1,348,490,449	3,190,592,752
Lead	573,671,490	15,736,124	15,192,958	43,916	44,265,657	648,910,145
Lithium	65,475	216,408	-	-	289	282,172
Magnesium and magnesium compounds	50,590,219	1,442,467	17,030	286,938	2,301,713	54,638,367
Manganese	8,268,874	24,596	-	170	843,441	9,137,081
Mercury	78,755	-	-	-	159,719	238,474
Molybdenum	71,949,848	105,774,760	73,522,268	39,375,671	15,874,018	306,496,565
Nickel	568,313,465	1,279,091,612	134,806,921	298,079	3,102,940,890	5,085,450,967
Niobium	33,756,369	84,020,339	7,118,076		31,033,255	155,928,039
Platinum group metals	161,394,723	61,591,782	11,078	348,655	95,011,793	318,358,031
Rare earth metals	3,784,169	1,780,960	6,925,377	-	51,370	12,541,876
Selenium	8,057,687	12,407,745	-	-	12,310,567	32,775,999
Silicon	114,019,291	55,775,822	400,171	1,166,997	13,942,069	185,304,350
Silver	1,768,348,043	19,304,622	15,663,453	35,387	59,010,283	1,862,361,788
Tantalum	568,066	12,575	49,599	339	706,377	1,336,956
Tellurium	6,587,502	10,697,460	75,795	-	2,817,739	20,178,496
Tin	52,277,452	1,852,729	904	14,440	543,191	54,688,716
Titanium metal	26,030,217	3,595,947	216,033	808,382	6,421,504	37,072,083
Tungsten	3,655,701	6,863,448	40,862	17	9,582,596	20,142,624
Uranium and thorium	710,046,665	1,282,021,825	28,092,621	1,249,432	165,206,424	2,186,616,967
Vanadium	85,194,805	156,376,352	24,388,880	-	64,408,888	330,368,925
Zinc	1,342,343,074	208,324,651	15,140,070	92,690	168,723,363	1,734,623,848
Zirconium	1,674,744	8,543,946	353,551	-	4,163,170	14,735,411
Other metals	3,413,015,510	697,753,819	58,620,508	79,289,973	722,100,172	4,970,779,982
TOTAL METALS	**$36,072,815,214**	**15,193,314,284**	**1,501,077,807**	**766,687,133**	**10,449,752,960**	**63,983,647,398**

TOTAL EXPORTS OF MINERALS AND MINERAL PRODUCTS, BY COMMODITY AND COUNTRY OF DESTINATION, 2010

($000)	US	European Union (EU-27)	Japan	Mexico	Other Countries	Total
NONMETALS						
Abrasives	215,244,683	16,851,399	4,526,033	2,456,334	26,422,425	265,500,874
Barite and witherite	117,809	-	-	-	-	117,809
Boron	1,115,751	1,057,090	-	457	1,350,099	3,523,397
Bromine	76,522	-	-	-	-	76,522
Calcium (industrial minerals)	-	-	-	-	40	40
Cement	483,251,123	5,772,849	404,798	20,119	11,329,597	500,778,486
Chlorine and chlorine compounds	156,874,259	605,629	-	24,577	16,845,439	174,349,904
Chrysotile (Asbestos)	2,470,437	404,443	55,853	2,959,355	80,807,557	86,697,645
Clay and clay products	56,618,026	6,865,546	161,942	46,584	7,325,676	71,017,774
Diamonds	157,817,131	2,367,263,408	279,945	23,022,692	133,263,619	2,681,646,795
Dolomite	18,217,322	1,357,573	-	5,476	3,322,954	22,903,325
Feldspar	-	59,439	-	-	1,350	60,789
Fluorspar	62,076,461	300,433	-	-	1,343,435	63,720,329
Glass and glassware products	472,464,546	27,892,550	1,749,558	4,445,725	30,743,466	537,295,845
Granite	34,023,768	1,006,004	77,564	29,758	10,378,885	45,515,979
Graphite	116,485,918	7,219,232	260,967	308,826	9,627,036	133,901,979
Gypsum	70,358,300	940,510	27,359	-	5,322,517	76,648,686
Iodine	8,820,763	1,791,886	-	25,923	1,043,113	11,681,685
Lime	47,947,256	-	-	539	27,079	47,974,874
Limestone flux and other limestone	14,240,778	526,264	-	-	2,025,984	16,793,026
Marble, travertine and other calcareous stones	51,584,531	311,316	-	3,781	771,063	52,670,691
Mica	4,986,752	803,104	3,369,926	35,949	1,420,233	10,615,964
Mineral pigments	122,977,944	5,152,285	2,214,063	724,442	11,563,442	142,632,176
Nepheline syenite	62,532,926	15,210,792	1,271,023	51,704	5,286,503	84,352,948
Nitrogen	1,357,458,093	1,798,835	54,410	525,737	13,991,147	1,373,828,222
Pearls	1,842,002	15,495	-	6,146	211,795	2,075,438
Peat	250,149,652	1,964,473	12,901,563	992,890	20,075,696	286,084,274
Phosphate and phosphate compounds	71,333,969	234,372	750,529	1,103	2,958,850	75,278,823
Potash and potassium compounds	3,103,118,624	24,857,705	2,159,036	27,889,799	2,039,368,328	5,197,393,492
Salt and sodium compounds	495,868,284	11,324,641	33,713,499	1,273,847	40,867,518	583,047,789
Sand and gravel	43,606,543	77,160	-	-	2,430,305	46,114,008
Sandstone	466,943	-	-	-	11,811	478,754
Silica and silica compounds	50,672,412	1,572,487	460,795	407,009	5,709,516	58,822,219
Slate	6,055,472	9,298,633			333,085	15,687,190

