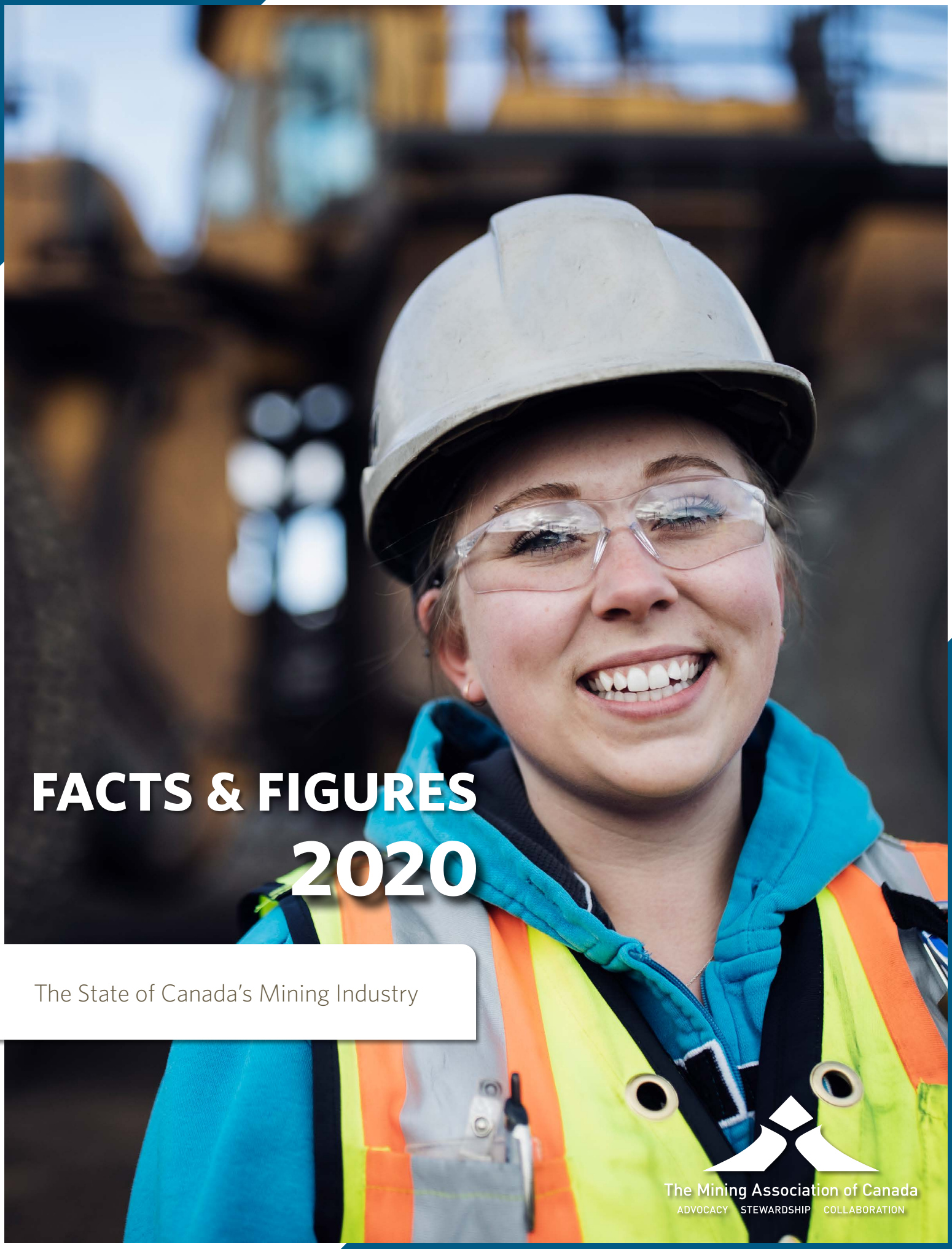

FACTS & FIGURES 2020

The State of Canada's 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, other industries, and environmental and community groups in Canada and around the world.

DATA AND SOURCES

This annual report reflects currently available data, the majority from 2019, though some from prior years and some from 2020. Dollar amounts are expressed in Canadian dollars unless noted otherwise.

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Design: McKenna Design & Strategy

Acknowledgments: This report could not have been prepared without the significant assistance of the dedicated staff of the Minerals and Metals Sector at Natural Resources Canada. Special thanks are also extended to Cynthia Waldmeier from MAC and Monique Laflèche.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF ANNEXES

STATE OF THE INDUSTRY AND KEY ISSUES

PROTECTING THE HEALTH AND SAFETY OF EMPLOYEES, CONTRACTORS AND COMMUNITIES IS DEEPLY INGRAINED IN THE CANADIAN MINING INDUSTRY'S CULTURE AND IS A POINT OF FOCUS NOW MORE THAN EVER IN THE FACE OF THE ONGOING COVID-19 PANDEMIC.

From building mobile testing units at remote mine locations, to chartering planes for fly-in fly-out operations to ensure social distancing, to allowing Indigenous employees to remain in their home communities with full pay, the mining sector has prioritized the health and safety of their employees, their contractors and the communities in and around which they operate, and will continue to do so.

Canada's mining industry supplies the materials required for the manufacture of products essential for Canadians, including medical technologies and medications, and it has been critical that supply chains stay open so that mined products are readily available for the people and businesses who rely on them. Mined materials, like gold, carbon, zinc, uranium and nickel, are required in the instruments used in hospitals around the globe. For example, gold is an integral ingredient in the hundreds of millions of Rapid Diagnostic Tests that are used around the world each year, carbon is needed in everything from hospital furniture to ventilators, and it is thanks to nickel alloys and nickel-containing stainless steel, essential materials in surgical steel, medical devices and diagnostic tools, that we are able to provide medical solutions and prolong lives.

Mined metals like copper play an important role in killing bacteria and preventing patients from acquiring infections, and there is promising research being done on technology that incorporates and seals antimicrobial agents in aluminium surfaces by companies like Rio Tinto that, if it receives regulatory approval, could be used on everything from door handles, to medical equipment to bars on public transport. This technology, which has been tested by Canada's National Research Council and several research entities and certified in independent laboratories, eliminates up to 99.99% of bacteria, viruses and other germs and could be a game changer in preventing the spread of diseases like COVID-19.

Markets for many of these products transitioned through a highly volatile period in spring 2020, with operations reeling from supply chain disruptions and associated delays, production curtailments, and in some cases, operational stoppages. Fortunately, mineral and metal prices rebounded over the summer months, with many having exceeded pre-COVID highs at the time of writing. Globally, Canadian mining operations have withstood COVID-19 better than many peers in other jurisdictions, with companies adapting their health and safety policies to accommodate risks, build confidence, and ultimately return to production with comparably limited disruption.

Beyond safety, MAC member companies have gone further, making contributions to foodbanks, women's shelters, Indigenous organizations and health authorities across Canada exceeding $40 million. These are in addition to the donation of tens of thousands of N95 masks, test kits and ventilators amongst other equipment and goods to address shortages of these critical supplies.

ECONOMIC CONTRIBUTION

The mining industry has contributed greatly to Canada's economic strength. The industry directly employs 392,000

workers across the country in mineral extraction, smelting, fabrication and manufacturing, and indirectly employs an additional 327,000 people. Proportionally, the mining industry is also the largest private sector employer of Indigenous peoples, providing over 16,500 jobs. In 2019, the minerals sector directly and indirectly contributed $109 billion, or roughly 5%, to Canada's total nominal GDP.

Internationally, Canada is one of the leading mining countries and one of the largest producers of minerals and metals. The industry accounted for 19%, or $106 billion, of the overall value of Canadian goods exports in 2019, selling a diversified array of minerals and metals abroad.

While mining is important to Canada at the local community level, it also contributes to the economies of large cities. Toronto, for example, is the global hub for mining finance. The Toronto Stock Exchange (TSX) and TSX Venture Exchange are the world's number one mining and exploration listing venues, where 37% of global mining equity has been raised over the last five years. Vancouver features the world's leading cluster of exploration companies, while Montreal is home to major aluminium and iron ore firms. Edmonton has become a centre for oil sands expertise and Saskatoon for uranium and potash.

Other evidence of the industry's vast economic reach is that mining is the single largest industrial customer group of Canada's railways and is a major user of Canada's ports. Annually, the industry accounts for approximately 50% of total rail freight revenue generated and is the largest single shipping sector by volume by both rail and marine modes.

The average annual pay for a mining worker in 2019 exceeded $123,200, which surpassed the average annual earnings of workers in the forestry, manufacturing, finance and construction sectors respectively.

A STATE OF TRANSITION

Canada has long been the dominant global mining nation—in mineral production, mining finance, mining services and supplies, and sustainability and safety. However, there are signs that this leadership position is slipping, which has the potential to jeopardize Canada's ability to seize new opportunities for growth.

- While 2020 saw a modest increase in the value of mining projects planned and under construction from 2020 to 2030 (by $2 billion year-over-year), the total 10-year projected value ($82 billion) remains nearly 50% below the 2014 level of $160 billion.
- Canada continued to lose ground to Australia in the competition for the world's top destination for non-ferrous exploration spending in 2019, accounting for 13% of total global expenditures in 2019. Capital spending in the sector is projected to account for 4.9% of Canada's total at $11.9 billion, also down year-over-year.

Critical to bolstering the industry's domestic and international leadership is a predictable and consistent domestic policy and regulatory environment, with proactive and bold policy to position the country for longer term success. There are tremendous opportunities to do that in the areas of critical and battery minerals – arguably the foundation for any resurgence in Canadian advanced manufacturing.

FEDERAL POLICIES AND CANADIAN MINING COMPETITIVENESS

Looking forward, as the federal government continues to weigh when and how best to bolster the economy in support of ongoing COVID-19 recovery efforts, MAC and its members recommend focusing on the following areas:

- **Economic Development, Regulatory Certainty and Investment Competitiveness**
  Acknowledging there is fierce global competition for finite exploration and mine development investment dollars, that Canada's economy is dependent on foreign direct investment, and that tax competitiveness and regulatory certainty are critical determinants of Canada's investment attractiveness, it is essential that a number of critical measures be considered. These include the effective and efficient regulation of the mining industry, including sound implementation of the new federal Impact Assessment Act, access to prospective lands, and continued and expanded investments in remote and northern infrastructure.

- **Advancing the Participation of Indigenous Peoples in the Minerals Sector**
  The Canadian mining industry is a leader in Indigenous engagement and partnerships. Governments can support enhanced participation of, and partnerships with, Indigenous communities in the sector through foundational social investments in areas such as health, education and housing, and by targeting funding for skills training and entrepreneurship to assist Indigenous peoples in securing employment and business development opportunities generated by the industry. Governments should also focus on adequately discharging its duty to consult.

- **Environment**
  The Canadian mineral exploration and mining industry is well-positioned to play a pivotal role in the low-carbon economy as the provider of the raw materials necessary for innovation in many other sectors, including clean tech, manufacturing, transportation, high-tech, and aerospace and defence. For the "mines-to-mobility" strategy to work, policy must bolster and strengthen Canada's critical mineral supply chains in all regions of Canada, both on and off grid. Addressing climate change, while preventing carbon leakage, is critical to ensuring Canada's "best-in-class" mining sector becomes a supplier of choice to meet global demand for raw materials in the most sustainable and environmentally responsible way possible. Respecting the country's biodiversity also continues to be a priority for the sector and ensuring appropriate approaches to conserving species at risk will play a pivotal role in Canada's exploration and mining future.

- **Science, Technology and Innovation**
  Geoscience and innovation continue to be focal points for the mineral exploration and mining sector. Federal, provincial and territorial governments should expand rigorous geological studies across Canada, particularly for mapping of remote regions in greater detail. Innovation, in everything from autonomous vehicles and mine electrification, to rare earth separation and manufacturing, is increasingly important to the sector. By investing in these technologies, and providing financial support to catalyze private sector innovation investments, real progress can be made in energy efficiency, environmental protection, business productivity and greater independence in all aspects of critical minerals development and the advanced manufacturing that depends on them.

- **Skills Training**
  Investments in human resources and skills training are essential for the sector. Increasing collaboration between governments, industry and educational institutions to ensure new entrants to the mining industry have the required skills is particularly important. It is also essential that governments work together to enhance support for initiatives to address barriers to diversity and inclusion in the mineral exploration and mining sector.

- **Global Leadership**
  Supporting the Canadian mining industry, including the continued expansion of market access through free trade and investment agreements, is critical to its future success. Canada is a global leader in responsible business conduct, and its leading practices should be promoted by governments to advance Canada's development goals and expand the benefits that exploration and mining activity brings to communities around the globe. The federal government should continue to work with the private sector, including Canadian exploration and mining companies operating abroad, to leverage Canadian development activities and realize better outcomes for communities.

As a leader in the responsible sourcing movement, Canada's mining industry plays a significant role in promoting sustainable mining practices, particularly through MAC's externally-verified performance system, *Towards Sustainable Mining® (TSM)*. This program has received international attention, and seven mining associations outside of Canada, including most recently Norway, have adopted *TSM* to support meeting society's needs for minerals, metals and energy products in the most socially, economically and environmentally responsible way.

MINING

MINERALS AND METALS ARE ESSENTIAL TO OUR HEALTH, WELLBEING AND EVERY DAY ACTIVITIES

THE COVID-19 PANDEMIC IS UNDOUBTEDLY THE DEFINING GLOBAL HEALTH CRISIS OF OUR TIME. THROUGHOUT, THE CANADIAN MINING INDUSTRY'S PRIORITY REMAINS PROTECTING THE HEALTH AND SAFETY OF EMPLOYEES AND THE COMMUNITIES AROUND WHICH IT OPERATES.

Canada's mining sector provides the building blocks for products essential to the fight against COVID-19, the infrastructure to keep Canadians connected in a time defined by social distancing, and the technologies, energy and innovation required for the low carbon future.

Our modern lives depend on mining. From the critical minerals and energy needed to build and propel clean transportation, to the materials without which smartphones, computers and digital connectivity would be impossible, to the inputs for critical medical equipment needed to combat COVID-19, such as rapid test kits, personal protective equipment, ventilators and antimicrobial surfaces, the world needs responsible mining.

Because the mining industry is vital to daily life and Canada's future, the relationship between the opportunities and challenges it faces, and the public policies and regulations that govern its activities must be understood by decision makers. Historically, Canada has profited from low-cost mineral and metal products, good jobs and significant wealth development opportunities – benefits that Canadians overwhelmingly want to persist into the future. With demand for minerals and metals expected to grow as both the Canadian and global economy recover from the COVID-related downturn, Canada's mining industry is proud to be recognized as a responsible producer, providing global leadership in corporate social responsibility and environmental stewardship.

PRODUCTS THAT RELY ON MINING

- Rapid test kits (gold)
- Antimicrobial surfaces (copper, aluminium)
- Ventilators (carbon)
- Medicine (uranium, zinc)
- Solar PV panels (copper, iron ore, titanium, silver, gallium, indium)
- Batteries (nickel, cadmium, lithium, cobalt)
- Circuitry (gold, copper, aluminium, steel, lithium, titanium, silver, cobalt, tin, lead, zinc)
- Smartphones (silicon, boron, lead, barium, strontium, phosphorus, indium)
- Electric cars (copper, lithium, aluminium, nickel, cadmium, cobalt, zinc)
- Wind turbines (steelmaking coal, iron ore, copper, nickel)
- Energy (uranium, oil sands, petroleum products)
- Musical instruments (copper, silver, steel, nickel, brass, cobalt, copper, iron, aluminium)
- Sports equipment (graphite, aluminium, titanium, calcium carbonate, sulphur)

SECTION 1

MINING AND THE CANADIAN ECONOMY

THE SOCIAL MOBILITY LIMITATIONS ESSENTIAL TO COMBATTING THE COVID-19 PANDEMIC – AND THE ASSOCIATED ECONOMIC AND SUPPLY-CHAIN CONSTRAINTS – WERE DISRUPTIVE ON A GLOBAL SCALE UNPRECEDENTED IN A GENERATION, REMAIN ONGOING IN VARYING DEGREES WITHIN CANADA AND INTERNATIONALLY, AND ARE LIKELY TO PERSIST IN VARYING DEGREES FOR THE FORESEEABLE FUTURE.

Just as economies are not immune to shocks, the mining industry is not unique in experiencing and needing to adapt to the social and economic consequences of COVID-19. The industry in Canada – compared to its counterparts in other jurisdictions and other industrial sectors within Canada – has rebounded more quickly. What follows is an overview of economic developments and indicators that help contextualize the economic trajectory of Canada's mining sector over the course of 2020 and into the future.

GLOBAL ECONOMIC TRENDS

COVID-19 has caused the biggest global economic downturn since the Great Depression in the 1930s. At the time of writing, the International Monetary Fund (IMF) had released its October 2020 World Economic Outlook, entitled: *A Long and Difficult Ascent*. The near-term outlook, while less severe than previous IMF projections in June, was calling for global growth at -4.4%, an estimated loss of $6.25 trillion in economic activity around the world. When juxtaposed against an estimated $10 trillion (and counting) of stimulus spending to prevent economic collapse, the extent of the impact that COVID-19 has had on the global economy takes greater shape.

While distressing, the IMF revision reflects the broad-based increase in economic activity that accompanied economic re-opening policies adopted by multiple jurisdictions, including Canada, over the summer months. This also suggests that first phase stimulus programs enacted by governments around the world were largely successful when measured against their objective of staving off worst-case economic scenarios, and positioning economies for a more rapid rebound than otherwise would have been possible.

Looking ahead, global growth is projected at 5.2% in 2021, a modest 0.6% above that of 2019. If this forecast holds true, COVID-19 will have effectively eliminated an entire year of global economic growth before returning to more normal circumstances. And this return is itself projected to be volatile. IMF growth projections anticipate negative output gaps – where actual economic activity is below an economy's full capacity – and elevated unemployment rates into 2021 across both advanced and emerging market economies. The recovery is forecast to be uneven, as some economic sectors were harder hit than others, and are anticipated to take longer to recover or adapt to new realities.

Given the extent and length of the disruption so far, and its projected duration, aspects of the pre-COVID economy will likely be permanently altered or transformed. These processes are currently underway and are also very difficult to predict. Noting that forecasts in the best of times can only provide impressions of the future, as the world continues to transition through the pandemic, it will be prudent to expect larger margins of error and more substantial revisions – such as those that occurred between the June and October IMF global economic outlooks discussed above – in the months and year to come.

Canadian Economic Outlook

The Canadian economy was not immune to the substantial disruption discussed above. At its lowest point in April, according to the Conference Board of Canada, Canada's real GDP had fallen 18% from February's (pre-COVID) level, 3 million Canadians were out of work (amounting to a 15.6% decline in employment), and total hours worked had plummeted a staggering 28%. These outcomes resulted from joint federal and provincial pandemic containment policies that, by elevating public health concerns over economic objectives, suspended activities across many segments of the Canadian economy to quell the spread of the pandemic.

To support Canadians and businesses adversely affected by the pandemic, the federal government deployed its largest annual federal spending program in the post-war era. The goal, through liquidity programs, emergency benefits and wage subsidies, was to help bridge Canadians and businesses adversely affected by the economic contraction back to more normal economic circumstances. An important consideration, too, was ensuring that affected businesses were supported to enable an expedient resumption of operations as containment policies were gradually lifted and affected segments of the economy were permitted to reopen.

Canada's economy bounced back over the summer months, regaining nearly two-thirds of lost ground from the April low. The reopening that began in May saw the economy rebound 11.6% over the subsequent two months. Statistics Canada estimated an additional 3% increase in growth in July, placing the economy roughly 6% below pre-COVID-19 levels. On the employment side, by August, almost 2 million jobs had been recouped—roughly two-thirds of job losses accrued through March and April. Looking ahead, the IMF projects Canada's economy to contract -7.1% in 2020. While deep, this a significantly improved scenario when compared to the -18% drop in April, and one the IMF projects will recover further with continued rebound growth of 5.2% in 2021.

Noteworthy is that the summer rebound was only possible through the reopening policies implemented by governments when COVID-19 was in retreat. Fall 2020 saw the second wave of COVID-19 in Canada and resulted in several provincial governments implementing surgical and rolling closures for segments of their economies – a practice that is likely to persist in varying degrees over the course of the winter months. While the Canadian economy is unlikely to contract as it did in spring 2020, the unknown extent and scope of these second wave disruptions are major variables in forecasting Canadian economic outcomes, and will likely be significant in driving revisions over the coming months and year.

This uncertainty weighs heavily on fiscal policy makers, whose decisions about how and when to stimulate economic recovery carry much weight. The subdued economic outlook comes with a significant projected increase in sovereign debt – amassed by government programs designed to support their citizens through the disruption. This unplanned spending is juxtaposed against downward revisions to economic output and the reduced associated tax base over the medium term. Balancing fiscal fundamentals while investing wisely toward a meaningful economic recovery will be the key focus of economic decision makers over the next 24 months.

Canadian Mining Industry COVID Implications

From the outset of the pandemic, the mining sector was declared essential by virtually every government in Canada and was therefore largely unaffected by government first wave containment policies. That said, miners were impacted by COVID-related supply chain disruptions, augmented health and safety policies, and pandemic-driven market implications.

Every Canadian mining operation was directly affected by COVID-19, with impacts varying depending on product and region:

- Remote operations were the first to be affected and have had the longest standing impacts, primarily out of responsiveness to local community concerns, as well as market developments discussed further below.
- Companies implemented social distancing protocols to enhance employee safety. While essential, these policies increased costs and constrained production.
- Most companies curtailed production (while a few suspended production entirely) with select operations deploying rolling shutdowns to manage reduced demand.

Beyond the mine site, several factors contributed to heavy volatility in global demand for minerals, metals and energy products:

- For many products, mining customers shut down operations, deferred shipments or cancelled or delayed orders, creating backlogs and delays. This affected the

efficiency of logistics operations both at loading and receiving ends of the supply chain.

- Delays were experienced in securing raw materials, equipment, chemicals, and re-agents for operations and PPE for employees, as well as in the processing of operational documentation such as through financial institutions.
- Capital projects were impacted, delays occurred in equipment procurement, and force majeures were declared by service providers and customers.

Markets reacted to the above disruptions, reaching peak volatility in April 2020 as prices plummeted for zinc (-18.9%), copper (-17%), nickel (-14.2%), iron ore (-8.6%) and other products. The global diamond market collapsed and there was 20% demand decline for petroleum products. The only bright spots in those early days were gold – as a financial hedge in times of security – up 12.8%, and uranium, pushing to a four year high of $33.25 per pound (though largely driven by voluntary curtailment of production).

From May until October, depressed prices rebounded with London Metal Exchange average three-month future contracts trading 30%, 41% and 26% higher for zinc, copper and nickel respectively, while the monthly average price of iron ore skyrocketed 43%. The gap closed on metallurgical coal, bringing prices back to within striking distance of the pre-COVID high, while gold broke $2,000/oz – an all-time record – in August, before settling to $1,886/oz at the time of writing, up 20% year-to-date.

On the backdrop of a strong pricing recovery post peak uncertainty, Canadian miners anticipate a steady return to pre-pandemic production levels over the balance of 2020 and early 2021 presuming:

- Major outbreaks are prevented in Canada through testing, containment, social distancing and widespread and persistent adherence to public health guidance.
- Mining as a designated essential service maintains access to export markets and imports for smelters and refineries and for essential inputs remain accessible.
- The reliability and fluidity of the supply chain improves compared to the disruptions experienced over the last 18 months (more of which is discussed in Chapter 2).

Canadian Mining Industry Outlook

In the near term, presuming operational stability persists, there are a number of substantial prospects for the Canadian mining sector. The roll out of the Canada Minerals and Metals Plan, and continued work on opening new markets and retooling supply chains for critical minerals hold great promise. The expansion of a growing government "mines to mobility" strategy that seeks to leverage the stability and reliability of Canada's mining sector at a time of major supply chain disruption bodes well for the future. Recent calls by Tesla's Elon Musk for a greater supply of cleaner nickel, and recently announced investments by Ford and Chrysler – in partnership with the federal and Ontario governments – to secure both battery and electric vehicle manufacturing in Canada are indicative of the opportunity in this space.

The government of Quebec also announced its Plan for the Development of Critical and Strategic Minerals. This five-year initiative is intended to promote the development of minerals used in daily technologies such as cell phones and laptops, green energy technologies such as solar panels and windmills, as well as technologies in the health sector.

> **TODAY, THE DISCUSSION STARTS ABOUT HOW WE USE OUR LITHIUM IN QUEBEC; OUR NICKEL IN SUDBURY; OUR COBALT IN NORTHERN ONTARIO; OUR ALUMINIUM FROM QUEBEC AND BRITISH COLUMBIA – TO PUT CANADIANS TO WORK.**
>
> **- JERRY DIAS, PRESIDENT, UNIFOR**

The plan lists eight critical minerals – minerals essential for the economy in limited supply including copper, tin and zinc – and 12 strategic minerals – minerals used in key sectors of the province's policies, such as battery minerals like cobalt, nickel and lithium – that will be prioritized. The government will invest $90 million through 2025 in advancing geoscientific knowledge, providing financial support for exploration and R&D, and supporting companies in their development projects.

The above initiatives are part of a broader trend of investments and economic transformation taking place globally. As the world transitions to a lower carbon economy, demand for a number of minerals and metals is going to increase substantially. According to research by KPMG, the projection for global growth for metals needed for battery production by 2028 is massive:

- Nickel +1,237%
- Cobalt +256%

- Lithium +575%
- Graphite +530%

Beyond batteries, the material demand for renewable power technology is also set to rise. For example, *Clean Energy Canada* highlights the opportunity that a lower carbon economy presents to Canada and its mining industry, noting that Canada has rich deposits in many of the minerals and metals needed in renewable energy technologies. Noting that Canada is home to 14 of the 19 metals and minerals needed to make a solar PV panel, the think-tank highlights MAC's *Towards Sustainable Mining® (TSM)* initiative, and the fact that Canada hosts some of the lowest carbon-intensive mines in the world thanks to the energy mix and company adoption of lower emitting technologies at their sites.

As a leading producer of responsibly sourced mineral and metal products globally, Canada has an opportunity to become the world's leading supplier of inputs integral to a lower carbon economy. *TSM* can help demonstrate responsible sourcing as it produces site-level performance data in key environmental and social areas. It is essential that Canada's role in the responsible sourcing of the mined materials necessary for green technology be prioritized. (For more information, see Section 5)

As the global economy recovers from COVID-19, and the middle classes of the world's most populous countries continue to emerge, growth in mineral and metal demand is anticipated to continue. The degree to which Canada participates in this longer-term growth trajectory depends on the establishment of a competitive domestic business environment.

MINING'S CONTRIBUTION TO THE CANADIAN ECONOMY

Mining is a significant contributor to the Canadian economy. The direct and indirect wages and employment of approximately 720,000 people across the country (of which 392,000 are direct jobs), taxes and royalties collected by governments, and the capital expenditures required for project development and operation are only some examples of the essential role it plays. Beyond its direct economic impact, the industry also supports many firms and sectors that supply miners with the goods and services they need to operate.

What follows throughout this publication is the presentation of the mining industry's economic and social contributions to Canada, as well as its environmental and operational performance across Canada and internationally, using the latest data available. MAC is reliant on the Government of Canada for much of the data published in these pages, and the latest year available for much of this data is 2019. For reasons above explained, 2020 is an outlier year in economic terms, and as such, 2019 data is unlikely in many cases to be representative of 2020 realities. Where possible, MAC will endeavour to provide current context to reconcile this data lag, but in many instances this will not be possible. Caution and patience is requested from readers.

Contribution to Canada's GDP

Real GDP is used by policy makers, financial institutions and other businesses to help determine the economic health of the nation. Since real GDP measures the volume of goods and services produced, an increase in its value is a sign of a healthy economy while a decline indicates that the economy is not functioning to its full capacity.

Historically, the value of minerals and metals to Canada's economy has ranged between 2.7% and 4.5% of the country's real GDP. In 2019, the industry's contribution remained within this range at 3.5%.

2018 Contribution

The extractive industry, which combines mineral extraction with oil and gas extraction, contributed $155.1 billion, or 7.8%, to Canada's real GDP in 2019 (*see Figure 1*). By this measure – unchanged as a percentage of the economy year-over-year – the extractive industry is the fourth largest of Canada's 18 industries, surpassed only by the services, real estate, and manufacturing sectors.

The mining industry as a whole goes beyond extraction to include mineral manufacturing and needs to be carved out from the broader mining and oil and gas category. The mining industry's 2019 contribution to real GDP is detailed in Figure 2, which divides industry activity into four stages:

- **Stage 1**, extraction of minerals (metals, non-metals and coal): $34.1 billion
- **Stage 2**, primary metal manufacturing (smelting, refining, rolling, extruding, alloying and casting of primary metals): $11 billion
- **Stage 3**, non-metallic mineral product manufacturing (abrasives, lime, cement, glass and ceramics): $7.1 billion
- **Stage 4**, fabricated metal product manufacturing (forging, stamping and heat-treating to produce

reinforcing bars, fabricated wire, cutlery, tools and hardware): $16.5 billion

MINING'S DIRECT CONTRIBUTION TO 2019 REAL GDP TOTALED $73.7 BILLION, WHILE THE SECTOR'S DIRECT CONTRIBUTION TO NOMINAL GDP TOTALED $71.4 BILLION, A 1% REDUCTION FOR EACH METRIC YEAR-OVER-YEAR.

The difference between real and nominal GDP is that real GDP is only calculated in terms of expenditure, whereas nominal GDP is calculated by using current dollars, and is produced in terms of income and expenditure. Real GDP is better at illustrating the performance of a sector over time, whereas nominal GDP is useful to illustrate an industry's contribution to the economy in a given year. Accordingly, mining's nominal GDP for 2019 decreased modestly year-over-year by 1% from $71.4 to $70.7 billion , suggesting fairly consistent commodity prices in aggregate from one year to next (*see Figure 3*). These numbers increase further when indirect contributions that the industry generates are factored in. These would include service consumption from third parties, such as railways and other service providers discussed further below. NRCan reports that for 2018, mining's indirect contributions to nominal GDP were $25 billion, adding roughly 35% more economic activity.

Reflecting on 2020, it is difficult to predict with accuracy the impact that the economic and supply chain disruption caused by COVID-19 will have on mining industry GDP, at both national and regional levels. Given the substantial pricing volatility discussed above, and the reduced production levels that many mines are presently experiencing, it is reasonable to predict that 2019 numbers for this metric are buoyant, and that 2020 will see a contraction in the sector's overall economic performance.

MINING IN THE PROVINCES AND TERRITORIES

Year-over-year, mineral production values were projected to increase for 2019 in nine of Canada's 13 provinces and territories. The production values for four jurisdictions were projected to decrease, two of which remained roughly consistent. Quebec posted the largest gain in absolute value by more than $789 million while British Columbia dropped by more than $850 million.

Overall, total production value is up 2.5%, or more than $1.1 billion. *See Figure 4* for more information.

Looking to 2020, while the mining industry in aggregate rebounded well from peak COVID-19 lows, not all commodities followed the same trajectory. Gold, as a financial hedge, soared, suggesting that regions with concentrated gold production (such as Nunavut, Quebec and the Yukon) are poised to see increases in 2020 production values. Diamonds, on the other end of the spectrum, have fallen furthest and have not yet recovered suggesting production values in the Northwest Territories will diminish year-over-year given the concentration of diamond mining in the region. As discussed above, a plurality of other commodities saw dramatic price drops followed by buoyant and sustained price recoveries now into their 6th month, suggesting that provinces with diversified mining industries will be better able to hedge this volatility from a production value perspective.

Regional Distribution of Mining

Figure 5 illustrates the geographical location of Canada's mining clusters and active mineral development regions (*details in Annex 1*). The Northwest Territories are the country's dominant source of diamonds. Leading in the production of gold are Ontario and Quebec. Saskatchewan produces all of Canada's uranium and has world-class potash reserves. British Columbia is prominent in steelmaking coal production. Newfoundland and Labrador and Quebec produce virtually all of Canada's iron ore. (For detailed mineral production by province and territory, *see Annex 2* and *Annex 3*).

CANADIAN MINES IN 2019

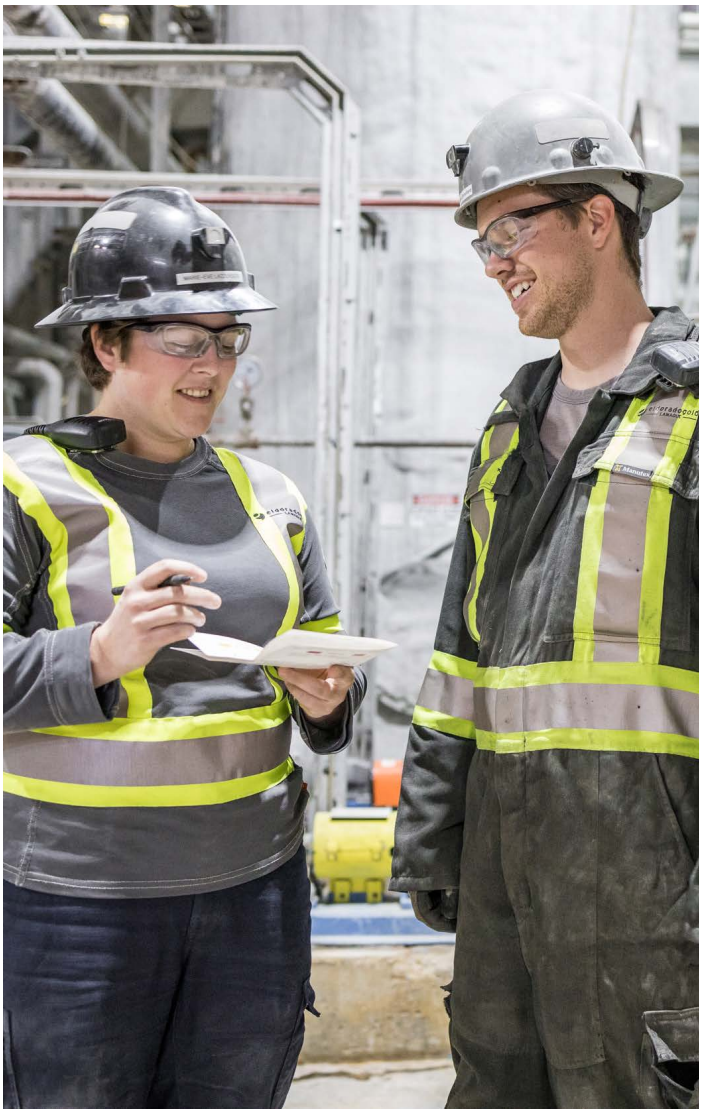
Total mining establishments: 1,001
Metals: 70
Non-metals: 931

PROVINCES WITH THE MOST METAL MINES

Quebec – 24
Ontario – 18
British Columbia – 9

MAIN TYPES OF NON-METAL MINES

Sand and gravel – 571
Stone – 265
Peat – 50



Marie-Ève Lacoursière, Mill Electric Supervisor at Eldorado Gold Québec revised her employee's work card. The work card facilitates the transmission of information between supervisors of different work shifts (photo credit: Mathieu Dupuis).

Canada's mining business has significant ties to its major cities. Some of the largest Canadian and international mining companies are headquartered or have a significant presence in urban centres, including: Vancouver (Newmont, Teck Resources Limited), Saskatoon (Cameco Corporation, PotashCorp), Calgary (Canadian Natural Resources Limited, Suncor Energy Inc.), Toronto (IAMGOLD, Vale, Glencore) and Montreal (ArcelorMittal, Iron Ore Company of Canada, Rio Tinto Alcan).

Vancouver is the global centre of expertise for mineral exploration. Some 800 exploration companies are located in British Columbia, most of which are in the greater Vancouver area.

Toronto is the global centre for mining finance. The Toronto Stock Exchange (TSX) and TSX Venture Exchange are the world's number one mining and exploration listing venues, where much of the world's total mining equity capital is raised annually (see Section 3 for more information). The city itself hosts mining company head offices, as well as several hundred mining suppliers, consulting firms and service providers.

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

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

Regional Value of Mining

A correlation exists between production values and expenditures on resource development. The top four provinces by production value in 2019 – Ontario, Quebec, British Columbia and Saskatchewan – also led in expenditures on mineral resource development (*see Figure 6*). Of the $9.7 billion invested in mine complex development in Canada, combined spending across these three provinces exceeded $6.6 billion (69% of the total).

One region to look to is Nunavut, where in recent years significant investments in mine complex development have been the norm, with 2019 seeing $1.2 billion invested. The majority of this investment was made by Agnico Eagle who recently opened its Meliadine mine and Amaruq Whale Tail Project, both of which are now operational. A smaller, but regionally significant investment was made in the Yukon by Victoria Gold to develop its Eagle Gold project, which poured its first gold during summer 2019.

VALUE OF MINING IN 2019

Canada-wide: $48.1 billion

TOP 4 PROVINCES

1. Quebec: $10.8 billion
2. Ontario: $10.7 billion
3. British Columbia: $8.8 billion
4. Saskatchewan: $6.7 billion

TAXES AND OTHER PAYMENTS TO GOVERNMENTS

Canadian governments receive substantial taxes and royalties as a result of mining activity, with these payments coming from the first three stages of activity – extraction, smelting and processing (*see Figure 2*). These tax revenues, in turn, are reinvested to provide education, healthcare and other social and economic development programs that support the quality of life that Canadians enjoy. The industry proactively discloses the taxes, royalties and other payments companies make to Canadian governments.

