IGF INTERGOVERNMENTAL FORUM on Mining, Minerals, Metals and Sustainable Development

WOMEN AND THE MINE OF THE FUTURE

A Gendered Analysis of Employment and Skills in the Large-Scale-Mining Sector: Canada

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- Environmental Governance Programme of the Swedish Environmental Protection Agency and the United Nations Development Programme
- International Labour Organization
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EXECUTIVE SUMMARY

The Women and the Mine of the Future Project is a collaboration with the Intergovernmental Forum, International Women in Mining, the International Labour Organization, and the United Nations Development Programme's Environment and Governance Program. The Canada Country Report provides a baseline analysis of publicly available gender-disaggregated data along with an overview of the legal and policy context that influences employment in the Canadian mining sector.

The study gathered Canadian mining sector data and prior analysis from a variety of public sources. A further synthesis summarizes mining occupations, the state of women's employment in mining, the education and skills of the mining workforce, a case study of training in mining, and government policies influencing mining.

Key trends for women in Canadian mining include the following:

- Women are employed in all phases of mining yet are persistently underrepresented (~16% of the mining workforce).
- Women in mining are highly educated, resulting in less employment loss through the COVID-19 pandemic than in other underrepresented groups.
- Women in mining have less representation in all occupations and all skill levels compared to women in other Canadian industries.

Furthermore, systemic gender inequities in Canadian mining result in

- Gendered pay gaps.
- Unequal access to support networks, resulting in fewer opportunities for women in mining to be promoted and advance in their careers.
- Higher rates of discrimination and harassment incidents being experienced by women than men in mining, many of which are not resolved.

Recommendations from this Canadian baseline study include actions and policies that governments and companies can adopt to increase the representation and retention of women working in Canadian mining. Of greatest importance is increasing public access to gender-disaggregated, regional, and company-specific data, which allows for the analysis of policies. As Canada works toward reconciliation with Indigenous Peoples and advancing equity, diversity, and inclusion for underrepresented groups, such as women, there is greater potential to access these gender-disaggregated data sources.

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1.0 INTRODUCTION

1.1 Women and the Mine of the Future Project

The Intergovernmental Forum, in partnership with International Women in Mining, the International Labour Organization, and the United Nations Development Programme Environment and Governance Program, are collaborating on the Women and the Mine of the Future Project. The Women and the Mine of the Future Project aims to establish a baseline to uncover the existing profile of women employed in large-scale mining and in its supply chain. The project explores the existing gender-disaggregated profile of workers in the large-scale mining sector and in its supply chain, with particular attention paid to the participation of women. The project aims to understand what global trends, such as the adoption of new and disruptive technologies and the rising demand for minerals for the low-carbon transition, may hold for women, whether at the workplace (directly at mine sites or remotely in control rooms, etc.) or in the supply chain.

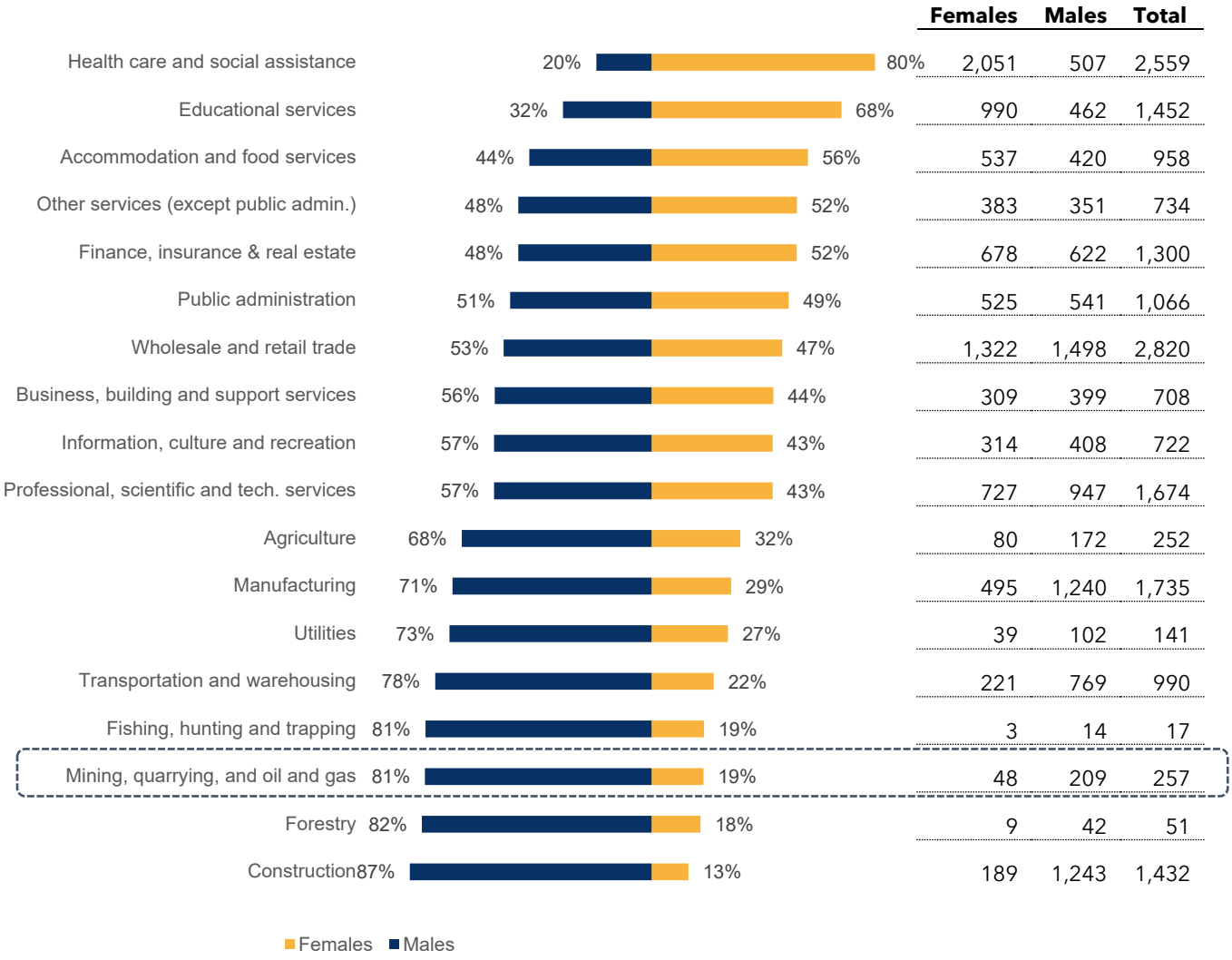
In this first phase of the project, a baseline analysis was completed across 11 countries, including Canada. This Canadian Country Report describes Canadian data collected and analyzed by Prairie Catalyst Consulting. Prairie Catalyst Consulting is a Canadian-based company focused on advancing equity, diversity, and inclusion and has 18 years of experience in the Canadian mining sector. This Canadian-focused report details the legal and policy context, methodology, findings, and implications to understand the profile of women employed in large-scale Canadian mining. Finally, the findings of the baseline study inform policy recommendations to promote and support women working in large-scale mining and its supply chains.

1.2 Canadian Policy and Regulatory Context

1.2.1 Canadian Overview

In 2021, Statistics Canada's labour force survey reported a population of 31.5 million people in Canada and an employment rate of 60% of the working-age population. A breakdown of the labour force by industry and sex is shown in Figure 1. The Canadian mining, quarrying, and oil and gas industry has the third-lowest representation of women (19%), according to annualized labour force surveys (LFS).

Figure 1. Total employed persons by industry and sex



	Females	Males	Total
Health care and social assistance	2,051	507	2,559
Educational services	990	462	1,452
Accommodation and food services	537	420	958
Other services (except public admin.)	383	351	734
Finance, insurance & real estate	678	622	1,300
Public administration	525	541	1,066
Wholesale and retail trade	1,322	1,498	2,820
Business, building and support services	309	399	708
Information, culture and recreation	314	408	722
Professional, scientific and tech. services	727	947	1,674
Agriculture	80	172	252
Manufacturing	495	1,240	1,735
Utilities	39	102	141
Transportation and warehousing	221	769	990
Fishing, hunting and trapping	3	14	17
Mining, quarrying, and oil and gas	48	209	257
Forestry	9	42	51
Construction	189	1,243	1,432

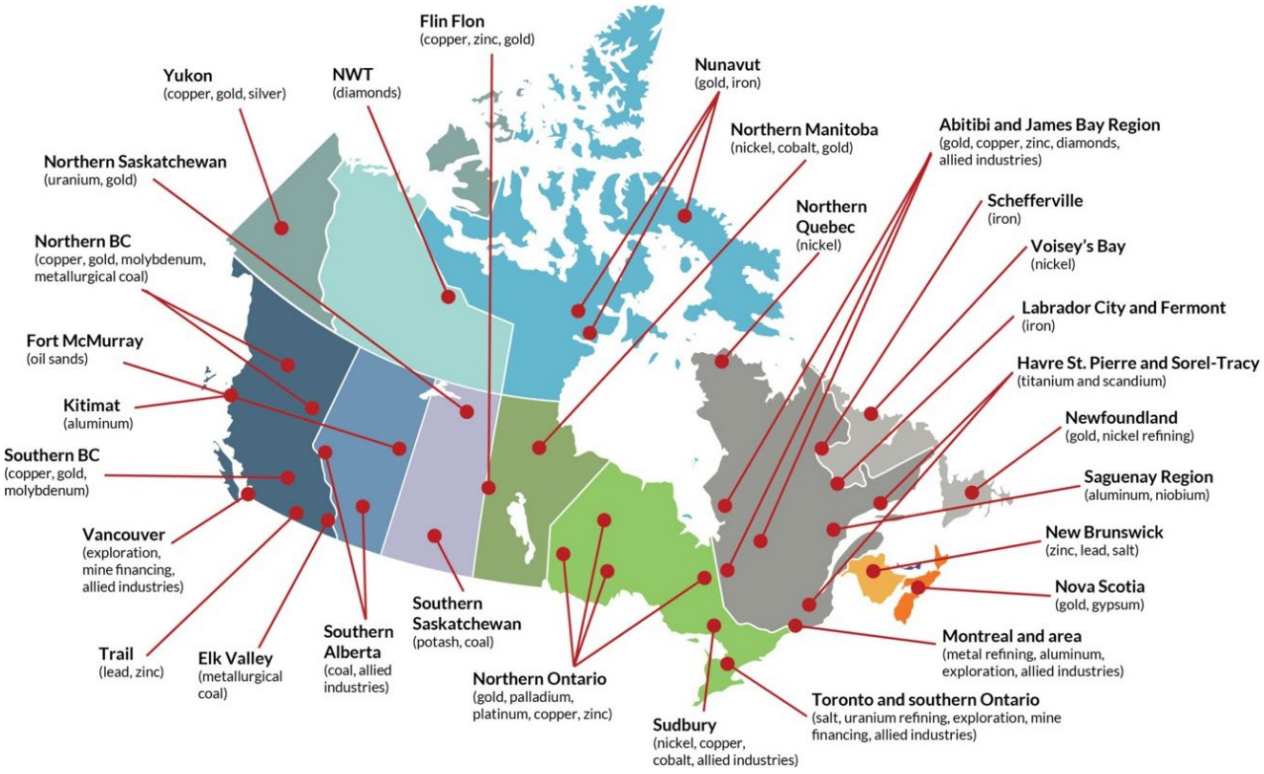
Source: 2021 LFS (% share, thousands).

While the global COVID-19 pandemic has impacted all people, Canadian women's participation in the workforce was more negatively impacted than Canadian men's, particularly in service sectors where remote work options were not possible. As a result, one year into the pandemic, women accounted for 53.7% of employment losses (Grekou & Lu, 2021). In the mining industry, women tend to hold more roles in professions or administration, which were better able to pivot to remote work; as such, women's employment in mining was less impacted by the pandemic than in other sectors (Mining Industry Human Resource Council, 2021c).

1.2.2 Canada's Minerals Profile

Canada produces more than 60 minerals and metals at more than 200 mines. As shown in Figure 2, mining activity occurs across nearly all regions in Canada.[1] Mining methods include underground, open-pit, and solution mining. Mines are regionally dispersed and often located outside metro areas and in rural areas. Corporate offices, including regional division offices or commodity division offices, are typically located in urban centres, such as Toronto, Vancouver, Montreal, Saskatoon, and Sudbury.

Figure 2. Minerals and metals produced in Canada



Source: Mining Association of Canada, 2021.

1.2.3 Canadian Mineral Governance Framework

Canada's provincial governments have jurisdiction over natural resource extraction and labour. As such, mining-related legislation can vary slightly across the country. The federal government has jurisdiction over mining in some instances. The areas where the federal government has control over mining activities include uranium production—due to the higher risk of handling nuclear material—mining in Northern Canada, and in relationship to Indigenous Peoples, who are recognized rights holders in the Canadian constitution. The federal Department of Indian Affairs and Northern Development has jurisdiction over natural resource extraction in Canada's northern territories (Yukon, Northwest Territories,

[1] Natural Resources Canada's Atlas of Canada – Minerals and Mining (https://atlas.gc.ca/mins/en/index.html) is an interactive resource for exploring exploration and production sites in Canada.

and Nunavut). In other regions, the federal government may be involved in natural resource exploration and development due to its role as the representative of the "Crown" in relation to Indigenous Peoples.

The Canadian Minerals and Metals Plan is a strategic plan for the Canadian minerals and metals sector established by the Canadian Government in 2019. Of importance to the Women and the Mine of the Future Project is the plan's business case and strategic goal to increase women's representation in mining to 30% and the particular focus on increasing Indigenous women's participation in mining. The negative impacts at the intersection of Indigenous relations, gender, and mining are well documented by the National Inquiry into Missing and Murdered Indigenous Women and Girls' 2019 report. This landmark report highlights instances of greater gender violence in locations near mining sites (National Inquiry of Missing and Murdered Indigenous Women and Girls, 2019). In 2022, Canada is continuing to face the historical truths of discriminatory policies regarding Indigenous Peoples and the gendered impacts of colonization on Indigenous women and girls (National Inquiry of Missing and Murdered Indigenous Women and Girls, 2019; Truth and Reconciliation Commission of Canada, 2015). Furthermore, in 2020 the Mining Association of Canada issued a statement outlining its support of diversity, equity, and inclusion in the mining industry.