TOTAL EXPORTS OF MINERALS AND MINERAL PRODUCTS, BY COMMODITY AND COUNTRY OF DESTINATION, 2010

($000)	US	European Union (EU-27)	Japan	Mexico	Other Countries	Total
Sulphur and sulphur compounds	223,572,582	106,332	1,902	10,367,515	444,345,700	678,394,031
Talc, soapstone and pyrophyllite	20,515,911	34,813	107,704	31	42,420	20,700,87
Titanium oxides	212,717,138	6,672,711	13,812	-	9,303,373	228,707,034
Other nonmetals	436,367,007	51,922,010	2,509,642	1,496,860	43,172,303	535,467,822
Other structurals	139,147,307	14,161,966	189,385	754,038	10,865,560	165,118,256
TOTAL NONMETALS	**$8,573,194,945**	**2,585,433,385**	**67,261,308**	**77,877,216**	**2,993,908,919**	**14,297,675,773**
MINERAL FUELS						
Coal	487,263,293	850,681,932	1,859,178,145	90,010,066	2,945,356,735	6,232,490,171
Coke	16,870,439	13,200	-	111	459,424	17,343,174
TOTAL MINERAL FUELS	**$504,133,732**	**850,695,132**	**1,859,178,145**	**90,010,177**	**2,945,816,159**	**6,249,833,345**
TOTAL MINING EXPORTS	**$45,150,143,891**	**18,629,442,801**	**3,427,517,260**	**934,574,526**	**16,389,478,038**	**84,531,156,516**

- Nil

Notes:
Total Exports are the sum of Domestic Exports and Re-Exports.

Source: TRAGS, Natural Resouces Canada; Statistics Canada,
Data is as of August 11, 2011 data release.

