

Engineers Canada's Comments on the Government of Canada's Discussion Paper on Mining Ideas for the Canadian Minerals and Metals Plan

Questions concerning the content of this report should be directed to:

Joey Taylor
Manager, Public Affairs
Engineers Canada
joey.taylor@engineerscanada.ca
613.232.2474 Ext. 213

Overview

Producing more than 60 metals and minerals, Canada has a positive history of sustainable mineral development and a strong reputation as a leading mining nation. Canada currently ranks in the top five producing countries for 13 major minerals and metals, including potash, uranium, gold, copper, niobium, and nickel, and remains one of the world's most open countries in terms of trade and mining investment. The mining and metals industry is a significant producer of wealth and employment for Canadian citizens, directly employing more than 403,000 workers across Canada in mineral extraction, smelting, and manufacturing, and indirectly employing 193,000 individuals.¹ The Canadian minerals and metals industry is also a significant contributor to Canada's economy, contributing \$57.6 billion to Canada's GDP in 2016 and accounting for 19 per cent of the value of Canadian goods exported within the same year.²

Canada's leadership and innovative sustainable development practices within the mining industry have worked to develop a "Canada Brand" that is recognized and trusted globally. Corporate social responsibility practices, access to capital markets, and advanced principles towards clean technology and mining services have all worked to support this brand.³ However, recent yearly trends have indicated that Canada's position, and its brand as a destination for mineral investment, is in jeopardy. Canadian reserves of certain metals have been "trending downwards and the country has experienced a decline in the production volumes of key commodities."⁴

Some of the obstacles in Canada's mineral and metals industry are shifting global demands, fluctuating commodity prices, global investments in other countries, mitigating environmental impacts on infrastructure projects, fragmented innovation programs, and limited access to skilled labour for future mining and metal infrastructure projects.

The Government of Canada is seeking the views of Canadians to strengthen and improve Canada's position as a leading mining nation while ensuring that the industry continues to contribute to prosperity for Canadians. A discussion paper was prepared by the Intergovernmental Working Group on the Mineral Industry on behalf of Canada's ministers responsible for mining. Its purpose is to encourage public discussion and comments to assist federal, provincial, and territorial officials in the preparation of the Canadian Minerals and Metals Plan. The aim of the Canadian Minerals and Metals Plan is to encourage collaboration with mining industry stakeholders, Indigenous partners, and the public while simultaneously supporting existing provincial and territorial priorities, thereby bringing together resources from across the country to address challenges, improve innovative practices, and uncover opportunities within the mining and metals industry.

Engineers Canada welcomes the discussion paper and appreciates the opportunity to provide input. Professional engineers play a key role in Canada's mining industry, and have a professional obligation in the safeguarding of life, health, property, economic interests, public welfare, and the environment. We

¹ The Mining Association of Canada (2017). "Mining Facts." Retrieved April 3, 2018, from: <http://mining.ca/resources/mining-facts>.

² IBID

³ The Government of Canada (2018). "Mining Ideas for the Canadian Minerals and Metals Plan: A Discussion Paper." Retrieved April 3, 2018, from: https://www.minescanada.ca/sites/default/files/cmmp_discussion-paper_march-7-2018-final.pdf.

⁴ IBID

believe that the proposed actions outlined in the discussion paper are positive steps towards strengthening Canada's position as a leading mining nation while simultaneously achieving transparency in basing decisions on stakeholder and industry expertise.

Streamlining our regulatory environment

Canada's mining industry has strong regulatory regimes that have propelled Canada's competitive advantage forward within the international community. It has promoted foreign investment and has supported Canada's ability to get resources to market. Yet the current regulatory framework for mining activities in Canada is evolving and must be able to adapt to emerging technologies that can improve environmental stewardship and economic development. For the mining and metals industry in Canada to streamline a regulatory framework that supports sustainable natural resource development, while safeguarding the rights and interests of Canadians, it must use unbiased, evidence-based decisions from the engineering profession that reflect the best up-to-date and available knowledge. The federal government's partnership with the mining industry, along with the engineering profession as one of the key stakeholders, can be a great first step in achieving this objective.

