



# Electricity in Demand

## Alberta Workforce 2023-2028

The Province of Alberta is working in partnership with the Government of Canada to provide employment support programs and services.

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# About Electricity Human Resources Canada (EHRC)

EHRC is the leading provider of research and analysis on human resources (HR) issues affecting Canada's electricity and renewable energy sector. Our primary objective is to enable the sector to meet its evolving workforce requirements. EHRC develops strategies to help employers recruit, retain and develop the skilled workers necessary to operate an efficient and reliable electricity system, and achieve Canada's long-term goal of creating a carbon-free economy.

Our vision is to build a worldclass electricity workforce. We will achieve this by developing an electricity work force that is safety-focused, innovative and inclusive.

*Ce rapport est également disponible en français sous le titre: Cadre sur la communauté d'apprentissage professionnelle.*  
This report is also available in French.

The opinions and interpretations in this publication are those of the author and do not necessarily reflect those of the Government of Canada.

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## Our mandate is to:

- Deliver critical business intelligence to inform labour market decision-making.
- Forge partnerships that enable the industry to adapt, upskill and innovate.
- Lead the industry in creating and sustaining a skilled and inclusive workforce.
- Inspire our future workforce to build a low carbon economy.

Further information on EHRC is available at [ehrc.ca](http://ehrc.ca).

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# Introduction

*In the Fall of 2023 Electricity Human Resources Canada's (EHRC) Labour Market Intelligence (LMI) team commenced a comprehensive study of recent trends and developments in Alberta's electricity sector. It included an examination of economic, regulatory, environmental, technological, political and other factors that have impacted, or could impact, the future performance and viability of the sector.*

*The enquiry's ultimate objective is to ensure that Alberta's electricity sector has enough well-trained workers to continue to operate a stable, reliable, and resilient system over the next five years. This is necessary for the province to achieve its economic and environmental goals, and provide a good quality of life to its citizens.*

## The structure of the report is as follows:

The Executive Summary outlines the study's main conclusions. **Chapter 3** and **Chapter 4** highlight relevant economic and demographic factors, respectively. **Chapter 5** discusses the market structure, regulatory environment, and main distinguishing features of Alberta's electricity sector—such as its capacity, fuel mix and greenhouse gas emissions. **Chapter 6** explains how these parameters could potentially change over time, given the priorities of policy makers, electricity sector planners and society-at-large. **Chapters 7** examines key aspects of Alberta's labour market while **Chapter 8** profiles the electricity sector's

workforce. **Chapter 9** analyzes the sector's use of outsourcing while **Chapter 10** explores Alberta's postsecondary environment and the degree to which its academic programs prepare students to work in the sector. **Chapter 11** considers how labour market conditions in Alberta's electricity sector are likely to evolve over the next five years, particularly at the occupational level. **Chapter 12** outlines the key elements of EHRC's proposed workforce strategy for Alberta. It will enable the province's human resources practitioners, post-secondary institutions, policy makers and other electricity sector stakeholders to address the main issues of concern identified in the study.

The study utilized multiple lines of evidence and data sources (quantitative and qualitative) to triangulate its findings. They included an environmental scan, in-depth interviews with key informants and targeted surveys. Information was acquired from Federal and provincial/territorial governments, industry participants, trade associations, academic institutions, international agencies and other credible sources.

# Executive Summary

## Alberta's Electricity Sector

Alberta is unique among Canada's provincial electricity markets in that its generation is provided through a competitive market, rather than being centrally planned. However, transmission and distribution functions are regulated. Some 230 privately owned organizations provide such services.

In 2021, Canada's electricity output was valued at \$47.1 Billion. Alberta contributed the third largest share (12%) of this amount, next to Quebec and Ontario. In 2023 Alberta's electrical capacity reached 20,777 MW, most of which originated from natural gas and wind power. Natural gas currently fuels approximately 70% of the province's generation,<sup>1</sup> while 40% of the electricity generated in Alberta comes from cogeneration at industrial facilities.<sup>2</sup>

In less than a decade Alberta's electricity generation fuel mix has been transformed from one that was predominantly coal-based to one that is virtually coal-free. A milestone was reached in 2022 when, for the first time, renewable sources provided more of Alberta's power than coal.

Alberta has a dynamic renewable energy industry. The province's Renewable Electricity Act (2017) legislated the goal of generating at least 30% of its electricity from renewable sources by 2030. In 2023 it received more than 85% of the new solar and wind capacity installed in Canada. Alberta has the third largest share

(13%) of wind turbines in Canada, after Ontario and Quebec. More than 8,000 MW of wind and solar power have been integrated into the province's electricity system. In the past five years renewable power contracts signed by Alberta companies have brought nearly \$5 Billion in investment and 5,430 jobs to the province.

## Decarbonization of the Electricity Sector and Overall Economy

The Canada Energy Regulator's "Canada Net Zero" scenario presents one plausible path (among many) that will enable Canada to achieve a carbon neutral economy by 2050. It enumerates the volume of electricity that provinces and territories would need to generate, as well the degree to which different fuel sources would be used. The Canada Net Zero scenario envisages Canada and Alberta virtually doubling their electrical output by 2050.

It would be more challenging for Alberta than any other province to achieve the Government of Canada's objective of establishing a Net Zero electricity grid by 2035. Unlike some other provinces Alberta doesn't have any large-scale hydroelectric or nuclear capacity. Nor does it have any fuel source that can serve as a substitute for natural gas in the short-to-medium term. Creating a net-zero grid in Alberta would require tens of billions of dollars in investments in generation and transmission infrastructure.

Although Alberta aspires to decarbonize its economy by 2050, it doesn't have any specific

1 <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=2510001501&pickMembers%5B0%5D=1.10&pickMembers%5B1%5D=2.1&cubeTimeFrame.startMonth=07&cubeTimeFrame.startYear=2023&cubeTimeFrame.endMonth=11&cubeTimeFrame.endYear=2023&referencePeriods=20230701%2C20231101>; <https://edmontonjournal.com/news/local-news/power-fail-a-break-down-of-alberta-electricity-numbers>

2 <https://www.alberta.ca/system/files/epa-government-of-alberta-submission-on-draft-federal-electricity-regulations.pdf>

emission reduction targets for 2035 that would serve as an intermediary goal. Its power requirements will likely expand significantly by 2035, primarily because of economic and population growth, increased oil sands production, greater interconnections with other jurisdictions, and the proliferation of electric vehicles. The Alberta Electrical System Operator's (AESO) most recent long-term outlook anticipates that the province's generation will increase by 28% between 2022 and 2043.<sup>3</sup>

Some observers think that deploying small modular reactors (SMRs) in Alberta would be one of the most effective ways to generate sufficient emissions-free baseload power to meet its long-term requirements. Hydroelectric, storage and other emission-reduction technologies could potentially provide additional opportunities to decarbonize its economy.

Energy efficiency, distributed energy resources and demand-side management measures are important elements of Alberta's system that help to reduce the risk of inadequate electricity supply. They will likely become the focus of much greater efforts over time.

## Labour Market Developments

Alberta's economy exhibited resilience during the past couple of years. In 2022, the number of people employed reached 2.38 million. This exceeded 2021's figure by 5.2%, while the corresponding growth rate for Canada was 4%. The province's post-COVID recovery has tightened conditions in the labour market.

In 2022, the number of Albertans (13,354) employed in the generation, transmission and distribution of electricity comprised 12.1% of Canada's electricity sector workforce.

Between 2017 and 2022 such employment expanded approximately 2.6% in Alberta and 2.3% in Canada, on an average annual basis.

Alberta's electricity sector offers relatively stable employment and above average levels of remuneration. However, it has become increasingly difficult for its employers to recruit and retain enough workers with the right mix of skills and experience. This problem is compounded by the fact that organizations in the oil/gas, construction, financial, telecommunications and other sectors increasingly compete for employees who possess the same skills that are valued in the electricity sector. In addition to facing systemic skill and labour shortages, the electricity sector's workforce is aging.

***EHRC has identified 21 specific occupations that are integral to Alberta's electricity sector. They can be categorized into five main occupational groups: Managers and supervisors; Engineers, Technicians & Technologists; the Trades; Information and Communications Technology (ICT); and "other occupations".***

In Alberta's electricity sector, the four occupations for which it is most difficult to recruit staff are electrical and electronics engineers; other corporate professionals; engineering managers; and information and communications technology practitioners. The three occupations for which it is most challenging to retain personnel are other corporate professionals; electrical and electronics engineers; and mechanical engineers. Employee turnover rates are much higher in the renewable energy space and the Trades. Turnover is also high in corporate occupations within the economics and finance

<sup>3</sup> "2024 Long-term Outlook Preliminary Update", AESO, November 15, 2023



disciplines. Restructuring Alberta's energy market will certainly require many more people who are skillful in these areas.

In the next decade retirements are expected to create numerous job vacancies in Alberta's electricity sector. Virtually all employers have succession plans for managerial and supervisory positions. The percentage of employers that have them for other corporate professionals, engineering and ICT positions is 66%, 45% and 36%, respectively.

*Alberta's electricity sector has a relatively well-educated workforce. More than 45% of employees have a bachelor's degree or higher credential. This exceeds the corresponding figure at the national level, which is just over one-third.*

Alberta's economy is closely linked with apprenticeship and skilled trades. Approximately 16,000 new apprentices were registered in Alberta (11,000 above 2021's figure) in 2022 while 6,000 people were certified as apprentices. As of September 2023 the province had nearly 54,000 registered apprentices. The most popular apprenticeship programs are electrician; heavy equipment technician; and welder. Alberta's wider economy will need 26,000 new journeypersons and 51,000 new apprenticeships by 2026.

Between 2023 and 2028 employment levels are expected to rise in all occupational groups within Alberta's electricity sector. ICT occupations are projected to grow the most. Significant labour market imbalances are expected to persist and, in some cases intensify, unless effective measures are taken to address potentially problematic issues, such as the large number of expected retirements.

Under the Current Measures (i.e.: Business as Usual) Scenario EHRC projects 3,100 job openings in Alberta's electricity sector over the 2023-2028 period. Nearly two-thirds of them will be caused by the need to replace retiring workers, while the remainder are linked to industry expansion. The three occupational groups expected to register the largest number of openings are "other occupations" (1,368); Trades (731); and Managers (443).

Under the Net Zero Scenario, 2,700 job openings are expected during the 2023-2028 period. The vast majority (61%) of them reflect the need to replace retiring workers. The others are attributed to expansion demand caused by economic and population growth, as well as the electrification of industries. The occupations expected to register the most job openings are "other occupations" (1,195), Trades (647) and Managers (416).

Alberta's future electricity system will require a more adaptable, flexible and diverse workforce. The increased integration of renewable sources, storage systems and smart grids, as well the desire to decarbonize the economy, will necessitate the development of new skills, curriculum and human resources practices.

Alberta's electricity industry will benefit immensely from the development and deployment of an integrated workforce strategy. It will require the active participation and collaboration of Alberta's government, postsecondary institutions, and major unions. It should address key issues such as recruitment and retention; diversity/equity/inclusion; education and training; and succession planning; as well as the provision and dissemination of industry-specific labour market information.

# Economic Overview

Alberta is one of Canada’s most successful, entrepreneurial, and technologically innovative provinces. It is a world leader in energy, nanotechnology, and quantum science, among many other fields. In 2022 Alberta’s economy exhibited strong growth, largely due to the strength of its oil and gas industry, rising energy prices and the post-COVID recovery. The province’s Gross Domestic Product (GDP)—\$343 Billion—expanded 5.1% from the previous year, whereas the corresponding national figure was 3.6%. Alberta’s nominal per capita GDP reached \$73,742 in 2022, the highest among

all provinces and territories.<sup>4</sup> Employment in Alberta increased by 5.2% in 2022, while the unemployment rate was 5.8%.<sup>5</sup> Despite this favourable performance, Alberta’s leaders believe that the province’s economy must become more diversified, adaptive and innovative, to assure its continued prosperity.