ANNEX 12

TOTAL IMPORTS OF MINERALS AND MINERAL PRODUCTS, BY COMMODITY AND COUNTRY OF ORIGIN, 2010

($000)	US	European Union (EU-27)	Japan	Mexico	Other Countries	Total
METALS						
Aluminum	2,945,669,731	222,129,062	4,896,419	16,954,462	1,813,049,678	5,002,699,352
Antimony	2,525,714	770,474	48,805	159,192	15,043,816	18,548,001
Barium	730,444	3,755,592	11,719	160	1,160,755	5,658,670
Beryllium	685,776	-	-	7,707	11,951	705,434
Bismuth	1,022,879	390,780	-	-	721,257	2,134,916
Cadmium	377,143	36,073	75	8,135	738,251	1,159,677
Calcium metals	57,067,496	3,409,838	114,985	73,608	1,620,573	62,286,500
Chromium	13,226,367	13,810,285	86,195	310,449	49,090,304	76,523,600
Cobalt	15,678,874	11,228,922	2,543,663	2,945	27,879,620	57,334,024
Copper	1,958,996,553	132,042,388	11,136,530	60,435,106	874,482,830	3,037,093,407
Gallium	170,824	33,251	4,415	-	180,428	388,918
Germanium	2,224,988	265,427	-	-	1,825,936	4,316,351
Gold	2,205,178,482	551,364,577	7,001,665	502,995,060	6,245,491,251	9,512,031,035
Hafnium	517,289	-	-	-	607,317	1,124,606
Indium	1,692,121	245,772	7,339	-	77,595	2,022,827
Iron and steel	12,975,543,776	1,796,936,334	665,446,690	906,795,131	3,918,818,341	20,263,540,272
Iron ore	909,479,539	4,889,166	41	4,898,526	786,379	920,053,651
Lead	343,293,567	22,540,802	2,792,176	16,997,969	81,435,214	467,059,728
Lithium	29,909,487	6,700,778	5,237,641	119,055	23,961,162	65,928,123
Magnesium and magnesium compounds	48,971,638	9,590,204	2,977,576	883,705	143,586,542	206,009,665
Manganese	149,455,353	10,481,217	479,994	11,003,842	196,148,181	367,568,587
Mercury	280,375	77,865	11,631	164	1,126,241	1,496,276
Molybdenum	107,751,339	2,210,872	15,740	3,312,301	15,965,168	129,255,420
Nickel	187,102,417	152,863,031	3,804,868	152,724	496,311,334	840,234,374
Niobium	3,999,234	635,703	-	-	40,181,106	44,816,043
Platinum group metals	157,019,560	49,021,563	3,572,116	6,456	162,128,871	371,748,566
Rare earth metals	426,083	179,224	175,119	570	15,428,436	16,209,432
Rhenium	27,159	33,060	-	-	33,300	93,519
Selenium	430,713	3,388,715	3,081,991	290,846	1,637,657	8,829,922
Silicon	20,792,703	2,723,336	54,995	-	73,205,233	96,776,267
Silver	547,970,991	639,546,046	646,407	75,078,662	740,198,743	2,003,440,849
Strontium	51,243	440,672		257,747	33,260	782,922
Tantalum	960,609	656,512	1,104	310	227,978	1,846,513
Tellurium	879,736	1,342,466	3,932,290	-	9,503,465	15,657,957
Thallium	3,292	1,744	-	-	…	5,036
Tin	23,170,964	1,620,859	1,543,209	1,894,450	72,105,701	100,335,183

TOTAL IMPORTS OF MINERALS AND MINERAL PRODUCTS, BY COMMODITY AND COUNTRY OF ORIGIN, 2010

($000)	U.S.A.	European Union (EU-27)	Japan	Mexico	Other Countries	Total
Titanium metal	53,814,061	10,644,408	1,634,450	381,399	52,543,032	119,017,350
Tungsten	11,191,274	2,569,518	94,228		4,051,201	17,906,221
Uranium and thorium	70,692,067	39,975,869	-	201	652,532,856	763,200,993
Vanadium	12,126,797	1,404,003	50	-	17,254,845	30,785,695
Zinc	243,299,078	17,697,873	13,181	34,408,439	89,211,738	384,630,309
Zirconium	44,389,624	1,297,608	419,627	3,501	9,848,256	55,958,616
Other metals	5,614,297,703	1,048,587,166	264,903,760	940,542,544	3,020,247,548	10,888,578,721
TOTAL METALS	**28,763,095,063**	**4,767,539,055**	**986,690,694**	**2,577,975,366**	**18,870,493,350**	**55,965,793,528**
NONMETALS						
Abrasives	166,786,577	88,083,096	11,238,355	7,195,668	99,172,144	372,475,840
Arsenic	127,773	142	12,060	-	31,811	171,786
Barite and witherite	13,055,119	357,212	6,006	-	6,008,649	19,426,986
Boron	22,158,270	395,389	128,342	2,551	8,637,066	31,321,618
Bromine	4,216,599	437	126	-	771,074	4,988,236
Calcium (Industrial minerals)	5,964,941	8,059	-	-	533,336	6,506,336
Cement	340,802,809	25,922,517	1,578,166	1,924,590	72,425,979	442,654,061
Chlorine and chlorine compounds	64,321,177	3,456,188	177,889	1,359,483	5,241,041	74,555,778
Chrysotile (Asbestos)	95,084,176	3,540,165	4,286,140	6,667,766	19,301,385	128,879,632
Clay and clay products	296,264,135	219,641,992	16,072,492	63,404,929	528,442,097	1,123,825,645
Diamonds	92,613,491	123,229,961	87,329	5,506	455,385,712	671,321,999
Dolomite	12,278,927	68,102	-	-	25,361	12,372,390
Feldspar	452,401	6,624	-	-	997	460,022
Fluorspar	11,619,421	10,455,454	112,302	27,857,714	17,228,441	67,273,332
Glass and glassware products	1,669,716,075	173,366,387	19,215,294	111,209,481	430,337,332	2,403,844,569
Granite	16,238,376	31,932,808	260	8,578	123,870,005	172,050,027
Graphite	252,939,985	77,868,497	38,827,311	5,229,467	83,076,414	457,941,674
Gypsum	161,733,962	739,127	79,494	1,459,646	808,578	164,820,807
Iodine	6,372,154	8,516	2,224,790	-	12,070,412	20,675,872
Lime	18,258,702	151,525	6,921	-	42,759	18,459,907
Limestone flux and other limestone	22,318,284	134,847	-	141	689,111	23,142,383
Marble, travertine and other calcareous stones	14,605,937	36,117,724	1,617	1,908,308	78,293,652	130,927,238
Mica	6,387,401	2,507,142	513,243	5,883	1,390,213	10,803,882
Mineral pigments	117,767,274	15,699,024	2,828,377	1,789,284	12,850,689	150,934,648
Nepheline syenite	47,981	-	-	-	...	47,981
Nitrogen	122,905,616	26,756,620	885,296	219,943	237,144,425	387,911,900
Olivine	624,724	185	-	-	2,810	627,719