2.0 METHODOLOGY

Canadian mining data was gathered, and analysis was conducted from a variety of publicly available sources and largely relies on Statistics Canada source data. Statistics Canada source data are collected from either a census or LFS. Census data are collected in Canada every five years (i.e., 2006, 2011, 2016, 2021); however, 2021 census data will not be available until the fall of 2022. National LFS are conducted monthly and are averaged annually. Both census data and LFS inform the status of mining employment in Canada. Due to the relatively small number of women working in Canadian mining and the nature of LFS, more detailed information is available from census data.

The key data themes collected included the

1. Mapping of mining occupations in the large-scale mining sector
2. State of play of employment in the large-scale mining sector
3. Education and skills of the mining workforce
4. Training for the mining workforce
5. Government policies and spending on education and research and development (R&D).

Where available, time-series data (from 2010 to 2021) was used to show trends over time, and gender-disaggregated data was used to describe the status of women in the Canadian mining sector.

The North American Industry Classification System (NAICS) is used to classify industries in Canada, the United States, and Mexico. NAICS codes are hierarchical and can be used to disaggregate Statistics Canada data by industry. For example, the 2-digit code NAICS 21 incorporates all NAICS 212 data (mining and quarrying) plus NAICS 211(oil and gas extraction data). Statistics Canada allows end users to directly access 2-digit NAICS data, but more detailed NAICS data, such as data coded with 3 digits or higher, is only available by special request. A few relevant NAICS codes in the context of Canadian mining include

- NAICS 21– mining, quarrying, and oil and gas extraction
- NAICS 212 – mining and quarrying (except oil and gas)
- NAICS 2121 – coal mining
- NAICS 2122 – metal ore mining
- NAICS 2123 – non-metallic mineral mining and quarrying
- NAICS 213 – support activities for mining and oil and gas extraction.

Products from the Canadian oil sands (NAICS 211114) in Northern Alberta are extracted using conventional open-pit mining methods. In some instances, oil sands exploration and mining data may be present with Canadian mining data in NAICS 21 data. Because we understand that oil sands extraction is not a focus of this work, we attempted to separate or note data that are inclusive of oil sands mining or oil and gas production. Furthermore, the smelting and refining of mined material (NAICS 331) may be included in some Statistics Canada occupational data or mining company occupational data. Because we understand that smelting and refining are not a focus of this work, we attempted to separate or note data that are inclusive of smelting and refining.

2.1 Mapping of Mining Occupations in the Large-Scale Mining Sector

The mapping of mining occupations in large-scale mining started with a list of 70 relevant mining occupations identified by the MiHR (2018), an organization focused on analyzing labour trends in the Canadian minerals and metals industries. The list of occupations was categorized and mapped onto the National Occupational Classification (NOC) 2011 system by MiHR. The 70 relevant mining occupations were then categorized by Prairie Catalyst to

- Align with the International Standard Classification of Occupations (ISCO) 20082
- Indicate which occupations typically occur in the exploration, construction, and/or exploitation phases of a mine
- Describe the education fields and educational requirements using the Classification of Instructional Programs 2016 (Statistics Canada, 2021)
- Identify the educational fields categories describing the qualifications required for the occupations
- Correspond to a 5-point skill level ranging from management to on-the-job training, defined by MiHR (2018).

Findings from this mapping exercise are presented in Section 3.1 and can be used as a mapping database by the Women and the Mine of the Future Project to compare occupations in other global jurisdictions.

[2] In mapping to ISCO 2008 another 10 occupations were added.

2.2 State of Play of Employment in the Large-Scale Mining Sector

The employment data was used to describe large-scale mining. Data describing the current state of direct employment in the large-scale mining sector was sourced largely from Statics Canada and MiHR and relies heavily on Statistics Canada source data.

As mining resources are managed provincially within Canada, the five provinces in Canada with the highest amount of mining and quarrying (NAICS 212) activity and most consistent availability of LFS data were examined in further detail. Due to the low number of women in mining across Canada, especially when trying to examine by region or by subsector (4-digit NAICS codes), we encountered issues with LFS and data suppression.[3] As such, the regions examined included the provinces of Alberta, Ontario, Quebec, British Columbia, and Saskatchewan, where more mining and quarrying activity occurs. The following list describes the types of employment data, the origin of the Statistics Canada source data, and where data were reported:

1. Overall gender-disaggregated direct employment, as a share of the total employment in large-scale mining (source data: Canada census, reported by MiHR).
2. Gender-disaggregated employment in the following mining activities (source data: Canada census, reported by MiHR):
    a. Exploration
    b. Support services
    c. Manufacturing and fabrication
    d. Mining exploitation/operation.
3. Gender-disaggregated employment in the construction industry[4] (source data: Canadian LFS, reported by BuildForce).
4. Gender-disaggregated employment by types of minerals produced in the country (source data: Canadian LFS, reported by MiHR).
5. Gender-disaggregated employment by geography—that is, by sub-regional level (source data: Canadian LFS, reported by MiHR).

[3] LFS data for Canada, Quebec, Ontario, Alberta and British Columbia are suppressed if the estimate is below 1,500 people, for Newfoundland and Labrador, Nova Scotia, New Brunswick, Manitoba, and Saskatchewan, if the estimate is below 500 people, and for Prince Edward Island, Yukon, Northwest Territories, and Nunavut, if the estimate is below 200 people. For suppression levels within census metropolitan areas and economic regions, use the respective provincial suppression levels above.

[4] Occupational data due to mining construction is not typically distinguished by Statistics Canada and was not reported. Instead, the Country Profile created by the International Institute of Sustainable Development provided gender-disaggregated data to describe the Canadian construction industry.

6. Gender pay gap, by level of responsibility (source data: The Canadian Conference Board of Canada and Statistics Canada, reported by Women in Mining [WIM] Canada and MiHR) (Women in Mining, 2010).

A second set of data was used to describe gender-disaggregated leaders in key ministries, mining associations, and corporate boards. Gendered leadership data was largely sourced from publicly available reports and websites. The following list describes the types of gendered leadership data, source data, and how data was collected:

1. Gender-disaggregated employment in key ministries responsible for mining and Canadian mining associations (Source data: Public ministry or mining association websites).
2. Gender-disaggregated board composition (Source data: Regulatory corporate reporting, reported by Osler).

In total, the gender data from six leaders of mining ministries were collected from 2010 to 2020. The six leaders included the federal mining minister, deputy minister, and provincial mining minister from the provinces of British Columbia, Saskatchewan, Ontario, and Quebec. Next, leadership data were also collected from publicly available websites to describe the national leaders for six Canadian mining associations. The six national mining associations included WIM Canada, Prospectors and Development Association of Canada (PDAC), Canadian Institute of Mining, Metallurgy and Petroleum (CIM), and the Mining Association of Canada. Two levels of governance were reported for both CIM and the Mining Association of Canada. Data on the regional organizations of WIM Canada or CIM and provincial mining associations were not collected. Finally, regulatory reporting was used to describe the board composition of Canadian mining corporations relative to other Canadian corporations.

2.3 Education and Skills of the Mining Workforce

Gender-disaggregated education and skills data and analysis were sourced from MiHR and are based on 2016 Canadian census data. Gender-disaggregated data and analysis gathered include the

1. Share of women in the labour force by broad occupational category
2. Representation of women in the mining labour force by skill level
3. Select occupations with the largest gaps in the share of women
4. Share of the mining workforce per level of education, including
    a. Primary level (elementary)
    b. Secondary level (equivalent to the end of high school)
    c. Technical and vocational training (college or trades)

        i. Distinguished into categories of apprenticeship or trades and college, CÉGEP[5], or other non-university certification
    d. Tertiary level (university degree).

5. Field of education, split between science, technology, engineering, and math (STEM) and non-STEM education.

Of note, Statistics Canada and MiHR data typically report role or profession but not both together; some disaggregated data may not be available as a result. The mapping database, described in Section 3.1, can be used to infer role or profession.

2.4 Training for the Mining Workforce

Data on the training of the mining workforce were provided by reviewing mining companies' annual sustainability reports. Many mining companies operating large-scale mines in Canada are multi-national organizations and produce annual sustainability reports. The types of data provided in sustainability reports vary by organization, so a case study of one select company, Teck Resources Ltd. (Teck), is used to highlight approaches. Data collected in this case study included

1. Annual spending on training
2. Average hours of training per employee
3. Descriptions of training programs, including equity, diversity, and inclusion (EDI) initiatives and targeted employees.

2.5 Government Policies and Spending on Education and R&D

Federal government spending on STEM education and R&D is reported by the Natural Sciences and Engineering Research Council of Canada (NSERC). In addition, provincial and territorial governments may commit additional funds to STEM and R&D in their jurisdictions. Government spending on R&D will focus primarily on federal government funding.

Federal government spending on resources and energy includes

4. Direct funding, researcher and student support, industrial partners and their funding contributions
5. Total government spending on R&D.

[5] CÉGEP is a 2–3-year post-secondary education program unique to the province of Quebec.

3.0 FINDINGS

3.1 Mapping of Mining Occupations in the Large-Scale Mining Sector

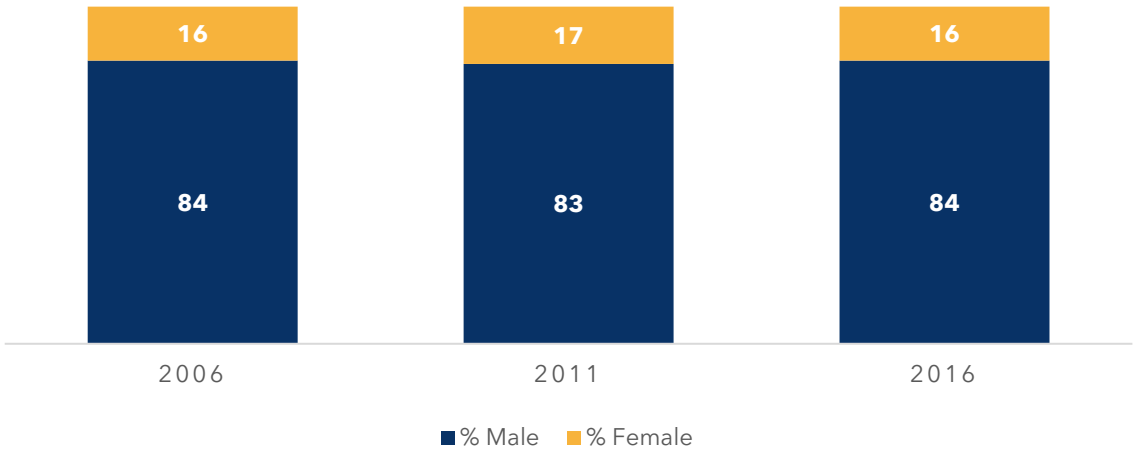
The resulting mapping exercise of occupations in large-scale mining can be used as a database to interpret Canadian mining data and analysis and relate it to other nations' data. The mining occupation mapping database is available in Appendix A.

3.2 State of Play of Employment in the Large-Scale Mining Sector

3.2.1 Employment in Mining

MiHR (2021b) reports that the Canadian mining industry (NAIC 212) employed 60,000 people as of November 2021. Women's employment in the Canadian mining, quarrying, and oil and gas industries (NAIC 21) has increased from 15% in 1987 to 19% in 2020 (Mining Industry Human Resource Council, 2018). However, the share of women's employment based on NAIC 212 (mining and quarrying only) from the last three censuses shows little to no change over a 10-year period (see Figure 3). Canadian 2021 census data will be released in the fall of 2022.

Figure 3. Gendered direct employment in the Canadian mining industry

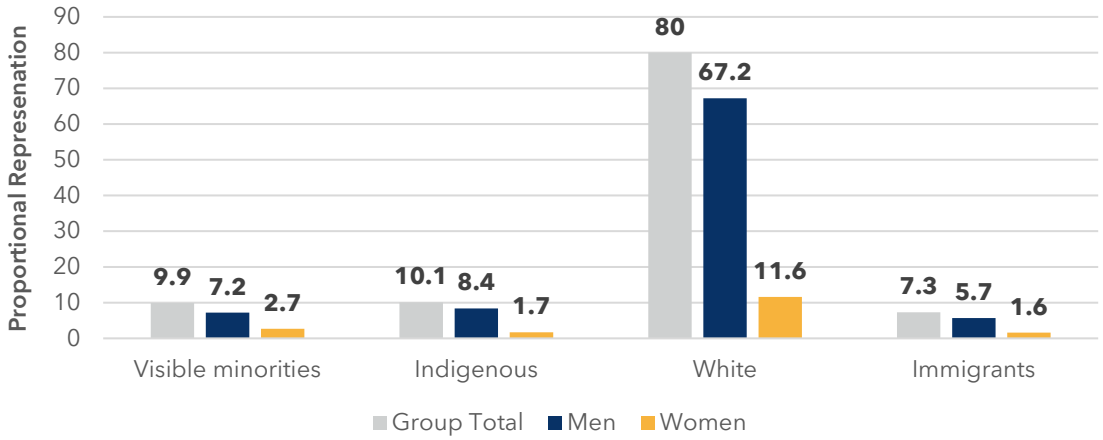


Source: Census (Mining Industry Human Resource Council, 2018).

MiHR's Interactive Labour Market Dashboard draws from monthly LFS results. As of November 2021, women represented 17.3%, Indigenous people represented 10.1%, and

immigrants[6] represented 7.3% of the mining and quarrying (NAIC 212) workforce. Furthermore, Indigenous women's representation is approximately 17% of the Indigenous mining workforce, immigrant women's representation is 22% of the immigrant mining workforce, and visible minority[7] women's representation is 27% of the visible minority mining workforce (Mining Industry Human Resource Council, 2020b; Ng & Gagnon, 2020). The proportional representation of women and equity-seeking groups is shown in Figure 4.

Figure 4. Intersectional employment in the Canadian mining industry



Source: 2016 census data (Mining Industry Human Resource Council, 2020b; Ng & Gagnon, 2020).