Payments to Governments

Canada's payment disclosure legislation, the *Extractive Sector Transparency Measures Act*, which came into force in 2015, requires companies to disclose the payments they make to governments that exceed a $100,000 threshold. This creates greater transparency of the taxes, royalties and other forms of disbursement that companies pay to governments, both at home and abroad.

According to the Natural Resource Governance Institute, in 2019, extractive sector companies reported payments of more than $38.4 billion to Canadian governments of which $4.7 billion derived from mining projects outside the oil and gas sector. These payments, to Indigenous, municipal, provincial and federal governments, are generally royalty or tax payments.

EXTRACTIVE SECTOR PAYMENTS TO CANADIAN GOVERNMENTS TOTALLED $38.4 BILLION IN 2019, OF WHICH $4.7 BILLION DERIVES FROM THE MINING SECTOR.

While payments to governments are a significant benefit generator from natural resource extraction and processing, they do not characterize the full extent of the benefit. For example, the mining industry pays the highest industrial wage in Canada, on which the federal government levies taxes from both companies and employees, both of which pay tax on virtually all goods and services they consume, augmenting these benefits even further.

INDIRECT CONTRIBUTIONS TO MINING INDUSTRY SUPPLIERS

The mining industry's economic impact far surpasses its direct contribution to the GDP. For example, mining accounts for approximately half of Canada's rail-freight revenues and tonnage annually, typically exceeding $6 billion in expenditure (details in Section 2). Organizations such as CN Rail, CP Rail, and the Ports of Montreal, Quebec and Vancouver rely on a vibrant mining industry. Many other related specialist firms, including those in the legal, environmental, taxation, engineering and other fields, support the industry's many requirements to locate, develop, construct, operate and reclaim a mine. These supply relationships are mutually beneficial. As just one example, supplier companies play a crucial role in introducing and spreading innovative technologies and ideas within the mining industry.

InfoMine, a mining database, reported in 2019 that more than 3,700 firms provide technical, legal, financial, accounting, environmental and other expertise to the Canadian mining industry. Most of these suppliers are located in Ontario and British Columbia, followed by Alberta, Quebec, Saskatchewan and Manitoba, and generate significant local benefits for Canada. For example, according to the Mining Suppliers of British Columbia, that province's supply sector generated $2.9 billion worth of economic activity in 2018.

Recently, InfoMine reported that Australia's identified mining supply sector surpassed that of Canada's, bumping Canada to third place. In 2019, neither Canada nor Australia's sectors grew much year-over-year, but the gap between them persists at roughly 700 firms. This is one of many indicators suggesting that Canada's attractiveness as a destination for mineral investment has declined in recent years. (See Section 3 of this report for more discussion on investment trends.)

NUMBER OF MINING SUPPLIERS IN LEADING COUNTRIES

United States: 5,988
Australia: 4,543
Canada: 3,767
Brazil: 3,652
Chile: 1,824

Source: InfoMine

FIGURE 1

CANADA'S REAL GROSS DOMESTIC PRODUCT, BY INDUSTRY, 2008-2019

Return to text

($ millions)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
All industries	1,621,860	1,569,642	1,624,731	1,678,329	1,710,432	1,753,922	1,804,500	1,819,352	1,839,238	1,898,412	1,949,587	1,981,604
Agriculture	25,895	24,841	24,314	25,051	25,568	31,191	27,843	29,476	31,225	31,291	32,696	34,121
Forestry and logging	4,020	3,173	3,668	4,034	3,937	4,049	4,210	4,259	4,255	4,128	3,985	3,633
Fishing, hunting and trapping	1,231	1,198	1,274	1,250	1,269	1,292	1,343	1,261	1,195	1,142	1,093	1,101
Support activities for agriculutre and forestry	2,182	2,250	2,291	2,356	2,322	2,470	2,475	2,496	2,543	2,598	2,546	2,625
Mining (including milling) and quarrying, and oil and gas extraction	**120,897**	**108,195**	**118,700**	**126,955**	**124,526**	**131,038**	**141,701**	**137,783**	**133,050**	**144,752**	**158,617**	**155,119**
Support activities for mining and oil and gas extraction	17,590	12,754	15,784	18,710	19,078	19,330	20,178	14,202	10,206	13,514	16,469	11,925
Electric power, gas and water utilities	39,927	37,605	38,121	39,344	38,954	38,986	40,238	40,378	40,854	42,297	43,155	43,923
Construction	118,474	111,197	120,344	125,049	134,959	140,830	144,554	141,176	134,927	140,900	142,842	142,063
Manufacturing	192,987	166,375	174,409	180,460	183,090	182,490	187,914	188,979	190,340	197,478	201,832	202,432
Trade, wholesale	81,913	76,333	82,073	88,224	91,307	95,163	97,598	94,411	95,305	100,892	99,964	102,210
Trade, retail	84,024	81,974	84,347	85,126	85,541	90,309	91,276	91,158	93,849	99,414	101,598	102,594
Transportation and warehousing	67,827	65,361	67,861	70,485	71,428	72,706	77,060	79,095	81,356	85,069	88,165	89,525
Information and cultural industries	53,044	52,370	53,480	54,218	54,677	54,378	56,130	57,290	57,797	58,537	62,785	64,458
Finance and insurance	98,536	97,555	99,679	103,061	104,909	108,753	111,814	117,263	122,076	125,859	127,282	131,059
Real estate and rental and leasing	186,130	191,269	197,448	203,639	210,100	215,931	222,014	228,619	235,390	241,380	244,697	251,077
Community, business and personal services**	206,289	201,819	202,201	208,764	215,169	220,313	230,830	232,623	233,338	238,017	245,463	252,863
Public administration	111,941	117,964	121,234	123,419	122,427	121,921	121,309	122,079	123,635	125,942	130,451	133,558
Health care and social assistance	113,826	116,492	118,226	120,291	122,167	122,357	124,221	126,012	128,931	131,423	135,557	139,987
Educational services	88,088	89,418	91,166	91,927	93,705	95,112	96,452	97,640	99,198	100,514	102,213	104,392

Source: Statistics Canada, CANSIM Table 379-0031.
Note: Values at Basic Prices in 2012 Constant Dollars.
***Combination of Professional, scientific and technical services, administrative and support, waste management, accomodation and food services, other services.*

FIGURE 2

CANADA'S REAL GROSS DOMESTIC PRODUCT, MINING, MINERAL MANUFACTURING, AND OIL AND GAS, 2008-2019

Return to text

($ millions)	2008	2009	2010	2011	2012	2013
Metal mines	15,494	12,732	13,189	14,462	14,669	16,296
Nonmetal mines	10,377	6,139	9,836	10,648	9,151	9,672
Coal mines	3,978	3,326	3,771	3,686	3,717	4,040
Total Mining	**29,849**	**22,197**	**26,796**	**28,796**	**27,537**	**30,008**
Primary metal manufacturing	12,517	9,310	10,623	11,270	11,151	10,785
Fabricated metal product manufacturing	14,588	12,417	12,949	14,004	15,052	15,434
Non-metallic mineral product manufacturing	6,905	5,857	6,002	6,120	6,215	6,098
Total Mineral Manufacturing	**34,010**	**27,584**	**29,574**	**31,394**	**32,418**	**32,317**
Oil and gas extraction	75,264	72,888	75,975	79,581	77,912	81,706
Petroleum and coal products manufacturing	11,806	12,557	11,851	11,344	11,396	11,331
Support activities for mining and oil & gas	17,590	12,754	15,784	18,710	19,078	19,330
Total Oil and Gas and Associated Manufacturing	**104,660**	**98,199**	**103,610**	**109,635**	**108,386**	**112,367**

($ millions)	2014	2015	2016	2017	2018	2019
Metal mines	17,605	18,883	19,069	18,670	18,859	19,289
Nonmetal mines	10,512	10,572	10,226	12,064	13,058	11,585
Coal mines	3,935	3,359	3,381	3,365	3,344	3,299
Total Mining	**32,052**	**32,814**	**32,676**	**34,099**	**35,261**	**34,173**
Primary metal manufacturing	11,637	11,495	11,791	12,128	11,916	11,038
Fabricated metal product manufacturing	15,368	14,819	13,813	14,605	15,815	16,580
Non-metallic mineral product manufacturing	6,219	6,140	6,075	6,474	6,858	7,110
Total Mineral Manufacturing	**33,224**	**32,454**	**31,679**	**33,207**	**34,589**	**34,728**
Oil and gas extraction	89,179	91,532	93,143	99,887	106,887	108,955
Petroleum and coal products manufacturing	11,637	11,645	11,525	12,271	11,537	11,330
Support activities for mining and oil & gas	20,178	14,202	10,206	13,514	16,469	11,942
Total Oil and Gas and Associated Manufacturing	**120,994**	**117,379**	**114,874**	**125,672**	**134,893**	**132,227**

Source: Statistics Canada, CANSIM Table 379-0031.
Note: Values at Basic Prices in 2012 Constant Dollars.

FIGURE 3
NATIONAL GDP BY INCOME AND EXPENDITURE (2007-2019)

Return to text

Mining Industry Nominal GDP (Dollars x 1,000,000)

Indicators	Commodities	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2018-19 % diff.
Gross value added	Total commodities	46,502	48,579	33,422	43,329	54,095	46,934	43,711	43,308	41,861	41,019	45,440	46,840	45,265	-3%
Gross value added	Extraction	23,347	25,877	17,533	25,336	32,892	26,444	24,862	23,888	22,821	22,159	25,324	25,638	23,952	-7%
Gross value added	Coal	1,669	3,881	3,242	3,989	5,575	3,704	2,726	1,998	1,506	2,540	3,941	4,192	3,882	-7%
Gross value added	Metallic minerals	16,198	13,218	8,210	13,056	16,766	14,132	14,105	13,568	12,565	13,063	14,294	13,914	13,536	-3%
Gross value added	Non-metallic minerals	5,480	8,778	6,081	8,291	10,551	8,608	8,031	8,322	8,750	6,556	7,089	7,532	6,534	-13%
Gross value added	Services	3,861	4,684	3,472	4,550	6,127	6,269	5,873	5,368	5,171	5,028	5,541	5,633	6,108	8%
Gross value added	Primary manufacturing	19,294	18,018	12,417	13,443	15,076	14,221	12,976	14,052	13,869	13,832	14,575	15,569	15,205	-2%
Gross value added	Primary metallic minerals products	12,435	11,733	7,191	8,157	9,605	8,538	7,432	8,312	8,281	8,289	8,744	8,982	8,114	-10%
Gross value added	Primary non-metallic minerals products	6,859	6,285	5,226	5,286	5,471	5,683	5,544	5,740	5,588	5,543	5,831	6,587	7,091	8%
Gross value added	Total commodities	18,380	17,534	15,537	16,527	18,664	20,226	20,731	21,455	21,898	21,284	22,440	24,572	25,461	4%
Gross value added	Miscellaneous metal products	2,155	1,714	2,320	2,694	3,298	3,516	3,452	3,624	3,943	3,923	3,542	3,380	3,071	-9%
Gross value added	Secondary metal products	3,083	3,303	2,093	2,559	2,788	2,941	2,948	3,307	3,268	2,978	3,351	3,659	3,662	0%
Gross value added	Services and custom work	2,128	2,026	1,933	1,980	2,115	2,165	1,973	2,072	2,129	2,084	2,237	2,459	2,611	6%
Gross value added	Tertiary metal products	11,014	10,491	9,191	9,294	10,463	11,604	12,358	12,452	12,558	12,299	13,310	15,074	16,117	7%
Total	**Total Minerals and Metals**	**64,882**	**66,113**	**48,959**	**59,856**	**72,759**	**67,160**	**64,442**	**64,763**	**63,759**	**62,303**	**67,880**	**71,412**	**70,726**	**-1%**

FIGURE 3 CONTINUED
NATIONAL GDP BY INCOME AND EXPENDITURE (2007-2019)

Return to text

Mining Industry Nominal GDP (Dollars x 1,000,000)

Indicators	Commodities	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2018-19 % diff.
Gross value added	Total commodities	50,170	50,877	38,692	43,596	47,769	46,937	46,315	47,686	47,771	47,424	49,969	51,250	50,174	-2%
Gross value added	Extraction	28,684	29,156	21,903	24,822	27,440	26,446	27,087	28,120	28,768	29,177	30,598	31,068	29,866	-4%
Gross value added	Coal	3,733	3,932	3,289	3,730	3,646	3,705	3,984	3,435	2,931	3,022	3,008	2,925	2,887	-1%
Gross value added	Metallic minerals	14,251	14,919	11,582	12,007	14,054	14,133	14,395	15,103	16,199	16,709	16,416	16,204	16,505	2%
Gross value added	Non-metallic minerals	10,700	10,305	7,032	9,085	9,740	8,608	8,708	9,582	9,638	9,446	11,174	11,939	10,474	-12%
Gross value added	Services	5,248	5,779	4,188	5,184	6,148	6,269	5,899	5,462	5,074	4,490	5,447	5,666	6,113	8%
Gross value added	Primary manufacturing	16,238	15,942	12,601	13,590	14,181	14,222	13,329	14,104	13,929	13,757	13,924	14,516	14,195	-2%
Gross value added	Primary metallic minerals products	9,694	9,669	7,282	8,140	8,623	8,539	8,124	8,792	8,684	8,483	8,303	8,664	8,067	-7%
Gross value added	Primary non-metallic minerals products	6,544	6,273	5,319	5,450	5,558	5,683	5,205	5,312	5,245	5,274	5,621	5,852	6,128	5%
Gross value added	Total commodities	19,850	17,984	15,793	17,100	18,971	20,225	20,986	21,753	21,355	20,415	22,088	23,210	23,550	1%
Gross value added	Miscellaneous metal products	2,354	1,867	2,199	2,591	3,280	3,517	3,485	3,497	3,519	3,524	3,569	3,623	3,293	-9%
Gross value added	Secondary metal products	3,072	3,254	2,184	2,721	2,862	2,940	3,170	3,506	3,571	3,444	4,309	4,309	4,240	-2%
Gross value added	Services and custom work	2,098	1,842	1,703	1,800	2,018	2,165	2,231	2,343	2,301	2,191	2,377	2,504	2,609	4%
Gross value added	Tertiary metal products	12,326	11,021	9,707	9,988	10,811	11,603	12,100	12,407	11,964	11,256	11,833	12,774	13,408	5%
Total	**Total Minerals and Metals**	**70,020**	**68,861**	**54,485**	**60,696**	**66,740**	**67,162**	**67,301**	**69,439**	**69,126**	**67,839**	**72,057**	**74,460**	**73,724**	**-1%**

Source: Statistics Canada. Table 38-10-0285-01 - Natural resources satellite account, indicators, annual (dollars unless otherwise noted). (accessed: August 20, 2020)
Note[1]: Real GDP measured in 2012 constant prices.

FIGURE 4

CANADA, VALUE OF MINERAL PRODUCTION BY PROVINCE AND TERRITORY, 2009 AND 2019[P]

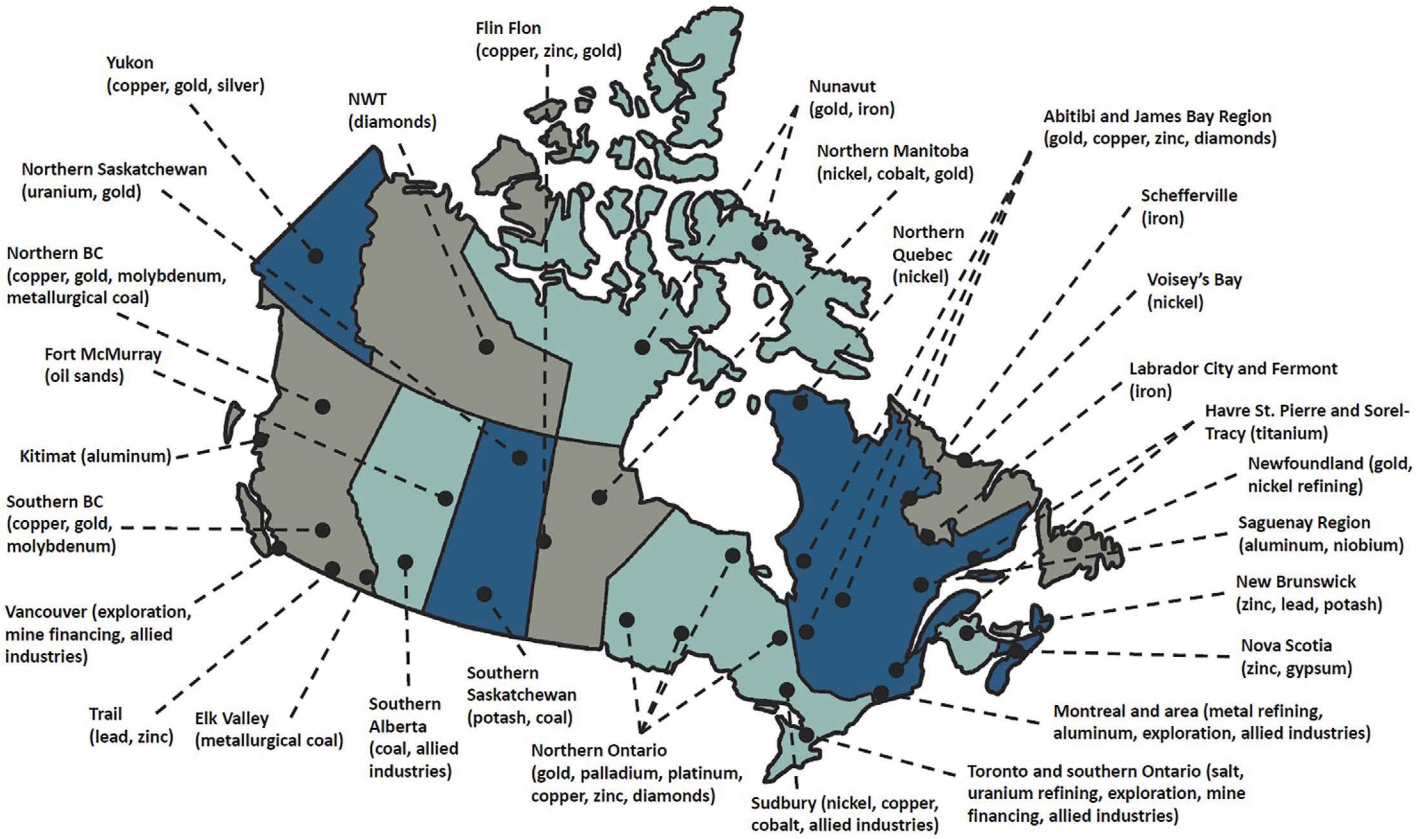
Return to text

($ millions)	2009			2019[P]		
Province/Territory	($ current millions)	(%)	RANK	($ current millions)	(%)	RANK
Quebec	5,271.6	17.6	3	10,775.3	22.4	1
Ontario	5,802.8	19.3	1	10,662.9	22.1	2
British Columbia	5,417.6	18.0	2	8,799.8	18.3	3
Saskatchewan	5,059.1	16.9	4	6,729.5	14.0	4
Newfoundland and Labrador	2,409.5	8.0	5	3,543.1	7.4	5
Alberta	1,633.9	5.4	6	2,187.5	4.5	6
Northwest Territories	1,506.6	5.0	7	1,817.9	3.8	7
Manitoba	1,341.4	4.5	8	1,360.2	2.8	8
Nunavut	0.0	…	13	1,316.0	2.7	9
Nova Scotia	232.8	0.8	11	418.9	0.9	10
New Brunswick	1,100.4	3.7	9	373.9	0.8	11
Yukon	240.3	0.8	10	169.8	0.4	12
Prince Edward Island	3.6	…	12	3.4	…	13
Canada	**30,019.5**	**100.0**		**48,158.2**	**100.0**	

Sources: Natural Resources Canada; Statistics Canada.
[P] Preliminary; … Amount too small to be expressed.
Notes: This table includes the production of coal but excludes the production of petroleum and natural gas. Numbers may not add to totals due to rounding. As of reference year 2017, Statistics Canada has ceased the collection of the cement data. Values for cement production have been removed from 2009 values.

FIGURE 5
CANADIAN MINING INDUSTRY CLUSTERS

Return to text



Source: The Mining Association of Canada.

FIGURE 6

TOTAL MINERAL DEVELOPMENT EXPENDITURES, BY STAGE AND PROVINCE AND TERRITORY, 2019[P]

Return to text

Province/Territory	Exploration ($ millions)	Deposit Appraisal ($ millions)	Mine Complex Development ($ millions)	Total Expenditures ($ millions)
Newfoundland and Labrador	46.8	8.3	888.6	943.6
Nova Scotia	10.3	25.6	64.9	100.8
New Brunswick	9.4	1.3	13.8	24.5
Quebec	360.3	231.4	1797.2	2,388.8
Ontario	385.3	156.8	2065.9	2,607.9
Manitoba	50.7	17.4	263.7	331.8
Saskatchewan	162.4	132.5	2086.5	2,381.4
Alberta	15.9	26.4	298.2	340.5
British Columbia	224.3	163.5	728.3	1,116.1
Yukon	72.9	71.7	178.4	323.0
Northwest Territories	56.9	9.4	149.3	215.7
Nunavut	116.7	17.7	1172.2	1,306.6
Canada	**1,511.8**	**862.1**	**9,706.9**	**12,080.7**

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

[P] Preliminary.

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

SECTION 2

THE ACTIVITIES: PRODUCTION, PROCESSING AND TRANSPORTATION

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

PRODUCTION OF KEY MINERALS

Richly endowed with natural resources, Canada ranks among the top five countries in the global production of 17 minerals and metals (*details in Annex 4*):

- First in potash
- Second in gemstones
- Third in diamonds, niobium and uranium
- Fourth in aluminium, cadmium, indium and wollastonite
- Fifth in graphite, gold, mica, sulphur, tellurium and nickel

While Canada produces some 60 different minerals and metals, its status as a top-five producer has slipped over the past 15 years. Today, Canada no longer holds the position as a top producer of copper, zinc, molybdenum, and lead, having been surpassed by other countries. For example, Canada has lost ranking for critical battery metals nickel and cobalt – second in the world for the production of both in 2008 accounting for 15.9% and 13.3% of global production respectively – having fallen in 2019 to 5th for nickel (at 6.7% of global production) and 8th for cobalt (at 2.3% of global production). In both cases, the absolute volumes produced have shrunk while that of other jurisdictions have increased, suggesting the need to locate and increase the attractiveness of Canada for the development of these materials critical to the climate transition.

Also noteworthy is that Canada has become a top-five producer over the same period of time of five commodities for which it previously was not on the charts, including mica, indium, gemstones, wollastonite and graphite. Also of note is Canada's position as third in the world as a producer of diamonds, according to value, despite being fourth in production – an increase from fifth globally for production year-over-year.

Production Values

In 2019, the value of Canadian mineral production decreased marginally, falling 1.8% (or by $900 million) to $48.1 billion (*see Figure 7*). Values subtly increased across metal production, but mildly contracted across non-metal and coal streams. Increases and decreases in production values correlate to the increases and decreases in metal, non-metal and coal prices over the course of the year.

Canada's top 10 minerals and metals (*see Figure 8*) each had projected production values of more than $1.2 billion in 2019, with six (gold, potash, copper, iron ore, coal, and nickel) at more than $3 billion each. Together, the top 10 minerals and metals represented $41.4 billion (88%) of Canada's total mineral production value in 2019. *See Annex 5* for a complete set of production volumes and values.

On the petroleum front, synthetic crude oil accounted for 28% of Canada's crude oil production volume in 2018, a modest decrease from 2017 (*see Figure 9*). Indicative of an increase in oil prices, the absolute value of synthetic crude

oil production increased from $25.4 billion to $26.6 billion year-over-year.

With prices for a host of minerals, metals and energy products plummeting due to COVID-19 economic contraction, supply-chain disruptions and, in the case of energy, demand destruction, one should expect the 2020 production values for the commodities noted in Figures 8 and 9 to be measurably lower. While a number of minerals and metals recovered their losses, with several exceeding their pre-COVID highs, many operations have not yet fully recovered pre-COVID levels of production. While companies are tracking to resume optimal production by the end of 2020/early 2021, this reality will apply downward pressure on production values for 2020.

The price of oil has followed a different trajectory. The resulting reduction in mobility associated with COVID restrictions has seen the consumption of transportation fuels (both surface and aviation) remain depressed compared to pre-COVID levels, without a substantial recovery. This persisting demand destruction has resulted in subdued prices persisting well into 2020, with the per-barrel price of oil not having reached pre-COVID highs at the time of writing. One can presume this market reality will significantly diminish oil production values for 2020 when the numbers are tallied and released by the government next year.

PROCESSING OF MINERALS

Canada has a significant mineral-processing industry, with 30 facilities – comprised of non-ferrous metal smelters, refineries and conversion facilities – in six provinces (*see Figure 10*).

CANADA'S MINERAL-PROCESSING FACILITIES

- Quebec: 9 smelters, 4 refineries, 2 secondary smelters
- Ontario: 2 secondary smelters, 3 refineries, 3 smelter/refineries, 1 conversion facility
- Manitoba: 1 smelter/refinery, 1 refinery
- Alberta: 1 refinery
- British Columbia: 1 smelter, 1 secondary smelter, 1 smelter/refinery, 1 processing plant
- Newfoundland and Labrador: 1 refinery

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

The quantity and value of refined metal production in Canada has become irregular due to the depletion of reserves and greater dependence on imported concentrates. Figure 11 shows that the production volumes for refined metals over the past 10 years have been mixed. Since 2008, production of refined copper and zinc have dropped, while aluminium has fluctuated. The production of cadmium, cobalt and lead has increased. In absolute terms, total refined Canadian metal production has decreased by 85.6%, or 252,067 tonnes, since 2009.

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

Other factors also influence the competitiveness of Canada's mineral-processing industry. Canada's processing facilities operate in a global arena, where China and other countries are expanding their capacity with newer facilities and competing fiercely for raw materials. The cost of electricity is also a factor in some Canadian jurisdictions, such as Ontario, where rates have steadily increased in recent years. Given the energy-intensive nature of these value-added processes, high-cost power jurisdictions dampen the competitiveness of existing operations and can deter future investment. Finally, the age of some Canadian operations, and their ability to meet potential regulatory requirements, also affects their viability.

In the face of these combined factors, the downstream Canadian mining industry risks being left behind. This is particularly relevant given the federal government's recognition of how critical the stability and security of the mining and primary metal manufacturing ecosystem

The QNS&L train from IOC Operations hauling iron ore between Labrador City, Newfoundland and Labrador and Sept-Iles, Quebec.

is to attracting advanced manufacturing investment. Noteworthy, in the electric vehicle battery space, is Tesla's Elon Musk making an open call to the global mining community for more nickel. With its lowest carbon nickel mining and smelting production diminishing in recent years, Canada must signal that it no longer takes its smelting and refining industry for granted, and take action to protect its competitiveness as essential to the low-carbon economy both in Canada and abroad.

At stake are real benefits, such as stable, long-term, and high-paying employment, including union jobs. For example, primary metal manufacturing and non-metallic mineral product manufacturing employment exceeded 83,000 jobs in 2019. Both sectors combined account for almost 21% of the industry's overall direct employment for the year. While significant, these numbers have been in decline. Since 2008, employment in primary metal manufacturing and non-metallic mineral product manufacturing has dropped by 38,000 jobs, or nearly 10% of the industry's current total direct workforce. A concrete example of this is the recently announced closure of the Brunswick Smelter in northern New Brunswick in November 2019.

TRANSPORTATION OF MINING PRODUCTS

Over the last year, Canada has witnessed an unprecedented level of disruption in its supply chain through labour actions by railway and port workers, civil disruption in the form of random and sporadic rail blockades and, of course, the widespread and ongoing disruptions associated with COVID-19. Canada's logistics supply chain is critical to the flow of mined and refined products to both domestic and international markets, and the mining industry is the largest industrial customer group of Canada's transportation sector, providing it with considerable tonnage. Canada can and must do better at creating a stable and predictable logistics supply chain that restores greater confidence in Canada's reliability as a trading partner.

Strained Confidence in Canada's Supply Chain

MAC has been underscoring for years that the reliability of the supply chain is a significant determinant for mining industry investment given the volume of mineral and metal products transported in Canada. The reliability of Canada's supply chain has deteriorated significantly over the last 24 months, due largely to the number and extent of both regional and national disruptions, including:

- Winter 2018, plagued by rail service disruptions
- Vancouver port and rail congestion in winter 2019
- Extensive Canadian National Rail strike in November 2019
- Crippling rail barricades in February and March 2020
- Port of Montreal strike in July 2020

Noteworthy is that the above disruptions are separate and distinct from the additional supply chain impacts stemming from COVID-19, specifically the associated shortage of goods due to the pandemic and the general delays associated with the delivery of products. Unfortunately, rail service disruptions have become a perennial feature of Canada's supply chain since the mid-2000s and have escalated in both scale and frequency in more recent years, underscoring the need for further reforms to the system. The costs to Canada are immense: reputational damage as a reliable trade partner; additional operational costs to businesses; and reduced confidence in Canada as a destination for business investment for supply-chain reliant businesses, such as mining.

Rail

As the largest shipper by both freight revenue and volume shipped, the mining industry is the Canadian rail system's most significant customer. In 2019, shipments of coal, iron ore, potash and other minerals and metals represented 52.3% of total Canadian rail freight volume (*see Figure 12*). What's more is that the industry has accounted roughly half of total rail freight volume for the last 15 years, at least as long as the figure tabulates the data.

A key challenge is that Canada's rail freight system operates primarily as a dual monopoly, shared by CN and CP – Canada's only Class I railways. Mining operations, in addition to communities and businesses, are frequently captive to only one railway given the remoteness of their locations.

The number of rail service-related consultations and legislative measures in recent years reflect the persisting challenges that rail customers face. *The Fair Rail Freight Service Act*, the *Fair Rail for Grain Farmers Act* and the *Transportation Modernization Act* – three pieces of legislation in six years, have consistently failed to address systemic challenges, hampering opportunities for Canadian mining companies to grow their businesses, take advantage of newly created market share from trade agreements, and contribute more substantively to the Canadian economy. These ongoing challenges also impact Canada's reputation as a stable and reliable destination for foreign direct investment.

Transportation Modernization Act

In spring 2017, building on *Transportation 2030: A Strategic Plan for the Future of Transportation in Canada*, then Minister of Transport, the Honourable Marc Garneau, tabled Bill C-49, the *Transportation Modernization Act*.

While the package of reforms went further than those of Minister Garneau's predecessors, they still fell short of rebalancing the position of railways and customers in the rail freight market. MAC, in partnership with seven other resource shipping associations, advanced two recommendations to improve the bill. The first was to give shippers a right to a costing assessment in the context of a Final Offer Arbitration (FOA), one of the remedies under the Canadian Transportation Act. The second was to give the Canada Transportation Agency unilateral "own-motion" powers to investigate service disruptions in the rail freight market – with the aim of expeditiously advancing solutions to reduce economic harm.

For decades, the one useful remedy for captive shippers was FOA, and in order for it to work properly, there has to be reasonable access to information on both sides of an arbitration, including with respect to costing. Without such information, shippers are negotiating in the dark, and arbitrators are unable to assess the reasonableness of bids. For many years, shippers requested such information during a FOA and the railways complied, leading to fair processes and reasonable outcomes. But that changed about a decade ago when railways started objecting to this information being shared, leaving shippers at a major disadvantage and effectively nullifying the FOA remedy.

MAC's proposed amendment would have made the provision of costing information a mandatory input into a FOA process, restoring the remedies to function as originally designed. The amendment was rejected on the basis of a false premise, and the own-motion powers proposal was reduced in scope, requiring the Agency to seek permission from the Minister instead of being able to act independently as a third-party regulator should be.

More recently, as a component of the *Transportation Modernization Act*, Transport Canada launched a regulatory consultation to establish a permanent transportation data regime, to which MAC has made a submission. To support greater balance in the rail freight market, MAC recommends the establishment of a robust transportation data regime that maximizes data disclosure and public access, including railway capacity data.

Achieving this would not only enhance transparency in the transportation system, but also improve relations between shippers and transportation service providers, avoid unnecessary and costly disputes, and provide government with the tools necessary to identify, assess and resolve existing policy challenges. MAC believes that robust data

transparency is the least onerous way to reform Canada's rail network without resorting to re-regulation. Allowing data to inform the interactions between railways and their customers is the nearest term, most justifiable, and least intrusive choice available to federal decision makers to effect desired and positive change. Getting this data regime right is the last opportunity Transport Canada has to properly deliver on a key component of its *Transportation Modernization Act* initiative.

Trucking

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

According to the federal government's 2018 report, *Transportation in Canada*, trucks carried more than $220 billion in Canadian exports in 2017, 11% of which ($23.4 billion) were mining-related products. Trucks also carried $306 billion in imports to Canada, 89% of which ($26 billion) were mining-related products.

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

Marine

Mining is also a leading customer of Canadian ports. The Port of Montreal handles large volumes of iron ore and salt, as well as other mineral products such as fertilizer, ores, gypsum and scrap metal. Total dry bulk mined products accounted for approximately 4 million tonnes in 2019, or ~43%, of the port's dry bulk cargo shipments for the year. Generally, these arrive by ship as inbound cargo and are then transported by rail or truck to the region's smelting and refining facilities. On the container side, the port moves metallurgical, steel and mineral products, which together accounted for ~2.2 million tonnes of goods moved, or roughly 15% of total container volumes moved.

Beyond Montreal, the mining industry is a major contributor to Canada's St. Lawrence Seaway. Shipments of iron ore, coke and coal represent ~20% of total seaway traffic, with iron ore accounting for the second-largest share of any commodity shipped.

Steelmaking coal accounts for ~19% of the total overall volume of goods handled at the Port of Vancouver annually, which moves shipments to China, Japan and other Asian markets. Fertilizer/potash represents another 8% of the port's volume, and minerals and ores another 9%. All told, mining products account for more than 50 million tonnes, or roughly 40%, of the port's volume.

Pipelines

The North American energy landscape is changing rapidly. Historically, Canadian oil companies shipped the majority of their product to the US, which was reliant on imports to meet its oil demand. However, hydraulic fracturing to produce oil and gas from shale and tight rock formations has transformed the US into a self-sufficient energy producer. Even in a low-price environment this development has drastically reduced the country's need for imported oil. Meanwhile, growth in global oil demand has shifted to Asia, with China surpassing the US as the world's largest oil importer. This shift in demand is challenging Canadian oil companies because existing transportation infrastructure is impeding their ability to access global markets. It is important to note that there are costs associated with the inadequacy of Canada's existing pipeline network. Declining US demand, together with insufficient pipeline capacity and transportation bottlenecks in the US Midwest, are driving down the price for Canadian crude oils relative to other crude oils. Even during a time of demand destruction, such as COVID temporarily created, Western Canadian Select is still trading at roughly a $10 per barrel discount compared to West Texas Intermediate, meaning Canadians are not receiving the full benefit of energy natural resource extraction.

To address this situation, Canada must develop new pipeline and port infrastructure to reach markets in Asia, the US Gulf Coast, eastern Canada, and the US seaboard markets. The first step is constructing the Trans Mountain Expansion Pipeline as expeditiously as possible to narrow the price discount for barrels sold to the US.

FIGURE 7
VALUE OF CANADIAN MINERAL PRODUCTION, 1999-2019[P]

Return to text

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019[P]
Metals	9.7	11.0	10.4	10.4	9.7	12.4	14.6	21.1	26.2	22.6	15.5	21.4	25.6	23.6	23.5	24.2	23.1	23.3	25.7	27.1	27.7
Non-metals	6.1	6.2	6.3	6.5	7.4	8.7	8.8	8.6	9.8	17.7	10.2	13.2	16.2	14.9	13.9	14.1	14.8	12.1	13.3	15.5	14.6
Coal	1.5	1.4	1.6	1.6	1.5	1.6	2.9	2.9	2.7	5.0	4.4	5.5	7.5	5.9	4.9	3.9	3.1	4.0	6.3	6.5	5.8
Total Mineral Production	**17.3**	**18.6**	**18.2**	**18.5**	**18.6**	**22.7**	**26.3**	**32.6**	**38.7**	**45.3**	**30.1**	**40.1**	**49.3**	**44.4**	**42.3**	**42.2**	**41.0**	**39.4**	**45.3**	**49.0**	**48.1**

Sources: Natural Resources Canada; Statistics Canada.
[P] Preliminary.
Notes: This table includes the production of coal but excludes the production of petroleum and natural gas. Numbers may not add to totals due to rounding. As of 2017, Statistics Canada is no longer conducting the monthly survey of cement, and values are no longer included in Canada's mineral production. Cement production has also been excluded from 1999 to 2016 values for comparability.

FIGURE 8

CANADA'S TOP TEN METALLIC AND NON-METALLIC MINERAL PRODUCTS, BY VALUE OF PRODUCTION, 2009 AND 2019[P]

Return to text

		2009		2019[P]	
	Unit of Measure	Quantity	$ Value ($ millions)	Quantity	$ Value ($ millions)
Gold	t	97	3,449	175	10,285
Coal	kt	63,935	4,406	51,652	5,774
Iron ore	kt	31,728	2,674	58,472	5,587
Potash (K_2O)[1]	kt	4,297	3,431	12,770	5,548
Copper	kt	470	2,766	544	4,346
Nickel	kt	132	2,214	181	3,323
Sand and gravel	kt	201,678	1,362	243,818	2,272
Diamonds	000 ct	10,946	1,684	18,491	2,186
Stone	kt	153,038	1,503	177,733	1,961
Platinum group	t	11	258	28	1,202

Sources: Natural Resources Canada; Statistics Canada.

[P] Preliminary.