In 2022 Alberta’s most important industries, based on their contribution to GDP, were oil, gas, and mining (22%); real estate, rental, and leasing (10.72%); manufacturing (8.59%) and construction (8.27%).<sup>6</sup>

**Table 1:  
Gross Domestic Product in Alberta (Expenditure-Based)  
in Chained (2017) dollars (\$1,000,000)<sup>7</sup>**

	2018	2019	2020	2021	2022
<b>GDP at Market Prices</b>	338,965	339,281	312,726	327,115	343,484

The utilities sector—which includes the generation, transmission, and distribution of electricity;<sup>8</sup> natural gas distribution; water, sewage, and other systems;—contributed 1.77% to the province’s GDP. As of December 2023 the province’s utilities sector employed 20,800 people—97.5% of whom worked full-time.<sup>9</sup>

This is significantly higher than Alberta’s economy-wide rate of full-time employment, which was 81.5%. Alberta’s share (13%) of Canada’s utilities sector employment was only exceeded by Ontario (41%) and Quebec (22%). The electricity industry accounts for approximately 70% of employment in Alberta’s utilities sector.<sup>10</sup>

4 <https://investalberta.ca/why-alberta/talent-productivity/#:~:text=Our%20workforce%20is%20the%20youngest,engineers%20per%20capita%20in%20Canada>

5 <https://www.alberta.ca/economic-outlook>

6 <https://www.statista.com/statistics/608354/gdp-distribution-of-alberta-canada-by-industry/>

7 Statistics Canada. Table 36-10-0222-01 Gross domestic product, expenditure-based, provincial and territorial, annual (x 1,000,000)

8 Under the North American Industry Classification System, generation, transmission and distribution are collectively classified as NAICS 2211.

9 [open.alberta.ca/dataset/0045c7cd-ec73-40a8-bff9-d49f6e7e364f/resource/d5649108-44d9-4b74-acdd-d427c1ae01d0/download/jend-alberta-utilities-industry-profile-2021-2022.pdf](https://open.alberta.ca/dataset/0045c7cd-ec73-40a8-bff9-d49f6e7e364f/resource/d5649108-44d9-4b74-acdd-d427c1ae01d0/download/jend-alberta-utilities-industry-profile-2021-2022.pdf)

10 Statistics Canada. Table 36-10-0489-01 Labour statistics consistent with the System of National Accounts (SNA), by job category and industry

In the past few months Alberta's labour market has been tighter than it has been in several years. Businesses are generally quite concerned about labour and skill shortages, as well as cost pressures. A survey of Alberta organizations conducted by the Alberta Chambers of Commerce from October 31, 2023 to December 3, 2024, found that 80% of respondents have experienced skill shortages in the past two years. One-quarter of the respondents hired individuals from other provinces because they couldn't find enough skilled personnel in Alberta. Among those seeking employees with technical skills, the figure rose to one-third.<sup>11</sup>

Although there has recently been a modest decline in economy-wide job postings in Alberta, most businesses report that labour shortages have constrained their ability to meet consumer demand.

Nevertheless, Alberta is expected to thrive in 2024. According to the Canadian Survey on Business Conditions, which was conducted in the fourth quarter of 2023, 65% of Alberta's businesses have a very optimistic (21%) or somewhat optimistic (44.1%) outlook for the next year.<sup>12</sup> According to the Resource Diversification Council, a non-profit association that comprises Alberta's industry, postsecondary and labour leaders, \$22 Billion in projects "primarily focused on decarbonization and the production of low-carbon fuels and polymers" are planned for Alberta by 2031. It's expected that they will require between 20,000 and 30,000 skilled workers.<sup>13</sup>



11 <https://www.abchamber.ca/acc-media-release-1-29-2024/>

12 <https://www.atb.com/company/insights/the-owl/canadian-survey-on-business-conditions-fourth-quarter-2023/>

13 <https://www.diversification.org/who-we-are>

# Demographic Situation

Alberta is Canada's fourth most populous province, behind Ontario (15.5M), Quebec (8.8M), and British Columbia (5.4M). Approximately 18% of its population reside in rural municipalities.<sup>14</sup>

**Alberta's population increased by 668,563 between 2012 and 2022, while its share of Canada's population increased by 0.5 percentage points, reaching 11.7%. In 2022, Alberta's 10-year population growth rate (17.3%) greatly exceeded Canada's corresponding rate (12.1%).**

In the year prior to October 1, 2023, Alberta's population expanded by an unprecedented 194,000 people, or 4.3% - the highest annual rate seen since 1980.<sup>15</sup> Between 2017 and 2021 more migrants left Alberta than moved there. However, in 2022 Alberta received 45,526 interprovincial migrants (one-half of whom came from Ontario),<sup>16</sup> and it was the only province to experience a net gain.<sup>17</sup> Alberta's relatively affordable housing market, favourable economic conditions, low tax rates and high quality of life appeal to many newcomers to Canada.<sup>18</sup> Landed immigrants are the

largest component of international migration to Alberta. In 2022, the province accepted the fourth-most immigrants of any Canadian province or territory, at 52,573.<sup>19</sup> In 2022, Alberta's immigrant population was 937,500, which equals 26% of all Albertans aged 15 years and over and 11.1% of Canada's immigrants.<sup>20</sup> Alberta's share of Canada's immigrants is about 20% higher than its percentage of the national population. Newcomers to the province tend to be much younger than the rest of its population and are a key driver of growth in the core-aged workforce.<sup>21</sup> More than 80% of Alberta's immigrants are under 45 years of age, with most being between 25 and 34 years of age.<sup>22</sup> It's estimated that immigrants will comprise up to 37% and 41% of the workforce in Canada and Alberta, respectively, by 2036.<sup>23</sup>

Alberta has a slightly younger population than Canada. In 2022 its median age was 38.1 years, while Canada's was 41.0.<sup>24</sup> Almost one quarter (24%) of Alberta's population are 19 years of age or younger, whereas 27% are 55 years of age or older. The corresponding proportions for Canada are 21% and one-third, respectively. Almost one-half (49%) of Alberta's population are between the ages of 21 and 54 years, whereas the relevant figure for Canada is 46%.

14 <https://openparliament.ca/committees/immigration/43-2/34/paul-mclauchlin-1/>

15 <https://calgaryherald.com/opinion/columnists/varcoe-alberta-set-to-call-more-workers-even-as-population-boom-continues>

16 Source: Statistics Canada. Table 17-10-0020-01 Estimates of the components of interprovincial migration, quarterly

17 <https://www.alberta.ca/population-statistics#:~:text=As%20of%20October%201%2C%202023%2C%20Alberta's%20population%20was%204%2C756%2C408.>

18 Albertans pay no PST, no payroll tax or health premium, as well as a low-income tax that 40% of tax filers don't pay.

19 <https://www.immigration.ca/here-are-the-top-10-most-in-demand-occupations-in-calgary-alberta/>

20 <https://open.alberta.ca/dataset/cab80384-59c6-42a1-9d7c-4b1f8b676ad8/resource/60f31df8-3b59-49d0-8fd1-06a1ba9afcf4/download/jet-alberta-labour-force-profiles-immigrants-2022.pdf>

21 <https://open.alberta.ca/dataset/81512550-40fd-4a76-b73e-a5dd25ededb3/resource/0804f7d6-ba23-45c8-a6d0-5fa13ee3a1a7/download/tbf-labour-market-insight-2023-12-18.pdf>

22 <https://businesscouncilab.com/insights-category/immigration-snapshot-who-is-immigrating-to-canada-and-alberta/>

23 <https://businesscouncilab.com/insights-category/by-the-numbers-what-the-immigration-target-increase-means-for-canada-and-alberta/>

24 Source: Statistics Canada. Table 17-10-0005-01 Population estimates on July 1st, by age and sex.

Census 2021 shows that visible minorities and Indigenous Peoples comprise 28% and 6.8% of Alberta's population, respectively. Alberta has the third largest Indigenous population (approximately 285,000) among Canada's provinces, next to Ontario and British Columbia.

It has the fourth largest percentage of Indigenous people, behind Manitoba (18.1%), Saskatchewan (17%) and Newfoundland and Labrador (9.3%). It's expected that visible minorities will comprise one-third of Alberta's population by 2030.<sup>25</sup>

# Alberta's Electricity Market

## Background

Alberta is unique among Canada's provincial electricity markets. Its electricity is not centrally planned, but is financed and developed entirely by private investors. They determine the size, fuel source and location of new generation, based on many factors, such as the cost and performance of different technologies. Although the market for electricity generation is competitive, transmission and distribution functions are regulated. No single electric utility exercises undue power. Some 230 privately owned organizations participate in the generation, transmission and/or distribution of electricity. Approximately twenty companies provide retail services to industrial and large commercial consumers.

Alberta has four main electricity distribution service territories—Calgary, Edmonton, northern Alberta, and southern Alberta. Each territory establishes its own distribution and transmission fees for the following categories of customers: Residential; Farms; Commercial; Industrial; Lighting; and Oilfields.

A significant proportion of Alberta's electricity generation is integrated into industrial processes, such as oil and gas, chemical manufacturing, forestry, and pulp/paper. Many industrial, commercial and municipal facilities utilize cogeneration (i.e.: combined heat and power) fueled by natural gas. Cogeneration accounts for 40% of Alberta's electricity.<sup>26</sup> It is more efficient than traditional forms of electricity generation and has a lower carbon footprint. Such systems can be connected to the power grid or function independently as stand-alone entities. Excess cogeneration can be transferred to the grid.<sup>27</sup>

Alberta's wholesale electricity market includes approximately 26,000 kilometres of transmission lines and 426 generating units. The capacity and reliability of Alberta's power system is marginally enhanced through its transmission interties with Saskatchewan, British Columbia, and Montana, which are owned and operated by various utilities. They enable the province to sell surplus generation and/or supplement its requirements with alternative sources of baseload power

25 <https://open.alberta.ca/dataset/d7eb8e16-179d-4dba-a89b-f254ba09d90c/resource/829f6970-7448-44a4-b191-0dc4c59c1bfc/download/jend-albertas-supply-outlook-model-2021-2030-indigenous-visible-minorities-people-with-disabilit.pdf>

26 <https://www.alberta.ca/system/files/epa-government-of-alberta-submission-on-draft-federal-electricity-regulations.pdf>

27 <https://www.alberta.ca/system/files/epa-government-of-alberta-submission-on-draft-federal-electricity-regulations.pdf>

(particularly during emergency situations and supply shortfalls). Interties help manage some of the intermittency and load fluctuations associated with wind and solar power. Nevertheless, Alberta has one of North America's least-interconnected electricity systems. Its intertie capacity is less than 15% of peak demand.<sup>28</sup>

The **Alberta Electric System Operator** (AESO), a nonprofit organization, ensures that Alberta's electricity system operates safely, reliably, and efficiently. It manages the settlement of the hourly wholesale market (i.e.: the Power Pool) and transmission system services. All wholesale electrical energy in the province must be exchanged through the Power Pool unless it is exempted. The **Market Surveillance Administrator** (MSA)—a public agency—protects and promotes the fair, efficient and competitive operation of Alberta's electricity market, and ensures that market participants comply with all relevant legislation, Alberta Reliability Standards and AESO rules.

Under Alberta's deregulated electricity system, generators are paid market-determined prices (i.e.: the "Pool Price") only when they provide power to the wholesale market.<sup>29</sup> Under this "energy only" system, power producers have no incentive to provide standby generation. This differs from the situation in a "capacity market", where generators are compensated for producing energy *and* providing capacity. Nevertheless, Alberta does not always have enough generation in high demand periods. The inherent unpredictability of Alberta's power market is exacerbated by the growing deployment of renewable (intermittent) power, which contributes to price volatility and makes it difficult for generators to plan and invest in new capacity. There is no guarantee

that they will earn enough revenue to recoup their investments in power plants.

Alberta's future ability to generate sufficient electricity concerns many stakeholders. In the next few decades its power system will likely require more clean generation, a more diverse grid, greater storage capacity and more interconnections with other provinces.<sup>30</sup> Energy efficiency, distributed energy resources (DER) and demand-side management—which already play a significant role in the system—will likely become the focus of much greater efforts.

## Regulatory Environment

The **Alberta Utilities Commission** (AUC) exercises regulatory oversight over Alberta's electricity system. It reviews and approves upgrades and enhancements to the distribution system and determines whether new power plants (and their location) serve the public interest. The AUC also regulates Alberta's electricity transmission companies.<sup>31</sup> They are permitted to recover reasonable and necessary costs and earn a fair return on their capital investment.

Like Canada's other provinces and territories, Alberta has extensive legislation regarding environmental protection and management. It includes protections for the health of populations living near electrical infrastructure. Environmental assessments (EA) may be required for projects involving the construction of electricity infrastructure. Applicants must obtain approval from **Alberta Environment and Parks** (AEP) to construct hydroelectric plants and large thermal power plants that use non-gaseous fuel. However, when an EA for electricity

28 <https://openparliament.ca/committees/natural-resources/42-1/63/jerry-mossing-1/>

29 <https://www.auc.ab.ca/energy-charges/>

30 <https://www.aeso.ca/assets/Uploads/industry-roundtables/2021-12-03-Industry-CEO-Roundtable-Net-Zero-by-2035-v3.pdf>

31 <https://www.auc.ab.ca/transmission-rates/>

infrastructure is not deemed mandatory under the regulations (such as for the construction of a transmission line) the AEP uses its discretion to determine whether it is required.