Recommendation #1: Engagement of professional engineers and other practitioners

The federal government must recognize the contribution that the engineering profession have made in enabling environmentally and economically sustainable improvements to resource development, including gains in tailings management, energy efficiency, and greenhouse gas reductions.

Provincial and territorial engineering regulators in Canada demand a high standard for sustainability and environmental protection from their members. The government needs to rely on the engineering community for technical advice on natural resource development, trusting in the profession to make the best recommendations. The government needs to ensure consistency and logic in the regulatory process and enforce the processes and the outcome.

To increase transparency throughout the mining industry while safeguarding the rights and interests of Canadians, professional engineers and other practitioners should be involved in early mining and infrastructure project planning processes. Public safety is threatened and environmental, social, and economic impacts are not adequately addressed when professional engineers are not directly involved in the planning, design, review, implementation, maintenance, and rehabilitation of mining and metal projects that require the application of engineering and professional practice.

Professional engineers bring innovative and diverse ideas to find and solve complex problems. This benefits the federal government throughout the full life cycle of a project. The federal government needs to engage professional engineers early in the planning and preliminary mining design phase of projects to uncover technical feasibility, environmental, or safety issues that have been overlooked or misunderstood. Public trust and confidence in the assessment process and technical feasibility, along with how decisions around resource development are made, are strengthened when technical issues and potential environmental impacts and cumulative effects are identified early and appropriately addressed by qualified professionals prior to project approvals and during the project implementation.

Recommendation #2: Professional engineers should be involved in early sustainable development and environmental assessment processes

The mining and metals industry in Canada must turn to the expertise of the engineering profession to continuously improve the environmental assessment processes in mining-related activities and to foster environmental sustainability for the future of the mining industry and its accountability to the Canadian public.

Engineers Canada has undertaken significant steps to underscore the importance of sustainable development and environmental stewardship for all areas of engineering practice. This is particularly relevant and important to exploration, production for mining projects and metal production in Canada and abroad. Our profession through responsible practice of our licensed engineers, serves the common public interest with the Federal government and provincial bodies towards public safety, preservation of environment and the public benefit of mining and metals industry. This focus is also mindful of the economic benefits that these industries provide to Canadians.

In 2016, Engineers Canada, in partnership with the provincial and territorial engineering regulators, developed a National Guideline on sustainable development and environmental stewardship for professional engineers. The guideline is comprised of ten guidelines that have been prepared to support the existing codes of ethics of the 12 regulators of the engineering profession.

The purpose of the guideline is to describe engineering practices that are anticipatory of sustainable development and preventative in degrading the natural environment. For example, instigating monitoring systems so that any environmental and social impacts of engineering projects are identified at an early stage contributes to the sustainability of the project and provides information on the environment that can be used to implement remedial actions. It is an engineer's responsibility to understand the consequences of their actions with respect to the environmental and societal implications of their work.

Responsible environmental management is an inherent part of the duties undertaken by all engineers, regardless of discipline or role; whether as employees, employers, researchers, academics, consultants, regulators, or managers. As noted in the Engineers Canada National Guideline on the code of ethics, the primary duty of engineers is to hold paramount the protection of public safety and welfare with due regard for the environment and societal values. To streamline a regulatory mining processes that support sustainable natural resource development while safeguarding the rights of Canadians, the engineering profession must be at the decision-making table with both the mining industry and federal government.

Fostering an inclusive workforce in mining

Canada's mining and metals industry is an important sector that undeniably drives Canada's economy forward. The industry is known for having a highly skilled workforce that provides unparalleled expertise in extractive skills and geological and biological sciences.

Achieving support for natural resource projects across Canada has become a challenge within the last few years. The challenge stems from a diverse "number of communities across Canada, the differences of opinions within communities, and the capacity of individual communities to participate in planning and

regulatory processes.”⁵ The mining and metals industry in Canada can better understand, and therefore protect public interests, if it is representative of the demographics of the Canadian public it serves.