Notes: [1]Shipments of potash to Canadian potassium sulphate plants are not included in this table. As of 2017, Statistics Canada is no longer conducting the monthly survey of cement, and values are no longer included in Canada's mineral production. Cement production has been excluded from 2009 values for comparability with 2019 data.

FIGURE 9

PRODUCTION OF SYNTHETIC CRUDE OIL BY OIL SANDS MINING PLANTS, ALBERTA AND CANADA, BY QUANTITY AND VALUE, 1998-2018

Return to text

	Synthetic Crude Oil (000's of m3)	Total Crude Oil and Equivalents	Synthetic Crude as % of Total	Synthetic Crude Oil ($000)	Total Crude Oil and Equivalents ($000)	Synthetic Crude as % of Total
ALBERTA						
1998	17,870.8	94,676.2	18.9	2,313,518	9,734,475	23.8
1999	18,766.9	89,065.5	21.1	3,252,547	13,727,829	23.7
2000	18,608.0	89,136.1	20.9	5,188,916	21,687,681	23.9
2001	20,260.6	89,364.5	22.7	4,995,003	17,734,825	28.2
2002	25,494.6	89,885.1	28.4	6,455,743	19,778,759	32.6
2003	25,028.8	95,311.4	26.3	6,777,342	22,187,602	30.5
2004	26,661.9	101,007.0	26.4	8,570,468	27,767,704	30.9
2005	21,932.5	98,878.7	22.2	9,213,624	33,282,754	27.7
2006	28,764.2	106,017.8	27.1	14,831,145	38,498,843	38.5
2007	39,900.2	108,853.3	36.7	18,012,945	42,130,415	42.8
2008	38,020.7	108,322.4	35.1	25,214,415	62,941,690	40.1
2009	44,330.8	112,937.7	39.3	19,043,537	43,934,049	43.3
2010	46,110.5	119,559.3	38.6	23,473,269	54,005,153	43.5
2011	49,375.1	129,183.4	38.2	30,518,182	69,033,911	44.2
2012	52,455.2	143,873.9	36.5	28,588,084	69,346,737	41.2
2013	54,328.1	154,324.2	35.2	34,382,129	79,535,264	43.2
2014	55,345.9	168,971.7	32.8	35,467,401	94,140,139	37.7
2015	56,646.4	179,262.9	31.6	21,512,827	57,544,954	37.4
2016	54,072.0	179,202.5	30.2	19,276,126	51,957,648	37.1
2017	59,565.2	196,674.2	30.3	25,370,287	71,020,665	35.7
2018[P]	61,299.4	215,910.0	28.4	28,598,985	82,132,901	34.8
CANADA						
1998	17,870.8	128,400.3	13.9	2,313,518	12,940,149	17.9
1999	18,766.9	122,287.0	15.3	3,252,547	18,698,282	17.4
2000	18,608.0	127,769.2	14.6	5,188,916	30,523,595	17
2001	20,260.7	128,951.0	15.7	4,995,003	24,911,953	20.1
2002	25,494.6	136,969.8	18.6	6,455,743	29,956,080	21.6
2003	25,028.8	144,813.2	17.3	6,777,342	33,610,498	20.2
2004	26,661.9	149,159.6	17.9	8,570,468	40,639,940	21.1
2005	21,932.5	146,207.9	15.0	9,213,624	49,159,801	18.7
2006	28,764.2	161,434.0	17.8	14,831,145	63,649,683	23.3
2007	39,900.2	160,448.3	24.9	18,012,945	62,919,592	28.6
2008	38,020.7	158,950.4	23.9	25,214,415	91,757,005	27.5
2009	44,330.8	158,100.4	28.0	19,043,537	61,558,676	30.9
2010	46,110.5	165,335.3	27.9	23,473,269	75,174,373	31.2
2011	49,375.1	175,312.1	28.5	30,518,182	95,496,704	32.3
2012	52,455.2	189,133.7	27.7	28,588,084	94,076,834	30.4
2013	54,328.1	202,292.6	26.9	34,382,129	106,507,173	32.3
2014	55,345.9	218,050.8	25.4	35,467,401	122,128,728	29.0
2015	56,646.4	224,157.5	25.3	21,512,827	72,081,704	29.8
2016	54,072.0	225,089.3	24.0	19,276,126	65,410,168	29.5
2017	59,565.2	244,670.2	24.3	25,370,287	88,548,410	28.7
2018[P]	61,299.4	266,733.2	23.0	28,598,985	103,800,123	27.6

Sources: Natural Resources Canada; Statistics Canada.

[P] Preliminary.

FIGURE 10
NON-FERROUS SMELTERS AND REFINERIES IN CANADA, 2019

Return to text

Owner/Operator	Operation	Type of facility	Location	Outputs
Newfoundland and Labrador				
Vale Newfoundland and Labrador Limited	Long Harbour	(Ref.)	Long Harbour	Ni, Cu, Co
Quebec				
Rio Tinto Aluminium Inc./Aluminium Austria Metall Québec/Hydro Aluminium a.s./Société générale de financement du Québec/Marubeni Québec Inc.	Alouette	(Sm.)	Sept-Îles	Al
Alcoa Corporation	Baie-Comeau	(Sm.)	Baie-Comeau	Al
Rio Tinto Aluminium Inc.	Grande-Baie	(Sm.)	Grande-Baie	Al
Rio Tinto Aluminium Inc.	Laterrière	(Sm.)	Laterrière	Al
Rio Tinto Aluminium Inc.	Vaudreuil Works	(Ref.)	Jonquière	Alumina
Rio Tinto Aluminium Inc.	Arvida	(Sm.)	Arvida	Al
Rio Tinto Aluminium Inc.	Alma	(Sm.)	Alma	Al
Alcoa Corporation	Deschambault	(Sm.)	Deschambault	Al
Alcoa Corporation/Rio Tinto Aluminium Inc.	Bécancour	(Sm.)	Bécancour	Al
Glencore Canada Corporation	CCR	(Ref.)	Montréal-Est	Cu, Au, Ag, Se, Te, Ni, PGM
Terrapure Environmental	Sainte-Catherine	(Ref.), (Sec. Sm.)	Sainte-Catherine	Recycled Pb
Glencore Canada Corporation	General Smelting Company of Canada	(Sec. Sm.)	Lachine	Recycled Pb
Glencore Canada Corporation/Noranda Income Fund	Canadian Electrolytic Zinc Limited (CEZinc)	(Ref.)	Valleyfield	Zn, Cd, S*
Glencore Canada Corporation	Horne	(Sm.)	Rouyn-Noranda	Cu, Au, Ag

FIGURE 10 CONTINUED
NON-FERROUS SMELTERS AND REFINERIES IN CANADA, 2019

Return to text

Ontario				
Royal Canadian Mint	Ottawa	(Ref.)	Ottawa	Au, Ag, Cu, PGM
Cameco Corporation	Port Hope	(Con. Fac.)	Port Hope	U
Vale Canada Limited	Port Colborne	(Ref.)	Port Colborne	Electrolytic Co, PGM, Co oxide
Tonolli Canada Ltd.	Mississauga	(Sec. Sm.)	Mississauga	Recycled Pb
Real Alloy Canada Ltd.	Mississauga	(Sec. Sm.)	Mississauga	Recycled Zn
Asahi Refining Canada Ltd.	Brampton	(Sm.), (Ref.)	Brampton	Au, Ag, Recycled Pb
Glencore Canada Corporation	Sudbury	(Sm.), (Pl.)	Sudbury	Ni, Cu, Co, Au, Ag, PGM
Vale Canada Limited	Copper Cliff Complex	(Sm.), (Ref.), (Pl.)	Sudbury	Ni, Au, Ag, Se, Te, PGM, S*
Cameco Corporation	Blind River	(Ref.)	Blind River	U
Manitoba				
HudBay Minerals Inc.	Flin Flon	(Ref.)	Flin Flon	Zn
Alberta				
Sherritt International Corporation/General Nickel Company S.A. (The Cobalt Refinery Company Inc.)	The Cobalt Refinery Company Inc.	(Ref.)	Fort Saskatchewan	Ni, Co, Cu sulphide, ammonium sulphate
British Columbia				
Teck Resources Limited	Trail	(Sm.), (Ref.), (Pl.)	Trail	Zn, Pb, Bi, Cd, In, Ge, Au, Ag, S*
Metalex Products Ltd.	Richmond	(Sec. Sm.)	Burnaby	Recycled Pb
Rio Tinto Alcan Inc.	Kitimat	(Sm.)	Kitimat	Al

Source: Natural Resources Canada.
Note: Included are operations that produced in 2017.
(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, 2004-2019[P]

Return to text

Metals	2004	2005	2006	2007	2008	2009	2010	2011
Aluminium	2,592,160	2,894,204	3,051,128	3,082,625	3,120,148	3,030,269	2,963,210	2,987,964
Cadmium	1,880	1,727	2,090	1,388	1,409	1,299	1,357	1,240
Cobalt	4,673	4,618	4,555	4,883	4,899	4,358	4,145	5,317
Copper	526,955	515,223	500,463	453,453	442,050	335,896	319,618	273,761
Lead	241,169	230,237	250,464	236,688	259,094	258,854	273,017	282,589
Nickel	151,518	139,683	146,899	153,647	167,732	116,909	105,413	142,445
Zinc	805,438	724,035	824,464	802,103	764,310	685,504	693,014	662,151

Metals	2012	2013	2014	2015	2016	2017	2018	2019[P]
Aluminium	2,780,556	2,967,364	2,858,238	2,880,035	3,208,707	3,211,882	2,923,204	2,853,771
Cadmium	1,286	1,313	1,187	1,159	2,305	1,802	1,857	1,803
Cobalt	5,322	4,012	4,527	5,359	5,584	5,152	6,349	6,075
Copper	275,990	321,511	325,352	330,902	314,074	330,386	291,250	281,176
Lead	279,150	281,781	281,456	268,863	273,299	274,061	260,956	260,267
Nickel	146,850	152,728	149,486	149,717	158,381	154,759	137,411	124,736
Zinc	648,619	651,638	649,217	683,118	685,409	598,438	620,202	653,194

Sources: Natural Resources Canada; Statistics Canada.
[P] Preliminary.
Starting in 2020, the data can be downloaded from the StatCan website at the following link (Table: 16-10-0019-01)
www150.statcan.gc.ca/n1/daily-quotidien/200720/dq200720c-cansim-eng.htm

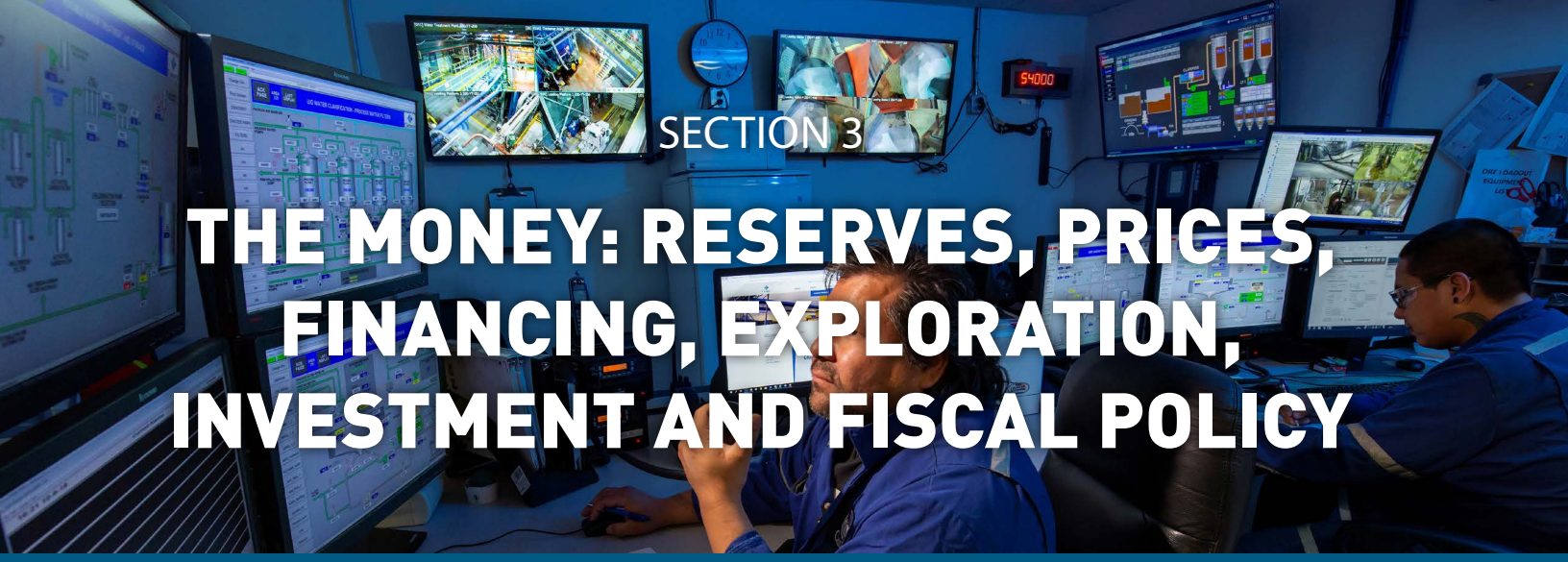
FIGURE 12

CRUDE MINERALS AND PROCESSED MINERAL PRODUCTS TRANSPORTED BY CANADIAN RAILWAYS, 2005-2019

Return to text

(million tonnes)	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total Freight Volume[1]	260.7	258.7	255.7	244.4	212.9	235.4	250.8	253.5	268.0	277.9	287.6	281.7	295.1	307.5	307.5
Total Crude Minerals	112.8	108.0	112.0	111.9	85.0	107.6	109.8	103.4	112.0	112.0	123.2	120.5	128.2	131.2	134.2
Total Processed Mineral Products	27.3	27.9	27.7	27.6	21.7	24.6	26.5	27.3	28.3	28.1	28.7	28.3	29.0	29.9	28.7
Total Crude and Processed Minerals	**140.1**	**135.9**	**139.8**	**139.4**	**106.7**	**132.3**	**136.4**	**130.7**	**140.3**	**140.1**	**151.9**	**148.8**	**157.2**	**161.1**	**162.9**
Crude Minerals and Processed Mineral Products as a Percentage of Total Freight Volume	53.7	52.5	54.7	57.1	50.1	56.2	54.4	51.5	52.4	50.4	52.8	52.8	53.3	52.4	53.0

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



SECTION 3

THE MONEY: RESERVES, PRICES, FINANCING, EXPLORATION, INVESTMENT AND FISCAL POLICY

THE FINANCIAL HEALTH OF THE MINERAL EXPLORATION AND MINING SECTOR CAN BE MEASURED BY EXPLORATION AND DEPOSIT APPRAISAL AND BY CAPITAL SPENDING, BOTH OF WHICH ARE AFFECTED BY MINERAL AND METAL PRICES. CANADA'S ABILITY TO CAPTURE MINERAL INVESTMENT IS CONTINGENT ON MINERAL PROSPECTS AND THE POLICY ENVIRONMENT, OF WHICH TAX POLICY IS A KEY DETERMINANT.

CANADIAN RESERVES

The past 30 years have seen marked declines in Canadian mineral reserves in all major base metals (*see Figure 13* and *Annex 6*). Since 1980, the most dramatic declines have been in lead (98.7%) and zinc (93%). Copper (51%) and nickel (72%) reserves have also fallen significantly.

Recent years have shown fluctuating growth for certain commodities. Since 2009, gold, silver and copper reserves have fluctuated, with gold at historic highs and copper at heights not seen since the early 1990s. For example, gold reserves have increased by 193% since 2009. Zinc, on the other hand, has ebbed downward, with current levels suggesting continued decline.

Consistent investment over time and access to large tracks of land to explore are needed to reverse the long-term decline in proven and probable reserves. To ensure the Canadian mining industry maintains its competitive advantage in this crucial area, the federal and provincial governments should continue to invest in geoscience and strengthen policies that stimulate exploration spending within Canada's borders.

MINERAL AND METAL PRICES

Mineral and metal prices are affected daily by global economic events. Prices for mined products are driven largely by the strength and performance of major economies. China, in particular, buys approximately 50% of the world's base metals, up from just 5% in the 1980s. Additionally, as a means of controlling exports of key commodities, China stockpiles iron ore, aluminium, copper, nickel, tin, zinc, oil and other commodities when prices are low, making it difficult for analysts to accurately forecast how supply and demand dynamics are likely to affect prices for minerals.

Figure 14 illustrates the strong growth, on an annual basis, in mineral prices from 2000 to 2007, the dramatic decline for most metals in late 2008, the robust rebound of prices through 2011, and the subsequent downward pressure on many minerals and metals during the recent downturn.

2020 saw tremendous volatility due to COVID-19 related disruptions, reaching peak volatility in April 2020 as prices plummeted for zinc (-18.9%), copper (-17%), nickel (-14.2%), iron ore (-8.6%) and other products. The global diamond market collapsed and there was 20% demand decline for petroleum products. The only bright spots in the early days of the pandemic were focused on gold – as a financial hedge in times of security – up 12.8%, and uranium, pushing to a four year high of $33.25 per pound (though largely driven by voluntary curtailment of production).

From May until October, depressed prices rebounded with London Metal Exchange average three-month future contracts trading 30%, 41% and 26% higher for zinc, copper and nickel respectively, while the monthly average price of iron ore skyrocketed 43%. The gap closed on metallurgical coal, bringing prices back to within striking distance of the pre-COVID high, while gold broke $2,000/oz – an all-time record – in August, before settling.

The general consensus is that demand for mineral and metal products should be favourable over the medium to long-term, despite volatility. Rising incomes and increased prosperity in developing countries due to industrialization and urbanization will continue to drive global demand. Further, the transition to a lower carbon future will result in significant demand for battery minerals and metals, including copper, nickel, lithium and cobalt, among others. The broader advanced manufacturing push, and the reliance on critical minerals, suggests an increased demand for these products as well. With the gradual emergence of India and its demand for minerals and metals – which some speculate will overtake China by 2050 – the mining industry should enjoy favourable commodity prices despite anticipated periods of market volatility.

FINANCING

Canada is the leading global centre for mining finance. The Toronto Stock Exchange (TSX) and TSX Venture Exchange (TSX-V) list 48% of the world's publicly traded mining companies, which combined accounted for more mining equity capital raised (37% of the global total) than any other exchange in the last five years. In 2019, 1,138 of the firms listed on the TSX were mining companies. Together, they had a combined market value of $381 billion and raised $12.5 billion in equity. TSX-listed mining companies mainly deal in gold, copper, uranium, silver, diamonds, zinc, nickel, lithium, iron ore, zinc and molybdenum.

The TSX-V gives emerging companies efficient access to capital while offering investors a regulated market for venture investments. As of December 31st , 2019, the 926 mining companies listed on the TSX-V had a combined quoted market value of $19 billion and raised $2.2 billion in equity capital for the year. Junior mining companies have faced challenges in raising capital in recent years, presenting challenges, but the federal government's decision to renew the Mineral Exploration Tax Credit for a five-year period in November 2018 – the first time such an expansive renewal has ever occurred – will surely help bolster these numbers in the years ahead. For more information, please visit the TSX at *www.tsx.com/listings/listing-with-us/sector-and-product-profiles/mining*.

Global Financing

According to the Prospectors and Developers Association, global funding for the mineral sector continued to contract in 2019 with new investments the lowest that have been seen in a decade. The roughly US$18 billion in equity raised within the sector last year represents a 40% drop from 2017 (*see Figure 15*).

TSX-LISTED MINING COMPANIES - 2019

On the TSX: 1,138

- Senior TSX companies: 212
- TSX-V companies: 926

Despite this, there are signs that Canada is holding its ground in the face of weakening investment. Mineral industry financing on foreign exchanges declined at twice the rate recorded in Canada, and notably nearly half of the exploration dollars raised in 2019 were through Canadian exchanges—the largest proportion in over a decade. On top of this, four regions in Canada projected year-over-year growth in exploration activity in 2019. In particular, Alberta reported a doubling in expenditures and Saskatchewan reached a seven-year high in 2019, according to NRCan.

The global mining industry raised $18.2 billion in equity in 2019, up $2.1 billion year-over-year. For context, in 2019, 51% of all global mining equity financing was done on the TSX and TSX-V, representing over 62% of the equity capital raised globally for the same year.

The large proportion of public financing conducted on the TSX reflects the exchange's appeal to both junior and senior companies. The TSX-V'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.

TSX-listed mining companies also have a strong global focus. As of January 2019, TSX and TSX-V companies were involved in more than 5,200 mineral projects worldwide (*see Figure 16*), with more than half in Canada. Most of the projects involve exploration, and very few will turn into operating mines. However, the locations do illustrate the prime areas of mining interest, and the broad international reach of the exchange.

EXPLORATION

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

healthy levels of investment over the long-term in order to achieve success.

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

Exploration and Deposit Appraisal in Canada

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

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

The two expenditures combined are generically called "exploration spending." 2019 saw a year-over-year decrease in exploration spending of 16% in 2018, with total expenditure falling from $2.46 billion in 2018 to $2.08 billion in 2019 (*see Figure 17*). Looking ahead, investment intentions suggest that this decline will be partially reversed with projected spending in 2020 poised to increase by 2.2% to $2.13 billion.

Financing for Junior Mining Sector

A major issue for junior mining companies is the persistent challenge of raising capital. Indicative of this dampened financial investment climate is the reversal in exploration and deposit appraisal expenditures. For example, in 2007, junior companies accounted for the majority (67%) of expenditure on these activities, with majors accounting for the balance (*see Figure 18*). From 2007 until 2015, juniors accounted for less each year, and the majors' share grew to 69%. The three years from 2016 to 2018 showed a return toward normalcy as junior companies' absolute share of exploration and deposit appraisal strengthened. Since then, however, their share of spending has contracted, and the dominance of senior driven investment has returned. Spending intentions for 2020 indicated a continuation of this trend with junior companies accounting for 41% of spending.

Allocation of Investment by Minerals and Metals

Precious metals attracted the lion's share of Canadian exploration spending again in 2019, accounting for 57% overall (*see Figure 19*) – a 4% decrease over 2018, and the second consecutive annual reduction.

This is positive, in one sense. For the third consecutive year, base metal exploration's share of total investment edged upwards, to 19%. Over the last three years, the absolute value of dollars invested in base metal exploration has nearly doubled, from $209 million in 2017 to $400 million in 2019. This trend is welcome as these investments are essential to address the ongoing depletion of Canadian base metal reserves. Without sustained and effective exploration, Canadian base metal production will outstrip reserve additions, reducing the competitiveness of our smelters and refineries. Further, new discoveries of copper, nickel and other battery minerals and metals are key to positioning Canada for success in capturing projected increases in global demand for these products.

International Exploration

Globally, Canada has been a top destination for mineral exploration investment for the past 37 years. Canada dropped to second place in 1992 for non-ferrous exploration budgets, surpassed by Australia. In 2004, Canada regained the top position and remained there until 2020, when it was again surpassed by Australia.

S&P Global Market Intelligence, in its 2020 edition of the State of Mineral Finance, assessed that global exploration expenditures from 2012-2017 declined over 65% from a peak of US$20.5 billion in 2012 to US$7 billion in 2016. The report confirmed a trend reversal in 2017 as expenditures increased approximately 15% compared to 2016 (to US$8.1 billion) and this trend continued in 2018, with global expenditures rising a further 18% to US$9.6 billion. Canada and Australia continued to lead global activity in 2018, accounting for 15% and 13.8% of expenditures, respectively. In 2020, while Canada and Australia are statistically tied at 16% each, Australia's absolute share of expenditure comes in slightly higher than that of Canada, at US$1.37 billion.

When exploration budgets factor in iron ore, S&P data indicate that Australia's share over Canada increases even further. Australia's attractiveness as a destination for investment has increased recently with its introduction of a

flow-through share mechanism to bolster investment in early stage exploration, as well as the predictability and reliability of its regulatory regime, and the dedicated focus on mining as a priority in the country's broader innovation agenda.

Part of the challenge in Canada is regulatory uncertainty, as companies will not invest where they do not believe they can permit a mine, and cost, where they will not invest where they can't afford to build and profitably operate a mine. At the time of writing the *Impact Assessment Act* had only recently come into force, and it is too soon to assess the success of this legislation in bringing greater certainty to companies seeking to permit natural resources projects in Canada.

INVESTMENT

Capital Spending

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

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

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

The federal government recently announced several new projects that will provide much needed enhancements to mine related infrastructure, including $155 million for the T'licho Road and $90 million to extend a section of the McKenzie Valley Highway in the Northwest Territories (NWT), and $360 million for the Yukon Resource Gateway to expand several road networks in the Yukon. Funding was announced to advance a road that would connect Gray's Bay Nunavut to Yellowknife via the Slave Geological Province in the NWT, as well as support the advancement and planning of the Kivalliq Hydro-Fibre link. These projects will enhance the economics of several mining projects, such as Fortune Minerals' Nico project in the NWT, Newmont's Coffee Gold project and Western Copper and Gold's Casino project in the Yukon.

Mining Industry Capital Investment

In 2020, capital spending in the Canadian mining industry is projected to account for 4.9% of Canada's total at $11.95 billion, down 16% year-over-year. This decrease reverses a one-year uptick in sectoral capital investment in 2019, following a five-year downward trend. Capital investment in the Canadian mining sector, which peaked in 2012 at $19.5 billion, has fallen 39% from that high (*see Figure 20*).

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

Spending on repairs, most of which falls into the machinery and equipment category, is not included in Figure 20 as this data lags behind capital expenditure data by one year. Adding 2018 repair costs (about $5.8 billion) to 2020 projected capital ($11.95 billion) and exploration ($2.1 billion) spending is projected to produce roughly $19.85 billion in Canadian mineral development investment in 2020.

Current and Future Investments

Despite volatility – including that caused by COVID-related disruptions – healthier commodity prices in recent years have seen a return to normalcy in the global mining industry, which could lead mining companies to make new and significant investments to meet growing projected demand. The extent to which Canada's mining industry will rebound after recent years of lower growth remains uncertain. Recent indicators provide some line of sight into Canada's competitiveness as a destination for mineral investment:

- The most recent edition of NRCan's annual report, *Natural Resources: Major Projects Planned and Under Construction – 2020 to 2030*, while showing modest upward growth of 2.5% (or $2 billion) year-over-year, indicates the total value of projects planned and under construction from 2020 to 2030 has reduced by nearly 50% since 2014, from $160 billion to $82 billion.
- Australia's mining supply sector surpassed Canada's in 2015, leading now by more than 700 firms.
- Over the last 15 years, several Canadian senior mining companies have been acquired by multi-nationals, resulting in an erosion of Canada's role as the host to global head-offices for the mining industry.
- Canada's share of global production for critical minerals and metals has been eroding, with other jurisdictions capturing greater market share for growing demand.

Beyond the above quantitative metrics, qualitative indicators from MAC member companies suggest that Canada's competitiveness is declining compared to other jurisdictions. Our once formidable mining tax competitiveness has been outstripped by the orientation of our sector northward, and the heightened infrastructure costs associated with operating remotely. The number and extent of supply chain disruptions in recent years has damaged Canada's reputation as a reliable trading partner, and prevented companies from growing their businesses through increases in exports. Mining companies are assessing other jurisdictions outside of our own as alternative destinations for developing projects.

Mining Industry Competitiveness and Federal Fiscal Policy

MAC maintains that federal and provincial regulations and policies have dampened Canada's competitiveness as a destination for mineral investment in recent years. Concurrent reviews of federal environmental legislation, pan-Canadian climate change policies, long-standing transportation challenges, tax competitiveness concerns, all overlapping with various developments at the provincial/territorial levels, have contributed to an uncertain policy landscape in Canada.

MAC remained very engaged in many of these policy consultations, several of which have reformed how Canada's fiscal policy treats mining and mining-related activities. For example, MAC welcomed the measures included in the federal government's 2018 Fall Economic Statement as an important first step to boosting Canadian mining competitiveness, key measures of which included:

- The Accelerated Investment Incentive, which will enable miners to write off three times the eligible cost of newly acquired assets in the year the investment is made.
- Extending the Mineral Exploration Tax Credit for a five-year term, bringing greater investment certainty for early stage mineral exploration.
- Allowing businesses to immediately write-off the full cost of clean energy equipment.

More recently, the level of work done on positioning Canada for success in the critical minerals space, and the recognition of the need for a healthy mining and metal manufacturing industry for Canada to attract advanced manufacturing investment has been positive. Measures, such as those announced by the Prime Minister in March 2020 enabling the immediate write-off of heavy electric vehicles, are encouraging. Such policies, beyond being made permanent to create long-term clean technology investment predictability, should be supplemented by measures that would enable immediate and whole depreciation of capital investments in the mining and mineral manufacturing industries. With the advent of mine electrification and zero-emissions mining, the Canadian mining industry is at a tipping point in the transition to a lower carbon economy. Encouraging these investments to help green the mining process, which will enable the responsible extraction of the raw materials needed to support the low-carbon economy, must be a priority.

Mining is a significant engine of the Canadian economy and supports many other important sectors, including construction, manufacturing and transportation. While Canada remains one of the top mining countries, its leadership in this area is being challenged, and is not guaranteed going forward. If Canada loses its competitiveness, this will translate into an increasing amount of exploration and mining investments flowing offshore, job losses, deteriorating trade balances and, overall, a weakening of our economic strength. Further, it will decrease the economic prospects for many Indigenous peoples, and rural communities who rely on the mining sector for reliable and well paying jobs in remote areas where there are often very few alternative employment opportunities.

FIGURE 13
CANADIAN RESERVES OF SELECTED METALS, 1980 - 2018[P]

Return to text

Metal Contained in Proven and Probable Mineable Ore[1] in Operating Mines[2] and Deposits Committed to Production[3]

Year	Copper (000 t)	Nickel (000 t)	Lead (000 t)	Zinc (000 t)	Molybdenum (000 t)	Silver (t)	Gold (t)
1980	16,714	8,348	9,637	27,742	551	33,804	826
1985	14,201	7,041	8,503	24,553	331	29,442	1,373
1990	11,261	5,776	5,643	17,847	198	20,102	1,542
1995	9,250	5,832	3,660	14,712	129	19,073	1,540
2000	7,419	4,782	1,315	8,876	97	13,919	1,142
2003	6,037	4,303	749	6,251	78	9,245	1,009
2004	5,546	3,846	667	5,299	80	6,568	787
2005	6,589	3,960	552	5,063	95	6,684	958
2006	6,923	3,940	737	6,055	101	6,873	1,032
2007	7,565	3,778	682	5,984	213	6,588	987
2008	7,456	3,605	534	5,005	222	5,665	947
2009	7,290	3,301	451	4,250	215	6,254	918
2010	10,747	3,074	400	4,133	254	6,916	1,473
2011	10,570	2,936	247	4,812	256	6,954	2,225
2012	10,364	2,617	126	4,163	256	5,598	2,148
2013	10,777	2,682	116	3,532	145	5,013	2,140
2014	10,214	2,287	88	2,972	121	5,498	2,070
2015	9,937	2,725	83	3,009	101	5,345	1,984
2016	9,101	2,604	40	2,231	98	3,626	1,910
2017	8,984	2,790	165	2,286	96	5,074	2,578
2018[P]	8,196	2,296	116	1,936	80	4,754	2,696

Source: Natural Resources Canada, based on company reports and the Federal-Provincial/Territorial Annual 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.
[P] Preliminary.
Note: One tonne (t) = 1.1023113 short tons = 32 150.746 troy oz.

FIGURE 14
METAL PRICES, 2001-2019

Return to text

Prices	Aluminium US ¢/lb	Copper US ¢/lb	Gold US $/tr. oz	Iron Ore[1] US $/DMT	Nickel US $/lb	Silver US ¢/tr. oz	Uranium US $/lb	Zinc US ¢/lb
2019	82.24	272.35	1,391.53	93.32	6.33	16.18	25.64	115.58
2018	95.88	296.22	1,268.09	71.20	5.95	15.61	24.59	132.31
2017	89.25	293.46	1,257.56	71.76	4.79	17.17	21.66	130.86
2016	72.12	284.93	1,326.03	56.67	4.35	17.11	23.00	97.51
2015	75.41	224.22	1,160.11	55.21	5.26	15.51	36.46	86.97
2014	84.62	311.13	1,266.12	96.84	7.61	18.76	33.21	98.05
2013	83.70	332.29	1,411.06	135.36	6.74	23.53	38.17	86.64
2012	91.59	360.58	1,668.81	128.53	7.91	31.63	48.40	88.35
2011	108.77	400.10	1,568.58	167.79	10.46	35.56	56.37	99.47
2010	98.55	341.74	1,224.66	146.72	10.11	20.51	46.84	97.99
2009	75.50	233.67	972.98	79.99	6.78	14.77	46.06	75.06
2008	116.68	315.47	871.67	61.57	9.37	14.98	61.71	85.01
2007	119.65	322.83	696.66	36.63	16.70	13.51	99.33	147.03
2006	116.55	304.85	604.34	33.45	11.39	11.83	49.61	145.15
2005	86.10	166.84	444.88	28.11	6.68	7.39	28.67	62.66
2004	77.82	129.96	409.21	16.39	6.40	6.68	18.60	47.51
2003	64.92	80.68	363.51	13.82	4.53	4.95	11.55	37.75
2002	61.23	70.72	309.97	12.68	3.08	4.60	9.88	35.31
2001	66.46	72.74	269.98	12.99	2.67	4.38	8.82	41.27

Source: Market Insider
[1]April 2010 marked the end of the 40-year global benchmarking system for sale of iron ore under contract prices. Thus, new historical data based on U.S. $/dmt will have to be utilized.

FIGURE 15
MINING EQUITY RAISED—ROLE OF TORONTO STOCK EXCHANGE, 2000-2019

Return to text

Equity Raised	2000	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
						(US$ billions)								
Worldwide	3.1	50.3	46.6	65.9	29.6	31.7	14.8	15	14.4	19.8	22.7	24.2	16.1	18.2
TSX exchanges	1.1	17.6	8.3	22.2	17.8	12.5	10.3	6.9	8.9	6.8	9.4	8.5	6.4	12.5
Percent of worldwide total reported by TSX and TSXV	36	35	18	34	60	39	70	46	62	34	41	35	34	68

Source: Gamah International, compiled by Toronto Stock Exchange.
Note: All values as at December 31, 2018.

FIGURE 16
GEOGRAPHIC REACH OF TSX-LISTED COMPANIES, JANUARY 2020

Return to text

Location of Mineral Projects	Number	Percent
Canada	2,340	45%
Latin America	1,196	23%
United States	780	15%
Africa	364	7%
United Kingdom and Europe	208	4%
Asia	104	2%
Middle East / Russia and CIS	52	1%
Australia/PNG/NZ	156	3%
Total	**5,200**	**100%**

Source: Infomine, TSX/TSXV Market Intelligence Group, compiled by the Toronto Stock Exchange.
Note: Total projects is an approximation on the basis of available informaiton.

FIGURE 17

MINERAL EXPLORATION AND DEPOSIT APPRAISAL EXPENDITURES, BY PROVINCE AND TERRITORY, 2007-2020[I]

Return to text

Province/Territory	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019[P]	2020	% Change from 2019 to 2020
Newfoundland and Labrador	148.0	146.7	54.9	105.2	156.8	199.9	117.2	80.7	47.4	25.4	41.5	47.1	48.6	65.0	33.7%
Nova Scotia	23.5	21.4	9.0	16.7	13.7	14.6	12.3	7.0	10.1	5.3	18.2	40.4	35.9	33.4	-6.9%
New Brunswick	35.8	32.7	8.1	17.1	27.1	28.0	27.6	29.0	8.6	14.2	15.8	25.6	10.7	12.2	13.8%
Quebec	476.4	526.1	379.3	511.6	833.9	620.7	381.8	317.4	259.5	297.4	573.9	564.8	432.4	560.9	29.7%
Ontario	571.7	799.3	536.2	853.4	1,067.7	961.5	562.0	468.1	440.2	394.3	539.7	591.4	496.7	469.9	-5.4%
Manitoba	102.6	152.1	97.8	83.5	140.0	105.6	61.4	28.0	46.9	47.3	41.1	49.7	67.4	56.7	-15.9%
Saskatchewan	314.0	430.7	311.0	299.4	334.6	411.1	221.7	245.2	257.0	228.7	191.2	261.9	272.6	302.6	11.0%
Alberta	11.8	20.8	8.3	15.2	47.3	35.2	38.9	26.1	18.5	16.7	24.6	26.6	42.3	48.7	15.1%
British Columbia	470.6	435.4	217.1	374.4	645.1	734.1	493.0	448.9	346.3	231.5	302.6	427.9	351.6	317.8	-9.6%
Yukon	144.7	134.0	90.9	156.9	331.7	233.2	100.6	107.1	92.2	90.4	168.7	182.3	139.6	97.9	-29.9%
Northwest Territories	193.7	147.7	44.1	81.7	93.8	108.7	77.9	101.7	100.9	73.0	91.2	112.0	66.3	52.1	-21.5%
Nunavut	338.0	432.6	187.6	256.7	535.7	422.5	257.6	158.0	215.0	204.5	177.0	155.6	123.2	115.7	-6.1%
Total	**2,830.8**	**3,279.5**	**1,944.4**	**2,771.9**	**4,227.4**	**3,875.1**	**2,352.0**	**2,017.4**	**1,842.4**	**1,628.8**	**2,185.5**	**2,485.2**	**2,087.5**	**2,132.8**	**2.2%**

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

[P] Preliminary; [I] Intentions.