TOTAL IMPORTS OF MINERALS AND MINERAL PRODUCTS, BY COMMODITY AND COUNTRY OF ORIGIN, 2010

($000)	U.S.A.	European Union (EU-27)	Japan	Mexico	Other Countries	Total
Pearls	7,791,365	1,016,149	1,923,145	1,200,739	17,204,144	29,135,542
Peat	3,963,370	563,414	251	-	3,483,059	8,010,094
Perlite	13,883,018	2,973,118	-	122	431	16,856,689
Phosphate and phosphate compounds	381,132,047	28,376,842	15,397	5,356,500	64,459,870	479,340,656
Potash and potassium compounds	58,716,888	3,317,177	357,672	58,439	9,915,103	72,365,279
Salt and sodium compounds	298,336,675	22,622,918	2,764,690	4,199,733	67,873,352	395,797,368
Sand and gravel	17,084,909	42,026	96	33,698	767,485	17,928,214
Sandstone	1,764,075	136,767	-	-	3,033,435	4,934,277
Silica and silica compounds	126,616,352	20,873,343	9,749,999	305,798	18,097,043	175,642,535
Slate	1,982,511	315,153	481	2,325	12,361,720	14,662,190
Sulphur and sulphur compounds	24,998,803	651,392	235,610	-	881,757	26,767,562
Talc, soapstone and pyrophyllite	11,127,047	736,724	477,783	-	563,083	12,904,637
Titanium oxides	138,285,920	8,092,446	1,501,220	13,061,162	13,868,250	174,808,998
Vermiculite	3,699,041	73,607	-	-	3,680,736	7,453,384
zz- Other nonmetals	641,637,240	60,093,597	8,756,363	9,956,679	57,236,456	777,680,335
zz- Other structurals	64,455,344	12,967,821	1,720,149	1,616,324	39,266,242	120,025,880
TOTAL NONMETALS	**5,331,136,892**	**1,003,300,234**	**125,784,666**	**266,040,457**	**2,506,473,659**	**9,232,735,908**
MINERAL FUELS						
Coal	935,114,047	4,047,695	255,625	571,241	218,691,406	1,158,680,014
Coke	57,789,919	24,850,271	75	-	120,977,740	203,618,005
TOTAL MINERAL FUELS	**992,903,966**	**28,897,966**	**255,700**	**571,241**	**339,669,146**	**1,362,298,019**
TOTAL MINING IMPORTS	**35,087,135,921**	**5,799,737,255**	**1,112,731,060**	**2,844,587,064**	**21,716,636,155**	**66,560,827,455**

- Nil; … Amount too small to be expressed.

Source: TRAGS, Natural Resouces Canada; Statistics Canada.
Data as of August 11, 2011 data release.