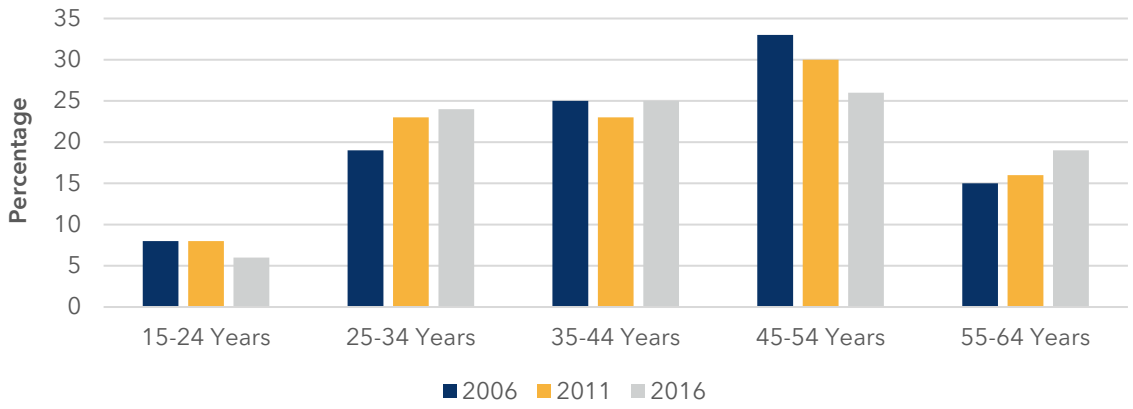
From 2010 to 2020, 98.7% of people in mining worked in full-time roles (Statistics Canada, 2022b). Over that same period, women's representation in full-time mining work has averaged 12.5% of the workforce, and women have represented up to 40% of the part-time workforce (Statistics Canada, 2022b).

The Canadian mining workforce is continuing to age, as shown in Figure 5. MiHR (2018) projects an increasing need for more workers as the current mining workforce nears retirement age. Equivalent gendered LFS data by age was not readily available due to data suppression. Future work could explore gender- and age-disaggregated 2021 census data.

[6] Statistics Canada defines an immigrant as a person who is, or who has ever been, a landed immigrant or permanent resident. Such a person has been granted the right to live in Canada permanently by immigration authorities. Immigrants who have obtained Canadian citizenship by naturalization are also included in this group.

[7] Visible minorities in the Employer Equity Act are defined as persons, other than Aboriginal peoples, who are non-Caucasian in race or non-white in colour.

Figure 5. Canadian mining workforce by age

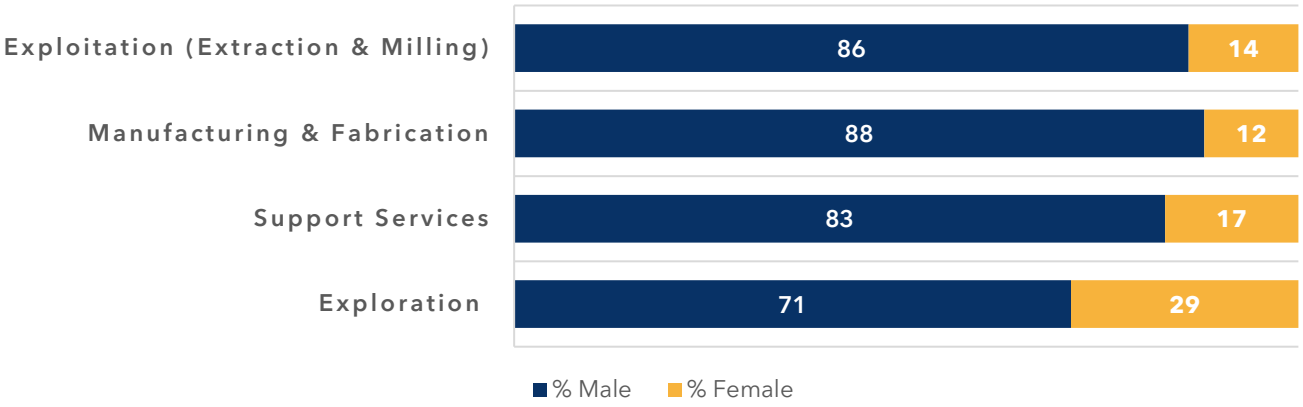


Source: Census (Mining Industry Human Resource Council, 2018).

3.2.2 Employment by Mining Activities

Women's representation varies across specific mining activities, such as exploration, support services, manufacturing and fabrication, and mining operations. As shown in Figure 6, women are most involved in exploration activities and least involved in manufacturing and fabrication. In Canada, women tend to be better represented in fields such as geoscience and less represented in the trades. Further discussion of occupations by mining activity can be found in Section 3.1.

Figure 6. Gendered employment by mining activity



Source: 2016 census (Mining Industry Human Resource Council, 2018).

3.2.3 Employment in the Construction Industry

According to BuildForce (2021), women's employment in the Canadian construction industry is currently 13%. Specific data on employment related to mining construction or gendered employment in mining construction are not available. Canadian construction-

related data are categorized by residential, industrial, commercial, institutional, and infrastructure construction. Mining-related construction is commonly related to industrial or infrastructure. Industrial construction activities would be conducted in proximity to the mine or processing facilities, while infrastructure activities could be related to bringing services and access to the mine site.

3.2.4 Employment by Types of Minerals Produced in-Country

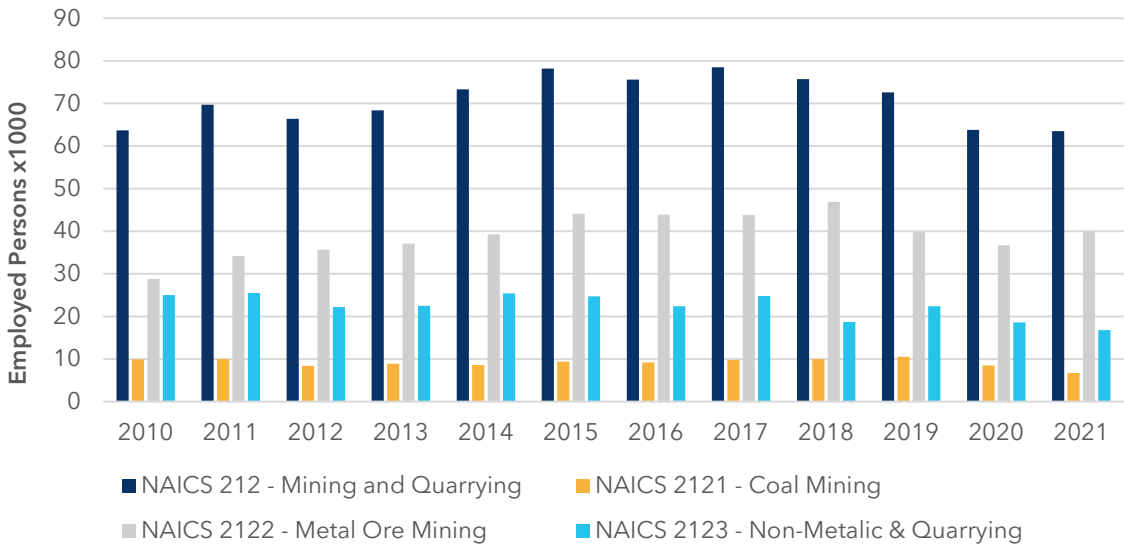
Data related to employment by mineral type is not readily available from publicly accessible LFS. The NAICS 4-digit codes distinguishing the sub-sectors in mining are shown in Table 1. Furthermore, overall employment in Canadian mining and quarrying is shown in Figure 7. Between 2010 and 2020, of the workers employed in mining and quarrying, 55% were in metal ore, 32% were in non-metallic and quarrying, and 13% were in coal.

Table 1. Quantity of mines in Canada by mineral type

	Quantity of mines in Canada	NAICS
Metal mines and mills	87	2122
Non-metal mines	91	2123
Coal & oil sands mines	27	2121

Source: Nov 2021 LFS (Mining Industry Human Resource Council, 2021b).

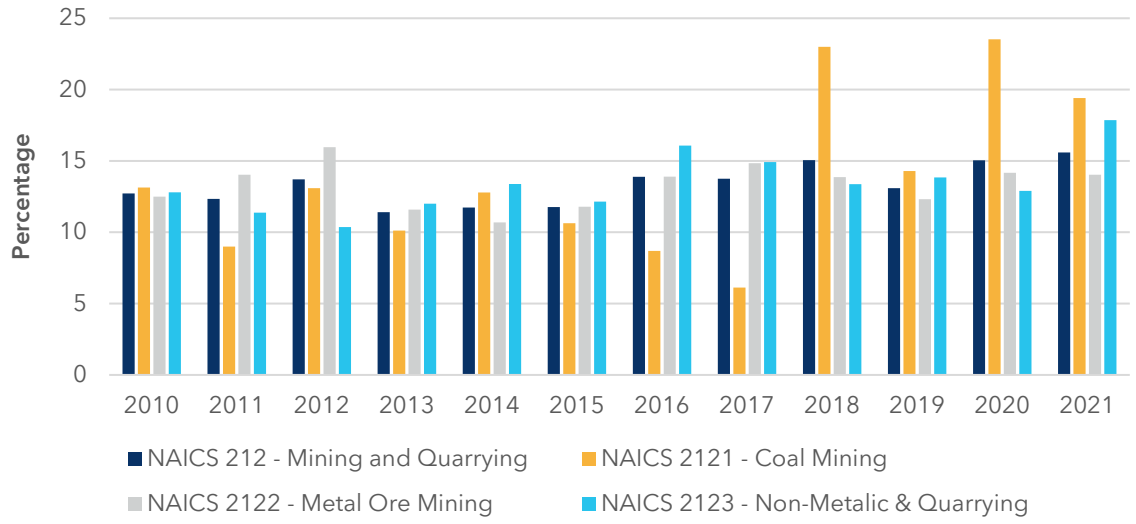
Figure 7. Mining and quarrying (NAICS 212) employed persons by subsector



Source: LFS (Statistics Canada, 2022a).

Gendered employment in mining by subsector is shown in Figure 8. Annual fluctuations of employment impacting women appear to be the largest in coal mining; however, this is likely due to an LFS data suppression error because of the lower numbers of women working in coal mining. The only true data points for women in coal mining are the peaks shown in 2018 and 2020. The other annual points were calculated based on estimations of overall and male employment in coal mining. In general, as we try to dig deeper to understand women's employment by mining sub-sectors, there are higher instances of data suppression when using LFS.

Figure 8. Mining and quarrying (NAICS 212)-employed women by subsector

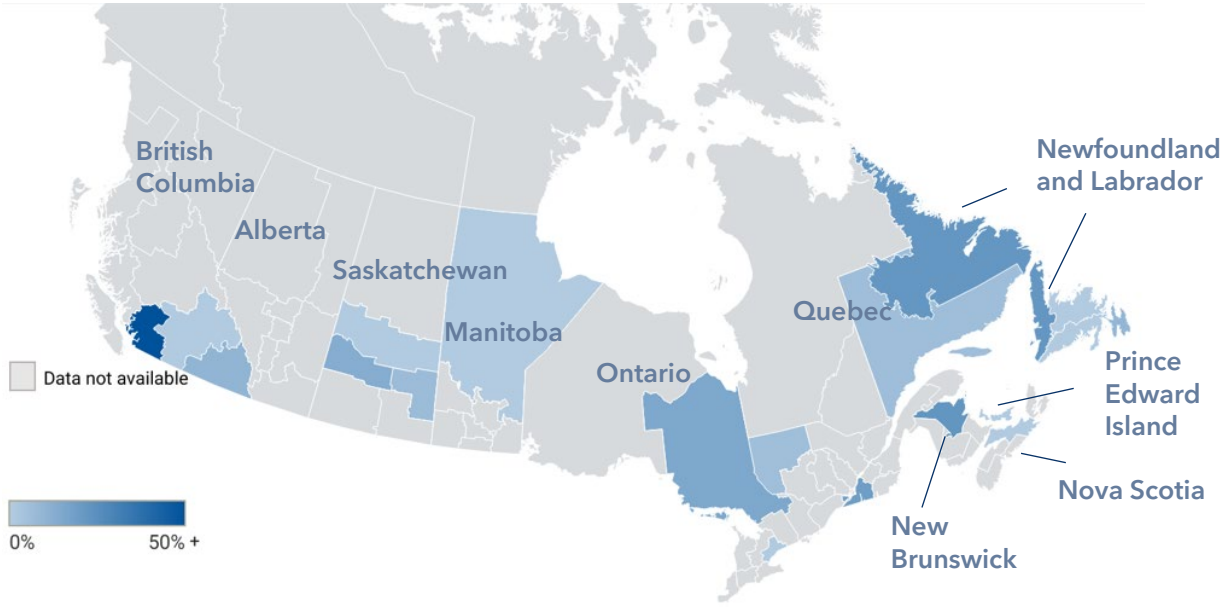


Source: LFS (Statistics Canada, 2022a).

3.2.5 Employment by Regions

MiHR's (2021b) Interactive Labour Market Dashboard, shown in Appendix B, provides a window into recent LFS data relevant to the mining sector (NAIC 212). Further refinement of the dashboard highlights regions with higher employment of women, as shown in Figure 9. This dashboard can be a useful tool to monitor potential changes in regional employment, critical occupations, and the representation of underrepresented groups, such as women, Indigenous Peoples, and immigrants.

Figure 9. Mining and quarrying (NAICS 212) women's share of the mining labour force

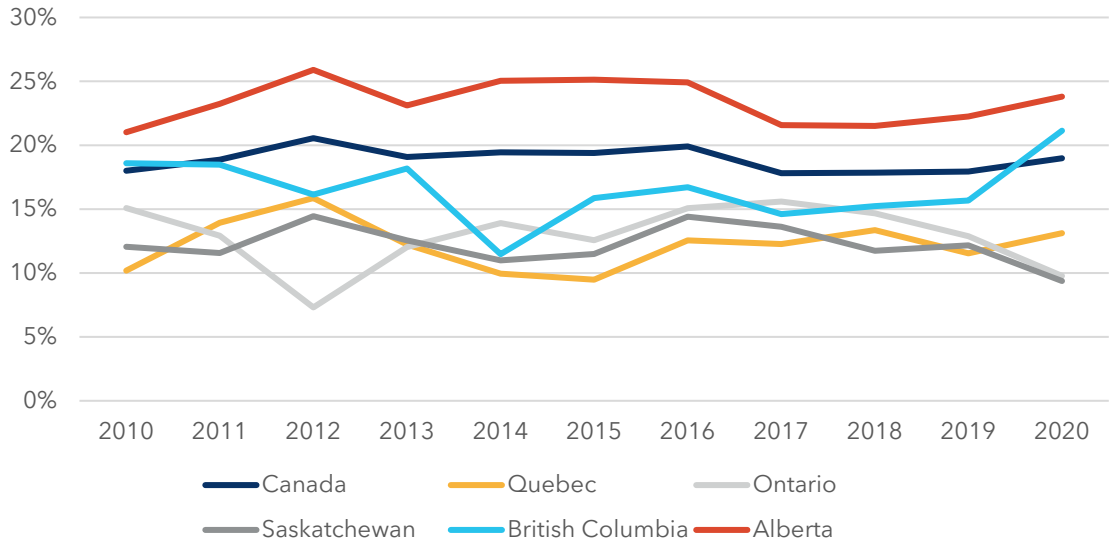


Source: Q3 2021 LFS (Mining Industry Human Resource Council, 2021b).

