



Building a Nuclear SMR Workforce for Western Canada:

**Forecasting Talent Demand,
Labour Supply, and Workforce
Development Pathways**

Research by



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Preface

The Information and Communications Technology Council (ICTC) is a neutral, not-for-profit national centre of expertise with the mission of strengthening Canada's digital advantage in the global economy. For over 30 years, ICTC has delivered forward-looking research, practical policy advice, and capacity-building solutions for individuals and businesses. The organization's goal is to ensure that technology is utilized to drive economic growth and innovation and that Canada's workforce remains competitive on a global scale.

 [ictc-ctic.ca](https://www.ictc-ctic.ca)  info@ictc-ctic.ca

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Author order is alphabetized.

Researched and written by Erik Henningsmoen (Senior Research & Policy Analyst) and Christopher Lindstrom (Economist) with generous support from Jianshi Li (Data Scientist) and the ICTC Research & Policy team.

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Executive Summary

Canada is undergoing a generational expansion of its nuclear energy infrastructure. While nuclear energy expansion is centred in Ontario, which is presently building the first small modular reactors (SMRs) in the G7, SMRs may also be deployed in Western Canada in the coming decade to help meet the energy needs of the growing economies of Alberta and Saskatchewan.

Developing SMRs in Alberta and Saskatchewan would underscore Canada's status as an advanced nuclear energy state with significant scientific and engineering expertise in nuclear technology. To support nuclear energy expansion, Alberta and Saskatchewan need to build a skilled nuclear energy workforce in Western Canada. To have skilled workers ready to build and operate SMRs in Western Canada in the coming decade, new education and training programs in Alberta and Saskatchewan will need to begin the design and approval process in the coming years.

Alberta and Saskatchewan will need to develop a nuclear energy workforce from the ground up. Presently, Canada's skilled nuclear energy workforce is in Eastern Canada, primarily in Ontario. This nuclear energy workforce consists of numerous specialized occupations, spanning engineering, scientific and technological specialists, skilled trades, and administration and support personnel.

This ICTC report explores building Western Canada's future nuclear workforce. The report provides an overview of Canada's nuclear energy industry, including the locations of existing nuclear energy infrastructure, current SMR and conventional nuclear

energy projects under development throughout Canada, and labour market data on Canada's current nuclear workforce. The report explores the demand of nuclear energy workers in Canada with contemporary labour market data for the Canadian nuclear energy industry and reviews staffing-level estimates for conventional nuclear energy and SMR projects. Finally, the report provides an overview of potential sources of supply of nuclear energy workers in Western Canada from adjacent industries in Alberta and Saskatchewan.

After exploring factors of supply and demand for nuclear energy workers in Western Canada, the report maps Canada's current specialized nuclear energy education and training ecosystem, nearly entirely centred in Ontario, and evaluates options to create nuclear energy workforce development in Western Canada, including the role that colleges and universities in Alberta and Saskatchewan could play in the provinces' nuclear energy training through specialized diploma, degree, and nuclear industry-specific continuing education and micro-credential programs. The report concludes with policy recommendations for fostering a future nuclear SMR workforce for Western Canada.

Key Takeaways



A generational renewal and expansion of nuclear energy is occurring in Canada. This includes the deployment of the first SMRs in the G7 at the Darlington Nuclear Generating Station in Ontario, as well as the development of SMR projects in Western Canada in the next decade.



Canada is an advanced nuclear energy state with a large nuclear energy industry and decades of experience safely operating nuclear reactors for electricity generation, but the Canadian nuclear industry is primarily centred in Eastern Canada. For SMR development to occur in Alberta and Saskatchewan, Western Canada will need its own highly skilled nuclear workforce.





A highly skilled nuclear workforce for Western Canada will include engineering, scientific and technical specialists, skilled trades, and supporting administrative roles. Alberta and Saskatchewan have significant numbers of preexisting engineering, scientific and technical, and skilled trades workers, with skills relevant to the nuclear energy industry, but skilled talent in these fields is already in high demand by industries such as oil and gas, mining, utilities, and heavy industry in Western Canada.



Universities, colleges, and polytechnics in Alberta and Saskatchewan have a significant role to play in providing specialist nuclear energy education and training programs for Western Canada's future nuclear energy workforce.



While deploying the first SMRs in Western Canada is at least a decade away—due to the time required to develop and approve new post-secondary programs and graduate initial cohorts of students—post-secondary institutions in Alberta and Saskatchewan will need to begin new program design and approval processes soon to produce graduates in time for the first SMRs to come online.

List of Acronyms

AI: artificial intelligence

CANDU: Canada Deuterium Uranium reactor

CER: Canada Energy Regulator

CNA: Canadian Nuclear Association

FTE: full-time equivalent

HALEU: high-assay low-enriched uranium

IAAC: Impact Assessment Agency of Canada

IAEA: International Atomic Energy Agency

IEA: International Energy Agency

ICTC: Information and Communications Technology Council

MEng: Master of Engineering

MoU: memorandum of understanding

NAICS: North American Industry Classification System

NII: Nuclear Innovation Institute

NOC: National Occupational Classification

NWMO: Nuclear Waste Management Organization

OPG: Ontario Power Generation

SAGD: steam-assisted gravity drainage

SASC: site access security clearance

SRC: Saskatchewan Research Council

SMR: small modular reactor

TEER: training, education, experience, and responsibilities

UNENE: University Network of Excellence in Nuclear Engineering

WIL: work-integrated learning

ZEPP: Zero Energy Experimental Pile



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Introduction and Background

Key Takeaways



Canada is an advanced nuclear energy state, with significant scientific and technological strengths and decades of experience safely operating nuclear reactors for electricity generation.



Canada is undergoing a generational renewal and expansion of its nuclear energy infrastructure, including refurbishing existing nuclear reactors in Ontario, as well as the deployment of the first SMR nuclear project in the G7, named the Darlington New Nuclear Project.



Alberta and Saskatchewan have also begun serious work to develop SMR projects but are at least a decade away in Saskatchewan and even longer in Alberta.



A growing digital economy, including electricity demand from artificial intelligence (AI) data centres and other advanced computing infrastructure, may put major demands on electricity generation throughout Canada and globally.

Canada is in the midst of a generational expansion of nuclear energy. This includes the first deployment of SMRs at the Darlington nuclear site in Ontario. While the current focus for nuclear energy expansion is occurring in Eastern Canada, Alberta and Saskatchewan are also actively working toward developing nuclear energy projects, including deploying SMRs, to help meet the energy needs of Western Canada. Ongoing developments in Western Canada come as the Canadian federal government released its nuclear energy strategy in June 2026. The federal strategy seeks to greatly expand Canada's already significant nuclear energy sector, adding 10 new nuclear reactors and doubling the size of Canada's nuclear energy workforce.¹

This report forecasts the talent demand, potential labour supply, and workforce training and development pathways for Western Canada's emerging nuclear energy industry.

The report outlines the basics of nuclear energy and SMR technology and then provides a scan of Canada's contemporary nuclear energy industry, including locations of nuclear energy infrastructure throughout the country as well as data on the contemporary Canadian nuclear workforce. The report also highlights major nuclear energy renewal and expansion projects, including large-scale conventional nuclear energy and SMR projects, occurring throughout Canada. It then focuses on contemporary developments and nuclear energy

¹ See: Natural Resources Canada. June 22, 2026. Nuclear Energy Strategy for Canada. <https://natural-resources.canada.ca/energy-sources/nuclear-energy-uranium/nuclear-energy-strategy-canada>.



project timelines in Alberta and Saskatchewan. It also provides an overview of potential demand for a future SMR workforce in Western Canada, including key occupational categories and evaluates potential sources of talent supply in Alberta and Saskatchewan.

The report then maps Canada's nuclear energy training ecosystem, including specialist post-secondary programs focused on nuclear energy, and assesses education and training pathways for developing a future nuclear energy workforce for Western Canada. The report concludes with policy recommendations toward building a future nuclear SMR workforce for Western Canada.

What is Nuclear Energy?

All matter is made up of atoms, which are tiny particles so small that they cannot be seen with the naked eye. At the centre of each atom is a nucleus that contains enormous amounts of stored energy. Under certain conditions, the nucleus of a specific type of atom can be split into smaller parts when it absorbs a neutron (one kind of particle that is smaller than an atom). Energy from the nucleus, or nuclear energy, is harnessed through a process called nuclear fission.

When nuclear fission occurs, it releases large amounts of heat, radiation, and additional neutrons that can go on to split other nuclei, creating a chain reaction where each split triggers further splits. In a nuclear power plant, this chain reaction is controlled inside a nuclear reactor. The heat produced through fission is used to generate steam, which spins turbines connected to generators that produce electricity.² Nuclear reactors allow this process to occur in a controlled, safe, and sustained manner.

The nuclear energy industry originates from the first experimental nuclear reactors developed between the late 1940s and into the 1950s, with the first commercial reactors appearing in the 1960s.³ Canada played a key role in the development of

nuclear technology, first as a partner in nuclear technology development during World War II, and then in the post-war years, developing peaceful applications for nuclear energy. This included producing experimental nuclear reactors, such as Zero Energy Experimental Pile (ZEEP), the first experimental reactor put into operation outside of the United States, starting in 1945.⁴ This work was completed through the National Research Council Canada and Atomic Energy of Canada Ltd., a Canadian Crown corporation founded in 1952.⁵

According to the World Nuclear Association, today there are an estimated 440 nuclear power reactors used for electricity generation in operation around the world, along with 220 smaller research reactors used for research, training, and to produce nuclear materials essential for medical and industrial uses.⁶ The International Energy Agency (IEA) reports nuclear power produces around 10% of electricity globally and 20% of electricity across advanced economies.⁷

What are Small Modular Reactors?

An SMR refers to a novel class of nuclear reactors that are smaller scale when compared to conventional nuclear reactors. These reactors are modular, which allows them to be manufactured in a centralized factory setting and transported as standardized pre-built components to a site for assembly and operation.⁸

Due to their relatively small size and flexibility, SMRs are ideal for applications such as acting as a dedicated source of energy for large industrial sites (in the form of industrial heat or electricity) or providing electricity for remote communities. SMRs can also be placed in parallel with larger, conventional reactors—based on large-scale, legacy nuclear reactor technology—at existing nuclear power facilities, allowing these nuclear power generation facilities to be scaled up or down quickly in response to energy demand.

² See: International Atomic Energy Agency. November 15, 2022. What is nuclear energy? The science of nuclear power. <https://www.iaea.org/newscenter/news/what-is-nuclear-energy-the-science-of-nuclear-power>.

³ See: World Nuclear Association. March 15, 2026. Outline history of nuclear energy. <https://world-nuclear.org/information-library/current-and-future-generation/outline-history-of-nuclear-energy>.

⁴ Green, R.E. and A. Okazaki. 1995. ZEEP: The little reactor that could. Canadian Nuclear Society Bulletin, 16(3): 3-8. https://cns-snc.ca/wp-content/uploads/2022/01/Vol_16_No3_1995.pdf.

⁵ See: Krenz, F.H. and D.K. Evans. July 17, 2014. Nuclear research establishments. The Canadian Encyclopedia. <https://www.thecanadianencyclopedia.ca/en/article/nuclear-research-establishments>.

⁶ World Nuclear Association. January 6, 2025. Nuclear power in the world today. <https://world-nuclear.org/information-library/current-and-future-generation/nuclear-power-in-the-world-today>.

⁷ International Energy Agency. March 18, 2026. Nuclear power. <https://www.iea.org/energy-system/electricity/nuclear-power>.

⁸ International Atomic Energy Agency (IAEA). September 13, 2023. What are small modular reactors (SMRs)? <https://www.iaea.org/newscenter/news/what-are-small-modular-reactors-smrs>.



According to the Canadian Nuclear Safety Commission, SMRs normally have a generation capacity of up to 300 megawatts or enough electricity to power 300,000 Canadian homes.⁹ SMRs vary from a large building to about a city block in size and take 7 to 10 years to build. In comparison, conventional, large-scale nuclear reactors can produce over 1,000 megawatts, require kilometres of land, take 10 to 15 years to build, and are used to power large urban areas.¹⁰

Due to their smaller size and flexibility, in addition to providing electricity for urban areas, SMRs are also attractive for industrial applications such as providing industrial heat and steam, as well as acting as a dedicated electricity source, for large-scale industrial sites.

The smallest types of SMRs, referred to as microreactors, produce as little as 1 to 20 megawatts of power, are self-regulated, and can be transported to a site via semi-trailer truck or railcar.¹¹ The Idaho National Laboratory notes that these microreactors' characteristics make them ideal for industrial applications, powering remote communities, defence applications, and disaster relief.¹² Microreactors also have the potential to be fully automated in the future, depending on the design direction of new technologies and regulatory requirements.¹³

International Trends in Nuclear Energy Development

Globally, there is renewed interest in nuclear energy as a low-carbon energy solution for modern economies with growing energy needs. As the IEA notes in a 2025 report, "the last few years have seen renewed interest in building new nuclear plants and extending the lifetimes of existing ones, and 2025 is set to see generation from nuclear plants reaching an all-time high."¹⁴

This renewed interest and expansion of nuclear energy is being driven by concerns over energy security, the need for low-carbon electricity generation, advances in nuclear technology, and improved policy support for nuclear energy projects.¹⁵ This comes at a time when global energy supply chains have faced significant disruptions. Globally, there are over 60 nuclear reactors currently under construction, primarily in China.^{16,17} According to IEA projections, by 2050 there will be nearly 400 gigawatts of nuclear energy generation capacity worldwide.¹⁸ SMRs are expected to be a key component of nuclear energy investment over the coming decades, according to IEA's analysis, with the most bullish scenarios for SMR deployment amounting to 1,000 SMRs worldwide by 2050, accounting for 20% of new nuclear energy generating capacity.¹⁹

⁹ Canadian Nuclear Safety Commission (Government of Canada). August 29, 2024. About small modular reactors. <https://www.cnsccsn.gc.ca/eng/reactors/smr/about/>.

¹⁰ See: Government of Alberta. Nuclear energy – An introduction, p. 1. <https://www.alberta.ca/system/files/au-nuclear-energy-an-introduction.pdf>.

¹¹ U.S. Department of Energy. February 26, 2021. What is a nuclear microreactor? <https://www.energy.gov/ne/articles/what-nuclear-microreactor>.

¹² Idaho National Laboratory. March 12, 2025. What are microreactors? <https://inl.gov/trending-topics/microreactors/>.

¹³ See: Stevens, K.R., et al. July 2023. Opportunities and challenges for remote microreactor operations. Idaho National Laboratory. https://indigitalibrary.inl.gov/sites/sti/sti/Sort_70584.pdf.

¹⁴ International Energy Agency. January 2025. The path to a new era for nuclear energy, p. 14. <https://www.iea.org/reports/the-path-to-a-new-era-for-nuclear-energy>

¹⁵ Ibid., p. 14.

¹⁶ International Energy Agency. March 18, 2026. Nuclear power. <https://www.iea.org/energy-system/electricity/nuclear-power>.

¹⁷ See: International Atomic Energy Agency. April 21, 2026. Power reactor information system: Under construction – by country. <https://pris.iaea.org/PRIS/worldstatistics/UnderConstructionReactorsByCountry.aspx>.

¹⁸ International Energy Agency. March 18, 2026. Nuclear power. <https://www.iea.org/energy-system/electricity/nuclear-power>.

¹⁹ International Energy Agency. January 2025. The path to a new era for nuclear energy, p. 47. <https://www.iea.org/reports/the-path-to-a-new-era-for-nuclear-energy>.



Factor of Energy Demand – Data Centres, AI Compute, and Hyperscalers

As more information technology services move to the cloud and as developments in advanced computing applications, such as AI and quantum computing rapidly increase, the modern economy will require more data centres to provide necessary computing power.

McKinsey & Company projects that between 2023 and 2030, demand for data centre capacity will increase by 19% to 22% annually.²⁰ Increases in the number and scale of data centres will demand corresponding increases in electricity generation, which is already putting a strain on local electricity grids.²¹ Goldman Sachs forecasts that data centre electricity demand will increase globally by 163% by 2030 (using 2023 as a baseline).²² Much of this increase in electricity demand for data centres is being driven by AI applications, including hyperscaler AI cloud service providers such as Amazon Web Services, Google Cloud, and Microsoft Azure.²³ By 2030, total global data centre capacity could require 122 gigawatts of power.²⁴

According to IEA analysis, total electricity demand from data centres, AI, and cryptocurrencies amounted to 460 terawatt-hours or 2% of global electricity demand.²⁵ The IEA notes that SMRs are well suited to powering data centres due to their ability to provide reliable and steady amounts of clean electricity.²⁶ Indeed, the IEA observes that the shorter potential deployment timeframes, lower upfront capital costs, and smaller overall scale of SMR projects, when compared to conventional nuclear power, make them attractive to commercial investors.²⁷

Canada's Contemporary Nuclear Industry

With over seven decades of experience successfully generating nuclear power, today, Canada is an advanced nuclear energy state.²⁸ Canada is the world's second largest producer of uranium, a vital fuel in the nuclear energy industry, of which all Canadian production is currently based in Saskatchewan, home to the largest deposit of high-grade uranium on the planet.²⁹ The Canadian Nuclear Association (CNA) estimates that the nuclear energy industry contributes over \$22 billion to Canada's GDP.³⁰

Aside from the uranium mining industry in Saskatchewan, Canada's contemporary nuclear industry is centred entirely in Eastern Canada, with one small nuclear generating station in New Brunswick and three much larger facilities in Ontario. Ontario is also home to Chalk River Laboratories, a nuclear research facility in Deep River, Ontario, operated by Canadian Nuclear Laboratories.³¹ Canada's nuclear fuel waste is managed by the Nuclear Waste Management Organization (NWMO), which is establishing a permanent, centralized repository site at Wabigoon Lake Ojibway Nation in Ignace in Northwestern Ontario.³²

²⁰ McKinsey & Company. October 29, 2024. AI power: Expanding data center capacity to meet growing demand. <https://www.mckinsey.com/industries/technology-media-and-telecommunications/our-insights/ai-power-expanding-data-center-capacity-to-meet-growing-demand>.

²¹ Nicoletti, L., N. Malik, and A. Tartar. December 27, 2024. AI needs so much power, it's making yours worse. Bloomberg. <https://www.bloomberg.com/graphics/2024-ai-power-home-appliances/>.

²² Goldman Sachs. February 4, 2025. AI to drive 165% increase in data center power demand by 2030. <https://www.goldmansachs.com/insights/articles/ai-to-drive-165-increase-in-data-center-power-demand-by-2030>.

²³ Red Hat. December 20, 2022. What is a hyperscaler? <https://www.redhat.com/en/topics/cloud-computing/what-is-a-hyperscaler>.

²⁴ Goldman Sachs. February 4, 2025. AI to drive 165% increase in data center power demand by 2030. <https://www.goldmansachs.com/insights/articles/ai-to-drive-165-increase-in-data-center-power-demand-by-2030>.

²⁵ International Energy Agency. January 2024. Electricity 2024: Analysis and forecast to 2026, p. 31. <https://www.iea.org/reports/electricity-2024>.

²⁶ Ibid., pp. 38–39.

²⁷ Ibid., pp. 95–96.

²⁸ Natural Resources Canada. October 26, 2022. Canada's national statement on nuclear energy. <https://www.canada.ca/en/natural-resources-canada/news/2022/10/canadas-national-statement-on-nuclear-energy-the-honourable-jonathan-wilkinson-minister-of-natural-resources-the-international-atomic-energy-agency.html>.

²⁹ World Nuclear Association. March 3, 2026. Country profiles: Uranium in Canada. <https://world-nuclear.org/information-library/country-profiles/countries-a-f/canada-uranium>.

³⁰ Canadian Nuclear Association. March 25, 2026. Jobs and the economy. <https://cna.ca/advantages/jobs-and-the-economy/>.

³¹ Canadian Nuclear Safety Commission. December 4, 2019. Chalk River Laboratories. <https://www.cnsccsn.gc.ca/eng/reactors/research-reactors/chalk-river/>.

³² Natural Resources Canada. January 8, 2025. Nuclear Waste Management Organization. <https://natural-resources.canada.ca/energy-sources/nuclear-energy-uranium/nuclear-waste-management-organization>: NWMO. March 9, 2026. Activities in the Wabigoon Lake Ojibway Nation-Ignace area. <https://www.nwmo.ca/Site-selection/Wabigoon-Lake-Ojibway-Nation-Ignace-area/Activities-in-the-Wabigoon-Lake-Ojibway-Nation-Ignace-area>.



Canada's CANDU Nuclear Reactor Fleet

The technological basis of Canada's nuclear industry since the 1950s is the Canada Deuterium Uranium (CANDU) pressurized heavy-water reactor.³³ CANDU reactors have been used in Canada's nuclear energy industry since the 1960s.³⁴ In addition to their use in Canada, the CANDU reactors have also been exported to Argentina, China, India, Pakistan, Romania, and South Korea.³⁵

There are currently 17 nuclear reactors in Canada, including 14 active reactors and three undergoing refurbishment.³⁶ These reactors are spread across four nuclear power stations, with three in Ontario and one in New Brunswick.³⁷ There is also one

former nuclear power station in Bécancour, Québec, that was shut down in 2012 and is undergoing decommissioning.³⁸ Figure 1 outlines current nuclear generating stations in Canada.

Canadian Research Reactors

In addition to nuclear facilities used in energy generation, there are four operating research reactors throughout Canada. These non-power reactors are used to conduct basic and applied nuclear research; produce neutrons for scientific, medical, and industrial applications; and train scientists, engineers, and other nuclear energy professionals.⁴⁰ Thus, research reactors play an important role in a country's nuclear energy ecosystem. Figure 2 lists research reactors operating in Canada.