Alberta's **Technology Innovation and Emissions Reduction (TIER) Regulation** incentivizes investment in low or non-emitting electricity generation. It helps large emitters (i.e.: industrial facilities that produce more than 100,000 tons of CO<sub>2</sub> equivalent annually) find innovative ways to reduce emissions and invest in clean technology. In 2015 the Government of Alberta launched the Climate Change Leadership Plan. It aims to gradually eliminate all pollution caused by burning coal; transition to more renewable energy and natural gas generation by 2030; and limit greenhouse gas (GHG) emissions from oil sands operations.

*Alberta's Renewable Electricity Act (2017) legislated the goal of generating at least 30% of the province's electricity from renewable sources by 2030.*

In February 2019, a Ministerial Order established the following interim renewable energy targets under the Act: 15% by 2022; 20% by 2025; 26% by 2028. The Act envisaged the elimination of coal-fired generation; coal-to-gas conversions; the integration of new infrastructure; and technological innovations.

Alberta's **Micro-Generation Regulation** allows Albertans to sell surplus power to the grid, with a limit of 5 MW of installed capacity.

In December 2023, the province had 17,811 micro generation sites, virtually all of which were solar photovoltaic (PV) systems. Of these 77% and 11% were installed at residential and commercial sites, respectively.<sup>32</sup> They collectively provided 218 MW of installed capacity. An additional 68 sites collectively provided 151 MW of distributed generation.<sup>33</sup>

The **Modernizing Alberta's Electricity Grid Amendment Act (2022)** seeks to integrate new innovative technologies and enable the distribution system to accommodate electric vehicles (EVs), renewable power sources and distributed energy resources.<sup>34</sup> It is a part of the province's ongoing efforts to provide reliable, safe, and affordable electricity to its residents.

The approval of large-scale hydro and nuclear projects face significant regulatory hurdles in Alberta. It can take as long as 10 to 15 years for new generation facilities to become operational. Obtaining the approval of large-scale transmission interconnections can also be a lengthy and complex process, depending on the distance and configuration of the proposed interties.<sup>35</sup>

On August 3, 2023, Alberta imposed a seven-month moratorium on new renewable electricity projects (excluding microgeneration) larger than 1 MW, to allow for a review of policies and procedures for developing such generation. At the time 15 new renewable energy projects awaited approval from the AUC, while more than 90 remained in the development stage.<sup>36, 37, 38</sup> The projects entailed 12.7 GW of solar, 5.3 GW of wind, and 1.5 GW of battery energy

32 <https://www.greenalbertaenergy.ca/statistics.html>

33 <https://www.aeso.ca/market/market-and-system-reporting/micro-and-small-distributed-generation-reporting/>

34 <https://www.alberta.ca/alberta-electricity-overview>

35 This would involve the Canadian Energy Regulator Act, Impact Assessment Act, and the Navigation Protection Act.

36 <https://www.cbc.ca/news/canada/calgary/renewables-pause-alberta-projects-companies-1.6942597>

37 Renewables pause was 'necessary' for sector's stability, Smith insists; Premier defends UCP moratorium to industry players Varcoe, Chris. Edmonton Journal; Edmonton, Alta. 25 Oct 2023: A.4.

38 Renewables pause was 'necessary' for sector's stability, smith insists; Premier defends UCP moratorium to industry players Varcoe, Chris. Edmonton Journal; Edmonton, Alta. 25 Oct 2023: A.4.

storage, and involved 64 business entities. According to the Pembina Institute, the projects represent at least \$33 Billion in investment and more than 24,000 job-years of employment.<sup>39</sup> Moreover, they have the potential to generate as much as \$263 million in local taxes and leases for landowners in 27 municipalities.<sup>40</sup>

On March 1, 2024, at the conclusion of the moratorium, the Government of Alberta announced new rules for renewable energy projects that give municipalities greater input into how and where they can be developed within their boundaries. The new rules prevent wind turbines from being constructed within 35 KMs of Alberta's "protected areas and pristine viewscapes"; require "visual impact assessments" before wind turbines can be approved in other areas; place tighter restrictions on building wind and solar farms on fertile farmland; and require renewable energy developers to provide securities or bonds to cover future reclamation costs associated with winding up a renewable energy project. According to Business Renewables Centre-Canada, wind and solar projects contributed \$28 million in tax revenues to rural municipalities in Alberta in 2022.<sup>41</sup>

## Electricity from Renewable Sources

**Figure 1 shows that by the end of 2022 natural gas (61%), wind power (17%) and coal (8%) collectively accounted for 86% of Alberta's 18,344 MW of generation capacity.<sup>42</sup> By January 2024 that figure had increased to 20,777.<sup>43</sup>**

The AESO anticipates that renewable sources will account for 30% of the province's electricity supply by 2026.<sup>44</sup> Alberta is expected to greatly expand its wind and solar capacity over the next couple of decades, due to the market's low barriers to entry, investment tax credits, declining cost of renewable energy, and corporate purchase power agreements (PPAs). The province's unique geography and deregulated electricity grid make it ideal for utility-scale wind and solar projects.

39 <https://www.pembina.org/reports/2023-08-24-albertas-renewable-energy-moratorium-factsheet.pdf>

40 <https://www.cbc.ca/news/canada/calgary/pembina-institute-report-renewable-projects-affected-by-pause-moratorium-1.6946440>

41 <https://businessrenewables.ca/news/business-renewables-centre-canada-disappointed-cloud-uncertainty-continues-renewable-energy>

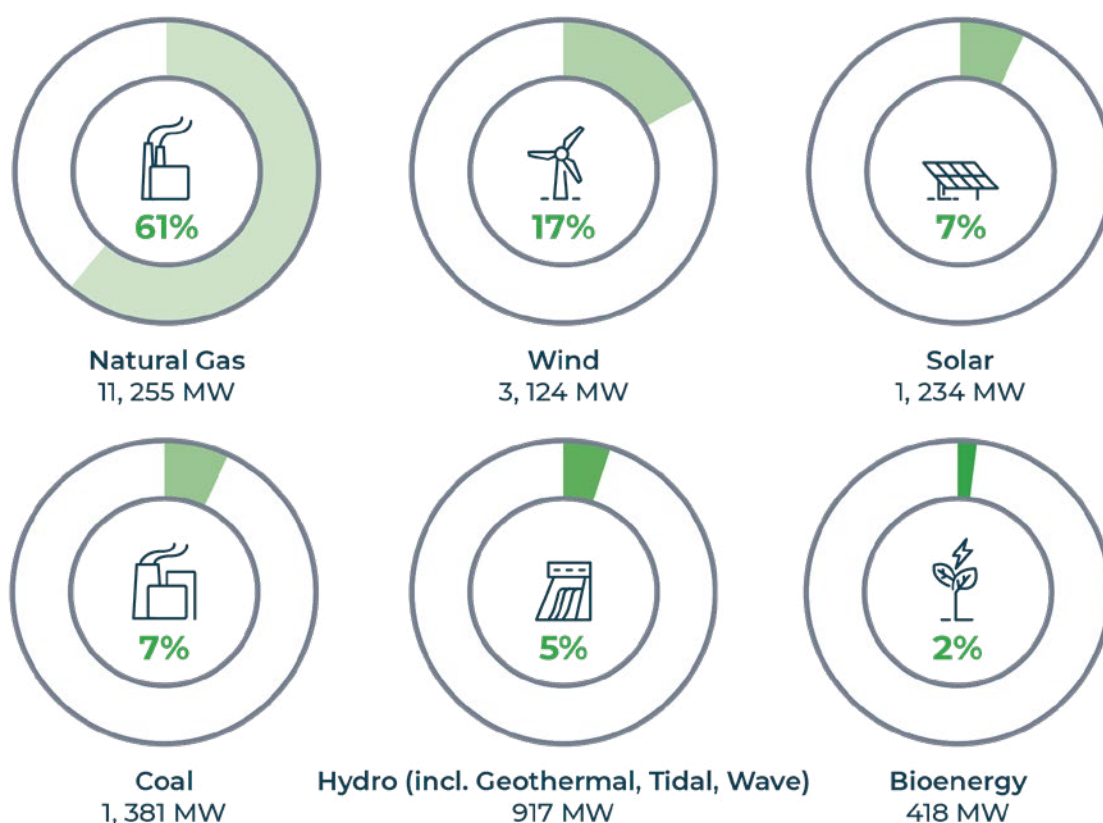
42 [https://www.aeso.ca/assets/Uploads/market-and-system-reporting/2022\\_Annual\\_Market\\_Stats\\_Final.pdf](https://www.aeso.ca/assets/Uploads/market-and-system-reporting/2022_Annual_Market_Stats_Final.pdf)

43 <https://www.poweradvisoryllc.com/reports/january-2024-supply-shortfall-in-alberta>

44 <https://www.aeso.ca/future-of-electricity/albertas-power-system-in-transition/>



**Figure 1:**  
**Electric Energy Net Installed Capacity in Alberta (MW) By Resource, 2022<sup>45</sup>**



In the past five years wind and solar power contracts signed by Alberta companies have brought nearly \$5 billion in investment to the province and created nearly 5,430 jobs.<sup>46, 47</sup> It received more than three-quarters (nearly 1.4 GW) of the new wind and solar capacity deployed in Canada in 2022. North America's largest solar farm, the \$516 million 465 MW Travers Solar Project, located in rural Alberta (Vulcan County), can power 150,000 homes.<sup>48</sup>

A 2010 study commissioned by the AUC revealed that Alberta has approximately 42,000 GWh per year of developable hydroelectric

energy potential, most of which is located in the northern part of the province, in the Athabasca, Peace and Slave River basins. However, thus far, the province has attracted little investment in hydro generation.<sup>49</sup> Developing it would require extraordinary government support.<sup>50</sup> It will be quite challenging to obtain approval for any new large scale hydro project, and connecting it to the transmission system will likely be a complex and costly undertaking. Despite the financial and other incentives available to encourage the generation of emission-free power, private companies appear to be unwilling to assume the risks associated with investing in a large hydro project.

45 <https://media.www.auc.ab.ca/prd-wp-uploads/Shared%20CascadDocuments/2022-CapGenInterchange.pdf>

46 <https://www.pembina.org/blog/albertas-renewable-energy-advantage>

47 <https://calgary.ctvnews.ca/alberta-utilities-commission-says-it-will-still-process-applications-during-renewables-moratorium-1.6531704>

48 <https://pv-magazine-usa.com/2023/01/05/nrg-systems-provides-monitoring-solution-for-largest-pv-plant-in-canada/>

49 [bc.ca/news/canada/edmonton/hydro-once-made-up-around-half-of-alberta-s-power-capacity-why-does-alberta-have-so-little-now-1.6744209](https://bc.ca/news/canada/edmonton/hydro-once-made-up-around-half-of-alberta-s-power-capacity-why-does-alberta-have-so-little-now-1.6744209)

50 <https://www.aeso.ca/assets/AESO-Net-Zero-Emissions-Pathways-Report-July7.pdf>

# Greenhouse Gas Emissions

Alberta emits far more GHGs than any other province—256 MT CO<sub>2</sub> eq in 2021—primarily because of its enormous oil and gas industry.<sup>51</sup> In 2020, the electricity sector emitted 32.7 MTs CO<sub>2</sub> eq of GHG, or 13% of Alberta’s economy-wide emissions.<sup>52</sup> As indicated in Table 2, in 2021 the electricity sector contributed 7.7% of Canada’s total GHG emissions, nearly one half (47%) of which came from Alberta.<sup>53</sup>

Since 2005 the carbon emissions intensity of electricity generated in Alberta has declined more than 40%. In 2007, Alberta enacted the Specified Gas Emitters Regulation (SGER),<sup>54</sup> and became the first jurisdiction in North America to apply a carbon price on industrial emissions.<sup>55</sup> In 2019 Alberta’s per capita electricity consumption (17.5 MWh) ranked fifth among Canada’s provinces, and 17% above the national average.<sup>56</sup> The province’s electricity demand has increased 30% in the past 20 years. It’s expected that Alberta’s electricity sector will gradually lower its GHG emissions over the period to 2035, since all major utilities in the province have established net-zero emission targets.<sup>57</sup> According to the AESO’s 2021 Long Term Forecast, Alberta’s electricity sector is on track to lower its GHG emissions by 61% from 2005 levels, by 2030.