One notable difference in the regional employment of women is the relatively higher concentration of women, shown by darker shades of blue, in the lower mainland of British Columbia. The higher concentration of women in the lower mainland is likely due to a higher proportion of women employed in exploration and mining corporate offices, which tend to be concentrated in the Vancouver area. However, due to the nature of monthly LFS data and the low relative representation of women, there is a potential for large swings from month to month. Future work could explore 2021 Canada census data in the regions where women's employment in mining is proportionally higher to further understand women's employment trends, especially in connection with pandemic impacts and opportunities for remote work.

From both the MiHR interactive dashboard and the annual Canadian Mining Labour Market Outlook's resources (Mining Industry Human Resource Council, 2017, 2018), five regions in Canada were examined: Alberta, Ontario, Quebec, British Columbia, and Saskatchewan. Alberta, which is the largest producer of oil and gas in Canada, has the highest percentage of women employed in mining, quarrying, and oil and gas (NAICS 21) compared to all other regions (see Figure 10). A portion of Alberta's oil and gas is produced using conventional open-pit mining methods in the oil sands; however, oil sands production is categorized as oil and gas, not mining, by Statistics Canada.

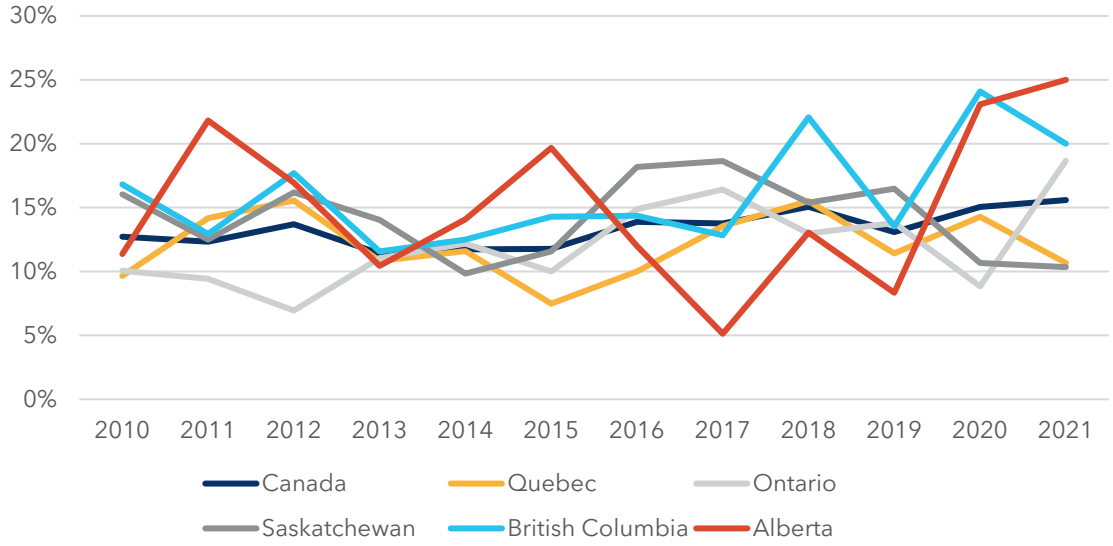
Figure 10. Women employed in the Canadian mining, quarrying, and oil/gas sectors by key regions



Source: Annualized LFS 2010–2020 (Statistics Canada, 2021).

A mining and quarrying (NAICS 212)-only view of women's employment is shown in Figure 11. Due to the nature of LFS data and the relatively lower number of women working in mining, there are larger fluctuations in data as we dig down into regional or sub-sections of the mining industry.

Figure 11. Women employed in Canadian mining and quarrying by key regions

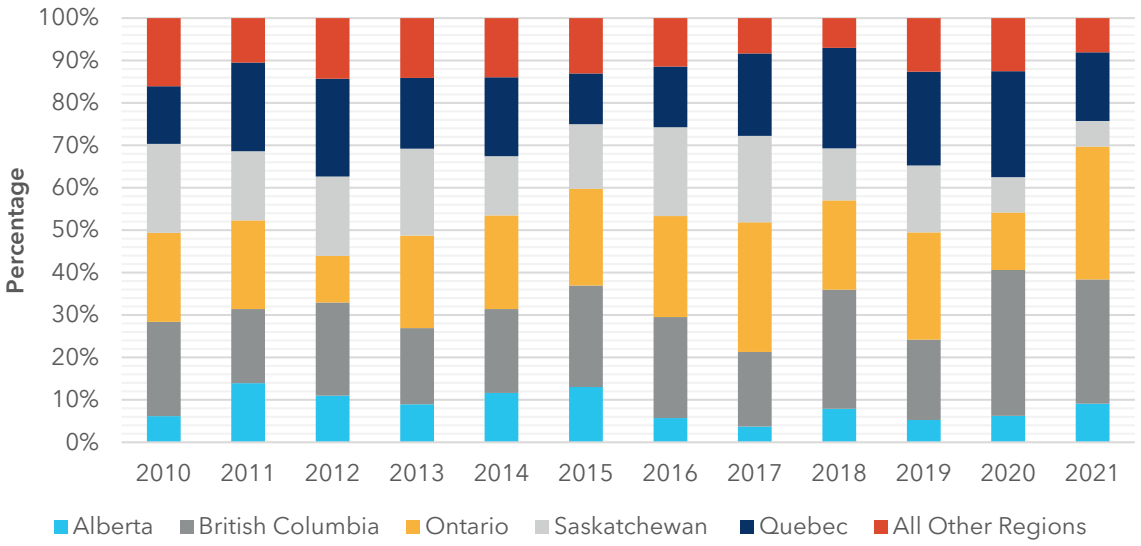


Source: Annualized LFS 2010–2021 (Statistics Canada, 2022a).

Women in mining and quarrying had the highest representation in British Columbia's mining and quarrying sectors at an average of 16% from 2010 to 2021. An overview of which jurisdictions women are employed in the Canada resource sector (NAICS 212) is

shown in Figure 12. Similar to the effects seen in LFS sub-sectors when we try to look into regional details, we see more swings in jurisdictions with a lower representation of women, such as Saskatchewan.

Figure 12. Where women are employed in Canadian mining and quarrying by key regions



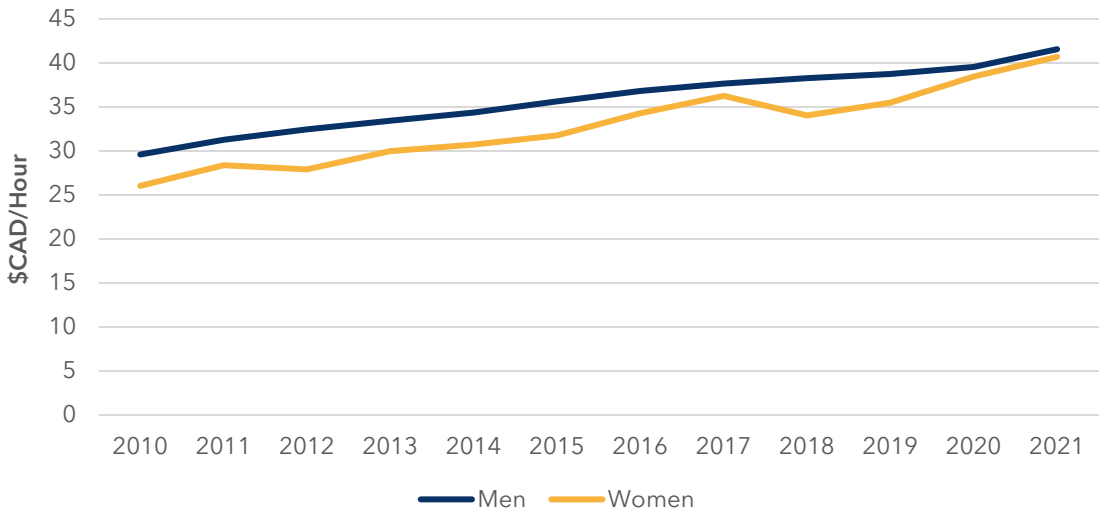
Source: Annualized LFS 2010–2021 (Statistics Canada, 2022a).

3.2.6 Gender Pay Gap and Level of Responsibility

Gendered pay gaps are seen across all Canadian sectors and regions. Previous research has explored Canadian gender pay gaps that may be due to differences in age, occupations, level of education, or skill level; however, a portion of all gendered pay gaps remains unexplained. Furthermore, gendered pay gaps are larger for women who are also Indigenous, a visible minority,7 or disabled (Pay Equity Task Force, 2004).

LFS data highlighting wage gaps in the mining and quarrying sector (NAICS 212) in Canada are not readily accessible and were obtained by a special data request from Statistics Canada. As shown in Figure 13, the wage gap between men and women in Canada has persisted for many years, and hourly differences in pay appear to be narrowing only since 2020. Our analysis also found that between 2010 and 2020, women working full-time in Canadian mining worked an average of 2.9 hours per week (6.5%) less than men (Statistics Canada, 2022b). From 2010 to 2020, women also earned an average of $3.1/hour (CAD) less than men or 9% less per hour, and, as a result, women earned 14.8% less per week than men in mining over this 10-year period (Statistics Canada, 2022b). We were not able to analyze LFS by age category and wage due to data suppression caused by the lower number of women working in mining and quarrying (NAICS 212).

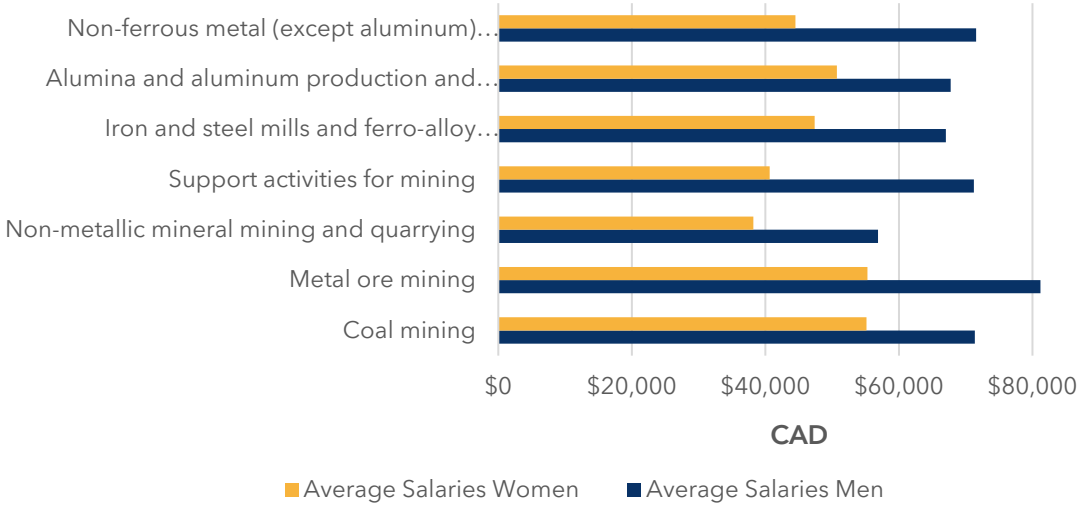
Figure 13. Canadian mining and quarrying (NAICS 212) average hourly wage rate by gender



Source data: (Statistics Canada, 2022b).

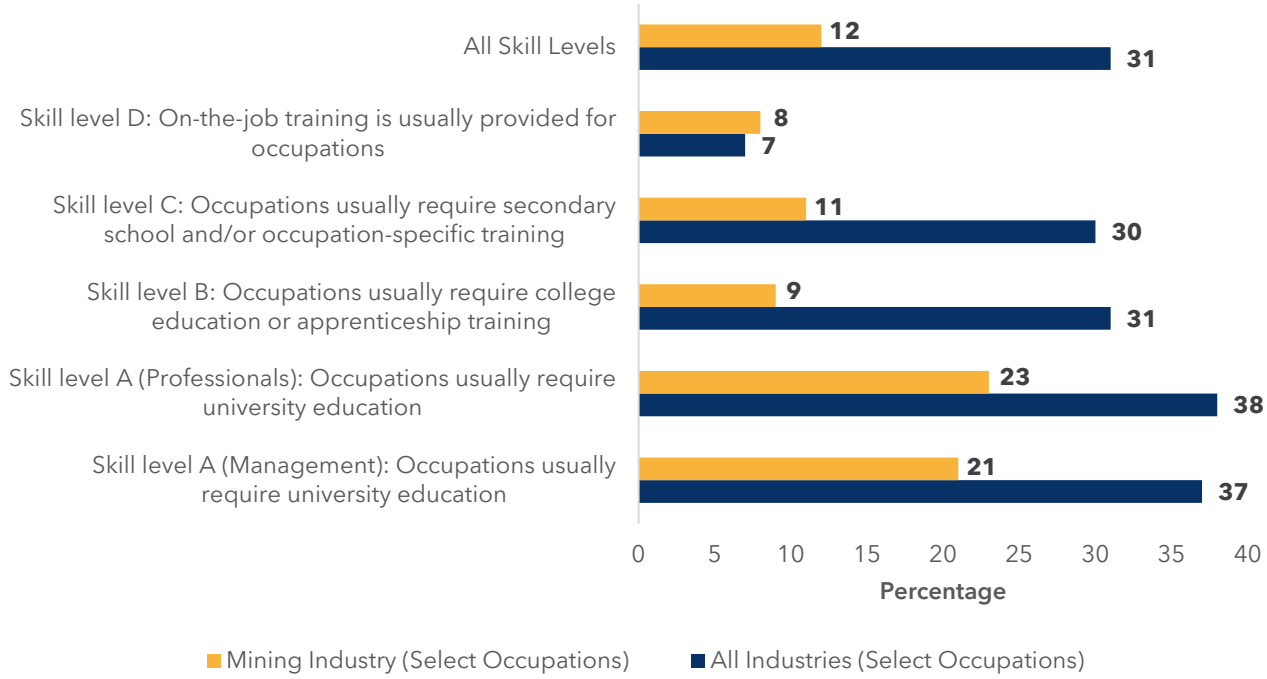
Many previous studies have highlighted persistent gender gaps in pay across Canadian sectors and occupations. A 2010 study by WIM (Figure 14) highlighted average wage gaps of 32% by gender and mining activities. Based on our analysis, there is a possibility that the wage gap has narrowed since 2010.

