



2023

CANADIAN MINING WORKPLACE PROFILE



MINING INDUSTRY
HUMAN RESOURCES COUNCIL



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INTRODUCTION

From geologists and engineers to equipment operators and support staff, the mining industry relies on a diverse workforce to extract and process the valuable minerals that are essential to modern life. The Mining Industry Human Resources Council's (MiHR) *Canadian Mining Workplace Profile (2023)* aims to profile Canada's mining workforce to better understand its characteristics, highlight key trends in important topics such as equity and diversity, and identify where the workforce could be vulnerable to shifting trends in technology and labour demand.

Coupled with this publication, MiHR is releasing a companion report that offers an analysis of the acute labour market tightness that has emerged since the COVID-19 pandemic. MiHR's *Canadian Mining Outlook (2023)* further explores evidence of long-term labour market challenges, primarily from unfavourable demographic characteristics that promise to undermine the industry's efforts to develop a robust and skilled labour force.

INDUSTRY AND OCCUPATIONAL DEFINITIONS

Data presented in this report rely primarily on industry-level data gathered and aggregated through Statistics Canada. Data throughout the analysis in this report are aligned with the *North American Industry Classification System (NAICS)* to define the mining industry in Canada and with the *National Occupational Classification (NOC)* system to define relevant occupations of interest. Though the mining industry spans multiple industry codes, for simplicity this analysis will focus primarily on a single NAICS code—*Mining and quarrying (NAICS 212)*.

PRODUCING MINES ACROSS CANADA

Mining activity spans all corners of Canada. Mines are frequently found in clusters; this is a product of underlying geological factors, maturity of mining development and access to population centres and amenities.

According to Natural Resources Canada (NRCan)'s latest official list, there were 137 producing mines in Canada in 2021.¹ Figure 1 illustrates their geographical distribution, denoting the type of operation and where there is a higher

density of mines relative to other areas. The figure shows the largest cluster of mining activity is found in Northeast Ontario and Abitibi-Témiscamingue, Québec, where there is a long and established history of mining.

Gold is the leading metal produced in Canada with 38% of production (by value of shipments), while potash holds the largest non-metal production at 40% (not including coal production) (Figure 2).

1 The list does not include aggregate mining (i.e., stone, sand, and gravel pits).

FIGURE 1: PRODUCING MINES IN CANADA (2022)

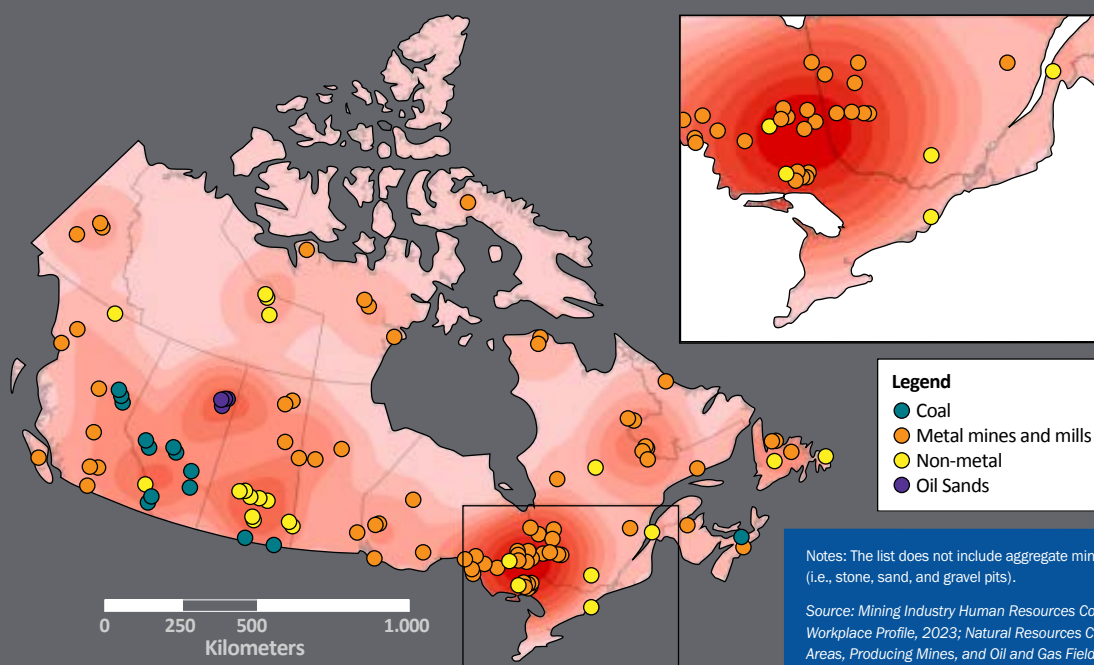
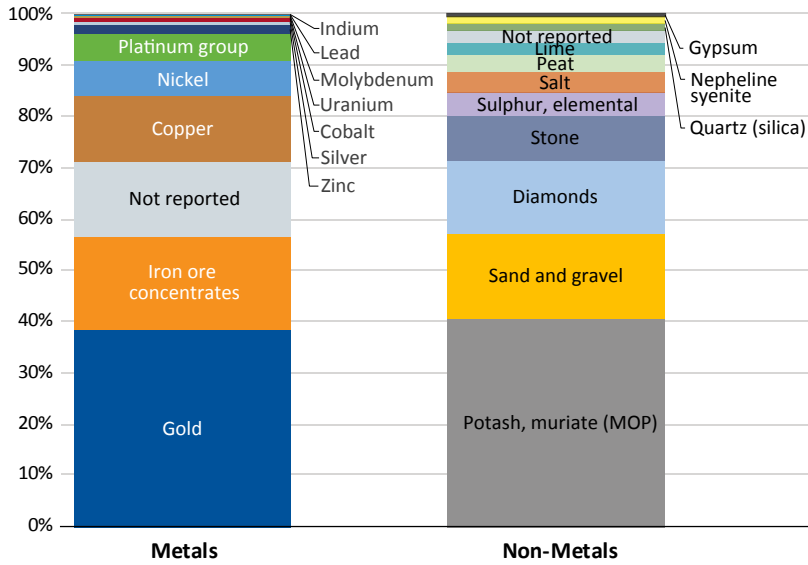


FIGURE 2: MINERAL PRODUCTION BREAKDOWN BY COMMODITY (VALUE OF SHIPMENTS) (2021)



Source: Mining Industry Human Resources Council, Canadian Mining Workplace Profile, 2023; Natural Resources Canada, Preliminary Estimate of the Mineral Production in Canada, 2021.

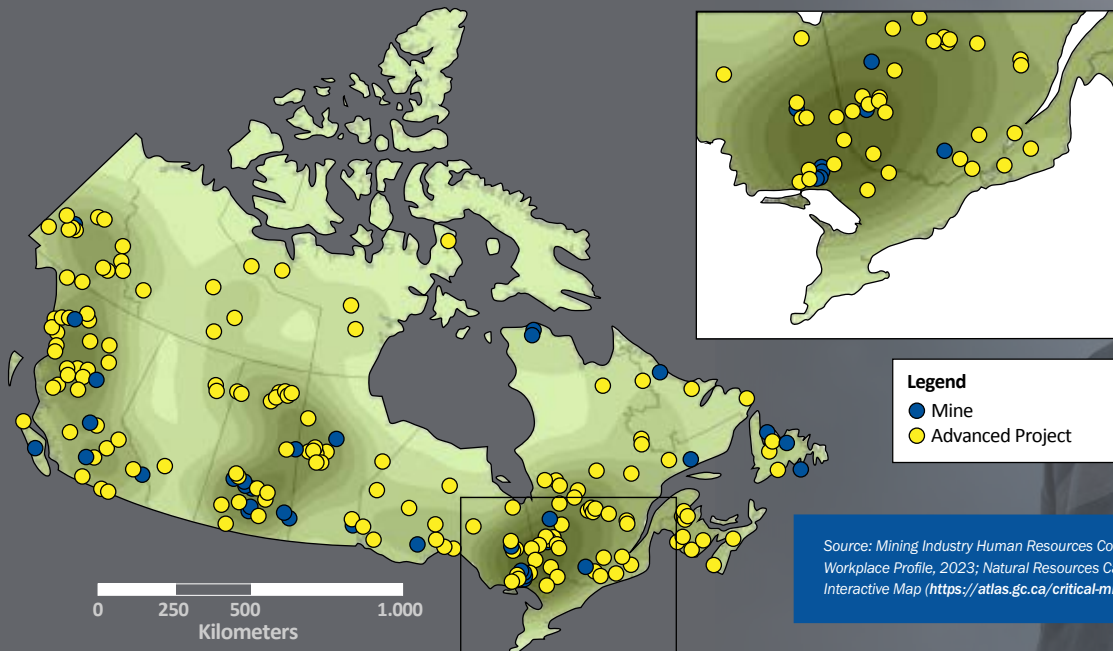
Critical Mineral Production in Canada

The shift to a green economy in Canada will largely depend on critical minerals that will make clean energy technologies possible. The International Energy Agency (IEA) states, “the rapid deployment of clean energy technologies as part of energy transitions implies a significant increase in demand for minerals.” IEA projects that, by 2040, mineral requirements would double under current stated policies and quadruple to meet the standards of the *Paris Agreement* (“well below 2°C global temperature rise”).²

With its vast geological landscape, Canada is well-positioned to be a producer of key critical minerals as they are anticipated to increase in demand. Figure 3 displays critical mineral projects across Canada in 2021. These projects encompass a variety of critical minerals, including Zinc, Copper, Cobalt, Nickel, among several others.

² International Energy Agency (IEA). (2022). The Role of Critical Minerals in Clean Energy Transitions. *World Energy Outlook Special Report*. <https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions>.

FIGURE 3: CRITICAL MINERAL MINING PROJECTS IN CANADA (2021)



Source: Mining Industry Human Resources Council, Canadian Mining Workplace Profile, 2023; Natural Resources Canada, Critical Minerals Interactive Map (<https://atlas.gc.ca/critical-minerals/en/>), 2022.