Figure 1. Nuclear Energy Generation Facilities in Canada

Facility	Operator	Location	Reactor Type	No. of Reactors	Installed Capacity
Bruce A and B Nuclear Generating Stations	Bruce Power	Kincardine, ON	CANDU	8	6,232 MWe
Pickering Nuclear Generating Station	Ontario Power Generation	Pickering, ON	CANDU	4	3,100 MWe
Darlington Nuclear Generating Station	Ontario Power Generation	Clarington, ON	CANDU	4	3,512 MWe
Point Lepreau Nuclear Generating Station	NB Power	Lepreau, NB	CANDU-6	1	705 MWe

Data Source: Canadian Nuclear Safety Commission, 2025.³⁹

Figure 2. Research Reactors Operating in Canada

Reactor	Site	Location
Zero Energy Deuterium 2 (ZED-2)	Chalk River Laboratories	Deep River, ON
McMaster Nuclear Reactor (MNR)	McMaster University	Hamilton, ON
SLOWPOKE-2 Facility	Royal Military College	Kingston, ON
SLOWPOKE Nuclear Reactor	École Polytechnique de Montréal	Montréal, QC

Source: Canadian Nuclear Society, 2024.⁴¹

³³ See: Brooks, G.L. January 1993. A short history of the CANDU nuclear power system. Ontario Hydro Demand/Supply Plan Hearing, available from the CANDU Owners Group, pp. 6-8. <https://canteach.candu.org/Content%20Library/Forms/DispForm.aspx?ID=10&RootFolder>.

³⁴ Ibid., 12-16.

³⁵ Monsueto Vitorino, I., and L. De Stefani. 2021. On CANDU reactors: History, features and its use around the world. 2021 International Nuclear Atlantic Conference, November 29 to December 2, pp. 2-3. <https://www.mittetecnologia.com.br/anais/inac2021/resumos/R0434-1.pdf>.

³⁶ Canadian Nuclear Safety Commission. December 1, 2025. Nuclear power plants. <https://www.cnsccs.gc.ca/eng/reactors/power-plants/>.

³⁷ Ibid.

³⁸ Hydro-Québec. March 24, 2026. Decommissioning of the Gentilly 2 facilities. <https://www.hydroquebec.com/projects/decommissioning-gentilly-2/>.

³⁹ Canadian Nuclear Safety Commission. December 1, 2025. Nuclear power plants. <https://www.cnsccs.gc.ca/eng/reactors/power-plants/>.

⁴⁰ Mattar, E., and N. Jawerth. November 2019. Exploring research reactors and their use. IAEA Bulletin, International Atomic Energy Agency. <https://www.iaea.org/bulletin/exploring-research-reactors-and-their-use>.

⁴¹ Where are Canada's reactors located? 2024. Canadian Nuclear Society. <https://www.cns-snc.ca/learn-nuclear/basics-of-nuclear/where-are-canadas-reactors-located/>.



While all of Canada's current research reactors are in Eastern Canada, Western Canada has been home to several research reactors in the past. The University of Alberta operated a research reactor from 1977 to 2017 in Edmonton,⁴² and the Saskatchewan Research Council (SRC) operated a research reactor from 1981 to 2019 in Saskatoon.⁴³ The Whiteshell Laboratories in Pinawa, Manitoba, operated two research reactors: the Whiteshell Reactor 1 (from 1965 to 1985) and the SLOWPOKE Demonstration Reactor (from 1989 to 1990).⁴⁴ Since 2003, the site has been undergoing decommissioning.⁴⁵

However, the Canadian Prairies are poised to be home to a research reactor again. In November 2023, the Government of Saskatchewan announced \$80 million in funding for the SRC to procure a demonstration microreactor.⁴⁶ Furthermore, the town of Pinawa expressed interest in hosting a future SMR demonstration facility.⁴⁷ Saskatchewan is set to establish a Small Modular Reactor Safety, Licensing, and Testing Centre for SMR technology, which will include testing loop facilities that simulate different parts of a nuclear reactor. This new facility will be at the Innovation Saskatchewan Research and Technology Park near the University of Regina.⁴⁸

Reestablishing research reactors and supporting infrastructure in Western Canada is an important step to creating the needed ecosystem to develop a skilled nuclear workforce for Alberta and Saskatchewan.

Canada's Existing Nuclear Workforce

According to the CNA, Canada's nuclear energy industry employed around 89,000 people as of 2024, amounting to a 17% increase in nuclear energy employment between 2019 and 2024.⁴⁹ In addition to utility companies, which operate nuclear generating energy stations (also known as nuclear generating stations), according to the International Atomic Energy Agency (IAEA), there are over 200 specialized companies participating in Canada's nuclear supply chain as vendors and contractors.⁵⁰

The nuclear energy industry requires a skilled workforce to safely operate nuclear energy infrastructure and is a major employer of highly qualified personnel in Canada. According to the CNA, 89% of nuclear energy jobs in Canada are categorized as highly skilled, with 42% of nuclear energy jobs requiring a university-level qualification (bachelor's degree or higher) and 47% being technical and skilled trades jobs.⁵¹

A significant portion of Canada's existing nuclear energy workforce will retire in the coming years. As of 2024, 30% of nuclear energy workers in Canada are over the age of 50 years old, while 44% are 40 years old or younger.⁵² The CNA projects that demographic greying of Canada's nuclear energy workforce, coupled with a significant build-out and renewal of Canada's nuclear energy capacity, will lead to labour shortages by 2030, which will become more acute into the early 2040s.⁵³

⁴² Canadian Nuclear Safety Commission. December 7, 2018. University of Alberta SLOWPOKE-2 research reactor. <https://www.cnsccsn.gc.ca/eng/reactors/research-reactors/university-of-alberta/>.

⁴³ Canadian Nuclear Safety Commission. July 14, 2023. Saskatchewan Research Council SLOWPOKE-2 research reactor. <https://www.cnsccsn.gc.ca/eng/reactors/research-reactors/saskatchewan-research-council/>.

⁴⁴ Canadian Nuclear Safety Commission. October 10, 2025. Nuclear facility - Whiteshell Laboratories. <https://www.cnsccsn.gc.ca/eng/reactors/research-reactors/other-reactor-facilities/whiteshell-laboratories/>.

⁴⁵ Ibid.

⁴⁶ Langager, B. November 27, 2023. Saskatchewan invests in microreactor to help develop the nuclear industry. Global News. <https://globalnews.ca/news/10117235/saskatchewan-microreactor-nuclear-industry/>.

⁴⁷ See: Redekop, B. December 20, 2017. Pinawa eyes nuclear-powered future. Winnipeg Free Press. <https://www.winnipegfreepress.com/business/2017/12/20/pinawa-eyes-nuclear-powered-future>; Local government district of Pinawa. December 18, 2020. Canada's small modular reactor action plan. <https://smractionplan.ca/content/local-government-district-pinawa>.

⁴⁸ See: Quon, A. January 19, 2026. Small modular nuclear reactor testing centre planned for Regina. CBC News. <https://www.cbc.ca/news/canada/saskatchewan/smr-safety-funding-saskpower-9.7051664>.

⁴⁹ Canadian Nuclear Association. March 25, 2026. Jobs and the economy. <https://cna.ca/advantages/jobs-and-the-economy/>.

⁵⁰ International Atomic Energy Agency. 2022. Country nuclear power profiles: Canada. <https://www-pub.iaea.org/MTCD/publications/PDF/cnpp2022/countryprofiles/Canada/Canada.htm>.

⁵¹ Canadian Nuclear Association. Jobs and the economy. <https://cna.ca/advantages/jobs-and-the-economy/>.

⁵² Ibid.

⁵³ See: Canadian Nuclear Association. February 5, 2026. Workforce readiness emerges as a key enabler of Canada's nuclear buildout. <https://cna.ca/2026/02/05/workforce-readiness-emerges-as-a-key-enabler-of-canadas-nuclear-buildout/>.



A 2026 paper by the Public Policy Forum notes how it will be crucial for the federal and provincial governments, as well as post-secondary institutions and the private sector, to develop talent and workforce development pipelines to support future SMR development throughout Canada.⁵⁴

To develop nuclear energy talent needed for the next generation of Canadian SMR and large-scale nuclear energy, untapped sources of talent, including

women and Indigenous workers, have potential to be streamlined into the sector. As of 2024, women made up 21% of Canada's nuclear energy workforce, while Indigenous workers made up only 4% of the workforce, though Indigenous workers make up over 50% of the uranium mining industry's workforce in Saskatchewan.⁵⁵ Indigenous workers in Canada's mining industry fill key skilled roles in mining operations and the trades.⁵⁶

Women in Nuclear Energy

A 2020 survey commissioned by Women in Nuclear Canada found that 44% of female respondents reported that their gender had negatively affected raises, promotions, and other career opportunities.⁵⁷ Furthermore, the survey data suggest that the pipeline from middle to senior management has fewer women, thus making it less likely for women to be represented on senior management teams in the nuclear industry.⁵⁸ This data highlights that more can be done to remove barriers to women's career advancement in the nuclear energy industry.

A 2023 gender equity roadmap published jointly by Women in Nuclear Canada and Natural Resources Canada outlines four strategic pillars to engage more women to join Canada's nuclear energy industry: (1) attraction and education, (2) recruitment, (3) retention, and (4) advancement.⁵⁹ These pillars are considered crucial for the industry to have more women consider careers in the nuclear industry, pursue the intensive education and training pipeline to become nuclear energy professionals, obtain employment and stay engaged in the sector long-term, and advance in their nuclear energy careers.

⁵⁴ Kokkinos, Y., and C. Turner. March 4, 2026. Nuclear powerhouse: A playbook to unlock Canada's SMR advantage. Public Policy Forum, p. 38. <https://ppforum.ca/publications/nuclear-powerhouse/>.

⁵⁵ Canadian Nuclear Association. Jobs and the economy. <https://cna.ca/advantages/jobs-and-the-economy/>.

⁵⁶ See: Mining Industry Human Resources Council. Mining industry human resources guide for Aboriginal Communities. <https://mihrc.ca/wp-content/uploads/2020/03/MIHRGuidetoAboriginalCommunities.pdf>.

⁵⁷ Strategic Policy Economics. June 2020. Women in Nuclear Canada member survey: Findings. Women in Nuclear Energy Canada, p. 17. <https://strapolec.ca/wp-content/uploads/2020/10/WiN-Canada-Member-Survey-Final-Report-June-2020.pdf>.

⁵⁸ Ibid., 20–21.

⁵⁹ See: Canadian Equality Consulting. October 2023. Gender balance roadmap: A roadmap for the nuclear industry. Women in Nuclear Canada and Natural Resources Canada, p. 14. <https://womeninnuclear.com/programs-services/edi-roadmap-nuclear-industry/>.



Engaging Indigenous Workers in Western Canada's Nuclear Energy Industry

As Alberta and Saskatchewan develop SMR projects and supporting infrastructure, there is a significant opportunity to engage with Indigenous communities to develop workforce training and talent development pipelines into Western Canada's nuclear workforce. This could include employment pathways to utilities companies and other employers who will operate SMR technology in Western Canada, as well as the wider nuclear supply chain, which includes technical and skilled trades positions.

First Nations communities in Ontario and Indigenous-owned businesses are already working with nuclear companies such as Bruce Power on joint investments and procurement opportunities.⁶⁰ In Saskatchewan, initiatives like the Ready4SMR program, offered in partnership between the Organization of Canadian Nuclear Industries, the Saskatchewan Industry & Mining Suppliers Association, and the First Nations Power Authority, provide local vendors, including Indigenous-owned businesses, with knowledge and skills necessary to supply services and products to Canada's SMR supply chain.⁶¹

Ensuring economic inclusion for Indigenous communities and workers in the build-out and operation of SMR projects in Western Canada could form an important pillar for reconciliation,⁶² including the Truth and Reconciliation Commission's Call to Action 92 on business and reconciliation, which mandates that "Aboriginal peoples have equitable access to jobs, training, and education opportunities in the corporate sector, and that Aboriginal communities gain long-term sustainable benefits from economic development projects."⁶³

Carefully designed training and employment pathways to recruit, train, and retain Indigenous workers—as well as advancing Indigenous talent in the nuclear energy industry—will be important considerations as Indigenous communities are engaged in SMR project developments and meeting respective labour market needs in Alberta and Saskatchewan.

Nuclear Energy Renewal and Expansion in Canada

The Canadian government's recent nuclear energy strategy, launched in June 2026, seeks to build 10 new nuclear reactors in Canada by 2040—including two reactors already under construction in Ontario.⁶⁴ The strategy calls for the development of at least one nuclear reactor, such as an SMR, outside of Ontario by 2035, as well as a Canadian demonstration microreactor deployed by 2035.⁶⁵ The federal nuclear strategy also seeks to double the size of Canada's current nuclear workforce, with support for specialized education, training, and experiential learning opportunities.

Prior to the release of the new national nuclear energy strategy, there were already several nuclear energy renewal and expansion projects under development in Canada. These include refurbishments of existing CANDU reactors at the Darlington, Pickering, and Bruce Nuclear Generating Stations, as well as the construction of the Darlington New Nuclear Project, consisting of four new SMR units at the Darlington nuclear station. The Darlington New Nuclear Project will be the first SMR deployed in the G7.⁶⁶ Bruce Power is also in the planning stages to add an additional

⁶⁰ See: Exner-Pirot, H., and J. McCormick. November 2023. Primer on nuclear energy, SMRs and First Nations. First Nations Major Project Coalition, p. 8. https://fnmpc.ca/wp-content/uploads/FNMPC_SMR_PRIMER_for_email.pdf.

⁶¹ Ready4SMR Program. April 3, 2026. About us. <https://ready4smr.ca/>.

⁶² Desai, R., and J. LeMoine. June 19, 2025. Indigenous engagement is essential for small modular nuclear reactor projects. The Conversation. <https://theconversation.com/indigenous-engagement-is-essential-for-small-modular-nuclear-reactor-projects-252134>.

⁶³ Crown-Indigenous Relations and Northern Affairs Canada. April 1, 2022. Delivering on Truth and Reconciliation Commission Calls to Action: Call to Action 92 - Business and reconciliation. <https://www.rcaanc-cirnac.gc.ca/eng/1524506030545/1557513309443>.

⁶⁴ Natural Resources Canada. June 22, 2026. Nuclear Energy Strategy for Canada. last updated June 22, 2026, <https://natural-resources.canada.ca/energy-sources/nuclear-energy-uranium/nuclear-energy-strategy-canada>.

⁶⁵ Ibid.

⁶⁶ Government of Ontario. May 8, 2025. Ontario leads the G7 by building first small modular reactor. <https://news.ontario.ca/en/release/1005889/ontario-leads-the-g7-by-building-first-small-modular-reactor>.



4,800 megawatts of nuclear energy generation capacity at its Bruce Power nuclear generating station—enough additional electricity for 4.8 million homes—through its Bruce C expansion project.⁶⁷ In January 2025, the Government of Ontario announced that it has asked Ontario Power Generation (OPG) to explore developing a large-scale nuclear energy site near Port Hope, Ontario, and the Williams Treaties First Nations.⁶⁸ OPG is a Crown corporation owned by the Province of Ontario that generates low-carbon electricity, including nuclear and hydro power.

In addition to major nuclear energy renewal and expansion projects occurring in Ontario, New Brunswick Power, in partnership with ARC Clean Technology, is exploring deploying an SMR at the Point Lepreau Nuclear Generating Station.⁶⁹

The significant number of ongoing projects to renew and expand nuclear energy generating capacity in Eastern Canada, particularly in Ontario, highlights the important role that nuclear energy will continue to play in Canada's energy mix. Figure 3 outlines active conventional nuclear energy renewal and SMR development projects in Ontario and New Brunswick.

Figure 3. Ontario and New Brunswick Nuclear Power Renewal and Expansion Projects

Project	Operator	Location	Reactor Type	Status
Darlington Nuclear Generating Station Unit 4 refurbishment	OPG	Clarington, ON	CANDU	Complete (as of February 2026)
Pickering Nuclear Generating Station Units 5–8 refurbishment	OPG	Pickering, ON	CANDU	Ongoing refurbishment
Bruce A and B (Units 1–8) modernization	Bruce Power	Kincardine, ON	CANDU	Ongoing refurbishment
Bruce C expansion	Bruce Power	Kincardine, ON	CANDU-MONARK	Planning
NB Power ARC-100 project	NB Power	Point Lepreau, NB	ARC-100 SMR	Under consideration
Darlington New Nuclear Project	OPG	Clarington, ON	BWRX-300 SMR	Construction

Sources: Canadian Nuclear Safety Commission, Government of Ontario, Bruce Power, Ontario Power Generation, NB Power.⁷⁰

⁶⁷ World Nuclear News. August 22, 2025. Key phase completed of impact assessment for Bruce C project. <https://www.world-nuclear-news.org/articles/key-phase-completed-of-impact-assessment-for-bruce-c-project>; Government of Ontario. December 23, 2025. Powering Ontario. <https://www.ontario.ca/page/powering-ontario>.

⁶⁸ Government of Ontario. January 15, 2025. Ontario exploring new nuclear energy generation in Port Hope. <https://news.ontario.ca/en/release/1005585/ontario-exploring-new-nuclear-energy-generation-in-port-hope>.

⁶⁹ Canadian Nuclear Safety Commission. January 26, 2026. New Brunswick Power's ARC-100 project. <https://www.cnsccsn.gc.ca/eng/reactors/new-reactor-power-plant-projects/new-reactor-power-plant-facilities/nbpower/>.

⁷⁰ Canadian Nuclear Safety Commission. January 15, 2026. Darlington New Nuclear Project. <https://www.cnsccsn.gc.ca/eng/reactors/new-reactor-power-plant-projects/new-reactor-power-plant-facilities/darlington-new-nuclear-project/>; Canadian Nuclear Safety Commission. January 26, 2026. New Brunswick Power's ARC-100 project. <https://www.cnsccsn.gc.ca/eng/reactors/new-reactor-power-plant-projects/new-reactor-power-plant-facilities/nbpower/>; Government of Ontario. February 2, 2026. Ontario delivers Darlington refurbishment project ahead of schedule and under budget. <https://news.ontario.ca/en/release/1006993/ontario-delivers-darlington-refurbishment-project-ahead-of-schedule-and-under-budget>; Bruce Power. March 4, 2026. Life-extension program & MCR project. <https://www.brucepower.com/life-extension-program-mcr-project/>; Bruce Power. March 4, 2026. The Bruce C project. <https://www.brucepower.com/the-bruce-c-project/>; Ontario Power Generation. March 4, 2026. Ontarians helping build the G7's first small modular reactor. <https://www.opg.com/projects-services/projects/nuclear/smr/darlington-smr/>; NB Power. March 4, 2026. Advanced small modular reactors. <https://www.nbpower.com/en/about-us/projects/advanced-small-modular-reactors/>.



Nuclear SMR Development in Western Canada

In addition to conventional nuclear renewal and SMR expansion projects in Ontario, Saskatchewan and Alberta have nuclear energy projects in the development pipeline. These projects will represent the first nuclear power generation infrastructure in Western Canada—marking a significant milestone in energy infrastructure development on the prairies and represent a major development in Canada's nuclear energy industry. Nuclear energy project development in Western Canada also represents a major opportunity in Alberta and Saskatchewan to participate in Canada's expanding nuclear supply chain. A 2022 study commissioned by Prairies Economic Development Canada found that Alberta and Saskatchewan's construction and heavy industrial sectors could furnish 68% of needed capital inputs to build SMRs in Western Canada.⁷¹

Establishing a Canadian SMR Deployment Framework – National Roadmaps, Technology Feasibility Studies, Deployment Plans, and MoUs

The Canadian federal government, provincial governments, and nuclear operator utility companies have been collaborating to produce SMR feasibility studies, roadmaps, deployment plans, and cooperation frameworks to begin SMR development in Canada. In 2022, the governments of Alberta, Saskatchewan, Ontario, and New Brunswick released

a high-level plan to deploy SMR technology as a clean energy solution.⁷² This deployment plan was built from a 2021 feasibility study on SMR development in Canada. The study was commissioned by three provincially owned Crown corporations: OPG, NB Power, and SaskPower, together with Bruce Power.⁷³

The 2021 feasibility study followed a 2019 memorandum of understanding (MoU) on SMR deployment signed by the governments of Ontario, Saskatchewan, and New Brunswick, with Alberta joining as a signatory in 2021.⁷⁴ The interprovincial MoU on SMRs preceded the 2018 publication of a Canadian SMR roadmap jointly developed by the federal government, Canadian provinces and territories, and several Canadian power utilities companies.⁷⁵ This multi-year policy planning process has laid the groundwork to develop SMR projects in Canada, including in Alberta and Saskatchewan.

Nuclear SMR Development in Saskatchewan

As of early 2026, Saskatchewan is in the advanced stages of SMR project development and planning. SaskPower, Saskatchewan's principal electric utility company, has been evaluating the feasibility of building SMRs in the province since 2019. A final investment decision will not be made until 2029, with construction of the first SMRs beginning in 2030 and entering operations in the mid-2030s.⁷⁶ The project will be near Estevan, with two candidate sites under consideration.⁷⁷ It is not yet determined how many SMRs would be deployed for this project.⁷⁸ Figure 4 outlines Saskatchewan's current estimated SMR project development timeline.

⁷¹ Hatch. April 2022. Assessment of Alberta and Saskatchewan's industrial potential to participate in an emerging Canadian SMR supply chain. Prairies Economic Development Canada, p. 6. <https://albertainnovates.ca/wp-content/uploads/2022/05/SMR-Supply-Chain-Study-Executive-Summary-Final-Report-2022-05.pdf>.

⁷² Governments of Ontario, New Brunswick, Alberta, and Saskatchewan. March 2022. A strategic plan for the deployment of small modular reactors. <https://open.alberta.ca/publications/a-strategic-plan-for-the-deployment-of-small-modular-reactors>.

⁷³ SaskPower, NB Power, Bruce Power, and Ontario Power Generation. March 2021. Feasibility of small modular reactor development and deployment in Canada. <https://mcmillan.ca/wp-content/uploads/2021/05/Feasibility-of-Small-Modular-Reactor-Development-and-Deployment-in-Canada-Report.pdf>.

⁷⁴ See: Dentons. April 16, 2021. Innovation in nuclear energy in Canada – Alberta signs memorandum of understanding for the development and deployment of small modular reactors. <https://www.dentons.com/en/insights/articles/2021/april/16/innovation-in-nuclear-energy-in-canada-alberta-signs-memorandum-of-understanding-for-the-development>.

⁷⁵ Canadian Small Modular Reactor Roadmap Steering Committee. November 2018. A call to action: A Canadian roadmap for small modular reactors. Natural Resources Canada. <https://publications.gc.ca/site/eng/9.860541/publication.html>.