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

FIGURE 18

MINERAL EXPLORATION AND DEPOSIT APPRAISAL EXPENDITURES, BY COMPANY TYPE, 2007-2020

Return to text

Type of Company	2007	%	2008	%	2009	%	2010	%	2011	%	2012	%	2013	%
Junior	1,904.4	67.3	2,117.8	64.6	1,110.7	57.1	1,547.0	55.8	2,049.1	48.5	1,847.0	47.7	963.6	41.0
Senior	926.5	32.7	1,161.7	35.4	833.7	42.9	1,224.9	44.2	2,178.3	51.5	2,028.1	52.3	1,388.4	59.0
Total	**2,830.8**		**3,279.5**		**1,944.4**		**2,771.9**		**4,227.4**		**3,875.1**		**2,352.0**	

Type of Company	2014	%	2015	%	2016	%	2017	%	2018	%	2019[P]	%	2020[I]	%
Junior	814.3	40.4	577.7	31.4	633.9	38.9	1,076.3	49.2	1,121.3	45.1	866.7	41.5	877.8	41.2
Senior	1,203.2	59.6	1,264.7	68.6	994.9	61.1	1,109.3	50.8	1,363.9	54.9	1,220.8	58.5	1,255.0	58.8
Total	**2,017.4**		**1,842.4**		**1,628.8**		**2,185.6**		**2,485.2**		**2,087.5**		**2,132.8**	

Source: Natural Resources Canada, based on the Federal-Provincial/Territorial Survey of Mineral Exploration, Deposit Appraisal and Mine Complex Development Expenditures.
[P] Preliminary; [I] Intentions.
Notes: Includes on-mine-site and off-mine-site activities. Includes field work, overhead costs, engineering, economic and pre- or production feasibility studies, environment, and land access costs. Totals may not add due to rounding.

FIGURE 19

MINERAL EXPLORATION AND DEPOSIT APPRAISAL EXPENDITURES, BY TARGET, 2010 and 2019[P]

Return to text

	2010		2019[P]	
	$ millions	% of Total	$ millions	% of Total
Precious metals	952.8	53.3	1,187.8	56.9
Base metals	368.8	20.6	400.2	19.2
Uranium	175.3	9.8	162.7	7.8
Coal	71.0	4.0	75.3	3.6
Nonmetals (excluding diamonds)	52.7	2.9	58.9	2.8
Other metals	35.2	2.0	69.7	3.3
Diamonds	121.0	6.8	111.8	5.4
Iron ore	10.3	0.6	20.8	1.0
Total	**1,787.2**	**100.0**	**2,087.5**	**100.0**

Source: Natural Resources Canada, based on the Federal-Provincial/Territorial Survey of Mineral Exploration, Deposit Appraisal and Mine Complex Development Expenditures.
[P] Preliminary.
Notes: Includes on-mine site and off-mine site activities. Includes field work, overhead costs, engineering, economic and pre- or production feasibility studies, environment, and land access costs. Totals may not add due to rounding.

FIGURE 20

CAPITAL EXPENDITURES IN THE CANADIAN MINING INDUSTRY, 2009-2020[I]

Return to text

Equity Raised	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019[P]	2020[I]
						($ millions)						
Stage 1 - Total Mineral Extraction	6,194	9,054	12,163	16,916	15,086	11,115	10,188	9,637	8,986	7,702	10,224	8,574
Metal ore mineral extraction	3,537	5,504	8,108	11,020	9,174	5,298	4,881	5,137	5,413	6,715	6,693	5,717
Non-metallic mineral extraction	2,297	2,853	3,083	4,812	5,243	5,433	5,078	4,294	3,201	2,335.4B	2,830	2,179
Coal mining	361	697	972	1,085	668	384	230	206	373	987	702	678
Stage 2 - Primary Metal Manufacturing	948	1,823	2,936	3,864	3,458	3,332	3,219	2,329	1,520	1,792	2,186	1,959
Stage 3 - Non-Metallic Mineral Product Manufacturing	581	765	672	572	459	976	1,136	1,196	899	611	718	508
Stage 4 - Fabricated Metal Product Manufacturing	750	608	729	536	574	640	735	746	925	856	1,114	913
Total Mining and Mineral Processing	**8,473**	**12,250**	**16,500**	**21,888**	**19,577**	**16,062**	**15,279**	**13,908**	**12,330**	**10,961**	**14,243**	**11,954**
Non-conventional oil extraction (oil sands)	10,249	17,113	22,163	26,246	29,029	35,711	23,420	16,596	14,278	12,090	10,179	8,281

Source: Statistics Canada , Table 34-10-0036-01 (formerly: CANSIM 029-0046).
[P] Preliminary; [I] Intentions.
Notes: Includes capital construction and machinery and equipment. As of 2014, capital expenditures on non-residential construction and on machinery and equipment exclude expenditures related to intellectual property, including mineral exploration activities. Historical values have been revised to reflect these methodological changes. Totals may not add due to rounding.

SECTION 4

THE PEOPLE: SAFETY, EMPLOYMENT, COSTS AND INNOVATION

THE CANADIAN MINING INDUSTRY ACCOUNTS FOR ONE IN EVERY 26 JOBS ACROSS CANADA AND, PROPORTIONALLY, IS THE LARGEST INDUSTRIAL EMPLOYER OF INDIGENOUS PEOPLES IN CANADA. THE SAFETY OF WORKERS IS THE INDUSTRY'S NUMBER ONE PRIORITY.

WORKPLACE SAFETY AND HEALTH

In mining, safety comes first. As a core industry value and practice, Canadian mining companies invest significant time and effort in developing and maintaining a positive safety culture in all aspects of their operations, diligently working with their employees, contractors and communities to reach the goal of "zero harm." All mine sites have on-site professionals dedicated to safety and health in the workplace. Larger mines have numerous specialized safety trainers on site; smaller mines often contract out safety training to specialist companies.

Safety First: COVID-19 Health and Safety Measures in Canada's Mining Sector

Protecting the health and safety of employees, contractors and communities is deeply ingrained in the Canadian mining industry's culture and is a point of focus now more than ever in the face of the ongoing COVID-19 pandemic. From building mobile testing units at remote mine locations, to chartering planes for fly-in fly-out operations to ensure social distancing, to allowing Indigenous employees to remain in their home communities with full pay, the mining sector has prioritized the health and safety of their employees, their contractors and the communities in and around which they operate, and will continue to do so.

Due to the mining industry's essential nature across Canada and its critical role as a contributor to global long-term economic recovery efforts, it has been of utmost importance that those who work at the mine site are protected and engaging in safe practices. MAC and its members are dedicated to ensuring screening and testing measures of the highest caliber are in place to minimize the potential spread of the pandemic. In fact, Canadian mining companies have in many cases led the way in innovative testing, like New Gold's Rainy River mine's use of a Precision Biomonitoring testing systems, to ensure its workforce is able to have assurance that those on-site are virus free.

Canada's mining industry supplies the materials required for the manufacture of products essential for Canadians, including medical technologies and medications, and it has been critical that supply chains stay open so that mined products are readily available for the people and businesses who rely on them. Mined materials, like gold, carbon, zinc, uranium and nickel, are required in the instruments used in hospitals around the globe. For example, gold is an integral ingredient in the hundreds of millions of Rapid Diagnostic Tests that are used around the world each year, carbon is needed in everything from hospital furniture to ventilators, and it is thanks to nickel alloys and nickel-containing stainless steel, essential materials in surgical steel, medical devices and diagnostic tools, that we are able to provide medical solutions and prolong lives.

Mined metals like copper play an important role in killing bacteria and preventing patients from acquiring infections, and there is promising research being done on technology that incorporates and seals antimicrobial agents in aluminium surfaces by companies like Rio Tinto

that, if it receives regulatory approval, could be used on everything from door handles, to medical equipment to bars on public transport. This technology, which has been tested by Canada's National Research Council and several research entities and certified in independent laboratories, eliminates up to 99.99% of bacteria, viruses and other germs and could be a game changer in preventing the spread of diseases like COVID-19.

Beyond safety, MAC member companies have gone further, making contributions to foodbanks, women's shelters, Indigenous organizations and health authorities across Canada exceeding $40 million. These are in addition to the donation of tens of thousands of N95 masks, test kits and ventilators amongst other equipment and goods to address shortages of these critical supplies.

The John T. Ryan Trophies

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

Mining safety statistics can be invaluable tools for tracking the effectiveness of safety programs and driving improvements, whether for a safety manager working on site or for industry discussions on safety regulations. Ensuring that safety statistics are useful requires that existing figures and analyses are made easily accessible and that the people and organizations compiling statistics understand the information needs of safety professionals.

In 2020, the following MAC members were recipients of John T. Ryan Trophies:

- Glencore's Raglan Mine – Canada Trophy for Metal Mines
- Vale's Voisey's Bay Mine – Canada Trophy for Select Mines
- DeBeers' Gahcho Kué Mine – Canada Trophy for Select Mines
- New Gold's New Afton Mine – Regional Metal BC / Yukon
- Cameco's Cigar Lake Mine – Regional Metal Prairies and Territories
- Glencore's Kidd Mine – Regional Metal Trophy Ontario
- DeBeers' Victor Mine – Regional Select East

MINING INDUSTRY EMPLOYMENT

According to Statistics Canada data, the mining industry directly employed 392,000 people in 2019, accounting for roughly one in every 48 Canadian jobs (*see Figure 21*). When indirect jobs are included, the industry's employment reach increases significantly. According to Natural Resources Canada estimates, the mining industry indirectly employed an additional 327,000 individuals in 2019. Together, the industry's direct and indirect employment exceeds 719,000 jobs, accounting for one in every 26 jobs in Canada.

Overall Employment Numbers

In 2019, 183,000 (47%) of those directly employed in mining worked in the extraction and primary metal and non-metallic manufacturing sector (*see Figure 21*). This figure includes approximately 37,000 workers in metal mining, 26,000 workers in non-metal mining and 7,000 workers in coal mining. 83,000 employees are split evenly between primary metal and non-metallic manufacturing, with mining services accounting for the balance of 21,000 jobs.

In the oil sands extraction sector, recent data show that Suncor, Syncrude and Canadian Natural directly employ approximately 12,600, 4,600, and 15,700 people respectively, in mining and oil and gas activities. These figures do not include indirect employees, which number in the thousands.

ACCORDING TO NATURAL RESOURCES CANADA, THE MINING INDUSTRY INDIRECTLY EMPLOYED AN ADDITIONAL 327,000 INDIVIDUALS IN 2019, BRINGING TOTAL EMPLOYMENT TO 719,000 JOBS.

Employment statistics for the mining and oil sands sectors are dynamic because of the cyclical reality of commodity markets and fluctuating prices, globalization and other trends. Recent mergers and acquisitions have changed the landscape of Canadian mining. Some companies have been acquired or no longer report separate employment figures. Other companies report global figures without disaggregating for the Canadian component of their operations. Canada's Mining Industry Human Resources

Council (MiHR) is focused on researching these changing trends and forecasts labour market demand to help the industry meet its human resources needs and objectives.

Need for Workers and Skills

The mining industry, both in Canada and abroad, faces a number of human resources challenges. MiHR's 2020 edition of the *Canadian Mining Labour Market Outlook*, estimates that the Canadian mining industry will need to hire 79,680 new workers over the next decade to 2030. These new hires are required to replace retirees and fill new positions to meet baseline production targets (*see Figure 22*). In its report, MiHR also forecasts contractionary and expansionary hiring scenarios. Notably, even in a contractionary scenario, the hiring forecast predicts that nearly 50,000 new hires will be necessary to meet labour demand.

This workforce shortage is compounded by the wave of the industry's skilled core of workers who are retiring. By 2030, MiHR forecasts that more than 57,000 employees will retire from the sector, which represents over 25% of the industry's current workforce. This will result in a significant loss of industry knowledge and experience. Also concerning is MiHR's forecast of further contraction in employment in the primary metal manufacturing sector, projecting 4,400 job losses over the next decade. Underscoring the essential role that Canada's smelters and refineries play in the critical minerals supply chain, and how essential their products are to attracting advanced manufacturing investment into Canada, policy-makers should heed this warning and take measures to strengthen Canada's competitiveness in this space.

These shifts lead to an entirely new set of challenges, with relatively inexperienced workers replacing those far more seasoned, particularly in the high turnover trades and production occupations. Further, with smelters and refineries often located in rural communities, the loss of these employment opportunities is likely to present local economic challenges. This places an additional onus on industry to work collaboratively with government and educational institutions to ensure that new entrants to the industry have the skills required for high-demand jobs within mining. Companies need to ensure that new employees have opportunities to learn from those with significant experience both during training programs and on the job. Beyond skilled talent, a broader set of policy considerations should be undertaken with the aim of ensuring Canada's downstream metal manufacturing sector remains competitive over the next decade.

The mining industry comprises 70 core mining occupations and needs new workers for all of them. Among those required are geoscientists, metallurgists, mining engineers and geologists, as well as workers skilled in computer technology, information management, mechanical repair, and heavy equipment operation in addition to other areas. Because today's mining industry relies on advanced technologies, much of the demand is for highly skilled workers.

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

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

- Promote the industry to women, youth, Indigenous people and non-traditional worker groups.
- Develop programs that bring back retired workers, retain older workers and increase mentoring.
- Improve educational programs and employer-provided training.
- Introduce standards for key occupations to facilitate domestic worker mobility and skills recognition.

The federal government has taken some steps to help the industry address these problems, including through the expansion of the Youth Employment Strategy, the proposed Post-Secondary Industry Partnership and Co-operative Placement Initiative, and continued funding for the Indigenous Skills and Employment Training Strategy (ISETS). MAC supports an expansion of this program, which has proved to be a valuable source of funding for Indigenous skills training initiatives.

MiHR has also benefited from programmatic support, specifically in developing critical research to inform industry actions to address its human resources challenges and meet its employment needs. Ensuring MiHR can continue to produce crucial research and deliver strategic programs is essential to supporting the industry's workforce needs and meeting its commitments to diversity.

Women in Mining

While Canada's mining industry has long been a male dominated sector, strides forward are being made to promote greater inclusion of women. Mining companies across the country are increasingly seeing women in senior

leadership roles and working at the site level, but there is still work to be done to ensure that their meaningful participation in the sector is prioritized.

According to Canada's most recent census data for selected occupations, women's representation has increased across all industries in recent years, from 27% in 2011 to 31% in 2016 (Figure 23). However, the mining industry has yet to realize these gains since the share in these occupations has remained constant, at 12% in both 2011 and 2016. This trend points to potential opportunities for the mining industry to increase its representation among the selected occupations. Overall, the most significant finding from MiHR's research remains consistent — the industry continues to struggle with underrepresentation of women and this must change.

While the above challenge persists, early and more recent signs of the industry's effort to correct this trend are promising. For example, according to MiHR's 2020 Labour Force Survey (LFS) data, women's share of employment was 12% in 2011, 13% in 2016, and 15% in 2018, indicating an upward trend in the right direction.

Of note is that MiHR sources both data from the census and from LFS to complete its analyses, with the former being collected every five years, and the latter being procured, but from a smaller sample, on an annual basis. In this sense, while the census is more authoritative, LFS data provides a more current set of information, helping to bridge the long gaps in available information between respective editions of the national census. Ultimately, both tools are important to monitor trends and help the industry inform, refine and adapt human resources programming.

Recognizing the need to do more in attracting female workers, concerted efforts by both industry and government are underway to attract and retain women in the mining industry. Developed on the foundation of a previous research initiative – Strengthening Mining's Talent Alloy: Exploring Gender Inclusion – MiHR's Gender Equity in Mining Works (GEM Works) program offers comprehensive training to help establish Change Agents within an organization and ultimately eliminate unintentional barriers to gender inclusion found in dated policies, procedures and practices. Validated through industry leading labour market research and funded through Employment and Social Development Canada's Sectoral Initiatives Program and the Department of Status of Women, the driving intent of GEM Works is to provide mining companies with tangible tools and training to increase the participation of women in the sector. Following a successful launch of the pilot program, the number of active sites that have adopted and/or continue to use GEM Works training has increased. To learn more about this important work, *visit MiHR's website*.

Written resources highlighting what mining companies can do to enhance the inclusion of women in the sector have also been an industry focus. The Prospectors and Developers Association of Canada, an organization representing Canada's junior mining sector, recently published *Gender Diversity and Inclusion: A Guide for Explorers*, which is designed as a guide for mining companies that are new to understanding issues and implementing efforts related to gender, diversity and inclusion. The purpose of the document is to provide the information and tools needed for exploration and mining companies to both implement gender diversity and inclusion strategies and programs and cultivate more gender inclusive and diverse environments both internally and externally within the communities in which they engage. MAC and its members were pleased to play a role in the creation of this important resource.

Several organizations in Canada, including *Women in Mining Canada* and *Women Who Rock*, focus on encouraging mentorship and supporting initiatives that promote professional development for women in the mining sector. These initiatives, and others like them at the company level, are dedicated to empowering women and improving gender diversity in the mining industry.

Employment of Indigenous People

Proportionally, the mining industry is the largest private sector employer of Indigenous peoples in Canada. According to MiHR research, Indigenous people represented more than 7% of the mining workforce in Canada in 2016, up from roughly 5% in 2011. Most of the Indigenous people in the mining industry are either Métis or First Nations, though Inuk employment in the sector has been growing as mining opportunities in Inuit regions have increased in recent years. Indigenous people are better represented in the mining industry (7.4%) than in all other industries (3.9%). Interestingly, the share of the mining workforce that is Métis nearly doubles the share found in all industries (*see Figure 24*).

Indigenous people in Canada comprise three main groups: First Nations, Métis and Inuit. In 2016, they accounted for 5% of the total population, up from about 4% in 2006, and 3% in 1996. Since 2006, the Indigenous population in Canada has grown by 43% – more than four times the rate

of the non-Indigenous population – and is expected to reach more than 2.5 million over the next two decades.

THE PROPORTION OF INDIGENOUS WORKERS IN THE MINING INDUSTRY IS WELL ABOVE THAT OF THE REST OF THE CANADIAN WORKFORCE.

A critical challenge is to ensure that this new cohort of Indigenous peoples has the opportunity to participate meaningfully in the Canadian workforce and is provided with training and educational opportunities to advance and thrive. Approximately one in four Indigenous people in their prime working age (between 25-54 years old) are not participating in the labour force. Since attaining an appropriate level of education is an important factor to entering the labour force, training to develop the requisite skills for meaningful participation is critical for accessing well-paying mining jobs.

Fortunately, the mining industry has proven an effective vehicle not just for Indigenous employment, but also for skills training and upward mobility. For example, Indigenous people in the mining workforce are increasingly pursuing formal education credentials. According to 2019 MiHR research in 2006, 30% had no certificate, diploma or degree; by 2016, that rate fell to 22%. From 2006 to 2016, the share of Indigenous people in the mining workforce with a college, CEGEP or other non-university certificate or diploma rose by three percentage points, as did the rate for those with a university certificate, diploma or degree at bachelor level or above.

Potential for increased Indigenous employment remains strong. Some 180 producing mines and more than 2,500 exploration properties are located within 200 km of Indigenous communities. Also, many mines and projects are located on traditional lands. Indigenous people across the country are, therefore, ideally situated to access employment opportunities (and other benefits) in the mining industry. To learn more about how mining demonstrates opportunities for inclusive growth, see Section 5.

New Canadians and Visible Minorities Workers

Census data from 2016 demonstrate that immigrants and visible minorities in Canada each make up one-fifth of the country's total population. Of the visible minority population, 30% were born in Canada. Statistics Canada projects that the immigrant share of Canada's population could reach between 25% and 30% by 2036; Canada's visible minority population is expected to be even higher, between 31% and 38%.

According to MiHR research, in 2016, the representation of immigrants (13%) and visible minorities (9%) in the mining workforce were both lower relative to all industries (23% and 21% respectively). Concurrently, the share of the mining workforce that are immigrants has been modestly increasing, from 12% in 2006 to 13% in 2016 (*see Figure 25*). Similarly, the share of visible minorities in mining is smaller relative to immigrants, but this gap is closing; the share of visible minorities in the mining workforce grew from 7% in 2006 to 9% in 2016.

Given Canada's aging population, the labour market demand for new immigrants is increasing. Thus, appealing to this demographic is important to the medium and longer-term sustainability of the mining sector workforce.

KEY COSTS

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

Wages

The Canadian mining industry boasts the highest wages and salaries of all industrial sectors in Canada (*see Annexes 7* and *8* for details). The average annual pay for a mining worker in 2019 exceeded $123,000, which surpassed the average annual earnings of workers in forestry, manufacturing, finance and construction by a range of $33,000 to $47,000.

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

Overall Production Costs

Mining operations incur significant production costs. The industry's three main production costs – wages and materials and supplies – totalled $5.1 billion, $2.8 billion and $8.5 billion, respectively, in 2018, the most recent year for which data are available (*see Figure 25*) cost data for energy – historically the third highest operational cost in the mining industry – has historically been available but has been suppressed due to confidentiality considerations in the Statistics Act for this year. This is likely due to mergers and acquisitions in the industry that have resulted in an increased risk of data breach should certain figures be released. Recently, MAC led an effort, in partnership with

NRCan, to get member companies to sign waivers that would permit the release of this important data. While there was strong participation from the membership, unfortunately, MAC does not represent thermal coal operators, where these numbers have been suppressed. MAC supports public and transparent reporting of data as a critical step in the broader public policy development process and encourages companies to sign waivers in support of fact-based discourse.

Remote and Northern Regions

While the mining industry is truly pan-Canadian, with operations from coast-to-coast-to-coast, it is particularly significant to northern Canada. Mining is the largest private sector driver in Canada's Arctic, employing approximately 8,500 people (roughly one in every six jobs). These numbers expand when the northern regions of Manitoba, Quebec and Newfoundland and Labrador are incorporated. Direct GDP contributions in the Northwest Territories and Nunavut are approximately 27% and 28%, respectively, as of 2019, and 6% in the Yukon as of 2018. Research indicates that mining companies have invested, or have committed to invest, more than $9 billion in recent years. While these contributions are substantial, the potential is even greater.

Proportionally, the industry is the largest private sector employer of Indigenous peoples in the country and the territories host the highest per-capita demographic of Indigenous peoples of any sub-national jurisdiction in Canada. Mining is also the largest private sector business partner of Indigenous-owned enterprises in the North, responsible for helping to develop and grow many successful Indigenous businesses, some that have grown and now serve customers beyond the mining sector. As such, more so than any other region in the country, strengthening northern people and communities means advancing Indigenous economic reconciliation.

The future of Canada's mining industry lies increasingly in remote and northern regions, but the infrastructure deficit in this part of the country challenges project economics. Lack of infrastructure, sparse or no population, and often extreme seasonal temperatures make remote and northern regions in Canada high-cost jurisdictions in which to build and operate a mine. Frequently, companies that seek to develop mining projects in remote and northern regions must build the infrastructure they require for operation. Historically, this infrastructure has included the following: power generation and transmission; transportation infrastructure such as ports, roads and railways; and airstrips and on-site accommodation for fly-in/fly-out employees.

MAC and mineral industry partners undertook extensive research on how remote and northern mining costs compare to those in the south. Our research indicates it costs 2-2.5 times more to build the same precious or base metal mine in the North (off-grid) than in a centrally located region and, most importantly, that 70% of this cost differential derives from the infrastructure deficit.

The remote and northern segment of the Canadian mining industry was the hardest hit by COVID-19 and has taken the longest to recover. Companies, in close consultation with and out of respect for the concerns of their local communities, made difficult decisions to temporarily cease operations, or curtail production, often while continuing to pay their local workforce salaries. At the time of writing, several mines were operating below capacity, while one had not yet re-opened. The impact of COVID-19 to the diamond price – a major concern for the Northwest Territories, was devasting, and unlike a number of other mineral and metal prices, has not yet rebounded. These realities, combined with the extensive infrastructure deficit, the limited optionality to displace mounting carbon costs, and the corresponding heightened remote operational costs, have presented challenges for our sector in this region.

Without strategic and wealth-generating infrastructure development to enhance investment competitiveness, these regions and their inhabitants will remain disproportionately reliant on transfer funding for core services and program delivery (frequently at lower standards than southern Canadian jurisdictions enjoy). Strategic investments in energy infrastructure are also essential to reduce northern reliance on higher-emitting fossil fuels.

Positive first steps have been taken to address these challenges. MAC welcomed the government's renewal of the Trade and Transportation Corridors Initiative's (TTCI) northern allocation of $400 million in Budget 2019, the commitment to invest $1.7 billion over 13 years to enhance digital connectivity and internet speeds, and the allocation of an additional $700 million over the next 10 years in new and focused funding to ensure Arctic communities have the opportunity to grow. Allocating $35 billion in the creation of the Canada Infrastructure Bank adds an additional incentive for remote and northern project development and funding amplification for strategic projects. Beyond these programmatic developments, positive project-specific funding decisions have been made in support of:

- The Yukon Resource Gateway ($360 million).

- The T'licho Road in the NWT ($155 million).
- A section of the McKenzie Valley Highway in the Northwest Territories ($90 million).
- Funding to advance planning for the road that will connect the Slave Geological Province in the NWT to the Kitikmeot Inuit region of Nunavut ($27 million).
- Support planning by the Government of Northwest Territories for its proposed Taltson hydroelectricity expansion project ($18 million).

While some of the above listed projects will require further funding considerations as they progress over time, MAC interprets these allocations as recognition by decision-makers that these projects are in the national interest, have a strategic value to Canada, and that all Canadians stand to benefit from their completion.

Northern Climate Change Policy – Bridging the Gap

MAC supports climate action that is consistent with the ambition of the Paris Agreement to limit global warming to well below 2 degrees Celsius, has held an association policy position on climate change since 2000, and is openly supportive of a revenue-neutral price on carbon. From the outset of our engagement on this important issue, MAC has underscored the need for any climate change policy to ensure the competitiveness of emissions-intensive and trade exposed sectors (such as mining), as well as the necessity of being sensitive to the realities of remote and northern regions.

While the government has deployed various programs to support businesses and communities in reducing their carbon cost exposure, these programs have not been designed with remote industry in mind. While the high energy costs in the North have long served as a strong incentive to maximize energy and fuel efficiency, evidence suggests that the proverbial "low-hanging" fruit are gone, meaning future improvements will be incremental and gradual barring a paradigm shift technological breakthrough, such as small modular reactors (SMR). While MAC is supportive of the government's leadership on SMRs as a key tool to electrify off-grid regions and industry, there is a gap between now and when this technology will be available where remote, off-grid and diesel-reliant industrial operations will become increasingly vulnerable to rising carbon costs with little viable recourse.

NEWMONT'S BORDEN PROJECT

Canada's mining industry is committed to innovation and environmental sustainability, and these two priorities are being realized at Newmont's Borden mine, one the country's first all-electric underground mines.

Newmont's 100 percent owned Borden mine is located near Chapleau, Ontario and features state-of-the-art health and safety controls, digital mining technologies and processes, and low-carbon energy vehicles – all anchored in a mutually beneficial partnership with local communities. Borden achieved commercial production in October 2019.

At the inauguration of Borden in September 2019, Tom Palmer, Newmont's President said, "Borden opens a new gold mining district in Ontario and profitably extends operations at the Porcupine complex near Timmins. In addition, Borden's electric underground fleet will eliminate diesel particulate matter from the underground environment and lower greenhouse gas emissions. This will help reduce energy costs, protect employee health and minimize impacts to the environment."

Ore from Borden is processed at the existing mill at Newmont's Porcupine operation in Timmins, 180 kilometres to the east. Borden is fully permitted for operation, and Partnership Agreements have been signed with local First Nations. At 1,000 square kilometres, Borden's land package represents additional exploration upside as the Borden deposit remains open at depth.

In recognition of Borden's contribution to the future of safe and sustainable mining, the Canadian and Ontario governments each granted CAD$5 million towards electrification of the mine.

To bridge this gap, and help bolster the segment of Canadian mining industry, MAC recommends government undertake a five-year investment of at least $250 million for remote and northern off-grid industrial electrification to accelerate improvements in energy and fuel efficiency, and drive to the maximum extent possible the scalability, deploy-ability, capacity and storage capabilities of clean power generation in northern Canada, including SMRs.

INNOVATION AND RESEARCH AND DEVELOPMENT

Innovation is a broad theme, and relevant statistics are not always current or easy to compare. The information presented below indicates that Canadian mining embraces innovation, but that Canada faces a challenge in facilitating a robust environment in which to foster innovation and enhance research and development (R&D). Further, given the present opportunity before Canada on the critical minerals front, what follows underscores the need to address this long-standing challenge to position the industry for long-term success.

Innovation Essential to Critical Minerals Success

Without a sustainable and competitive critical mineral and metal manufacturing supply chain, Canada's competitiveness as a destination for advanced technology manufacturing is significantly diminished.

While a number of policy measures are required for success, deploying an effective critical minerals innovation strategy is key among them, and support from the federal government is critical. Innovation is needed to support the identification, extraction and refining processes for rare earth elements (REEs), including from existing mine waste streams where they are are commonly found. Making progress in advancing these technologies can unlock lower cost and carbon-reduced access to these critical minerals, the stable and reliable production of which are essential for Canada to effectively attract advanced manufacturing investment. To support this objective, MAC recommends the government:

- Enhance funding for Natural Resources Canada's CanmetMINING to develop state of the art REE identification, extraction and refining processes, including from recycled mine waste streams.
- Commit to a whole-of-supply chain approach, including supports for downstream market development and value-added production, which will drive demand for upstream REE manufacturing, until China's control of the market is loosened.
- Establish an interdepartmental joint government-industry task force to study and report back on additional policy options to position Canada as a leader in the production and processing of critical minerals – both for REEs, and other strategic minerals and metals. This review should include a benchmarking exercise of Canada's mining fiscal and regulatory policies vis-à-vis competing jurisdictions.

Looking ahead, the opportunity is great. Canada and the US have finalized a Joint Action Plan on Critical Minerals Collaboration with the intent to strengthen pre-existing supply chains where possible and establish new ones to bolster greater North American security of supply for critical minerals. Specifically, the Critical Minerals Action plan with the US calls for work on four themes: improving industry engagement between Canada and the US, enhancing critical mineral supply chains including for defence, investing in research and development, and data and information sharing including geoscience and project readiness pipelines. We are encouraged that active dialogues remain ongoing between Canada and the EU and Japan to establish similar joint collaboration. The Critical Minerals Action Plan, together with the *Canadian Minerals and Metals Plan*, is a promising step forward to ensuring Canada is uniquely positioned to supply the world with critical minerals, representing a significant opportunity for new investment and growth in mining and mineral processing.

Canada's Approach to Innovation

MAC and its members are committed to ongoing improvement and are continually innovating to protect the environment and reduce their energy use and GHG emissions. Over the past two decades, mining companies have focused on improving energy efficiency and reduced emissions at their operations through measures such as MAC's mandatory *TSM* initiative and through innovations at the mine-site level.

To remain sustainable, progressive and profitable, the industry must innovate and collectively challenge existing ways of thinking. Through innovation investment from industry and governments, the Canadian mining industry can address these critical business challenges and continuously improve the sector's environmental and health and safety performance. This will help ensure that Canada's mining sector can maintain and grow its immense socio-economic contributions to communities across the country, while meeting Canadians' evolving expectations about industry practice and performance.

FIGURE 21

MINERALS AND METALS SECTOR EMPLOYMENT, BY SUBSECTOR AND PRODUCT GROUP, 2019[P]

Return to text

Subsector/Commodity group	(000 jobs)
Direct	**392**
Primary	**183**
Extraction	**70**
Coal	7
Metallic minerals	37
Non-metallic minerals	26
Services	**21**
Primary manufacturing	**83**
Primary metallic mineral products	41
Primary non-metallic mineral products	41
Downstream	**209**
Secondary metal products	24
Tertiary metal products	127
Miscellaneous metal products	34
Services and custom work	24
Indirect	**327**
Total minerals and metals sector	**719**

p - preliminary
Source: Statistics Canada. Table 38-10-0285-01 Natural resources satellite account, indicators.

FIGURE 22

CUMULATIVE HIRING REQUIREMENTS BY FORECAST SCENARIO (2020–2030)

Return to text

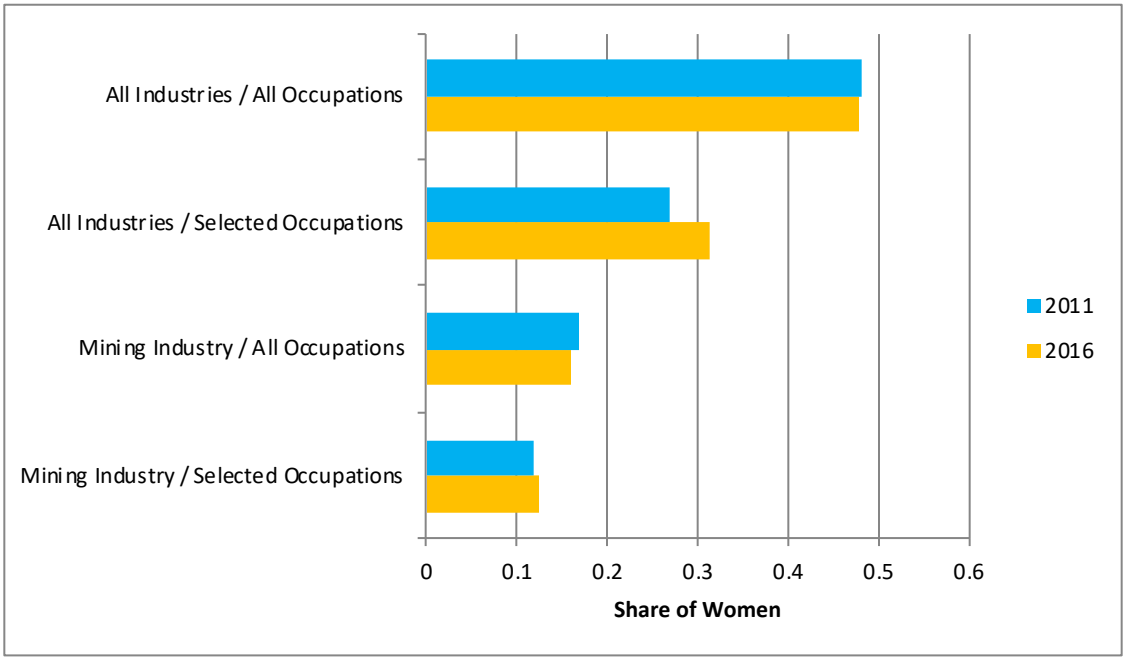
		Replacement Requirements		
	Net Change in Employment	Retirement	Non-Retirement	Cumulative Hiring Requirements
Contractionary	-25,940	56,020	21,800	49,880
Baseline	-1,140	57,830	23,260	79,680
Expansionary	26,330	61,960	24,840	113,130

Source: Mining Industry Human Resources Council, Statistics Canada (System of National Accounts, 2016 Census), 2019

FIGURE 23

REPRESENTATION OF WOMEN IN MINING INDUSTRY AND ALL INDUSTRIES, SELECTED OCCUPATIONS AND ALL OCCUPATIONS (2011 AND 2016)

Return to text

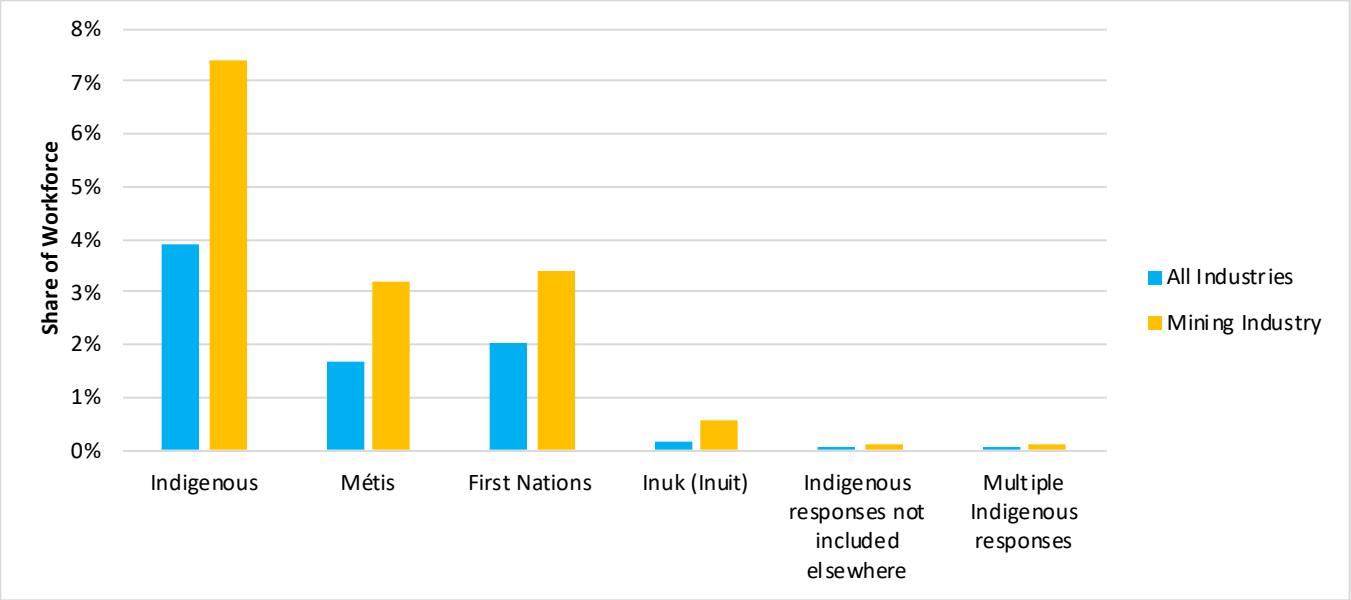


Source: Mining Industry Human Resources Council, Statistics Canada (2011 NHS, 2016 Census), 2019

FIGURE 24

REPRESENTATION OF INDIGENOUS PEOPLES IN THE WORKFORCE, MINING INDUSTRY AND ALL INDUSTRIES, 2016

Return to text



Source: Mining Industry Human Resources Council, Statistics Canada (2016 Census), 2018

FIGURE 25

REPRESENTATION OF NEW CANADIANS AND VISIBLE MINORITIES IN THE MINING WORKFORCE (2006, 2011, 2016)

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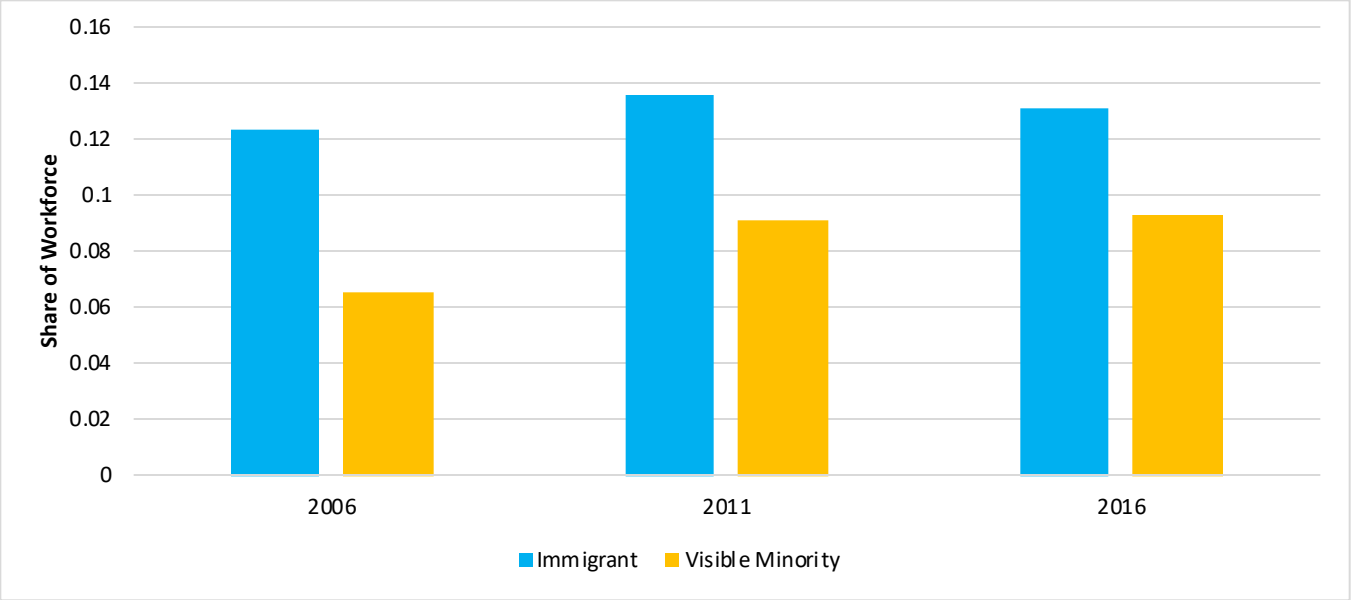


Source: Mining Industry Human Resources Council, Statistics Canada (2006 Census, 2011 NHS, 2016 Census), 2018

FIGURE 26

SELECTED COSTS OF PRODUCTION IN THE MINERAL INDUSTRY[1], 2018

Return to text

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	68	3,134,056	1,924,006	5,833,610	26,871,087
Nonmetallic Mining and Quarrying	931	1,493,978	921,823	1,694,807	13,447,430
Coal	21	494,400	X	988,766	X
Total Mineral Industry	**1 020**	**5 122 434**	**X**	**8 517 183**	**X**

Source: Statistics Canada.
X - Suppressed to meet the confidentiality requirements of the Statistics Act
[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.