MINING WORKFORCE ACROSS CANADA

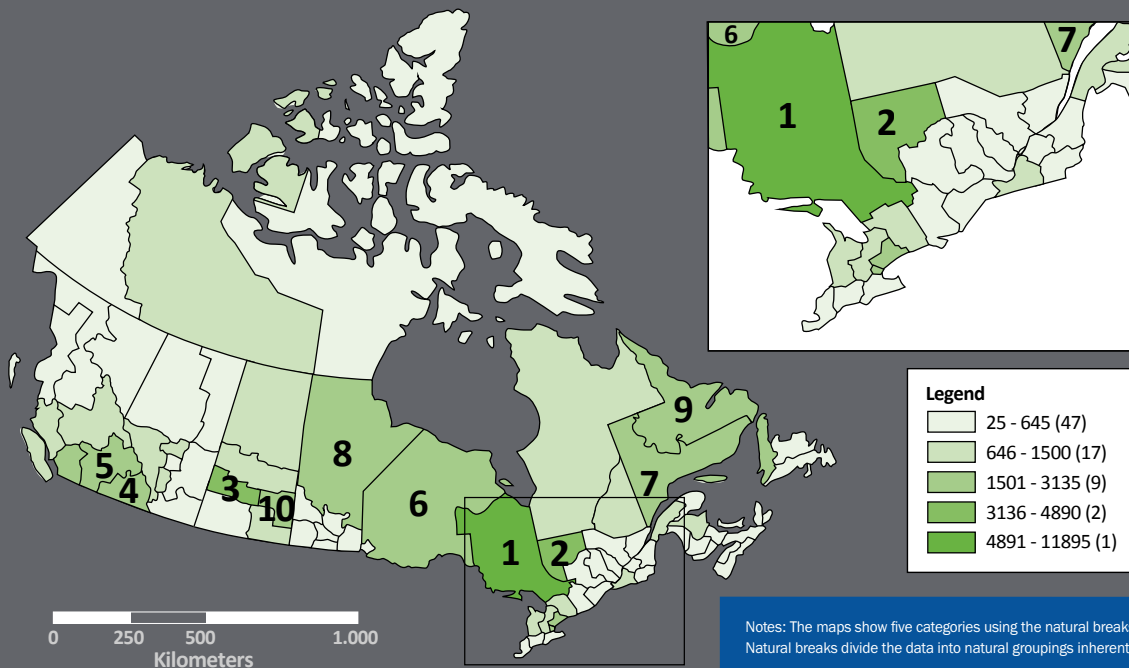
Figure 4 shows how the mining workforce is distributed across the country by place of residence. Specifically, the thematic map highlights Economic Regions in Canada³ and the relative size of each workforce in *Mining and quarrying (NAICS 212)*, according to the 2016 Census of Population. Table 1 reports the top 10 regions by size of workforce corresponding to the map in Figure 1.

Similar to the producing mines, mining workers are found in all corners of Canada, particularly in the Northeastern parts of the country (Ontario and Quebec), but also in remote, less densely populated areas. Northeast Ontario has the largest workforce followed by Abitibi-Témiscamingue, Quebec and Saskatoon-Biggar, Saskatchewan.



³ Comprised from a grouping of census divisions, an economic region provides a standard geographic boundary for analyzing regional economic activity.

FIGURE 4: SIZE OF LABOUR FORCE ACROSS ECONOMIC REGIONS, MINING AND QUARRYING (NAICS 212) (2016)



Notes: The maps show five categories using the natural breaks classification. Natural breaks divide the data into natural groupings inherent in the underlying data.

Source: Mining Industry Human Resources Council, *Canadian Mining Workplace Profile, 2023*; Statistics Canada, *Census of Population, 2016*.

TABLE 1: TOP 10 REGIONS BY SIZE AND SHARE OF LABOUR FORCE, MINING AND QUARRYING (NAICS 212) (2016)

| Rank | Geography | Size of Labour Force | Share of Labour Force |
|------|---|----------------------|-----------------------|
| 1 | Northeast, Ontario | 11,895 | 4.4% |
| 2 | Abitibi-Témiscamingue, Quebec | 4,890 | 6.6% |
| 3 | Saskatoon-Biggar, Saskatchewan | 4,560 | 2.3% |
| 4 | Kootenay, British Columbia | 3,135 | 4.1% |
| 5 | Thompson-Okanagan, British Columbia | 2,685 | 1.0% |
| 6 | Northwest, Ontario | 2,635 | 2.3% |
| 7 | Côte-Nord, Quebec | 2,215 | 4.8% |
| 8 | Northern, Manitoba | 2,050 | 6.1% |
| 9 | West Coast-Northern Peninsula-Labrador, Newfoundland and Labrador | 2,035 | 4.0% |
| 10 | Yorkton-Melville, Saskatchewan | 1,860 | 4.3% |

Source: Mining Industry Human Resources Council, Canadian Mining Workplace Profile, 2023; Statistics Canada, Census of Population, 2016.

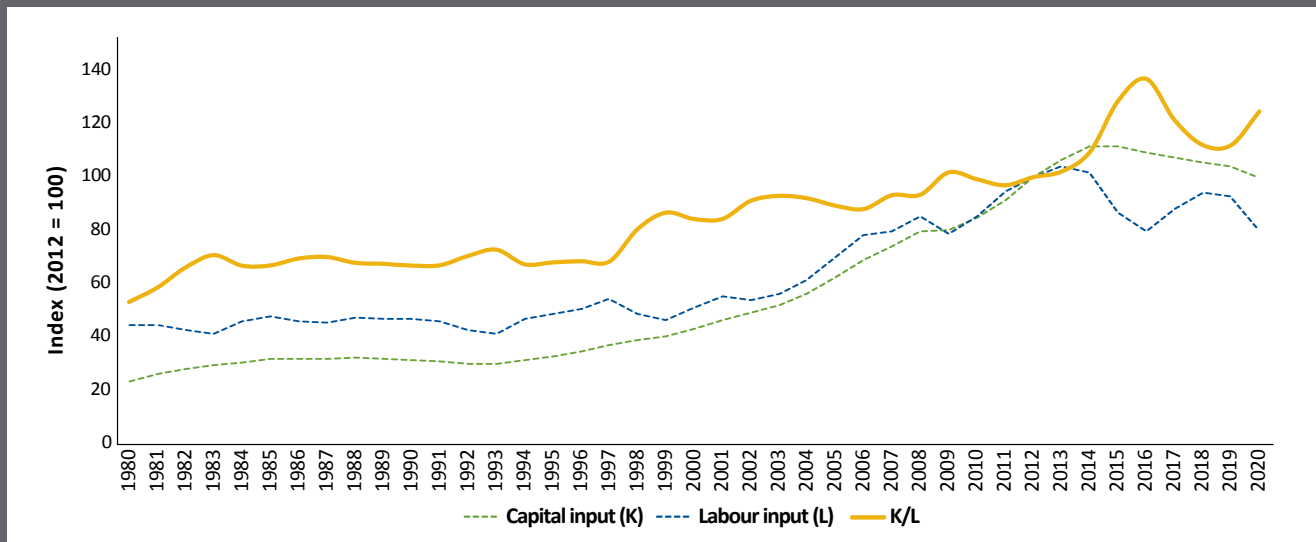
CAPITAL AND LABOUR

In *Mining, quarrying, and oil and gas extraction (NAICS 21)* operations, the ratio of capital-to-labour has consistently been on the rise over the last four decades, suggesting further capital deepening in the mining industry (Figure 5).

Capital input (K) describes the structures, equipment, information and communications technologies, etc., that are used in mining operations. *Labour input (L)* describes the aggregated hours worked by all workers. *Capital-to-*

labour ratio (K/L) is the total capital available per unit of labour, which is an indicator of capital deepening (capital intensification). Overall, capital deepening indicates improved labour productivity through better utilization of labour-augmenting technologies (e.g., automation, robotics, etc.) and points to change in the occupational mix and types of skills that will be relevant to future mining operations.

FIGURE 5: INDICES OF CAPITAL AND LABOUR INPUTS, MINING, QUARRYING, AND OIL AND GAS EXTRACTION (NAICS 21) (1980 – 2020)⁴



Source: Mining Industry Human Resources Council, Canadian Mining Workplace Profile, 2023; Statistics Canada, Productivity Measures and Related Variables – National and Provincial (Annual) (Table 36-10-0208-01), 2022.

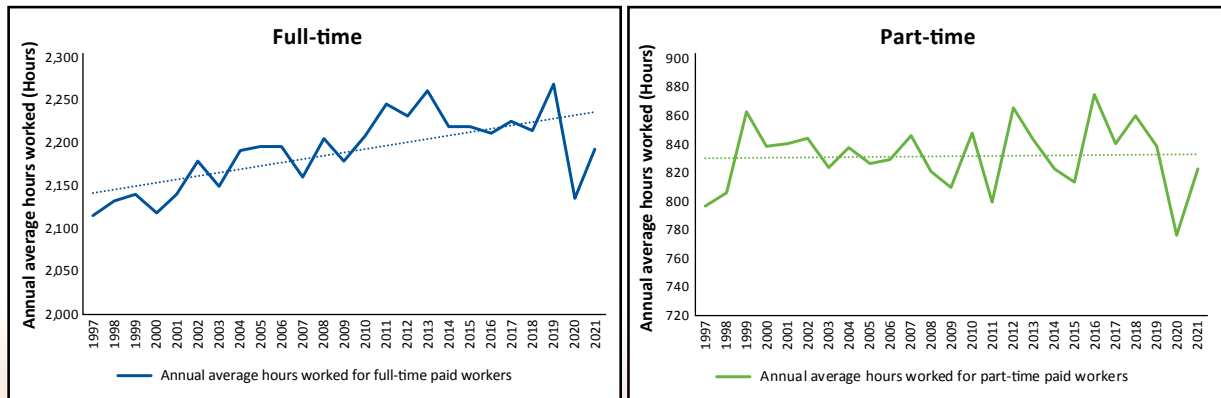
⁴ Statistics Canada's measure of labour input is obtained by chained-Fisher aggregation of hours worked of all workers, using hourly compensation as weights. Its capital input is obtained by chained-Fisher aggregation of capital stocks, using the cost of capital as weights.