⁷⁶ SaskPower. April 4, 2026. SMR project schedule. <https://www.saskpower.com/-/media/saskpower/our-power-future/construction-projects/smr/infographic-smr-progress-timeline.jpg>.

⁷⁷ SaskPower. May 31, 2024. SaskPower update on SMR site selection near Estevan. <https://www.saskpower.com/about-us/media-information/news-releases/2024/saskpower-update-on-smr-site-selection-near-estevan>.

⁷⁸ Canadian Nuclear Safety Commission. January 26, 2026. SaskPower: Planning for nuclear power. <https://www.cnsccsn.gc.ca/eng/reactors/new-reactor-power-plant-projects/new-reactor-power-plant-facilities/saskpower-smr-project/>.



Figure 4. Estimated SMR Project Development Timeline Saskatchewan (as of April 2026)

2019–2021			2022–2029							2030–2034					2035+	
I. Feasibility studies																
			II. Project planning and regulatory reviews													
										III. Construction						
															IV. Operations begin	

Source: ICTC analysis; estimates based on public information from the Government of Saskatchewan and SaskPower.

In June 2022, SaskPower selected GE Vernova Hitachi’s BWRX-300 SMR for the project.⁷⁹ In June 2024, SaskPower signed an MoU with Westinghouse, a nuclear power company, and Cameco, a uranium company, regarding nuclear fuel supply and evaluated various nuclear reactors for future deployment.⁸⁰ In 2024, SaskPower established SaskNuclear, a subsidiary company, to advance SMR projects in Saskatchewan through regulatory review and licensing.⁸¹

In addition to Saskatchewan’s current SMR development program, the province has also designated the SRC as the “primary organization responsible for micro-Small Modular Reactor

(microreactor) development in the province.”⁸² Under this mandate, the SRC will deploy the first microreactor in the province to provide reliable and clean edge-of-grid and off-grid electricity to remote communities.⁸³

In early 2026, the Government of Saskatchewan and SaskPower announced that, in addition to the two potential SMR sites under development, they will also evaluate large-scale conventional nuclear technology to be developed “in parallel” with SMR technology.⁸⁴ This coincided with the signing of an MoU between SaskPower and Bruce Power on large reactor nuclear technology.⁸⁵

⁷⁹ SaskPower. June 27, 2022. SaskPower selects the GE-Hitachi BWRX-300 small modular reactor technology for potential deployment in Saskatchewan. <https://www.saskpower.com/about-us/media-information/news-releases/2022/saskpower-selects-the-ge-hitachi-bwrx-300-smr-technology-for-potential-deployment-in-saskatchewan>.

⁸⁰ SaskPower. June 17, 2024. SaskPower, Westinghouse and Cameco sign MOU to explore reactor and fuel supply potential. <https://www.saskpower.com/about-us/media-information/news-releases/2024/saskpower-westinghouse-cameco-sign-mou-to-explore-reactor-and-fuel-supply-potential>.

⁸¹ SaskPower. September 4, 2024. SaskPower establishes nuclear subsidiary called SaskNuclear. <https://www.saskpower.com/about-us/media-information/news-releases/2024/saskpower-establishes-nuclear-subsidiary-called-sasknuclear>.

⁸² Government of Saskatchewan. March 15, 2024. SRC designated as primary organization in Saskatchewan responsible for microreactor development. <https://www.saskatchewan.ca/government/news-and-media/2024/march/15/src-designated-as-primary-organization-in-saskatchewan-responsible-for-microreactor-development>.

⁸³ See: Saskatchewan Research Council. March 25, 2026. SRC nuclear. <https://www.src.sk.ca/src-nuclear>.

⁸⁴ Government of Saskatchewan. January 28, 2026. SaskPower begins formal process to evaluate large nuclear technologies. <https://www.saskatchewan.ca/government/news-and-media/2026/january/28/saskpower-begins-process-to-evaluate-large-nuclear-technologies>.

⁸⁵ Davenport, C. April 16, 2026. SaskPower signs agreement with Ontario power company on full-size nuclear reactor. CTV News. <https://www.ctvnews.ca/regina/article/saskpower-signs-agreement-with-ontario-power-company-on-full-size-nuclear/>.



Saskatchewan's Uranium Mining Industry and Canada's Nuclear Fuel Supply Chain

Uranium ore mined in Saskatchewan makes Canada the second largest producer of uranium in the world.⁸⁶ In 2024, the Saskatchewan uranium mining industry employed an estimated 3,400 people and produced \$2.6 billion in output.⁸⁷ Uranium mined in the province is essential for providing fuel for the Canadian nuclear energy industry and is also widely exported.

Uranium ore used in Canadian nuclear reactors is mined and milled into uranium yellowcake in Saskatchewan.⁸⁸ From there, it is refined at the Blind River Refinery in Blind River, Ontario, and then converted into uranium dioxide at a facility in Port Hope, Ontario.⁸⁹ The uranium dioxide is then converted into pellets and packaged as nuclear fuel bundles at BWXT Canada facilities in Toronto and Peterborough, Ontario.⁹⁰ The packaged bundles of nuclear fuel are used to power CANDU reactors in Ontario and New Brunswick.

Unlike CANDU reactors, which use non-enriched uranium sources, SMRs require enriched uranium fuel, such as high-assay low-enriched uranium (HALEU), to operate. SMR nuclear fuels, including HALEU, require an additional enrichment step in the nuclear fuel supply chain to be produced. Canada does not currently have the necessary facilities to produce enriched nuclear fuel.⁹¹ Without such facilities, Canada must import HALEU fuel for its future SMR fleet.⁹²

Nuclear SMR Development in Alberta

Compared to Saskatchewan, SMR technology deployment in Alberta is more preliminary. For instance, SaskPower is moving toward a final investment decision by 2029, with SMRs potentially entering service by the mid-2030s. Currently, Alberta is still exploring its options, with potential SMR project proponents, such as a consortium between Capital Power and OPG, conducting feasibility studies for deploying SMRs in the province.⁹³

When compared to Saskatchewan, Ontario, and New Brunswick's more centralized approaches to investing in electricity generation capacity, Alberta's deregulated electricity market requires a private sector project proponent to pursue SMR development using private capital. This makes establishing development timelines for new SMR

projects less certain as no centralized authority exists to drive SMR development.

In November 2025, the Government of Alberta and the federal government signed an MoU on energy, AI, and infrastructure development in the province. Included in the MoU were provisions to collaborate on "a nuclear power generation strategy" for Alberta.⁹⁴ Some Alberta policymakers are reportedly looking toward nuclear energy for providing electricity to the province's budding data centre industry.⁹⁵

As of this research, there are no confirmed SMR projects or decisions on which technologies may be adopted. Although, there is current industry interest in Alberta in the potential to deploy SMRs for electricity generation, as well as industrial heat and steam applications. Thus, SMR development timelines are much less certain than in Saskatchewan. Figure 5 outlines ICTC's analysis and estimate of Alberta's SMR project development timeline.

⁸⁶ Natural Resources Canada. December 20, 2024. Uranium in Canada. <https://natural-resources.canada.ca/energy-sources/nuclear-energy-uranium/uranium-canada>.

⁸⁷ Government of Saskatchewan. April 23, 2025. Saskatchewan uranium production and sales reach all time highs. <https://www.saskatchewan.ca/government/news-and-media/2025/april/23/saskatchewan-uranium-production-and-sales-reach-all-time-highs>.

⁸⁸ Canadian Nuclear Safety Commission. March 23, 2026. Uranium mines and mills. <https://www.cnsccs.gc.ca/eng/uranium/mines-and-mills/>.

⁸⁹ Canadian Nuclear Safety Commission. June 16, 2025. Nuclear facility - Blind River Refinery. <https://www.cnsccs.gc.ca/eng/uranium/processing/nuclear-facilities/blind-river/>; Canadian Nuclear Safety Commission. June 16, 2025. Nuclear facility - Port Hope Conversion Facility. <https://www.cnsccs.gc.ca/eng/uranium/processing/nuclear-facilities/port-hope-uranium-conversion/>.

⁹⁰ Canadian Nuclear Safety Commission. March 11, 2026. Nuclear facility - BWXT Nuclear Energy Canada Inc. - Peterborough. <https://www.cnsccs.gc.ca/eng/uranium/processing/nuclear-facilities/bwxt-nuclear-energy-canada-inc-peterborough/>.

⁹¹ Canada Energy Regulator. August 20, 2025. Market snapshot: Canada's role in small modular reactor (SMR) technology. <https://www.cer-rec.gc.ca/en/data-analysis/energy-markets/market-snapshots/2025/market-snapshot-canadas-role-in-small-modular-reactor-smr-technology.html>.

⁹² McClellan, M. April 4, 2026. The federal government faces calls to begin enriching uranium. Should it? The Globe and Mail. <https://www.theglobeandmail.com/business/article-canada-enriched-uranium-power-reactors/>.

⁹³ Capital Power and Ontario Power Generation. April 4, 2026. Alberta SMR study. <https://albertasmr.ca/smr-study/>.

⁹⁴ Prime Minister of Canada. November 27, 2025. Canada-Alberta memorandum of understanding. <https://www.pm.gc.ca/en/news/backgrounders/2025/11/27/canada-alberta-memorandum-understanding>.

⁹⁵ See: Krugel, L. July 7, 2025. Alberta to hold nuclear power consultations as reactor companies weigh opportunities. Financial Post. <https://financialpost.com/commodities/energy/alberta-nuclear-power-consultations-as-reactor-companies-opportunities>.



Figure 5. Estimated SMR Project Development Timeline Alberta (as of April 2026)

2021–2027 (?)							2028–2034 (?)							2035–2039 (?)				2040+
I. Feasibility studies																		
							II. Project planning and regulatory reviews											
													III. Construction					
																	IV. Operations begin	

Source: ICTC analysis; due to the less advanced stage of SMR project development in Alberta when compared to Saskatchewan, this estimated timeline is subject to significantly more uncertainty.

In 2021, Alberta's largest oilsands producers (i.e., Suncor Energy, Cenovus Energy, MEG Energy, and others) formed an alliance to explore net zero greenhouse gas emissions reduction technologies, including SMRs.⁹⁶ In 2023, Cenovus Energy conducted an engineering feasibility study, funded by Emissions Reduction Alberta. The study assessed if SMRs could be used to produce industrial heat for an oilsands facility that used steam-assisted gravity drainage (SAGD) oil recovery technology⁹⁷ and found SMRs were not a viable option due to technological, financial, and regulatory risks.⁹⁸

Emissions Reduction Alberta also funded an engineering feasibility study by X-energy in 2024. The goal was to determine whether a former TransAlta thermal power plant could be repurposed for nuclear power generation by deploying an SMR to the site.⁹⁹ X-energy found that deploying an SMR and repurposing the site was feasible, with applications for electricity generation, as well as acting as a source of industrial heat and steam.¹⁰⁰

The Government of Alberta conducted relevant stakeholder engagement and public information sessions on the future of nuclear energy in the province from August 2025 to March 2026.¹⁰¹ A similar public consultation process to consider a large-scale conventional nuclear power project proposed in the Peace River region of Northern Alberta occurred in 2009, though the project ultimately did not move forward due to market conditions at the time.¹⁰² Energy Alberta, a clean energy company, has recently revived the idea of building a conventional nuclear energy site in the Peace River region. In 2025, the company submitted an Initial Project Description to the Impact Assessment Agency of Canada (IAAC) to build four conventional nuclear reactors at a site near Peace River.¹⁰³ In April 2026, IAAC commenced an impact assessment for this proposed project.¹⁰⁴

While there are significant, if preliminary, developments occurring in Alberta for deploying SMR and conventional nuclear energy to meet the province's future energy needs, nuclear projects are unlikely to begin construction any time prior to the mid-2030s.

⁹⁶ Suncor Energy. June 9, 2021. Canada's largest oil sands producers announce unprecedented alliance to achieve net zero greenhouse gas emissions. GlobeNewswire. <https://www.globeandmail.com/news-release/2021/06/09/2244216/0/en/Canada-s-largest-oil-sands-producers-announce-unprecedented-alliance-to-achieve-net-zero-greenhouse-gas-emissions.html>.

⁹⁷ Emissions Reduction Alberta. April 4, 2026. Small modular reactor feed study. <https://www.eralberta.ca/projects/details/small-modular-reactor-feed-study/>.

⁹⁸ Cenovus Energy Inc. December 31, 2024. SMR feed study final outcomes report. <https://www.eralberta.ca/wp-content/uploads/2025/09/SMR-FEED-Study-Public-Final-Outcomes-Report.pdf>.

⁹⁹ Emissions Reduction Alberta. April 5, 2026. Assessing site and distribution infrastructure from transitioning a thermal power plant to an SMR. <https://www.eralberta.ca/projects/details/assessing-site-and-distribution-infrastructure-from-transitioning-a-thermal-power-plant-to-an-smr/>.

¹⁰⁰ X-energy. September 25, 2025. X-energy confirms feasibility of Xe-100 advanced small modular reactor deployment in Alberta. <https://x-energy.com/news/x-energy-confirms-feasibility-of-xe-100-advanced-small-modular-reactor-deployment-in-alberta/>.

¹⁰¹ See: Government of Alberta. April 4, 2026. Nuclear energy engagement. <https://www.alberta.ca/nuclear-energy-engagement>.

¹⁰² World Nuclear Association. April 5, 2026. Country profiles: Nuclear power in Canada. <https://world-nuclear.org/information-library/country-profiles/countries-a-f/canada-nuclear-power>.

¹⁰³ Impact Assessment Agency of Canada. April 2, 2026. Peace river nuclear power project. <https://iaac-aeic.gc.ca/050/evaluations/proj/89430>.

¹⁰⁴ Impact Assessment Agency of Canada. April 20, 2026. Peace river nuclear power project: Notice of commencement of an impact assessment. <https://iaac-aeic.gc.ca/050/evaluations/document/166097?culture=en-CA>.



Anticipating SMR Workforce Demand in Western Canada

Key Takeaways



Nuclear energy projects, including SMRs, require a diverse range of skilled talent to build and operate, including engineering, specialist, skilled trades, and supporting administrative roles.



Current demand for skilled nuclear workers is highly concentrated in Ontario, where most nuclear energy infrastructure is located; this is expected to shift as nuclear energy projects, such as SMRs, are built and operated in Alberta and Saskatchewan.



While nuclear energy in Western Canada is still at least a decade away, the composition of a future nuclear workforce in Alberta and Saskatchewan can be forecasted based on labour market information on Ontario's nuclear energy industry and staffing estimates from studies on SMR and CANDU reactors.

The development of SMRs in Western Canada will generate new and sustained demand for labour across a range of occupations tied to the nuclear energy industry. Nuclear energy projects require a diverse workforce spanning technical, operational, and administrative functions, with demand emerging across multiple phases of development, including planning, construction, long-term operations and maintenance, and eventual decommissioning.

Understanding current and upcoming nuclear labour demand is therefore crucial to identifying potential shortages in priority roles and for informing the policies and talent pipelines that must be established. Yet, as nuclear energy projects in Saskatchewan are still in the development and planning stages, and potential projects in Alberta are at least a decade away, rather than attempt to forecast specific workforce demand for Western

Canada's future nuclear workforce, this report will take an anticipatory approach. By reviewing documented staffing estimates and job functions involved in operating SMR and CANDU reactors, the future nuclear workforce demand will be assessed, and contemporary nuclear energy labour demand will be evaluated using data drawn from Vicinity Jobs.

Figure 6 outlines the estimated operational staffing complement for a single CANDU-6 700 megawatt electrical nuclear reactor. While staffing levels to support a CANDU reactor unit would likely be over and above what would be required for much smaller SMRs,¹⁰⁵ these estimates are illustrative of functional role requirements at nuclear energy generation facilities and provide a helpful comparison to a new generation of SMRs that may eventually be deployed in Western Canada.

¹⁰⁵ For example, experts have noted that there will likely be fewer nuclear operators required to staff SMRs when compared to large-scale conventional reactors like CANDUs; see: House of Commons Standing Committee on Science and Research. February 2023. Small modular nuclear reactors: Report of the Standing Committee on Science and Research. 1st Session, 44th Parliament, p. 32. <https://www.ourcommons.ca/Content/Committee/441/SRSR/Reports/RP12212540/srsrrp03/srsrrp03-e.pdf>.

Figure 6. Estimated Staffing Roles for x1 CANDU-6 700 MWe Reactor Unit

Job Function/Role	Staffing Level (FTE)
Management (including vice-president nuclear)	6
Station manager	1
Planning	8
Storage (supply)	20
Production manager	1
Operations	89
Maintenance	151
Fuelling	28
Chemistry	18
Technical manager	1
Technical electrical, control, and instrumentation (EC&I)	33
Technical mechanical	31
Technical specialists, safety systems	14
Technical engineering services	5
Nuclear safety manager	1
Nuclear safety analysis	11
Regulatory affairs (licensing)	3
Nuclear safety reliability	4
Administration manager	1
Public affairs	1
Budget and cost control	1
Security	22
Administrative support (clerical)	38
Training	20
Quality assurance	8
Health physics	21
Health physics (laboratory)	3
Total	540

Data Source: IAEA, 2001.¹⁰⁶

¹⁰⁶ McQuade, D. 2001. Staffing requirements for future small & medium reactors. In International Atomic Energy Agency, Staffing requirements for future small and medium reactors (SMRs) based on operating experience and projections, p. 27. https://www-pub.iaea.org/MTCD/Publications/PDF/te_1193_prn.pdf.



Figure 7 provides staffing estimates, expressed in full-time equivalent (FTE) positions, provided by the Pacific Northwest National Laboratory, for two prototype SMR units (SC-HTGR and NuScale iPWR). While neither of these SMR reactor types

are currently planned to be deployed in Canada, the staffing-level estimates provide a useful analog to other SMR reactor technologies, including the BWRX-300, which may eventually be deployed in Western Canada.

Figure 7. Staffing Estimates for x1 SC-HTGR 625 MWe and x1 NuScale iPWR 1920 MWe SMRs

Job Function/Role	Staffing-Level Estimates			
	SC-HTGR (625 MWe)		NuScale iPWR (1,920 MWe)	
	FTE	% Total	FTE	% Total
Operations and maintenance	70	42%	89	25%
Security	44	27%	84	23%
Engineering	12	7%	45	13%
Radiation protection	10	6%	42	12%
Outages and plant modifications	8	5%	41	11%
Supplies and telecommunications	9	5%	15	4%
Operations support and oversight	6	4%	21	6%
Training	5	3%	17	5%
Management	2	1%	7	1%
Total	166 FTE		361 FTE	

Data Source: Pacific Northwest National Laboratory, 2018.¹⁰⁷

Contemporary Labour Demand in the Canadian Nuclear Energy Industry

The following section on labour demand in Canada's contemporary nuclear energy industry draws on established staffing benchmarks for CANDU nuclear facilities, emerging estimates for SMR technologies, and Vicinity Jobs posting data for the nuclear industry across Canada. This approach will assess the composition of contemporary nuclear workforce demand.

To structure this analysis, nuclear workforce occupations were grouped into four occupational categories based on roles identified through the aforementioned staffing benchmarks and insights

from industry roundtables conducted by ICTC in April 2024. These were then mapped to relevant National Occupational Classification (NOC) codes. The four occupational categories include **engineering** (e.g., civil, mechanical/nuclear, chemical, and software engineers, as well as related technologists), **specialist** (i.e., domain-specific scientific and technical expertise), **skilled trades** (e.g., construction millwrights and industrial mechanics), and **supporting** (i.e., administrative and managerial, operational, and security and protective services roles).

¹⁰⁷ Pacific Northwest National Laboratory. March 2018. Deployability of small modular nuclear reactors for Alberta applications – Phase II. U.S. Department of Energy & Alberta Innovates, p. xv. <https://albertainnovates.ca/wp-content/uploads/2020/07/Pacific-Northwest-National-Laboratory-Deployability-of-Small-Modular-Nuclear-Reactors-for-Alberta-Applications-Phase-2.pdf>.



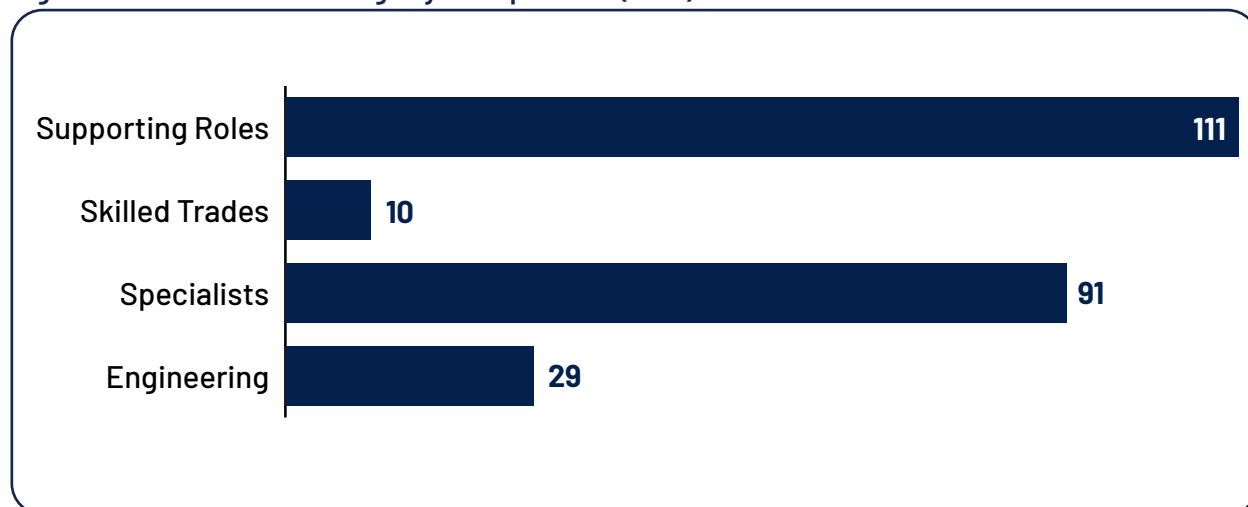
The Current State of Nuclear Workforce Demand in Canada

Current nuclear workforce demand in Canada is concentrated in supporting and specialist roles. As depicted in Figure 8, job posting data indicates that supporting roles account for the largest share of demand (111 postings), followed by specialist occupations (91 postings). In contrast, demand for engineering roles (29 postings) and skilled trades (10 postings) is more limited in the current hiring landscape. This distribution reflects the operational nature of Canada's existing nuclear fleet, where ongoing facility management, regulatory compliance, and technical monitoring drive

demand for administrative, safety, and domain-specific expertise.