51 <https://www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/sources-sinks-executive-summary-2023.html#toc8>

52 [https://natural-resources.canada.ca/sites/nrcan/files/electricityVisionPaper/Electricity%20Paper\\_ENGLISH.pdf](https://natural-resources.canada.ca/sites/nrcan/files/electricityVisionPaper/Electricity%20Paper_ENGLISH.pdf)

53 <https://www.cbc.ca/news/canada/calgary/alberta-clean-electricity-power-grid-charts-context-1.6933163>

54 Among other things, it required that all facilities emitting more than 100,000 tonnes of carbon dioxide equivalent (CO<sub>2</sub>e) annually had to report their emissions.

55 <https://www.alberta.ca/emissions-reduction-and-energy-development-plan#:~:text=Alberta's%20plan%20includes%20an%20aspiration,Albertans%2C%20Canadians%20and%20the%20world>

56 <https://www.cer-rec.gc.ca/en/data-analysis/energy-markets/provincial-territorial-energy-profiles/provincial-territorial-energy-profiles-alberta.html>

57 <https://www.aeso.ca/future-of-electricity/albertas-power-system-in-transition/>

**Table 2:  
Canada's GHG Emissions (Mt CO<sub>2</sub> eq) by Economic Sector (2018-2021)<sup>58</sup>**

Sector	2018	2019	2020	2021
Oil and Gas	202	201	183	189
Electricity	63	62	54	52
Transport	169	170	143	150
Heavy Industry	80	79	74	77
Buildings	92	93	89	87
Agriculture	69	69	70	69
Waste and others	50	50	46	47
<b>National Total</b>	<b>725</b>	<b>724</b>	<b>659</b>	<b>670</b>

<sup>58</sup> <https://www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/sources-sinks-executive-summary-2023.html#toc8>

## Electricity Generation

In 2021 Canada's electrical output was valued at \$47.1 Billion. Alberta contributed the third-largest share of any province or territory, next to Quebec and Ontario. In 2022, Alberta

produced 74.9 TWh of electricity, or 12% of Canada's power. The province was the third largest producer of electricity, after Quebec (34%) and Ontario (23%).<sup>59</sup>

**Table 3:<sup>60</sup>  
Total Electricity Generated in Canada (2022), by Utilities in MW Hours<sup>61</sup>**

Province/Territory	MW Hours	Share
Alberta	74,897,860	12%
British Columbia	69,832,448	11%
Manitoba	37,846,980	6%
New Brunswick	12,550,549	2%
Newfoundland and Labrador	41,539,027	7%
Northwest Territories	701,741	0%
Nova Scotia	8,773,655	1%
Nunavut	190,534	0%
Ontario	149,270,829	23%
Prince Edward Island	494,678	0%
Quebec	215,524,266	34%
Saskatchewan	23,958,124	4%
Yukon	573,048	0%
<b>Total</b>	<b>636,153,739</b>	

<sup>59</sup> [https://www.aeso.ca/assets/Uploads/market-and-system-reporting/2022\\_Annual\\_Market\\_Stats\\_Final.pdf](https://www.aeso.ca/assets/Uploads/market-and-system-reporting/2022_Annual_Market_Stats_Final.pdf)

<sup>60</sup> <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=2510002001&pickMembers%5B0%5D=1.14&pickMembers%5B1%5D=3.1&cubeTimeFrame.startYear=2017&cubeTimeFrame.endYear=2021&referencePeriods=20170101%2C20210101>

<sup>61</sup> Statistics Canada. Table 25-10-0020-01 Electric power, annual generation by class of producer

Table 4 enumerates Alberta’s electricity consumption in 2022, by sector. It shows that the industrial, commercial, and residential sectors consumed 48%, 29% and 20% of the province’s electricity, respectively.

**Table 4:  
Electric Energy Distribution Sales and Number of Customers in Alberta (2022)<sup>62</sup>**

	<b>Electricity Used in GWh</b>	<b>Proportion of Generation</b>	<b>Number of Customers</b>	<b>Proportion of Customers</b>
<b>Residential</b>	10,920.4	20%	1,609,503	84%
<b>Farm</b>	2,095.0	4%	80,893	4%
<b>Commercial</b>	15,881.7	29%	191,138	10%
<b>Industrial</b>	26,403.7	48%	30,238	2%
<b>Total</b>	<b>55,301</b>		<b>1,911,771</b>	

Alberta exports and imports electricity to/from neighbouring jurisdictions, including British Columbia, Saskatchewan, and Montana. However, it has historically been a net importer of electricity.

**Table 5:  
Alberta Electricity Interchange (GWh), 2022<sup>63</sup>**

<b>Jurisdiction</b>	<b>Exports</b>	<b>Imports</b>	<b>Net Interchange</b>
<b>British Columbia*</b>	473	2,591	2,119
<b>Saskatchewan</b>	22	814	792
<b>Montana</b>	136	1,129	993
	<b>631</b>	<b>4,534</b>	<b>3,904</b>

62 <https://media.www.auc.ab.ca/prd-wp-uploads/Shared%20Documents/2022-SalesHistory.pdf>

63 <https://media.www.auc.ab.ca/prd-wp-uploads/Shared%20Documents/2022-CapGenInterchange.pdf>

## Generation Supply Mix in 2022

Alberta’s electricity supply mix has fundamentally changed in the past few years. Its former fleet of coal plants—which were the largest among all provinces and territories—had a total capacity of 5,555 MW. Although Alberta’s climate change legislation required their elimination by 2030, its power generators expedited their conversion from coal to natural gas and

most facilities made the transition (the others were retired) by the end of 2023.<sup>64</sup> This has reduced the province’s emissions of sulphur dioxide, nitrogen oxides and particulate matter. CO<sub>2</sub> emissions from Alberta’s nine combined cycle natural gas (which together amount to about 3,000 MW capacity) plants are less than half those of coal fired plants.

**Table 6:**  
**Electricity Generation (GWH) in Alberta by Fuel Source, 2022<sup>65</sup>**

	Coal	Natural Gas	Hydro	Wind	Biogas/ Biomass	Solar	Others	Total
<b>Total</b>	10,155	60,821	1,960	7,345	2,089	1,159	239	83,768
<b>%</b>	12%	73%	2%	9%	2%	1%	0%	100%

In 2022, coal-fired generation provided 17% of the province’s net-to-grid power, down from 47% in 2018.<sup>66</sup> Offsetting the elimination of coal were proportionally large increases in natural gas, solar and wind. In 2022, gas generation technologies delivered 64% of Alberta’s net-to-grid generation, up from 42% in 2018. Hydro, wind and solar collectively provided 17% of generation, up from 10% in 2018. A milestone was reached in 2022 when, for the first time, renewables provided more of Alberta’s power than coal.

Between 2019 and 2023, more than 2,000 MW of new solar and wind power entered service in Alberta. In 2022 the province’s solar capacity was 1,138 MW, or 6% of total generation capacity. Ten new wind facilities, with a combined capacity of 1,349 MW, came online. This increased the total capacity of wind power to 3,618 MW, or 20% of the province’s total. In 2022, such power contributed 12% of Alberta’s electrical generation. Most of its 900 wind turbines (as of 2021) are in the southern and/or central-east regions of the province. Alberta has the third largest share (13%) of wind facilities in Canada, next to Ontario (40%) and Quebec (30%).

64 Many of the natural gas units generate nearly 50% fewer GHG emissions than coal.

65 <https://media.www.auc.ab.ca/prd-wp-uploads/Shared%20Documents/2022-CapGenInterchange.pdf>

66 Net-to-grid generation is the generation dispatched to meet system load.

**Table 7:  
Number of Wind Turbines in Canada by Province/Territory (2021)<sup>67</sup>**

Province/Territory	Number	% of Total
Alberta	900	13%
British Columbia	292	4%
Manitoba	133	2%
New Brunswick	119	2%
Newfoundland and Labrador	27	0%
Northwest Territories	4	0%
Nova Scotia	310	5%
Ontario	2,663	40%
PEI	104	2%
Quebec	1,991	30%
Saskatchewan	153	2%
Yukon	2	0%
<b>Total</b>	<b>6,698</b>	

Alberta relies on natural-gas sourced electricity for base load generation and to meet peak demand. Its largest gas-fired power station—the Shepard Energy Centre, located east of Calgary, has a capacity of 860 MW.<sup>68</sup> An unprecedented amount of new gas-fired power—1,900 MW—is expected to enter service in 2024. The \$1.5-billion Cascade Power Project, which comprises two 450 MW First Nations-owned combined cycle natural gas plants being built in Yellowhead County near Edson, Alberta,

is expected to operate by mid 2024. Suncor Energy’s new \$1.4-billion cogeneration project, which will provide about 800 MW (roughly 8% of Alberta’s current electricity demand), is also under construction. Although these facilities will benefit consumers, the province’s electricity grid will become increasingly dependent on unabated fossil fuels. Alberta does not have any fuel sources that can serve as a substitute for natural gas in the short-to-medium term.

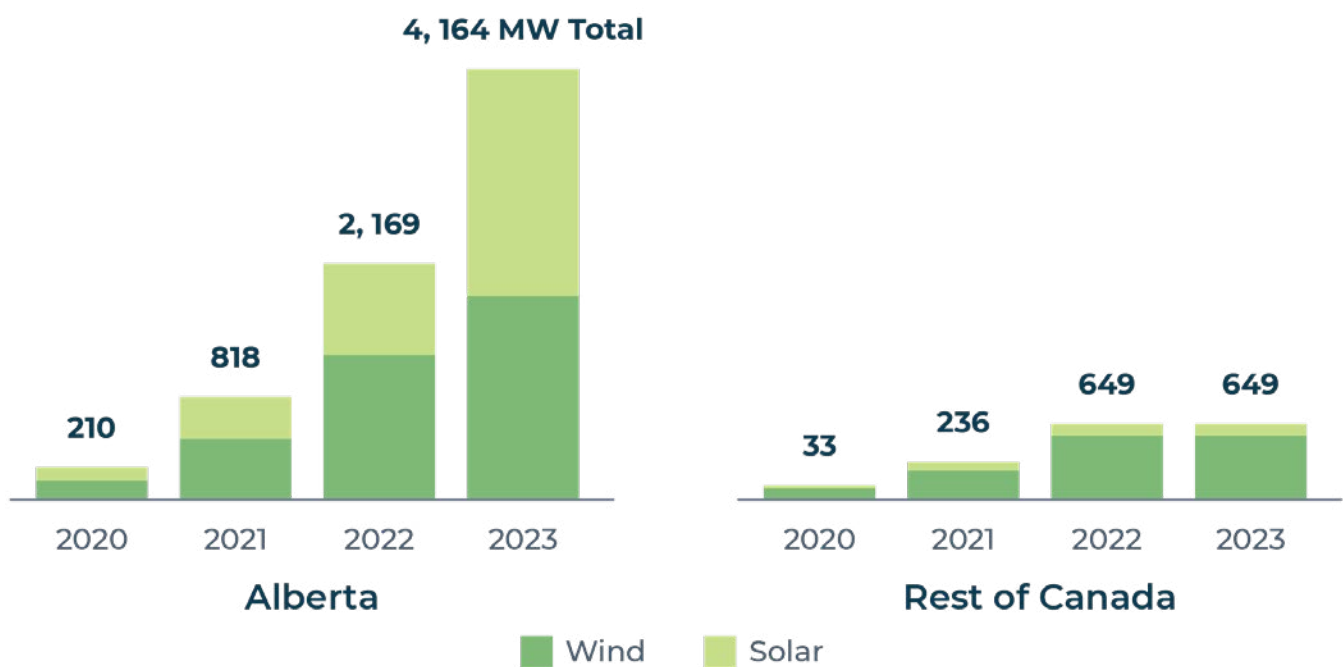
<sup>67</sup> <https://www.nationalobserver.com/2020/10/23/news/wind-turbine-database-canada>

<sup>68</sup> <https://www.cer-rec.gc.ca/en/data-analysis/energy-markets/provincial-territorial-energy-profiles/provincial-territorial-energy-profiles-alberta.html>

In 2022 wind and solar power were Alberta's least costly sources of electricity. Its electricity grid included 2,848 MW of wind power and 949 MW of solar power.<sup>69</sup> Their costs are expected to fall further over time. However, the reliability of these sources is uncertain due to their intermittency, particularly given Alberta's cold dark winter nights—when demand peaks.