AVERAGE ANNUAL HOURS OF WORK

The average number of hours worked per employee has been trending upward in *Mining and quarrying (NAICS 212)*. For full-time workers, average annual hours have expanded from 2,115 hours in 1997 to 2,269 hours in 2019, before the COVID-19 pandemic disrupted the trend (Figure 6). The difference translates to a 7% increase, or

roughly 20 more working days per year (using eight-hour days as the benchmark). This trend is primarily driven by full-time workers (the trend for part-time workers remains constant) and is a potential sign of labour tightness to the extent that employees are working longer hours to compensate for increased labour demand.

FIGURE 6: AVERAGE WORK HOURS PER YEAR, MINING AND QUARRYING (NAICS 212) (1997 – 2021)



Source: Mining Industry Human Resources Council, *Canadian Mining Workplace Profile, 2023*; Statistics Canada, *Labour Productivity Measures – Provinces and Territories (Annual) (Table 36-10-0676-01), 2022*.

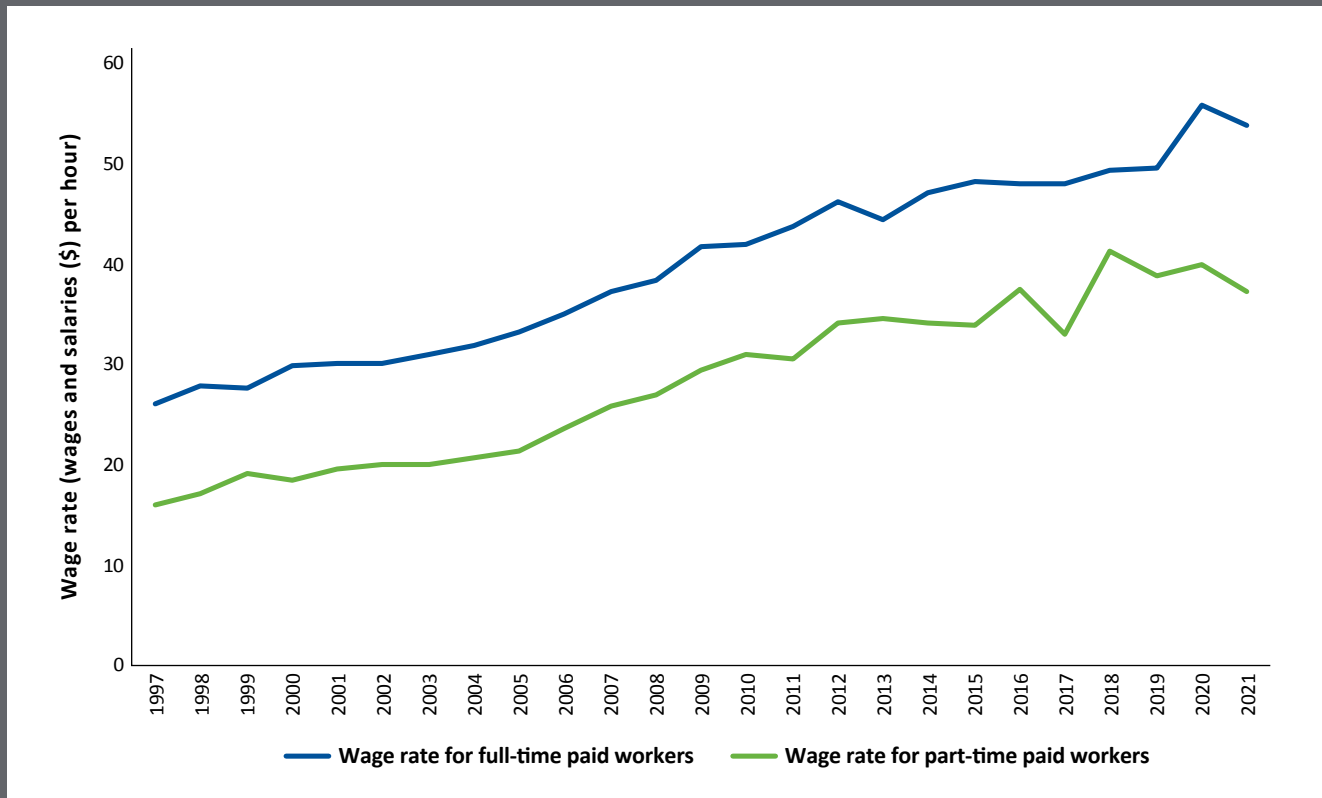


HOURLY WAGE

Not only have average work hours increased, but hourly wages for employees have also been trending up for both full-time and part-time workers in *Mining and quarrying (NAICS 212)*. Nominal wages and salaries for full-time workers have roughly doubled from \$26.14 per hour in 1997 to \$53.70 per hour in 2021 (Figure 7). From 1997 to 2021, full-time wages have grown at 3% CAGR while part-time wages have grown at 3.6% CAGR. However, over the last five years, part-time wages have trended downward from \$41.32 per hour in 2018 to \$37.33 per hour in 2021.



FIGURE 7: HOURLY WAGE OF FULL-TIME AND PART-TIME WORKERS, MINING AND QUARRYING (NAICS 212) (1997 – 2021)



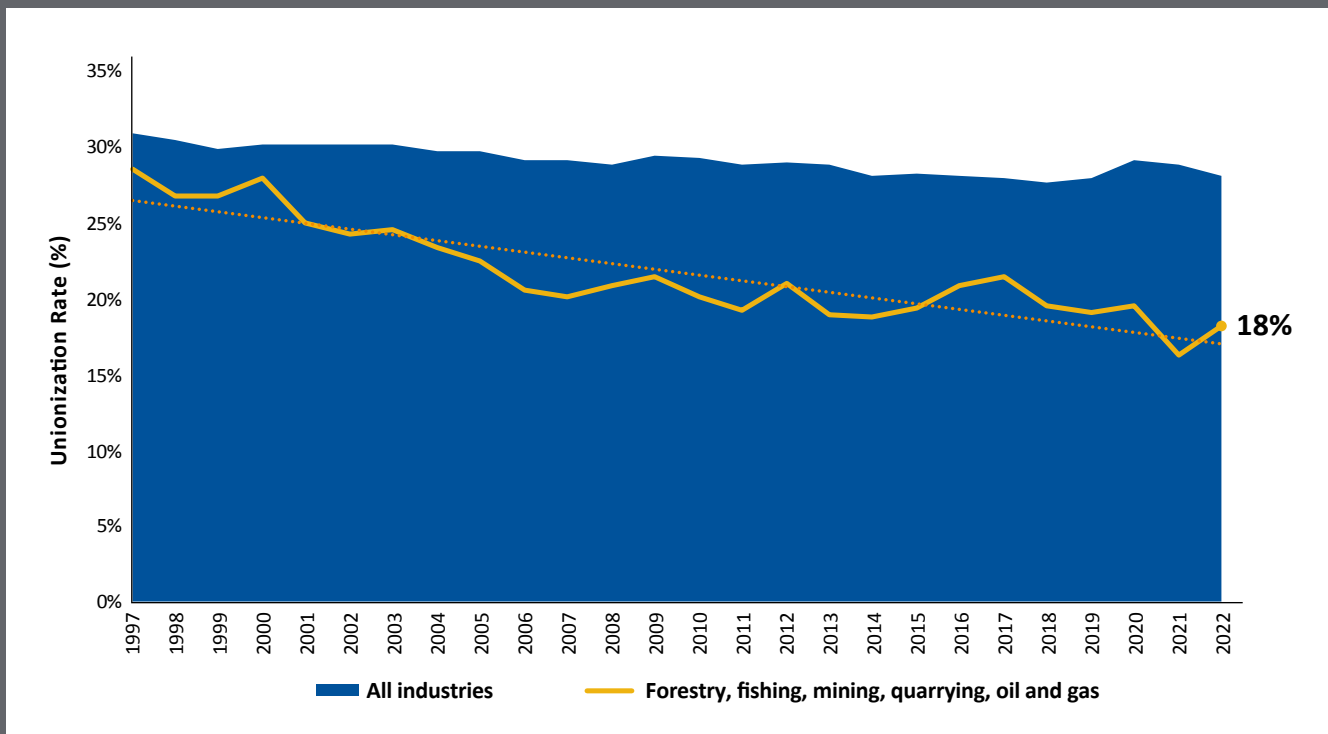
Source: Mining Industry Human Resources Council, *Canadian Mining Workplace Profile, 2023*; Statistics Canada, *Labour Productivity Measures – Provinces and Territories (Annual)* (Table 36-10-0676-01), 2022.

UNIONIZATION RATE

A potential reason for increased wage rates could be due to an increase in the number of workers who are union members and/or covered by a collective agreement. However, Figure 8 shows a secular decline in unionization rates over the last couple of decades in *Forestry, Fishing, Mining, Quarrying, Oil and Gas (NAICS 21, 113-114, 1153, 2100)*. While unionization rates for all industries have been historically stable at around 30%, rates in natural resources industries have fallen from 29% in 1997 to 18% in 2022. This suggests recent trends in hours worked and wage hikes are primarily driven by labour demand and supply conditions.



FIGURE 8: UNIONIZATION RATE, ALL INDUSTRIES AND FORESTRY, FISHING, MINING, QUARRYING, OIL AND GAS (NAICS 21, 113-114, 1153, 2100) (1997 – 2022)



Source: Mining Industry Human Resources Council, *Canadian Mining Workplace Profile, 2023*; Statistics Canada, *Labour Force Survey (Table: 14-10-0132-01), 2022*.