Figure 14. The 2010 gender wage gap in the mining and exploration sector



Source: Women In Mining, 2010.

Figure 15. Representation of women in the mining labour force for select occupations by skill level



Source: 2016 census (Mining Industry Human Resource Council, 2018).

As shown in Figure 15, women in mining are underrepresented at nearly all skill levels when compared to all other industries in Canada. Women have the highest representation in professional and management roles at 23% and 21%, respectively (MiHR, 2018). Both professional and management roles tend to require university education and tend to be higher paid than lower-skilled roles. Further details on occupation, education, and skills will be discussed in Section 3.3.

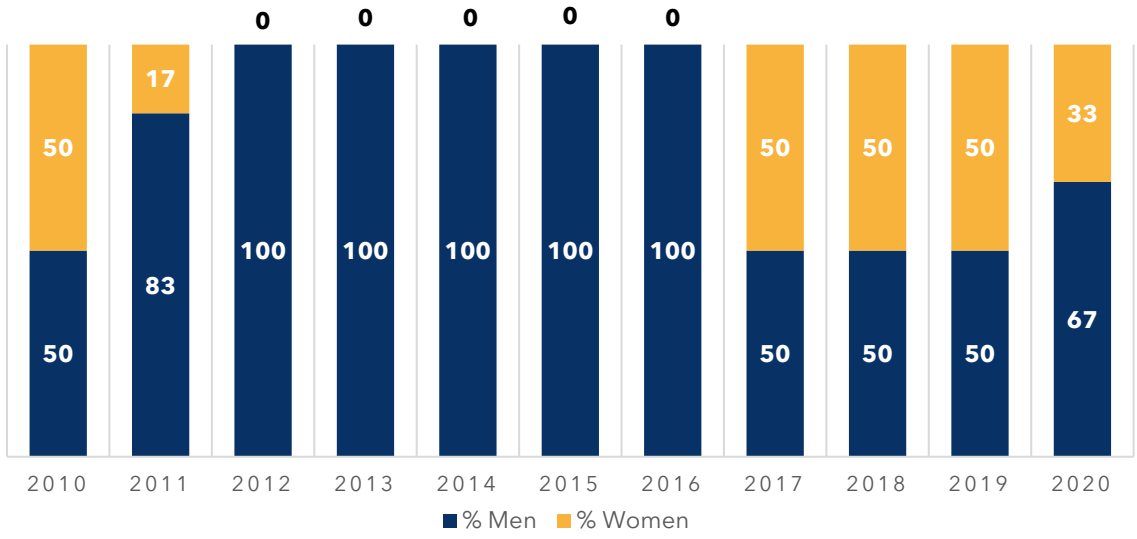
3.2.7 Employment in Key Ministries and Associations

The gender of the top elected officials responsible for five mining-related ministries was retrieved from public websites for the federal government and the provinces of British Columbia, Saskatchewan, Ontario, and Quebec. In addition, Natural Resources Canada (2021) reports who held the deputy minister's role—a top public servant role—from 2010 to 2020. A summary of the gender of these six public ministry officials is shown in Figure 16.

A number of mining associations work to foster the sharing of best practices between industry members and/or advocate on behalf of the industry with policy-makers. In Canada, these organizations include WIM Canada, PDAC, CIM, and the Mining Association of Canada. The gender of the leaders at the federal level of these associations is shown in Figure 17. The findings from the gender composition of mining associations' boards show a higher gender representation for women than Canadian mining

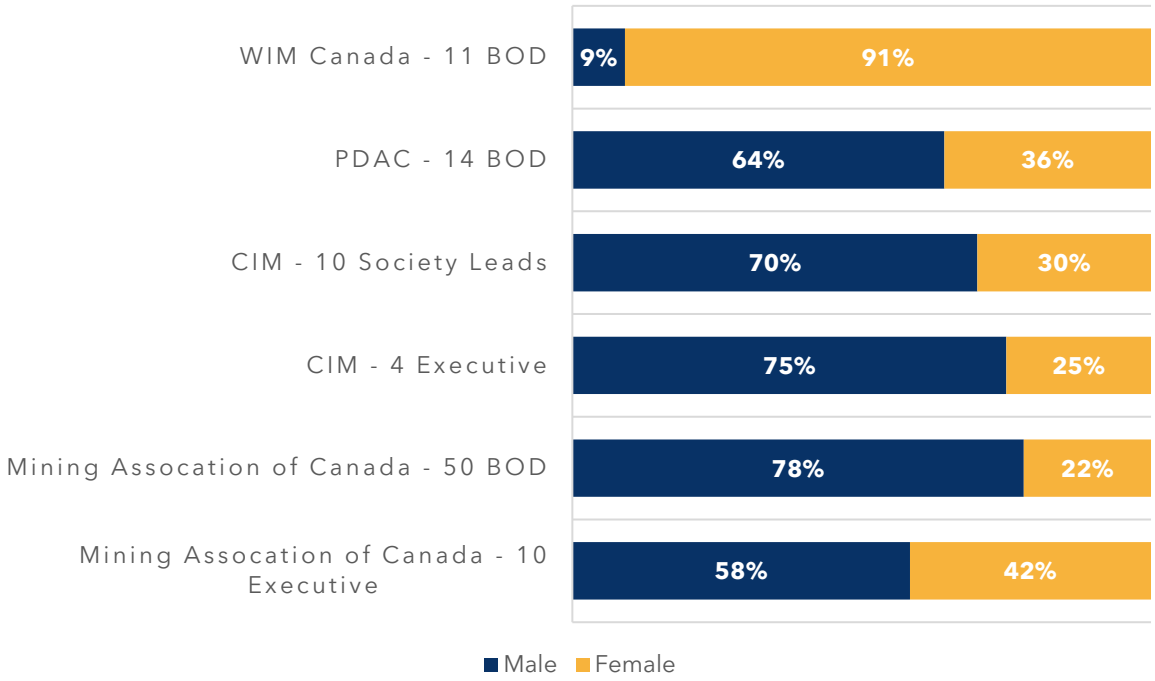
corporations' boards (20%). Furthermore, many of these associations have exceeded the 30% threshold thought to indicate a sustainable level of women's representation. Further analysis of Canadian corporate boards is discussed in Section 3.2.8.

Figure 16. Gender of six public leaders of mining ministries at the federal level in British Columbia, Saskatchewan, Ontario, and Quebec from 2010 to 2020[8]



[8] Data source: British Columbia. (2021). *Ministry of energy, mines and low carbon innovation*. https://www2.gov.bc.ca/gov/content/governments/organizational-structure/ministries-organizations/ministries/energy-mines-and-petroleum-resources, Natural Resources Canada. (2021). *Former deputy ministers of NRCan*. https://www.nrcan.gc.ca/former-deputy-ministers/10861, Ontario. (2021). *Ministry of Northern development, mines, natural resources, and forestry*. https://www.ontario.ca/page/ministry-northern-development-mines-natural-resources-forestry, Québec. (2021). *Ministry of energy and natural resources*. https://mern.gouv.qc.ca/en/, Saskatchewan. (2021). *Ministry of energy and resources*. https://www.saskatchewan.ca/government/government-structure/ministries/energy-and-resources, Wikipedia. (2021). *Minister of Natural Resources*. https://en.wikipedia.org/wiki/Minister_of_Natural_Resources.

Figure 17. Gendered leadership in select Canadian mining associations (2021)[9]



3.2.8 Board Compositions

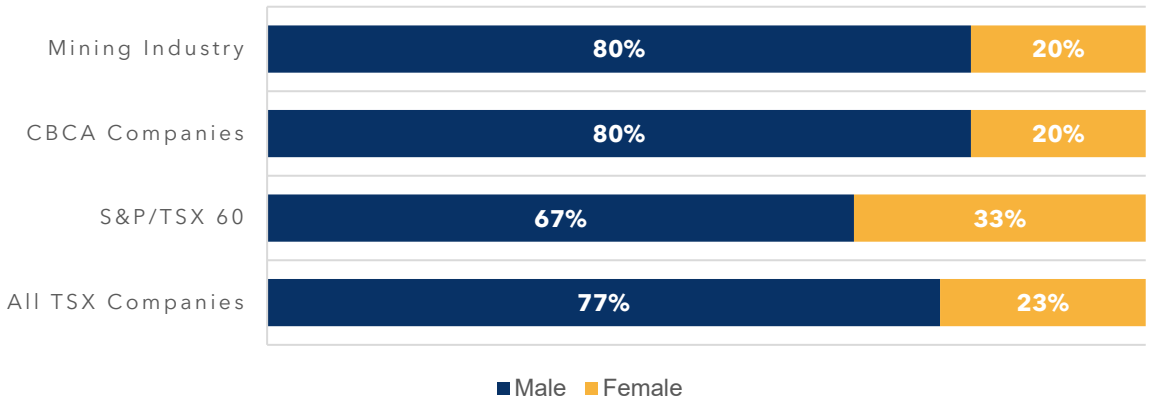
Publicly traded corporations in Canada are regulated to disclose the representation and strategies to increase the representation of equity-seeking groups defined by the Employment Equity Act. The four equity-seeking groups in Canada are

- Women
- Indigenous Peoples (First Nations, Inuit, and Métis)
- Persons with disabilities
- Members of visible minorities.[7]

The Toronto Stock Exchange (TSX) has required disclosure from listed companies since 2015. Disclosure requirements for corporations subject to the Canadian Business Corporations Act (CBCA) came into effect in 2020. The average gendered composition of Canadian mining industry corporations is compared to companies listed with the TSX and CBCA in Figure 18. Currently, the board diversity of the Canadian mining industry is lagging behind TSX-listed companies; however, there is higher representation on the boards than in the overall Canadian mining workforce.

[9] Data source: CIM. (2021). Website. In, Mining Association of Canada. (2021). *Website*. https://mining.ca, PDAC. (2021). *Website*. https://www.pdac.ca, Women in Mining Canada. (2021). *Women in Mining Canada webpage*. http://wimcanada.org

Figure 18. 2020 gendered board composition in Canada



Source: Osler, 2021

Apart from gender, Canadian boards lack representation from the other equity-seeking groups. Osler (2021) reports that members of visible minorities fill 6.8% of board seats, while Indigenous Peoples and persons with disabilities fill 0.5%. Gender-disaggregated board data is not available for all equity-seeking groups.

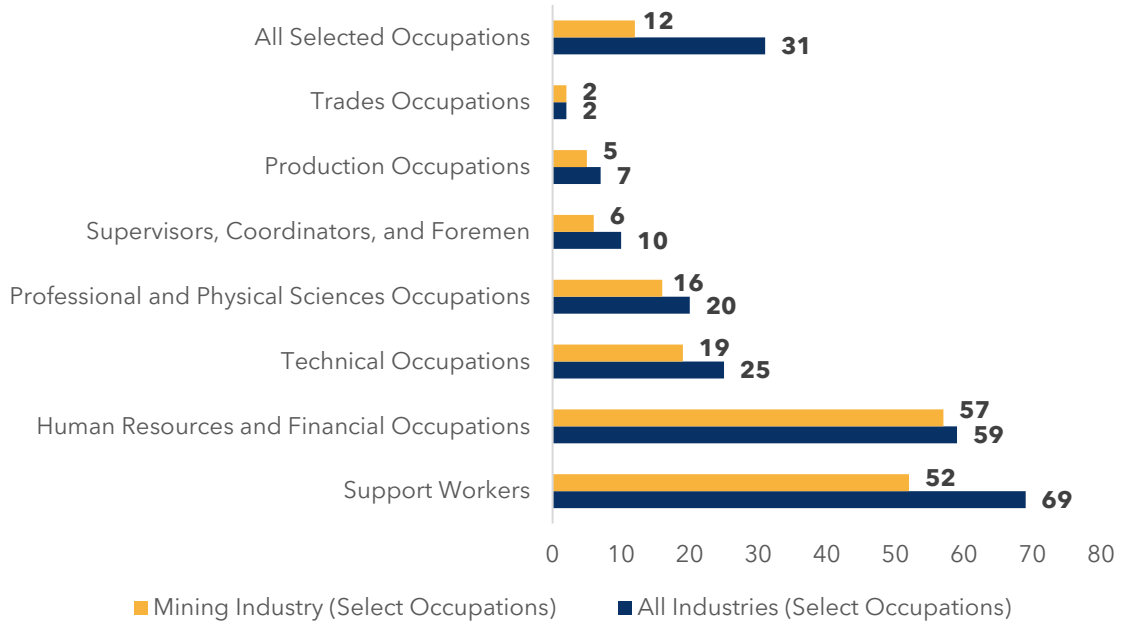
3.3 Education and Skills of the Mining Workforce

The education system in Canada consists of primary (elementary), secondary (high school), and post-secondary education. 2016 census data showed that 79.3% of Canadians completed high school, which is generally a prerequisite for entering a post-secondary institution. Post-secondary institutions consist of universities and colleges. Universities can grant degrees, including bachelor's, master's, and Ph.D. Colleges administer programs that tend to focus on practical or hands-on skills, resulting in certificates or diplomas. In the province of Quebec, high school ends at grade 11 rather than grade 12 in the rest of Canada. Quebec students can then attend CÉGEP. CÉGEP provides either 2 years of pre-university or 3 years of technical education. Post-secondary completion in Canada for those aged 25 to 34 has increased from 59% in 2000 to 73% in 2019 (Zeman & Frenette, 2021). Women aged 25 to 34 are more likely to have a college diploma, certificate, bachelor's, master's, or Ph.D. degree than men aged 25 to 34 (Zeman & Frenette, 2021). The only Canadian post-secondary institutions in which men aged 25 to 34 outnumber women are trade schools (Zeman & Frenette, 2021).

