Signal49 RESEARCH

In partnership with Future Skills Centre | Centre des Compétences futures

Talent and Technology in Canada's Primary Industries

Key Findings and Recommendations

Fuelling our future

Canada's mining and oil & gas industries drive national prosperity, protect economic sovereignty, and support the energy transition. They supply critical minerals, enable low carbon technologies, and strengthen export performance. Yet an aging workforce, declining enrolment, and slow adoption of new technologies threaten long-term competitiveness.

Automation and advanced tools offer real opportunities—if Canada can build the talent, infrastructure, and regulatory capacity needed to put them to work.

Key findings

1. The talent pipeline is shrinking—and aging rapidly

- The ratio of workers aged 55 and over to those aged 15 to 24 more than doubled over the past decade, reaching 3.19 in 2024—almost twice the national industry average.
- Post secondary enrolment in mining and petroleum programs continues to decline, and many institutions now rely on international students to sustain programs.
- Public perception remains positive, but interest is low: more than 40 per cent of young Canadians say they "definitely would not consider" a career in these industries.
- Remote operations limit the labour pool, and Indigenous participation—despite strong partnerships in some regions—remains below its potential.

2. Technology adoption is growing—but not fast enough

- Mining and oil & gas rank as Canada's second most automation exposed sector, with 35.6 per cent of tasks automatable today.
- Firms most often use environmental monitoring tools and advanced mapping systems (65 per cent each), followed by materials-handling technologies and digital twins or remote monitoring systems (58 per cent).
- Many firms adopt only proven technologies and hesitate to lead on new solutions.
- Structural hurdles reinforce this caution, including lengthy permitting processes, variable site life cycles, and non standardized operating environments.

3. Automation offers productivity gains—if paired with workforce transition support

- Mining shows higher automation potential (39.1 per cent) than oil & gas (30.8 per cent).
- A small group of automation-exposed roles represents a large share of total jobs. Automation could ease labour shortages, but it may displace workers without clear reskilling pathways.

- Nearly 30 per cent of firms say they find it "very difficult" to hire workers with advanced technological skills.
- Sixty five per cent of firms say they feel prepared to manage workforce transitions—if supported by targeted training and a stronger talent supply.

4. Collaboration is essential to scaling innovation

- More than half of firms co-develop technologies with external partners, showing how much innovation depends on colleges, vendors, and government labs.
- Firms identify key barriers to adoption, including data-security concerns, questions about return on investment, and integration challenges.
- Federal and provincial programs—such as the Critical Minerals Sovereign Fund and investments in mining innovation centres—help close gaps but need scale and long-term consistency.

Key actionable insights

For government

1. Modernize incentives to accelerate technology adoption

- Expand accelerated capital cost allowances to include automation, advanced mining systems, AI, and remote-operations technologies.
- Support partnerships with Canadian technology developers to grow domestic innovation capacity.

2. Reform permitting systems to reduce delays

- Scale parallel permitting frameworks, such as One Project, One Review, while upholding Indigenous consultation and environmental protections.
- Create intergovernmental coordination units focused on critical minerals and energy projects.

3. Strengthen the talent pipeline

- Introduce sector-specific co-op tax credits or grants to support industry–post-secondary training partnerships.
- Restore and selectively increase international student caps for mining, energy, and engineering programs.
- Expand early-education outreach through campaigns such as Mining Needs You and Careers in Energy.

4. Support Indigenous workforce development and partnerships

- Prioritize funding and hiring incentives for graduates of Indigenous-led training institutions such as SIIT.
- Encourage joint ventures between Indigenous communities and industry that build local employment and long-term community benefits.

For industry

- Build deeper partnerships with polytechnics; applied research centres such as NORCAT, CEMI, and CRIN; and technology vendors to pilot and scale innovations.
- Invest in clear reskilling pathways, especially for medium-exposure roles that will evolve rather than disappear.
- Strengthen retention strategies for workers with technical skills, including career paths in AI, automation, and digital operations.

For universities and colleges

- Align curricula with industry needs through direct collaboration with polytechnics and industry leaders.
- Invite industry ambassadors into classrooms to address perception challenges and highlight the sector's transformation.

For the full analysis, see our impact paper *Fuelling Our Future: Talent and Technology in Canada's Mining and Oil and Gas Industries*.

In partnership with: Toronto Metropolitan University, Signal49 RESEARCH, Blueprint

Funded by the Government of Canada's Future Skills Program | Canada

This research was prepared with financial support provided through the Government of Canada's Future Skills Program.