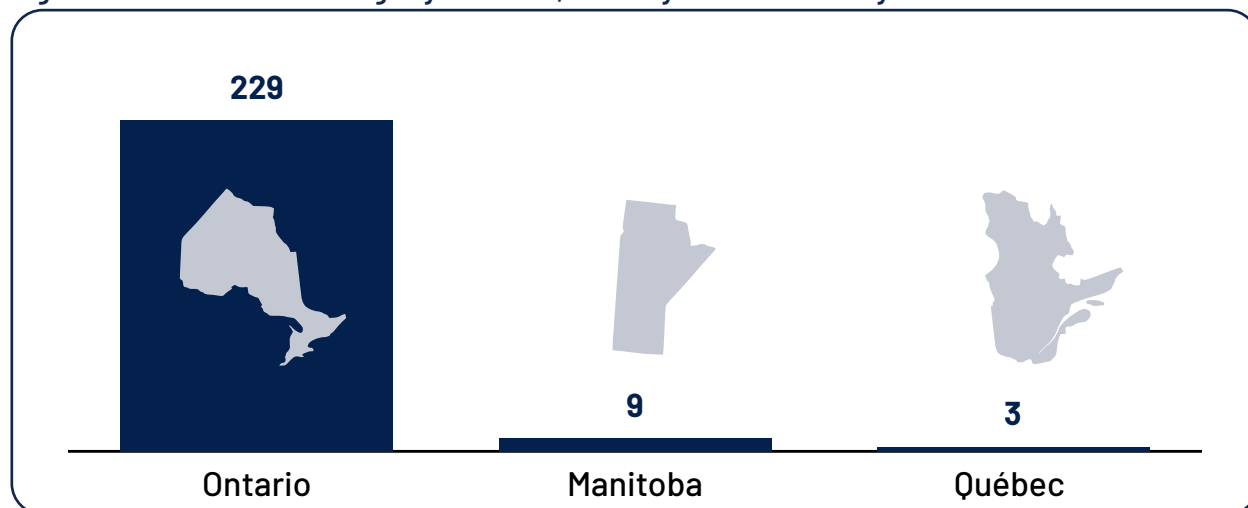
Simultaneously, as illustrated in Figure 9, nuclear hiring activity is highly concentrated geographically. Of the 241 nuclear industry job postings identified, 229 (95%) were in Ontario, with the remainder in Manitoba (nine postings) and Québec (three postings), reflecting Ontario's role as an established nuclear ecosystem and core of Canada's contemporary nuclear workforce. Despite being home to the Point Lepreau Nuclear Generating Station, no SMR-relevant nuclear energy job postings were observed in New Brunswick between January 2022 and January 2026.

Figure 8. Nuclear Job Postings by Occupational (NOC) Cluster



Data source: Vicinity Jobs, March 2026; ICTC calculations.

Figure 9. Nuclear Job Postings by Province, January 2022 to January 2026



Data source: Vicinity Jobs, March 2026; ICTC calculations.



The Nuclear Industry and Canada's Digital Economy

The digital economy encompasses occupations and industries that create, enable, support, and intensively use digital technologies as the core of their work. It extends beyond the traditional view of “tech workers” to capture the full spectrum of digital work in Canada’s modern labour market.

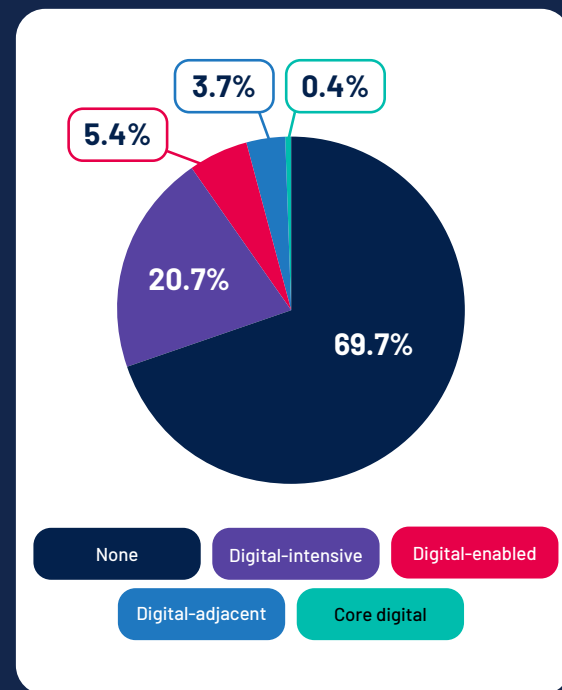
ICTC classifies occupations in the digital economy based on their level of involvement in and exposure to digital technologies. Using occupation and industry data, roles are categorized from non-digital to core digital, reflecting the extent to which digital tools and systems shape their functions and outputs.

As illustrated in Figure 10, job postings in Canada’s nuclear energy sector are predominantly concentrated in roles outside the digital economy, with 168 postings classified as non-digital. Among digital-related occupations, the largest share falls under digital-intensive roles (50 postings), which are traditional occupations whose workflows have increasingly been influenced by technology adoption (e.g., engineers and scientists).

This is followed by digital-enabled roles (13), where digital tools are central to day-to-day work, and digital-adjacent roles (nine), which support or interact closely with digital systems. Only a single posting, software engineers and designers, is classified as core digital, involving the direct creation or management of digital

technologies. This distribution aligns with the disproportionate demand for support and administrative roles and technical specialists highlighted earlier, where digital competencies are present but do not fundamentally shift the nature of their outputs and services.

Figure 10. Nuclear job postings by digital economy classification



Data source: Vicinity Jobs, March 2026; ICTC analysis.

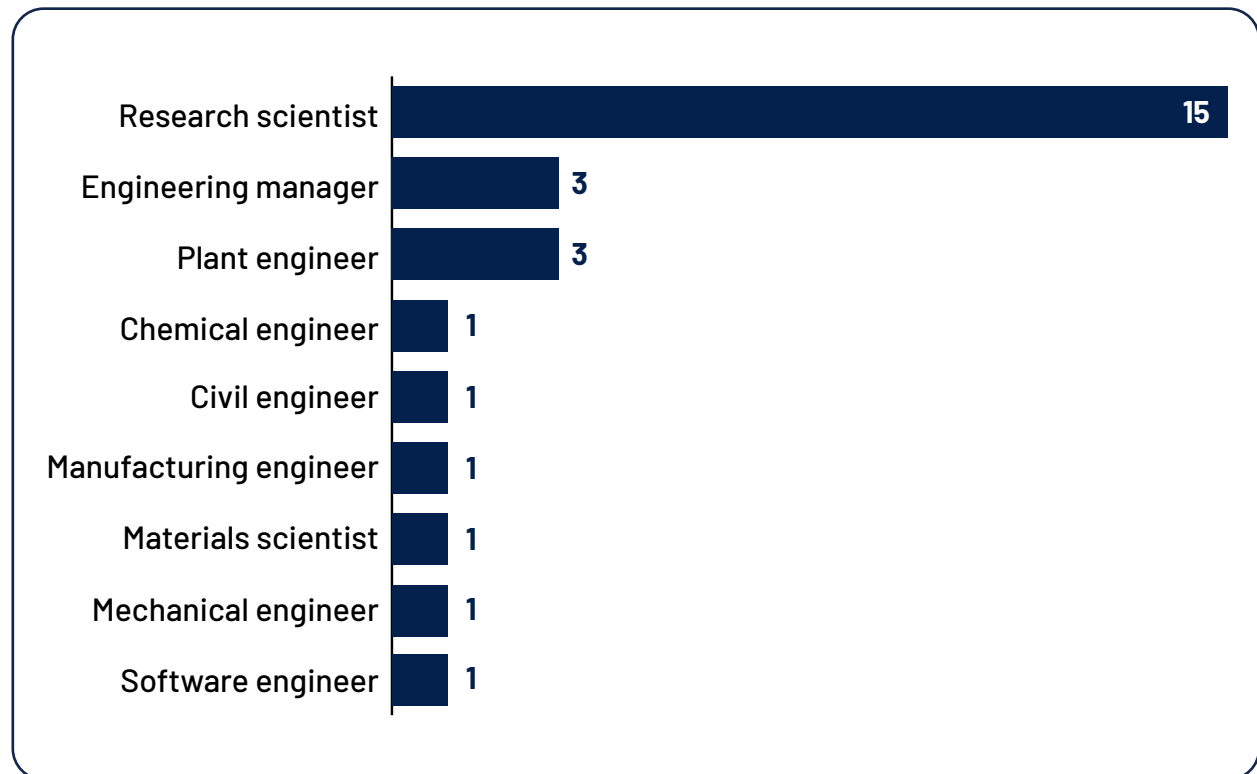
Engineering Occupations

Figure 11 shows that current demand for engineering roles in Canada's nuclear energy sector remains largely concentrated in a few occupations. Job posting data indicates that hiring in this cluster is modest overall, with demand distributed across several engineering disciplines but with low volumes in most categories. Among engineering-related roles, research scientists account for the largest share of postings (55%), while more traditional engineering occupations, including civil, mechanical, chemical, manufacturing, and software engineers, each account for only one posting. Slightly higher demand is observed for plant engineers (11%) and engineering managers (11%).

This distribution suggests that current hiring activity is not driven by large-scale infrastructure development or expansion of engineering teams, but rather by targeted demand for specialized expertise. Simultaneously, the limited number of postings across core engineering disciplines points to a relatively stable engineering workforce in existing nuclear operations.

In SMR development, these findings suggest that current hiring patterns may not fully reflect the range or scale of engineering demand associated with new reactor builds. While job postings provide insight into present labour needs, they may underrepresent future demand tied to planning, design, and construction phases, which may require a broader mix of engineering disciplines.

Figure 11. In-demand Engineering Occupations, January 2022 to January 2026



Data source: Vicinity Jobs, March 2026; ICTC calculations.



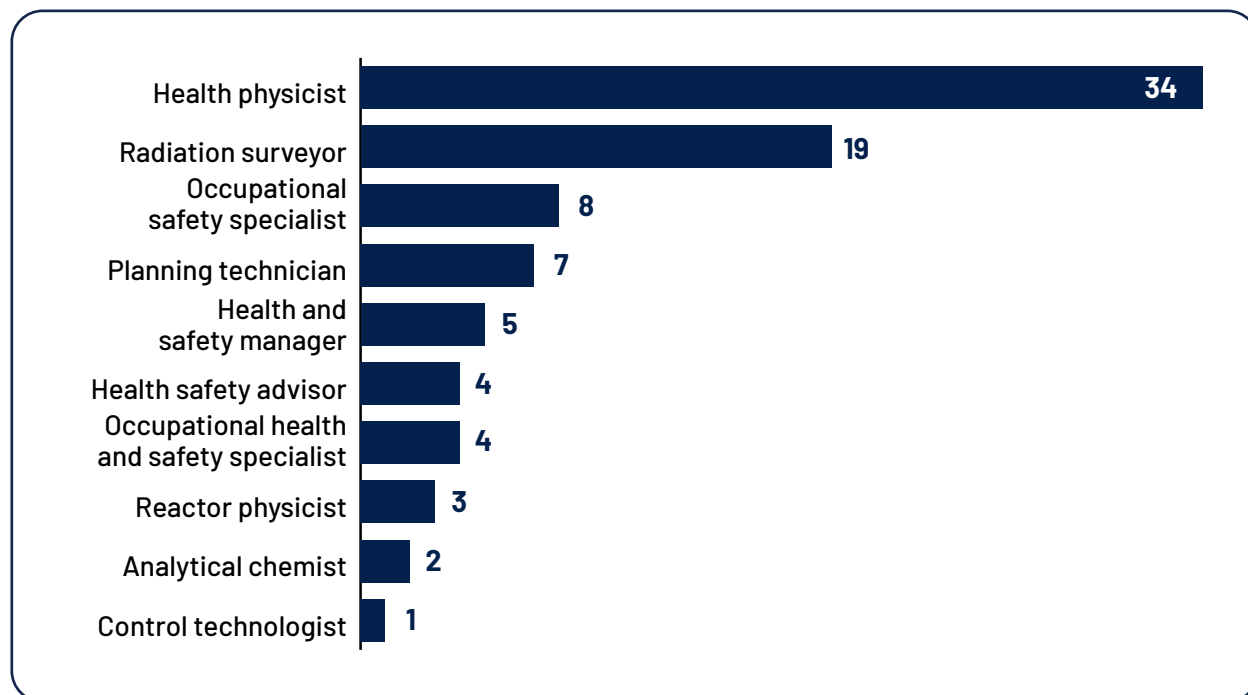
Specialist Occupations

Following supporting roles, specialist occupations represent the second largest source of current hiring demand in Canada's nuclear sector, with demand concentrated in safety- and compliance-related functions. Job posting data depicted in Figure 12 shows a strong clustering in a few roles, led by health physicists (37%) and radiation surveyors (21%). Beyond these roles, hiring activity extends to a narrower set of safety and operational positions, including occupational safety specialists (9%), planning technicians (8%), and health and safety managers (5%). Other occupations, such as reactor physicists (3%), analytical chemists (2%), and control technologists (1%) remain limited in current demand.

The concentration of postings in these occupations points to the central role of radiation protection, monitoring, and regulatory compliance in the nuclear sector. Rather than being broadly distributed across technical domains, hiring is focused on functions that ensure safe and compliant operations, reflecting the regulatory intensity and risk profile of nuclear energy operations.

Occupations such as health physicists and radiation surveyors emerge as priority roles in the labour market, indicating areas where demand is concentrated, operationally essential, and likely to remain important in future SMR workforce development.

Figure 12. In-demand Specialist Occupations, January 2022 to January 2026



Data source: Vicinity Jobs, March 2026; ICTC calculations.

Skilled Trades

Skilled tradespeople are often hired through unions and contractors. This presents challenges to data availability, which restricted ICTC's analysis of contemporary labour demand data for skilled trade roles in the nuclear sector. However, skilled tradespeople are essential for the construction and maintenance of nuclear generating stations. As Bruce Power states on its skilled trades recruitment webpage, "Skilled trades are critical to Bruce

Power's success as Ontario's low-cost nuclear generator" and are "central to the operation and life extension of our facilities."¹⁰⁸

Figure 13 outlines skilled trades roles that experts ICTC consulted with for this research identified as being essential for the construction, operations, and maintenance of SMR facilities in Western Canada, including their status as designated trades in Alberta and Saskatchewan and their status as Red Seal trades in Canada.

¹⁰⁸ Bruce Power. April 6, 2026. Skilled trades at Bruce Power. <https://www.brucepower.com/careers/skilled-trades-at-bruce-power/>.



Figure 13. Skilled Trades Roles Identified as Essential for Western Canada's Nuclear Industry

Trade	Designated Trade?		Canada Red Seal Program?	NOC 2021
	Alberta	Saskatchewan		
Boilermaker	X	X	X	72103
Carpenters	X	X	X	72310
Communications technician	X			72205
Concrete finisher	X		X	73100
Construction craft labourer/worker	X	X	X	75110
Construction electrician	X	X	X	72200
Gasfitter	X		X	72302
Heavy duty equipment technician	X	X	X	72401
Industrial electrician			X	72201
Instrumentation and control technician	X	X	X	22312
Insulator	X	X	X	72321
Iron worker (structural and reinforcing)	X	X	X	72105
Machinist	X	X	X	72100
Metal fabricator (fitter)	X	X	X	72104
Millwright (industrial mechanic)	X	X	X	72400
Non-destructive testing technician				22230
Painter and decorator	X	X	X	73112
Parts technician	X	X	X	14401
Plant operator/power engineer				92100
Plumber	X	X	X	72300
Steamfitter/pipefitter	X	X	X	72301
Power system electrician	X			72202
Powerline technician	X	X	X	72203
Bricklayer (refractory)	X	X	X	72320
Scaffolder				75110
Sheet metal worker	X	X	X	72102
Surveyor				21203
Welder	X	X	X	72106

Data sources: Red Seal Program, Alberta Apprenticeship and Industry Training, Saskatchewan Apprenticeship and Trade Certification Commission.¹⁰⁹

¹⁰⁹ Red Seal Program. April 6, 2026. Red Seal trades. <https://red-seal.ca/eng/trades/trades-list.shtml>; Alberta Apprenticeship and Industry Training. April 6, 2026. Trade profiles. <https://tradesecrets.alberta.ca/trades-in-alberta/designated-trades-profiles>; Saskatchewan Apprenticeship and Trade Certification Commission. April 6, 2026. Trade profiles. <https://saskapprenticeship.ca/designated-trades-searchable/>.



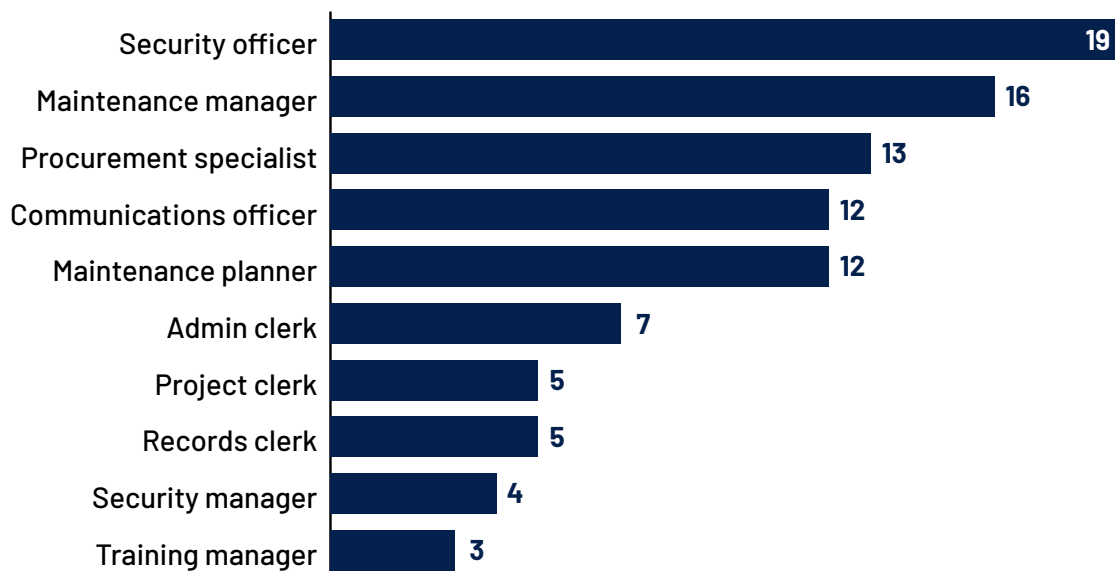
Supporting Roles

Supporting occupations account for the largest share of current hiring demand in Canada's nuclear sector. Job posting data shows that demand is widespread and includes administrative, logistical, and site-based roles, with particularly strong demand for security officers (17%), maintenance managers (14%), and procurement specialists (12%). Additional hiring is observed for communications officers (11%) and maintenance planners (11%), alongside more general administrative roles such as admin clerks (6%), records clerks (4%), and project clerks (4%).

Demand for supporting roles is spread across functions that enable the day-to-day operations of nuclear facilities. The prominence of maintenance and procurement roles highlights the importance of ongoing site management and supply chain reliability, while the significant demand for security-related roles underscores the regulatory and security requirements unique to nuclear energy systems.

This distribution reinforces the role of supporting occupations as the operational backbone of the nuclear workforce. Demand in areas such as maintenance, procurement, and security reflects the systems and processes required to keep facilities running safely and efficiently and highlights a sustained need for these roles as nuclear projects evolve and kick off.

Figure 14. In-demand Support Occupations, January 2022 to January 2026



Data source: Vicinity Jobs, March 2026; ICTC calculations.



Evaluating Potential SMR Workforce Supply in Western Canada

Key Takeaways



While Western Canada does not have a preexisting nuclear energy workforce, though workers from adjacent industries such as oil and gas, mining, utilities, and heavy industry, may be able to fill nuclear energy jobs.



Alberta and Saskatchewan have significant engineering, scientific and technical, and skilled trades workers relevant to the nuclear energy industry, but skilled talent in these fields is already in high demand; a future Western Canadian SMR industry will compete with other sectors to recruit and retain skilled workers.



Security requirements specific to the nuclear industry may further constrain supplies of labour to Western Canada's nuclear energy industry.



The safety culture in the oil and gas industry is distinct, but highly compatible with the safety culture in the nuclear energy industry, making oil and gas workers in Western Canada good candidates to transition to nuclear energy careers.

A crucial component of establishing a nuclear energy sector in Western Canada will be establishing a supply of skilled talent to develop, operate, and maintain SMRs and other nuclear energy assets. Indeed, nuclear energy development can act as a catalyst for economic growth and long-term, quality jobs in host regions. Yet, simultaneously, the availability and distribution of this workforce

will play a key role in determining the pace and feasibility of SMR deployment. Understanding where relevant talent exists, how it is distributed across industries and occupations, and whether current labour market conditions support mobility is therefore critical to understanding Western Canada's readiness to support a future nuclear energy sector.

Supply Constraint – Security Clearance Requirements in the Canadian Nuclear Industry

As sensitive critical infrastructure, nuclear energy generation sites require extensive security controls, including rigorous vetting of workers entering the nuclear industry. New nuclear hires require extensive background checks and are required to be able to obtain and maintain security clearances, including a site access security clearance (SASC).

As the Canadian Nuclear Safety Commission describes, the “purpose of a SASC is to prevent unreasonable risk to high-security sites. This includes risks to operations, personnel, safety and national security from the insider threat” and evaluates a candidate’s “character, honesty, background, qualifications and trustworthiness.”¹¹⁰ ICTC’s analysis of 241 nuclear energy-related job postings found that 53% specifically mentioned security clearance requirements as a term of employment.

The regulatory requirement for nuclear energy workers in Canada to obtain and hold an SASC, while essential due to the nature of nuclear energy sites, creates a further labour supply constraint and increases the time for new workers to enter the nuclear energy industry. It may also greatly complicate hiring international students for nuclear energy roles as well as experienced nuclear energy professionals from abroad.