At such times it is imperative to have sufficient dispatchable generation. The problem can be partially mitigated by using energy storage technology, which captures and stores electricity during low demand times and releases it as required. Energy storage for short time periods (1-4 hours) is currently viable for some applications and their costs are falling.

**Figure 2:  
Cumulative New Renewables Capacity since 2019**



Source: Pembina Institute

Since 2019 between \$4 and \$5 Billion has been invested in renewable power generation and energy storage projects in Alberta.<sup>70</sup> More than 3,500 MW of renewable projects are currently under construction.

Alberta received 74 wind and solar project applications in the month following the August 2023 announcement of a moratorium on renewable energy projects.

<sup>69</sup> <https://www.canada.ca/en/services/environment/weather/climatechange/climate-action/powering-future-clean-energy/overview-alberta.html>

<sup>70</sup> Natural gas powering Alberta during grid alerts, cost spikes Varcoe, Chris. Calgary Herald; Calgary, Alta... 22 Dec 2022: A.1.



## Future Electricity Requirements

Alberta's power requirements are expected to expand significantly by 2035, due to economic growth, greater oil sands production, population expansion, new interconnections with other jurisdictions and the proliferation of EVs (driven by government policy and automaker pledges to eliminate internal combustion engines). In December 2022, the Government of Canada announced that 20%, 60% and 100% of new vehicles sold in Canada must be EVs by 2026, 2030 and 2035, respectively. It also renewed the rebate program for individuals and businesses purchasing or leasing an EV. The Government of Canada has implemented several other initiatives to support Canada's EV industry. They include (but are not limited to): a) Zero-Emission Vehicle (ZEV) incentive program, which offers up to \$5,000 in incentives for the purchase or lease of eligible battery-electric, hydrogen fuel cell, or longer-range plug-in hybrid vehicles; b) ZEV Infrastructure Program (provides up to 50% of the total project costs to install new or upgrade existing ZEV charging stations and hydrogen refueling stations in key locations).

There has been modest growth in Alberta's EV market thus far. The market share of EVs in the province was 3.8% in the second quarter of 2023, whereas it was 10.5% in Canada as a whole.<sup>71</sup> Nevertheless, a substantial increase is projected in the future use of EVs. It will have a significant impact on Alberta's electricity load, especially if the vehicles are deployed in commercial and industrial fleets.

Energy efficiency, distributed energy resources and demand-side management are important

aspects of Alberta's electricity system. Since they help reduce the risk of inadequate supply, they will likely become the focus of much greater efforts over time. The growth of nascent industries, such as hydrogen, which is viewed as a key element of Alberta's decarbonization future, and the electrification of buildings and heavy industries (e.g.: mining, oil/gas, aerospace, pulp/paper), could also expand power requirements and, to some extent, supply—if distributed energy resources become more widespread.<sup>72</sup> Although this could be achieved through the greater use of natural gas, Canada's proposed Clean Electricity Regulations (CERs), which effectively prohibit electricity generation that is not low or non-emitting as of 2035, stipulates that such plants must capture 95% of their emissions.<sup>73</sup>

### Decarbonizing the Electricity Grid and Economy

It will likely be more challenging for Alberta than any other province to create a carbon neutral electricity grid. Its power system was created to exploit its abundant supply of natural gas and coal. Unlike Quebec, Manitoba and Ontario, Alberta doesn't have any large-scale hydro or nuclear generation—and it is the province with the highest level of GHG emissions.<sup>74</sup> Alberta's ability to create a Net Zero grid will depend on many factors, each of which entails much risk and uncertainty. The regulatory and technological uncertainties that exist in this regard are daunting, and could be exacerbated by political and macroeconomic considerations, as well as the long development times required for new infrastructure.

<sup>71</sup> <https://electricautonomy.ca/2023/08/25/zev-market-share-canada-q2/>

<sup>72</sup> This means that most natural gas-based heating systems in Alberta will switch to heat pumps and electric water tanks.

<sup>73</sup> Smith bolsters sovereignty act attack on Ottawa with 'last resort' Crown electricity corporation

<sup>74</sup> Alberta has nine hydro facilities that collectively have a maximum capacity of 894 MW.

Political and social imperatives to decarbonize and electrify more of Alberta's economy over the next few years could place a growing burden on its power generators. This may result in the delay or cancellation of some investment decisions, disrupt some organizations' business models, and alter the competitive dynamics and/or market structure of the industry.

During the past few years Alberta's electricity sector has been in a period of transition. In less than a decade its generation mix has been transformed from one that was predominantly coal-fired (i.e.: over 50%) to one that is virtually coal-free. Further impactful changes are expected in the medium and long term. They will likely entail the greater use of renewable sources, energy storage and natural gas generation, among others. The sector recognizes that it must prioritize and balance the goal of decarbonization with the need to assure the electricity system's resiliency, reliability, and affordability.<sup>75</sup>

The emissions intensity limits outlined in Canada's proposed CERs require that natural gas power plants sequester an annual average of 95% of emissions through technologies such as carbon capture utilization and storage (CCUS).<sup>76</sup> The regulations permit gas-fired generating plants built before 2025 to continue to operate unabated for 20 years, without such technology. However, new CCUS-equipped units can operate beyond 2035. Unabated gas-fired generation will only be permitted during emergency situations. The Government of Alberta's technical submission to the Federal

Government, in response to the Draft Clean Electricity Regulations, includes this statement: "*Cogeneration cannot physically or economically implement CCUS and may just stop operating or install inexpensive and inefficient boilers.*"<sup>77</sup>

The AESO believes that the CERs will create a significant reliability risk, and impose disproportionately high costs on Alberta, when they come into effect in 2035.<sup>78</sup> This is largely because its fleet of 40 cogeneration plants, which currently provide 40% of total generation,<sup>79</sup> may have to be retired or disconnected from the grid. If the attempt to decarbonize Alberta's economy causes it to have relatively higher electricity prices, some of its businesses/industries may migrate to other provinces.

***Roughly 2,200 MW of solar power and 2,200 MW of wind power are expected to enter service in Alberta by 2025.***

These fuel sources are expected to become more pervasive in the early 2030s. To minimize its GHG emissions by 2050, Alberta will require a substantial amount of new reliable baseload power. This could be achieved through carbon capture (Alberta's deep saline aquifers are suitable for safe underground CO<sub>2</sub> storage), hydrogen, new hydro generation, SMRs, as well as additional interties. However, bringing them to fruition will involve huge capital costs and extensive collaboration among stakeholders.<sup>80, 81</sup> Increasing the

75 <https://www.mccarthy.ca/en/insights/blogs/canadian-energy-perspectives/key-developments-albertas-power-industry-2022>

76 The regulations are a key element of Canada's 2030 Emissions Reduction Plan to establish performance standards to reduce GHG emissions from electricity generated from fossil fuels, starting in 2035. They cover four main elements: Clean electricity supply and generation; Clean electricity transmission and storage; Electrification and energy efficiency for energy end-use sectors; and Innovative, clean and enabling technologies to advance electrification.

77 "Federal Draft Clean Electricity Regulations: Government of Alberta Technical Submission", Government of Alberta < November 3, 2023

78 [https://www.aeso.ca/assets/LTO\\_Resource\\_Adequacy\\_CER\\_Assessment\\_27.09.2023.pdf](https://www.aeso.ca/assets/LTO_Resource_Adequacy_CER_Assessment_27.09.2023.pdf)

79 <https://www.aeso.ca/assets/AESO-Preliminary-CER-Submission-for-ECCC.pdf>

80 Alberta's Capital Power partners with Ontario Power Generation to build province's first nuclear power reactor: Over the next two years, the companies will jointly assess the viability of building small modular reactors in Alberta. If constructed, those SMRs might be jointly owned and operated, OPG says" Globe and Mail, January 15, 2024

81 <https://www.aeso.ca/assets/AESO-Net-Zero-Emissions-Pathways-Report-July7.pdf>

number of interties would necessitate managing the structural differences between different jurisdictions' markets and ensuring that inter-provincial electricity trade is carried out in a fair and mutually beneficial manner.

### Future Use of Nuclear Power

In the past five years Canada has invested billions of dollars in nuclear power—including SMRs—for use in heavy industry and remote communities. SMRs, which are built in factories and assembled on site, remain in the development stage. They have a capacity of up to 300 MW and entail high capital costs relative to other generation technologies. Since they can be scaled to suit local requirements, they could be particularly useful in Alberta's remote, rural and Indigenous communities—where diesel fuel is commonly used. They could also help to decarbonize the oil sands, mining, and other industries. Alberta's Indigenous communities have expressed interest in partnerships, involvement, and training in all energy sectors, including SMR development.

Some observers believe that despite public concerns about radiation, waste management, high costs and potential accidents, the deployment of nuclear power in Alberta would be one of the most effective ways to generate enough non-intermittent carbon-free power to electrify the economy.<sup>82</sup>

In April 2021 Alberta signed a Memorandum of Understanding with New Brunswick, Ontario, and Saskatchewan, to collaborate in the development of a SMR industry. Alberta does not currently have any rules and regulations

regarding the development of nuclear power. However, in July 2023 the Premier of Alberta issued a “mandate letter” to the Minister of Energy and Minerals that included a directive to “*work with the Minister of Environment and Protected Areas to develop and implement a regulatory framework for small modular reactor technology use in Alberta*”.<sup>83</sup> In January 2024, Capital Power Corp., which generates electricity in Alberta using natural gas, wind and solar, formed a partnership with Ontario Power Generation (OPG) to assess the viability of deploying SMRs in Alberta. The company is currently working on a proposed carbon capture project for its gas-fired generating station located near Warburg, Alberta. Up to three million tonnes of CO<sub>2</sub> per year are forecasted to be captured and sequestered, as early as 2027.<sup>84</sup>

The Government of Alberta aspires to achieve a carbon neutral economy by 2050 “*without compromising affordable, reliable, and secure energy for Albertans*”.<sup>85</sup> However, its Emissions Reduction and Energy Development Plan (April 2023) does not include specific emission reduction targets for 2035 that would serve as an intermediary goal. Rather, it emphasizes the important role that new and innovative technologies will play in the transition process.

The AESO's 2024 long-term outlook envisages that Alberta's power consumption will rise by 28% between 2022 and 2043.<sup>86</sup> The AESO believes that creating a carbon neutral power grid in Alberta by 2035 is not feasible, because it would put the system's reliability at risk and be too costly. It would require tens of billions of dollars in investments in generation and transmission infrastructure. The AESO has

82 Ontario got it right on nuclear power Staples, David. Edmonton Journal; Edmonton, Alta. 25 Aug 2023: A.2.

83 <https://open.alberta.ca/dataset/bf7f9a42-a807-49b3-8ba3-451ae3bc2d2f/resource/c87b60b4-217e-4d60-98be-1bbd2f538353/download/em-mandate-letter-energy-and-minerals.pdf>

84 <https://www.eralberta.ca/projects/details/genesee-ccs/>

85 <https://www.alberta.ca/system/files/epa-government-of-alberta-submission-on-draft-federal-electricity-regulations.pdf>

86 Alberta poised for massive increase in natural gas-fired electricity in 2024. Graney, Emma. The Globe and Mail; Toronto, Ont. 15 Dec 2023:

pegged the cost at \$44 Billion (not including distribution system change costs).<sup>87</sup> Moreover, the additional GHG emission reductions that would be achieved by decarbonizing by 2035 (rather than 2050) would be minimal. The Government of Alberta’s Technical Submission in response to the Federal Draft CERs includes the following statement: “*The 2035 goal is especially ambitious given the range of uncertainties associated with the maturation of low-carbon technologies, supply chain readiness, skilled labour shortages, and development timelines for energy-related infrastructure.*”<sup>88</sup>

## Electricity Prices

Canada’s electricity prices are lower than those of most other member countries of the International Energy Agency (IEA). In 2020 Canada’s industrial rates were the eighth lowest, at 89.7 USD/MWh (with a 12% tax rate), while its residential rates were fourth lowest, at 109 USD/MWh (with an 11% tax rate). In most provinces and territories industrial and commercial customers pay the lowest electricity rates, while small businesses and residential consumers pay the highest fees.

In Alberta residential customers may choose their own retailer and decide whether to pay for power via a fixed or floating rate. Alternatively, consumers can use the Regulated Rate Option (RRO) – whereby they pay a monthly rate that varies in accordance with the AUC-approved electricity market price. According to the Market Surveillance Administrator, one-in-three Albertans choose this option.