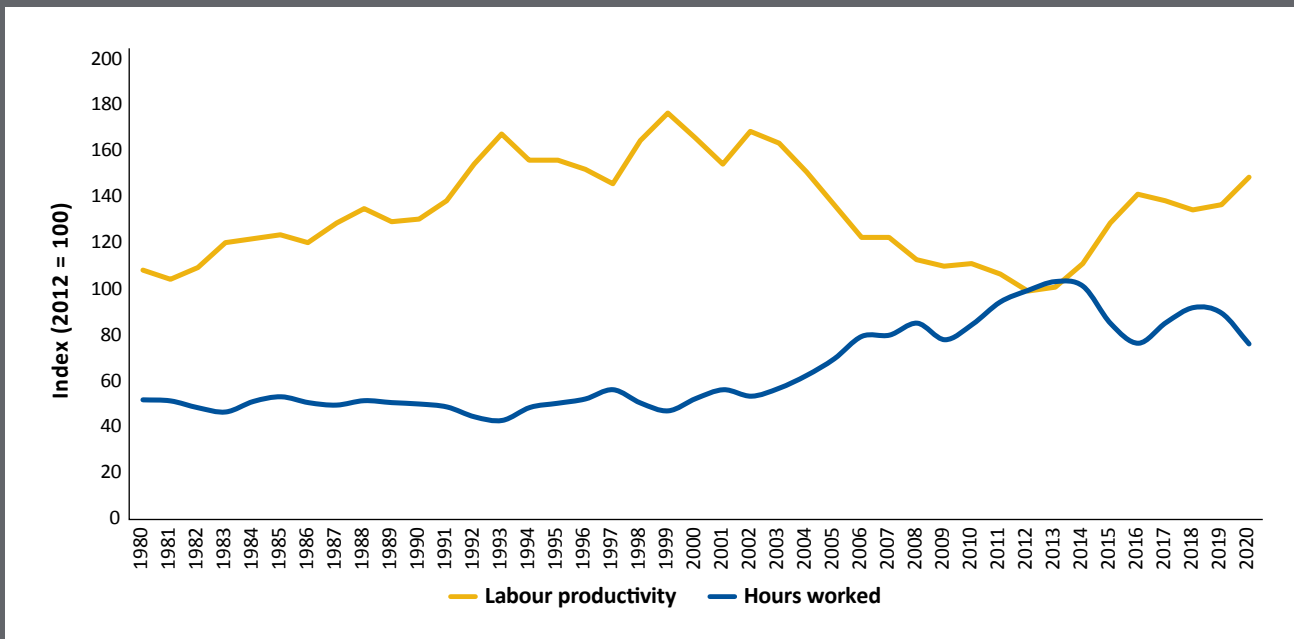
LABOUR PRODUCTIVITY

Labour productivity describes the value of output that is produced for every input of labour, measured as real gross domestic product (GDP) per hours worked. This measure indicates how labour is being used to produce output over time. *Mining, Quarrying, and Oil and Gas Extraction (NAICS 21)* has experienced a steady rise in labour productivity since 2012 (about a 50% increase) (Figure 9).

The figure also illustrates that labour productivity is negatively correlated with hours worked. An increase in labour productivity reflects how overall production efficiency derives influence jointly from the upskilling of labour and from capital investment.



FIGURE 9: INDICES OF LABOUR PRODUCTIVITY AND HOURS WORKED, MINING, QUARRYING AND OIL AND GAS EXTRACTION (NAICS 21) (1980 – 2020)⁵



Source: Mining Industry Human Resources Council, *Canadian Mining Workplace Profile, 2023*; Statistics Canada, *Productivity Measures and Related Variables – National and Provincial (Annual)* (Table 36-10-0208-01), 2022.

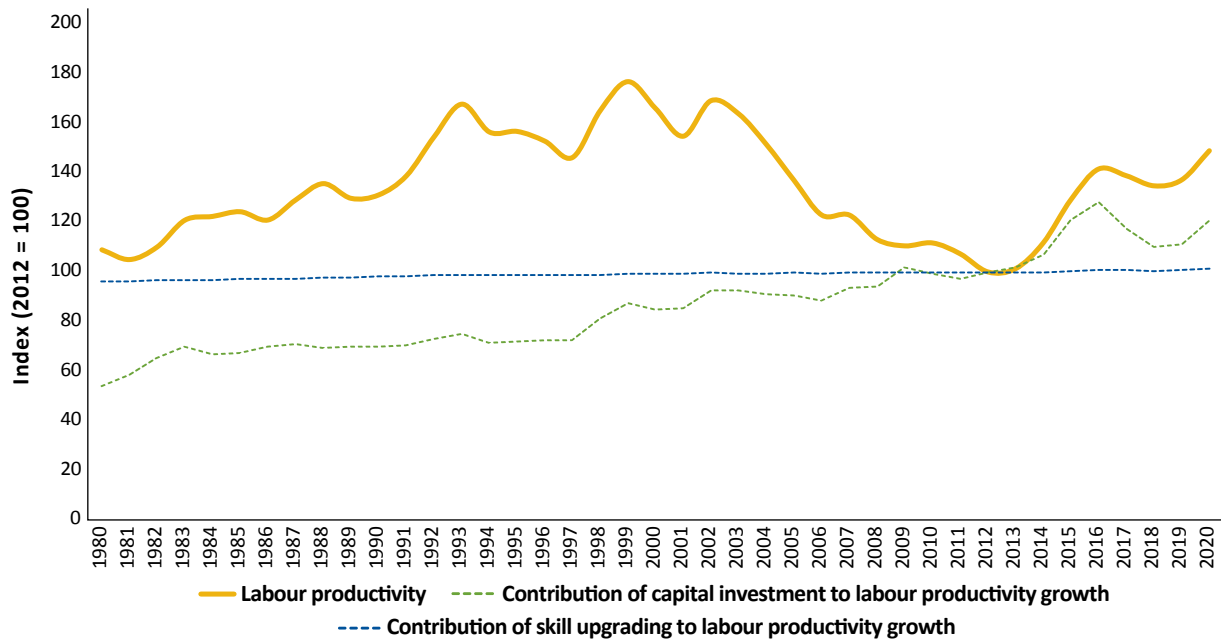
⁵ Statistics Canada measures hours worked as the number of all jobs times the annual average hours worked in all jobs. This is the total number of hours that a person spends working, whether paid or not. Note that this is slightly different from “Labour input” shown in Figure 6 as labour input weighs hours worked by hourly compensation.



Since 2012, the contribution of capital investment to labour productivity growth has outpaced that of skills upgrading (i.e., increases in experience and education composition of the workforce) (Figure 10). Therefore, the labour productivity growth experienced in *Mining, Quarrying, and Oil and Gas Extraction (NAICS 21)* in the past decade has been driven primarily by increasing investment in capital. This demonstrates that capital deepening (Figure 5) and implementation of labour-enhancing technology has made labour more productive.

By comparison, the contribution of skills upgrading to labour productivity growth has been fairly moderate, though this trend is likely to gain momentum as the industry moves towards a greener economy, and as the adoption of innovative technologies promises to change the sector’s educational/skills mix in the coming years.

FIGURE 10: INDICES OF CAPITAL INVESTMENT AND SKILL UPGRADE CONTRIBUTION TO LABOUR PRODUCTIVITY, MINING, QUARRYING AND OIL AND GAS EXTRACTION (NAICS 21) (1980 – 2020)⁶



Source: Mining Industry Human Resources Council, *Canadian Mining Workplace Profile, 2023*; Statistics Canada, *Productivity Measures and Related Variables – National and Provincial (Annual) (Table 36-10-0208-01)*, 2022.

⁶ Statistics Canada calculates the contribution of skills upgrading to labour productivity growth as the growth rate of labour composition (i.e., ratio of labour input to hours worked) times labour’s share of total costs. Contribution of capital investment to labour productivity growth is calculated as the growth in capital services per hour times capital’s share of total costs.

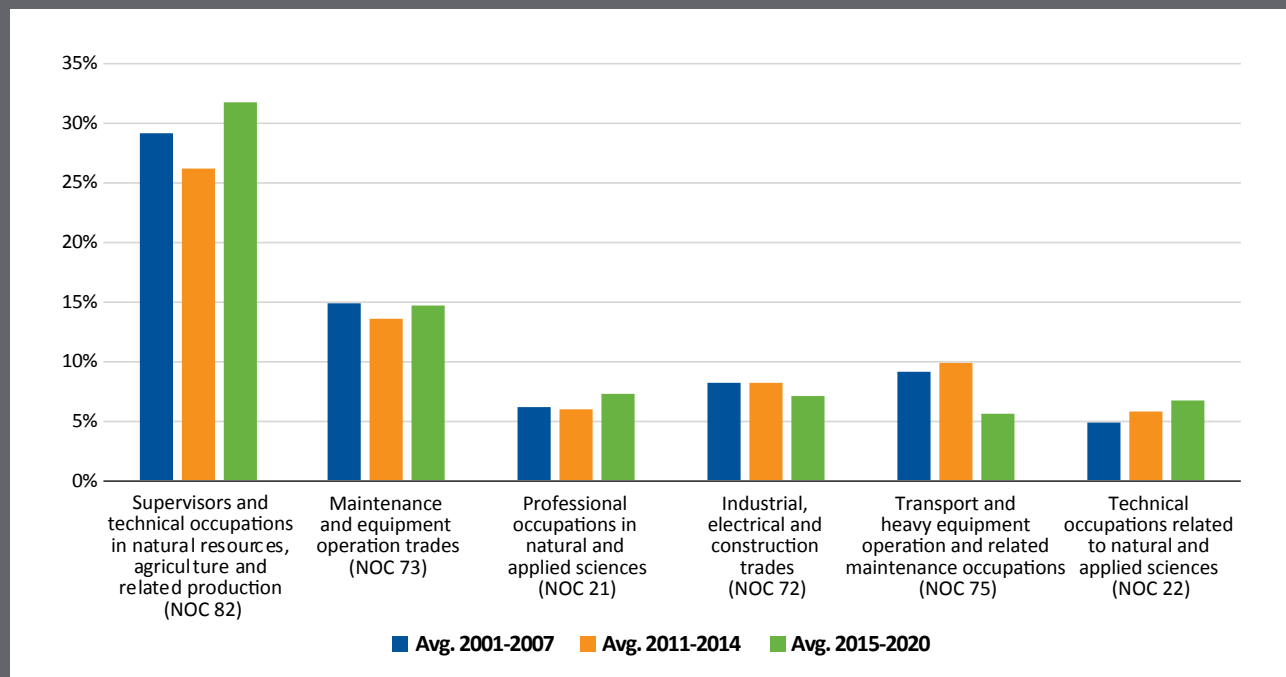
OCCUPATIONAL MIX

The occupational mix refers to the composition of occupations that perform mining activities across the country. Though the mining workforce is diverse, *Underground miners (NOC 823)* remains the largest occupation in Canada’s mining sector.