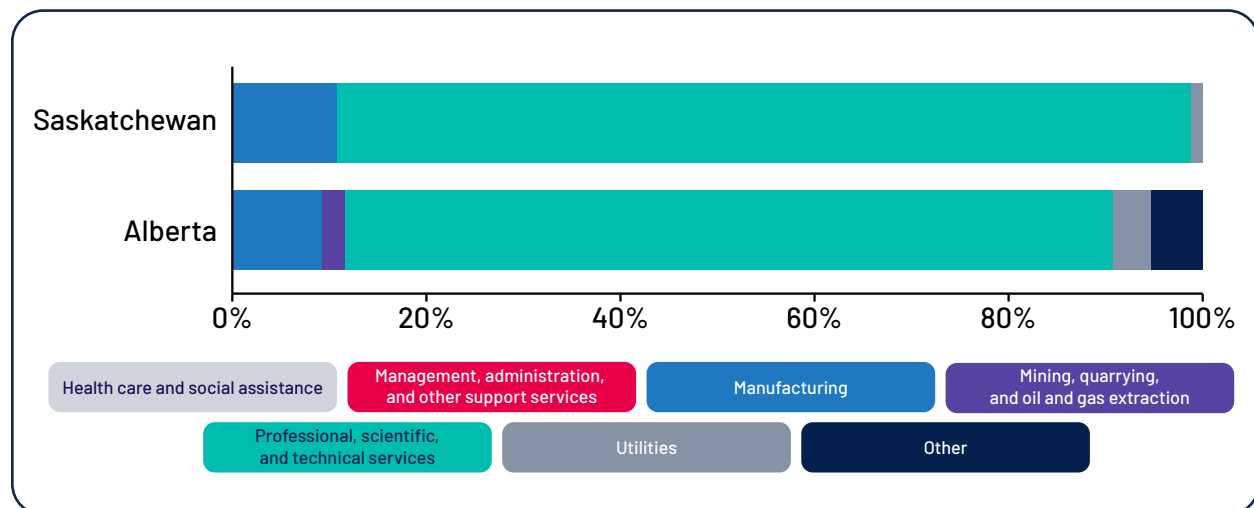
The Current State of SMR Workforce Supply in Canada

Across Alberta and Saskatchewan, workers in nuclear-relevant occupations are concentrated in relatively few core industries.

In Alberta, engineering roles are overwhelmingly concentrated in professional, scientific, and technical services, which accounts for approximately 79% of employment in this cluster (see Figure 15). Smaller shares are distributed across manufacturing (9%), utilities (4%), and mining and

oil and gas (2%). A similar pattern is observed in Saskatchewan, where professional, scientific, and technical services account for an even larger share of engineering employment at 88%, with limited representation in manufacturing (11%) and utilities (1%). The data clearly depicts that engineering talent in both provinces is primarily embedded in professional services, rather than directly in energy or utility operations.

Figure 15. Engineering Occupations Distribution by Industry, 2025 Average



Data source: Statistics Canada Labour Force Survey, March 2026; ICTC calculations.

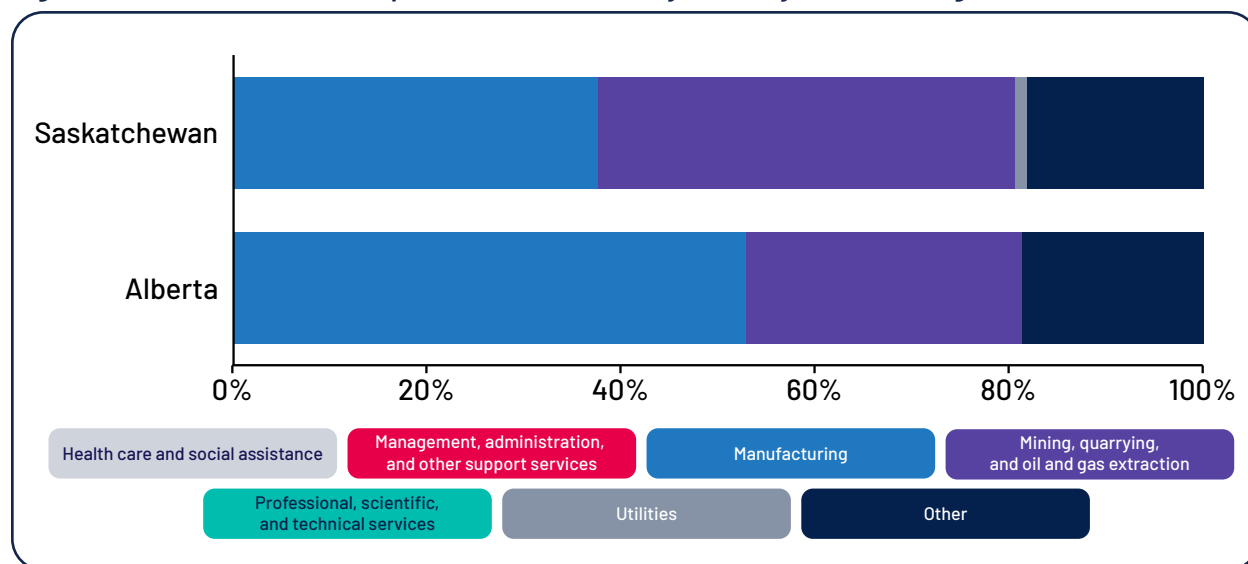
¹¹⁰ Canadian Nuclear Safety Commission. May 9, 2025. REGDOC-2.12.2, site access security clearance. <https://www.cnsccsn.gc.ca/eng/acts-and-regulations/regulatory-documents/published/html/regdoc2-12-2/>.



In contrast, skilled trades occupations are concentrated in industrial and resource-based sectors (Figure 16). In Alberta, 53% of skilled trades employment is in manufacturing, with an additional 28% in mining and oil and gas and 19% in other industries. Saskatchewan shares a similar distribution, with skilled trades being more heavily concentrated in mining and oil and gas (43%) and manufacturing (38%), with 18% in other industries.

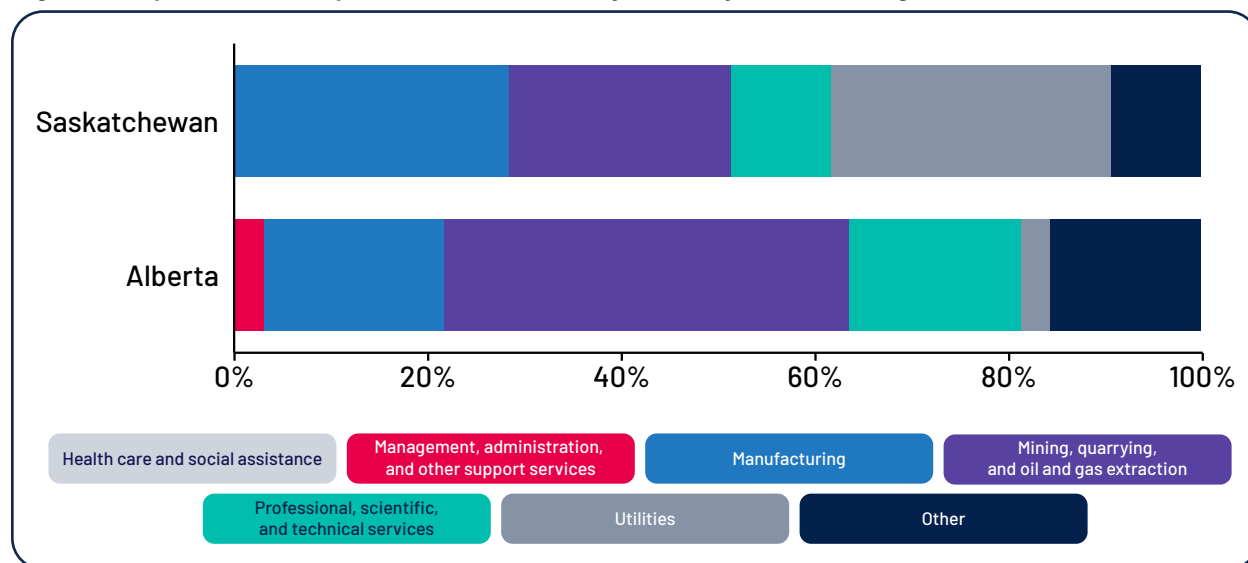
Specialist occupations show a more mixed distribution but remain strongly tied to resource and industrial sectors (Figure 17). In Alberta, specialist roles are concentrated in mining and oil and gas (42%), manufacturing (19%), and professional services (18%), with smaller shares in utility (3%) and administrative services (3%). In Saskatchewan, specialists are distributed across manufacturing (28%), mining and oil and gas (23%), and utilities (30%), with a smaller share in professional services (10%).

Figure 16. Skilled Trades Occupations Distribution by Industry, 2025 Average



Data source: Statistics Canada Labour Force Survey, March 2026; ICTC calculations.

Figure 17. Specialist Occupations Distribution by Industry, 2025 Average



Data source: Statistics Canada Labour Force Survey, March 2026; ICTC calculations.



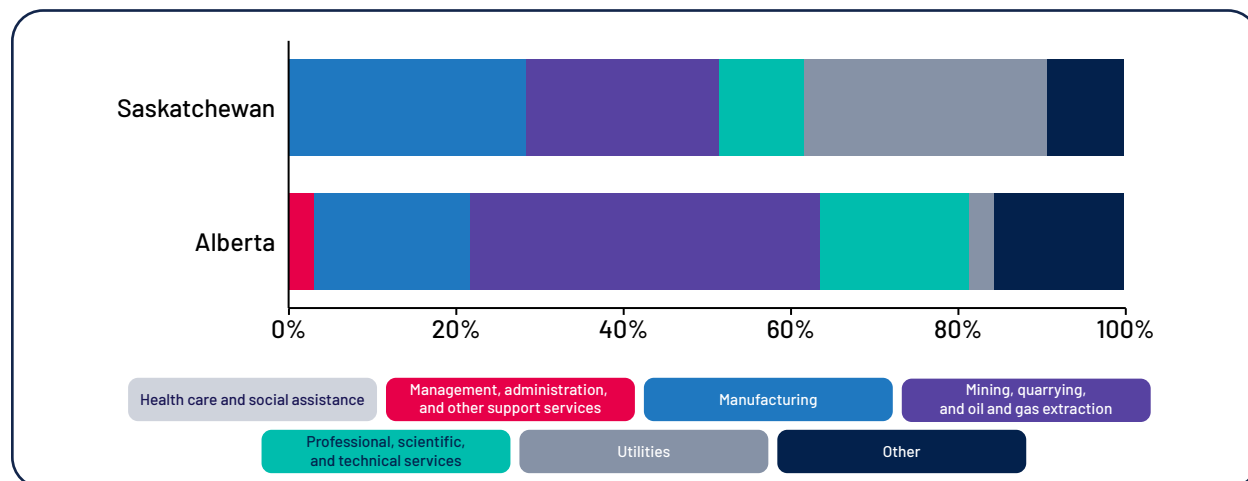
Supporting roles are more broadly distributed across the economy (Figure 18). In Alberta, administrative and support occupations are spread across management, administration, and other support services (15%), professional services (15%), health care (13%), and a large residual share across other industries (50%). In Saskatchewan, supporting roles are even more diffuse, with 60% of employment in other industries, alongside notable shares in administrative services (18%) and health care (16%), with trends in both provinces reflecting the generalist nature of supporting occupations, which are less tied to specific industries and more easily transferable across sectors.

Recent unemployment data in Figure 19 further underscores the limited availability of labour across key nuclear employment clusters. Unemployment remains low, not only in Alberta and Saskatchewan, but also in Ontario, which is home to Canada's largest

existing nuclear workforce. Between 2023 and 2025, the number of unemployed workers in engineering, skilled trades, and specialist occupations remained modest across all three provinces, with Ontario also exhibiting relatively limited excess capacity despite its larger labour pool.

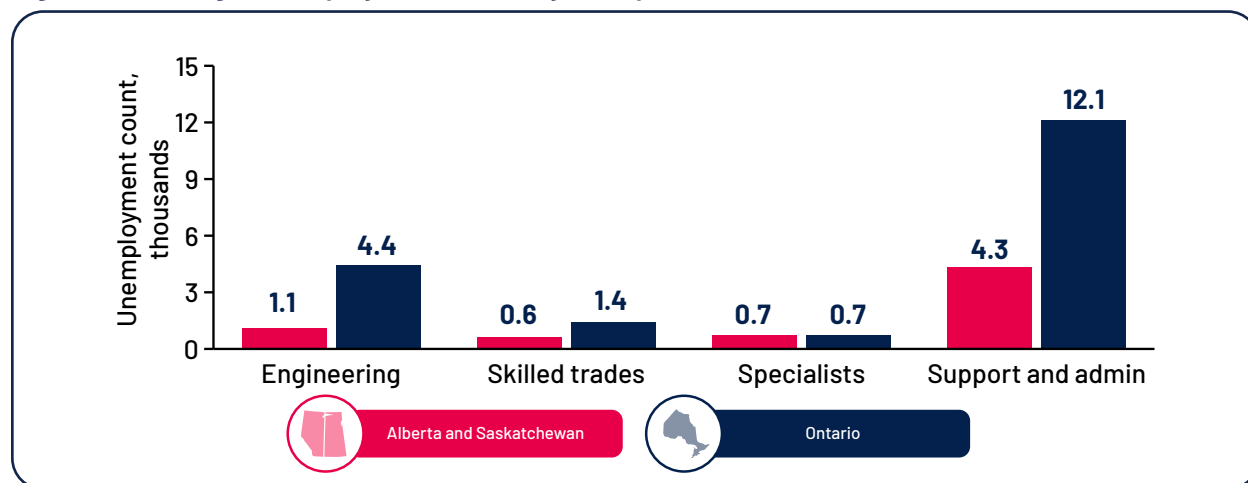
These trends point to limited labour market slack, characterized by tight competition for workers and constrained capacity to absorb additional labour demand, at the national level, particularly in occupations critical to nuclear energy development. Therefore, interprovincial migration might not meaningfully offset labour shortages as SMR development progresses, emphasizing the importance of addressing nuclear workforce supply needs through multiple channels, including reallocation from adjacent industries and the establishment of targeted, nuclear-specific training pipelines.

Figure 18. Support Occupations Distribution by Industry, 2025 Average



Data source: Statistics Canada Labour Force Survey, March 2026; ICTC calculations.

Figure 19. Average Unemployment Count by Occupation Cluster, thousands (2023–2025)



Data source: Statistics Canada Labour Force Survey, March 2026; ICTC calculations.



Engineering Occupations

Engineering occupations form a core component of the potential SMR workforce in Western Canada. Across Alberta and Saskatchewan, employment levels in engineering-related occupations have remained relatively stable over time. In Alberta, engineering employment increased from approximately 28,600 workers in January 2014 to 40,000 to 50,000 workers in recent years, reaching 50,600 in January 2026 (Figure 20). As illustrated in Figure 21, Saskatchewan exhibits a smaller engineering workforce but with similar trends, fluctuating between 3,000 and 7,000 workers, with recent employment levels around 5,600 to 6,700 workers.

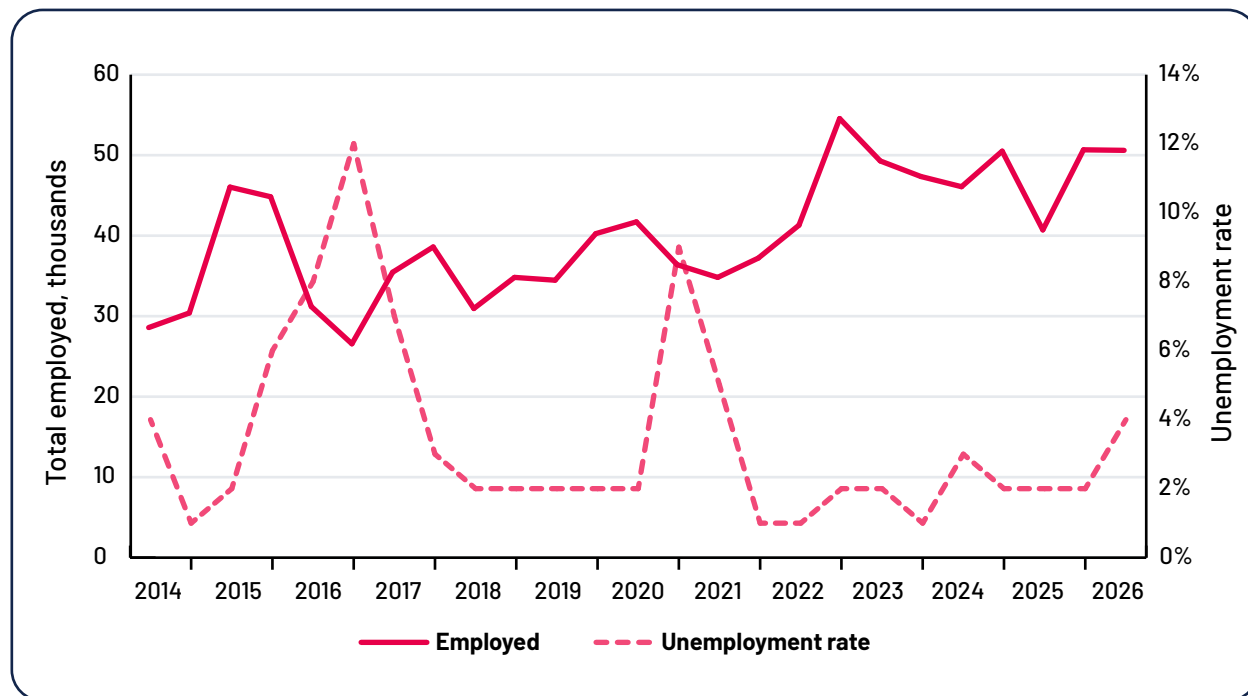
Despite this relatively stable employment base, labour market conditions for engineering occupations are generally tight. In Alberta, unemployment rates for engineering occupations have remained low in recent years, typically between 1.5% and 2.0% between 2022 and 2025, with a slight increase to 3.6% in January 2026. Saskatchewan shows a similar pattern of low unemployment, with

rates frequently below 3%, although some variability is observed in earlier years and during periods of economic disruption.

Persistently low unemployment rates imply that most engineers in both provinces are already employed, with limited excess labour available for immediate redeployment into nuclear-related roles. While the overall size of the engineering workforce suggests that Western Canada possesses sufficient capacity in aggregate, the lack of labour market slack means that new SMR-related demand must be met through strategies beyond drawing on a large pool of unemployed workers.

Accordingly, competition for engineering talent is likely to emerge as a key constraint. Engineers are employed across several sectors, including oil and gas, infrastructure, and professional services, all of which may continue to demand similar skill sets. As a result, attracting engineering talent into the nuclear sector will likely require targeted incentives, specialized training, and clear career pathways aligned with SMR development.

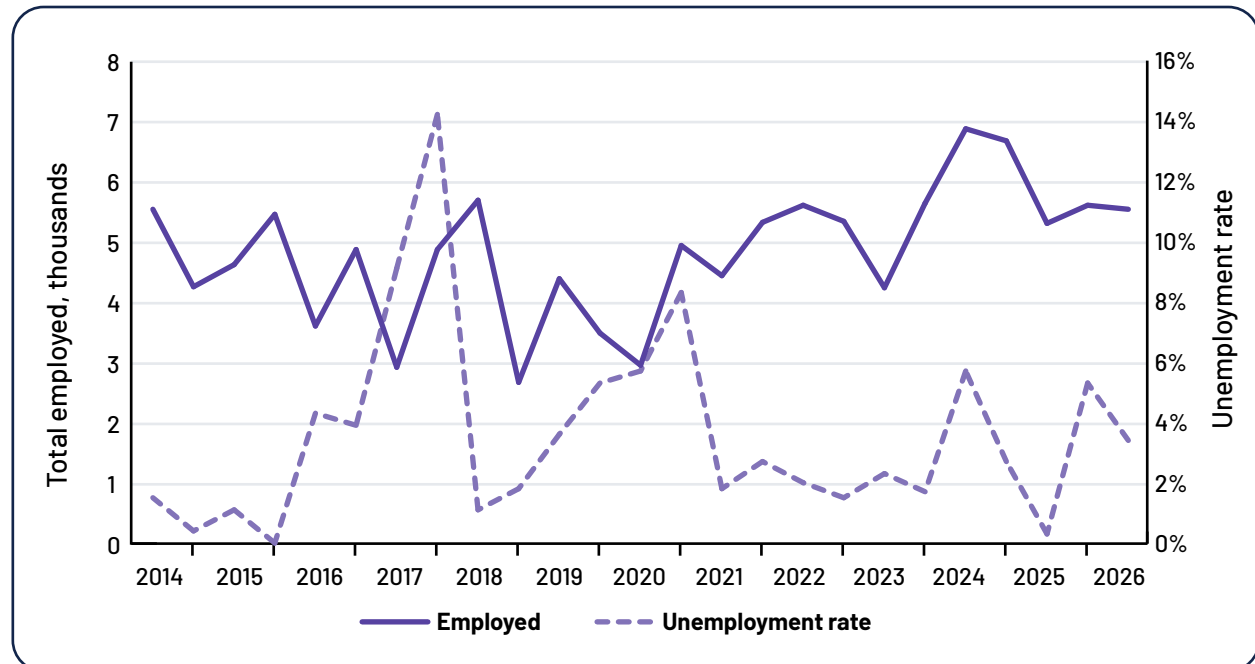
Figure 20. Engineering Occupations Employment Count (thousands) and Unemployment Rate, Alberta, 2014–2026



Data source: Statistics Canada Labour Force Survey, March 2026; ICTC calculations.



Figure 21. Engineering Occupations Employment Count (thousands) and Unemployment Rate, Saskatchewan, 2014–2026



Data source: Statistics Canada Labour Force Survey, March 2026; ICTC calculations.

Specialist Occupations

Specialist occupations, such as chemists, health physicists, and other domain-specific technical roles, represent a critical component of the workforce required for SMR deployment, particularly in safety, monitoring, and regulatory compliance.