Alberta’s residential electricity rates declined between 2014 and 2017 and then increased faster than the rate of inflation during the next few years. The province’s transition from coal to gas-fired generation made its electricity rates more susceptible to fluctuations in natural gas prices. Power prices also rose because of the carbon tax, as well as the increasing demand for power during periods of extreme weather, and the lack of excess generation. Electricity prices averaged \$133 per MWh in 2000<sup>89</sup> and roughly \$141 per MWh in 2022. In 2022 Alberta’s electricity prices reached their highest levels since the market was deregulated. Table 8 shows that in September 2023, Alberta had Canada’s third-highest residential electricity prices—next to Nunavut and the Northwest Territories.



**Table 8:  
Average Residential Electricity Prices (Cents/KWh)  
by Province or Territory (September 2023)<sup>90</sup>**

Province	2020
Alberta	25.8
British Columbia	11.4
Manitoba	10.2
New Brunswick	13.9
NFLD/LAB	14.8
Nova Scotia	18.3
Nunavut	35.4
NWT	41
Ontario	14.1
PEI	18.4
Quebec	7.8
Saskatchewan	19.9
Yukon	18.7

<sup>90</sup> <https://www.energyhub.org/electricity-prices/>

# Impacts of Decarbonization on Electricity Generation and Fuel Mix

In August 2023, Canada's Minister of Energy and Natural Resources publicly released "*Powering Canada Forward*." It articulates Federal plans to decarbonize the country's electricity grids by 2035, while assuring their continued stability, reliability, and affordability.

Federal Budget 2023 entailed several initiatives to expand Canada's ability to generate emission-free electricity. The Canada Infrastructure Bank, the Federal government's main financing tool for supporting clean electricity generation, transmission, and storage projects, plans to invest \$10 Billion in clean power and green infrastructure projects. Budget 2023 also unveiled the Clean Electricity Tax Credit, which provides a 15% credit for eligible investments in clean electricity. Qualifying investments include those in non-emitting electricity generation systems (e.g., wind, solar, nuclear), abated natural gas-fired electricity generation, stationary electricity storage systems that do not utilize fossil fuels, and equipment that transmits electricity between provinces and territories. Altogether, the Government of Canada pledged to invest more than \$40 Billion over the next decade to support provinces and territories in their efforts to create a Net Zero electricity system.<sup>91</sup>

*Canada's Energy Future 2023*, a report produced by the Canada Energy Regulator (CER) outlines one potential scenario among many that could enable Canada to create a Net Zero electricity grid by 2035 and eliminate economy-wide GHG emissions by 2050. It specifies the volume of electricity (and corresponding fuel mixes) that would have to be generated in each province each year to achieve these goals. Under the "Canada Net Zero" scenario, the volume of electricity generated in Canada and Alberta will virtually double over the next 26 years.

The Net Zero scenario assumes that the percentage of Alberta's electricity that is wind-powered will more than triple by 2035, reaching slightly more than one half (51%). Solar power's share will also significantly rise, reaching 20% by 2035. To some extent these changes mirror what would be required at the national level (i.e., growth in wind and solar power by 2035, with coal and coke production being eliminated). However, the percentage of electricity generated from natural gas would decline more in Alberta than Canada. From 2023 to 2035, its share of generation would fall from 70% to 21% (output falls from 61,387 to 26,515 GWh), whereas nationally it would decline from 14% to 4% (output plummets from 90,568 to 32,851 GWh). Between 2035 and 2050, the percentage of electricity fueled by natural gas would contract from 21% to 15% (output falls from 26,515 to 25,539 GWh) in Alberta while climbing from

<sup>91</sup> <https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/clean-electricity-regulation.html>

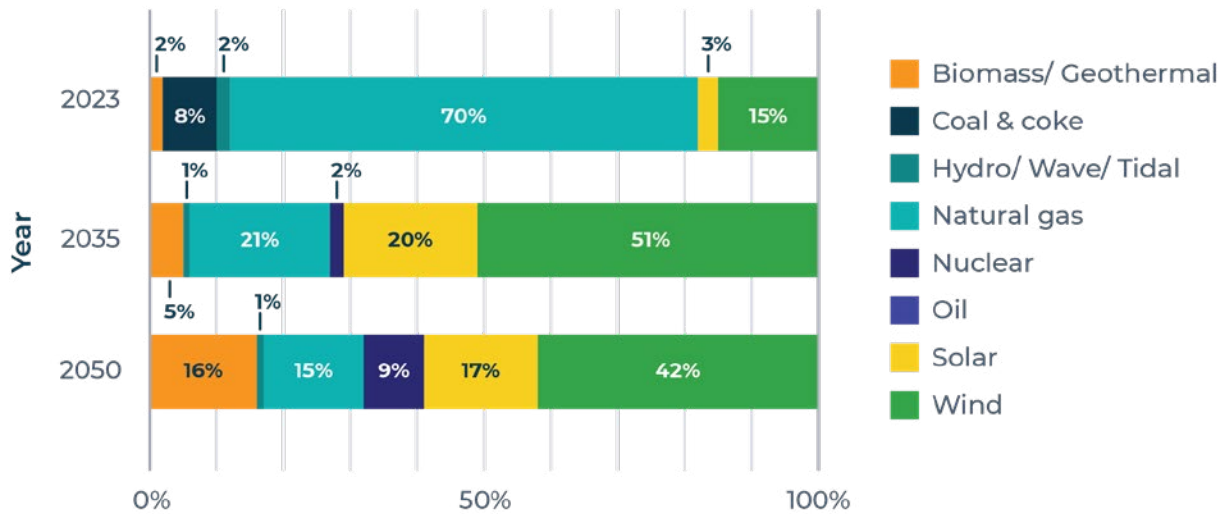
4% to 5% (output expands from 32,851 to 62,772 GWh) in Canada.

As Figure 3 illustrates, the percentage of electricity generated from natural gas in Alberta under

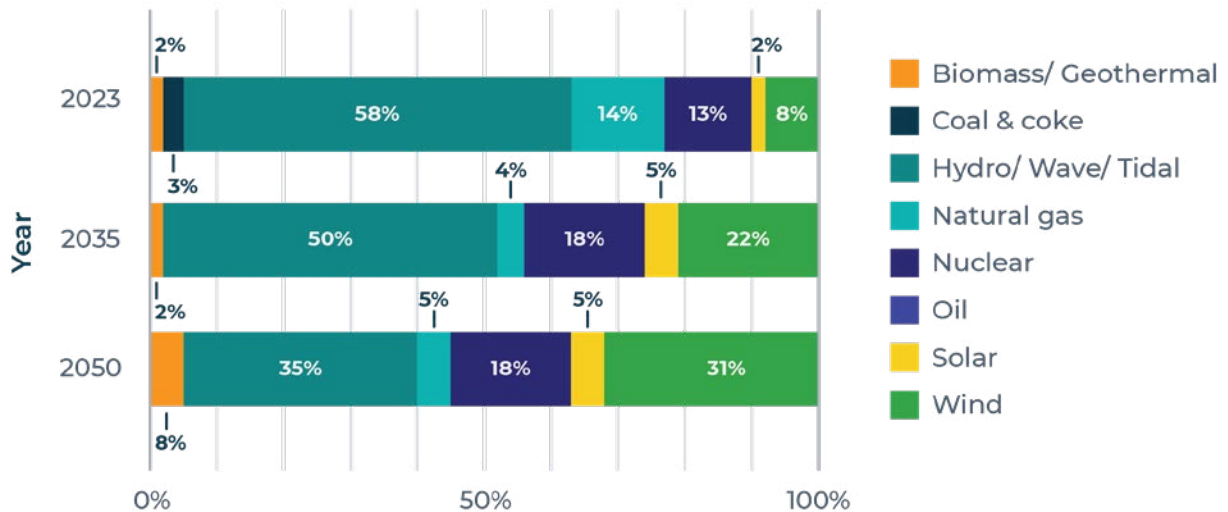
the Net Zero scenario is expected to decline significantly by 2050. However, in absolute terms, starting in 2035, such generation is expected to equal 2008–2009 levels, accompanied by carbon capture technologies.

**Figure 3:**  
**Shares of Electricity Generation (in %) by Fuel Source and Year**  
**(2023, 2035 and 2050) Under Net Zero Scenario—Alberta and Canada**

**Panel A: Alberta**



**Panel B: Canada**



Source: Canada Energy Regulator, Canada's Energy Future Data Appendices.

**Note:** “Net-zero” refers to CER’s “Canada Net Zero” scenario and reflects an energy mix for electricity generation that could enable Canada to achieve a net-zero electricity grid by 2035, and net-zero GHG emissions by 2050.

The Net Zero scenario envisages that wind (42%), solar power (17%) and biomass/geothermal (16%) will be Alberta’s main sources of electricity in 2050. The share of natural gas will decline to 15% in 2050 (Figure 3, panel A). At the national level, hydro’s share will fall by over 20 percentage points by 2050, while wind power will supply slightly more than 30% of Canada’s power in 2050 (Figure 3, panel B). Nationally, natural gas’ share will fall to 5%, while solar power’s contribution will grow modestly.

In addition to significant shifts in the mix of fuels used to generate Alberta’s electricity, the total volume of power produced will rise substantially. The volumes generated from some fuel sources will rise dramatically relative to their current levels (Table 9). From 2023 to 2035, the largest increase in Alberta’s electricity generation will come from solar—which will register 22% AAG. Wind power and biomass/geothermal are expected to exhibit 14% AAG and 12% AAG. Although solar power will register a sizable increase relative to its baseline, its share of output will remain relatively low. From 2035 to 2050, under the Net Zero path, nuclear power (nearly 11% AAG) and biomass/geothermal (nearly 10% AAG) will exhibit the most growth, while minimal changes are expected elsewhere.





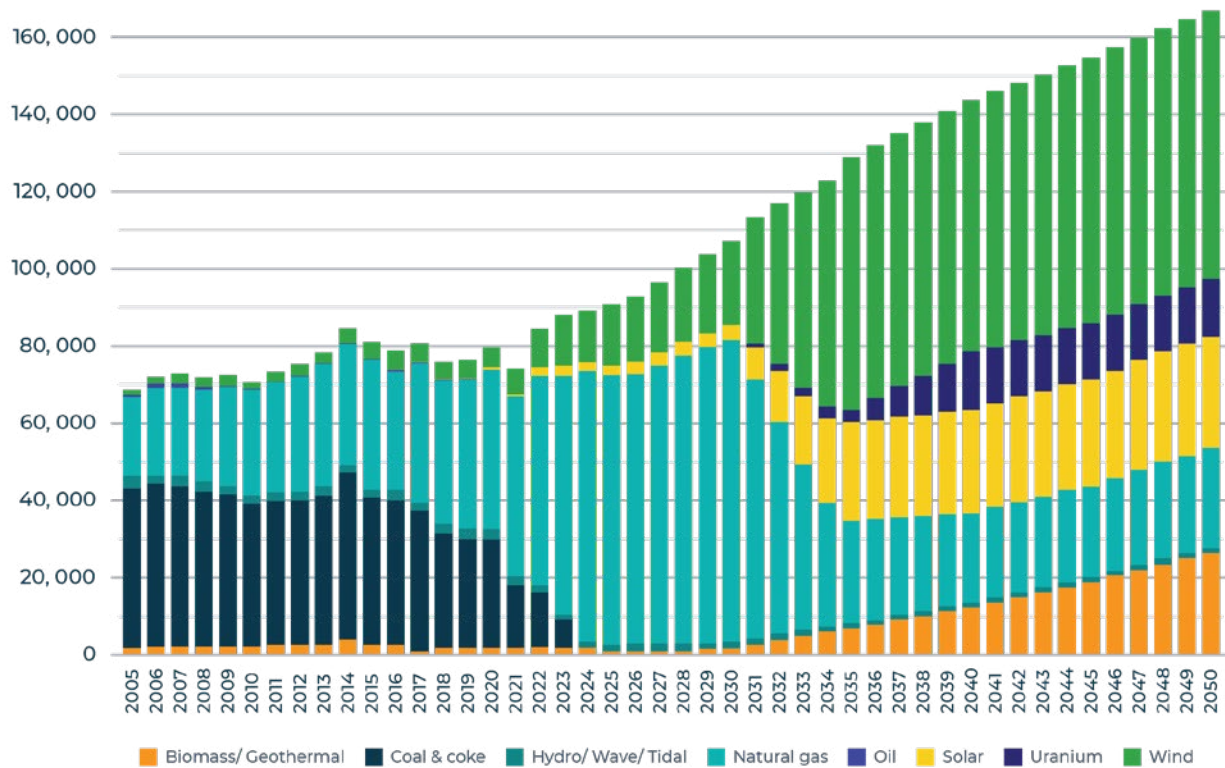
**Table 9: Anticipated Growth in Electricity Generation (in GWh) by Fuel Source Under the Net Zero Scenario, (Compound Annual Growth in %) 2023–35 and 2035–2050**

Energy source	Alberta			Canada		
	2023	2035	2050	2023	2035	2050
Natural gas	61,387	26,515 (-6.8%)	25,539 (-0.2%)	90,568	32,851 (-8.1%)	62,772 (4.4%)
Wind	13,372	65,155 -14.10%	69,446 -0.40%	53,498	207,476 (12.0%)	425,064 (4.9%)
Coal & coke	7,142	- (-100%)	- (N/A)	19,594	-	-
Solar	2,336	25,494 (22.0%)	28,788 (0.8%)	11,060	44,914 (12.4%)	74,699 (3.4%)
Biomass/ geothermal	1,810	6,776 (11.6%)	26,428 (9.5%)	10,224	18,446 (5.0%)	71,889 (9.5%)
Hydro/wave/ tidal	1,651	1,351 (-1.7%)	1,351 (0.0%)	376,053	467,766 (1.8%)	474,316 (0.1%)
Oil	16	- (-100%)	0 (N/A)	1,606	670 (-7.0%)	1,004 (2.7%)
Nuclear	-	3,201 (N/A)	14,813 (10.8%)	82,425	164,478 (5.9%)	249,972 (2.8%)
<b>Total</b>	<b>87,713</b>	<b>128,492 (3.2%)</b>	<b>166,365 (1.7%)</b>	<b>645,028</b>	<b>936,600 (3.2%)</b>	<b>1,359,716 (2.5%)</b>

Source: Canada Energy Regulator, Canada's Energy Future Data Appendices.