The mining industry cannot afford to ignore the innovative, social, and economic benefits of greater diversity; if Canada is to stand strong against global competitors, and remain innovative, it must actively engage, attract, and retain underrepresented talent within the mining industry.

The federal government needs to be more visible in promoting the benefits mining brings to the economy, with its impact on GDP and employment, and the positive impact mining has on the quality of life Canadians enjoy.

Addressing the mining industry’s skills shortage

The mining industry faces many challenges, including an impending skilled labour shortage that threatens the industry’s global competitive advantage and short-and long-term economic growth prospects. The mining industry is not the only industry in Canada facing this challenge; however, as individuals retire and as new mining projects break ground across Canada, a labour market outlook for Canada’s mining industry is forecasting a critical skills shortage within the next 10 years.⁶ Improving diversity within the mining and metals workforce across Canada, specifically by attracting and retaining traditionally underrepresented talent groups such as women and Indigenous peoples, will address the industry’s impending skills shortage—while simultaneously increasing its innovative capacity.

Women and Indigenous peoples remain severely underrepresented within Canada’s mining and metals industry. Women represent approximately 17 per cent of the total Canadian mining workforce,⁷ with Indigenous peoples representing approximately five per cent of the total mining labour force in Canada.⁸ Accessibility and feasibility are two systemic barriers that disproportionately impact underrepresented groups’ opportunities to enter the mining industry.

The challenges in attracting and retaining both women and Indigenous peoples in the mining industry in Canada revolves around a lack of career awareness or negative perceptions about careers in mining, a lack of representation in senior leadership positions, inflexible work-life practices, and a perceived lack of opportunities for career advancement and mentorship.⁹

Engineers Canada strongly believes that attracting and retaining women and Indigenous peoples into the mining and metals industry in Canada requires a combination of solutions, such as improving youth engagement strategies in STEM subjects—specifically engineering—improving labour market information

⁵ The Government of Canada (2018). “Mining Ideas for the Canadian Minerals and Metals Plan: A Discussion Paper.” Retrieved April 3, 2018, from: https://www.minescanada.ca/sites/default/files/cmmp_discussion-paper_march-7-2018-final.pdf.

⁶ Gillis, L. (2017). “Mining industry gearing up for ‘critical’ manpower shortage.” Retrieved April 3, 2018, from: <http://www.timminspress.com/2017/07/26/mining-industry-gearing-up-for-critical-manpower-shortage>.

⁷ Mining Industry Human Resources Council (2016). “Strengthening Mining’s Talent Alloy: Exploring Gender Inclusion.” Retrieved April 4, 2018, from: https://www.mihr.ca/pdf/MiHR_Gender_Report_EN_WEB.pdf.

⁸ The Government of Canada (2018). “Mining Ideas for the Canadian Minerals and Metals Plan: A Discussion Paper.” Retrieved April 3, 2018, from: https://www.minescanada.ca/sites/default/files/cmmp_discussion-paper_march-7-2018-final.pdf.

⁹ Mining Industry Human Resources Council (2016). “Strengthening Mining’s Talent Alloy: Exploring Gender Inclusion.” Retrieved April 4, 2018, from: https://www.mihr.ca/pdf/MiHR_Gender_Report_EN_WEB.pdf.

and post-secondary mining engineering enrolment, and enhancing industry networking and career mentorship services.

Engineers Canada is also working to increase the representation of Indigenous peoples within the engineering profession by supporting the *Indigenous Peoples' Access to Post-Secondary Engineering Programs: A Review of Practice Consensus*, a report which supports the development of engineering access programs, including mining and mineral engineering programs, for Indigenous peoples across Canada. Engineers Canada has identified programs that increase Indigenous peoples' access to engineering and is working towards the expansion of these programs to raise the profile, as well as improve the image, of the engineering profession in Indigenous communities.