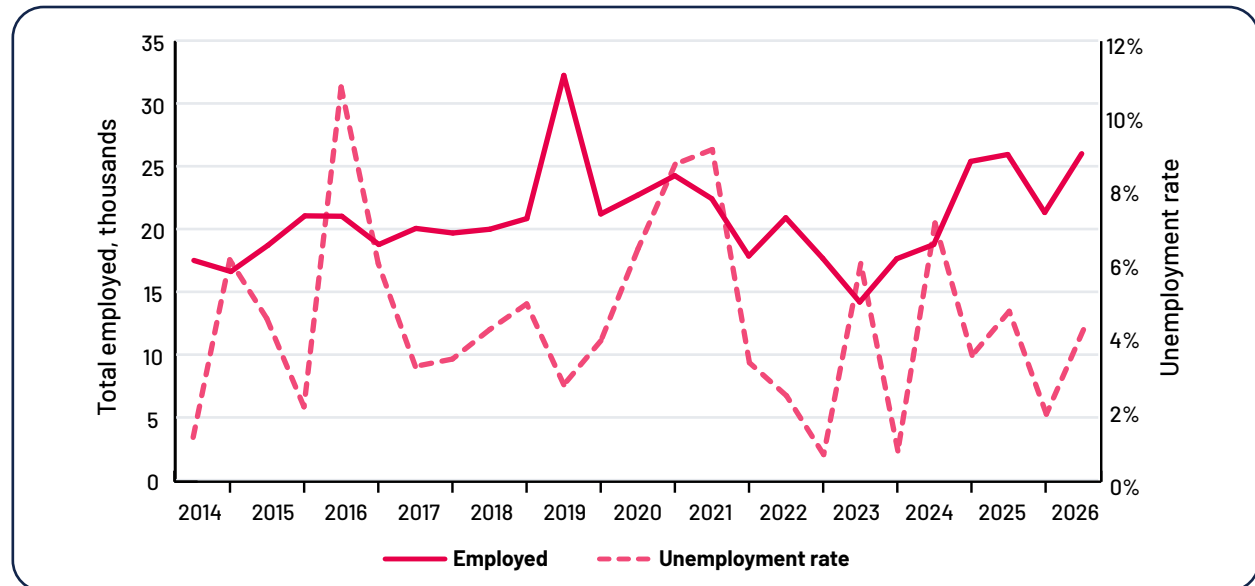
As illustrated in Figure 22, in Alberta, the specialist workforce has generally fluctuated between approximately 17,000 and 26,000 workers since 2014. Following a temporary decline to 14,200 in January 2023, employment rebounded to 25,900 in January 2025 and 26,000 in January 2026. As illustrated in Figure 23, Saskatchewan's specialist workforce is smaller in absolute terms, typically ranging between 3,000 and 5,000 workers, with more recent increases to 5,700 in July 2025 and 6,900 in January 2026.

Unemployment trends point to a labour market that is moderately tight, but more variable than those observed for engineering and skilled trades occupations. In Alberta, unemployment rates have generally remained within the 2% to 5% range

in recent years, although periods of economic disruption led to temporary increases, including 10.7% in January 2016 and 8.6% in July 2020. Saskatchewan exhibits greater volatility, with unemployment often low, but with occasional sharp increases, such as 17.4% in July 2015 and 9.9% in January 2025. These fluctuations are consistent with the relatively small size of the specialist labour pool and a sensitivity to sector demand shifts.

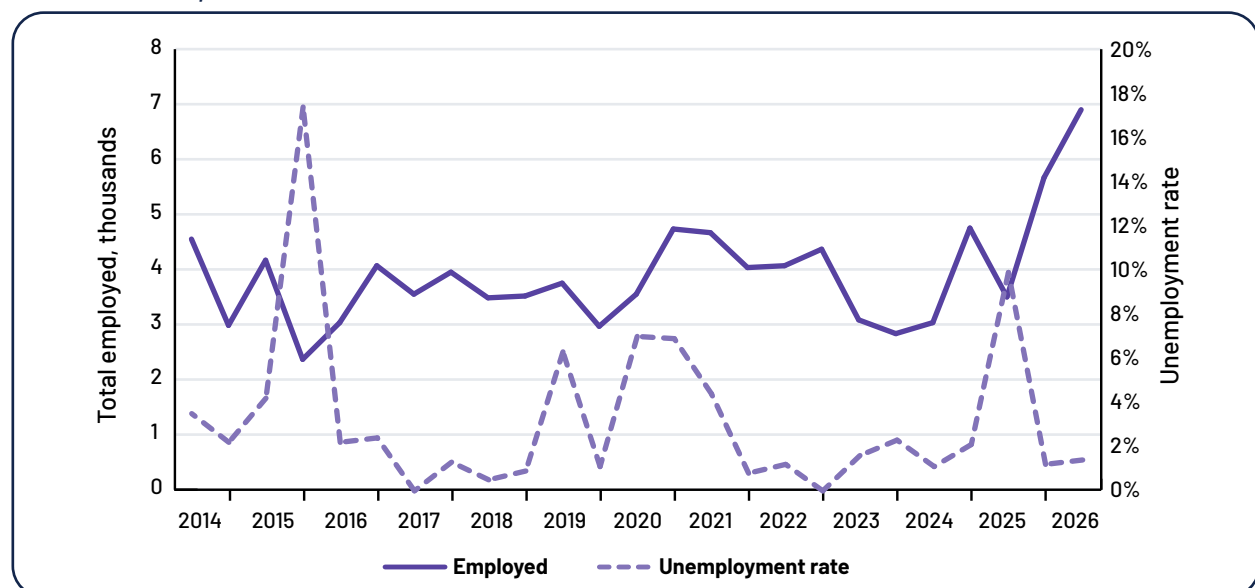
The data suggests that while there is some degree of variability in unemployment, the overall size of the specialist labour pool remains limited, which reduces the availability of readily deployable workers. Many of these occupations are currently embedded in resource and industrial sectors, where they support functions related to health and safety analysis. Although these competencies provide a strong foundation, additional training and certification is required to align this workforce with specific regulatory and operational requirements of nuclear energy systems.

Figure 22. Specialist Occupations Employment Count (thousands) and Unemployment Rate, Alberta, 2014–2026



Data source: Statistics Canada Labour Force Survey, March 2026; ICTC calculations.

Figure 23. Specialist Occupations Employment Count (thousands) and Unemployment Rate, Saskatchewan, 2014–2026



Data source: Statistics Canada Labour Force Survey, March 2026; ICTC calculations.

Skilled Trades

The supply of skilled trades occupations will be an important consideration, particularly given the significance of these trades in the construction and maintenance phases of SMR facility development. As illustrated in Figure 24, in Alberta, this type of employment has remained relatively stable, generally

falling between approximately 8,000 and 14,000 workers since 2014. More recent data shows some variability, including a peak of 16,800 in July 2024, followed by a decline to 9,400 in January 2026. As illustrated in Figure 25, Saskatchewan's skilled trades workforce has fluctuated between 2,000 and 5,000 workers, with recent levels clustering around 2,900 to 3,600 workers.



The data shows limited slack in the labour market, with employment levels that tend to shift more noticeably in response to short-term economic conditions than in other occupation clusters. In Alberta, unemployment has remained low in recent years, with only occasional increases during periods of economic disruption. Saskatchewan follows a similar pattern, with generally low unemployment punctuated by periodic spikes.

These spikes align with broader economic shocks that disproportionately affected resource-dependent regions and the coinciding dips in activity in sectors such as construction, mining, and oil and gas. In particular, the 2020 increase in unemployment corresponds to the combined effects of the COVID-19 pandemic and a sharp decline in global oil demand, which led to significant job losses in oil and gas and related industries across Alberta and Saskatchewan.¹¹¹ Earlier periods of elevated unemployment, particularly around 2015 to 2017, reflect the aftermath of the global oil price collapse

beginning in 2014, which resulted in substantial job losses across construction, mining, and oil and gas sectors in Alberta.¹¹²

Despite these periods of volatility, overall labour market conditions indicate that most skilled trades workers are actively employed during periods of economic stability. This indicates that available labour supply is limited under typical conditions, with only temporary increases in availability during downturns.

What emerges from these patterns is a workforce that is already closely tied to existing industrial activity, particularly in resource extraction and manufacturing. Skilled trades workers do not represent a readily available surplus of labour but are instead embedded in sectors that rely on similar capabilities. Consequently, any increase in demand associated with SMR development would likely interact directly with these existing labour demands, rather than drawing from a large pool of underutilized workers.

Figure 24. Skilled Trades Occupations Employment Count (thousands) and Unemployment Rate, Alberta, 2014–2026



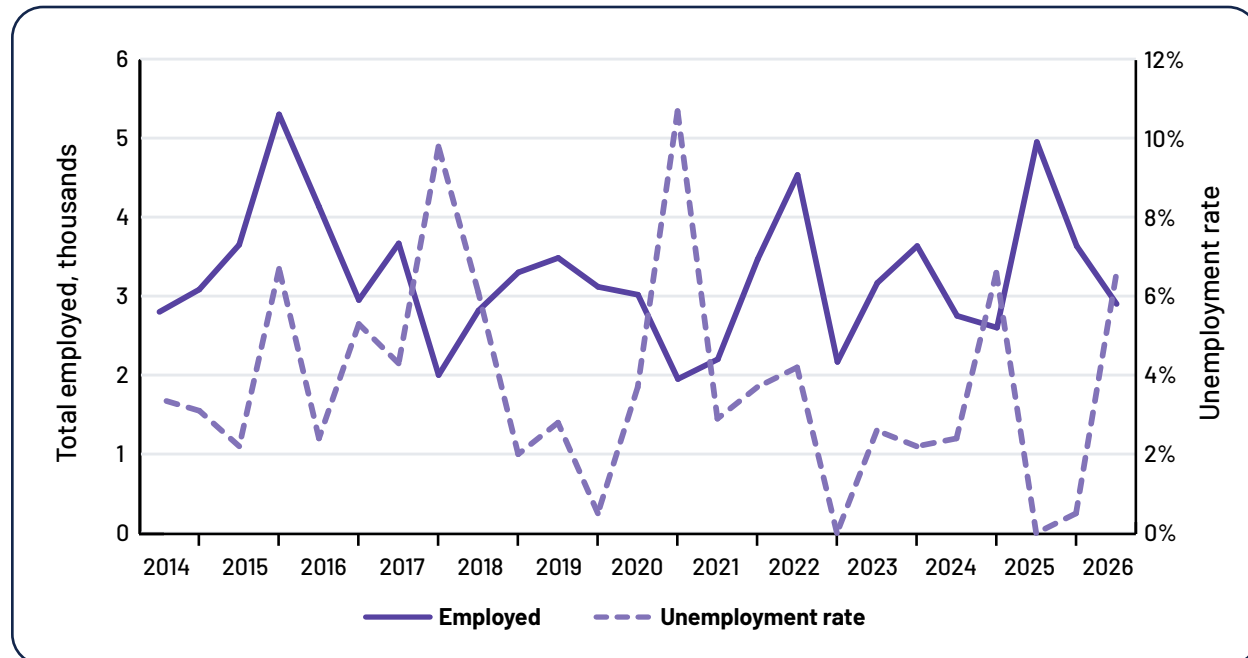
Data source: Statistics Canada Labour Force Survey, March 2026; ICTC calculations.

¹¹¹ Labour Market Information Council. June 2020. Sectors at risk: The impact of COVID-19 on the Canadian oil and gas sector. LMI Insight Report no. 33. <https://lmic-cimt.ca/publications-all/lmi-insight-report-no-33-sectors-at-risk-the-impact-of-covid-19-on-the-canadian-oil-and-gas-sector/>.

¹¹² See: Service Canada, Western-Territories Region. 2015. Alberta: Environmental scan. https://publications.gc.ca/collections/collection_2018/servcan/sg3-4/SG3-4-2015-eng.pdf.



Figure 25. Skilled Trades Occupations Employment Count (thousands) and Unemployment Rate, Saskatchewan, 2014–2026



Data source: Statistics Canada Labour Force Survey, March 2026; ICTC calculations.

Supporting Roles

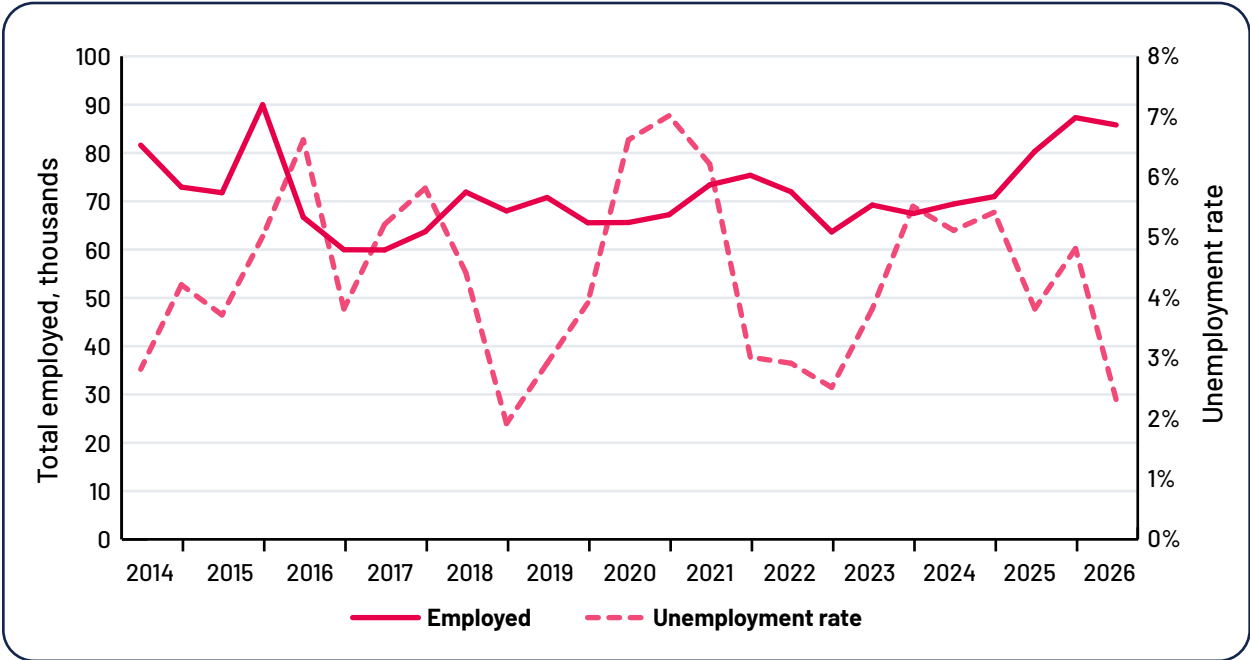
Supporting occupations, such as financial analysts, administrative staff, operations personnel, and security and protective services workers, form the largest and most broadly distributed component of the potential SMR workforce. Unlike engineering, specialist, and skilled trades roles, these occupations are not tied to a specific technical domain and are instead distributed across a wide range of industries.

Employment levels in these roles are substantially higher than in other occupation clusters, particularly in Alberta. As illustrated in Figure 26, over the past decade, supporting roles in Alberta have generally ranged between approximately 60,000 and 90,000 workers, declining to around 60,000 in 2016–2017 before recovering in recent years. This recovery has been sustained, with employment reaching 80,400 in January 2025, peaking at 87,300 in July 2025, and remaining elevated at 85,800 in January 2026. As illustrated in Figure 27, in Saskatchewan, the supporting workforce varies from 11,000 to 19,000 workers, with recent levels reaching 19,400 in July 2025 and 18,000 in January 2026.

Unemployment patterns indicate that these roles operate in a relatively balanced labour market. Aside from notable periods like the COVID-19 pandemic, unemployment rates in both provinces have generally remained within 2% to 5% compared to other occupation clusters; these fluctuations are less pronounced and reflect the broader and more diversified demand for supporting roles across the economy.

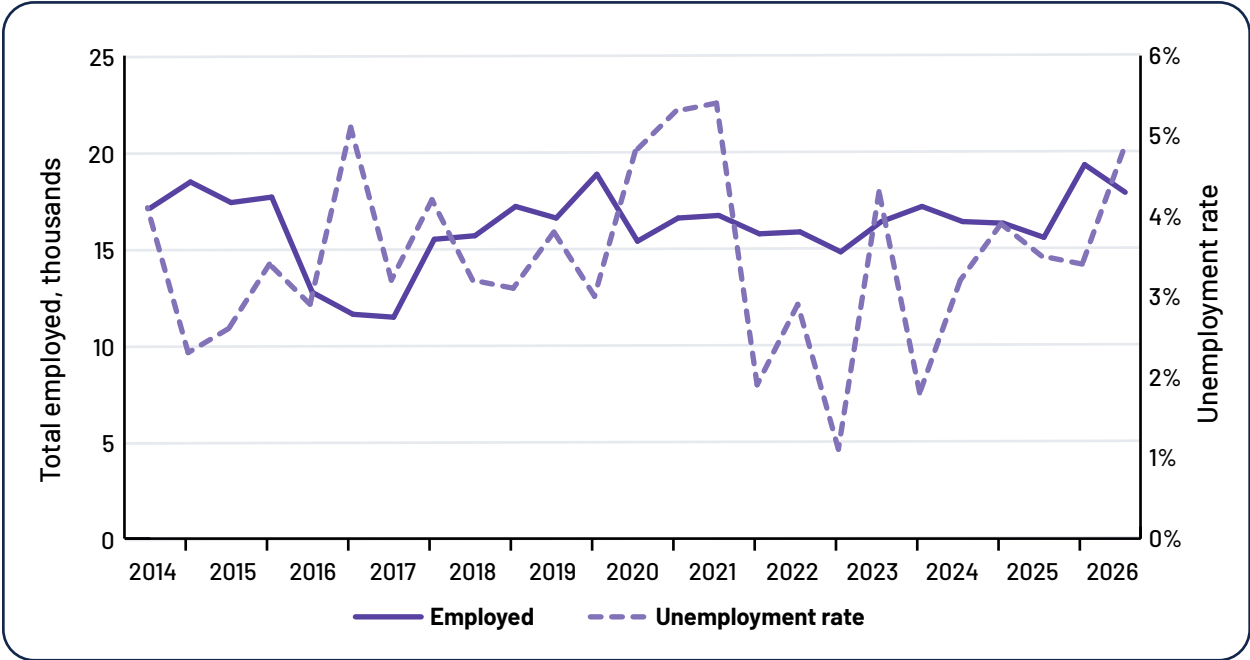
This combination of scale and moderate labour market slack suggests that supporting occupations are unlikely to represent a binding constraint for SMR workforce development. Because these roles are less specialized and more transferable across industries, workers can be more readily reallocated to meet new demand. While certain positions, particularly those tied to facility operations, procurement, and site security, will still require additional nuclear-specific training and security clearance, the overall workforce base provides flexibility that is not present in more specialized occupation clusters.

Figure 26. Support Occupations Employment Count (thousands) and Unemployment Rate, Alberta, 2014–2026



Data source: Statistics Canada Labour Force Survey, March 2026; ICTC calculations.

Figure 27. Support Occupations Employment Count (thousands) and Unemployment Rate, Saskatchewan, 2014–2026



Data source: Statistics Canada Labour Force Survey, March 2026; ICTC calculations.

Nuclear Safety Culture and Compatibility with Safety Culture in Alberta's Oil and Gas Industry

Nuclear energy experts ICTC engaged with for this research observed that the safety culture that has been fostered in the Alberta oil and gas sector could translate well into nuclear energy. Alberta's oil and gas and heavy industrial workforce is already well-versed in safety and championing safety culture on the jobsite. While specific risks in industries like oil and gas differ from nuclear energy, the core tenets of safety culture are the same.

The Canadian Nuclear Safety Commission defines safety culture in the nuclear industry as "characteristics of the work environment, such as the values, rules, and common understandings that influence workers' perceptions and attitudes about the importance that the organization places on safety."¹¹³ The IAEA notes "Safety culture is that type of organizational culture where safety is of utmost priority, considered essential for the long term success of the organization,"¹¹⁴ and defines safety culture characteristics as being "learning driven," "integrated into all activities" and "clearly recognized value" within an organization, stressing clear lines of "leadership" and "accountability."

Likewise, a 2021 white paper by the Canadian Energy Regulator (CER) on safety culture in the Canadian oil and gas industry provides a framework of safety culture based on positive dimensions that enhance workplace safety and negative dimensions that diminish safety. Positive dimensions of safety include "committed safety leadership," "vigilance," "empowerment and accountability," and "resiliency."¹¹⁵ When comparing these overarching approaches to safety culture in the nuclear energy and oil and gas industries, the similar approaches are notable. Figure 28 compares the IAEA's safety culture characteristics with the CER's safety culture framework.

Figure 28. Comparing the IAEA Safety Culture Characteristics and CER Safety Culture Framework

Nuclear Industry	Oil and Gas Sector
IAEA Safety Culture Characteristics	CER Safety Culture Framework
• Safety is integrated into all activities • Safety is a clearly recognized value • Leadership for safety is clear • Accountability for safety is clear • Safety is learning driven	• Committed safety leadership • Vigilance • Empowerment and accountability • Resiliency

Sources: IAEA, 2009, and Canadian Energy Regulator, 2021.¹¹⁶

¹¹³ Canadian Nuclear Safety Commission. April 2018. Management system: Safety culture, REGDOC-2.1.2, p. 1. <https://api.cnsccs.gc.ca/dms/digital-medias/REGDOC2-1-2-safety-culture-final-eng.pdf/object>.

¹¹⁴ International Atomic Energy Agency. 2009. The management system for nuclear installations. IAEA Safety Standards Series, No. GS-G-3.5, p. 6. https://www-pub.iaea.org/MTCD/Publications/PDF/Pub1392_web.pdf.

¹¹⁵ Canadian Energy Regulator. 2021. Advancing safety in the oil and gas industry: Statement on safety culture, p. 6. <https://www.cer-rec.gc.ca/en/safety-environment/safety-culture/statement-safety-culture/advancing-safety-in-the-oil-and-gas-industry-statement-on-safety-culture-2021.pdf>.

¹¹⁶ International Atomic Energy Agency. 2009. The management system for nuclear installations. IAEA Safety Standards Series, No. GS-G-3.5, p. 8. https://www-pub.iaea.org/MTCD/Publications/PDF/Pub1392_web.pdf; Canadian Energy Regulator. 2021. Advancing safety in the oil and gas industry: Statement on safety culture, p. 6. <https://www.cer-rec.gc.ca/en/safety-environment/safety-culture/statement-safety-culture/advancing-safety-in-the-oil-and-gas-industry-statement-on-safety-culture-2021.pdf>.