**Note:** "N/A" refers to not applicable. Figures in parenthesis for 2035 refer to the average compound annual growth in electricity generation anticipated for that energy source between 2023 and 2035. For those in the 2050 column, they refer to the average compound annual growth anticipated between 2035 and 2050. "Net-zero" refers to CER's "Canada Net Zero" scenario and reflects an energy mix scenario for electricity generation that could enable Canada to achieve a net-zero electricity grid by 2035, and net-zero GHG emissions by 2050.

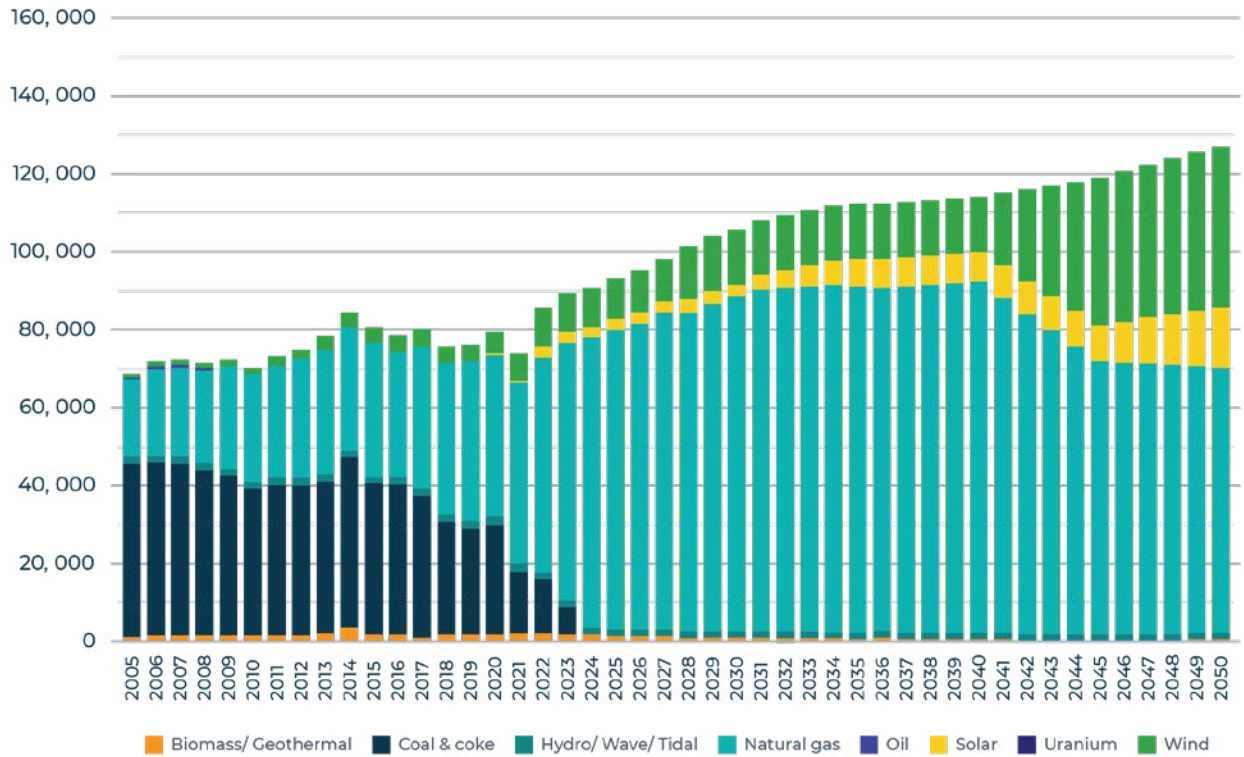
**Figure 4:  
Alberta's Electricity Generation Mix – Canada Net Zero Scenario  
Actual (2005-2021) and Projected (2022-2050)**



Over the 2023 to 2035 period, Canada's growth in electricity generation will come primarily from solar and wind (12% AAG), and nuclear (6% AAG). A similar pattern is expected in Alberta, with nuclear power becoming a new source of electricity on the path to Net-Zero. Under the Current Measures scenario, no nuclear electricity generation is expected, and

natural gas continues to be Alberta's primary source of electricity. During the 2035 to 2050 period, biomass/geothermal (> 9% AAG), and wind (5% AAG) will register the largest increases in Canada's power generation, while in Alberta electricity generated from biomass/geothermal (> 9% AAG) and nuclear (> 10% AAG) will experience the largest growth.

**Figure 5:  
Alberta's Electricity Generation Mix – Current Measures Scenario  
Actual (2005-2021) and Projected (2022-2050)**



Under the Current Measures scenario the total demand for electricity in Alberta in 2050 is 127 GWh, which is substantially less than the corresponding figure (166K GWh) under the Net Zero Scenario. Moreover, from 2023 to 2050, the percentage of the province's electricity that is generated from wind and solar power

will increase from 11% to 33%, and 3% to 12%, respectively. Both proportions increase much less than they do under the Net Zero Scenario. Not surprisingly, under the Current Measures Scenario natural gas remains Alberta's primary fuel source in 2050 (53%), while nuclear power continues to be non-existent. (see Figures 4 & 5).

## AESO's Long Term Outlook

In January 2024 the AESO issued its most recent bi-annual *Long Term Outlook* (LTO), which provides a 20-year forecast of key parameters in Alberta's electricity market, such as electrical capacity, load and generation requirements. The LTO is based on a wide range of factors and considerations impacting the electricity market, such as Federal and Provincial government policy, technological developments, key economic indicators, electrification initiatives and demographic developments.

The 2024 LTO includes forecasts for two different scenarios. The first scenario hypothesizes that Alberta's electricity grid is decarbonized by 2035, while the second one envisages attaining this goal by 2050. Figure 6 illustrates the mix of fuels used to generate electricity in Alberta under the two scenarios, in 2023, 2035

and 2043. It also shows how they differ from the two Canada Energy Regulator (Current Measures, Canada Net Zero) scenarios discussed above. It should be noted that although they envisage greater volumes of electricity being generated from hydrogen production, hydrogen itself is not a source of electricity.

The AESO anticipates that by 2035, nearly 100 TWh (Decarbonization by 2035) and 105 TWh (Decarbonization by 2050) of electricity will be generated in Alberta under the alternative scenarios, respectively. These levels are less than the volume of electricity generated in the province under the Current Measures (112 TWh) and Net-Zero (128 TWh) scenarios. The qualitative gap between them persists until 2043, with the Current Measures scenario (117 TWh) more closely resembling the Decarbonization by 2050 scenario (111 TWh).



**Figure 6:**  
**Shares of Electricity Generation (in %)**  
**by Scenario, Fuel Source, and Year (2023, 2035 and 2043)**

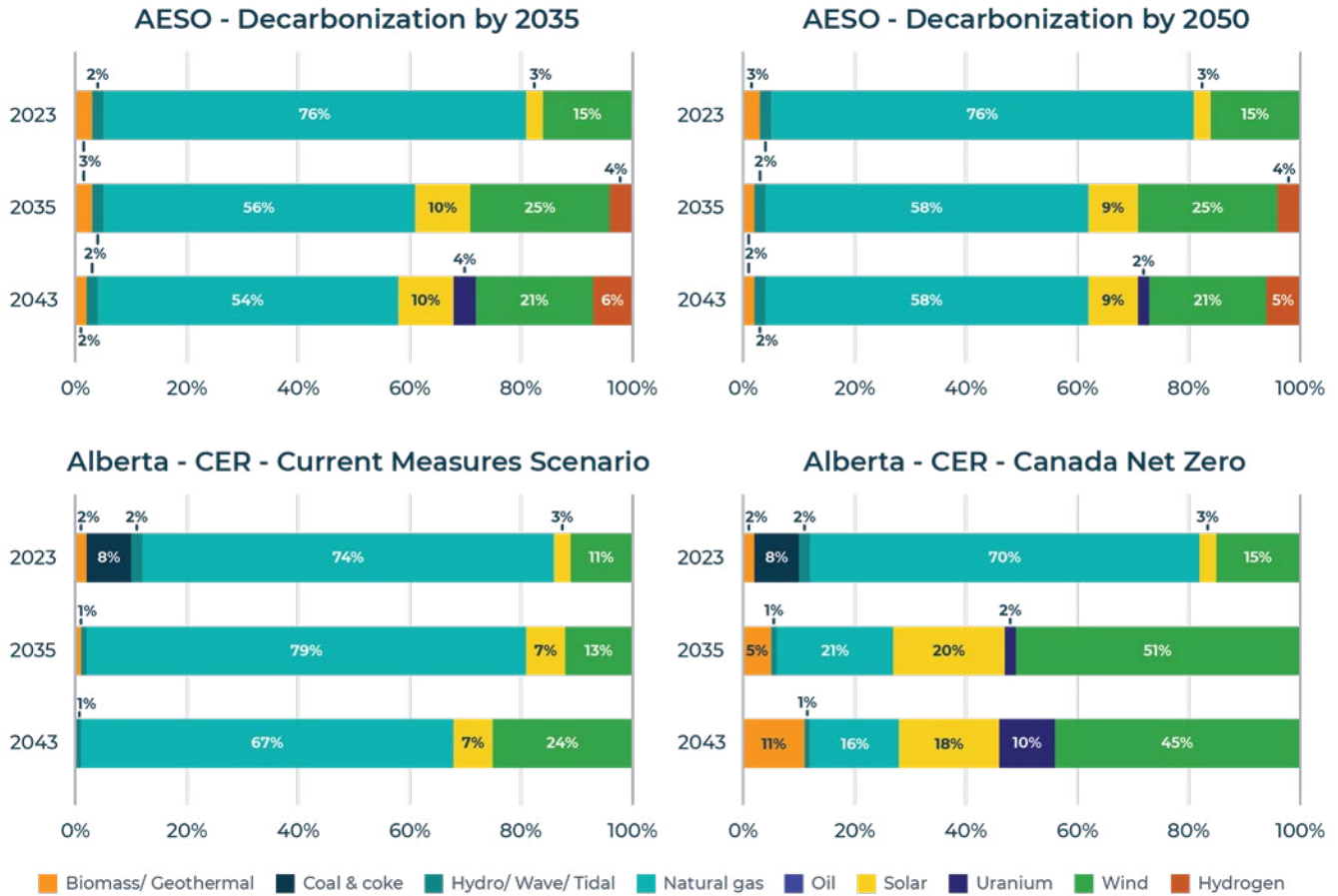


Figure 6 shows that the AESO Decarbonization scenarios (2035 and 2050) envisage that a similar mix of fuels will be used to generate electricity between 2023 and 2043. They both encompass significant increases in the proportion of electricity generated from wind and solar, as well as the introduction of nuclear (SMRs) and hydrogen-generated power. As noted above, under the Canada Net-Zero scenario, Alberta will see significant growth in wind and solar power, but only modest increases in nuclear and geothermal electricity.