SECTION 5

THE ENVIRONMENT: SUSTAINABLE DEVELOPMENT AND SOCIAL RESPONSIBILITY

THE CANADIAN MINING INDUSTRY IS PROVIDING GLOBAL LEADERSHIP THROUGH ITS TOWARDS SUSTAINABLE MINING® PROGRAM TO FOCUS ON ENABLING MINING COMPANIES TO MEET SOCIETY'S NEEDS FOR MINERALS, METALS AND ENERGY PRODUCTS IN THE MOST SOCIALLY AND ENVIRONMENTALLY RESPONSIBLE WAY.

Environmental and social considerations are increasingly well integrated into mine planning and management. Resource development and environmental conservation are not mutually exclusive but can be achieved by effective regulation and responsible sustainability practices. In Canada, mining companies are required to plan for closure well before entering into production. Not only are closure plans required by law in Canada, but companies must also provide financial assurance to ensure that appropriate funding is available for effective mine closure and reclamation. Reclamation, one of the most important aspects in the mine closure process, specifically focuses on restoring mined lands to their original state.

MAC's *Towards Sustainable Mining® (TSM)* initiative is committed to responsible mining and serves as an example of how resource development can co-exist with environmental conservation, and how partnerships can be fostered between mining companies and communities. *TSM*, first established in 2004 and mandatory for all MAC members, is focused on enabling mining companies to meet society's needs for minerals, metals and energy products in the most socially, economically and environmentally responsible way.

ENVIRONMENTAL STEWARDSHIP

The Canadian mining industry has made significant progress in its environmental performance by participating in a host of sustainability programs and initiatives.

Internationally, an array of sustainability and social license initiatives affect the Canadian mining industry. Companies seeking project financing are required to apply rigorous environmental and social standards set by organizations such as the International Finance Corporation, Export Development Canada, the World Bank and commercial banks that have adopted the Equator Principles, a framework used by financial institutions to determine, assess and manage environmental and social risk in projects. Companies dealing in dangerous substances abide by the Basel Convention and the International Cyanide Management Code (as well as Canada's own *Transportation of Dangerous Goods Act*). The practices of many companies are guided by the United Nations Global Compact, the Extractive Industries Transparency Initiative, the Kimberley Process, ISO 14001 certification and other sustainability programs. For a more detailed overview of how MAC member companies apply international standards and programs, *see Figure 27*.

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

Towards Sustainable Mining

TSM is a globally recognized performance system that helps mining companies evaluate and manage their environmental and social responsibilities. It is a set of tools and indicators to drive performance and to ensure that key mining risks are managed responsibly at participating mining and metallurgical facilities.

Exporting Canada's expertise in environmental and social stewardship is one important way that we can contribute to responsible mining practices around the world. In efforts to encourage responsible mining globally, MAC freely shares *TSM* with any country interested in promoting mining sustainably. Over the past several years, *TSM* has spread beyond Canada to seven other countries on four continents that have formally adopted the program to improve the performance of their domestic mining sectors, including Finland, Argentina, Botswana, the Philippines, Spain, Brazil and, most recently, Norway. Many other countries have also expressed interest in the program and are exploring adoption.

How TSM Works

Participation in *TSM* is mandatory for MAC's member companies. This involves subscribing to the *TSM Guiding Principles*, which are backed by specific performance indicators on which member companies publicly report on an annual basis. By adhering to the *TSM Guiding Principles*, mining companies exhibit leadership by:

- Engaging with communities
- Driving world-leading environmental practices
- Committing to the safety and health of employees and surrounding communities

At its core, *TSM* is:

- **Accountable:** Assessments are conducted at the facility level where the mining activity takes place – the first program in the world to do this in our sector. The results provide local communities with a meaningful view of how a nearby mine is faring.
- **Transparent:** On the MAC website, mining companies publicly report their facilities' performance against a suite of indicators. Results are externally verified every three years.
- **Credible:** *TSM* is overseen by an independent Community of Interest Advisory Panel. This multi-interest group helps mining companies and communities of interest foster dialogue, improve the industry's performance and shape the *TSM* initiative for continual improvement.

Currently, *TSM* sets out thirty performance indicators in eight areas:

- Tailings management
- Energy use and greenhouse gas emissions management
- Indigenous and community relationships
- Crisis management and communications planning
- Biodiversity conservation management
- Safety and health
- Preventing forced and child labour
- Water stewardship

Below is a summary of 2018 performance data (the most recent available) for three *TSM* areas that pertain to environmental stewardship: tailings management, biodiversity conservation management, and energy use and greenhouse gas emissions management. In 2021, companies will also begin reporting on a new *TSM Water Stewardship Protocol*. For a more complete overview of industry performance, please refer to the *TSM 2019 Progress Report* on the MAC website.

Tailings Management

Tailings facilities are necessary components of mining activity. It is crucial that these facilities be managed responsibly to protect human safety and the environment. MAC has developed tailings management guides that are used around the world. These include *A Guide to the Management of Tailings Facilities* (the Tailings Guide) and *Developing an Operation, Maintenance and Surveillance Manual for Tailings and Water Management Facilities* (the OMS Guide), both available on the MAC website. The guides outline best practices in safe tailings management for facilities. The *TSM Tailings Management Protocol* measures adherence to these guides.

In 2018, MAC members demonstrated strong performance across the five indicators in this protocol (*see Figure 28*). Notable improvements were made in terms of assigned accountability and responsibility and annual tailings management reviews. In 2017, there had been a drop in performance in these two areas, due in part to facilities new to *TSM* working to align their systems with the program and also due to some facilities' performance being downgraded during external verification. In 2018, at least 90% of facilities achieved a Level A or above on all indicators, with corrective actions taken by most of the facilities that had reported poorer performance in 2017.

Beyond *TSM*, oil sands operators are making measured progress in tailings management. Through the Oil Sands

Tailings Consortium, now a part of Canada's Oil Sands Innovation Alliance, seven of Canada's largest oil sands mining companies share tailings research and technology in a unified effort to advance tailings management.

Biodiversity Conservation Management

Adopting best practices in biodiversity conservation management through all stages of a mine's life cycle is an industry priority. The *TSM Biodiversity Conservation Management Protocol* evaluates and confirms a facility's commitment to biodiversity conservation. Facilities that achieve Level A performance in this protocol engage with key communities of interest – governments, Indigenous communities, and conservation organizations – to develop biodiversity objectives and strategies. Facilities also put in place mechanisms to assess, mitigate, and compensate for impacts on biodiversity.

MAC members have continued to make significant improvements in biodiversity conservation management since it was first introduced in 2012. In 2018, companies improved their performance across all three indicators, with 70% of facilities achieving Level A or higher (*see Figure 29*). There has also been a steady increase in the percent of facilities achieving Level AA and AAA since the protocol was first introduced.

Energy Use and Greenhouse Gas (GHG) Emissions Management

Improving energy efficiency and reducing GHG emissions are priorities for the mining industry. *TSM* measures a facility's ability to track and report energy data, as well as to establish and meet targets. Through comprehensive management systems, *TSM* helps mining operations reduce emissions that contribute to climate change, while also supporting them to reduce operational costs.

To achieve a Level A, *TSM* requires facilities to establish comprehensive systems for energy use and GHG emissions. This includes providing energy awareness training and establishing systems to track and report data for internal and external reporting. Facilities must also set and meet targets for their energy use and GHG emissions performance.

In 2018, the proportion of facilities achieving Level A or higher on some indicators decreased due to facilities that are new to *TSM* working to align their systems with the protocol's requirements (*see Figure 30*).

Over the course of 2020, MAC has undertaken a comprehensive review of the *Energy Use and Greenhouse Gas Emissions Management Protocol*, with a new *TSM Climate Change Protocol* expected to be published in early 2021. The review process drew on recommendations of MAC's COI Panel, which published an advisory *statement to MAC* in 2016, entitled *Rising to the Challenge: Advisory Statement on Climate Change*, which proposed specific ideas and actions to assist MAC and its members in building on the progress they have already made in addressing climate change, and to help guide future endeavours with respect to planning, managing and operating mines and related activities. *MAC's response to this statement* featured several important commitments related to *TSM*, including to take a more holistic view of climate change, to enhance performance requirements for members, and to integrate physical climate impacts.

The revised protocol will cement MAC members as industry leaders in climate change mitigation and adaptation, incorporating criteria to align with the recommendations of the Task Force on Climate-Related Financial Disclosures and introducing new requirements to manage physical climate impacts and adaptation. At higher levels of performance, companies will be making commitments in line with ambitions for net-zero emissions by 2050, taking decisions around future major capital allocations in line with this commitment, and contributing to Scope 3 (supply chain) emissions reductions.

CLIMATE CHANGE AND THE MINING INDUSTRY

Mining is essential for Canada's attainment of a lower carbon future. The world will never achieve a net-carbon-neutral future without a substantial increase in the supply of minerals and metals:

- By 2040, between 7 and 17% of global electricity generation will be from solar power. Renewable energy systems can require up to 12 times more copper compared to traditional energy systems.
- By 2040, between 9 and 21% of global electricity generation will be from wind power. Approximately 170 tonnes of steelmaking coal and 10 tonnes of zinc are needed to produce and galvanize the steel in an average wind turbine.
- By 2040, there will be more than 900 million electric cars worldwide, accounting for over 50% of the global fleet. Zero-emission electric vehicles require about three times as much copper as an internal combustion vehicle.
- By 2040, cars that rely solely on gasoline and diesel will be 40% more efficient than today. As the world

transitions to a low-carbon economy, oil will continue to play a necessary role in the global energy mix. We believe that the remaining demand should be met by low-carbon, responsible producers.

- Zero-Emissions haul trucks could reduce GHG emissions by 2,750 tonnes of CO_2e per truck per year. This equates to removing roughly 600 cars off the road.
- Uranium mined in Canada is a direct contributor to avoided GHG emissions around the world. Small nuclear reactors (SMRs) offer the potential for more accelerated decarbonization.

In Canada, the mining industry accounts for 1% of total overall emissions (*see Figure 31*). While the industry recognizes the above projected demand for minerals and metals presents a tremendous opportunity, the sector also recognizes the need to continue to reduce its own carbon footprint in the extraction and manufacturing of these materials. Beyond the above *TSM* related commitments focused on best practice and energy and GHG emission management, MAC and its members support climate action that is consistent with the ambition of the Paris Agreement to limit global warming to well below 2 degrees Celsius (above pre-industrial levels). To assist the government in the development of effective pan-Canadian climate change policies and regulations, MAC developed the following *Principles for Climate Change Policy Design*, and continues to use them as a basis for constructive engagement with decision makers on how best to achieve Canada's climate objectives. They include support for:

- **Establishing a broad-based carbon price** that is applicable to all sectors of the Canadian economy.
- **Being revenue neutral** by investing revenues generated through carbon pricing into the development of lower emission technologies to manage the transition to a lower carbon future, including climate adaptation, and to ensure a level playing field for trade-exposed industries that are emission intensive.
- **Addressing competitiveness and carbon leakage concerns** across all sectors to prevent declines in investment, employment, tax revenues and trade.
- **Being predictable, flexible and sensitive to changing economic conditions and geographic circumstances** to enable consumers and industry to adapt and to treat regions fairly, particularly Canada's North.
- **Being simple, complementary and effective** to ensure that a national climate change regime works in tandem with existing provincial schemes, avoids duplication, and is simple to understand and administer.
- **Supporting investments in the development and implementation of technologies that lower emissions** through capital investments, which could include public-private partnerships.
- **Recognizing early action** and acknowledging that some companies have been proactive in reducing their climate footprints and that several provinces have already established climate change mitigation regimes.

Federal Climate Change Policy

Beyond incentivizing targeted investments, getting the policy and regulatory environment right is essential for business to improve its performance while being able to grow and compete internationally. MAC is concerned that existing or developing federal, provincial and territorial regulatory initiatives will result in double regulation of the same emissions in one or more respects. This duplication would increase overall costs, create additional reporting and compliance burden, frustrate private sector investment and innovation, and generally blunt the incentive for corporations to take action on initiatives focused on climate change, all without achieving significant additional GHG emissions reductions.

MAC believes that carbon pricing is the simplest and most cost-effective way to lower GHG emissions and recommends that the government, as a general principle, commit to:

- Make carbon pricing the core of its climate policy, backed by robust protections for Emissions-Intensive and Trade-Exposed (EITE) sectors to mitigate investment and carbon leakage. It should also be sensitive to remote and northern regions. As noted below, MAC is pleased by the progress made to date, though we will continue to advance further refinements to the Output-Based Pricing System (OBPS) in the upcoming review.
- Clearly demonstrate complementarity before adopting non-pricing climate change policies and regulations, such as the the Clean Fuel Standard (CFS), to avoid cumulative effects. This demonstration should include a robust and publicly-disclosed economic impact assessment on an industry by industry basis that includes provincial climate policy cost considerations. This is important to accurately assess EITE competitiveness exposure and necessary to limit the potential for investment and carbon leakage.

Furthermore, to ensure transparency with Canadians, the total cumulative domestic cost impacts (i.e. the CFS) need to be reflected in terms of dollars per-tonne to consumers.

Output-Based Pricing System (OBPS)

MAC worked constructively with federal government decision-makers on the proposed output-based standards for mining, smelting and iron ore pelletizing. We were pleased to see several of our priorities recognized by ECCC in the final regulation, including recognition of the need to treat process emissions differently than combustion emissions.

Looking forward, government decisions on how carbon revenue recycling will be invested remain undetermined. We believe that all funds raised under the OBPS should be used to address the challenges faced by affected facilities. We strongly recommend that the federal government establish two mechanisms that will allow for the recycling of revenues back to industry to invest in their operations to lower GHG emissions, and that these mechanisms apply across all backstop jurisdictions. The first mechanism should establish individual accounts for the majority of a large final emitter's (LFE) compliance payments. The second mechanism should be a sectoral fund that receives the remainder of a LFE's compliance payment in the first few years and, after initial seeding, would pool the unused funds from the individual sector accounts.

Clean Fuel Standard (CFS) Regulation

From the outset of the CFS technical working group consultation, MAC, in tandem with other EITE sectors, has persistently underscored the need to:

- Recognize and protect the competitiveness of EITE sectors with a range of solutions.
- Generate EITE protections on the basis of cumulative carbon cost assessments.
- Disclose and engage stakeholders directly through participation in ECCC's cost-benefit modelling and regulatory impact assessment study.
- Be sensitive to remote and northern regions, whose inhabitants and industrial operations have exceptionally limited or no electrical grid or natural gas pipeline connectivity, and therefore are already subject to heightened power generation and operational costs.

Despite constructive engagement both independently and through our collaboration with other sectors, we find these key concerns with the proposed CFS regulation remain unaddressed, and have been advised by decision makers that they are unlikely to be as the regulation approaches the more public facing Canada Gazette I publication. In response to this, MAC recommends ECCC maximize the eligibility of mining companies to generate credits, as well as take a simpler and less restrictive approach to how credits are generated and treated under the proposed regime. Additionally, MAC simultaneously recommends programming to support off-grid industrial operations.

Off-Grid Industrial Electrification

Northern energy costs are compounded by the infrastructure deficit in the territories and remote regions of the provinces. The extremely limited reach of transmission and distribution infrastructure means mines and development projects are off-grid and dependent almost exclusively on diesel. Beyond the cost of fuel itself, the cost per unit of delivered fuel is inflated significantly by associated investments essential to supporting the mines' energy supply chain. Fuel-switching opportunities are also limited and are contingent on geographical considerations.

While the government has deployed various programs to support businesses and communities in reducing their carbon cost exposure, these programs have not been designed with remote industry in mind. While the high energy costs in the North have long served as a strong incentive to maximize energy and fuel efficiency, evidence suggests that the proverbial "low-hanging" fruit are gone, meaning future improvements will be incremental and gradual barring a technological breakthrough, such as SMRs. While MAC is supportive of the government's leadership on SMRs as a key tool to electrify off-grid regions, there is a gap between now and when this technology will be available where remote, off-grid and diesel-reliant industrial operations will become increasingly vulnerable to rising carbon costs with little viable recourse.

To bridge this gap, and help bolster the segment of the Canadian mining industry hardest hit by COVID-19, MAC recommends the government undertake a five-year investment of at least $250 million for remote and northern off-grid industrial electrification to accelerate improvements in energy and fuel efficiency, and drive to the maximum extent possible the scalability, deployability, capacity and storage capabilities of clean power generation in northern Canada, including SMRs.

Mining and Renewable Energy

Renewable energy technologies and their economics continue to improve. Renewable power is appealing to mining companies because it has the potential to reduce energy costs and environmental impacts, enhance energy security, address climate change and improve community and societal support for mining projects.

Given the heightened cost of powering mining operations, companies are giving the benefits of renewable energy technologies greater consideration. The levelized cost of electricity for wind, solar photovoltaic, concentrated solar power and some biomass technologies has steadily decreased, enhancing their competitiveness, particularly for off-grid generation where mining companies are reliant on diesel power.

Just as miners need to go where the viable deposits are located, renewable energy generation is contingent on the strength and reliability of the renewable asset. To date, off-grid wind deployment at remote mines in Canada has been able to displace ~10% of diesel reliance at site, with greater penetration rates internationally, particularly for solar power in sun-rich regions.

In Canada, these limitations have so far prevented renewable energy generation from being a sole-source industry-wide energy solution. To overcome these geological and capacity constraints, what is most likely is the dual application of renewable technologies with other energy solutions, such as SMRs and hydrogen applications discussed further below.

THE CLEAN ENERGY ECONOMY

Canada has all the ingredients—sustainably-sourced critical minerals, metals and energy products—needed for the technologies that are powering imaginations and enabling the transition to a low carbon future.

A report from *Clean Energy Canada* highlights the opportunity that a low carbon economy presents to the mining industry, noting that Canada has rich deposits in many of the minerals and metals needed in renewable energy technologies. For example, Canada is home to 14 of the 19 metals and minerals needed to make a solar PV panel. Clean Energy Canada encourages Canada to become the world's leading supplier of the mining products integral to a low carbon economy.

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

Two recent areas in which the government has taken positive steps are in advancing both SMRs and hydrogen technologies – both of which hold promise for Canada's mining sector.

Small Modular Nuclear Reactors (SMRs)

SMRs could be the future of Canada's nuclear industry, with the potential to provide non-emitting energy for a wide range of applications, from grid-scale electricity generation to use in heavy industries. This could be positive for mining in Canada in both applications. The opportunity to significantly displace or eliminate GHG

COAL'S ROLE IN A SUSTAINABLE SOCIETY

About 770 kilograms of steelmaking coal (metallurgical coal not thermal coal) are required to produce one tonne of steel, and more than 700 million tonnes of steelmaking coal are used each year in global steel production. Steel is used to create the infrastructure and other materials Canadians use every day and is crucial for:

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

Source: Teck Resources Limited

emissions from carbon intensive electricity grids in Alberta and Saskatchewan presents a massive opportunity to improve the carbon competitiveness of the production of oil, uranium, potash and other commodities produced in these provinces. The off-grid application of SMRs has the potential to create a cost effective paradigm shift away from diesel reliance in remote regions, ushering in the possibility of net-neutral off-grid operations: the stuff of dreams only a decade ago.

In 2018, the federal government released its SMR Roadmap, and was poised to release a more substantial SMR Action Plan at the time of writing. On the provincial side, governments in the provinces of Ontario, Saskatchewan, Alberta and New Brunswick have signed a memorandum of understanding to collaborate in the advancement of SMRs.

While the opportunity is great, work remains to be done to pilot and enhance SMR technologies and create the social license and trust required for success. On this last point, it is MAC's view that substantial and meaningful engagement with stakeholders of all kinds, and consultation with Indigenous communities and self-governments, is paramount to establishing the confidence, the understanding of risks and benefits, and ultimately the acceptance of this technology without which its success in Canada will not be possible, regardless of the opportunity or potential. MAC was pleased to lead a consortium of mining, Indigenous, and nuclear industry organizations to jointly communicate this perspective to federal decision makers in 2020.

Hydrogen

There is increasing interest in the use of hydrogen and fuel cells to decarbonize energy use across economies around the world. Hydrogen is a versatile fuel that can be produced from many sources and act as an energy carrier. Hydrogen fuel cells do not produce emissions, only electrical power, water, and heat, meaning their potential application in the mining industry is diverse. The most recent application in mining in Canada was at Glencore's Raglan mine in northern Quebec, in partnership with TUGLIQ Energy and the federal and provincial governments, where a hydrogen fuel cell was co-deployed with a wind turbine to minimize the loss of wind energy over longer periods of time, and reduce intermittency.

Natural Resources Canada has been consulting and is also poised to launch a Hydrogen Strategy for Canada, in which MAC has also been engaged. MAC recommended that NRCan should:

1. Develop and make available a flexible technical scoping tool designed to assess the feasibility of hydrogen technologies in their various applications to mining companies. This model should be updated periodically as technologies improve and potential uptake becomes more realistic.

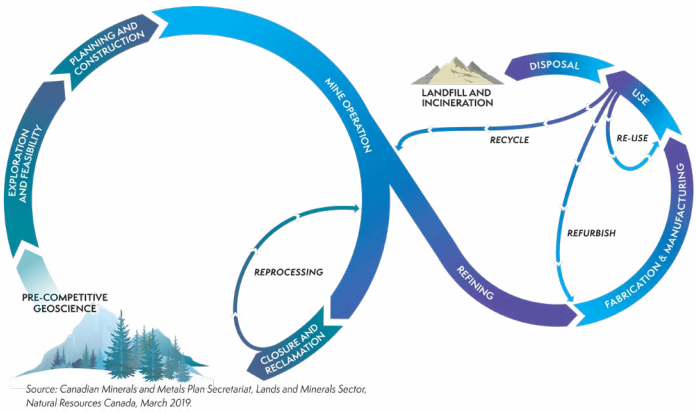
2. Create a heavy industry specific fund, eligible for renewal, to make pilot and demonstration project funding available to mining operators where the most promising opportunities are identified.

As is often the case with new technologies, there are learning and cost curves that need to be flattened to increase the uptake potential. Delivering on the above recommendations would help on both fronts, increasing awareness of the improving efficiency of hydrogen technologies over time, their applicability to mining operations, and the periodic assessment of the improved economic viability of deployment. To support the coordination of activities, MAC co-chairs a CANMET hosted committee on mining and hydrogen use in the mining sector.

Recycling, E-Waste and the Circular Economy

Conventional economic consumption and disposal of resources is increasingly putting pressure on our climate, communities, and in some cases, public health. Transitioning to a cleaner economy starts with modifying practices and technologies to create economic opportunities out of the materials that might otherwise be thrown away.

The circular economy is an idea that supports business practices that extract as much value as possible from resources by recycling, repairing, reusing, repurposing, or refurbishing products and materials—eliminating waste and GHG emissions at the design stage.



Source: Canadian Minerals and Metals Plan Secretariat, Lands and Minerals Sector, Natural Resources Canada, March 2019.

While minerals and metals are already commonly recycled in Canada at multiple levels, there is an opportunity and growing need to do more. One expanding waste stream that could be more optimally managed is that of electronics.

E-waste is one of the fastest-growing waste streams in the world and includes items such as mobile devices, computers, monitors, televisions and DVD players, among other electronic equipment. As consumers and businesses favour disposable technology and a shorter life cycle for electronics, the amount of e-waste generated is increasing. For example, a record 53.6 million metric tonnes of electronic waste was generated worldwide in 2019, up 21% (>10 million tonnes annually) in just five years, according to the UN's Global E-waste Monitor 2020, released in July 2020.

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

For example, Glencore's Horne smelter, located in Rouyn-Noranda in Quebec, has been recovering copper and precious metals from end-of-life electronics for over 30 years. The smelter receives end-of-life electronics from North America, Europe, Asia and South America and these materials are sampled for accurate value determination and processed to produce copper anodes. These are shipped to a Montreal refinery for further refinement into saleable products. Acknowledging how important recycling and reuse is to tackling climate change, when developing policies governments should be sensitive to ensure that facilities such as these are not unintentionally constrained from their critical recycling activities. Ideally, policies would be put in place that support and reward these activities within Canada's borders.

INDIGENOUS RELATIONS AND BENEFIT AGREEMENTS

More than any other sector, Canada's mining industry has prioritized building and maintaining respectful and mutually-beneficial partnerships with communities impacted by, or with an interest in, mineral exploration and mining activities.

From exploration to mine closure, the mining sector engages with communities, including Indigenous peoples, to share information and to collaborate on issues related to environmental effects, monitoring and cultural protection. The industry also focuses on developing partnerships and initiatives that generate economic opportunities and wealth for surrounding communities.

The sector further supports Indigenous participation through training, business development, employment, social investments, and procurement. As a result of its efforts, the mining industry has become the largest private-sector industrial employer, on a proportional basis, of Indigenous peoples in Canada and a trusted partner of Indigenous businesses. There are currently over 490 active agreements between mining companies and Indigenous communities.

Best Practice in Community Engagement

MAC members' commitment to ongoing engagement relationships with Indigenous communities is demonstrated through the *TSM* program. In December 2019, MAC adopted a new *TSM Indigenous and Community Relationships Protocol* – a comprehensive update to an existing protocol focused on outreach and engagement.

The *Indigenous and Community Relationships Protocol* consists of five performance indicators. These indicators seek to confirm that:

- Processes are in place to identify communities of interest, including Indigenous communities and organizations.
- Processes have been established to support the development and maintenance of meaningful relationships with communities of interest.
- Mining facilities are actively building meaningful relationships and implementing engagement and decision-making processes with Indigenous communities.
- Processes have been established to mitigate adverse community impacts and optimize social benefits generated from facilities.
- Processes are in place to respond to incidents, concerns, and feedback from communities of interest.

The revised protocol raises the bar on facility performance, featuring new indicators on effective Indigenous engagement and dialogue, as well as community impact

and benefit management. Among other criteria, good practice under the new protocol includes:

- A demonstrated commitment to aim to obtain the Free, Prior and Informed Consent (FPIC) of directly affected Indigenous peoples for new projects and expansions where impacts to rights may occur.
- Response to the Truth and Reconciliation Commission of Canada's Call to Action 92 iii, which calls for the corporate sector to provide education and skills-based training for managers and staff in areas such as Indigenous history and intercultural competency.
- Implementation of leading engagement processes designed to build meaningful relationships.
- Stronger commitments to collaborate with communities of interest, including in the management of impacts and benefits, engagement processes, and other areas.

United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP)

In 2019, British Columbia (BC) became the first jurisdiction in Canada to pass legislation intended to implement the United Nations Declaration on the Rights of Indigenous Peoples. The *Declaration on the Rights of Indigenous Peoples Act (DRIPA)*, which received Royal Assent on November 28, 2019, had unanimous support in the BC legislature.

The Government of Canada has committed to taking a similar approach to BC by introducing framework legislation to implement UNDRIP. It is anticipated that federal legislation will build on Bill C-262 (an NDP Private Member's Bill that died on the Order Paper in 2019) and will require the federal government to take necessary measures to ensure consistency between federal laws and UNDRIP; develop a joint action plan with Indigenous groups; and provide an annual report to Parliament on progress towards implementing UNDRIP.

Much of the discussion related to the implementation of UNDRIP in Canada has been focused on the interpretations of FPIC. Clarity from the federal government about how these provisions, rather than isolated terms, will be interpreted is needed to avoid diverging expectations and interpretations, all of which could jeopardize achieving decision-making processes that are transparent, consistent, efficient and timely.

In the Canadian context, discussions among Indigenous peoples, government and industry related to Indigenous participation in resource development decision making must be rooted in a shared understanding of FPIC and respect Canada's laws and constitutional framework. Similarly, application of FPIC must respect local laws and constitutional frameworks when being applied outside of Canada.

REGULATORY ENVIRONMENT

Developing and operating a mine in Canada requires compliance with a multitude of federal and provincial or territorial legislative and regulatory requirements. Some of these requirements are specific to mining, while many more apply generally to environmental protection, and the health and safety of workers and the public. To deal with this complexity, Canadian companies, as well as domestic and foreign investors, rely on governments to provide clear information about requirements, approval processes, timelines and responsibilities.

New mines and major expansions must fulfill the assessment and permitting requirements of their provincial jurisdiction. In addition, most new mines and major expansions must undergo federal impact assessment and, depending on the details of the project and the mine site, may require approvals under other federal legislation, such as the *Fisheries Act*.

Three federal acts relevant to mining projects were amended in 2019: the *Impact Assessment Act*, the *Fisheries Act*, and the *Canadian Navigable Waters Act*. Twelve months after Coming into Force of the amendments, most of the supporting regulations, policies, and guidance are in place for the *Impact Assessment Act* and the *Canadian Navigable Waters Act*, and partially in the case of the *Fisheries Act*.

For the mining industry to thrive in Canada, the process for reaching a decision on whether a mine can be built, and under what conditions, needs to be determined through a timely, coordinated and seamless process that continues to be grounded in meaningful consultation. In turn, this will help preserve Canada's reputation as an attractive jurisdiction for mineral investment and sustainable mining development.