ANNEX 13

PROPOSED CAPITAL INVESTMENTS BY THE CANADIAN MINING INDUSTRY

Company	Project	Province	Capital investment ($ million)
Coal Valley Resources	Robb Trend Coal Mine Expansion	AB	$10
MAXIM Power	Development of #14 Coal Mine	AB	$50
Canadian Natural Resources	Project Horizon	AB	$5,080
Fort Hills Energy (Suncor Energy / Total SA / Teck)	'Fort Hills' Oil Sands Mine	AB	$9,600
Imperial Oil Resources / ExxonMobil Canada	Kearl Lake' Oil Sands Mine Phase 1	AB	$10,900
Shell Canada	Athabasca Oil Sands Project Debottleneck Phase 1	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	$6,000
Suncor Energy / Total SA	Voyageur	AB	$19,000
Syncrude Canada	Mildred Lake	AB	$4,300
Syncrude Canada	Aurora	AB	$2,335
Total E&P Canada / Suncor Energy	Joslyn North Mine	AB	$6,000
Pan Pacific Aggregates	Sechelt Carbonate Mine	BC	—
Columbia Yukon Explorations	Storie molybdenum Mine	BC	$390
HD Mines International	Murray River Underground Coal Mine	BC	$500
Hard Creek Nickel	Turnagain Nickel Project	BC	$2,920
KGHM Ajax Mining	Ajax Copper-Gold Mine	BC	$535
First Coal	Central South Coal Mine	BC	$225
Spanish Mountain Gold	Spanish Mountain	BC	$496
Yellowhead Mining	Harper Creek Copper-Gold-Silver Mine	BC	$759
Seabridge Gold	KSM (Kerr-Sulphurets-Mitchell) Copper-Gold Mine	BC	$4,700
Pacific Booker Minerals	Morrison Copper-Gold Mine	BC	$517
Taseko Mines	Prosperity Gold-Copper Mine	BC	$1,100
Compliance Coal	Raven Underground Coal Mine	BC	$241
Western Coal	Willow Creek Expansion	BC	$270
Imperial Metals	Red Chris	BC	$443
Skyline Gold	Bronson Slope Metal Mine	BC	$258
TTM Resources	Chu Molybdenum Mine	BC	$727
Avanti Mining	Kitsault Molybdenum Mine	BC	$837
Teck Coal Ltd.	Line Creek Coal Mine Expansion	BC	$140
Teck Coal Ltd.	Quintette Coal Mine	BC	$500
Fortune Minerals	Mount Klappan Coal	BC	$768
Capstone Mining	Kutcho Copper-Zinc-Silver-Gold	BC	$185
Canadian Kailuan Dehua	Gething Coal	BC	$1,000
Thompson Creek Metals	Mt Milligan Copper-Gold Mine	BC	$915
Nova Gold/Teck	Galore Creek	BC	$5,155
Peace River Coal	Roman Coal	BC	$320
Copper Fox Metals	Schaft Creek	BC	$3,000
New Gold	New Afton mine	BC	$630

PROPOSED CAPITAL INVESTMENTS BY THE CANADIAN MINING INDUSTRY

Company	Project	Province	Capital investment ($ million)
Northgate Minerals	Kemess Underground Project	BC	$437
Imperial Metals	Ruddock Creek Zinc Lead Mine	BC	$7
Mustang Minerals	Makwa Project	MB	—
Teck Resources	Trail Operations	BC	$210
Teck Resources	Highland Valley Copper	BC	$475
Victory Nickel	Minago Nickel Mine	MB	$596
HudBay Minerals	Lalor	MB	$144
Castle Resources	Elmtree Property Gold Mine	NB	$3
Northcliff Resources Ltd.	Sisson Tungsten-Molybdenum Mine	NB	$500
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	$105
Rambler Metals and Mining	Ming mine/Nugget Pond mill reactivation	NL	$25
New Millennium/Tata Steel	Schefferville area DSO project	NL	$300
Canada Fluorspar	St. Lawrence fluorspar mine reactivation	NL	$160
Alderon Resources	Kami Iron Ore Project	NL	—
Xstrata Coal	Donkin Coal Project	NS	$550
Newmont	Hope Bay	NU	$2,000
Baffinland Iron Mines	Mary River	NU	$4,000
Mountain Province Diamonds and De Beers	Gahcho Kue	NWT	$650
Canadian Zinc	Prairie Creek	NWT	$100
Avalon Rare Metals	Nechalacho	NWT	$729
Fortune Minerals	Nico	NWT	$350
Tyhee Resources	Yellowknife Gold	NWT	$350
DetourGold	Detour Lake	ON	$992
Osisko	Hammond Reef Gold Mine	ON	$881
Noront Resources	Eagle's Nest Multi-metals Mine	ON	$600
Vale	Sudbury	ON	$3,400
Vale	Clarabelle Mill	ON	$200
Vale	Totten Mine	ON	$360
Northgate Minerals	Young-Davidson	ON	$339
Kirkland Lake Gold	Expansion	ON	$56
Goldcorp	Red Lake	ON	$350
Goldcorp	Porcupine	ON	$335
Goldcorp	Musselwhite	ON	$390
Lake Shore	Timmins West gold mine	ON	$186
Xstrata Nickel	Fraser Morgan Project	ON	$119
Xstrata Nickel	Nickel Rim South	ON	$920
Quadra FNX	Sudbury area expansion	ON	$200
North American Palladium	Lac des Iles Mine expansion	ON	$270
Stillwater Mining Company	Marathon PGM-Cu Project	ON	$351
Adriana Resources	Lac Otelnuk Iron Mine	QC	$8,500