Figure 11 shows the shares of six prominent occupational categories in *Mining and quarrying (NAICS 212)*. With roughly 30% of the workforce, *Supervisors and technical occupations in natural resources (NOC 82)* make up the greatest share of the workforce. About three-quarters of this category is represented by *Underground miners (NOC 823)*. Over the last decade, the share of *Underground miners (NOC 823)* has nearly doubled, from 15% in 2012 to 30% in 2020 (Figure 12). This trend demonstrates the growing importance of this occupation to mining operations in Canada.

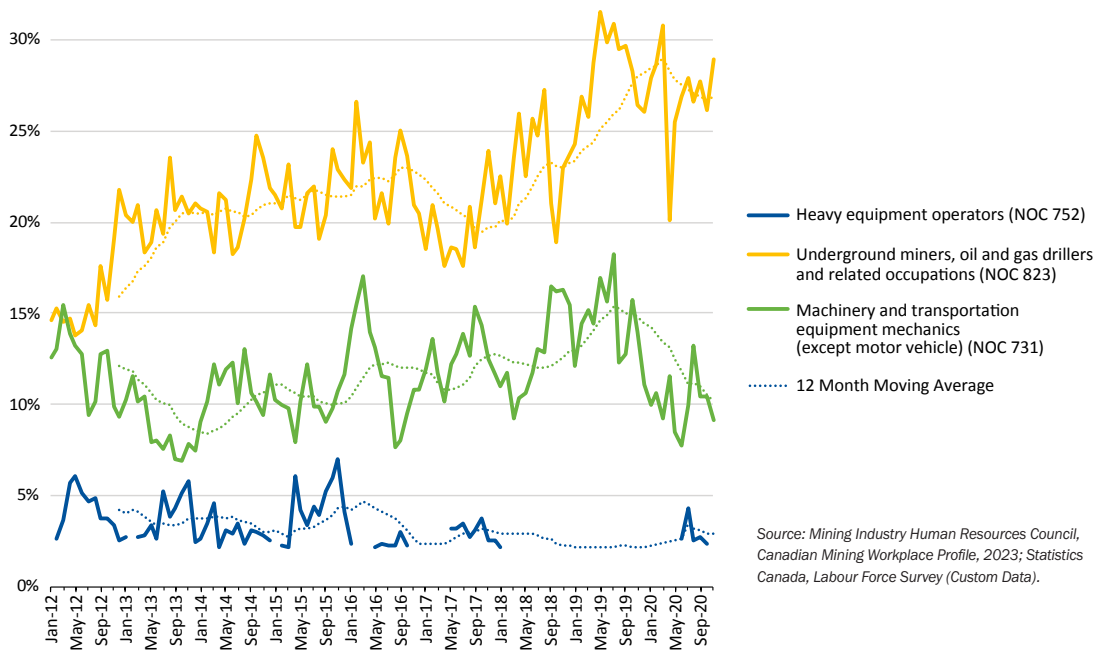


FIGURE 11: SHARE OF THE WORKFORCE FOR SIX PROMINENT OCCUPATIONAL CATEGORIES, MINING AND QUARRYING (NAICS 212) (2001 – 2020)



Source: Mining Industry Human Resources Council, *Canadian Mining Workplace Profile, 2023*; Statistics Canada, *Labour Force Survey (Custom Data)*.

FIGURE 12: SHARE OF THE WORKFORCE FOR SELECT OCCUPATIONAL CATEGORIES, MINING AND QUARRYING (NAICS 212) (2012 – 2020)



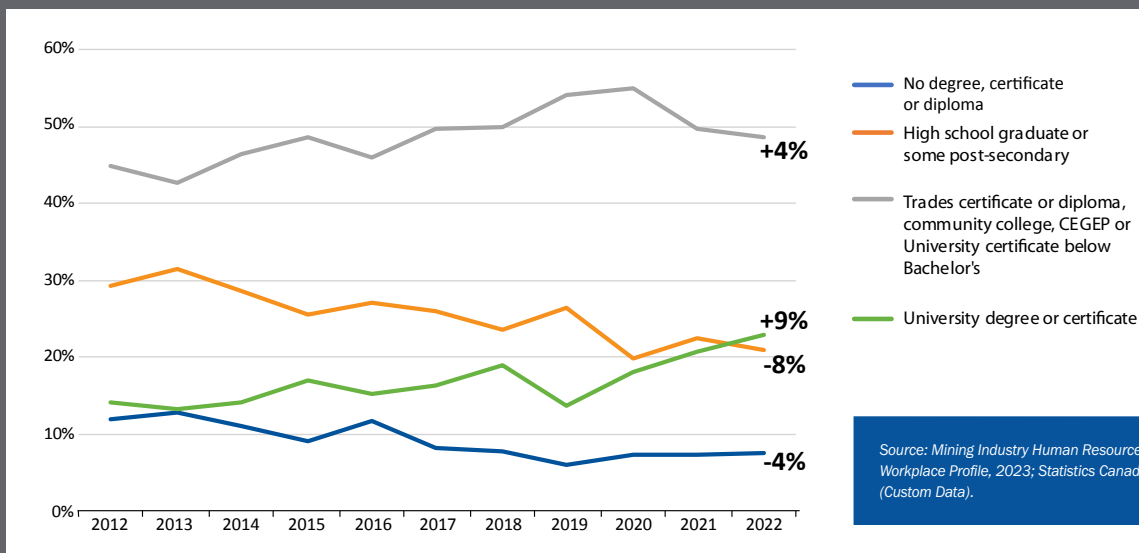
Source: Mining Industry Human Resources Council, Canadian Mining Workplace Profile, 2023; Statistics Canada, Labour Force Survey (Custom Data).

EDUCATIONAL BREAKDOWN

The mining workforce is comprised of people from different educational backgrounds. In *Mining and quarrying (NAICS 212)*, the share of workers with a post-secondary education certificate (i.e., university, and trades) has increased while the share of workers with no post-secondary education (i.e., high school and no certificate)

has been diminishing (Figure 13). As methods of mineral extraction become progressively more advanced, the educational requirements of the workforce are expected to evolve to include a greater share of workers with post-secondary training.

FIGURE 13: EDUCATIONAL BREAKDOWN OF THE WORKFORCE, MINING AND QUARRYING (NAICS 212) (2012 – 2022)



Source: Mining Industry Human Resources Council, Canadian Mining Workplace Profile, 2023; Statistics Canada, Labour Force Survey (Custom Data).

WORKFORCE SKILLS

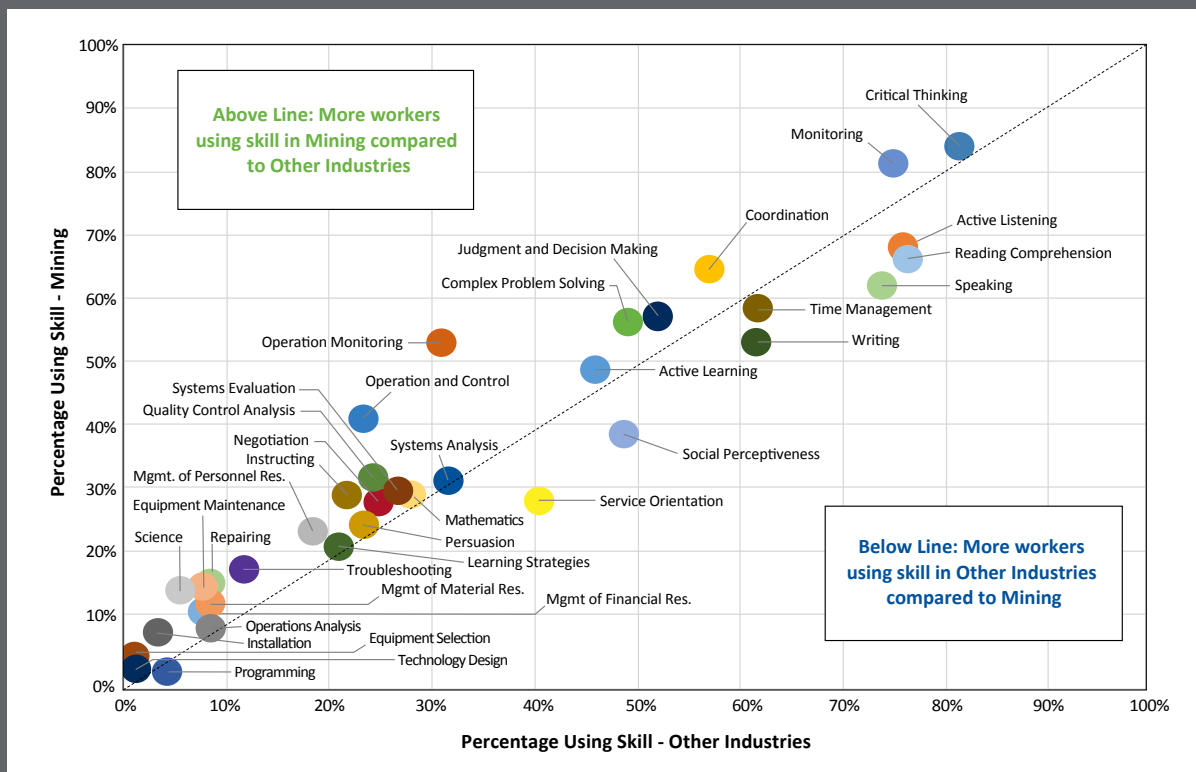
Workplace skills is an emerging topic of interest as new data and resources have become available to produce skills-related information. MiHR has developed an analysis that aims to quantify the skills that are most prevalent across 120 mining-related occupations. MiHR leverages the O*NET skills taxonomy to determine the skills (out of a list of 35 total workforce skills) that are important to a particular occupation.⁷ Specifically, the analysis follows a simple two-step approach: (1) Map skills to occupations, and (2) Add up workers in occupations using a particular skill.⁸

The result is an estimate of the most frequently utilized skills in the mining workforce. Figure 14 compares how skills differ between *Mining and quarrying (NAICS 212)* and other industries. Notable prevalent skills in the sector (shown above the parity line) include *Operation monitoring, Operation and control, Coordination, Science and Complex problem solving*. These findings serve as a reference point for skills distribution among workers and present mining stakeholders (i.e., career seekers, employers, educators, governments) with information to align labour supply skills with those that are in greatest demand.