FIGURE 27

MAC MEMBER COMPANY APPLICATION OF INTERNATIONAL STANDARDS AND PROGRAMS

Return to text

MAC MEMBER COMPANY APPLICATION OF INTERNATIONAL STANDARDS AND PROGRAMS	Industry Sustainability Initiatives		Management System Standards		International Voluntary Initiatives				Reporting, Disclosure and Transparency Standards					Financing Standards	Listed on Socially Responsible Investing Indices		Commodity Specific Standards		
	ICMM Sustainable Development Framework	WGC Conflict Free Gold Standard	ISO 14001: EMS Standard	OHSAS 18001	UN Global Compact	Extractive Industries Transparency Initiative	Voluntary Principles on Security and Human Rights	OECD Guidelines for Multinational Enterprises	AA 1000	Global Reporting Initiative	Carbon Disclosure Project	Water Disclosure Project	Carbon Pricing Leadership Coalition	IFC Social and Environmental Performance Standards	Dow Jones Sustainability Index	Jantzi Social Index	Responsible Jewellery	International Cyanide Code	Kimberley Process
INTERNATIONAL INITIATIVES																			
COMPANIES HEADQUARTERED IN CANADA																			
Agnico Eagle Mines Ltd.		✓					✓			✓	✓	✓			✓		✓	✓	
Barrick Gold Corporation	✓	✓	✓		✓	✓	✓	✓	✓	✓		✓	✓		✓				
Eldorado Gold		✓	✓	✓	✓					✓	✓	✓						✓	
First Quantum Minerals Inc.					✓	✓	✓				✓			✓					
HudBay Minerals Inc.			✓	✓		✓	✓	✓		✓	✓	✓		✓					
IAMGOLD Corporation		✓				✓		✓		✓				✓		✓			
Kinross Gold Corporation		✓	✓	✓	✓	✓	✓			✓	✓	✓		✓		✓		✓	
Lundin			✓	✓	✓		✓	✓	✓	✓	✓	✓							
New Gold Inc.		✓	✓	✓	✓		✓			✓	✓	✓						✓	
Sherritt International					✓	✓	✓	✓		✓				✓					
Teck Resources Limited	✓		✓		✓	✓		✓		✓	✓	✓	✓	✓	✓				
COMPANIES HEADQUARTERED OUTSIDE OF CANADA WITH CANADIAN OPERATIONS:																			
ArcelorMittal Mines Canada			✓	✓		✓				✓									
De Beers Canada Inc.	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓			✓		✓			✓
Glencore Nickel	✓		✓	✓	✓	✓	✓			✓	✓	✓		✓	✓				
Newmont Goldcorp	✓	✓	✓		✓	✓	✓			✓	✓				✓			✓	
Rio Tinto	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Vale			✓	✓	✓	✓	✓			✓	✓	✓	✓	✓					

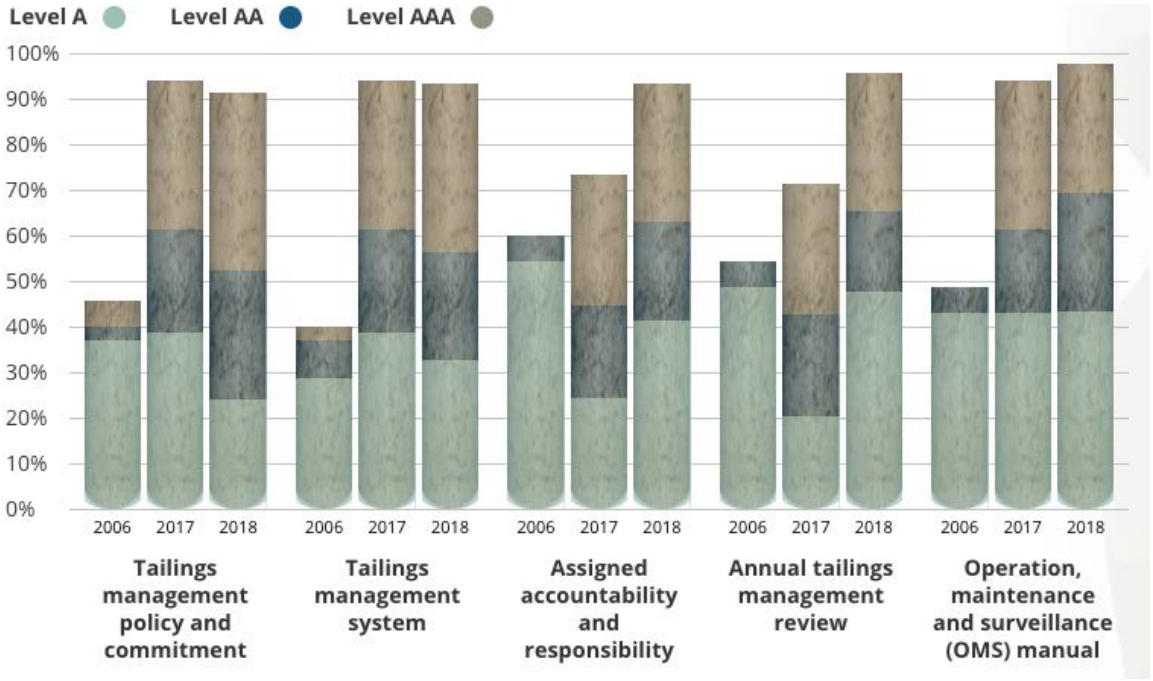
Source: Mining Association of Canada

Note: HudBay Minerals Inc. and Sherritt International apply the IFC Social and Environmental Performance Standards only to select international facilities

FIGURE 28
TSM TAILINGS MANAGEMENT

Return to text

Tailings Management Assessments
Percentage of Facilities at a Level A or Higher 2006, 2017 and 2018

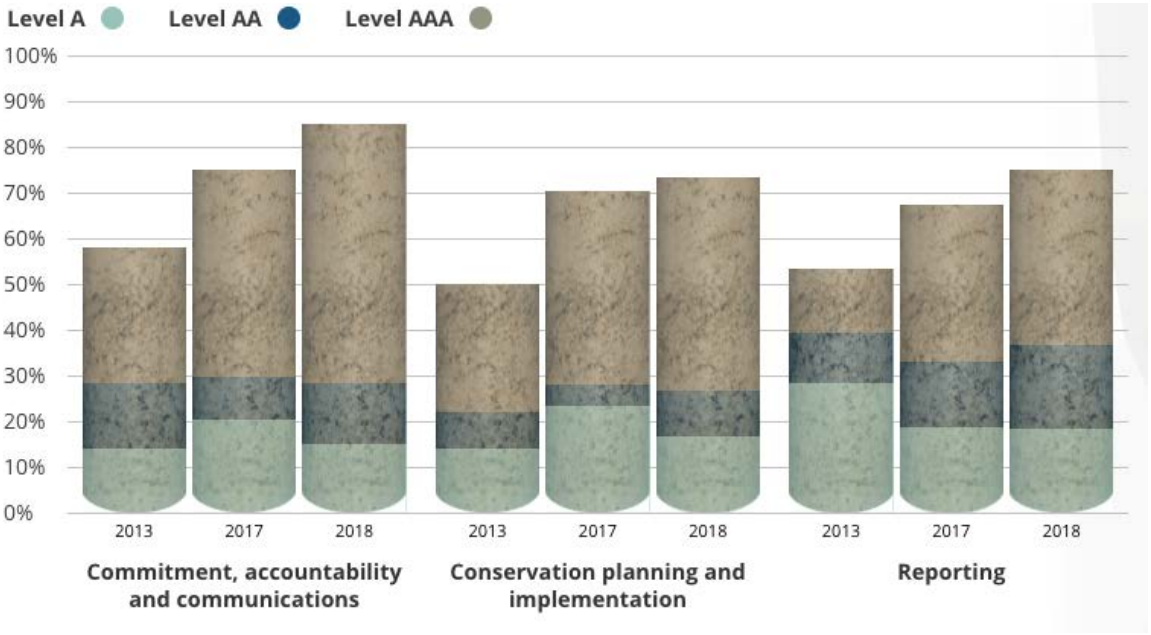


Source: www.mining.ca/towards-sustainable-mining

FIGURE 29
TSM BIODIVERSITY CONSERVATION MANAGEMENT

Return to text

Biodiversity Conservation Management Assessments
Percentage of Facilities at a Level A or Higher 2013, 2017 and 2018

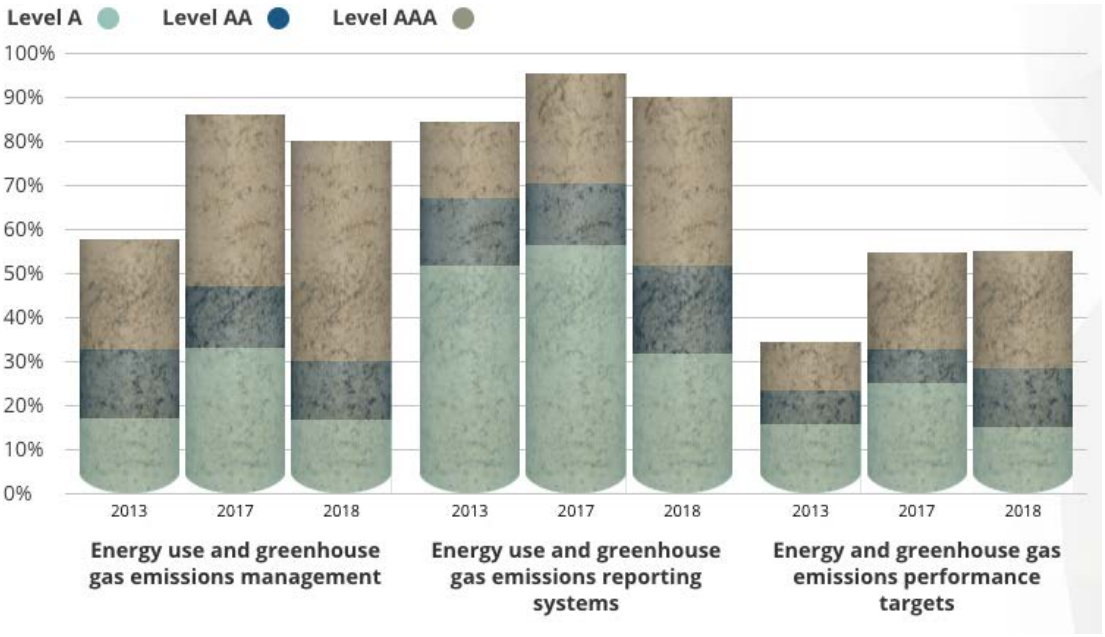


Source: www.mining.ca/towards-sustainable-mining

FIGURE 30
TSM ENERGY USE AND GHG EMISSIONS MANAGEMENT

Return to text

Energy Use and GHG Emissions Management Assessments
Percentage of Facilities at a Level A or Higher 2013, 2017 and 2018



Source: www.mining.ca/towards-sustainable-mining

FIGURE 31

MINING INDUSTRY ENERGY AND GHG EMISSIONS DATA, 1990 AND 2014-2018

Return to text

	1990	2014	2015	2016	2017	2018
Canadian economy						
Canadian energy use (PJ)	9,230	11,748	12,024	11,483	11,887	12,043
Energy used by broader industry (PJ)	2,710	3,563	3,611	3,478	3,607	3,565
Canadian GHG emissions (Mt CO_2e)	603	721	720	706	714	729
Direct GHG emissions by all industries (Mt CO_2e)	103.7	149.1	152.7	147.8	155.4	148.7
Metal and non-metal mining						
Total energy use (PJ)	148	161	160	163	177	192
Share of Canadian energy use (%)	1.6%	1.4%	1.3%	1.4%	1.5%	1.6%
Direct GHG emissions (Mt CO_2e)	6.3	6.7	6.7	6.6	7.3	7.5
Share of Canadian GHG emissions (%)	1.0%	0.9%	0.9%	0.9%	1.0%	1.0%

Source: Canadian Energy and Emissions Data Centre (CEEDC), 2020.
Notes: Total includes direct and indirect emissions MAC has sought to include coal and oil sands mining data into the above calculations to provide a more representative, mining sector-wide statistic; however, CEEDC does not have access to oil sands mining or coal mining energy and emissions data.

SECTION 6

THE WORLD: INTERNATIONAL MARKET ACTIVITIES AND DEVELOPMENTS

Photo courtesy of B2Gold.

CANADIANS CAN BE PROUD OF THEIR GLOBAL MINERALS INDUSTRY THAT CREATES OPPORTUNITIES IN MORE THAN 100 COUNTRIES. CANADA BOASTS THE INDUSTRY'S BEST EXPLORATION FIRMS AND A CAPITAL MARKET THAT IS HOME TO MORE THAN HALF OF THE WORLD'S PUBLICLY TRADED MINING COMPANIES.

There is an opportunity to translate Canada's strong reputation for sustainable mining and responsible business conduct into increased investment and enhanced market access for Canadian products, goods and services.

CANADIAN MINING'S INTERNATIONAL PRESENCE

Canadian mining companies operate in more than 100 countries around the world. According to NRCan, 650 Canadian companies held mining assets abroad (CMAA) valued at $174.4 billion in 2018 – the most recent year for which data is available. Year-over-year, this represents an increase in value of $5.7 billion or 3.4%. By comparison, this figure is nearly twice that of Canadian mining assets at home, which amounted to $97.2 billion, accounting for just over one-third (35.8%) of total Canadian mining assets (*see Figure 32*). While these numbers are significant, context is important to help situate Canada on the global scale of total mining asset value. For example, according to PwC, the world's 40 largest mining companies had a market capitalization of $849 billion as of April 2019, and BHP, the world's largest mining company, as a single corporate entity, was in possession of assets totaling $104 billion in 2020.

As a geographic indicator, the majority of CMAA (71.7%) are located in the Western Hemisphere. Latin America and the Caribbean accounted for 58% of CMAA, with a value of $104.4 billion in 2018. Total value in the region was up 6.1% year-over-year. Notable increases in Panama, Chile and the Dominican Republic offset declines in Argentina and Mexico.

The second highest concentration of CMAA is in Africa, where the overall value of Canadian mining assets increased by 3.2%, or $800 million, in 2018. Two of the top countries in terms of value (Burkina Faso and Mauritania) experienced gains, which were partially offset by declines in asset values held in Ghana.

There are significant annual investments associated with these assets. In fact, companies listed on the Toronto Stock Exchange (TSX) and the Venture Exchange (TSX-V) raised $860 million for African mining projects in 2018 and $2.1 billion in equity capital for Latin American mining projects in the same year. Despite these investments, Canadian mining companies are facing increased competition from other mining jurisdictions operating internationally, including Australia and China.

Canadian Direct Investment Abroad

Canadian Direct Investment Abroad (CDIA), and mining's share of it, is an indicator of the industry's international presence. CDIA was projected at $1.39 trillion in 2019 (*see Figure 33*). Of that, the mining sector accounted for $89.2 billion, or 6.4%, of the total, up modestly from 2018. While fluctuations year-over-year are normal, it remains a significant contributor.

Since 2013, mining CDIA has remained relatively consistent, starting at $77 billion, peaking in 2016 at $86 billion, and

declining since then to current projections. Preceding 2013, mining CDIA remained roughly consistent from 1999 to 2008 in the mid-$20 billion range, after which, outward flows of mining investment increased significantly – two and half fold – over the subsequent 10 years. While outward flows of investment are essential to any open economy, the sheer scale of the increase in outward investment demonstrates the increasing global strength and reach of our sector.

Foreign Direct Investment in Canada

Canada relies heavily on foreign direct investment (FDI), and the mining industry and downstream value-added manufacturing activities accounted for approximately $65.5 billion, or 7%, of FDI in 2019. When isolated from this total, 2019 mining FDI into Canada was $42.65 billion – a 70% increase ($17.6) year-over-year. This figure accounts for 4.37% of Canada's overall total (*see Figure 33*).

The Value of Company Expenditures in Host Countries

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

It has been estimated that approximately 80% of all money spent in building and operating a mine is spent in the host country through wages, local procurement and payments to various levels of government. This estimate is supported by research conducted by MAC in 2018. Using methodology developed by the World Gold Council, MAC surveyed its members on their 2017 expenditures related to mining activities outside of Canada. The purpose of this study was to better understand the Canadian mining sector's overall contributions to economic development around the world, beyond focusing exclusively on taxes and royalties.

Ten MAC member companies – representing 53 producing mines and non-producing operations that together employ 73,500 employees and contractors – provided information on their expenditures related to employee salaries, payments to suppliers, community investments, taxes and royalties, and payments to providers of capital.

The data provided by these 53 operations reveal results similar to those reported by the World Gold Council, which showed that the majority of expenditures associated with mining activities are spent in host countries. For MAC's survey, the reported expenditures totalled US$18.6 billion, with US$16.5 billion (89%) being spent within the host country, though there is a range from 41% expenditure in Mauritania to 98% expenditure in Chile.

The survey also found that the largest beneficiaries within host countries are companies that supply equipment and services to mining operations, accounting for 60% of the total. The second largest beneficiaries are payments to employees, accounting for 26% of the total, followed by combined payments to governments and communities accounting for 9% of the total. Figure 34 summarizes the consolidated survey data for 24 national jurisdictions and demonstrates that the broader economic contributions mining generates extend far beyond taxes and royalties.

Local Procurement and the Sustainable Development Goals

The positive economic impacts created when Canadian mining companies procure goods and services in their host countries and communities can be game-changers for economic and social development. While civil society and the public at large have tended to focus heavily on the level of tax paid by mining companies, procurement is the single-largest payment type a mining operation will make over its lifespan.

Therefore, recognition of the role that local procurement can play in helping to achieve Sustainable Development Goals (SDGs) is increasing. As discussed in the joint report,

1
NO POVERTY
Local procurement creates revenue and jobs for the countries that host mining.

8
DECENT WORK AND ECONOMIC GROWTH
Local procurement creates jobs with learning opportunities and more balanced growth in host countries.

9
INDUSTRY, INNOVATION AND INFRASTRUCTURE
Local procurement increases skills and transfers technology to less developed countries.

10
REDUCED INEQUALITIES
Local procurement helps ensure the benefits of mining are more shared across the economy.

AN ANALYSIS OF TEN MAC MEMBERS' INTERNATIONAL ACTIVITIES – SPANNING 53 OPERATIONS AND DEVELOPMENT PROJECTS – REVEALED THAT 89% OF COMPANY EXPENDITURES WERE SPENT WITHIN THE HOST COUNTRY.

Mapping Mining to the Sustainable Development Goals: An Atlas, local procurement can contribute meaningfully to a number of SDGs as shown below.

Organizations such as Mining Shared Value – a non-profit initiative of Engineers Without Borders Canada – are promoting awareness of the power of local procurement. For example, a single mine operated by one of MAC's members can spend hundreds of millions of dollars on procurement in a host country. This often represents several times the amount of official development assistance the Canadian government may provide to that country. For example, the in-country procurement spend of a single mine – IAMGOLD's Essakane operation in Burkina Faso – was approximately $240 million in 2018, compared to Canada's aid contributions to the same country, of $43 million, for the same year.

CANADA'S MINERAL TRADE

Despite showing a trade deficit in the third and fourth stages of mining in 2019, the sector as a whole maintained a surplus of $20.1 billion (*see Figure 35*). Approximately a five-fold increase from a decade earlier, this surplus indicates a healthy global demand for Canadian mineral products.

Exports

At $91.4 billion, exports of mineral products for the first three stages of mining were largely flat year-over-year in 2019, increasing by only $1.2 billion (or just under 1%), indicative of a continuation of elevated mineral and metal prices in 2018. Stage 4 exports totalled $18.4 billion, up just under 4% (or $700 million) year-over-year. Combined, the exports for the four stages reached $109.8 billion, or 19%, of the total value of Canada's exports (*see Figure 36*). The value of Canada's mineral and metal exports increased by approximately 32% between 2010 and 2019 (*see Figure 36*).

Just under half of Canada's mineral and metal exports by value were destined for the US in 2019, with iron and steel, aluminium, gold, silver, platinum, potash, copper, zinc and nickel holding the largest values (*see Annex 9*). The European Union is a leading destination for Canadian gold, iron ore, nickel and diamonds. Other destinations, including China, buy significant volumes of copper, iron ore, coal and potash.

Imports

Total imports for the first three stages of mining decreased by 2.5% year-over-year, coming in at $47 billion. Combined, the four stages totalled $88.9 billion in imports (*see Figure 36*). Of Canada's total mineral imports by value in 2019, 47% of which came from the US, which roughly equalized the balance of trade between the two countries for minerals and metals (*see Annex 10*). The reliance on the US market for the import and export of minerals and metals underscores the need to diversify trade.

CANADA'S TRADE POLICIES

Free trade, investment and taxation agreements help facilitate the trade of mining products and investment flows. These agreements reduce barriers for investment, enhance transparency and advance cooperation. The reduction and elimination of tariffs increases the competitiveness of Canadian mineral products in foreign jurisdictions by levelling the playing field from a cost standpoint, thus enabling companies to capture greater market share.

Investment agreements, complete with dispute resolution mechanisms, provide mining investors with greater certainty over the investments that companies make in foreign jurisdictions. Labour mobility and regulatory cooperation mechanisms enable companies to secure the key skills they need for project development and operation and promote dialogue through the complex process of obtaining regulatory approvals.

However, international agreements do not alone facilitate trade. Trade-enabling transportation infrastructure is essential for companies to get their goods to market. Beyond infrastructure expansion, the efficient operation of Canadian modes of transportation, such as rail, is critical. Further, the efforts of Canada's Trade Commissioner Service, and other outward looking programs, including Export Development Canada, are critical supports for Canadian companies operating aboard.

THE MINING SECTOR IN CANADA IS ONE OF THE FEW SECTORS THAT CONSISTENTLY MAKES A POSITIVE CONTRIBUTION TO CANADA'S BALANCE OF TRADE.

Material going to ground from a concentrator stacker at IOC Operations in Labrador City, Newfoundland and Labrador.

Part of maintaining Canada's global leadership is ensuring that Canadian mining and supply sectors have access to modern and comprehensive trade and investment vehicles to meet the world where it does business. MAC is pleased to see the Government of Canada pursuing a robust trade agenda and supports participation in the following engagements.

Investor State Dispute Settlement (ISDS) Mechanisms

ISDS is a mechanism in a free trade agreement (FTA) or investment treaty that provides foreign investors, including Canadian investors overseas, with the right to access an international tribunal to resolve investment disputes. ISDS protections are critically important to the Canadian mining industry due to unique factors that define mineral investments. First, mining companies must go to where commercially developable mineral and metal deposits are located. While Canada is rich in many minerals and metals, a significant number of our members also have operations overseas, with particularly high concentrations in some countries.

Mining operations are more vulnerable than those of other sectors due to the tremendous up-front capital costs involved with mineral development. It is common for an average mine's initial capital expenditure to exceed $1 billion before any minerals are produced or processed. After production begins, mines typically operate for several years to recover capital before any profit is realized. In the event of an interruption of mineral production beyond the miner's control, that investment is immobile as it is grounded in the host country.

Canada, US, Mexico Free Trade Agreement

On July 1st, 2020, the Canada, United States and Mexico Free Trade Agreement (CUSMA) entered into force in the signatory states. CUSMA is based on the North American Free Trade Agreement, which originally came into effect on January 1st, 1994. The present agreement was the result of more than a year of negotiations including threats of tariffs by the US against Canada.

MAC appreciates the negotiations were protracted and welcomes the reduction in business uncertainty that the signing of the agreement brings, as well as the reduction in the adversarial tone the negotiations took on. MAC was disappointed, however, that unlike NAFTA the CUSMA did not include an ISDS mechanism. ISDS protections are critically important to the Canadian mining industry due to the unique factors that define mineral investments, and MAC supports their continued inclusion in ongoing trade agreements, as well as Canada's continued pursuit of FIPAs with key partners.

While Canadian investors in the US will no longer have recourse to ISDS mechanisms, the signing and subsequent

coming into force of the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (discussed below) will have ISDS provisions that Canadian investors will have recourse to for investments in Mexico. After a turbulent few years, and regardless of the absence of this provision, the coming into force of the CUSMA provides much greater certainty in the critical trade-relationship that Canada has with both the US and Mexico.

What's more promising looking forward is the potential for deepened engagement between Canada and the US in the critical minerals space. After the signing of an executive level MoU between Prime Minister Trudeau and President Trump, and the subsequent release of a bilateral joint action plan on critical minerals, each government has demonstrated commitment to establishing new and strengthening existing supply chains here in North America for the extraction, processing and manufacturing of critical minerals, and the establishment of an expanded advanced manufacturing supply chain for products that rely on these inputs. While relatively early days, much work has already been undertaken in this space. For more context, see Section 4 of this report.

Trade Relations with China

China is the single largest consumer of raw materials. Recent estimates suggest that China accounts for 54% of aluminium, 48% of copper, 50% of nickel and 45% of all steel (and, therefore, a significant percentage of steelmaking coal) consumed globally. China is also a major consumer of precious metals, buying or mining 23% and 15% of the world's gold and silver supply, respectively. The country also consumes 13% of the world's uranium production, a number poised to increase given the number of nuclear reactors under construction or being commissioned. Further, China has dominant market control over rare earth elements – a series of critical mineral products essential for advanced manufacturing technologies. This market dominance is a significant catalyst for the above noted bilateral Canada-US actions to bolster a greater domestic supply of these materials within North America.

China is Canada's third-largest market for the export of minerals and metals after the US and the European Union, with an export value exceeding $5.4 billion in 2018, or approximately 5% of our overall total.

While the prospect of a free-trade agreement (FTA) with China has long been viewed as a potentially significant opportunity for Canada to capture greater share of Chinese market demand for raw materials, diplomatic incidents and tensions between the two countries in recent years has scuttled any prospect of an agreement. Should tensions abate in the future, Canada's North American advantage remains, namely that that the Ports of Metro Vancouver and Prince Rupert are, on average, three days closer to multiple Asian ports, including Chinese ports, than our American and Mexican competitors.

MERCOSUR

Mercosur is a South American sub-regional common market trade bloc whose current full members are Argentina, Brazil, Paraguay and Uruguay. On March 9th, 2018 in Asuncion, Paraguay, negotiations toward a comprehensive Canada-Mercosur FTA were launched, and remain ongoing to date.

MAC has supported the government's efforts to reassess the viability of a FTA with Mercosur and participated in consultations on the matter. Given the assets of Canadian companies operating in Brazil and Argentina alone exceed $10 billion each, Mercosur is critically important to our mining industry.

Beyond investments and assets, MAC and its members are exporting best practices in mining sustainability to Mercosur countries. The most significant recent example of this is in Argentina and Brazil, where the Cámara Argentina de Empresarios Mineros (Argentina's national mining association) and the Instituto Brasileiro de Mineração (the national mining chamber for Brazil) have adopted MAC's *Towards Sustainable Mining® (TSM®)* initiative. The adoption of *TSM* by these countries is an important step forward in cooperation on responsible mining standards between Canada and major mining jurisdictions in Latin America.

Pacific Alliance

The Pacific Alliance is a regional initiative created in 2011 by Chile, Colombia, Mexico and Peru that seeks the free movement of goods, services, capital and people. Each of the above countries are significant destinations for Canadian mineral investment, and closer trade-ties with this alliance is something that MAC supports.

With a combined GDP of $2.5 trillion, and 223 million inhabitants, the Pacific Alliance constitutes an important market for Canada. The Alliance's overarching goals are to foster the free movement of goods, services, capital and people and to promote greater competitiveness and economic growth for member countries.

GOING GLOBAL: THE INCREASING INTERNATIONAL ADOPTION OF MAC'S TOWARDS SUSTAINABLE MINING® SUSTAINABILITY STANDARD

Canada was the first to develop an externally-verified performance system for mining operations. Since then, countries around the world have adopted *TSM* to draw from Canada's expertise.

MAC established *TSM* in 2004 with the main objective of enabling mining companies to meet society's needs for minerals, metals and energy products in the most socially, economically and environmentally responsible way. *TSM* reflects our commitment to leaving a positive legacy where mining companies operate. In turn, we're helping businesses and their customers be confident in how their products are made.

TSM continues to garner international attention, with an increasing number of mining associations outside of Canada adopting the program for their members. At the time of writing, in addition to Canada, *TSM* has been adopted in Argentina, Botswana, Brazil, Finland, the Philippines, Spain, Norway and, most recently, Australia. For more information on this program, see Chapter 5.

THE CANADIAN INVESTMENT REGIME

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

Foreign Investment Promotion and Protection Agreements (FIPA)

A FIPA is a bilateral agreement aimed at protecting and promoting foreign investment through legally binding rights and obligations. As of 2020, Canada had 38 FIPAs in force, had signed two others yet to come into force, concluded negotiations with five additional countries, and remains engaged in ongoing negotiations with 14 other countries.

While the enforcement components of FIPAs are rarely used, such as the ISDS mechanisms discussed above, the mere existence of a FIPA provides foreign governments with a set of rules and expectations for fairness and transparency and gives investors additional confidence. At the time of writing, the department of Global Affairs Canada was reviewing their FIPA program, a component of which includes consulting with stakeholders. MAC will remain engaged in this process and underscores the importance of the continued inclusion of robust ISDS mechanisms in these agreements going forward.

Investment in Latin America

Eight of Canada's 38 active FIPAs are with Latin American countries, reflecting the industry's presence in the region, as well as the continent's mineral wealth and potential. As of 2018, Canadian companies held $80.4 billion in assets in Latin America, more than half of the total value of Canada's overseas mineral assets.

Investment in Africa

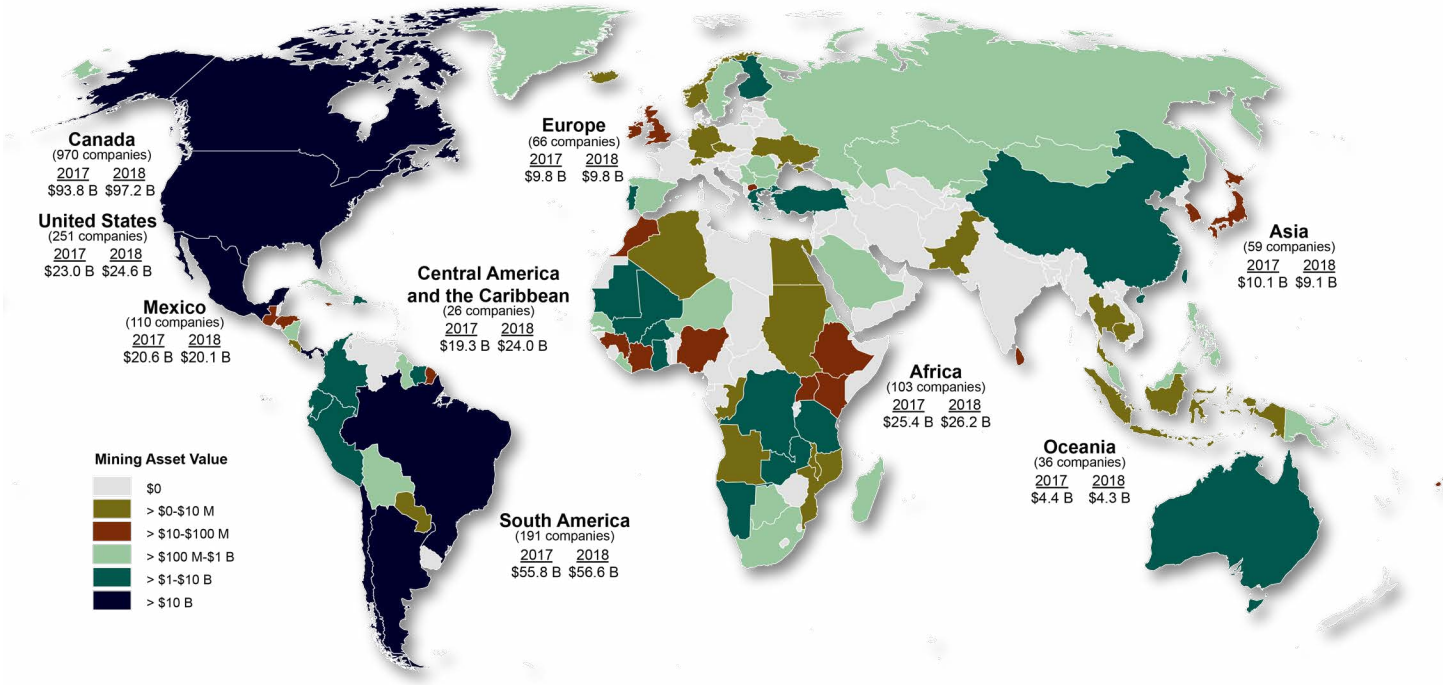
Since 2010, the Canadian government has concluded, signed or brought 12 FIPA negotiations into force with African countries with a further three currently under consideration. In recent years, many African countries have been seeking to benefit from their natural resource endowments and have become more open to new mining investments and the expansion of existing mining projects. Some of the major resources mined in Africa are iron ore, diamonds, gold, platinum, uranium, copper and coal. As of 2018, Canadian companies held $26.2 billion in assets in Africa.

While significant opportunities for strong partnerships exist between mining companies and their host countries, challenges must be overcome to ensure projects can develop in ways that enable the host community, country and company to benefit.

FIGURE 32

THE GEOGRAPHICAL DISTRIBUTION OF CANADA'S MINING ASSETS, 2018

Return to text



Source: Minerals and Metals Sector, Natural Resources Canada.

FIGURE 33

CANADIAN MINERAL INDUSTRY DIRECT INVESTMENT ABROAD AND FOREIGN DIRECT INVESTMENT STOCKS, 1999-2019[P]

Return to text

	Total, all industries		Mining (except oil and gas)		Non-metallic mineral product manufacturing		Primary metal manufacturing		Fabricated metal product manufacturing	
Year	Canadian direct investment abroad	Foreign direct investment in Canada	Canadian direct investment abroad	Foreign direct investment in Canada	Canadian direct investment abroad	Foreign direct investment in Canada	Canadian direct investment abroad	Foreign direct investment in Canada	Canadian direct investment abroad	Foreign direct investment in Canada
1999	290,730	252,563	23,878	5,520	3,048	4,867	9,859	3,732	4,570	2,162
2000	356,506	319,116	23,666	5,535	2,621	5,009	11,662	4,593	4,881	2,214
2001	399,253	340,429	23,666	7,122	3,257	5,425	14,393	4,266	6,091	2,468
2002	435,494	356,819	22,779	6,069	3,028	5,682	13,281	4,064	5,582	2,442
2003	412,217	373,685	22,374	5,666	2,632	6,276	x	4,428	5,464	2,681
2004	448,546	379,450	22,481	8,611	2,105	6,108	x	5,200	4,624	2,748
2005	452,195	397,828	23,025	10,291	2,237	3,659	x	4,484	4,707	2,198
2006	518,839	437,171	23,849	22,375	6,439	6,243	26,255	9,563	4,458	2,941
2007	515,294	512,266	25,045	23,502	5,590	6,525	26,438	29,126	3,251	3,125
2008	641,920	550,539	27,189	9,544	6,787	7,768	30,828	41,879	3,775	2,920
2009	630,818	573,901	38,801	12,219	6,212	8,158	24,132	37,899	3,420	2,473
2010	637,285	592,406	46,706	16,140	5,953	7,276	4,227	34,201	2,293	2,157
2011	675,020	603,455	54,541	14,701	6,384	8,067	5,636	33,784	2,262	2,968
2012	704,335	633,778	63,782	18,622	5,305	7,881	3,172	32,542	2,010	3,153
2013	778,371	688,873	77,108	21,898	5,835	7,092	4,715	27,954	2,270	3,270
2014	845,203	744,671	78,744	36,871	1,155	7,718	7,299	28,986	3,925	3,504
2015	1,043,822	782,912	82,379	21,064	2,867	8,421	4,442	14,923	3,385	2,384
2016	1,105,175	810,668	84,533	24,020	2,639	7,937	5,960	9,205	6,109	1,945
2017	1,181,911	828,991	83,915	24,429	2,869	9,042	3,748	8,321	4,235	2,362
2018	1,356,834	904,648	80,543	25,030	4,445	8,193	3,920	10,171	5,103	3,766
2019[P]	1,391,256	973,889	89,182	42,649	3,907	8,510	3,904	10,458	4,784	3,868

Source: Statistics Canada, Table 36-10-0009-01, International investment position.

[P] Preliminary.

FIGURE 34

MINING COMPANY INVESTMENT IN HOST COUNTRIES - 2017

Return to text

Country	Total in-country expenditures (US$m)	Total Expenditure (US$m)[1]	As a % of total expenditures	Payments to governments (US$m)[2]	Payments to Suppliers (US$m)
Argentina Total	$726,122,821.56	$830,837,490.19	87%	$5,260,000.00	$415,068,943.13
Australia Total	$141,513,000.00	$141,513,000.00	100%	$10,928,000.00	$86,542,000.00
Bolivia Total	$58,019,394.94	$58,019,394.94	100%	$21,530,000.00	$17,069,864.70
Brazil Total	$556,220,000.00	$664,520,000.00	84%	$5,320,000.00	$474,500,000.00
Burkina Faso Total	$290,702,560.48	$440,362,560.48	66%	$56,260,000.00	$192,214,625.19
Canada Total	$3,889,418,621.53	$4,085,701,002.90	95%	$334,944,284.00	$2,427,537,282.77
Chile Total	$336,741,001.00	$344,771,001.00	98%	$20,356,666.00	$249,924,335.00
Dominican Republic Total	$392,099,378.77	$608,598,757.55	64%	$53,650,000.00	$181,860,000.00
Finland Total	$239,068,983.23	$253,158,116.00	94%	$16,610,000.00	$190,101,197.23
Ghana Total	$238,580,000.00	$304,780,000.00	78%	$30,080,000.00	$154,500,000.00
Greece Total	$220,747,274.02	$245,725,451.22	90%	$330,000.00	$177,287,390.29
Guatamala Total	$59,955,033.29	$65,398,908.00	92%	$12,881,503.00	$29,268,171.55
Mauritania Total	$271,000,000.00	$660,150,000.00	41%	$13,200,000.00	$215,600,000.00
Mexico Total	$2,742,143,948.72	$2,935,836,911.09	93%	$16,030,000.00	$1,435,183,092.03
Papua New Guinea Total	$256,203,000.00	$376,701,000.00	68%	$3,180,000.00	$74,532,250.00
Peru Total	$621,024,556.67	$636,686,740.67	98%	$29,740,000.00	$456,328,872.66
Romania Total	$21,507,800.57	$24,899,305.71	86%	$230,000.00	$19,085,025.78
Russia Total	$461,520,000.00	$526,820,000.00	88%	$163,620,000.00	$208,200,000.00
Saudi Arabia Total	$127,035,000.00	$143,570,000.00	88%	*	$63,515,000.00
Suriname Total	$281,936,421.00	$407,655,362.10	69%	$100,290,000.00	$145,000,000.00
Turkey Total	$258,362,000.00	$292,392,000.00	88%	$38,850,000.00	$185,950,000.00
USA Total	$3,627,901,714.00	$3,703,106,714.00	98%	$520,591,000.00	$2,211,464,500.00
Zambia Total	$745,720,000.00	$851,780,000.00	88%	$62,740,000.00	$559,210,000.00
Totals	**$16,563,542,509.79**	**$18,602,983,715.85**	**112%**	**$1,516,621,453.00**	**$10,169,942,550.33**

Source: Mining Association of Canada.

[1] Includes in-jurisdiction payments to providers of capital.

[2] Includes royalties and land use, income and other taxes, employee taxes, other payments.

[3] Contractor salaries are included as payments to suppliers.

** Information not available.*

FIGURE 34 CONTINUED
MINING COMPANY INVESTMENT IN HOST COUNTRIES - 2017

Return to text

Country	Payments to employees	Communities (US$m)	Payments to providers of capital	Total mineral revenue	Number of employees and contractors[3]
Argentina Total	$244,119,811.44	$3,161,352.00	0	$22,178,000,000.00	6,429
Australia Total	$43,955,000.00	$88,000.00	0	$170,500,000.00	329
Bolivia Total	$19,419,530.24	*	0	$85,887,382.53	596
Brazil Total	$75,000,000.00	$1,400,000.00	0	$447,000,000.00	3,709
Burkina Faso Total	$42,000,000.00	$227,935.29	0	$547,300,000.00	3,234
Canada Total	$1,115,081,758.76	$11,855,296.00	$5,960.80	$4,375,887,837.00	13,673
Chile Total	$64,700,000.00	$1,760,000.00	0	$52,000,000.00	2,787
Dominican Republic Total	$58,974,000.00	$1,614,000.00	0	$1,419,353,915.00	4,793
Finland Total	$31,777,000.00	$580,786.00	0	$249,300,000.00	957
Ghana Total	$53,100,000.00	$900,000.00	0	$317,600,000.00	1,899
Greece Total	$41,252,508.76	$1,877,374.97	0	$53,481,725.04	492
Guatamala Total	$13,666,259.74	$4,139,099.00	0	$87,011,504.00	559
Mauritania Total	$40,400,000.00	$1,800,000.00	0	$298,400,000.00	4,917
Mexico Total	$1,075,032,571.69	$4,812,100.00	0	$2,414,181,486.50	2,950
Papua New Guinea Total	$178,068,000.00	$422,750.00	0	*	2,862
Peru Total	$80,296,484.01	$8,909,200.00	0	$1,019,715,024.89	2,849
Romania Total	$2,036,780.73	$155,994.06	0	*	318
Russia Total	$88,900,000.00	$800,000.00	0	$726,900,000.00	2,620
Saudi Arabia Total	$63,515,000.00	$5,000.00	0	$371,000,000.00	216
Suriname Total	$35,846,421.00	$800,000.00	0	$385,610,000.00	1,709
Turkey Total	$32,690,000.00	$872,000.00	0	$337,900,000.00	1,609
USA Total	$894,420,514.00	$1,425,700.00	0	$1,676,800,000.00	9,858
Zambia Total	$120,950,000.00	$2,820,000.00	0	*	4,211
Totals	**$4,415,201,640.37**	**$50,426,587.32**	**$5,960.80**	**$37,213,828,874.96**	**73,576**

Source: Mining Association of Canada.
[1] Includes in-jurisdiction payments to providers of capital.
[2] Includes royalties and land use, income and other taxes, employee taxes, other payments.
[3] Contractor salaries are included as payments to suppliers.
** Information not available.*

FIGURE 35
BALANCE OF CANADA'S MINERAL TRADE, 2019

Return to text

Stage	Domestic Exports ($000)	Total Exports ($000)	Total Imports ($000)	Balance of Trade ($000)
Stage 1	34,457,582	34,568,780	9,407,423	25,161,357
Stage 2	39,186,058	39,263,189	14,242,415	25,020,775
Stage 3	16,561,644	17,521,505	23,308,195	-5,786,690
Stage 4	15,937,655	18,420,062	41,936,365	-23,516,304
Total	**106,142,939**	**109,773,537**	**88,894,398**	**20,879,139**

Sources: Natural Resouces Canada; Statistics Canada.
Notes: Total exports represents the sum of domestic exports and re-exports. Re-exports are the goods of foreign origin that have not been materially transformed in Canada. This includes foreign goods withdrawn for export from bonded customs warehouses. Totals may not add due to rounding. As of 2014, Natural Resources Canada no longer includes nitrogen within the minerals and metals trade statistics. Historical data have been revised to reflect this change.