Recommendation #3: Encouraging innovation within the mining industry

The federal government needs to play a key role in fostering collaboration between industry, industry associations, academia, and provincial and municipal governments towards the development and application of innovative technologies and management practices. The engineering community are involved in all these areas from research to implementation and operation. From robotics, tailings management, data standards, and more recently the Battery Electric underground vehicle standards, Canada has a track record for innovation that should be celebrated and built on. These have all been developed through a collaborative network including industry, the Global Mining Standards Group and the Canadian Mining Innovation Council.

Youth engagement in STEM and post-secondary engineering studies

To address the critical labour skills shortage within the mining industry in Canada, mining engineering stakeholders need to be supported by national, government-driven policies that encourage youth—particularly youth from underrepresented groups—to consider pursuing post-secondary engineering education and in turn, a career in the mining industry.

To build a skilled workforce that includes more women and Indigenous peoples, it is crucial that foundational educational skills in and national programming in STEM be supported by the federal government and targeted to underrepresented youth. Disseminating information to underrepresented youth, specifically to increase their awareness of mining literacy and in turn the mining industry, will successfully prepare them for a career in mining.

Specific to women, college and university campuses across Canada have seen an increase in female representation over the past decades; however, post-secondary enrolment rates for women in STEM subjects remains low—particularly in mining and mineral engineering. Too often when discussing STEM disciplines is the emphasis placed on science, mathematics and technology, with engineering being forgotten. Yet engineering is equally important; it is fundamentally the ability to solve complicated and future-minded problems, including within the mining and mineral industry in Canada.

Recommendation #4: Ensure federal funding is available for mining labour market studies

Information that revolves around the mining and metals industry labour market in Canada, including the current unemployment rates of recent post-secondary mining engineering graduates, needs to be readily available for policy makers, industries, students, and educational institutions. Current data sources within

Canada “have significant shortcomings, including their relatively short-term nature”¹⁰ when referring to critical labour market information. To increase the representation of both women and Indigenous people in Canada’s mining and metals industry, national surveys of post-secondary mining engineering graduates need to be detailed, accurate, consistent, extended, and up-to-date. Having this information will help to inform underrepresented groups in Canada, specifically women and Indigenous peoples entering post-secondary mining engineering programs, about the prospects of securing meaningful employment within the mining and metals industry. This in turn may advance the participation of underrepresented groups in natural resource development and mineral exploration. These findings will also help policy-makers develop strategies to attract underrepresented groups.

Recommendation #5: Continue funding for co-op placements and work-integrated opportunities for students in post-secondary mining engineering programs

Budget 2017 highlighted the federal government’s increased support and funding for co-op placements and work-integrated learning opportunities over five years for students in STEM undergraduate programs, starting in 2017-2018. However, for students, particularly women and Indigenous peoples, to gain critical, hands-on experience in Canada’s mining and metals industry, as well as connect with potential employers and mentors within the industry, co-operative educational placements need to be made available throughout a student’s post-secondary mining engineering education and not just within their last years of post-secondary education.

Co-operative educational placements throughout an individual’s undergraduate degree will continually attract and engage an individual within the mining industry and prepare an individual for successful entry into the industry upon graduation by developing an individual’s valuable networks and honing the desired skills to be successful. Canada’s mining industry has an opportunity to leverage the experience and goodwill of current employees in their efforts to attract and retain untapped talent. For the mining industry in Canada, early and continuous engagement with post-secondary students, particularly underrepresented groups, is crucial to fill the skilled labour gap.

The federal government should finance programs that include government subsidies for a portion of the salary to encourage employers within the mining industry to hire and train new staff, and hold internship opportunities and bridging programs. Students who are prepared when they enter the workforce will contribute greatly to Canada’s economic growth and the mining industry’s labour market needs. Linking post-secondary institutions, employers, and government under one central structure to support the development of skills in line with mining and metals labour market needs will equip Canadian youth with the skills required to succeed in the future economy.

Enhancing industry networking and mentorship services

The mining industry in Canada can leverage skilled and talented workers through inclusive workplace cultures and personal connections, specifically through targeted industry mentorship programs for underrepresented groups.