7 The O*NET database provides an established resource that delineates occupations in terms of skills, knowledge, abilities, and experience (among other criteria). For more information on the skills taxonomy list used, visit O*Net Online: <https://www.onetonline.org/find/descriptor/browse/Skills/>.

8 For more details on the methodology, the skills analysis follows MiHR's previous work: Mining Industry Human Resources Council (MiHR). (2020). The Changing Nature of Work: Innovation, Automation and Canada's Mining Workforce. https://mihr.ca/wp-content/uploads/2020/05/MIHR_Innovation_Report_EN_WEB.pdf.

FIGURE 14: COMPARISON OF SKILLS PREVALENCE, MINING AND QUARRYING (NAICS 212) AND OTHER INDUSTRIES (2016)



Source: Mining Industry Human Resources Council, Canadian Mining Workplace Profile, 2023; O*NET Skills Database; Statistics Canada, Census of Population, 2016.

POST-SECONDARY TRENDS

A competitive labour market needs a reliable supply of graduates from post-secondary institutions. This section specifically focusses on enrolments in mining engineering programs, supported by data from Engineers Canada.

Size of Mining Engineering Programs

Figure 15 shows a breakdown of undergraduate enrolment in various engineering programs across Canada in 2020. The three most mining-centric engineering programs also have the smallest enrolment numbers. These are shown as Mining, Metallurgical and Geological engineering.

FIGURE 15: UNDERGRADUATE ENROLMENT IN ACCREDITED ENGINEERING PROGRAMS (2020)

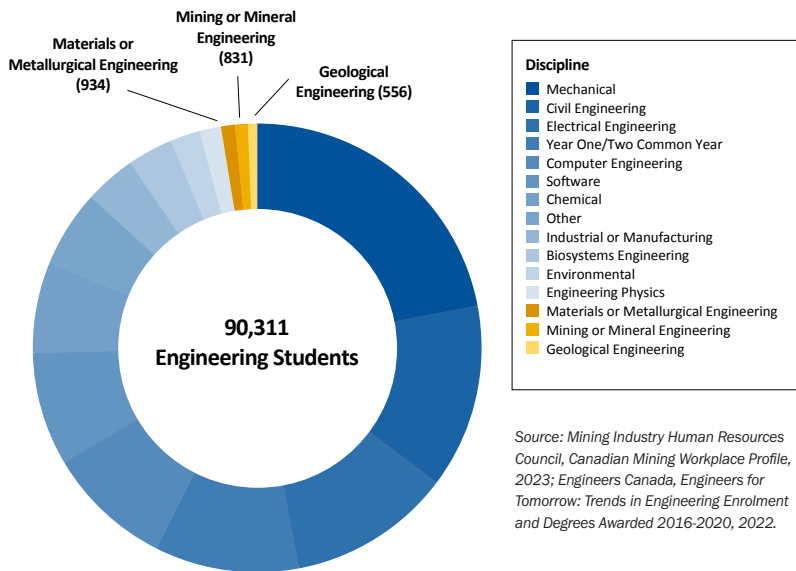


Table 2 further reports the average share of enrolment for the most popular and least popular undergraduate engineering programs from 2016 to 2020. Only 3% of students pursue mining-centric engineering disciplines, whereas the three most popular programs (i.e., Mechanical, Civil and Electrical engineering) represent roughly half of all enrolments.

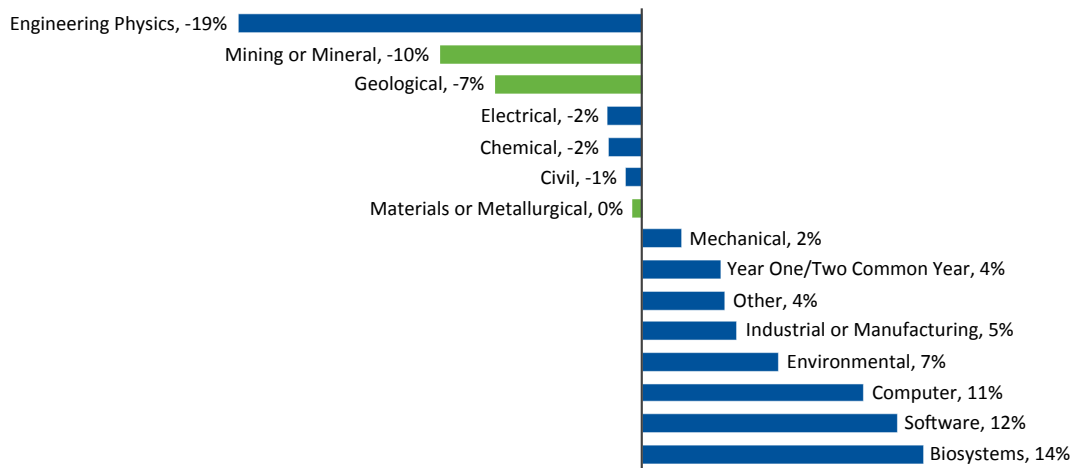
This trend highlights a potential bottleneck for attracting new talent given that other, more competitive programs are the primary destination for students enrolling in engineering.

TABLE 2: TOP THREE AND BOTTOM THREE ENGINEERING PROGRAMS BY ENROLMENT POPULARITY (AVERAGE 2016 – 2020)

| Total | All Programs | 86,720 | 100% | 100% |
|----------|----------------------------|--------|------|------|
| Top 3 | Mechanical | 19,190 | 22% | 49% |
| | Civil | 12,242 | 14% | |
| | Electrical | 11,235 | 13% | |
| Bottom 3 | Mining or Mineral | 1,020 | 1% | 3% |
| | Materials or Metallurgical | 905 | 1% | |
| | Geological | 634 | 1% | |

Source: Mining Industry Human Resources Council, Canadian Mining Workplace Profile, 2023; Engineers Canada, Engineers for Tomorrow: Trends in Engineering Enrolment and Degrees Awarded 2016-2020, 2022.

FIGURE 16: AVERAGE ANNUAL GROWTH IN UNDERGRADUATE ENGINEERING ENROLMENT BY DISCIPLINE (AVERAGE 2016 – 2020)



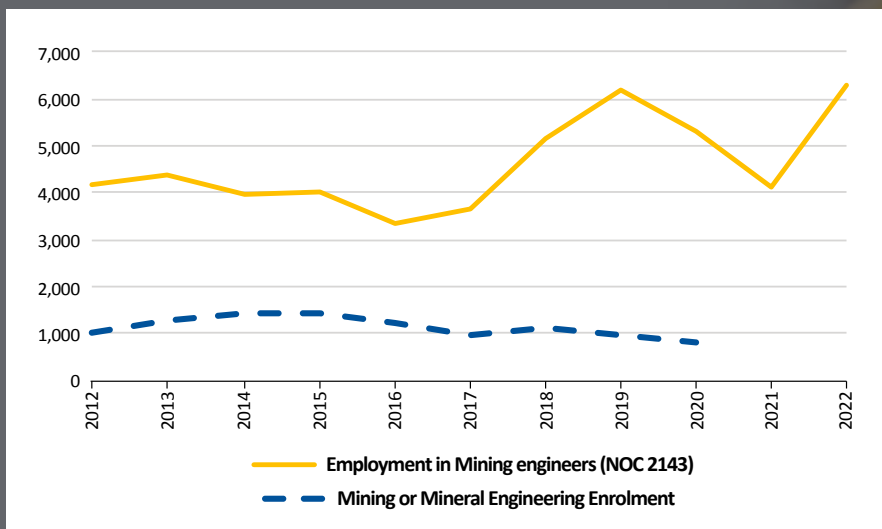
Source: Mining Industry Human Resources Council, Canadian Mining Workplace Profile, 2023; Engineers Canada, Engineers for Tomorrow: Trends in Engineering Enrolment and Degrees Awarded 2016-2020, 2022.

Growth of Mining Engineering Programs

Not only are mining engineering programs small relative to other engineering programs, they are also declining in enrolment size. Figure 16 reports the average annual growth of undergraduate enrolment in engineering disciplines from 2016 to 2020. Mining-centric programs show comparatively large enrolment decreases over this timeframe.

Despite this reduction in enrolment, employment numbers for these occupations have either maintained their levels or have grown over the last decade. *Mining engineers (NOC 2143)*, in particular, employment numbers have risen by roughly 50% since 2012 (Figure 17). If the trend continues, this could contribute to significant labour market tightness in the coming years.

FIGURE 17: ENROLMENT IN MINING OR MINERAL ENGINEERING AND EMPLOYMENT FOR MINING ENGINEERS (NOC 2143) (2012 – 2020)



Source: Mining Industry Human Resources Council, Canadian Mining Workplace Profile, 2023; Statistics Canada, Labour Force Survey (Custom Data); Engineers Canada, Engineers for Tomorrow: Trends in Engineering Enrolment and Degrees Awarded 2016-2020, 2022.

DIVERSITY

While Canada’s mining industry has increasingly embraced equity, diversity, and inclusion (EDI) as one of its main guiding principles, boosting representation among certain groups remains a persistent challenge. The latest trends on representation in the workforce show that, relative to other industries, mining continues to underperform with women and immigrants. At the same time, the sector has greatly expanded on its share of Indigenous workers in recent years.