FIGURE 36
VALUE OF CANADA'S MINING AND MINERAL PROCESSING INDUSTRY TRADE, 2003-2019

Return to text

Year	Domestic Exports ($ billions)	Total Exports ($ billions)	Imports ($ billions)	Balance of Trade ($ billions)
2003	45.6	47.0	45.0	2.1
2004	53.7	55.5	51.9	3.6
2005	61.0	63.2	56.3	6.8
2006	71.4	74.2	61.6	12.5
2007	80.1	83.6	62.2	21.4
2008	90.2	93.0	68.7	24.3
2009	62.7	65.0	54.7	10.3
2010	80.2	83.2	66.1	17.1
2011	95.9	100.3	76.7	23.6
2012	88.1	91.1	75.5	15.6
2013	86.9	90.0	73.4	16.6
2014	89.6	93.2	79.9	13.4
2015	92.0	96.2	80.9	15.3
2016	88.7	92.9	79.1	15.9
2017	97.4	101.4	84.0	19.9
2018	104.5	108.2	89.8	21.1
2019	106.1	109.8	88.9	20.6

Sources: Natural Resouces Canada; Statistics Canada.
Notes: Total exports represents the sum of domestic exports and re-exports. Re-exports are the goods of foreign origin that have not been materially transformed in Canada. This includes foreign goods withdrawn for export from bonded customs warehouses. Totals may not add due to rounding. As of 2014, Natural Resources Canada no longer includes nitrogen within the minerals and metals trade statistics. Historical data have been revised to reflect this change.

ANNEX 1
PRODUCING MINES IN CANADA, 2019

Return to text

COMPANY	MINE SITE	ACTIVITY TYPE	LOCATION	COMMODITY
Newfoundland & Labrador				
Beaver Brook Antimony Mine Inc.	Beaver Brook	(U., C.)	Glenwood	Sb
Rambler Metals and Mining Canada Limited	Nugget Pond	(C.)	Snook's Arm	Cu
Rambler Metals and Mining Canada Limited	Ming	(U.)	Baie Verte	Cu, Au, Ag
Anaconda Mining Inc.	Point Rousse (Pine Cove)	(P., C.)	Baie Verte	Au
Vale Newfoundland and Labrador Limited	Voisey's Bay	(P., C.)	Voisey's Bay	Ni, Cu, Co
Tacora Resources	Scully	(P., C.)	Wabush	Fe
Iron Ore Company of Canada (IOC)	Carol Lake	(P., C.)	Labrador City	Fe
Tata Steel Minerals Canada Limited	DSO (Timmins)	(P., C.)	Menihek	Fe
Canada Fluorspar (NL) Inc.	St. Lawrence	(P., U., C.)	St. Lawrence	Fluorspar
Nova Scotia				
St Barbara Limited	Moose River Consolidated	(P., C.)	Upper Musquodoboit	Au
Nova Scotia Power Inc.	Glen Morrison	(P.)	Cape Breton	Limestone
Antigonish Limestone Ltd.	Southside Antigonish Harbour	(P.)	Southside Antigonish Harbour	Limestone, lime
Mosher Limestone Company Limited	Upper Musquodoboit	(P.)	Upper Musquodoboit	Limestone, dolomite
Lafarge Canada Inc.	Brookfield	(P., Plant)	Brookfield	Limestone
National Gypsum (Canada) Ltd.	East Milford	(P.)	Milford	Gypsum
K+S Windsor Salt Ltd.	Pugwash	(U.)	Pugwash	Salt
Compass Minerals Canada Corporation	Amherst (Nappan)	(solution mining)	Amherst	Salt
Kameron Collieries ULC	Donkin	(U.)	Cape Breton	Coal (metallurgical, thermal)
Pioneer Coal Ltd.	Stellarton	(P.)	Stellarton	Coal (thermal)
New Brunswick				
Trevali Mining Corp.	Caribou	(P., U., C.)	Bathurst	Zn, Pb, Cu, Ag
Graymont Inc.	Havelock	(P., Plant)	Havelock	Limestone, lime
Nutrien Ltd.	Picadilly	(U.)	Sussex	Salt
Brookville Manufacturing Company	Brookville	(P., Plant)	Saint John	Dolomitic lime
Elmtree Resources Ltd.	Sormany	(P., Plant)	Sormany	Limestone
Quebec				
Rio Tinto Fer et Titane inc.	Tio	(P.)	Havre-Saint-Pierre	Ilmenite
Champion Iron Ltd	Bloom Lake	(P.)	Fermont	Fe
ArcelorMittal Mining Canada G.P.	Mont-Wright	(P., C.)	Fermont	Fe
Tata Steel Minerals Canada Limited	DSO (Goodwood)	(P.)	Schefferville	Fe
ArcelorMittal Mining Canada G.P.	Fire Lake	(P.)	Fermont	Fe
Magris Resources Inc.	Niobec	(U., C.)	Saint-Honoré-de-Chicoutimi	Nb
Glencore Canada Corporation	Raglan	(U., C.)	Katinniq	Ni, Cu, Co, PGM
Canadian Royalties Inc.	Nunavik	(P., U., C.)	Kangiqsujuaq	Ni, Cu, Co, PGM
Newmont Goldcorp Corp.	Éléonore	(U., C.)	Opinaca Reservoir	Au
Nystar NV	Langlois	(U., C.)	Lebel-sur-Quévillon	Zn, Cu, Au, Ag
Monarch Gold Corporation	Beaufor	(U.)	Val-d'Or	Au, Ag
Glencore Canada Corporation	Bracemac-McLeod	(U., C.)	Matagami	Zn, Cu, Au, Ag
Eldorado Gold	Lamaque	(U., C.)	Val-d'Or	Au
Ressources Nottaway Inc.	Vezza	(U.)	north of Amos	Au, Ag
Contemporary Amperex Technology Co. Limited (CATL)	North American Lithium	(P.)	La Corne	Lithium

COMPANY	MINE SITE	ACTIVITY TYPE	LOCATION	COMMODITY
Agnico Eagle Mines Limited	Goldex	(U., C.)	Val-d'Or	Au, Ag
Abcourt Mines Inc.	Sleeping Giant	(C.)	North of Amos	Au, Ag
Monarch Gold Corporation	Camflo	(C.)	Malartic	Au, Ag
Agnico Eagle Mines Limited and Yamana Gold Inc.	Canadian Malartic	(P., C.)	Malartic	Au, Ag
Agnico Eagle Mines Limited	LaRonde	(U., C.)	Preissac	Au, Zn, Cu, Pb, Ag
Agnico Eagle Mines Limited	LaRonde - Zone 5	(U.)	Preissac	Au
IAMGOLD Corporation	Westwood-Doyon	(U., C.)	Cadillac	Au, Cu, Ag, Zn
Abcourt Mines Inc.	Elder	(U.)	Rouyn-Noranda	Au, Ag
Hecla Mining Company	Casa-Berardi	(U., C.)	North of La Sarre, Casa Berardi Twp.	Au, Ag
K+S Windsor Salt Ltd.	Seleine	(U.)	Îles-de-la-Madeleine	Salt
Le Groupe Berger Ltée	Saint-Modeste	(P.)	Saint-Modeste	Vermiculite, perlite
Ciment Québec inc.	Quebec	(P., Plant)	Québec City	Limestone
Graymont Inc.	Marbleton	(P., Plant)	Marbleton	Limestone, lime
Ciment Québec inc.	Saint-Basile	(P., Plant)	Saint-Basile	Limestone
Graymont Inc.	Les Carrières Calco	(P., Plant)	St-Marc-des-Carrières	Calcium carbonate
Stornoway Diamond Corporation	Renard	(P., U., C.)	Mistissini	Diamonds
Carrière d'Acton Vale ltée	Acton Vale	(P., Plant)	Acton Vale	Calcium carbonate
Graymont Inc.	Bedford	(P., Plant)	Bedford	Limestone, lime
OMYA (Canada) Inc.	Saint-Armand	(P., Plant)	Saint-Armand	Calcium carbonate
CRH plc	Joliette	(P., Plant)	Joliette	Limestone
Graymont Inc.	Joliette	(P., Plant)	Joliette	Limestone, lime
Lafarge Canada Inc.	St-Constant	(P., Plant)	St-Constant	Limestone
Demix Agrégats	Laval	(P., Plant)	Laval	Limestone
Ciment Québec inc.	Laval	(P., Plant)	Laval	Limestone
Imerys Mica Suzorite, Inc.	Lac Letondal	(P.)	Parent, Suzor Twp.	Mica
Colacem Canada inc.	Kilmar	(P., Plant)	Calumet	Limestone
Imerys Graphite and Carbon	Lac-des-Îles	(P., Plant)	Saint-Aimé-du-Lac-des-Îles	Graphite
Ontario				
Detour Gold Corporation	Detour Lake	(P., C.)	Matagami	Au
Kirkland Lake Gold Ltd.	Holloway-Holt	(U., C.)	Timmins	Au
Kirkland Lake Gold Ltd.	Macassa	(U., C.)	Kirkland Lake area	Au, Ag
McEwen Mining Inc.	Black Fox	(P., U., C.)	Matheson	Au
Kirkland Lake Gold Ltd.	Taylor	(U.)	Cochrane	Au
Alamos Gold Inc.	Young-Davidson	(U., C.)	Kirkland Lake area	Au
Glencore Canada Corporation	Nickel Rim South	(U.)	Sudbury	Ni, Cu, Co, PGM, Au
Vale Canada Limited	Garson	(U.)	Sudbury	Ni, Cu, Co, PGM, Au, Ag, Se, Te
Vale Canada Limited	Clarabelle	(C.)	Sudbury	Ni, Cu, Co, PGM, Au, Ag, Se, Te
Vale Canada Limited	Copper Cliff North	(U.)	Sudbury	Ni, Cu, Co, PGM, Au, Ag, Se, Te
Newmont Goldcorp Corp.	Hoyle Pond	(U.)	South of Porcupine	Au
Pan American Silver Corp.	Bell Creek	(U., C.)	Timmins	Au
Vale Canada Limited	Creighton	(U.)	Sudbury	Ni, Cu, Co, PGM, Au, Ag, Se, Te
Newmont Goldcorp Corp.	Hollinger	(P.)	Timmins	Au
Vale Canada Limited	Coleman	(U.)	Sudbury	Ni, Cu, Co, PGM, Au, Ag, Se, Te
Glencore Canada Corporation	Fraser	(U.)	Sudbury	Ni, Cu, Co, PGM
Glencore Canada Corporation	Strathcona	(C.)	Sudbury	Ni, Cu, Co, PGM, Au, Ag, Se, Te
Glencore Canada Corporation	Kidd Creek	(U., C.)	Timmins	Cu, Zn, Ag, Se, Te, In, Cd

COMPANY	MINE SITE	ACTIVITY TYPE	LOCATION	COMMODITY
KGHM Polska Miedz S.A.	Morrison	(U.)	Sudbury	Cu, Ni
Vale Canada Limited	Totten	(U.)	Worthington	Ni, Cu, Co, PGM, Au
Pan American Silver Corp.	Timmins West	(U.)	Timmins	Au
Newmont Goldcorp Corp.	Borden	(U.)	Chapleau	Au
Alamos Gold Inc.	Island	(U., C.)	Dubreuilville	Au
Harte Gold Corp.	Sugar Zone	(U., C.)	White River	Au
Wesdome Gold Mines Ltd.	Mishi	(P., C.)	Timmins	Au
Wesdome Gold Mines Ltd.	Eagle River	(U.)	Wawa	Au
Barrick Gold Corporation	Hemlo (Williams)	(P., U., C.)	Marathon	Au
Impala Canada Ltd.	Lac des Iles	(P., U., C.)	Thunder Bay	PGM, Ni, Au, Cu, Co
Newmont Goldcorp Corp.	Musselwhite	(U., C.)	north of Pickle Lake	Au, Ag
Newmont Goldcorp Corp.	Red Lake	(U., C.)	Balmertown	Au, Ag
Newmont Goldcorp Corp.	Cochenour	(U.)	Cochenour	Au
New Gold Inc.	Rainy River	(P., U., C.)	Fort Frances	Au, Ag, Ni, Cu, Co
Canadian Wollastonite	St. Lawrence	(P.)	Kingston	Wollastonite
OMYA (Canada) Inc.	Tatlock	(P.)	Tatlock	Calcium carbonate
Lafarge Canada Inc.	Bath	(P.)	Bath	Limestone
ESSROC Canada Inc.	Picton	(P.)	Picton	Limestone
CRH plc	Ogden Point	(P.)	Ogden Point	Limestone
Covia Canada Ltd.	Blue Mountain	(P., Plant)	Blue Mountain	Nepheline syenite
St. Marys CBM (Canada) Inc.	Bowmanville	(P.)	Bowmanville	Limestone
Miller Minerals (Miller Paving Co.)	Bucke	(P.)	New Liskeard	Limestone
Carmeuse Lime (Canada) Limited	Dundas	(P.)	Dundas	Dolomitic lime
Lafarge Canada Inc.	Dundas	(P.)	Dundas	Limestone
Gebr. Knauf KG	Hagersville	(U., Plant)	Hagersville	Gypsum
Carmeuse Lime (Canada) Limited	Beachville	(P., Plant)	Ingersoll	Limestone, lime
E.C. King Contracting Ltd. (Miller Paving Co.)	Owen Sound	(P.)	Owen Sound	Dolomitic lime
St Marys CBM (Canada) Inc.	St Marys	(P.)	St. Marys	Limestone
Compass Minerals Canada Corporation	Goderich	(solution mining)	Goderich	Salt
Boreal Agrominerals Inc.	Spanish River Carbonite	(P.)	northwest of Sudbury	Vermiculite
Compass Minerals Canada Corporation	Goderich	(U., Plant)	Goderich	Salt
IMERYS Talc	Penhorwood	(P.)	Penhorwood	Talc
K+S Windsor Salt Ltd.	Windsor	(solution mining)	Windsor	Salt
K+S Windsor Salt Ltd.	Ojibway	(U.)	Windsor	Salt
Lafarge Canada Inc.	Meldrum Bay	(P., Plant)	Manitoulin Island	Limestone, dolomite
De Beers Canada Inc.	Victor	(P., Plant)	James Bay Lowlands	Diamonds
Manitoba				
Rare Metals Resources Co. Limited	Tanco	(U., C.)	Lac-du-Bonnet	Cs
Vale Canada Limited	Thompson	(P., U., C.)	Thompson	Ni, Cu, Co, PGM
HudBay Minerals Inc.	Snow Lake	(C.)	Snow Lake	Cu, Zn, Au, Ag
HudBay Minerals Inc.	Lalor Lake	(U.)	Snow Lake	Cu, Zn, Au, Ag
HudBay Minerals Inc.	777	(U.)	Flin Flon	Cu, Zn, Au, Ag
HudBay Minerals Inc.	Flin Flon	(C.)	Flin Flon	Cu, Zn, Au, Ag
Graymont Inc.	Faulkner	(P., Plant)	Faulkner	Limestone, lime
CertainTeed Gypsum Canada, Inc.	Amaranth	(P.)	Harcus	Gypsum
ERCO Worldwide	Hargrave	(U., Plant)	Virden	Sodium chlorate

COMPANY	MINE SITE	ACTIVITY TYPE	LOCATION	COMMODITY
Saskatchewan				
SSR Mining Inc.	Santoy	(U.)	Santoy Lake	Au
SSR Mining Inc.	Seabee	(C.)	Laonil Lake	Au
Cameco Corporation	Cigar Lake	(U.)	Wollaston Lake	U
Nutrien Ltd.	Rocanville	(U., Plant)	Rocanville	Potash
The Mosaic Company	Esterhazy (K-1, K-2 and K-3)	(U., Plant)	Esterhazy	Potash, salt
Compass Minerals Canada Corporation	Wynyard (Big Quill)	(Plant)	Wynyard	Potassium sulphate
The Mosaic Company	Belle Plaine	(U., Plant)	Belle Plaine	Potash, salt
Nutrien Ltd.	Lanigan	(U.)	Lanigan	Potash
K+S Potash Canada	Bethune	(U., Plant)	Bethune	Potash
The Mosaic Company	Colonsay	(U., Plant)	Colonsay	Potash, salt
Nutrien Ltd.	Allan	(U., Plant)	Allan	Potash
Nutrien Ltd.	Patience Lake	(U., Plant)	Blucher	Potash
Saskatchewan Mining and Minerals Inc.	Chaplin Lake	(P., Plant)	Chaplin	Sodium sulphate
Nutrien Ltd.	Cory	(U., Plant)	Cory	Potash
Nutrien Ltd.	Vanscoy	(U., Plant)	Vanscoy	Potash, salt
Compass Minerals Canada Corporation	Unity	(solution mining)	Unity	Salt
Westmoreland Coal Company	Estevan	(P.)	Bienfait	Coal (thermal)
Westmoreland Coal Company	Poplar River	(P.)	Coronach	Coal (thermal)
Alberta				
K+S Windsor Salt Ltd.	Lindbergh	(solution mining)	Elk Point	Salt
Hammerstone Corporation	Steepbank	(P.)	north of Fort McMurray	Limestone
Hammerstone Corporation	Muskeg Valley	(P.)	north of Fort McMurray	Limestone
Jarodon Resources Ltd.	Sunnynook	(solution mining)	Cessford	Salt
Suncor Energy Inc.	Fort McMurray West	(P.)	Fort McMurray	Limestone
Calcium Incorporated	Calling Lake	(solution mining)	Calling Lake	Salt
Tiger Calcium Services Inc.	Mitsue	(solution mining)	Slave Lake	Salt
Graymont Inc.	Summit	(P., Plant)	Coleman	Limestone, lime
Graymont Inc.	Exshaw (Gap)	(P., Plant)	Exshaw	Limestone, lime
Lafarge Canada Inc.	Exshaw	(P., Plant)	Exshaw	Limestone
Burnco Rock Products Ltd.	Clearwater	(P., Plant)	Clearwater River	Limestone
Lehigh Cement Company	Mcleod	(P.)	Cadomin	Limestone
Westmoreland Coal Company	Sheerness	(P.)	Hanna	Coal (thermal)
Westmoreland Coal Company	Paintearth	(P.)	Forestburg	Coal (thermal)
Westmoreland Coal Company	Genesee	(P.)	Genesee	Coal (thermal)
Transalta Corporation	Highvale	(P.)	Seba Beach	Coal (thermal)
Westmoreland Coal Company	Coal Valley	(P.)	Edson	Coal (thermal)
Bighorn Mining Ltd.	Vista	(P.)	Hinton	Coal (thermal)
Teck Resources Limited	Cardinal River (Cheviot)	(P.)	Hinton	Coal (metallurgical)
CST Canada Coal Limited	Grande Cache	(P., U.)	Grande Cache	Coal (metallurgical)
Imperial Oil Ltd.	Kearl	(P.)	Fort McMurray	Upgraded crude oil
Suncor Energy Inc.	Millennium and Steepbank	(P.)	Fort McMurray	Upgraded crude oil
Canadian Natural Resources Limited	Jackpine	(P.)	Fort MacKay	Upgraded crude oil
Syncrude Canada Ltd.	Aurora North and South	(P.)	Fort MacKay	Upgraded crude oil
Syncrude Canada Ltd.	Mildred Lake	(P.)	Fort MacKay	Upgraded crude oil
Canadian Natural Resources Limited	Muskeg River	(P.)	Fort MacKay	Upgraded crude oil

COMPANY	MINE SITE	ACTIVITY TYPE	LOCATION	COMMODITY
Suncor Energy Inc.	Fort Hills	(P.)	Fort MacKay	Upgraded crude oil
Canadian Natural Resources Limited	Horizon	(P.)	Fort MacKay	Upgraded crude oil
British Columbia				
New Gold Inc.	New Afton	(U., C.)	Kamloops	Au, Ag, Cu
Copper Mountain Mining Corporation	Copper Mountain	(P., C.)	Princeton	Cu, Au, Ag
Teck Resources Limited	Highland Valley	(P., C.)	Logan Lake	Cu, Mo
Imperial Metals Corporation	Mount Polley	(P., C.)	northeast of Williams Lake	Au, Cu
Taseko Mines Limited	Gibraltar	(P., C.)	north of Williams Lake	Cu, Mo
Centerra Gold Inc.	Mount Milligan	(P., C.)	Fort St. James	Cu, Au
Imperial Metals Corporation	Red Chris	(P., C.)	Kinaskan Lake	Au, Ag, Cu
Pretium Resources Inc.	Brucejack	(U., C.)	Stewart	Au, Ag
Cœur Mining	"			
Silvertip"	(P., U.)	Liard	Ag, Zn, Pb, 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
Lafarge Canada Inc.	Falkland	(P., Plant)	Falkland	Gypsum
Absorbent Products Ltd.	Bud	(P.)	Princeton	Calcium, clay
Absorbent Products Ltd.	Red Lake	(P.)	Kamloops	Diatomite, bentonite, leonardite
Imperial Limestone Co. Ltd.	Van Anda	(P.)	Texada Island	Limestone
Texada Quarrying Ltd. (Lafarge Canada Inc.)	Texada	(P.)	Texada Island	Limestone
Fireside Minerals Ltd.	Fireside	(P.)	Fireside	Barite
Teck Resources Limited	Coal Mountain	(P.)	Sparwood	Coal (metallurgical, thermal)
Teck Resources Limited	Line Creek	(P.)	Sparwood	Coal (metallurgical, thermal)
Teck Resources Limited	Elkview	(P.)	Sparwood	Coal (metallurgical)
Teck Resources Limited	Fording River	(P.)	Elkford	Coal (metallurgical)
Teck Resources Limited	Greenhills	(P.)	Sparwood	Coal (metallurgical)
Conuma Coal Resources Ltd.	Wolverine	(P., Plant)	Tumbler Ridge	Coal (metallurgical)
Conuma Coal Resources Ltd.	Brule	(P.)	Tumbler Ridge	Coal (metallurgical)
Conuma Coal Resources Ltd.	Willow Creek	(P.)	Chetwynd	Coal (metallurgical)
Quinsam Coal Resources	Quinsam	(U.)	Campbell River	Coal (thermal)
Coeur Mining	Silvertip	(P., U.)	Liard	Ag, Pb, Zn
Quinsam Coal Resources	Quinsam	(U)	Campbell River	Coal (thermal)
Yukon				
Victoria Gold Corporation	Eagle (Dublin Gulch)	(P., C.)	Mayo	Au
Pembridge Resources plc	Minto	(P., U., C.)	Pelly Crossing	Cu, Au, Ag
Northwest Territories				
De Beers Canada Inc.	Gahcho Kué	(P., Plant)	Lac de Gras	Diamonds
Diavik Diamond Mines Inc.	Diavik	(U., Plant)	Lac de Gras	Diamonds
Dominion Diamond Corporation	Ekati	(U., Plant)	Lac de Gras	Diamonds
Nunavut				
Baffinland Iron Mines Corporation	Mary River	(P.)	Pond Inlet	Fe
Agnico Eagle Mines Limited	Meliadine	(P., U., C.)	Kivalliq	Au
Agnico Eagle Mines Limited	Meadowbank	(P., C.)	Baker Lake	Au
Agnico Eagle Mines Limited	Amaruq	(P.)	Baker Lake	Au
TMAC Resources Inc.	Hope Bay	(U., C.)	Cambridge Bay	Au

Source: Natural Resources Canada. (P.) Open-Pit, (U.) Underground, (C.) Concentrator Note: Excluded operations are clay products, peat, and most construction materials (most stone, sand and gravel). Included are operations that produced during 2018.

ANNEX 2

MINING ESTABLISHMENTS IN CANADA, BY MINERAL, PROVINCE OR TERRITORY, 2018

Return to text

	NL	PE	NS	NB	QC	ON	MB	SK	AB	BC	YT	NT	NV	TOTAL
Metals														
Iron Ore	1	-	-	-	3	-	-	-	-	-	-	-	1	5
Gold & Silver Ore	1	-	1	-	14	13	1	1	-	1	-	-	2	34
Lead-zinc ore	-	-	-	1	-	-	-	-	-	1	-	-	-	2
Nickel-copper ore	1	-	-	-	2	3	1	-	-	-	-	-	-	7
Copper, copper-zinc ore	1	-	-	-	2	1	1	-	-	7	1	-	-	13
Uranium	-	-	-	-	-	-	-	2	-	-	-	-	-	2
Other Metals	-	-	-	-	3	1	1	2	-	-	-	-	-	7
TOTAL METALS	**4**	**0**	**1**	**1**	**24**	**18**	**4**	**5**	**0**	**9**	**1**	**0**	**3**	**70**
Non-metals														
Diamonds	-	-			1	1	-			-	-	3	-	5
Gypsum	-	-	-	-	-	-	-	-	-	1	-	-	-	1
Peat	1	3	1	19	14	-	5	1	5	1	-	-	-	50
Potash	-	-	-	-	-	-	-	10	-	-	-	-	-	10
Salt	-	-	2		1	4	-	3	2	-	-	-	-	12
Sand and gravel	2	-	2	9	62	207	10	50	149	79	1	-	-	571
Stone	3	-	13	9	91	104	8	-	21	16	-	-	-	265
Shale, Clay and other refractory minerals	-	-	1		3	2		-	-	2			-	8
Other nonmetals	-	-	-	-	3	2	-	1	-	3	-	-	-	9
TOTAL NONMETALS	**6**	**3**	**19**	**37**	**175**	**320**	**23**	**65**	**177**	**102**	**1**	**3**	**0**	**931**

Sources: Natural Resources Canada; Statistics Canada.
- Nil

ANNEX 3

CANADIAN PRODUCTION OF LEADING MINERALS BY PROVINCE AND TERRITORY, 2019[P]

Return to text

	GOLD		COAL		COPPER		POTASH (K_2O)[1]		IRON ORE	
	KILOGRAMS	$000	KILOTONNES	$000	TONNES	$000	KILOTONNES	$000	KILOTONNES	$000
Newfoundland	661	38,836			28,529	228,092			20,049	2,427,930
Prince Edward Island										
Nova Scotia	2,698	158,578	x	x						
New Brunswick					707	5,655				
Quebec	59,938	3,523,134			35,557	284,281			33,218	2,695,655
Ontario	73,733	4,334,037			158,212	1,264,903				
Manitoba	3,407	200,239			24,884	198,946				
Saskatchewan	3,616	212,528	x	x			12,770	5,548,260		
Alberta	38	2,251	x	x						
British Columbia	13,791	810,625	x	x	295,719	2,364,274				
Yukon	2,621	154,034								
Northwest Territories										
Nunavut	14,473	850,710							5,205	463,242
Canada	**174,974**	**10,284,971**	**51,652**	**5,773,909**	**543,609**	**4,346,152**	**12,770**	**5,548,260**	**58,472**	**5,586,827**

	NICKEL		DIAMONDS		SAND AND GRAVEL[2]		STONE		ZINC	
	TONNES	$000	000 CARATS	$000	KILOTONNES	$000	KILOTONNES	$000	TONNES	$000
Newfoundland	40,192	736,233			1,646	7,752	4,801	26,750	60	2,811
Prince Edward Island					x	x	x	x		
Nova Scotia					4,656	36,124	9,465	105,153		
New Brunswick					1,544	8,655	6,628	60,189		
Quebec	54,411	996,703	1,870	180,600	14,983	96,387	50,493	583,697	x	x
Ontario	73,998	1,355,500	421	225,816	82,059	712,657	74,316	803,978	21,084	889,153
Manitoba	12,809	234,632			12,460	83,544	8,427	94,146	x	x
Saskatchewan					12,089	116,284				
Alberta					71,028	734,147	11,739	166,189		
British Columbia					40,813	431,305	11,077	112,055		
Yukon					x	x	x	x		
Northwest Territories			16,200	1,779,706	x	x	x	x		
Nunavut										
Canada	**181,410**	**3,323,068**	**18,491**	**2,186,122**	**243,818**	**2,272,364**	**177,733**	**1,960,931**	**28,217**	**1,201,792**

Sources: Natural Resources Canada; Statistics Canada.
[P] Preliminary; - Nil; x Confidential.
[1] Excludes shipments to Canadian potassium sulphate plants.
[2] Mineral production of sand and gravel for Nunavut is included in totals for the Northwest Territories.
Note: As of reference year 2017, Statistics Canada has ceased the collection of the cement data.

ANNEX 4

CANADA'S WORLD ROLE AS A PRODUCER OF CERTAIN IMPORTANT MINERALS, 2019[P]

Return to text

		WORLD	RANK OF FIVE LEADING COUNTRIES				
			1	2	3	4	5
			Canada	Belarus	Russia	China	Germany
Potash (K_2O equivalent)	000 t	41,000	13,300	7,000	6,800	5,000	3,000
(mine production)	% of world total		32.4	17.1	16.6	12.2	7.3
			Russia	Canada	Botswana	South Africa	Angola
Gemstones	Millions$	91,000	25,000	23,000	18,000	8,000	7,500
	% of world total		27.5	25.3	19.8	8.8	8.2
				Brazil	Canada		
Niobium (mine production)	t	74,000		65,000	7,600		
	% of world total			87.8	10.3		
			Kazakhstan	Canada	Australia	Namibia	Niger
Uranium (metal content)	t	53,656	22,808	6,938	6,613	5,475	2,983
(mine production)	% of world total		42.5	12.9	12.3	10.2	5.6
Kimberly Statistics			Russia	Botswana	Canada	Congo	Australia
Diamonds (precious)	000 carats	138,191	45,271	23,687	18,638	14,158	12,999
	% of world total		32.8	17.1	13.5	10.2	9.4
			South Africa	Russia	Canada	Zimbabwe	United States
Platinum group metals	kg	390,000	210,000	108,000	27,400	27,000	15,600
(metal content)	% of world total		53.8	27.7	7.0	6.9	4.0
			China	S. Africa	Canada	Australia	Mozambique
Titanium concentrate	000 t	7,000	2,100	820	690	660	590
(Ilmenite)	% of world total		30.0	11.7	9.9	9.4	8.4
			China	India	Russia	Canada	UAE
Aluminum (primary metal)	000 t	64,000	36,000	3,700	3,600	2,900	2,700
	% of world total		56.3	5.8	5.6	4.5	4.2
Mexico tied with Kazakhstan			China	South Korea	Japan	Canada	Kazakhstan
Cadmium (metal)	t	25,000	8,200	5,000	1,900	1,600	1,400
	% of world total		32.8	20.0	7.6	6.4	5.6

			RANK OF FIVE LEADING COUNTRIES				
		WORLD	1	2	3	4	5
			China	South Korea	Japan	Canada	France
Indium	000 t	750	300	240	75	60	50
	% of world total		40.0	32.0	10.0	8.0	6.7
			China	India	Mexico	Canada	Finland
Wollastonite	000 t	1,200	890	150	93	20	11
	% of world total		74.2	12.5	7.8	1.7	0.9
			China	Mozambique	Brazil	Madagascar	Canada
Graphite	000 t	1,100	700	100	96	47	40
	% of world total		63.6	9.1	8.7	4.3	3.6
			China	Australia	Russia	United States	Canada
Gold (mine production)	t	3,300	420	330	310	200	180
	% of world total		12.7	10.0	9.4	6.1	5.5
			China	Finland	United States	Madagascar	Canada
Mica (natural)	000 t	380	100	64	38	36	23
	% of world total		26.3	16.8	10.0	9.5	6.1
			China	United States	Russia	S. Arabia	Canada
Sulphur, elemental	000 t	79,000	17,400	8,800	7,100	6,600	5,300
(mine production)	% of world total		22.0	11.1	9.0	8.4	6.7
			China	Japan	Russia	Sweden	Canada
Telerium	t	470	290	55	40	40	30
	% of world total		61.7	11.7	8.5	8.5	6.4
			Indonesia	Philippines	Russia	New Caledonia	Canada
Nickel (mine production)	000 t	2,700	800	420	270	220	180
	% of world total		29.6	15.6	10.0	8.1	6.7
Australia is tied with Canada			China	United States	India	Germany	Australia
Salt (mine production)	000 t	293,000	60,000	42,000	30,000	14,000	13,000
	% of world total		20.5	14.3	10.2	4.8	4.4
Canada 6th			Congo	Russia	Australia	Phillipines	Cuba
Cobalt (mine production)[2]	t	140,000	100,000	6,100	5,100	4,600	3,500
	% of world total			71.4	4.4	3.6	3.3

			RANK OF FIVE LEADING COUNTRIES				
		WORLD	1	2	3	4	5
Canada is 8th			Finland	Germany	Ireland	Belarus	Sweden
Peat	000 t	30,000	10,000	4,000	3,000	2,600	2,500
	% of world total		33.3	13.3	10.0	8.7	8.3
Canada is 7th			Chile	Peru	China	United States	Congo
Copper (mine production)	000 t	20,000	5,600	2,400	1,600	1,300	1,300
	% of world total		28.0	12.0	8.0	6.5	6.5
Canada not listed			Australia	Brazil	China	India	Russia
Iron ore (mine production)	mt	2,500	900	480	350	210	95
(usable ore)	% of world total		36.0	19.2	14.0	8.4	3.8
Canada 18th tied with US			China	Russia	United States	India	Indonesia
Nitrogen (fixed)--ammonia	000 t	140,000	44,000	14,000	12,500	11,000	6,000
	% of world total		31.4	10.0	8.9	7.9	4.3
Canada 8th			China	Peru	Australia	India	United States
Zinc (mine production)	000 t	13,000	4,300	1,600	1,300	800	780
	% of world total		33.1	12.3	10.0	6.2	6.0
Canada 7th			China	Chile	United States	Peru	Mexico
Molybdenum (Mo content)	t	290,000	130,000	54,000	44,000	28,000	16,000
(mine production)	% of world total		44.8	18.6	15.2	9.7	5.5
Canada not on the list			Mexico	Peru	China	Russia	Poland
Silver	t	27,000	6,300	3,800	3,600	2,100	1,700
	% of world total		23.3	14.1	13.3	7.8	6.3
Canada 12th			China	India	United States	Indonesia	Australia
Coal (primary)	Mt	7,921	3,693	769	640	616	503
	% of world total		46.6	9.7	8.1	7.8	6.4
Canada 11th			China	Russia	Norway	United States	Brazil
Silicon	000 t	7,000	4,500	600	370	320	210
	% of world total		64.3	8.6	5.3	4.6	3.0
Canada 18th			China	United States	India	Russia	Brazil
Lime	000 t	430,000	300,000	18,000	16,000	11,000	8,400
	% of world total		69.8	4.2	3.7	2.6	2.0

			RANK OF FIVE LEADING COUNTRIES				
		WORLD	1	2	3	4	5
Canada 14th			United States	China	Iran	Turkey	Thailand
Gypsum (mine production)	000 t	140,000	20 000	16,000	16,000	10,000	9,300
	% of world total		14.3	11.4	11.4	7.1	6.6
Canada 16th			United States	Netherlands	Spain	Italy	Turkey
Sand and Gravel (Industrial)	000 t	330,000	110,000	54,000	36,000	14,000	14,000
	% of world total		33.3	16.4	10.9	4.2	4.2
Canada not on the list			China	Vietnam	Mongolia	Russia	Bolivia
Tungsten (mine production)	t	85,000	70,000	4,800	1,900	1,500	1,200
	% of world total		82.4	5.6	2.2	1.8	1.4
Canada not on the list			China	Australia	Peru	United States	Mexico
Lead (mine production)	000 t	4,500	2,100	430	290	280	240
	% of world total		46.7	9.6	6.4	6.2	5.3

Sources: U.S. Geological Survey (USGS); International Energy Association; Kimberley Process.
n.a. Not applicable.