¹⁰ Finnie, R., et al. (2016). “Barista or Better? New Evidence on the Earnings of Post-Secondary Education Graduates: A Tax Linkage Approach – Executive Summary.” Retrieved April 3, 2018, from: https://static1.squarespace.com/static/5557eaf0e4b0384b6c9b0172/t/5796ca2be58c6252c0d41d3b/1469499948298/EPRI-ESDC+Tax+linkage_Exec+Sum.pdf.

It is evident that women do not generally view Canada’s mining and metals industry as one that supports diversity, inclusion, or professional development opportunities. Women who have chosen a career in mining “often had personal networks, mentors, family connections or other access to industry information that attracted them to the industry and its opportunities.”¹¹

Mentoring programs can be a great tool to address the “majority advantage” that exists for men within the mining and metals industry in Canada. The advantage “tends to give men access to more ‘natural mentoring,’ inside information and valuable contacts which accelerate professional development.”¹² For this reason, the mining industry in Canada, with support from the federal government, must establish formal mentoring programs across the country to attract and retain underrepresented groups to the industry.

Mentoring within the mining industry can improve cross-cultural understanding, reconciliation with Indigenous peoples, and provide underrepresented individuals with the opportunity to see themselves represented in senior management or board positions. It can also support an employee’s perception of ownership and acceptance within the industry. Mentoring programs allow for individuals to gain industry expertise, skills, values, and perspectives about the day-to-day realities of mining job requirements.

To actively support mentoring initiatives within Canada’s mining and minerals industry, there must also be opportunities to educate the public on the importance and value that the mining industry brings to Canada. To protect Canada’s brand as a trusted destination for mineral development, and to protect the future of Canada’s mining industry, public confidence towards the industry must be promoted and maintained.

Recommendation #6: Federal government should provide resources to support mining industry’s mentoring programs

Mentorship programs that are targeted towards Indigenous peoples and women within the mining industry create transparency and accountability within the mining industry. They provide employers with an opportunity to understand the barriers and biases that exist towards underrepresented groups in the mining industry, and even within their own company.

Mentorship programs within the mining industry in Canada should also support an individual throughout their career; particularly if the industry is motivated to maintain its talent pool and innovative capacity. Mentors that work with and connect with their mentees throughout their career will aide in “unblocking barriers to elevation that they may encounter, as well as increase their retention rate.”¹³

¹¹ Mining Industry Human Resources Council (2016). “Strengthening Mining’s Talent Alloy: Exploring Gender Inclusion.” Retrieved April 4, 2018, from: https://www.mihr.ca/pdf/MiHR_Gender_Report_EN_WEB.pdf.

¹² EY (2017). “Has mining discovered its next great resource?” Retrieved April 4, 2018, from: [http://www.ey.com/Publication/vwLUAssets/ey-has-mining-discovered-its-next-great-resource/\\$FILE/EY-women-in-mining.pdf](http://www.ey.com/Publication/vwLUAssets/ey-has-mining-discovered-its-next-great-resource/$FILE/EY-women-in-mining.pdf).

¹³ EY (2017). “Has mining discovered its next great resource?” Retrieved April 4, 2018, from: [http://www.ey.com/Publication/vwLUAssets/ey-has-mining-discovered-its-next-great-resource/\\$FILE/EY-women-in-mining.pdf](http://www.ey.com/Publication/vwLUAssets/ey-has-mining-discovered-its-next-great-resource/$FILE/EY-women-in-mining.pdf).

Who we are:

Engineers Canada is the national organization of the 12 provincial and territorial associations that regulate the practice of engineering in Canada and license the country's 290,000 professional engineers. Together, we work to advance the profession in the public interest.

Engineers drive much of Canada's economy. Natural resources, manufacturing, transportation infrastructure, technology and other sectors rely on the capability of engineers. As one of the top five exporters of engineering services in the world, the expertise of Canada's engineers contributes to both the Canadian and international economy.