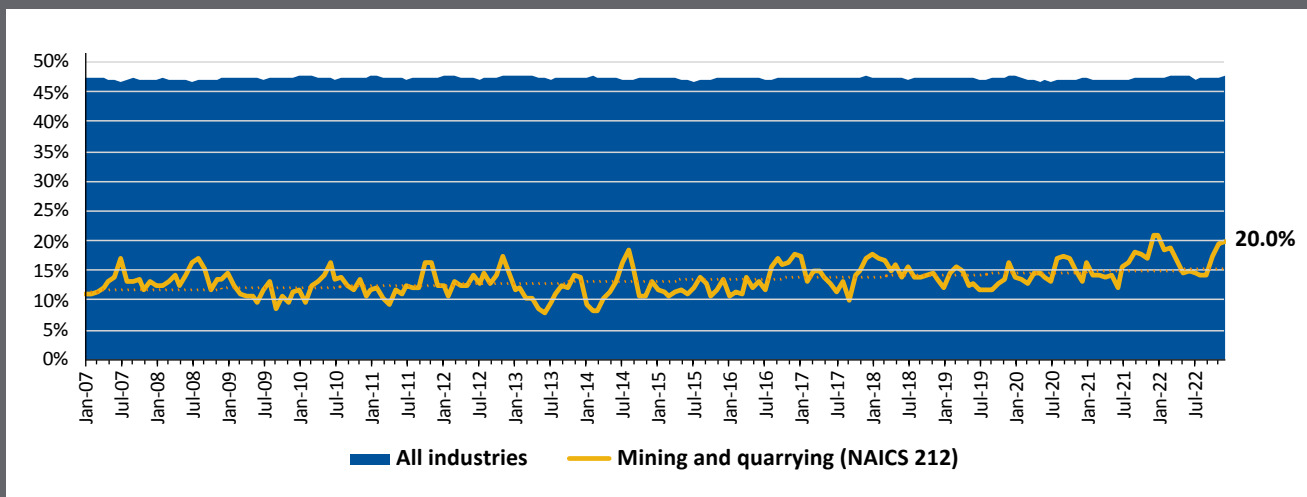
Women in Mining

At roughly half of the overall workforce, women represent a sizable group with the potential to fill the industry’s labour and talent shortages. Yet the trend has only slightly improved; from 2007 to 2019, women made up about 13% of the *Mining and quarrying (NAICS 212)*, while from 2020 to 2022 the average share rose to 16% (Figure 18).

Over the years there has been a mounting expectation of a significant breakthrough for the representation of women in mining, especially given the attention and resources devoted to addressing the barriers for women entering mining careers. However, as shown in Figure 18, progress is more likely to come from generational change rather than from short-term measures.



FIGURE 18: WOMEN’S SHARE OF THE WORKFORCE, MINING AND QUARRYING (NAICS 212) (2007 – 2022)



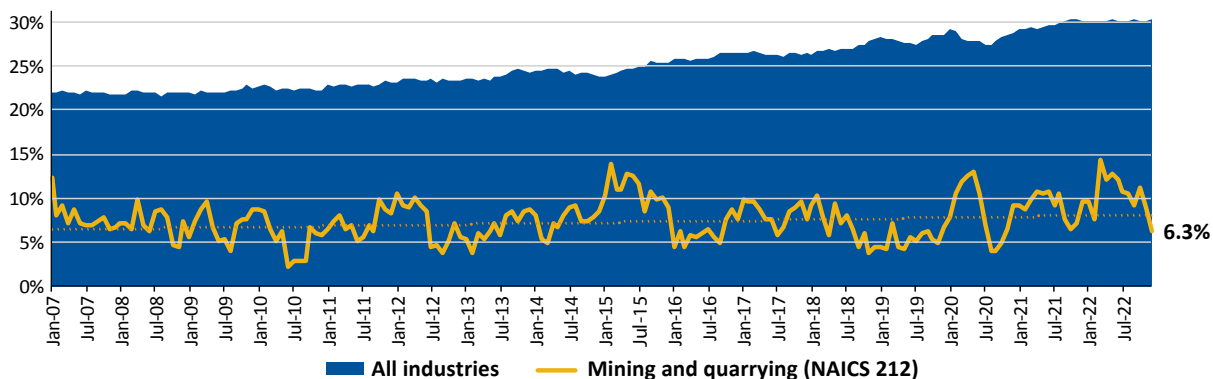
Source: Mining Industry Human Resources Council, Canadian Mining Workplace Profile, 2023; Statistics Canada, Labour Force Survey (Custom Data).

Immigrants in Mining

Like women, immigrant workers offer a significant opportunity for the mining industry to broaden its sources of labour. In 2022, immigrants represented roughly 30% of Canada’s overall workforce, but only 10% of the *Mining and quarrying (NAICS 212)* workforce (Figure 19).

From this perspective, the mining industry has been losing ground to other industries over the last decade and a half. From 2007 to 2022, the share of immigrants across all industries surged from 22% to over 30%, while the trend in *Mining and quarrying (NAICS 212)* remained comparatively stagnant (with the annual average rising from 8% to 10% over the same period), aside from temporary spikes during brief periods of volatility.

FIGURE 19: IMMIGRANTS’ SHARE OF THE WORKFORCE, MINING AND QUARRYING (NAICS 212) (2007 – 2022)



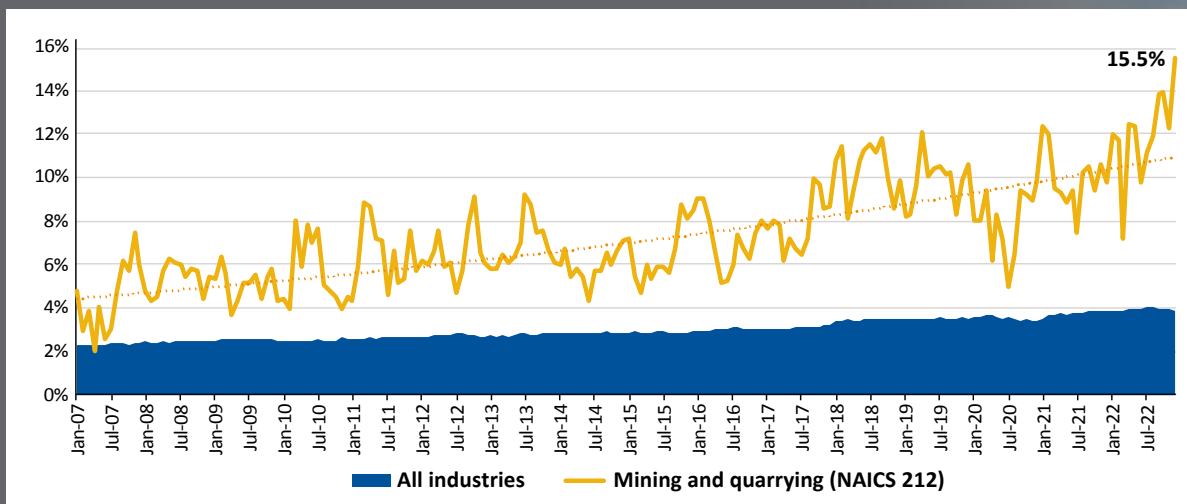
Source: Mining Industry Human Resources Council, Canadian Mining Workplace Profile, 2023; Statistics Canada, Labour Force Survey (Custom Data).

Indigenous Peoples in Mining

Mining is one of the largest employers of Indigenous peoples in Canada. In 2022, Indigenous workers averaged 12% of the *Mining and quarrying (NAICS 212)* workforce (Figure 20). By contrast, they represented less than

4% of Canada’s overall workforce. From 2007 to 2022, Indigenous representation in mining has nearly tripled, pointing to a favourable trend for Indigenous employment outcomes in the mining sector.

FIGURE 20: INDIGENOUS SHARE OF THE WORKFORCE, MINING AND QUARRYING (NAICS 212) (2007 – 2022)



Source: Mining Industry Human Resources Council, Canadian Mining Workplace Profile, 2023; Statistics Canada, Labour Force Survey (Custom Data).

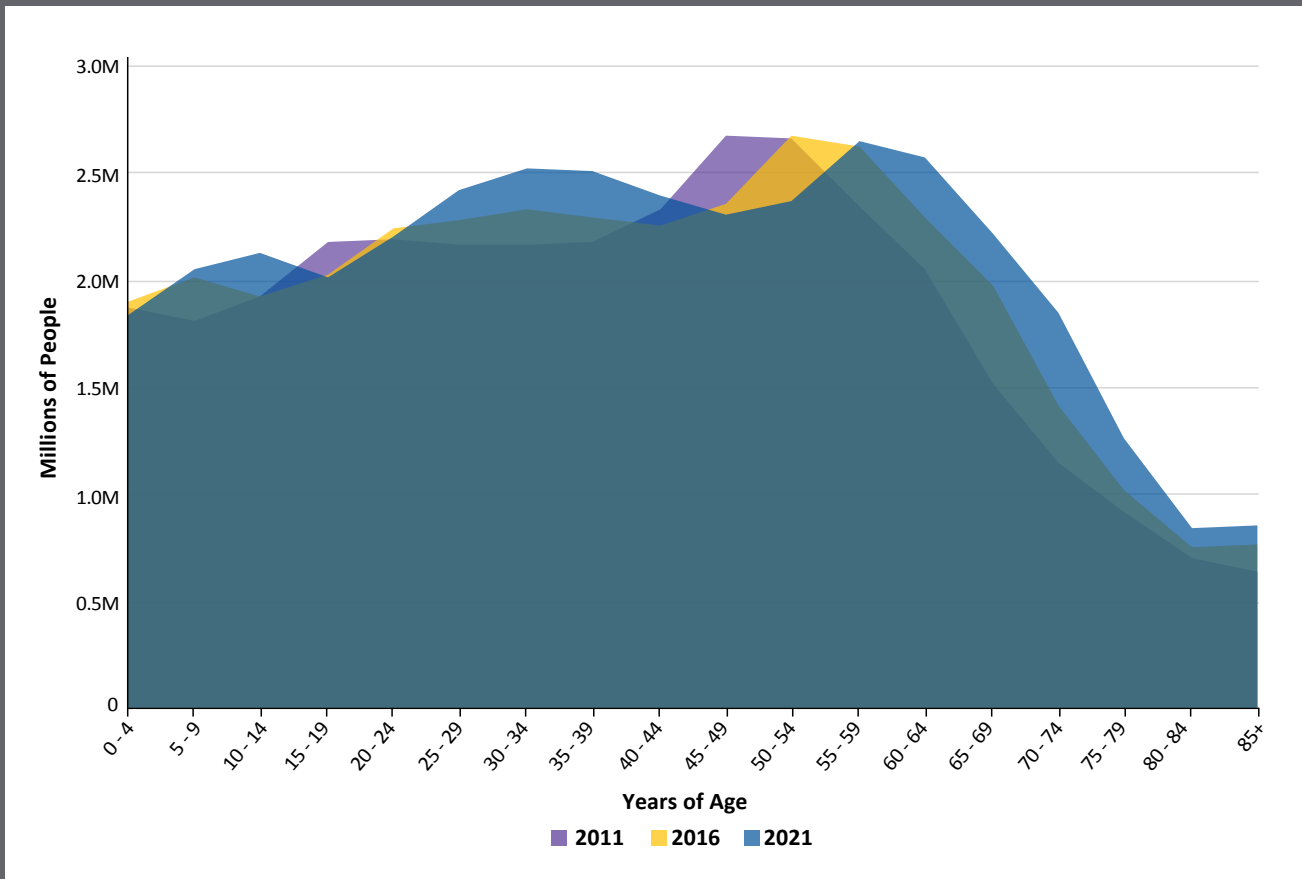
AGE BREAKDOWN

Canada’s aging population continues to be a concern for many industries, as the baby boomer generation continues to shift into retirement. The trend towards a retiring workforce can result in a potential shortage of skilled workers given that these older workers are not easily replaced.