ANNEX 5

MINERAL PRODUCTION OF CANADA, 2010-2019[P]

Return to text

METALLIC MINERALS		2010		2011		2012		2013		2014	
	Unit	(quantity)	($000)	(quantity)	($000)	(quantity)	($000)	(quantity)	($000)	(quantity)	($000)
Antimony	t	x	x	x	x	x	x	148	1,562	4	45
Bismuth	t	91	1,759	136	3,346	110	2,370	103	2,006	4	97
Cadmium	t	2,403	9,644	1,516	4,135	247	500	160	316	129	276
Cesium	t	x	x	x	x	x	x	x	x	x	x
Cobalt	t	2,644	125,144	3,741	146,768	3,698	114,604	4,005	118,114	3,907	137,844
Copper	t	507,883	3,941,677	553,725	4,831,801	560,476	4,453,541	620,989	4,695,298	654,468	4,983,772
Gold	kg	102,147	4,143,067	101,975	5,087,438	106,373	5,704,878	131,404	6,141,048	151,472	6,817,154
Ilmenite	000 t	x	x	x	x	x	x	x	x	x	x
Indium	kg	x	x	x	x	x	x	x	x	x	x
Iron ore	000 t	36,178	5,314,154	35,705	5,505,772	38,892	4,875,068	42,063	5,348,433	43,173	4,173,516
Iron, remelt	000 t	x	x	x	x	x	x	x	x	x	x
Lead	t	62,397	138,022	62,548	166,003	62,014	127,438	22,895	50,506	3,579	8,288
Lithium	t	x	x	-	-	-	-	-	-	x	x
Molybdenum	t	8,524	x	8,543	x	8,936	x	7,956	186,788	9,358	259,876
Nickel	t	156,270	3,509,833	211,417	4,787,323	203,970	3,546,420	218,026	3,372,864	218,233	4,069,165
Niobium (Columbium)	t	4,298	x	4,551	x	4,705	x	4,916	x	5,774	x
Platinum group	kg	9,864	260,304	22,337	749,572	22,490	644,195	25,465	767,363	31,386	1,058,992
Selenium	t	97	8,001	128	17,500	145	16,656	138	10,411	142	8,879
Silver	t	570	381,086	582	658,514	657	659,005	620	489,872	472	320,274
Tantalum	t	-	-	-	-	-	-	40	12,698	-	-
Tellurium	t	8	1,913	9	3,167	10	1,540	8	895	8	1,066
Tungsten	t	364	7,370	2,466	73,707	2,554	88,436	3,017	86,293	2,708	84,331
Uranium	t	9,927	1,230,182	9,017	1,307,174	9,520	1,197,441	7,889	806,418	9,780	933,583
Zinc	t	609,567	1,356,287	591,004	1,281,887	601,514	1,171,147	412,277	811,361	322,605	771,026
Total, Metallic Minerals		**. .**	**21,358,783**	**..**	**25,569,557**	**..**	**23,558,411**	**..**	**23,497,305**	**..**	**24,225,029**

METALLIC MINERALS		2015		2016		2017		2018		2019[P]	
	Unit	(quantity)	($000)	(quantity)	($000)	(quantity)	($000)	(quantity)	($000)	(quantity)	($000)
Antimony	t	1	5	0	3	1	11	5	54	5	55
Bismuth	t	2	29	2	31	4	59	5	58	5	45
Cadmium	t	68	102	60	113	158	381	148	595	164	612
Cesium	t	x	x	x	x	x	x	x	x	x	x
Cobalt	t	4,339	156,720	4,216	149,145	3,704	290,783	3,279	310,086	3,336	145,976
Copper	t	697,322	4,905,661	679,524	4,379,532	580,097	4,639,616	527,510	4,422,120	543,609	4,346,152
Gold	kg	160,751	7,667,339	161,497	8,590,179	172,877	9,069,125	191,882	10,118,125	174,974	10,284,971
Ilmenite	000 t	x	x	x	x	x	x	x	x	x	x
Indium	kg	x	x	x	x	x	x	x	x	x	x
Iron ore	000 t	46,220	2,854,585	46,731	3,165,022	50,300	4,693,042	52,755	4,949,188	58,472	5,586,827
Iron, remelt	000 t	x	x	x	x	x	x	x	x	x	x
Lead	t	3,699	8,485	12,020	29,785	13,494	40,589	15,605	45,131	21,782	57,961
Lithium	t	-	-	-	-	-	-	x	x	x	x
Molybdenum	t	2,505	48,846	2,783	53,105	4,765	112,054	5,048	152,725	3,896	118,803
Nickel	t	225,351	3,408,431	230,210	2,926,428	206,354	2,787,020	175,761	2,970,887	177,867	3,005,427
Niobium (Columbium)	t	5,385	x	6,099	x	x	x	x	x	x	x
Platinum group	kg	33,248	1,059,512	31,471	947,560	27,342	1,016,402	28,596	1,206,948	29,832	1,268,494
Selenium	t	156	6,575	175	3,886	72	3,204	85	4,133	57	1,671
Silver	t	371	239,656	385	282,666	368	261,688	392	254,759	379	259,173
Tantalum	t	-	-	-	-	-	-	-	-	-	-
Tellurium	t	10	990	18	870	18	885	x	x	x	x
Tungsten	t	2,289	62,339	-	-	-	-	-	-	-	-
Uranium	t	13,279	1,609,476	14,133	1,248,600	12,207	876,473	6,975	490,077	6,796	513,885
Zinc	t	275,410	632,892	301,210	832,545	305,314	1,146,760	287,632	1,087,538	299,814	1,031,361
Total, Metallic Minerals		**..**	**23,125,240**	**..**	**23,302,112**		**25,738,171**		**27,058,554**		**27,743,371**

NONMETALLIC MINERALS		2010		2011		2012		2013		2014	
	Unit	(quantity)	($000)	(quantity)	($000)	(quantity)	($000)	(quantity)	($000)	(quantity)	($000)
Barite	000 t	21	6,500	x	x	x	x	x	x	x	x
Carbonatite	000 t	x	x	x	x	x	x	x	x	x	x
Cement[1]	000 t	11,523	1,512,624	11,914	1,587,136	12,553	1,621,476	12,022	1,618,827	12,136	1,692,131
Chrysotile	000 t	x	x	x	x	x	x	x	x	x	x
Clay products[2]	000 t	..	148,907	..	135,422	..	136,502	..	122,577	..	118,012
Diamonds	000 ct	11,804	2,377,147	10,752	2,509,232	10,529	2,005,764	10,600	1,964,125	12,012	2,236,043
Gemstones	t	35	4,966	42	2,941	178	3,217	554	4,607	6,919	5,991
Graphite	000 t	x	x	x	x	x	x	x	x	x	x
Gypsum[3]	000 t	3,046	47,771	2,449	34,632	1,832	24,987	1,837	25,872	1,793	25,474
Lime	000 t	1,863	288,787	1,937	294,909	1,965	316,322	1,856	308,127	1,995	344,816
Magnesite	000 t	x	x	x	x	x	x	x	x	x	x
Marl	000 t	x	x	-	-	-	-	-	-	-	-
Mica	000 t	x	x	x	x	x	x	x	x	x	x
Nepheline syenite	000 t	603	57,304	602	58,377	586	61,892	646	72,911	654	83,805
Peat	000 t	1,286	260,664	1,139	213,359	1,277	238,018	1,173	213,798	1,178	249,078
Phosphate	000 t	x	x	x	x	x	x	x	x	-	-
Potash (K_2O)[4]	000 t	9,700	5,061,927	10,686	7,569,282	8,976	6,342,562	10,196	5,768,609	10,818	5,581,264
Potassium sulphate	000 t	x	x	x	x	x	x	x	x	x	x
Pumice	000 t	x	x	x	x	x	x	x	x	x	x
Quartz (silica)[3]	000 t	1,503	66,372	1,620	84,280	1,517	85,256	2,331	80,064	2,011	90,441
Salt	000 t	10,278	602,607	12,757	697,404	10,820	487,686	12,244	655,848	14,473	752,321
Sand and gravel	000 t	211,342	1,573,968	222,288	1,560,213	239,307	1,822,978	241,113	1,941,867	223,407	1,831,464
Soapstone, talc, pyrophyllite	000 t	100	26,125	116	25,244	130	30,249	175	34,223	90	38,985
Sodium sulphate	000 t	x	x	x	x	x	x	x	x	x	x
Stone[3]	000 t	170,664	1,637,757	161,729	1,591,511	152,977	1,559,358	147,746	1,509,427	147,739	1,541,321
Sulphur, elemental	000 t	6,247	298,990	5,970	637,250	5,594	581,611	5,624	342,937	5,252	326,335
Sulphur, in smelter gas	000 t	610	70,903	638	116,022	665	132,230	677	129,197	590	100,125
Titanium dioxide	000 t	x	x	x	x	x	x	x	x	x	x
Wollastonite	000 t	-	-	-	-	-	-	-	-	-	-
Zeolite	000 t	x	x	x	x	x	x	x	x	-	-
Total, Nonmetallic Minerals (including cement[1])		**. .**	**14,699,276**	**..**	**17,839,820**	**..**	**16,471,421**	**..**	**15,476,804**	**..**	**15,778,620**
Total, Nonmetallic Minerals (excluding cement[1])		**. .**	**13,186,652**	**..**	**16,252,684**	**..**	**14,849,945**	**..**	**13,857,977**	**..**	**14,086,489**

NONMETALLIC MINERALS		2015		2016		2017		2018		2019[P]	
	Unit	(quantity)	($000)	(quantity)	($000)	(quantity)	($000)	(quantity)	($000)	(quantity)	($000)
Barite	000 t	x	x	x	x	x	x	x	x	x	x
Carbonatite	000 t	x	x	x	x	x	x	-	-	-	-
Cement[1]	000 t	12,334	1,689,851	11,820	1,615,674	..	..	..	..	..	..
Chrysotile	000 t	x	x	x	x	-	-	-	-	-	-
Clay products[2]	000 t	..	124,446	..	140,122	..	147,131	..	131,928	..	110,871
Diamonds	000 ct	11,677	2,148,583	13,315	1,888,732	23,199	2,677,723	22,789	2,704,302	18,491	2,186,122
Gemstones	t	8,233	7,953	154	5,852	89	4,612	87	2,349	49	1,810
Graphite	000 t	x	x	x	x	14	20,336	11	19,156	11	22,116
Gypsum[3]	000 t	1,726	19,675	1,679	17,655	3,001	33,120	3,240	40,157	2,408	33,950
Lime	000 t	1,852	335,489	1,807	330,366	1,842	336,642	1,785	335,739	1,706	293,402
Magnesite	000 t	x	x	x	x	x	x	x	x	x	x
Marl	000 t	-	-	-	-	-	-	-	-	-	-
Mica	000 t	x	x	x	x	x	x	x	x	x	x
Nepheline syenite	000 t	614	97,880	571	81,219	612	64,712	565	131,689	523	118,755
Peat	000 t	1,297	257,030	1,452	330,653	1,459	330,991	1,306	314,924	1,259	313,250
Phosphate	000 t	-	-	-	-	-	-	-	-	-	-
Potash (K_2O)[4]	000 t	11,462	6,132,751	10,790	3,735,632	12,563	4,371,065	14,024	5,726,798	12,770	5,548,260
Potassium sulphate	000 t	x	x	x	x	x	x	x	x	x	x
Pumice	000 t	x	x	5	273	x	x	x	x	x	x
Quartz (silica)[3]	000 t	2,053	107,377	2,256	95,614	2,540	99,278	4,864	202,387	4,740	204,161
Salt	000 t	14,343	791,980	10,252	445,891	11,424	476,674	10,713	488,535	10,243	471,618
Sand and gravel	000 t	228,030	1,884,531	280,550	2,398,633	231,219	2,095,005	245,815	2,284,402	243,818	2,272,364
Soapstone, talc, pyrophyllite	000 t	175	50,335	199	55,513	215	51,754	279	42,635	243	47,245
Sodium sulphate	000 t	x	x	x	x	x	x	x	x	x	x
Stone[3]	000 t	158,034	1,687,916	160,016	1,664,188	169,518	1,747,125	188,974	1,987,973	177,733	1,960,931
Sulphur, elemental	000 t	5,187	423,452	4,746	193,877	4,803	206,740	4,828	449,441	6,418	222,291
Sulphur, in smelter gas	000 t	558	114,383	635	110,307	524	72,739	505	87,206	520	98,500
Titanium dioxide	000 t	x	x	x	x	x	x	x	x	x	x
Wollastonite	000 t	-	-	x	x	x	x	x	x	x	x
Zeolite	000 t	-	-	x	x	1	5	1	12	1	10
Total, Nonmetallic Minerals (including cement[1])		**..**	**16,519,513**	**..**	**13,724,154**	**..**	**..**	**..**	**..**	**..**	**..**
Total, Nonmetallic Minerals (excluding cement[1])		**..**	**14,829,662**	**..**	**12,108,480**	**..**	**13,304,062**	**..**	**15,530,709**	**..**	**14,640,909**

MINERAL FUELS		2010		2011		2012		2013		2014	
	Unit	(quantity)	($000)	(quantity)	($000)	(quantity)	($000)	(quantity)	($000)	(quantity)	($000)
Coal	000 t	68,152	5,540,967	67,113	7,471,408	66,471	5,880,836	68,751	4,886,804	69,035	3,896,746
Total Mineral Fuels		**68,152**	**5,540,967**	**67,113**	**7,471,408**	**66,471**	**5,880,836**	**68,751**	**4,886,804**	**69,035**	**3,896,746**

MINERAL FUELS		2015		2016		2017		2018		2019[P]	
	Unit	(quantity)	($000)	(quantity)	($000)	(quantity)	($000)	(quantity)	($000)	(quantity)	($000)
Coal	000 t	61,985	3,126,266	61,332	4,009,353	60,750	6,280,947	54,599	6,459,413	51,652	5,773,909
Total Mineral Fuels		**61,985**	**3,126,266**	**61,332**	**4,009,353**	**60,750**	**6,280,947**	**54,599**	**6,459,413**	**51,652**	**5,773,909**

MINERAL FUELS	2010		2011		2012		2013		2014	
Total Mineral Production (including cement[1])	**..**	**41,599,026**	**..**	**50,880,785**	**..**	**45,910,667**	**..**	**43,860,914**	**..**	**43,900,395**
Total Mineral Production (excluding cement[1])	**..**	**40,086,402**	**..**	**49,293,649**	**..**	**44,289,191**	**..**	**42,242,087**	**..**	**42,208,264**

MINERAL FUELS	2015		2016		2017		2018		2019[P]	
Total Mineral Production (including cement[1])	**..**	**42,771,019**	**..**	**41,035,618**	**..**	**..**	**..**	**..**	**..**	**..**
Total Mineral Production (excluding cement[1])	**..**	**41,081,168**	**..**	**39,419,944**	**..**	**45,323,180**	**..**	**49,048,676**	**..**	**48,158,188**

Sources: Natural Resources Canada; Statistics Canada.

[P] Preliminary; x Confidential; – Nil; . Not available.

Note: [1]As of reference year 2017, Statistics Canada has ceased the collection of cement data. NRCan is no longer deducting the quantity and value of gypsum, sand and gravel, silica, and stone used in the manufacture of cement products from the totals for gypsum, sand and gravel, silica, and stone.

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

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

[4]Shipments of potash to Canadian potassium sulphate plants are not included in this table. Numbers may not add due to rounding.

ANNEX 6

CANADIAN RESERVES OF SELECTED MAJOR METALS, 1978-2018[P]

Return to text

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	787
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	636	5,005	222	5,665	947
2009	7,290	3,301	451	4,250	215	6,254	918
2010	10,747	3,074	400	4,133	254	6,916	1,473
2011	10,570	2,936	247	4,812	256	6,954	2,225
2012	10,364	2,617	126	4,163	256	5,598	2,148
2013	10,777	2,682	116	3,532	145	5,013	2,140
2014	10,214	2,287	88	2,972	121	5,498	2,070
2015	9,937	2,725	83	3,009	101	5,345	1,984
2016	9,101	2,604	40	2,231	98	3,626	1,910
2017	8,984	2,790	165	2,286	96	5,074	2,578
2018[P]	8,196	2,296	116	1,936	80	4,754	2,696

Source: Natural Resources Canada, based on company reports and the Federal-Provincial/Territorial Annual 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.
[r]Revised; [P] Preliminary.
Note: One tonne (t) = 1.1023113 short tons = 32 150.746 troy oz.

ANNEX 7

EMPLOYMENT COUNT AND ANNUAL COMPENSATION IN THE CANADIAN MINING, SMELTING AND REFINING INDUSTRIES, 2007-2019

Return to text

	NUMBER OF EMPLOYEES	COMPENSATION PER JOB[1]
METAL MINES		
2007	28,610	96,254
2008	30,345	101,814
2009	27,680	109,886
2010	28,820	111,457
2011	30,060	115,820
2012	30,920	122,663
2013	39,170	119,936
2014	38,705	125,384
2015	34,325	131,043
2016	38,490	129,602
2017	39,060	129,729
2018	42,700	132,750
2019	43,025	135,388
NON-METAL MINES		
2007	17,425	81,639
2008	19,665	85,949
2009	17,410	90,750
2010	18,785	93,164
2011	19,100	99,984
2012	17,965	106,873
2013	21,865	99,572
2014	22,670	104,860
2015	22,650	108,072
2016	22,450	105,079
2017	24,020	105,741
2018	25,335	107,579
2019	26,265	107,960
COAL MINES		
2007	4,915	110,990
2008	5,095	119,209
2009	5,070	126,699
2010	6,200	109,394
2011	6,885	114,992
2012	7,095	121,355
2013	9,095	124,854
2014	7,795	122,805
2015	6,135	131,178
2016	7,265	129,823
2017	7,020	134,132
2018	7,645	133,842
2019	8,770	123,061

SMELTING AND REFINING[2]		
2007	59,015	95,294
2008	59,595	92,958
2009	46,205	96,382
2010	51,540	95,795
2011	54,920	97,723
2012	47,420	104,420
2013	46,915	108,527
2014	45,550	108,099
2015	46,090	109,609
2016	46,000	109,370
2017	46,180	113,840
2018	44,620	118,067
2019	44,340	120,610
TOTAL MINING, SMELTING AND REFINING		
2007	109,965	94,082
2008	114,700	95,265
2009	96,365	100,838
2010	105,345	100,411
2011	110,965	104,086
2012	103,400	111,463
2013	117,045	111,941
2014	114,720	114,290
2015	109,200	117,240
2016	114,205	116,646
2017	116,280	118,729
2018	120,300	122,072
2019	122,400	123,266

Source: Statistics Canada; Natural Resources Canada.
[1]Compensation for Smelting and Refining and Total based on weighted average.
[2]Comprised of NAICS 3311, NAICS 3313, and NAICS 3314.

ANNEX 8

TOTAL COMPENSATION PER JOB, BY SELECT CANADIAN INDUSTRIAL SECTOR, 2007-2019[P]

Return to text

	FORESTRY ($)	MINING, SMELTING AND REFINING[1] ($)	MANUFACTURING ($)	CONSTRUCTION ($)	FINANCE AND INSURANCE ($)
2007	65,023	94,082	63,616	61,168	62,019
2008	66,507	95,265	65,306	63,762	63,686
2009	67,491	100,838	65,774	63,733	63,968
2010	67,541	100,411	66,181	64,486	64,539
2011	70,877	104,086	67,564	66,741	66,667
2012	75,671	111,463	70,057	69,552	68,751
2013	79,452	111,941	71,980	71,875	71,279
2014	82,927	114,290	74,025	74,675	74,867
2015	86,326	117,240	75,593	74,891	78,622
2016	83,208	116,646	75,068	73,225	80,984
2017	83,783	118,729	76,051	72,933	84,527
2018	88,736	122,072	78,549	74,622	88,561
2019[P]	90,735	123,266	80,518	76,091	90,250

Sources: Statistics Canada; Natural Resources Canada.
[1]Based on a weighted average of NAICS 212, 3311, 3313, and 3314.

ANNEX 9

DOMESTIC EXPORTS OF MINERALS AND MINERAL PRODUCTS, BY COMMODITY AND COUNTRY OF DESTINATION, 2019

Return to text

METALS	U.S.A. ($)	EUROPEAN UNION (EU-28) ($)	CHINA ($)	JAPAN ($)	OTHER COUNTRIES ($)	TOTAL ($)
Aluminum	9,390,707,961	652,470,732	204,483,555	65,612,651	674,983,007	10,988,257,906
Antimony	977,318	158,704	3,039,532	4,172	8,370,725	12,550,451
Barium	15,506	—	—	—	—	15,506
Beryllium	71,969	—	—	—	—	71,969
Bismuth	132,757	2,079	—	15,677	122,668	273,181
Cadmium	534,538	3,186,934	1,325,657	—	1,525,251	6,572,380
Calcium metals	1,735,900	—	—	1,203	325,296	2,062,399
Chromium	4,354,282	116,336	—	—	54,282	4,524,900
Cobalt	133,614,464	101,063,232	36,462,318	74,674,949	104,459,168	450,274,131
Copper	3,464,710,727	784,045,973	1,026,221,607	701,079,961	1,057,138,768	7,033,197,036
Germanium	19,500,629	2,289,171	86,515	12,327,972	4,521,475	38,725,762
Gold	3,929,269,567	14,248,716,114	647,091,684	104,773,326	3,335,893,516	22,265,744,207
Iron and steel	12,636,443,668	257,037,164	113,536,453	14,302,016	1,499,749,726	14,521,069,027
Iron ore	251,452,771	2,666,758,300	1,374,500,736	856,690,093	1,407,834,114	6,557,236,014
Lead	766,119,504	23,216,406	483,658	1,292,569	56,215,032	847,327,169
Lithium	—	268,185	41,694,216	—	13,587	41,975,988
Magnesium and magnesium compounds	75,028,899	285,684	312,564	66,698	340,194	76,034,039
Manganese	490,294	44,491	—	—	706,169	1,240,954
Mercury	836,000	—	—	—	—	836,000
Molybdenum	100,002,476	43,413,447	1,035,315	39,618	221,422	144,712,278
Nickel	1,199,979,421	1,059,761,618	302,156,960	222,427,346	1,339,862,928	4,124,188,273
Niobium	136,225,109	76,999,481	64,691,453	4,864,912	27,852,381	310,633,336
Platinum group metals	1,277,610,892	16,795,353	—	82,850	345,446,726	1,639,935,821
Rare earth metals	250,427	1,487	—	8,991	28,725	289,630
Selenium	995,376	856,643	3,867,099	—	3,914,489	9,633,607
Silicon	185,908,768	636,955	323,913	396	17,886,742	204,756,774
Silver	930,513,783	93,245,392	15,361,438	14,552,043	52,687,764	1,106,360,420
Tantalum	3,069,604	330,097	—	4,236	169,309	3,573,246
Tin	31,787,376	3,686,857	65,899	11,467	1,801,560	37,353,159
Titanium metal	64,355,089	47,124,409	4,709,576	2,883,559	13,971,321	133,043,954
Tungsten	24,057,824	5,560,879	152,427	37,128	1,100,592	30,908,850
Uranium and thorium	868,354,775	523,667,946	23,564,388	18,014,342	265,124,247	1,698,725,698
Vanadium	246,982,038	293,564,848	17,807,642	77,291,746	26,297,128	661,943,402
Zinc	2,115,610,524	20,814,208	24,846,616	1,771,857	133,519,120	2,296,562,325
Zirconium	1,808,697	2,497,808	9,990,293	91,526	236,340	14,624,664
Other metals	4,749,403,677	1,250,454,439	88,095,495	53,353,834	1,263,531,244	7,404,838,689
TOTAL METALS	**42,612,912,610**	**22,179,071,372**	**4,005,907,009**	**2,226,277,138**	**11,645,905,016**	**82,670,073,145**

NON-METALS	U.S.A. ($)	EUROPEAN UNION (EU-28) ($)	CHINA ($)	JAPAN ($)	OTHER COUNTRIES ($)	TOTAL ($)
Abrasives	354,860,806	13,319,523	4,629,321	7,616,794	27,733,663	408,160,107
Barite and witherite	21,138	—	—	—	—	21,138
Boron	1,006,374	513,814	116,428	6,000	1,974,990	3,617,606
Bromine	2,703	11,202	17,393	—	35,787	67,085
Cement	1,269,566,417	7,775,441	971,388	194,181	9,169,157	1,287,676,584
Chlorine and chlorine compounds	161,999,956	666,432	19,047	710	470,739	163,156,884
Chrysotile (Asbestos)	6,559,823	458,160	2,931		1,967,186	8,988,100
Clay and clay products	19,027,352	8,350,875	650,540	81,611	10,325,014	38,435,392
Diamonds	57,648,525	687,208,178	136,602	75,581	1,468,044,908	2,213,113,794
Dolomite	28,862,635	493,787	27,559	—	393,606	29,777,587
Feldspar	153,004	—	—	—	—	153,004
Fluorspar	20,344,115	246,909	—	3,346	146,341	20,740,711
Glass and glassware products	589,203,566	29,753,086	5,824,796	2,781,992	30,986,596	658,550,036
Granite	39,150,026	1,299,197	990,667	—	1,203,846	42,643,736
Graphite	55,277,606	8,482,301	9,307,571	4,035,127	6,493,495	83,596,100
Gypsum	108,681,080	506,788	—	38,154	2,401,367	111,627,389
Iodine	2,963,333	958,736	—	—	358,423	4,280,492
Lime	57,432,846	200	23,243	—	42,726	57,499,015
Limestone flux and other limestone	18,845,363	2,073	105,720	—	1,384,065	20,337,221
Marble, travertine and other calcareous stones	29,400,644	1,563,384	3,529,079	80	367,111	34,860,298
Mica	8,009,881	628,374	137,913	1,825,602	2,997,061	13,598,831
Mineral pigments	141,258,523	907,611	497,491	22,352	7,094,047	149,780,024
Nepheline syenite	121,957,364	1,597,996	1,362,135	1,245,277	3,920,705	130,083,477
Pearls	2,027,945	30,363	—	9,406	273,214	2,340,928
Peat	470,812,245	776,832	1,066,472	13,041,914	18,659,133	504,356,596
Phosphate and phosphate compounds	84,505,004	2,530,958	1,297,227	964,097	17,318,285	106,615,571
Potash and potassium compounds	3,164,302,670	160,827,310	849,840,459	1,664,930	2,395,154,901	6,571,790,270
Salt and sodium compounds	664,888,613	13,647,015	1,958,642	34,271,901	23,654,116	738,420,287
Sand and gravel	92,459,208	5,201	—	—	3,230,417	95,694,826
Sandstone	158,791	—	—	—	1,743	160,534
Silica and silica compounds	100,643,172	2,903,593	710,261	172,337	3,021,993	107,451,356
Slate	6,635,419	4,799,343		113,717	1,212	11,549,691
Sulphur and sulphur compounds	339,340,921	26,355	109,800,559	—	189,851,848	639,019,683
Talc, soapstone and pyrophyllite	46,806,885	7,711,610	733,695	13,752	30,790	55,296,732
Titanium oxides	332,142,976	11,883,411	1,386,232	—	62,640,243	408,052,862
Other nonmetals	857,213,379	24,734,506	7,093,204	3,738,213	53,782,293	946,561,595
Other structurals	276,908,104	8,266,062	1,335,892	163,707	30,989,302	317,663,067
TOTAL NONMETALS	**9,531,078,412**	**1,002,886,626**	**1,003,572,467**	**72,080,781**	**4,376,120,323**	**15,985,738,609**

MINERAL FUELS	U.S.A. ($)	EUROPEAN UNION (EU-28) ($)	CHINA ($)	JAPAN ($)	OTHER COUNTRIES ($)	TOTAL ($)
Coal	533,000,715	649,082,597	869,869,250	1,812,481,953	3,611,313,823	7,475,335,845
Coke	9,440,917	—	—	—	2,350,188	11,791,105
Total Mineral Fuels	**542,441,632**	**649,082,597**	**869,869,250**	**1,812,481,953**	**3,613,664,011**	**7,487,126,950**
Total Mining Domestic Exports	**52,686,432,654**	**23,831,040,595**	**5,879,348,726**	**4,110,839,872**	**19,635,689,350**	**106,142,938,704**

Sources: Natural Resouces Canada; Statistics Canada.
- Nil.
Note: Stages 1 to 4

ANNEX 10

TOTAL IMPORTS OF MINERALS AND MINERAL PRODUCTS, BY COMMODITY AND COUNTRY OF IMPORT, 2019

Return to text

METALS	U.S.A.	EUROPEAN UNION (EU-28)	CHINA	MEXICO	OTHER COUNTRIES	TOTAL
Aluminum	3,320,101,500	510,748,067	925,384,981	53,657,590	2,756,157,381	7,566,049,519
Antimony	702,718	399,613	12,147,591	70,044	1,187,288	14,507,254
Barium	4,616,493	515,202	5,220,286		149,272	10,501,253
Beryllium	760,539	21,954	310		6,977	789,780
Bismuth	1,526,818	56,134	308,961	24,855	586,780	2,503,548
Cadmium	8,464,653	9,358,229	13,578,978	13	38,339,771	69,741,644
Calcium metals	30,196,114	7,765,073	918,195	38,864	3,348,302	42,266,548
Chromium	7,495,689	14,985,272	4,098,667	1,405,766	69,925,625	97,911,019
Cobalt	30,810,675	34,490,073	1,752,780		30,649,307	97,702,835
Copper	1,802,960,441	232,200,731	185,054,950	104,719,349	1,231,307,365	3,556,242,836
Germanium	8,291,604	365,287	427,050	243	4,727,029	13,811,213
Gold	2,651,274,049	73,775,841	1,095,220	133,426,897	6,831,763,130	9,691,335,137
Iron and steel	12,776,265,732	3,116,554,081	3,465,023,609	1,391,073,085	5,028,528,937	25,777,445,444
Iron ore	1,008,746,982	7,850,460	15,713	32,827	6,281,388	1,022,927,370
Lead	690,939,930	24,333,460	27,102,280	34,013,436	194,618,013	971,007,119
Lithium	42,456,857	17,157,740	24,534,919	162,866	64,329,354	148,641,736
Magnesium and magnesium compounds	52,012,470	9,314,774	230,058,857	1,159,805	41,932,468	334,478,374
Manganese	110,047,369	30,165,759	39,846,418	6,938,093	206,027,198	393,024,837
Mercury	535,077	1,094,644	577,748	1,671,667	1,071,509	4,950,645
Molybdenum	40,981,548	1,779,449	9,415,578	17,902,890	29,053,153	99,132,618
Nickel	370,840,453	255,938,746	26,957,535	4,385,823	72,218,042	730,340,599
Niobium	628,062	1,288,041			54,462,879	56,378,982
Platinum group metals	270,276,219	265,960,082	285,351	39,599	512,022,941	1,048,584,192
Rare earth metals	1,534,119	599,479	2,473,326		83,741	4,690,665
Selenium	3,660,870	6,005,820	19,341		419,746	10,105,777
Silicon	10,243,821	1,261,735	4,827,936	81,395	72,277,666	88,692,553
Silver	401,055,549	269,551,468	42,060,567	199,899,668	536,860,817	1,449,428,069
Strontium	16,128	385,800		239,363	353	641,644
Tantalum	1,731,794	280,669	319,511		154,036	2,486,010
Tellurium	318,101	544,809	14,948,285		10,913,741	26,724,936
Thallium	3,379	590			0	3,969
Tin	12,204,382	1,040,857	5,079,732	1,088,108	49,593,397	69,006,476
Titanium metal	173,673,645	19,061,336	37,785,935	100,267	62,040,546	292,661,729
Tungsten	13,122,959	1,393,327	7,257,391		4,312,638	26,086,315
Uranium and thorium	201,204,542	24,848,948	4,161,372		879,122,451	1,109,337,313
Vanadium	2,967,004	27,859,786	32,140,992		52,432,299	115,400,081
Zinc	725,869,249	46,730,668	12,727,970	96,355,025	350,155,024	1,231,837,936
Zirconium	66,468,908	2,464,697	301,084	1,560	1,741,726	70,977,975
Other metals	7,326,855,849	1,916,870,220	3,002,059,595	1,728,072,303	2,933,336,769	16,907,194,736
Grand Total	**32,171,862,291**	**6,935,018,921**	**8,139,969,014**	**3,776,561,401**	**22,132,139,059**	**73,155,550,686**

NONMETALS	U.S.A.	EUROPEAN UNION (EU-28)	CHINA	MEXICO	OTHER COUNTRIES	TOTAL
Abrasives	247,186,565	135,563,767	68,526,859	11,657,816	121,589,295	584,524,302
Arsenic	2,888	8,266	70,513		18,842	100,509
Barite and witherite	3,506,952	574,064	1,418,368		8,573,508	14,072,892
Boron	30,449,723	913,247	540,248		25,274,438	57,177,656
Bromine	5,264,168	18,465	268,213	6,129	4,467,118	10,024,093
Cement	527,232,244	75,361,545	159,043,222	19,536,655	87,194,442	868,368,108
Chlorine and chlorine compounds	104,526,647	9,399,719	12,911,229	993,766	9,597,000	137,428,361
Chrysotile (Asbestos)	144,051,345	9,218,393	10,879,429	520,859	16,324,922	180,994,948
Clay and clay products	337,392,056	313,984,019	522,351,598	73,663,453	172,349,903	1,419,741,029
Diamonds	81,426,333	41,799,099	3,445,157		339,776,341	466,446,930
Dolomite	23,456,231	2,000	45,985		15,114	23,519,330
Feldspar	762,788	2,864			136	765,788
Fluorspar	25,474,824	8,934,981	5,056,353	31,254,232	18,219,996	88,940,386
Glass and glassware products	2,302,470,531	313,985,672	738,656,168	283,400,913	194,641,353	3,833,154,637
Granite	18,649,439	17,099,606	25,492,128	16,390	41,003,482	102,261,045
Graphite	219,403,153	204,078,189	299,323,187	16,195,835	67,467,704	806,468,068
Gypsum	182,418,808	21,694,898	829,125	4,679,578	241,949	209,864,358
Iodine	6,676,990	39,362	211,314		15,726,516	22,654,182
Lime	55,214,108	725,441	8,270		2,627,435	58,575,254
Limestone flux and other limestone	38,187,906	776,002	2,374,746	102	337,442	41,676,198
Marble travertine and other calcareous stones	15,886,177	44,178,375	31,921,208	803,506	33,286,383	126,075,649
Mica	5,358,718	1,298,568	1,135,177	32,093	1,551,977	9,376,533
Mineral pigments	162,287,383	35,176,595	15,272,902	1,200,998	19,615,701	233,553,579
Nepheline syenite	1,811,774		277,606		3,121	2,092,501
Olivine	4,336,090	1,529,131	14,900,479	357,372	6,355,495	27,478,567
Pearls	9,157,250	3,732,952	21,935,539	173,420	7,576,620	42,575,781
Peat	17,905,783	3,429,548	43,210		4,647,839	26,026,380
Perlite	15,569,376	10,002	91		47,034	15,626,503
Phosphate and phosphate compounds	855,886,667	12,785,654	27,510,310	13,134,343	155,270,424	1,064,587,398
Potash and potassium compounds	83,918,930	7,966,044	10,914,113	734,263	19,859,457	123,392,807
Salt and sodium compounds	578,236,392	48,236,396	57,511,372	28,057,251	214,009,467	926,050,878
Sand and gravel	31,203,779	95,407	683,196	79,441	427,017	32,488,840
Sandstone	1,901,686	387,541	135,965	3	3,562,790	5,987,985
Silica and silica compounds	407,877,897	29,520,395	29,586,587	5,514,617	16,864,737	489,364,233
Slate	1,069,124	173,201	3,630,108	244	1,977,744	6,850,421
Sulphur and sulphur compounds	32,091,917	658,204	2,976,893	6,679	1,370,305	37,103,998
Talc soapstone and pyrophyllite	16,475,895	1,019,944	46,136		409,303	17,951,278
Titanium oxides	223,140,288	32,560,442	49,802,779	24,203,511	20,155,458	349,862,478
Other nonmetals	1,177,933,603	159,276,587	75,875,141	21,404,917	157,946,898	1,592,437,146
Other structurals	123,217,659	19,368,329	61,676,613	4,817,780	41,744,155	250,824,536
Grand Total	**8,119,020,087**	**1,555,582,914**	**2,257,287,537**	**542,446,166**	**1,832,128,861**	**14,306,465,565**

MINERAL FUELS	U.S.A.	EUROPEAN UNION (EU-28)	CHINA	MEXICO	OTHER COUNTRIES	TOTAL
Coal	886,469,595	7,493,327	862,127	923,486	224,675,134	1,120,423,669
Coke	299,517,778	2,763,920	286	10	9,676,347	311,958,341
Total Mineral Fuels	**1,185,987,373**	**10,257,247**	**862,413**	**923,496**	**234,351,481**	**1,432,382,010**
Total Mining Imports	**41,476,869,751**	**8,500,859,082**	**10,398,118,964**	**4,319,931,063**	**24,198,619,401**	**88,894,398,261**

Sources: Natural Resouces Canada; Statistics Canada.
- Nil.
Note: Stages 1 to 4

THE CANADIAN MINING INDUSTRY AT A GLANCE

	2009	2014	2015	2016	2018	2019
Mining industry GDP ($ billion)	32.0	57	55.6	57.6	97	109[1]
Percentage of total Canadian GDP (%)	2.7	3.5	3.4	3.4	3.5	3.5
Value of mineral production ($ billion)	32.2	44.7	42.8	40.8	47	48.1
Synthetic crude production value ($ billion)	n/a	35.5	21.5	19.6	28.5	n/a
Synthetic crude production (million cubic metres)	n/a	55.3	56.6	54.1	61.2	n/a
Number of mining establishments	961	1209	n.a	1201	1060	931
Mineral extraction employment	52,000	60,215	60,565	71,380	70,000	77,900
Total direct and indirect mining industry employment	308,000	376,000	560,000	596,000	626,000	719,000
Mineral exploration/appraisal spending ($ billion)	1.9	1.9	1.7	1.6	2.3	2.1
Mining industry capital expenditures ($ billion)	9.8	15.07	15.3	n.a	12.9	11
Oil sands capital expenditures ($ billion)	10.6	25.1	23.4	n.a	10.7	10.1
Stock of foreign mining direct investment ($ billion)	n/a	21.1	10.4	35.5	24.5	42.6
Stock of Canadian mining direct investment abroad ($ billion)	64.5	n/a	62.6	90.8	80.4	89.2

n/a—not available
[1]direct and indirect real GDP

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