Nuclear Energy Education and Training in Canada

Key Takeaways



Western Canada does not have a preexisting nuclear workforce to draw from as Alberta and Saskatchewan develop SMR and potentially large-scale, nuclear energy projects.



A nuclear training and education pipeline should be established in Alberta and Saskatchewan to support SMR development in Western Canada to address this labour market gap.



Universities, colleges, and polytechnics in Alberta and Saskatchewan play a major role in delivering academic programs needed by Western Canada's budding nuclear industry.



Due to the significant time it takes to design, obtain institutional and government approvals for new academic programs, and recruit and graduate the first cohort of students, new nuclear-specific academic programming at universities, colleges, and polytechnics must begin being designed and undergo the approvals process in the coming years to produce graduates in time to fill highly skilled future nuclear positions in Western Canada.

A major potential capacity constraint facing a future nuclear energy sector in Western Canada is a lack of local nuclear energy programs, such as nuclear engineering, housed at Alberta and Saskatchewan post-secondary institutions. Part IV of this report overviews Canada's domestic nuclear energy education and training system, evaluates key nuclear energy jobs by education requirements based on NOC TEER categories, and discusses the potential of developing specialized nuclear energy education and professional training in Alberta and Saskatchewan.

The Need to Develop a Nuclear Energy Training Pipeline in Western Canada

Creating a well-trained and sustainable nuclear energy workforce is crucial to any civil nuclear energy program. As a region without a preexisting nuclear energy workforce, Alberta and Saskatchewan must establish a training pipeline from the ground up.

Without local capacity in Western Canada to educate and train nuclear energy talent for future SMR, and possible large-scale conventional nuclear energy projects, highly qualified specialist talent must be recruited from Eastern Canada or abroad, or those living in Western Canada who are interested in entering the nuclear energy industry must train at post-secondary institutions in Eastern Canada and then return to Alberta or Saskatchewan to begin their nuclear energy careers upon graduating.

In both cases, Western Canada's nuclear energy industry would be wholly reliant on the nuclear energy

training system in Eastern Canada already strained by workforce demands for the significant number of expansion and renewal nuclear energy projects.

Furthermore, without localized delivery of nuclear energy professional development and training, mid-career nuclear energy workers will be limited to accessing learning online or travelling to Eastern Canada to access specialized nuclear energy training programs.

Training, Education, Experience, and Responsibilities Categories

Statistics Canada's training, education, experience, and responsibilities (TEER) design is a statistical categorization of workplace levels required for different occupations.¹¹⁷ There are six TEER categories, including TEER 0 and TEER 1, for managerial and professional roles requiring university-level qualifications; TEER 2 and TEER 3, requiring college education or apprenticeship; TEER 4, requiring a high school diploma or extensive on-the-job training; and TEER 5, requiring no formal education.

Mapping identified nuclear occupations to their corresponding TEER categories outlines training and education required for the numerous roles required. Figure 29 identifies nuclear occupations by their corresponding TEER categories. As the figure demonstrates, nuclear energy jobs are highly clustered around TEER 0, TEER 1, and TEER 2 categories, requiring relatively high levels of education and training.

¹¹⁷ See: Statistics Canada. September 14, 2023. Introduction to the National Occupational Classification (NOC) 2021 Version 1.0. <https://www.statcan.gc.ca/en/subjects/standard/noc/2021/introductionV1>.



Figure 29. Nuclear Occupations by TEER Category

TEER Category	Education Requirement	Engineering	Specialist	Skilled Trades	Support
TEER 0	University degree (management occupations)	Engineering managers (20010)			- Senior managers (00015) - Administrative services managers (10019) - Facility operation and maintenance managers (70012)
TEER 1	University degree	- Nuclear engineers (21301) - Software engineers (21231) - Civil (21300), mechanical (21301), electrical (21310), chemical (21320), industrial (21321), materials (21322), and other engineers (21399) - Other physical science professionals (21109)	- Physicists (21100) - Chemists (21101)		- Financial analysts (11102) - Marketing and public relations professionals (11202)
TEER 2	College diploma, apprenticeship training (2 or more years), or supervisory occupations	Engineering inspectors and regulatory officers (22231)	- Occupational health and safety specialists (22232) - Mechanical (22301), industrial (22302), and electrical technologists (22310) - Nuclear operators, power engineers, and power systems operators (92100)	Construction millwrights and industrial mechanics (72400)	
TEER 3	College diploma, apprenticeship training of less than 2 years, or more than 6 months of on-the-job training				
TEER 4	High school diploma or on-the-job training				- Office support workers (14100) - Purchasing and inventory control workers (14403) - Security officers and protective services (64410)
TEER 5	No formal education requirement				

Sources: Statistics Canada, Employment and Social Development Canada; ICTC analysis.¹¹⁸

¹¹⁸ Employment and Social Development Canada. March 26, 2026. National Occupation Classification: TEER category. <https://noc.esdc.gc.ca/Tutorial/TutorialTeerCategory>; Statistics Canada. September 28, 2021. National Occupational Classification (NOC) 2021 Version 1.0. <https://www23.statcan.gc.ca/imdb/p3VD.pl?Function=getVD&TV=1322554>.



The Role for Canadian Universities and Polytechnics in Western Canada

In its 2022 guide to human resources management for new nuclear energy programs, the IAEA highlights the critical role that both universities and vocational/technical schools play in educating and training new nuclear energy workers and establishing a nuclear energy sector.¹¹⁹

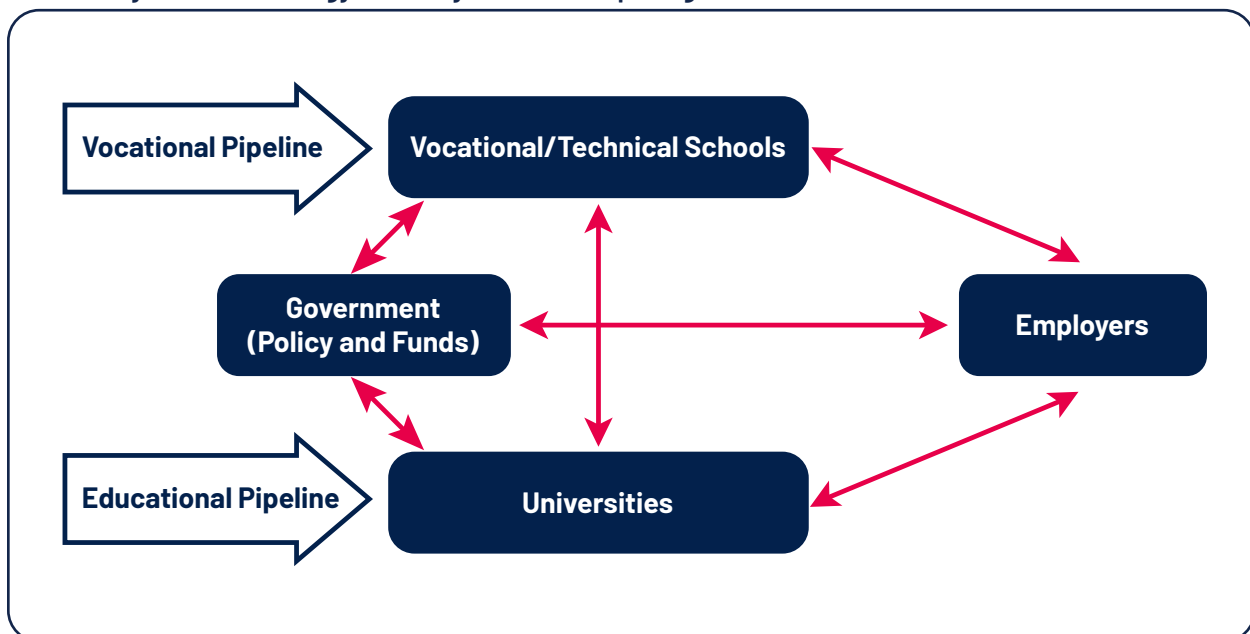
Under the IAEA's framework, vocational/technical schools train a pipeline of technical and supporting talent for the nuclear industry, such as technicians, technologists, and skilled trades (TEER 2 roles, see Figure 29 for descriptions of TEER categories), while the university education pipeline trains highly qualified technical talent such as engineers and nuclear scientists (TEER 1 roles), as well as managerial and executive talent (TEER 0 roles).

The IAEA notes that it is critical that universities and vocational/technical schools communicate and work in coordination with government and the nuclear industry. Figure 30 outlines the IAEA's suggested relationship linkages between post-secondary institutions, government, and nuclear energy employers. Under the IAEA's model, government

provides funding and policy guidance, the post-secondary system—including universities and vocational/technical schools—train and educate a pipeline of qualified nuclear energy workers, while the nuclear energy industry hires graduates from the post-secondary system.¹²⁰

For the post-secondary education systems in Alberta and Saskatchewan, the IAEA's guidance demonstrates the important role that universities, polytechnics, and regional colleges would play in delivering specialist education and training for Western Canada's new nuclear sector. Research intensive universities would play a major role in training highly qualified personnel, such as engineers and nuclear scientists, while the provinces' polytechnics and regional colleges would cover training for specialist technical roles, as well as provide qualified skilled trades personnel to construct and maintain SMR sites. Western Canadian post-secondary institutions may also host training and professional development for the nuclear energy industry.

Figure 30. Nuclear Energy Industry Education and Training Pipeline: Government, Post-Secondary, Nuclear Energy Industry Relationship Diagram



Source: Adapted from IAEA, 2022.¹²¹

¹¹⁹ International Atomic Energy Agency. 2022. Human resource management for new nuclear power programmes. IAEA Nuclear Energy Series No. NG-T-3.10, p. 12. <https://www.iaea.org/publications/14724/human-resource-management-for-new-nuclear-power-programmes>.

¹²⁰ Ibid., p. 12.

¹²¹ Ibid., p. 12.



Post-Secondary Education Program Development Timeline in Alberta and Saskatchewan

Like any new academic program, developing specialist nuclear energy education and training programs must follow a standardized development and approval process. The review and approval process and associated timelines should be considered because developing a nuclear energy training pipeline in Western Canada must be phased with future SMR deployments to ensure workforce readiness.

This process includes developing a detailed proposal; outlining program curriculum, a delivery model business case, and labour market analysis; and getting support from external parties, before gaining institutional-level approval for new for-credit and non-credit programs. Each college and university will have their own process of institutional approval.

From there, new for-credit program proposals must be submitted to the provincial government for review and final approval. In Alberta, new academic programs undertake an initial consultation before undergoing system coordination review by

the Campus Alberta Quality Council and gaining ministerial approval.¹²²

In Saskatchewan, new academic program proposals undergo a system coordination review and then a quality assurance review by the Saskatchewan Higher Education Quality Assurance Board, before being granted ministerial approval. For regulated professions, such as engineering, relevant professional bodies such as the Canadian Engineering Accreditation Board are consulted in the review process.¹²³

Figure 31 outlines estimated timelines for the initial development, institutional and government approval, and delivery for new academic programs at Alberta and Saskatchewan post-secondary institutions, including for-credit academic programs and non-credit continuing education certificate and micro-credential programs. Developing an initial new program proposal to gaining final government approval can take several years.

¹²² Government of Saskatchewan. March 18, 2026. Degree-granting in Saskatchewan. <https://www.saskatchewan.ca/government/education-and-child-care-facility-administration/services-for-post-secondary-educational-institutions/degree-granting>.

¹²³ Government of Alberta. March 18, 2026. Post-secondary program standards and oversight. <https://www.alberta.ca/post-secondary-program-standards-oversight>.



Figure 31. New Post-Secondary Program Estimated Approval Timelines (Alberta and Saskatchewan)

Academic Program Type	For Academic Credit?	1. New Program Proposal Development Lead Time	2. Institutional-Level Approval	3. Provincial Government Approval	4. Add to Academic Calendar / Recruit First Student Cohort	5. First Student Cohort Graduates	Total Estimated Lead Time: New Program Design to First Graduating Cohort
Master's	Yes	12 months	12 months	6–12 months	12 months	24 months	5–6 years
Bachelor's	Yes	12 months	12 months	6–12 months	12 months	48 months	7–8 years
College diploma	Yes	6–12 months	6 months	6–12 months	6–12 months	24 months	4–6 years
Continuing education certificate program	No	6–12 months	6–12 months	N/A	N/A	12 months	2–3 years
Micro-credential	No	~3 months	~3 months	N/A	N/A	<6 months	<1 year

Sources: Government of Saskatchewan, Government of Alberta, University of Calgary, University of Lethbridge, University of Alberta, University of Saskatchewan, Universities Canada; ICTC estimates.¹²⁴

¹²⁴ Government of Saskatchewan. March 18, 2026. Degree-granting in Saskatchewan. <https://www.saskatchewan.ca/government/education-and-child-care-facility-administration/services-for-post-secondary-educational-institutions/degree-granting>; Government of Alberta. March 18, 2026. Post-secondary program standards and oversight. <https://www.alberta.ca/post-secondary-program-standards-oversight>; University of Calgary. March 18, 2026. Program development process. <https://www.ucalgary.ca/provost/strategic-initiatives/program-innovation-hub/program-development-process>; University of Lethbridge. March 18, 2026. Program review and approval process. www.ulethbridge.ca/sites/default/files/2017/09/Program%20Approval%20Process_external_1.3.pdf; University of Alberta. March 18, 2026. Program changes + approval. <https://www.ualberta.ca/en/provost/policies-and-procedures/academic-programs.html>; University of Alberta. January 2024. Non-credit micro-credential development guide. <https://www.ualberta.ca/en/provost/media-library/u-of-a-non-credit-micro-credential-development-guide-v2.0.pdf>; University of Saskatchewan. May 18, 2023. Micro-credential guidelines. <https://governance.usask.ca/documents/proposals/curricular-changes/micro-credential-guidelines.pdf>; Universities Canada. March 18, 2026. Provincial quality assurance systems. <https://univcan.ca/about-universities-canada/membership-and-governance/quality-assurance/provincial-quality-assurance-systems/>.

When we compare the timeline for new academic program development, approval, and graduating first cohorts of students with estimated SMR project development timelines for Alberta and Saskatchewan, we find that both provinces have

a limited runway of years to begin planning and approvals to have college diploma and university degrees producing graduates before the first SMRs are estimated to be built and begin their operations, as shown in Figure 32.

Figure 32. Alberta and Saskatchewan Estimated SMR Project Development Timelines Compared to New Post-secondary Program Approval and First Cohort Graduation Timelines (2026–2040)

SMR estimated deployment timelines (after 2026)	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040+
Alberta SMR timeline	Project planning									Build/deploy SMRs				Operate SMRs	
Saskatchewan SMR timeline	Project planning				Build/deploy SMRs					Operate SMRs					
Timeline: Post-secondary program development and first graduating cohort															
College diploma	Program development and approval (3 years)			Recruit and graduate first cohort (3 years)											
Bachelor's degrees	Program development and approval (4 years)				Recruit and graduate first cohort (5 years)										
Master's degrees	Program development and approval (4 years)				Recruit and graduate first cohort (3 years)										

Source: ICTC analysis; timeline assumes that academic program development begins during 2026.



Current Nuclear Energy Education and Training in Canada

Canada already enjoys a robust specialist domestic nuclear energy education and training system. A major component of the system is numerous undergraduate- and graduate-level nuclear engineering, nuclear design engineering, and nuclear technology programs across Eastern Canada, particularly in Southern Ontario.

Figure 33 lists graduate-, undergraduate-, and college-level specialist programs in nuclear

technology and engineering offered by Canadian post-secondary institutions, excluding programs related to nuclear medicine. The programs listed result in for-credit academic credentials, such as college diplomas and university undergraduate and graduate degrees, as well as embedded academic certificate programs. The list does not include short courses, continuing education, micro-credentials, and other non-credit programs.

Figure 33. Specialist Nuclear Science, Technology, and Engineering Post-Secondary Programs in Canada

Program	Institution	Level of Study	Province
Dip. Applied Nuclear Science and Radiation Safety	Algonquin College	College	ON
Cert. Nuclear Engineering	University of Toronto	Bachelor	ON
MEng. Nuclear Engineering	University of Toronto	Graduate	ON
BEng. Nuclear Engineering	Ontario Tech University	Bachelor	ON
GDip. Nuclear Technology	Ontario Tech University	Graduate	ON
GDip. Nuclear Design Engineering	Ontario Tech University	Graduate	ON
MASc. Nuclear Engineering	Ontario Tech University	Graduate	ON
MEng. Nuclear Engineering	Ontario Tech University	Graduate	ON
MEng. Nuclear Engineering (UNENE)	Ontario Tech University	Graduate	ON
PhD. Nuclear Engineering	Ontario Tech University	Graduate	ON
MEng. Nuclear Engineering (UNENE)	Western University	Graduate	ON
MEng. Nuclear Engineering (UNENE)	Queen's University	Graduate	ON
MEng. Nuclear Engineering (UNENE)	McMaster University	Graduate	ON
GDip. Nuclear Engineering (UNENE)	McMaster University	Graduate	ON
MEng. Nuclear Engineering (UNENE)	University of Waterloo	Graduate	ON
MSc. Energy Engineering – Nuclear Specialization	École Polytechnique de Montréal	Graduate	QC

Sources: Algonquin College, University of Toronto, Ontario Tech University, Western University, Queen's University, McMaster University, University of Waterloo, École Polytechnique de Montréal.¹²⁵

Notes: (1) Does not include nuclear medicine programs, (2) does not include short courses and other non-credit programs, and (3) does not include academic minors.

¹²⁵ Algonquin College. March 13, 2026. Applied nuclear science and radiation safety. <https://www.algonquincollege.com/pembroke/program/applied-nuclear-science-radiation-safety/>; University of Toronto, Faculty of Applied Science & Engineering. March 13, 2026. Certificate in nuclear engineering – AECERNUC. <https://undergrad.engineering.utoronto.ca/academics-registration/minors-certificates/undergraduate-engineering-certificates/certificate-in-nuclear-engineering/>; University of Toronto. March 17, 2026. Engineering graduate studies: Nuclear engineering. <https://gradstudies.engineering.utoronto.ca/master-of-engineering-meng/emphasis-in-nuclear-engineering/>; Ontario Tech University. March 13, 2026. Graduate programs: Faculty of engineering and applied science. <https://ontariotechu.ca/programs/graduate/engineering-and-applied-science/index.php>; Western University. May 9, 2024. Graduate & postdoctoral studies: Nuclear engineering. <https://grad.uwo.ca/admissions/programs/program.cfm?p=105>; Smith Engineering, Queen's University. March 13, 2026. Nuclear engineering. <https://smithengineering.queensu.ca/programs/graduate/professional/nuclear-engineering-unene>; McMaster University. March 13, 2026. Graduate studies: UNENE nuclear engineering. <https://gs.mcmaster.ca/program/unene-nuclear-engineering/>; University of Waterloo. March 13, 2026. Graduate studies and postdoctoral affairs: Civil engineering – MEng (Nuclear engineering) at Waterloo. <https://uwaterloo.ca/graduate-studies-postdoctoral-affairs/future-students/programs/civil-engineering-meng-nuclear-engineering-waterloo>; École Polytechnique de Montréal. May 9, 2024. Programmes et cheminements: maîtrise recherche en génie énergétique option génie nucléaire. <https://www.polymtl.ca/programmes/programmes/option-genie-nucleaire>.



Work-Integrated Learning in Canada's Nuclear Industry

WIL programs are commonly offered by nuclear energy employers, such as Canadian Nuclear Laboratories, Bruce Power, and Westinghouse.¹²⁶ These WIL opportunities include engineering and science, as well as administrative and support roles, and provide direct on-ramps to the nuclear energy industry for students and recent graduates.

ICTC research suggests that students participating in WIL programs develop knowledge of the professional world and enhance their domain knowledge of their chosen careers and industries.¹²⁷ Students participating in WIL programs also tend to improve their soft skills, such as resilience, independence, adaptability, and self-efficacy.¹²⁸ Analysis by the C.D. Howe Institute finds that students participating in WIL programs during their studies enjoy improved employment outcomes post-graduation, including being more likely to obtaining employment in a field relevant to their studies and higher income post-graduation, particularly for university students.¹²⁹

As shown in Figure 33, there are no specialized post-secondary programs in nuclear technology or engineering available in Alberta and Saskatchewan. Most post-secondary programs available directly related to nuclear energy are in Ontario.

This is not to say that students cannot learn about nuclear technology and engineering elsewhere in Canada outside of these programs. Numerous universities offer individual coursework on nuclear physics and nuclear energy, but trainees do not have access to the same academic emphasis and focus that specialized nuclear technology and engineering programs provide.

Specialized nuclear post-secondary programs can also develop strong industry linkages with nuclear energy employers, creating pathways for work-integrated learning (WIL) opportunities, such as internships and co-op placements, for students seeking to enter the nuclear energy industry

The University Network of Excellence in Nuclear Engineering

The University Network of Excellence in Nuclear Engineering (UNENE) is a network of Canadian and international partner universities with significant expertise in education and research on nuclear science, technology, and engineering.¹³⁰ UNENE was founded in 2002 and is headquartered at McMaster University in Hamilton, Ontario.¹³¹

In collaboration with Ontario Tech University, Western University, Queen's University, McMaster University, and University of Waterloo, UNENE offers a course-based Master of Engineering (MEng) geared toward working professionals in the Canadian nuclear industry.¹³² UNENE also offers a graduate-level diploma in nuclear engineering in partnership with McMaster University and Ontario Tech University,¹³³ as well as short two-day professional

¹²⁶ See: Canadian Nuclear Laboratories. April 3, 2026. Student careers. <https://www.cnl.ca/about-cnl/student-careers/>; Bruce Power. April 3, 2026. Student opportunities. <https://www.brucepower.com/careers/student-opportunities/>; Westinghouse. April 3, 2026. Internships & co-ops. <https://westinghousenuclear.com/careers/students-new-graduates/internships-co-ops/>.

¹²⁷ Cutean, A., L. Henville, and F. Rice. August 2023. The impact of work-integrated learning on student success and the Canadian economy: A case study of Canada's student work placement program. Information and Communications Technology Council (ICTC), pp. 14–19. <https://ictc-ctic.ca/reports/the-impact-of-workforce-integrated-learning-on-student-success-and-the-canadian-economy>.