Figure 21 shows the distribution of age cohorts in the population over the last three census periods. While there is a noticeable progression of baby boomers advancing through their working years, the succeeding generations present a significant decline in population numbers. Thus, the impending exodus of baby boomers from the labour force may prove problematic for labour markets as ensuing generations are unable to offset the number of retirees.



FIGURE 21: AGE DISTRIBUTION IN CANADA (2011, 2016, 2021)

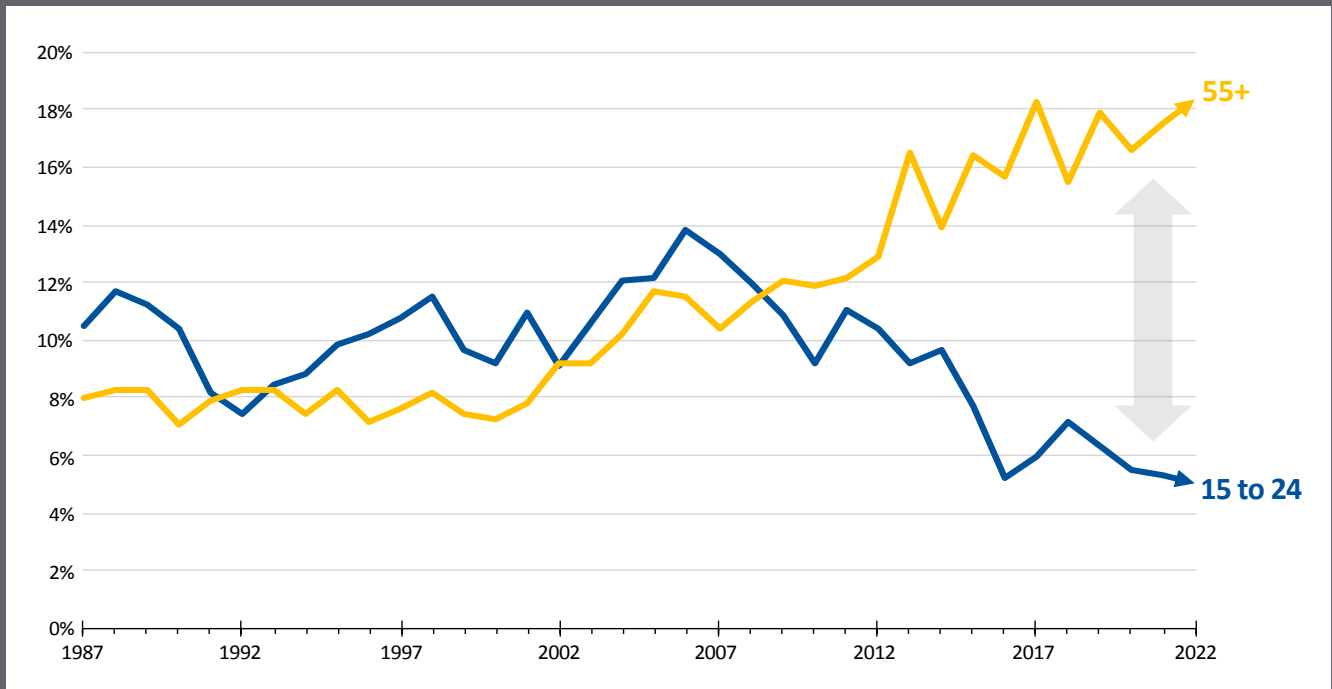


Source: Mining Industry Human Resources Council, Canadian Mining Workplace Profile, 2023; Statistics Canada, Census of Population, (2011, 2016, 2021).



The workforce in *Mining, quarrying and oil and gas extraction (NAICS 21)* also shows a widening age gap, with an increasing share of older workers relative to younger workers (Figure 22). From 2011 to 2022, the share of older workers (55 years and older) has surged from 12% to 18%, while younger workers (15 to 24 years) have dropped from 11% to 5% over that same period.

FIGURE 22: SHARE OF WORKFORCE BY AGE CATEGORY, MINING, QUARRYING AND OIL AND GAS EXTRACTION (NAICS 21) (1987 - 2021)



Source: Mining Industry Human Resources Council, Canadian Mining Workplace Profile, 2023; Statistics Canada, Labour Force Survey (Table: 14-10-0023-01), 2022.

SUMMARY OF KEY FINDINGS

The following summarizes the main findings of this workplace profile report:

Producing Mines across Canada

- There were 137 producing mines in Canada in 2021. Though mines are found in all corners of the country, the largest cluster of mining activity is found in Northeast Ontario and Abitibi-Témiscamingue, Québec.
- Gold is the leading metal produced in Canada with 38% of production (by value of shipments), while potash holds the largest non-metal production at 40% (not including coal production).

Critical Mineral Production in Canada

- The shift to a green economy in Canada will depend on critical minerals that will make clean energy technologies possible.
- With its vast geological landscape, Canada is well-positioned to be a producer of key critical minerals. Currently, Canada has numerous projects focussed on a variety of critical minerals, including Zinc, Copper, Cobalt, Nickel, among several others.

Mining Workforce across Canada

- Mining workers, like producing mines, are present in all corners of Canada, particularly in the Northeastern parts of the country (Ontario and Quebec), but also in remote, less densely populated areas.

Capital and Labour

- In *Mining, quarrying, and oil and gas extraction (NAICS 21)* operations, the ratio of capital-to-labour has consistently been on the rise over the last four decades, suggesting further capital deepening in the mining industry.

Annual Average Hours of Work

- Average work hours per worker have been trending upward in *Mining and quarrying (NAICS 212)*. For full-time workers, the average number of work hours has expanded by 7%, or roughly 20 more working days per year.

Hourly Wage

- Over the past two decades, full-time wages have grown at 3% CAGR while part-time wages have grown at 3.6% CAGR. However, over the last five years, part-time wages have trended downward from \$41.32 per hour in 2018 to \$37.33 per hour in 2021.

Unionization Rate

- Unionization rates in Natural resources sectors have been in decline over the last couple of decades. While unionization rates for all industries have been historically stable at around 30%, rates in natural resources industries have fallen from 29% in 1997 to 18% in 2022.

Labour Productivity

- *Mining, Quarrying, and Oil and Gas Extraction (NAICS 21)* has experienced a steady rise in labour productivity since 2012 (about a 50% increase).
- Labour productivity growth in the past decade has been driven primarily by increasing investment in capital, indicating that capital deepening and labour augmenting technology has made workers more productive.

Occupational Mix

- Though the mining workforce is diverse, *Underground miners (NOC 823)* remains the largest occupation in Canada's mining sector.
- Over the last decade, the share of *Underground miners (NOC 823)* has nearly doubled, from 15% in 2012 to 30% in 2020, demonstrating the growing importance of this occupation.

Educational Mix:

- In *Mining and quarrying (NAICS 212)*, the share of workers with a post-secondary education certificate (i.e., university, and trades) has increased while the share of workers with no post-secondary education (i.e., high school and no certificate) has been diminishing.
- As methods of mineral extraction become progressively more advanced, the educational requirement of the workforce needs to evolve to include a greater share of workers with post-secondary training.

Workforce Skills:

- MiHR leverages the O*NET skills taxonomy to determine the skills (out of a list of 35 total workforce skills) that are important to mining-related occupations. Notable prevalent skills in *Mining and quarrying (NAICS 212)* include *Operation monitoring, Operation and control, Coordination, Science and complex problem solving*.

Post-Secondary Trends (Mining Engineering):

- Size of Mining Engineering Programs: the three most mining-centric engineering programs (i.e., Mining, Metallurgical and Geological engineering) also have the smallest enrolment numbers.
- Growth of Mining Engineering Programs: not only are mining-engineering programs small relative to other engineering programs, but they are also declining in enrolment size.
- Despite the dwindling trends in enrolment, *Mining engineers (NOC 2143)* have seen employment numbers rise by roughly 50% since 2012.

Diversity:

- At roughly half of the overall workforce, women represent a sizable group with the potential to answer talent shortages. Yet from 2020 to 2022, women made up only 16% of the *Mining and quarrying (NAICS 212)* workforce—a slight improvement from the previous trend.
- Immigrant workers present a significant opportunity for the mining industry to expand its sources of labour supply. In 2022, immigrants represented roughly 30% Canada's overall workforce, but only 10% of the *Mining and quarrying (NAICS 212)* workforce.
- In 2022, Indigenous workers averaged 12% of the *Mining and quarrying (NAICS 212)* workforce. From 2007 to 2022 Indigenous representation has nearly tripled, pointing to a favourable trend for Indigenous employment outcomes in the mining sector.

Age Breakdown:

- There is a noticeable progression of the largest age group advancing into retirement; succeeding generations present a significantly smaller population.
- The ongoing exodus of baby boomers from the labour force may prove problematic for labour markets given that ensuing generations will be unable to offset the number of retirees.
- At the same time, the workforce in *Mining and quarrying (NAICS 212)* shows a widening age gap, with an increasing share of older workers relative to younger workers.