PROPOSED CAPITAL INVESTMENTS BY THE CANADIAN MINING INDUSTRY

Company	Project	Province	Capital investment ($ million)
Canada Phosphate	Lac à Paul Apatite and Ilmenite Mine	QC	$325
Canada Lithium	Quebec Lithium Mine	QC	$202
Aurizon Mines Ltd	Joanna Gold Mine	QC	$187
Royal Nickel	Dumont Nickel Project	QC	$2,300
Agnico- Eagle	Lapa expansion	QC	$6
Xstrata Zinc	Bracemac-McLeod	QC	$158
Stornoway Diamonds	Renard Diamond Mine	QC	$511
Mine Arnaud	Arnaud Apatite Mine	QC	$800
Xstrata Nickel	Raglan Extension	QC	$530
Western Troy Capital Resources	MacLeod Lake Molybdenum-Copper	QC	$210
Strateco Resources	Matoush Project	QC	$342
BlackRock Metals	BlackRock Vanadium Iron Titanium Mine	QC	—
Cameco	Millenium Uranium Mine	SK	—
AREVA Resources Canada	Midwest Uranium Mining and Milling	SK	$435
Shore Gold	Star-Orion South Diamond Mine	SK	$2,500
			Total : $137,428

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. The progress that will be made on these projects will be affected by market forces, some will likely be delayed or cancelled, others perhaps accelerated. The list is a work in progress.

THE CANADIAN MINING INDUSTRY AT A GLANCE

	2005	2006	2007	2008	2009	2010
Mining Industry GDP ($ billion)	40.0	40.0	41.9	40.3	32.0	35.7
Percentage of Total Canadian GDP (%)	3.8	3.7	3.4	3.3	2.7	2.9
Value of Mineral Production ($ billion)	27.4	34.2	40.6	47.0	32.2	41.3
Synthetic Crude Production Value ($ billion)	9.2	14.8	18.0	25.2	n/a	n/a
Synthetic Crude Production (million cubic metres)	21.9	28.8	39.9	38.0	n/a	n/a
Number of Mining Establishments	859	801	766	841	961	968
Mineral Extraction Employment (thousand)	47	49	53	59	52	53
Total Mining/Mineral Industry Employment (thousand)	353	363	360	351	308	308
Metal Prices - Copper (cents per pound)	168	309	322	313	234	343
Metal Prices - Gold ($ per ounce)	445	604	697	872	973	1225
Mineral Exploration/Appraisal Spending ($ billion)	1.3	1.9	2.8	3.3	1.9	2.6
Mining Industry Capital Expenditures ($ billion)	7.4	8.3	10.1	12.1	9.8	12.6
Oil Sands Capital Expenditures ($ billion)	9.8	12.2	16.8	20.7	10.6	11.2
Industry Payments to Canadian Governments ($ billion)	5.7	8.4	10.2	10.5	5.1	8.4
Stock of Foreign Direct Investment ($ billion)	21.2	38.3	61.6	65.1	59.8	58.0
Stock of Canadian Direct Investment Abroad ($ billion)	56.4	58.9	57.3	66.2	64.5	58.0

n/a–not available