¹²⁸ Ibid., 19–22.

¹²⁹ Seward, B., and R. Wyonch. May 31, 2023. From class to career: How work integrated learning benefits graduates looking for jobs. C.D. Howe Institute. <https://cdhowe.org/publication/class-career-how-work-integrated-learning-benefits-graduates-looking-jobs/>.

¹³⁰ University Network of Excellence in Nuclear Engineering. March 16, 2026. About UNENE. <https://unene.ca/about/>.

¹³¹ Ibid.

¹³² University Network of Excellence in Nuclear Engineering. March 16, 2026. Education: UNENE M.Eng. degree. <https://unene.ca/education/m-eng/>.

¹³³ University Network of Excellence in Nuclear Engineering. March 16, 2026. Education: Diploma program. <https://unene.ca/education/graduate-diploma-program/>.



development courses covering topics such as nuclear safety, nuclear fuel engineering, and nuclear power plant operations.¹³⁴

UNENE also collaborates with universities across Canada and globally on research activities, funding industrial research chairs in cooperation with industry and funding academic research projects.^{135,136} In Alberta, the University of Alberta and the University of Calgary are members of UNENE, and in Saskatchewan, the University of Saskatchewan and the University of Regina are also

members. Figure 34 lists UNENE's Canadian post-secondary members.¹³⁷

Academic networks, such as UNENE, are important for establishing a pipeline of nuclear energy specialist education and training locally in Western Canada. These networks can provide specialist nuclear engineering post-graduate degrees and diploma programs, alongside short courses and other professional development programs geared toward nuclear energy professionals.

Figure 34. UNENE Canadian Post-Secondary Member Institutions

Institution	City	Province
University of Alberta	Edmonton	AB
University of Calgary	Calgary	AB
University of Regina	Regina	SK
University of Saskatchewan	Saskatoon	SK
McMaster University	Hamilton	ON
Ontario Tech University	Oshawa	ON
Queen's University	Kingston	ON
Royal Military College of Canada	Kingston	ON
University of Guelph	Guelph	ON
University of Ottawa	Ottawa	ON
University of Toronto	Toronto	ON
University of Waterloo	Waterloo	ON
University of Windsor	Windsor	ON
Western University	London	ON
École Polytechnique de Montréal	Montréal	QC
University of New Brunswick	Fredericton and Saint John	NB
University of Manitoba	Winnipeg	MB

Source: University Network of Excellence in Nuclear Engineering.¹³⁸

¹³⁴ University Network of Excellence in Nuclear Engineering. March 16, 2026. Education: Short courses. <https://unene.ca/education/short-courses/>.

¹³⁵ University Network of Excellence in Nuclear Engineering. March 18, 2026. Research. <https://unene.ca/research/>.

¹³⁶ For a detailed outline of UNENE's academic partnerships and sponsored research, see: University Network of Excellence in Nuclear Engineering. February 2023. Research history of UNENE-sponsored university programs. https://unene.ca/wp-content/uploads/2025/07/UNENE_Research_History_FINAL_2023-Feb-27.pdf.

¹³⁷ In addition to UNENE's Canadian member post-secondary institutions, UNENE also counts international institutions as members, including the Universitatea Politehnica din Bucuresti (Romania) and Universidad Nacional de Córdoba (Argentina).

¹³⁸ University Network of Excellence in Nuclear Engineering. March 16, 2026. Our member organizations: University members. <https://unene.ca/about-unene/unene-member-organizations/>.



Nuclear Energy Micro-credential and Continuing Education Programs

In addition to traditional, for-credit academic programs (i.e., bachelor, master, and college diploma) related to nuclear energy and technology, numerous Canadian post-secondary institutions also offer micro-credential and continuing education programs related to nuclear science and technology which generally take less than one year to complete.

Most of these programs are centred in Ontario, but in October 2025, Saskatchewan Polytechnic launched the Western Canadian Nuclear Training Centre, which provided two short courses in nuclear energy in partnership with the United Kingdom-based National Skills Academy for Nuclear.¹³⁹ The Saskatoon-based Sylvia Fedoruk Canadian Centre for Nuclear Innovation also provides nuclear technology-related training in addition to supporting nuclear research.¹⁴⁰

Rather than directly qualify graduates to enter the nuclear energy sector, many of these micro-credentials are designed to offer existing nuclear energy industry professionals with targeted training and professional development. While others, such as Ontario Tech University's Nuclear Career Accelerator Program helps experienced, mid-career engineering and technical professionals from adjacent industries, such as

infrastructure, oil and gas, and manufacturing, to pivot to the nuclear energy industry.¹⁴¹ A 2024 study by ICTC found that micro-credential programs, when directly aligned to industry needs, can be a highly effective rapid skills development tool to help fill critical labour market gaps.¹⁴²

Short-term training opportunities, including continuing education and micro-credentials, are essential for maintaining and developing professional skills and competencies in the Canadian nuclear energy workforce and helping nuclear energy professionals develop in their careers. Figure 35 outlines nuclear energy and technology micro-credentials offered in Canada.

In addition to micro-credentials from Canadian post-secondary institutions, The Ontario-based Nuclear Innovation Institute (NII) is an innovation hub for the Canadian nuclear industry, including offering skilled development programs and experiential learning opportunities to students and others interested in pursuing careers in nuclear energy.¹⁴⁴ Groups like NII are important ecosystem actors as they operate across industry, higher education, and government, addressing skills and talent gaps in nuclear energy.

Figure 35. Nuclear Energy Micro-credentials in Canada

Micro-credential Program	Institution	Province
Atomic Energy Materials and Systems & Sustainability	University of Toronto	ON
CANDU Decommissioning	Ontario Tech University	ON
Nuclear Project Management Micro-Credential Program	Ontario Tech University	ON
Nuclear Career Accelerator	Ontario Tech University	ON
Graduate Academic Certificate in Nuclear Detection, Instrumentation & Methods	McMaster University	ON
Graduate Academic Certificate in Radioactivity and Radiation Interactions	McMaster University	ON

Sources: McMaster University, University of Toronto, Ontario Tech University.¹⁴³

Note: Does not include micro-credential programs related to nuclear medicine.

¹³⁹ See: Saskatchewan Polytechnic. October 22, 2025. Saskatchewan Polytechnic launches Western Canadian Nuclear Training Centre to meet growing demand for skills training in nuclear sector. <https://saskpolytech.ca/news/posts/2025/western-canadian-nuclear-training-centre.aspx>.

¹⁴⁰ See: The Sylvia Fedoruk Canadian Centre for Nuclear Innovation. April 4, 2026. Our offering. <https://fedorukcentre.ca/our-offering/our-offering.php>.

¹⁴¹ See: Ontario Tech University. March 17, 2026. Nuclear career accelerator program. <https://ontariotechu.ca/programs/continuous-learning/engineering/nuclear-career-accelerator-program-spring/index.php>.

¹⁴² McGeer, H. and E. Henningsmoen. March 2024. Accelerating Canada's workforce: Micro-credentialing in the digital economy. Information and Communications Technology Council (ICTC). <https://ictc-ctlc.ca/reports/accelerating-canadas-workforce>.

¹⁴³ McMaster University. March 17, 2026. Nuclear at McMaster: Education programs. <https://nuclear.mcmaster.ca/education-programs/>; Ontario Tech University. March 17, 2026. Continuous learning programs: Engineering. <https://ontariotechu.ca/programs/continuous-learning/engineering/index.php>; University of Toronto. March 17, 2026. New micro-credentials in nuclear fundamentals. <https://mse.utoronto.ca/news/new-aems-micro-credential-now-open-to-industry-professionals-and-u-of-t-alumni/>.

¹⁴⁴ See: Nuclear Innovation Institute (NII). April 8, 2026. About us. <https://www.nuclearinnovationinstitute.ca/about-us>.



Nuclear Plant Operator Training and Certification Pipeline

A crucial job in the safe and effective operation of nuclear energy facilities is the nuclear power plant operator. These specialist operators are akin to other power systems operators, but with specialty skill sets in operating nuclear reactors. They are highly skilled technologists with a unique training pathway and licensing regime governed by the Canadian Nuclear Safety Commission.¹⁴⁵

Nuclear operator jobs normally require at least a high school diploma and will often also require a post-secondary qualification, such as a power engineering certificate or the completion of a power system operator apprenticeship program.¹⁴⁶ Figure 36 outlines full-time power engineering diploma programs available at post-secondary institutions in Alberta and Saskatchewan.

Bruce Power notes that when hired, new nuclear operators attend a nuclear power school that provides technical training on instrumentation and control, mechanical, and electrical systems, alongside on-the-job training and ongoing examinations.¹⁴⁸ From there, experienced nuclear operators develop specialty roles in areas such as control room operator.¹⁴⁹

As nuclear operators are essential to operate nuclear power generation facilities, it is crucial that Alberta and Saskatchewan work with post-secondary institutions, SMR operators, and relevant regulatory bodies to develop a robust training and licensing pipeline.

Figure 36. Power Engineering Diploma Programs in Alberta and Saskatchewan

Program	Level(s)	Institution	Province
Dip. Power Engineering Technology	Third Class	Southern Alberta Institute of Technology	AB
Dip. Power Engineering Technology	Second Class /Third Class	Northern Alberta Institute of Technology	AB
Dip. Power Engineering Technology	Third Class / Fourth Class	Saskatchewan Polytechnic	SK
Dip. Power Engineering Technology	Third Class	Northwestern Polytechnic	AB
Dip. Power Engineering Technology	Second Class	Medicine Hat College	AB
Dip. Process and Power Engineering	Second Class / Third Class	Lakeland College	AB
Dip. Power and Process Technologies	Third Class / Fourth Class	Keyano College	AB

Sources: Southern Alberta Institute of Technology, Northern Alberta Institute of Technology, Northwestern Polytechnic, Medicine Hat College, Lakeland College, Keyano College, Saskatchewan Polytechnic.¹⁴⁷

Notes: (1) In addition to the full-time power engineering diploma programs listed above, there are numerous certificate programs and individual courses available at Alberta and Saskatchewan post-secondary institutions to pursue First, Second, Third, Fourth, and Fifth Class power engineering certifications. (2) Graduates of all power engineering programs in Alberta and Saskatchewan must pass examinations administered by the Technical Safety Authority Saskatchewan or Alberta Boilers Safety Association to obtain their power engineering certification.

¹⁴⁵ See: Canadian Nuclear Safety Commission. February 3, 2014. RD-204: Certification of persons working at nuclear power plants. <https://www.cnsccs.ca/eng/acts-and-regulations/regulatory-documents/published/html/rd204/>.

¹⁴⁶ See: Job Bank. January 28, 2026. Nuclear reactor operator in Canada: Job requirements. <https://www.jobbank.gc.ca/marketreport/requirements/26811/ca>.

¹⁴⁷ Southern Alberta Institute of Technology (SAIT). March 24, 2026. Power engineering technology. <https://www.sait.ca/programs-and-courses/diplomas/power-engineering-technology>; Northern Alberta Institute of Technology (NAIT). March 24, 2026. Power engineering technology. <https://www.nait.ca/programs/power-engineering-technology>; Northwestern Polytechnic. March 24, 2026. Power engineering technology diploma. <https://www.nwpolytech.ca/program/power-engineering-technology-diploma>; Medicine Hat College. March 24, 2026. Power engineering technology. <https://www.mhc.ab.ca/programs-and-admissions/browse-programs/power-engineering-technology>; Lakeland College. March 24, 2026. Process and power engineering. <https://lakelandcollege.ca/programs-and-courses/energy/process-power-engineering.html>; Keyano College. March 24, 2026. Power and process technologies diploma. <https://www.keyano.ca/programs/trades-technology/power-engineering/power-and-process-technologies-diploma/>; Saskatchewan Polytechnic. March 24, 2026. Power engineering technology. <https://saskpolytech.ca/programs-and-courses/programs/Power-Engineering-Technology.aspx>.

¹⁴⁸ Bruce Power. 2023. Nuclear operator: Realistic job preview, p. 7. www.brucepower.com/wp-content/uploads/2023/04/220011A_NOIT_RealisticJobPreview_R001-AX.pdf.

¹⁴⁹ Ibid., p. 11.



Nuclear Reactor and Control Room Simulation Facilities

In addition to classroom-based learning and on-the-job training, the Canadian nuclear industry makes extensive use of nuclear reactor and control room simulators to train operational staff and engineers, rehearse complex maintenance activities, and test nuclear operators for licensing. Simulators may be digitally based or virtual, using VR/XR technology, but physical one-to-one replicas of real-world nuclear facilities are also common.¹⁵⁰

For example, OPG's Darlington Nuclear Generating Station, as part of its refurbishment project, which concluded in March 2026,¹⁵¹ built a full-scale mock-up nuclear reactor training facility. The facility opened in 2014 and supported the decade-

long refurbishment of four nuclear reactors.¹⁵² It realistically simulates operating a CANDU-type reactor and maintenance tasks in a realistic manner, using real tools and equipment.¹⁵³

In 2020, Bruce Power completed building a training simulator replicating its nuclear generating and control room facilities.¹⁵⁴ AtkinsRéalis, through its subsidiary CANDU Energy Inc., operates a full-scale main control room simulator facility in Mississauga, Ontario, which simulates a CANDU reactor control room.¹⁵⁵ Similar facilities in Western Canada could be established to support training for Alberta and Saskatchewan's future SMR fleets.

¹⁵⁰ For example, see: Westinghouse. March 24, 2026. Simulation & control room solutions. <https://westinghousenuclear.com/training-resource-solutions/simulation-control-room-solutions/>; ABB. August 19, 2025. ABB and SimGenics collaborate on simulator-based training for nuclear sector in North America. <https://new.abb.com/news/detail/128280/abb-and-simgenics-collaborate-on-simulator-based-training-for-nuclear-sector-in-north-america>; GE Vernova Hitachi. March 24, 2026. Virtual reality (VR) simulator and training for nuclear plants. <https://www.gevernova.com/nuclear/services/training/virtual-training-simulator>.

¹⁵¹ Ontario Power Generation. April 22, 2026. That's a wrap on Darlington refurbishment construction. <https://www.opg.com/projects-services/projects/nuclear/darlington-refurbishment/>.

¹⁵² See: NS Energy. November 3, 2014. Training facility opens at Darlington. <https://www.nsenergybusiness.com/news/newstraining-facility-opens-at-darlington-4425736/>.

¹⁵³ Ontario Power Generation. March 24, 2026. Mock-up and training facility. <https://www.opg.com/projects-services/projects/nuclear/darlington-refurbishment/mock-up-and-training/>.

¹⁵⁴ World Nuclear News. January 29, 2020. New simulator commissioned at Bruce plant. <https://www.world-nuclear-news.org/Articles/New-simulator-commissioned-at-Bruce-plant>.

¹⁵⁵ AtkinsRéalis. March 24, 2026. Main control room mock-up and simulator. <https://www.atkinsrealis.com/~media/Files/A/atkinsrealis/download-centre/en/brochure/main-control-room-mock-up-en.pdf>.



Conclusion and Policy Recommendations

As Alberta and Saskatchewan explore SMR projects and large-scale conventional nuclear energy as a clean energy solution, fostering a sustainable nuclear energy workforce and creating an education and training pipeline for nuclear energy workers is essential.

With major refurbishments of conventional CANDU reactors in Ontario, as well as the construction of the first SMR units in the G7 through the Darlington New Nuclear Project and further SMR projects under consideration in Western Canada and New Brunswick, Canada is entering a generational nuclear energy renaissance.

For Alberta and Saskatchewan to seize nuclear energy technology as a clean energy solution to power their growing economies, these provinces must forecast the labour market needs of Western Canada's future nuclear energy industry. Though an operational SMR site is still years away in Saskatchewan, and even further into the future for Alberta, government, industry, and the post-secondary institutions in Western Canada must begin developing education and training programs to meet future workforce development needs.

Policy Recommendations

Based on the research conducted for this report, ICTC recommends the following policy measures to create a talent and workforce development pipeline in Alberta and Saskatchewan for establishing a nuclear energy industry in Western Canada in the 2030s:

- 1. Establishing university-level specialist nuclear science and engineering programs** in Alberta and Saskatchewan, including at the post-graduate level. These programs should be developed, approved, and opened to enrolment to coincide with the development of new nuclear facilities in Western Canada.
- 2. Establishing nuclear energy-specific WIL programs, such as co-op placements and internship programs**, in Alberta and Saskatchewan to provide career on-ramps for students and recent graduates with specialized nuclear energy education to nuclear energy employers.
- 3. Creating a Western Canadian nuclear talent forum** to allow government, industry, and post-secondary institutions to collaborate and coordinate in workforce planning, labour market analysis, and education and training program development.
- 4. Creating purposeful recruitment pipelines for women and Indigenous workers** to enter Western Canada's nuclear industry.
- 5. Developing a nuclear operator recruitment and training pipeline** in Alberta and Saskatchewan, using existing power engineering diploma programs at polytechnics and regional colleges as a basis.
- 6. Developing industry training and professional development programs**, including micro-credentials and short courses, at colleges, polytechnics, and universities in Alberta and Saskatchewan. This should include reskilling and conversion programs to stream experienced oil and gas and heavy industrial talent into Western Canada's nascent nuclear industry.
- 7. Building a research/demonstration reactor** in Alberta, possibly at the University of Alberta or University of Calgary, and continuing to co-locate other nuclear science and testing infrastructure at universities and adjacent research parks. An Alberta-based research/demonstration reactor would complement the research/demonstration microreactor being built by SRC in Saskatchewan.
- 8. Establishing SMR simulator facilities in Alberta and Saskatchewan to train the nuclear energy workforce**, rehearse complex operations and maintenance tasks, and test licensed nuclear operators locally.
- 9. Streamlining interprovincial credential recognition and federal security clearance acquisition**, as well as developing fast-track certification pathways for internationally trained nuclear energy professionals and skilled workers transitioning from adjacent industries.



Appendix: Research Methods

ICTC employs a mixed-methods approach to collect and analyze primary and secondary research data.

Literature and Secondary Data Review

ICTC conducted a review of relevant literature and secondary data on nuclear energy, SMR technology, education and training pathways for Canadian nuclear energy workers, and Canada's nuclear energy industry. This literature and secondary data review provided contextual information on the technological, economic, labour market, and policy dynamics shaping future nuclear SMR development in Western Canada.

Industry Roundtable

ICTC conducted an industry roundtable at SMR Canada 2024 Summit in Calgary, Alberta. During the roundtable, ICTC consulted with representatives for nuclear energy industry labour market needs, labour availability, and potential workforce development pathways for Western Canada. Ten nuclear energy professionals participated in the roundtable. Industry feedback collected during the workshop helped ICTC researchers identify future in-demand nuclear jobs in Western Canada, verify secondary data, and provide helpful background information to inform research findings and report content.

Analysis of Labour Market Data

NOC codes were central to this report's quantitative analysis of nuclear workforce supply, demand, and TEER-level distribution.

Nuclear-related roles were identified using the IAEA's CANDU and the Pacific Northwest National Laboratory's SMR staffing-level benchmarks, alongside insights from industry roundtables, and then mapped to corresponding NOC 2021 codes. These occupations were grouped into four clusters (engineering, specialist, skilled trades, and supporting occupations) to reflect their functional roles in the nuclear workforce. The final sample

comprises 27 unique NOCs, mapped to these four occupation clusters, shown in Figure 37.

For demand analysis, ICTC used Vicinity Data to identify job postings for these NOCs between January 1, 2022, and January 31, 2026, filtered by North American Industry Classification System (NAICS) code 221113, which represents the nuclear electric power generation industry. This resulted in a sample size of 241 job postings.

For supply analysis, Statistics Canada's Labour Force Survey was used to estimate employment levels and unemployment rates for each NOC in Alberta and Saskatchewan, and for their respective industries, from January 2014 to January 2026. Monthly data was smoothed using a six-month moving average to reduce volatility and better capture underlying labour market trends over the 12-year period, particularly given the relatively small sample sizes for certain occupations. This enabled ICTC to evaluate interprovincial and cross-industry labour force dynamics in nuclear-relevant NOCs over time and identify potential constraints in scaling workforce capacity.

Research Limitations

Alberta and Saskatchewan are only beginning their nuclear energy journeys and there is still significant uncertainty regarding the timeline in which nuclear energy projects will be developed in Western Canada, the types of SMRs and other nuclear energy technologies that will be adopted, and the total scope that nuclear energy will play in their energy futures.

ICTC researchers have taken great care to base their analysis on verified facts and reliable secondary data on Canada's nuclear energy industry. However, developments in the nuclear energy industry are ongoing, particularly as they relate to SMRs, and news developments may materially affect baseline assumptions used to support ICTC's analysis.



Figure 37. Nuclear Energy NOC Codes

Occupations	NOC Code (2021)	Job Cluster
Engineering managers	20010	Engineering
Other professional occupations in physical sciences	21109	Engineering
Software engineers and designers	21231	Engineering
Civil engineers	21300	Engineering
Mechanical engineers (including nuclear engineers)	21301	Engineering
Electrical and electronics engineers	21310	Engineering
Chemical engineers	21320	Engineering
Industrial and manufacturing engineers	21321	Engineering
Metallurgical and materials engineers	21322	Engineering
Other professional engineers	21399	Engineering
Engineering inspectors and regulatory officers	22231	Engineering
Mechanical engineering technologists and technicians	22301	Engineering
Construction millwrights and industrial mechanics	72400	Skilled trades
Physicists and astronomers	21100	Specialist
Chemists	21101	Specialist
Occupational health and safety specialists	22232	Specialist
Industrial engineering and manufacturing technologists and technicians	22302	Specialist
Electrical and electronics engineering technologists and technicians	22310	Specialist
Power engineers and power systems operators (including nuclear operators)	92100	Specialist
Senior managers (construction, transportation, production and utilities)	00015	Supporting
Other administrative services managers	10019	Supporting
Financial advisors	11102	Supporting
Professional occupations in advertising, marketing, and public relations	11202	Supporting
General office support workers	14100	Supporting
Purchasing and inventory control workers	14403	Supporting
Security guards and related security service occupations	64410	Supporting
Facility operation and maintenance managers	70012	Supporting





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