Nearly 50% of the employees in the Canadian mining industry have some level of post-secondary education (Mining Industry Human Resource Council, 2021b). MiHR also reports that women in the Canadian mining sector tend to have higher levels of education, which resulted in women in mining having lower unemployment rates than women in other sectors during the COVID-19 pandemic (Mining Industry Human Resource Council, 2021c).

Occupations present in the Canadian mining industry tend to have a lower representation of women than is present in other Canadian industries (see Figure 19). As was shown in Figure 15, there is also a lower representation of women by nearly all skill levels in the mining industry compared to the rest of the Canadian workforce. The one exception is that women in mining are represented at similar levels to the rest of the Canadian workforce for skills requiring on-the-job training. Future work could explore 2021 census data to better understand factors such as age, profession, and leadership roles for women in mining.

Figure 19. MiHR's (2018) analysis of women in the labour force by broad occupational category



Source: 2016 census.

Table 2 summarizes select occupations with the largest gender gaps and has been mapped to the minimum educational requirements. Findings from this table indicate gender biases and other gendered barriers that may prevent women from working in mining occupations relative to similar occupations in other industries. Gender bias will be further explored in Section 4.

Table 2. Select occupations with the largest gender gaps in the share of women

Select occupations (NOC 2011)	Occupational gaps (other industry % - mining %)	Educational fields	Min. educational requirements
1,523 production logistics coordinators	27%	Entry level	**Skill level D:** on-the-job training is usually provided for occupations
0112 human resources managers	14%	Business school	**Skill level A (professionals):** occupations usually require a university education
1,525 dispatchers	14%	Entry level	**Skill level D:** on-the-job training is usually provided for occupations
1,526 transportation route and crew schedulers	10%	Entry level	**Skill level D:** on-the-job training is usually provided for occupations
0111 financial managers	9%	Business school	**Skill level A (management):** occupations usually require a university education
1,121 human resources professionals	9%	Business school	**Skill level A (professionals):** occupations usually require a university education
2,112 chemists	9%	STEM	**Skill level B:** occupations usually require a college education or apprenticeship training
2,263 inspectors in public and environmental health and occupational health and safety	8%	STEM	**Skill level A (professionals):** occupations usually require a university education
2,121 biologists and related scientists	7%	STEM	**Skill level A (professionals):** occupations usually requira e university education
2,255 technical occupations in geomatics and meteorology	7%	Technician	**Skill level B:** occupations usually requira e college education or apprenticeship training

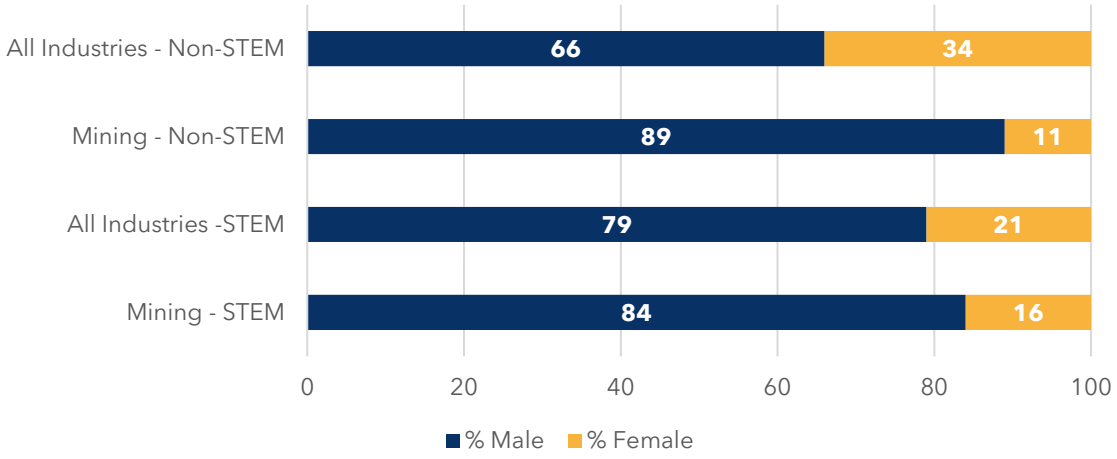
Source: 2016 Canada census (Mining Industry Human Resource Council, 2018).

While much focus has been put on attracting STEM-trained women into mining, with a particular focus on engineering, there are clear opportunities for mining to expand the number of women it attracts. Results from Table 2 indicate opportunities for the mining industry to expand the recruitment of women to business schools, in occupations such as finance and human resources, and to science programs, such as biology and chemistry.

Furthermore, by introducing remote operating centres, more women could be targeted for dispatch roles.

Finally, looking at STEM- or non-STEM-related fields, the Canadian mining industry has a lower representation of women in STEM and non-STEM fields than other industries (see Figure 20). Proportionally there are a greater number of STEM-trained women than non-STEM-trained women in the Canadian mining industry.

Figure 20. Women in STEM and non-STEM



Source: 2016 census (Mining Industry Human Resource Council, 2018).

The underrepresentation of women in STEM and non-STEM roles in mining compared to other sectors could be explained by research that shows women who are the "only" women in a department are more likely to face biases and discrimination than women who work with other women (McKinsey & Company & LeanIn.Org, 2021). A recent report by Elizabeth Broderick & Co. (2022) indicated that the prevalence of workplace bullying is higher for women (46.8%) in mining in Canada compared to men (43.3%). Also, this report showed that 27.1% of Canadian women in mining experienced sexual harassment compared to 5.0% of men and that these incidents are less likely to be reported or resolved (Rio Tinto & Elizabeth Broderick & Co, 2022). Lastly, the report highlighted that racism in Canadian mining was experienced by 14.7% of those working in a country different from that of their birth compared to 4.3% of those working in their birth country (Rio Tinto & Elizabeth Broderick & Co, 2022). Gender bias, discrimination, and harassment will be further explored in Section 4.

3.4 Training for the Mining Workforce

Data regarding the types of training provided to employees are available by business size and industry from Statistics Canada; however, the data are not gender disaggregated. As such, a case study approach was used to report on training for the mining workforce.

Mining organizations typically report on training in annual sustainability reports. Annual training is often mandatory for health and safety, and can also be for codes of conduct or business ethics. Increasingly, organizations are highlighting EDI and Indigenous awareness training in sustainability reports as they develop strategies to increase the representation of historically underrepresented groups such as women and Indigenous people. As a result, respectful workplace training, anti-harassment training, and Indigenous awareness training are increasingly being deployed across mining workplaces. Skills-based training strategies are another option to encourage the hiring of lower-skill-level workers and use in-house training, which progresses employees through operational or maintenance roles.

Data were sought to describe the number of people trained (by gender), types of training provided (attendance only; certification provided), and fields in which employees were trained. The reality is that many organizations are not publicly reporting training data disaggregated by region, commodity, gender, and type of training. Annual sustainability reports also may not be available beyond 5 years on a company's public website.

As an example, Teck (2020) reports on both its investment in training (see Table 3) and average hours of training per employee (see Table 4). Note that the data shown are not disaggregated by country; however, 80% of Teck's employees are located in Canada. The author reviewed a few other mining companies' sustainability reports and did not find relevant examples to share in this report that encompass both gender and Canadian mining.

Table 3. Teck's (2020) investment in training

	2015	2016	2017	2018	2019	2020
Dollars spent on training across the company (millions)	$9	$32	$38	$43	$48	$34

Table 4. Teck's (2020) average hours of training per employee

	2017		2018		2019		2020	
Type	Male	Female	Male	Female	Male	Female	Male	Female
Hourly	98	104	56	77	128	115	68	58
Staff	16	19	30	32	32	51	24	17
Total	114	123	86	109	160	166	92	75

3.5 Government Policies and Spending on Education and R&D

Canadian post-secondary education is subsidized by the federal and provincial governments for Canadian students. Federal funding supplements university researchers and students to pursue their studies and advance their knowledge. NSERC is the federal agency that provides funding to STEM fields. A summary of NSERC funding is shown in Table 5. NSERC funding was consistent from 2012 to 2018 and decreased as of 2019. A 2018 report on the state of R&D in Canada indicates that gross domestic expenditures on R&D have been decreasing since 2001 (Council of Canadian Academies).

Table 5. NSERC funding 2012 to 2019

Funding in	2012	2013	2014	2015	2016	2017	2018	2019
Total (millions)	$1,110.0	$1,110.0	$1,110.0	$1,110.0	$1,100.0	$1,200.0	$1,200.0	$1,059.3
Natural resources and energy	21%	19%	19%	18%	20%	21%	20%	15%
Natural resources and energy funding (millions)	$162.2	$159.9	$158.9	$161.0	$158.4	$167.6	$156.7	$155.9
NSERC-funded professors (#)	1,767	1,733	1,755	1,741	1,643	1,661	1,695	1,424
Industrial partners (#)	554	601	657	673	788	765	696	743
Funding contributed by partners (millions)	$42.9	$46.1	$54.3	$60.0	$61.4	$59.5	$59.0	$57.4
Students receiving indirect support (#)	4,566	4,556	4,632	4,823	4,731	4,902	4,335	4,244
NSERC-supported research chairs	155	154	154	154	147	147	101	84

Source: Natural Sciences and Engineering Research Council of Canada, 2019.

Gendered data was not available for NSERC funding for the time period. The Canadian Association of University Teachers (2018) reports that women, Indigenous, and racialized instructors are underrepresented compared to the Canadian labour force and underpaid compared to the majority group of white males. Recent practices adopted by federal post-secondary funding agencies, like NSERC, now require EDI to be considered on all applications; as a result, gender-disaggregated data may be available in future years.

4.0 DISCUSSION

4.1 Gendered Barriers and Equity Systems

Findings from data gathered in this study show that women's representation in the mining industry is slowly trending upwards but has remained relatively unchanged over the last decade (Mining Industry Human Resource Council, 2018). Women in Canadian mining tend to be highly educated (Mining Industry Human Resource Council, 2021c); however, women remain underrepresented and face barriers to accessing leadership roles and equal pay (Mining Industry Human Resource Council, 2018; Women In Mining, 2010). Furthermore, gender bias and instances of inequity impact women's inclusion, reduce their representation in leadership, and limit their sense of belonging in the mining industry (Peltier-Huntley, 2019). Despite these realities, employees in Canadian mining are confident these inequities can be addressed by their employers (Peltier-Huntley, 2019; Rio Tinto & Elizabeth Broderick & Co, 2022), and many employers are responding to societal and investor pressures by developing EDI strategies and policies. Examples of Canadian companies' EDI initiatives are summarized in Appendix C.

Many studies have explored gender bias, discrimination, and harassment as barriers that women face in Canadian mining and traditionally male-dominated sectors (Fouad et al., 2017; Peltier-Huntley, 2019; Rio Tinto & Elizabeth Broderick & Co, 2022; Women In Mining, 2010, 2017). Further equity measures to counter discrimination and harassment will be discussed in Section 4.2. Bias may prevent women from equitable access to mentorship and sponsorship opportunities, which results in fewer opportunities for recognition, compensation, and promotion. Programs such as WIM and Women in Nuclear Saskatchewan's (2021) mentorship program aim to provide women with access to mentors and allow mentors to recognize their potential biases. WIM Canada (2021) and its regional chapters offer opportunities to connect, empower, and support women. WIM organizations are largely run by women volunteers, many of whom are also working full-time in the mining industry. Services offered by WIM organizations across Canada include scholarships, recognition awards, networking events, conferences, education and training, and community outreach.

As a result of the COVID-19 pandemic, many Canadian workplaces have shifted to allow remote and flexible work options. Flexible work has been a long-standing concern raised by women in mining, particularly due to the intersections of having caregiver responsibilities and working in remote locations (Women In Mining, 2010). While flexible work may not be available in all mining occupations or locations, there has been a shift to allow flexibility for many professionals, leaders, and support staff (MiHR, 2021c). Furthermore, MiHR (2021a) reports that remote mining work increased from a pre-pandemic level of 13% to 37% in 2021 and estimates that up to 30% of roles could remain remote following the pandemic. As women employed in Canadian mining tend to be in

professional, leadership, or support staff roles, they have encountered higher retention rates through the pandemic than young workers or Indigenous people (MiHR, 2021a). If flexible and remote work benefits continue to be available to workers following the end of the pandemic, the challenge for women will be to ensure equal opportunities to pay and career advancements (McKinsey & Company & LeanIn.Org, 2021). Due to data suppression concerns with Canadian LFS data and relatively low numbers of women in mining, we will eagerly await the release of 2021 census data in the fall of 2022 to see if corporate and government policies to improve women's retention in mining over the past 5 years have been effective.

4.2 Future Developments in Policy and Data

Recent changes in Canadian policy have the potential to create or enhance data sources to monitor the advancement of women's participation in mining. Key policy areas include

- Reconciliation efforts with Indigenous people
- Improving EDI in workplaces.

As stated previously, in Canada, provincial governments have jurisdiction over natural resource extraction. Mining locations that have had federal government involvement have resulted in intersectional data sources due to their reporting on the impacts on women and girls in local communities, particularly in relation to Indigenous communities (Faircheallaigh, 2013; Hammond, 2015; Nightingale et al., 2017). Furthermore, in 2020, Canada ratified the United Nations Declaration for the Rights of Indigenous peoples. Importantly, the declaration ratification may impact the consultation and approval process for future resource projects with Indigenous communities and allow for greater disaggregated employee and community data, including gendered data.

Furthermore, the Government of Canada (2021) issued a 50-30 challenge in an effort to diversify Canadian workplaces. The 50-30 challenge aims for 50% gender representation and 30% representation of other equity-seeking groups, such as Indigenous Peoples, visible minorities, persons with disabilities, and members of the 2SLGBTQ+ community. However, increasing the representation of equity-seeking groups will also require a shift in workplace culture. Many Canadian mining companies are already working to advance EDI and foster meaningful relationships with Indigenous Peoples (e.g. Agrium, 2016; Barrick, 2017; BHP, 2017; PotashCorp, 2017; Teck, 2017).

Discrimination and harassment in the Canadian mining industry remain large threats to workplace culture. As reported by Elizabeth Broderick & Co. (2022), these incidents are grossly underreported, frequently unresolved, and predominantly impact women more than men. Another nationwide study found that 78% of mining workplace discrimination and harassment incidents went unreported, and only 17% resulted in the aggressor's behaviour stopping (Peltier-Huntley, 2019). Furthermore, many women working in mining

are not protected by labour unions, resulting in them needing to take a larger career risk to report incidents. Proposed changes to legislation, such as Saskatchewan's Employment Act, have the potential to provide a clearer path for reporting and resolving workplace sexual harassment (Djuric, 2021).

Current regional occupational health and safety regulations across Canada give all workers the right to speak up to stop unsafe acts. Provinces also each have separate human rights legislation, which prevents both overt harassment and indirect discrimination. As such, workplace discrimination and harassment are often reported and managed separately from other workplace health and safety incidents. Public data on workplace discrimination and harassment are largely invisible, as corporations do not report these incidents in sustainability reports. Many jurisdictions are incorporating additional measures to support improving workplace psychological health and safety. These measures frequently integrate the National Standard for Psychological Health and Safety into policies and legislation (Canadian Standards Association & Bureau de normalization du Quebec, 2013). Legislative changes which incorporate psychological health and safety are typically enacted either in provincial occupational health and safety legislation (Province of Alberta, 2020; Province of Manitoba, 2021) or worker's compensation legislation (Province of Saskatchewan, 2013). Further considerations of gendered barriers in employment and health and safety legislation may offer preventative and resolution mechanisms for women in mining.

Lastly, as reconciliation efforts between Indigenous and non-Indigenous Canadians and societal EDI efforts continue to progress, there is the potential for a positive impact on gendered reporting, public data availability, and support systems for women in mining.

4.3 Technology Impacts and Gender

A 2020 report by MiHR found that workers with low levels of skills and education are most likely to be impacted by technological advancements and shifts to automation in mining. In particular, those lacking post-secondary education, such as those in manual labour roles—frequently filled by Indigenous people—or administrative roles—often filled by women—are at the highest risk of being impacted by technology adoption and automation (MiHR, 2020a). Findings from MiHR's (2020a) mining automation study recommended the continued diversification of the industry and continued development of necessary skills in the current workforce.

Hiring women from other industries is one potential solution. To attract women from other industries, mining needs to offer flexibility and a psychologically safe working environment. Carrion et al.'s (2021) analysis of remote working in the mining industry indicates a shift toward increased remote working in both mining offices (60–70%) and mining operations (20–30%) in the 6 months following the start of the pandemic. A nationwide study found that only 25% of Canada's tech sector consists of women (Women

in Tech World, 2018). Similar to what has been found in studies in the mining industry, they found that the barriers for women in tech consist of

- Experiences of bias and discrimination
- Organizational culture that does not foster belonging
- Personal barriers of inadequacy due to feelings of isolation in a male-dominated industry
- Lack of support systems and resources in the workplace to advance career
- Lack of education and awareness to support workplace EDI. (Women in Tech World, 2018, pp. 7–8)

Currently, in Canada, there is a federally funded project called Engendering Success in STEM, which aims to increase women's participation in STEM. Engendering Success in STEM (2020) brings together multi-disciplinary researchers and partners from across Canada to test interventions meant to increase female representation in STEM. Engendering Success in STEM (2020) has four sub-projects, which examine gender bias and interventions during childhood, adolescence, university experience, and early-career experience. Of particular interest to the Women and the Mine of the Future Project might be the early-career interventions. The project releases periodic updates on findings throughout the year at https://successinstem.ca.

5.0 POLICY RECOMMENDATIONS

An overall result of the Women and the Mine of the Future Project will include policy guidelines, aimed at governments but also relevant to companies, that will be developed to help harness the potential of women in the large-scale mining sector, at present and in the future. The recommendations offered in Table 6 are linked to documented challenges and opportunities for Canadian women in mining.

Table 6. Policy recommendations

Challenge/Opportunity	Policy recommendation
Challenge: Inconsistency in corporate sustainability reports and a lack of data tables make it difficult to investigate policy impacts by equity-seeking groups or allow analysis by regions.	• Governments and stock exchanges can mandate companies to report disaggregated data tables which allow for manipulation by equity-seeking groups and region • Companies can adopt voluntary measures to report disaggregated data tables which allow for manipulation by equity-seeking groups and region
Challenge: Women in mining have less psychological safety due to higher proportional instances of discrimination and harassment. These incidents are underreported and frequently unresolved.	• Governments can introduce policies and legislation that incorporate workplace discrimination and harassment incident management in occupational health and safety legislation, thereby improving access to justice for women in mining and increasing transparency of psychological safety incidents • Companies can adopt workplace anti-discrimination and anti-harassment policies and training to allow psychological safety incidents to be managed within occupational health and safety programs and systems, thereby increasing transparency and trust in reporting systems
Challenge: Gendered pay gaps reduce the earning power of women in mining.	• Governments can introduce policies to proactively promote pay equity reviews and reporting of mining companies • Companies can adopt annual pay equity reviews which identify and address gendered pay gaps
Opportunity: Organizations such as WIM can provide support, education, and connection for women in mining and their allies.	• Governments can offer funding to support WIM organizations in hiring and retaining staff, thereby reducing dependency on volunteers and the risk of volunteer turnover • Companies can fund WIM organizations directly, support employees to contribute to WIM organizations by offering paid volunteer time and recognizing volunteering activities in annual employee performance reviews • Companies can collaborate with WIM organizations to provide EDI services and training lacking in their organizations

6.0 CONCLUSION

The Canadian Country Report synthesizes mining sector data and prior analysis from a variety of public sources. Key trends for women in Canadian mining are

- Women are employed in all phases of mining yet are persistently underrepresented (~16% of the mining workforce)
- Women in mining are highly educated, resulting in less employment loss through the COVID-19 pandemic than other underrepresented groups
- Women in mining have less representation in all occupations and all skill levels compared to women in other Canadian industries.

Furthermore, systemic gender inequities in Canadian mining result in

- Gendered pay gaps
- Unequal access to support networks, resulting in fewer opportunities for women in mining to be promoted and advance in their careers
- Higher rates of discrimination and harassment incidents being experienced by women than men in mining, many of which are not resolved.

Recommendations from this Canadian baseline study include actions and policies that governments and companies can adopt to increase the representation and retention of women working in Canadian mining. Of greatest importance is increasing public access to gender-disaggregated, regional, and company-specific data, which allow for an analysis of policies. As Canada works toward reconciliation with Indigenous Peoples and advancing EDI for underrepresented groups, such as women, there is a greater potential to access these gender-disaggregated data sources.

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APPENDIX A. MINING OCCUPATION MAPPING DATABASE

Occupational classification					Active in stage of mining			Educational classification		
ISCO 2008	ISCO 2008 Title	NOC 2011	MiHR Category	Occupation title	Exploration	Construction	Exploitation	Classification of Instructional Programs 2016	Education fields	Min. educational requirements[10]
1,211	Finance managers	111	Human resources and financial occupations	Financial managers	x	x	x	05 - Business, management, and public administration	Business school	Skill level A (Management): occupations usually require a university education
1,212	Human resource managers	112	Human resources and financial occupations	Human resources managers	x	x	x	05 - Business, management, and public administration	Business school	Skill level A (Professionals): Occupations usually require a university education
1,223	R&D managers	211	Supervisors, coordinators, and foremen	Engineering managers		x	x	08 - Architecture, engineering, and related technologies	STEM	Skill level A (Management): occupations usually require a university education
1,323	Construction managers	711	Supervisors, coordinators, and foremen	Construction managers		x	x	08 - Architecture, engineering, and related technologies	Trades	Skill level B: Occupations usually require a college education or apprenticeship training

[10] As defined by MiHR

1,322	Mining managers	811	Supervisors, coordinators, and foremen	Managers in natural resources production and fishing		x	x	08 - Architecture, engineering, and related technologies	STEM	Skill level A (Management): occupations usually require a university education
2,411	Accountants	1,111	Human resources and financial occupations	Financial auditors and accountants	x	x	x	05 - Business, management, and public administration	Business school	Skill level A (Professionals): Occupations usually require a university education
2,413	Financial analysts	1,112	Human resources and financial occupations	Financial and investment analysts	x	x	x	05 – Business, management, and public administration	Business school	Skill level A (Professionals): Occupations usually require a university education
2,423	Personnel and careers professionals	1,121	Human resources and financial occupations	Human resources professionals	x	x	x	05 - Business, management, and public administration	Business school	Skill level A (Professionals): Occupations usually require a university education
2,424	Training and staff development professionals	1,121	Human resources and financial occupations	Human resources professionals	x	x	x	05 - Business, management, and public administration	Business school	Skill level A (Professionals): Occupations usually require a university education
4,120	Secretaries (general)	1,241	Support workers	Administrative assistants	x	x	x	05 - Business, management, and public administration	Business school	Skill level C: Occupations usually require secondary school and/or occupation-specific training
3,343	Administrative and executive secretaries	1,241	Support workers	Administrative assistants	x	x	x	05 - Business, management, and public administration	Business school	Skill level B: Occupations usually require a college education or apprenticeship training
4,110	General office clerks	1,411	Support workers	General office support workers	x	x	x	09 - Agriculture, natural resources, and conservation	Entry level	Skill level D: On-the-job training is usually provided for occupations

4,322	Production clerks	1,523	Support workers	Production logistics coordinators			x	09 - Agriculture, natural resources, and conservation	Entry level	Skill level D: On-the-job training is usually provided for occupations
4,323	Transport clerks	1,525	Support workers	Dispatchers		x	x	09 - Agriculture, natural resources, and conservation	Entry level	Skill level D: On-the-job training is usually provided for occupations
4,323	Transport clerks	1,526	Support workers	Transportation route and crew schedulers		x	x	09 - Agriculture, natural resources, and conservation	Entry level	Skill level D: On-the-job training is usually provided for occupations
2,113	Chemists	2,112	Professional and physical sciences Occupations	Chemists	x		x	08 - Architecture, engineering, and related technologies	STEM	Skill level B: Occupations usually require a college education or apprenticeship training
2,114	Geologists and geophysicists	2,113	Professional and physical sciences occupations	Geoscientists and oceanographers	x	x	x	08 - Architecture, engineering, and related technologies	STEM	Skill level A (Professionals): Occupations usually require a university education
2,146	Mining engineers, metallurgists, and related professionals	2,115	Professional and physical sciences occupations	Other professional occupations in physical sciences	x		x	08 - Architecture, engineering, and related technologies	STEM	Skill level B: Occupations usually require a college education or apprenticeship training
2,133	Environmental protection professionals	2,121	Professional and physical sciences occupations	Biologists and related scientists	x	x	x	08 - Architecture, engineering, and related technologies	STEM	Skill level A (Professionals): Occupations usually require a university education
2,142	Civil engineers	2,131	Professional and physical sciences occupations	Civil engineers		x	x	08 - Architecture, engineering, and related technologies	STEM	Skill level A (Professionals): Occupations usually require a university education

2,144	Mechanical engineers	2,132	Professional and physical sciences occupations	Mechanical engineers		x	x	08 - Architecture, engineering, and related technologies	STEM	Skill level A (Professionals): Occupations usually require a university education
2,151	Electrical engineers	2,133	Professional and physical sciences occupations	Electrical and electronics engineers		x	x	08 - Architecture, engineering, and related technologies	STEM	Skill level A (Professionals): Occupations usually require a university education
2,145	Chemical engineers	2,134	Professional and physical sciences occupations	Chemical engineers		x	x	08 - Architecture, engineering, and related technologies	STEM	Skill level A (Professionals): Occupations usually require a university education
2,141	Industrial and production engineers	2,141	Professional and physical sciences occupations	Industrial and manufacturing engineers		x	x	08 - Architecture, engineering, and related technologies	STEM	Skill level A (Professionals): Occupations usually require a university education
2,146	Mining engineers, metallurgists, and related professionals	2,142	Professional and physical sciences occupations	Metallurgical and materials engineers	x	x	x	08 - Architecture, engineering, and related technologies	STEM	Skill level A (Professionals): Occupations usually require a university education
2,146	Mining engineers, metallurgists, and related professionals	2,143	Professional and physical sciences occupations	Mining engineers	x	x	x	08 - Architecture, engineering, and related technologies	STEM	Skill level A (Professionals): Occupations usually require a university education
2,142	Civil engineers	2,144	Professional and physical sciences occupations	Geological engineers	x	x	x	08 - Architecture, engineering, and related technologies	STEM	Skill level A (Professionals): Occupations usually require a university education
2,149	Engineering professionals not elsewhere classified	2,148	Professional and physical sciences occupations	Other professional engineers	x	x	x	08 - Architecture, engineering, and related technologies	STEM	Skill level A (Professionals): Occupations usually require a university education

2,165	Cartographers and surveyors	2,154	Technical occupations	Land surveyors	x	x	x	08 - Architecture, engineering, and related technologies	Technician	Skill level B: Occupations usually require a college education or apprenticeship training
2,511	Systems analysts	2,171	Technical occupations	Information systems analysts and consultants		x	x	08 - Architecture, engineering, and related technologies	Technician	Skill level B: Occupations usually require a college education or apprenticeship training
3,111	Chemical and physical science technicians	2,211	Technical occupations	Chemical technologists and technicians	x	x	x	08 - Architecture, engineering, and related technologies	Technician	Skill level B: Occupations usually require a college education or apprenticeship training
3,111	Chemical and physical science technicians	2,212	Technical occupations	Geological and mineral technologists and technicians	x	x	x	08 - Architecture, engineering, and related technologies	Technician	Skill level B: Occupations usually require a college education or apprenticeship training
3,141	Life science technicians (excluding medical)	2,221	Technical occupations	Biological technologists and technicians		x	x	08 - Architecture, engineering, and related technologies	Technician	Skill level B: Occupations usually require a college education or apprenticeship training
3,112	Civil engineering technicians	2,231	Technical occupations	Civil engineering technologists and technicians		x	x	08 - Architecture, engineering, and related technologies	Technician	Skill level B: Occupations usually require a college education or apprenticeship training
3,115	Mechanical engineering technicians	2,232	Technical occupations	Mechanical engineering technologists and technicians		x	x	08 - Architecture, engineering, and related technologies	Technician	Skill level B: Occupations usually require a college education or apprenticeship training
3,119	Physical and engineering science technicians not elsewhere classified	2,233	Technical occupations	Industrial engineering and manufacturing technologists and technicians			x	08 - Architecture, engineering, and related technologies	Technician	Skill level B: Occupations usually require a college education or apprenticeship training

3,112	Civil engineering technicians	2,234	Support workers	Construction estimators		x	x	08 - Architecture, engineering, and related technologies	Trades	Skill level B: Occupations usually require a college education or apprenticeship training
3,113	Electrical engineering technicians	2,241	Technical occupations	Electrical and electronics engineering technologists and technicians		x	x	08 - Architecture, engineering, and related technologies	Technician	Skill level B: Occupations usually require a college education or apprenticeship training
3,114	Electronics engineering technicians	2,243	Technical occupations	Industrial instrument technicians and mechanics		x	x	08 - Architecture, engineering, and related technologies	Technician	Skill level B: Occupations usually require a college education or apprenticeship training
3,118	Draughtspersons	2,253	Technical occupations	Drafting technologists and technicians		x	x	08 - Architecture, engineering, and related technologies	Technician	Skill level B: Occupations usually require a college education or apprenticeship training
3,118	Draughtspersons	2,254	Technical occupations	Land survey technologists and technicians		x	x	08 - Architecture, engineering, and related technologies	Technician	Skill level B: Occupations usually require a college education or apprenticeship training
3,111	Chemical and physical science technicians	2,255	Technical occupations	Technical occupations in geomatics and meteorology		x	x	08 - Architecture, engineering, and related technologies	Technician	Skill level B: Occupations usually require a college education or apprenticeship training
3,119	Physical and engineering science technicians not elsewhere classified	2,261	Support workers	Non-destructive testers and inspection technicians		x	x	08 - Architecture, engineering, and related technologies	Trades	Skill level B: Occupations usually require a college education or apprenticeship training

3,119	Physical and engineering science technicians not elsewhere classified	2,262	Support workers	Engineering inspectors and regulatory officers		x	x	08 - Architecture, engineering, and related technologies	STEM	Skill level A (Professionals): Occupations usually require a university education
3,257	Environmental and occupational health inspectors and associates	2,263	Support workers	Inspectors in public and environmental health and occupational health and safety	x	x	x	08 - Architecture, engineering, and related technologies	STEM	Skill level A (Professionals): Occupations usually require a university education
5,120	Cooks	6,322	Support workers	Cooks	x	x	x	12 - Other	Certificate	Skill level C: Occupations usually require secondary school and/or occupation-specific training
3,123	Construction supervisors	7,203	Supervisors, coordinators, and foremen	Contractors and supervisors, pipefitting trades		x	x	08 - Architecture, engineering, and related technologies	Trades	Skill level B: Occupations usually require a college education or apprenticeship training
7,212	Welders and flame cutters	7,237	Trades occupations	Welders and related machine operators	x	x	x	08 - Architecture, engineering, and related technologies	Trades	Skill level B: Occupations usually require a college education or apprenticeship training
7,411	Building and related electricians	7,242	Trades occupations	Industrial electricians	x	x	x	08 - Architecture, engineering, and related technologies	Trades	Skill level B: Occupations usually require a college education or apprenticeship training
7,126	Plumbers and pipe fitters	7,251	Trades occupations	Plumbers	x	x	x	08 - Architecture, engineering, and related technologies	Trades	Skill level B: Occupations usually require a college education or apprenticeship training

7,126	Plumbers and pipe fitters	7,252	Trades occupations	Steamfitters, pipefitters, and sprinkler system installers		x	x	08 - Architecture, engineering, and related technologies	Trades	Skill level B: Occupations usually require a college education or apprenticeship training
7,115	Carpenters and joiners	7,271	Trades occupations	Carpenters	x	x	x	08 - Architecture, engineering, and related technologies	Trades	Skill level B: Occupations usually require a college education or apprenticeship training
7,233	Agricultural and industrial machinery mechanics and repairers	7,301	Supervisors, coordinators, and foremen	Contractors and supervisors, mechanic trades		x	x	08 - Architecture, engineering, and related technologies	Trades	Skill level B: Occupations usually require a college education or apprenticeship training
7,233	Agricultural and industrial machinery mechanics and repairers	7,311	Trades occupations	Construction millwrights and industrial mechanics	x	x	x	08 - Architecture, engineering, and related technologies	Trades	Skill level B: Occupations usually require a college education or apprenticeship training
7,233	Agricultural and industrial machinery mechanics and repairers	7,312	Trades occupations	Heavy-duty equipment mechanics		x	x	08 - Architecture, engineering, and related technologies	Trades	Skill level B: Occupations usually require a college education or apprenticeship training
8,343	Crane, hoist, and related plant operators	7,371	Production occupations	Crane operators		x	x	08 - Architecture, engineering, and related technologies	Trades	Skill level B: Occupations usually require a college education or apprenticeship training
7,215	Riggers and cable splicers	7,371	Production occupations	Crane operators		x	x	08 - Architecture, engineering, and related technologies	Trades	Skill level B: Occupations usually require a college education or apprenticeship training

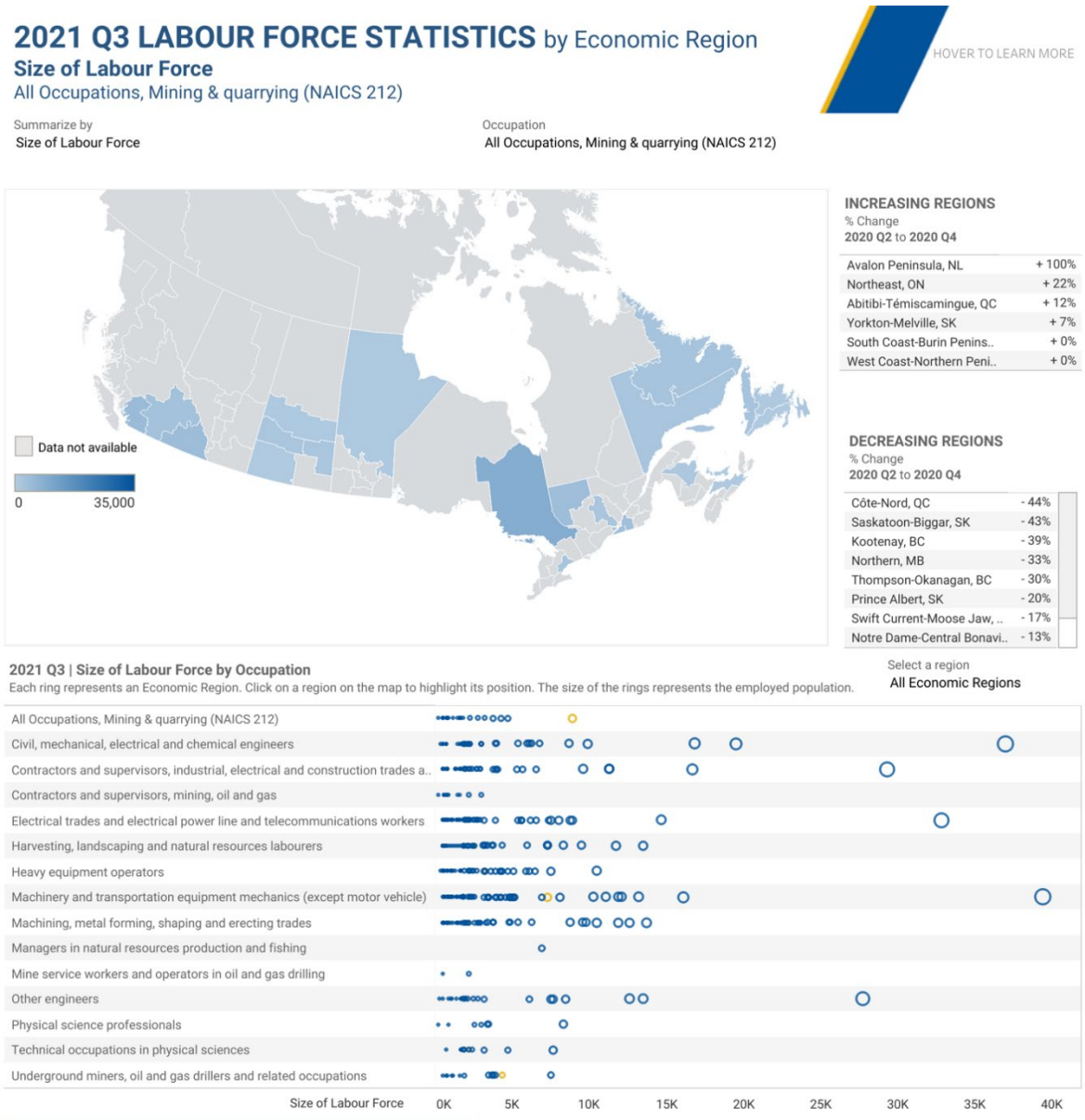
8,111	Miners and quarriers	7,372	Production occupations	Drillers and blasters – surface mining, quarrying, and construction			x	09 - Agriculture, natural resources, and conservation	Certificate	Skill level C: Occupations usually require secondary school and/or occupation-specific training
9,321	Hand packers	7,452	Production occupations	Material handlers			x	09 - Agriculture, natural resources, and conservation	Entry level	Skill level D: On-the-job training is usually provided for occupations
8,332	Heavy truck and lorry drivers	7,511	Production occupations	Transport truck drivers			x	11 - Personal, protective, and transportation services	Certificate	Skill level C: Occupations usually require secondary school and/or occupation-specific training
8,342	Earthmoving and related plant operators	7,521	Production occupations	Heavy equipment operators (except crane)			x	09 - Agriculture, natural resources, and conservation	Entry level	Skill level D: On-the-job training is usually provided for occupations
7,126	Plumbers and pipe fitters	7,611	Production occupations	Construction trades helpers and labourers			x	09 - Agriculture, natural resources, and conservation	Entry level	Skill level D: On-the-job training is usually provided for occupations
7,119	Building frame and related trades workers not elsewhere classified	7,611	Production occupations	Construction trades helpers and labourers			x	09 - Agriculture, natural resources, and conservation	Entry level	Skill level D: On-the-job training is usually provided for occupations
9,311	Mining and quarrying labourers	7,611	Production occupations	Construction trades helpers and labourers			x	09 - Agriculture, natural resources, and conservation	Entry level	Skill level D: On-the-job training is usually provided for occupations
9,312	Civil engineering labourers	7,611	Production occupations	Construction trades helpers and labourers			x	09 - Agriculture, natural resources, and conservation	Entry level	Skill level D: On-the-job training is usually provided for occupations
9,313	Building construction labourers	7,611	Production occupations	Construction trades helpers and labourers			x	09 - Agriculture, natural resources, and conservation	Entry level	Skill level D: On-the-job training is usually provided for occupations

9,629	Elementary workers not elsewhere classified	7,612	Production occupations	Other trades helpers and labourers			x	09 - Agriculture, natural resources, and conservation	Entry level	Skill level D: On-the-job training is usually provided for occupations
3,121	Mining supervisors	8,221	Supervisors, coordinators, and foremen	Supervisors, mining and quarrying		x	x	08 - Architecture, engineering, and related technologies	Technician	Skill level B: Occupations usually require a college education or apprenticeship training
8,111	Miners and quarriers	8,231	Production occupations	Underground production and development miners			x	09 - Agriculture, natural resources, and conservation	Entry level	Skill level D: On-the-job training is usually provided for occupations
9,311	Mining and quarrying labourers	8,411	Production occupations	Underground mine service and support workers			x	09 - Agriculture, natural resources, and conservation	Entry level	Skill level D: On-the-job training is usually provided for occupations
9,311	Mining and quarrying labourers	8,614	Production occupations	Mine labourers			x	09 - Agriculture, natural resources, and conservation	Entry level	Skill level D: On-the-job training is usually provided for occupations
3,122	Manufacturing supervisors	9,211	Supervisors, coordinators, and foremen	Supervisors, mineral and metal processing			x	08 - Architecture, engineering, and related technologies	Technician	Skill level B: Occupations usually require a college education or apprenticeship training
3,135	Metal production process controllers	9,231	Production occupations	Central control and process operators, mineral and metal processing			x	09 - Agriculture, natural resources, and conservation	Entry level	Skill level D: On-the-job training is usually provided for occupations
3,139	Process control technicians not elsewhere classified	9,231	Production occupations	Central control and process operators, mineral and metal processing			x	09 - Agriculture, natural resources, and conservation	Entry level	Skill level D: On-the-job training is usually provided for occupations

3,131	Power production plant operators	9,241	Production occupations	Power engineers and power systems operators			x	08 - Architecture, engineering, and related technologies	Trades	Skill level B: Occupations usually require a college education or apprenticeship training
8,182	Steam engine and boiler operators	9,241	Production occupations	Power engineers and power systems operators			x	08 - Architecture, engineering, and related technologies	Trades	Skill level B: Occupations usually require a college education or apprenticeship training
8,112	Mineral and stone processing plant operators	9,411	Production occupations	Machine operators, mineral and metal processing			x	09 - Agriculture, natural resources, and conservation	Entry level	Skill level D: On-the-job training is usually provided for occupations
8,121	Metal processing plant operators	9,411	Production occupations	Machine operators, mineral and metal processing			x	09 - Agriculture, natural resources, and conservation	Entry level	Skill level D: On-the-job training is usually provided for occupations
7,543	Product graders and testers (excluding foods and beverages)	9,415	Support workers	Inspectors and testers, mineral and metal processing	x	x	x	08 - Architecture, engineering, and related technologies	Technician	Skill level C: Occupations usually require secondary school and/or occupation-specific training
9,329	Manufacturing labourers not elsewhere classified	9,611	Production occupations	Labourers in mineral and metal processing			x	09 - Agriculture, natural resources, and conservation	Entry level	Skill level D: On-the-job training is usually provided for occupations

APPENDIX B. INTERACTIVE LABOUR MARKET DASHBOARD

Figure B1. Interactive labour market dashboard



Source: Mining Industry Human Resource Council, 2021b.

APPENDIX C. CANADIAN LARGE-SCALE MINING COMPANIES EDI INITIATIVES

Table C1. Canadian mining companies' EDI initiatives

Company	Representation of women in Canadian mining	EDI policies
BHP	34%	• Inclusion and Diversity Position Statement • Partnering for Change
Cameco	25%	• People Policy • Inclusion and Diversity, *as reported in Sustainability report*
IAMGold	N/A	• Diversity Policy • Diversity Standard • Discrimination, Harassment, and Violence in the Workplace Standard
Nutrien	N/A	• Inclusive Workplace Commitment • Nutrien Respect in the Workplace Policies & Procedures • Aboriginal Content Playbook
Mosaic	14.5%	• Commitment to Inclusion
Teck	21%	• Equity, Diversity, and Inclusion Policy • Indigenous Peoples Policy • Code of Sustainable Conduct

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