Like the Decarbonization by 2050 scenario, the Current Measures scenario anticipates an increase in the share of electricity generated from natural gas, and similar shares of wind and solar in 2043, and therefore could offer a comparable pathway to the AESO’s Decarbonization by 2050 scenario. However, hydrogen and nuclear power do not play a role in both the Current Measures and the Canada Net-Zero scenario.

# Alberta's Labour Market

After COVID-19 “lockdowns” started in 2020, Alberta’s unemployment rate reached 11.3%. The number of economy-wide online job postings in the province declined 17% year-over-year.<sup>92</sup> However, in the past couple of years, Alberta’s labour market has recovered. In 2022, the number of employed Albertans reached 2.38 million. This exceeded 2021’s corresponding figure by 5.2%, while the comparable national rate was 4%. Employment in Alberta increased in all age groups, except males aged 55 years and above.<sup>93</sup> The province’s on-line job postings increased by 70% in 2022.<sup>94</sup>

The number of economy-wide job vacancies in Alberta have significantly declined in the past year and a half. The figure fell from an unprecedented high of 108,000 (5.3%) in April 2022, to 84,000 (3.9%) in July 2023, and 82,250 (4%) in October 2023.<sup>95</sup> In December 2023 the vacancy rate was 3.8% in Alberta,<sup>96</sup> but just 1.8% in its utilities industry.<sup>97</sup> In January 2024, Alberta’s 4% vacancy rate exceeded the corresponding national figure (3.7%) for the first time since 2015.<sup>98</sup>

Alberta’s unemployment rate was 5.7% in Fall 2023, which is in line with the prior year’s rate, but less than pre-COVID levels, which were in the 7% range. In December 2023 Alberta’s (Canada’s) unemployment rate was 6.3% (5.8%).<sup>99</sup> The province’s labour force comprised 2.67 million people, and its participation rate was 69.7%.<sup>100</sup> In the past two years Alberta’s wages rose more rapidly than those of Canada, exceeding the inflation rate.<sup>101</sup>

From January 2023 to December 2023 economy-wide employment in Alberta increased by 74,700, climbing from 2.43 million to 2.5 million. Its growth rate (3.0%) exceeded the corresponding national rate (1.5%).<sup>102</sup> Figure 7 illustrates the change in employment in Alberta in 2023, by industry. The largest employment increases were in the resources industries (17,000), health care and social assistance (16,700), and transportation and warehousing (14,700). Educational services (-5,100) agriculture (-9,200) and professional services (-13,300) recorded the biggest declines. Employment in the utilities sector expanded by 1,400 in 2023.

92 [https://www.oecd-ilibrary.org/sites/659ce346-en/index.html?itemId=/content/publication/659ce346-en&\\_csp\\_=-670913c3ee141459ceaacf4d22856608&itemIGO=oecd&itemContentType=book](https://www.oecd-ilibrary.org/sites/659ce346-en/index.html?itemId=/content/publication/659ce346-en&_csp_=-670913c3ee141459ceaacf4d22856608&itemIGO=oecd&itemContentType=book)

93 <https://open.alberta.ca/dataset/591795c0-ac54-4692-81c4-9f1ee0f1bd27/resource/d2c86861-999f-4703-bd29-570f94d72e3b/download/jend-alberta-labour-market-review-2021-2022-annual-review.pdf>

94 <https://www.oecd-ilibrary.org/sites/659ce346-en/index.html?itemId=/content/publication/659ce346-en>

95 Statistics Canada. Table 14-10-0432-01 Job vacancies, payroll employees, and job vacancy rate by provinces and territories, monthly, adjusted for seasonality.

96 <https://open.alberta.ca/dataset/ba485553-c779-4370-8edf-849184183edd/resource/0186b1b9-02f3-409d-a4de-e262be8d7237/download/tbf-labour-market-notes-2024-01.pdf>

97 <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1410032601&pickMembers%5B0%5D=1.10&cubeTimeFrame.startMonth=07&cubeTimeFrame.startYear=2022&cubeTimeFrame.endMonth=07&cubeTimeFrame.endYear=2023&referencePeriods=20220701%2C20230701>

98 <https://businesscouncilab.com/wp-content/uploads/2024/01/Alberta-Snapshot-WINTER-2024-FINAL.pdf>

99 Statistics Canada. Table 14-10-0287-01 Labour force characteristics, monthly, seasonally adjusted and trend-cycle, last 5 months

100 Statistics Canada. Table 14-10-0017-01 Labour force characteristics by sex and detailed age group, monthly, unadjusted for seasonality (x 1,000)

101 <https://businesscouncilab.com/wp-content/uploads/2023/10/Alberta-Snapshot-Fall-2023-FINAL.pdf>

102 Statistics Canada. Table 14-10-0355-01 Employment by industry, monthly, seasonally adjusted and unadjusted, and trend-cycle, last 5 months (x 1,000)

**Figure 7:**  
**Employment Growth in Alberta (2023) by Industry (K = 1,000)<sup>103</sup>**

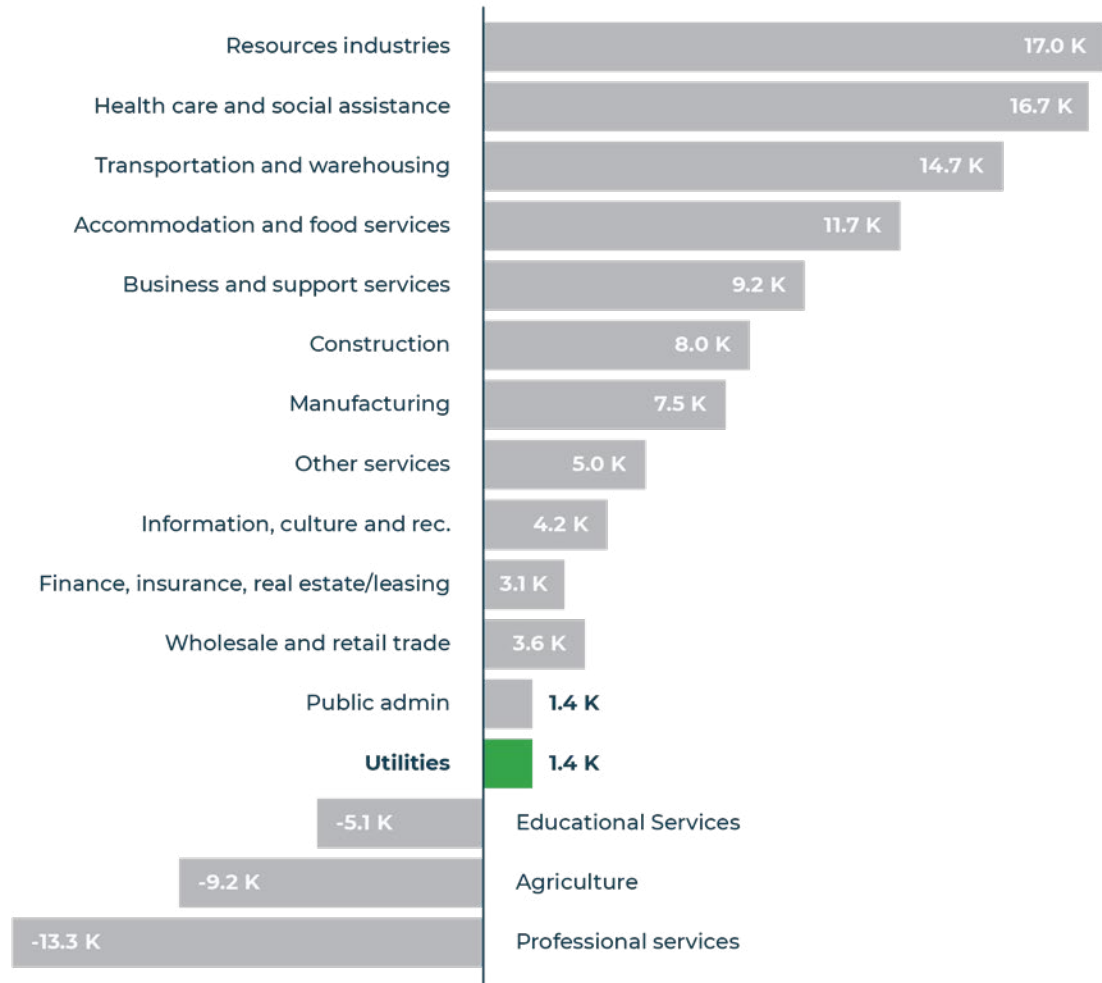


Table 10 indicates that the utilities sector employed 20,800 Albertans in December 2023,<sup>104</sup> or .85% of the province’s workforce. The sector contributed 1.5%, 1.5% and 1.77% to Alberta’s GDP in 2010, 2020 and 2022, respectively.<sup>105</sup>

103 Statistics Canada. Table 14-10-0355-01 Employment by industry, monthly, seasonally adjusted and unadjusted, and trend-cycle, last 5 months (x 1,000)

104 <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1410035501&pickMembers%5B0%5D=1.10&pickMembers%5B1%5D=3.1&pickMembers%5B2%5D=4.1&cubeTimeFrame.startMonth=07&cubeTimeFrame.startYear=2023&cubeTimeFrame.endMonth=11&cubeTimeFrame.endYear=2023&referencePeriods=20230701%2C20231101>

105 <open.alberta.ca/dataset/0045c7cd-ec73-40a8-bff9-d49f6e7e364f/resource/82de0d35-8f22-4dd3-90df-90cd5c3f75e0/download/lbr-alberta-utilities-industry-profile-2020.pdf>

**Table 10:**  
**Utilities Sector Employment Canada and Alberta<sup>106</sup> (in 000s)**

	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23
<b>Utilities Employment in Canada</b>	155.5	153.7	151.9	153.7	156
<b>Utilities Employment in Alberta</b>	18.3	18.1	19.5	21.3	20.8

Every two years the Government of Alberta’s Ministry of Jobs, Economy and Trade produces an “Occupational Outlook” for the province. The most recent Outlook, which covers the period from 2021 to 2030, forecasts substantial economy-wide labour market imbalances. It projects that the number of job openings (1,206,600) will exceed the number of job seekers (1,160,800) during the period, creating a cumulative shortage of 43,700 workers by 2029. The Outlook postulates that in 2029, 37% of the 115,200 total net job openings (or 42,700) will occur due to expansion demand (i.e.: sector growth) while 63% (or 72,500) will result from worker retirements. The 2021-2030 Occupational Outlook portends much more severe labour shortages than the prior Outlook (2019 to 2028), which anticipated a cumulative shortage of just 500 workers.

The main reasons cited for the labour shortages anticipated in the 2021 to 2030 period

include: the reinvigorated post-COVID economy; resurgent strength of Alberta’s energy sector and the presumed decline in the number of job seekers, following a period of reduced labour market participation. The forecast assumes that Alberta’s population will rise from 4.5 to 5.1 million from 2021 to 2030—which implies an average annual growth (AAG) rate of 1.5%. It anticipates that the fastest growing cohorts, those aged 65 years and older, and 45-54 years, will incur 4.2% and 2.5% annual growth, respectively, during the period.<sup>107</sup> It’s anticipated that by 2030, Alberta’s labour market will no longer include any baby boomers.<sup>108</sup>

The main cause of the expected labour shortage is the impending retirement of large numbers of baby-boomers (those born from 1946 to 1964), which comprised 19% of Alberta’s workforce in 2020. The proportions of job openings expected to occur due to retirements are as follows: 15% in 2021, 22% in 2025, and 17% in 2030.

106 <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1410035501&pickMembers%5B0%5D=1.10&pickMembers%5B1%5D=3.1&pickMembers%5B2%5D=4.1&cubeTimeFrame.startMonth=08&cubeTimeFrame.startYear=2023&cubeTimeFrame.endMonth=12&cubeTimeFrame.endYear=2023&referencePeriods=20230801%2C20231201>

107 <https://open.alberta.ca/dataset/d7eb8e16-179d-4dba-a89b-f254ba09d90c/resource/829f6970-7448-44a4-b191-0dc4c59c1bfc/download/jend-albertas-supply-outlook-model-2021-2030-indigenous-visible-minorities-people-with-disabilit.pdf>

108 <https://open.alberta.ca/dataset/8987e228-9ffa-4a2e-9f79-a9b869df2ccb/resource/8331ba6e-d402-49e9-9f5e-52dfd0906da8/download/jet-albertas-occupational-outlook-2021-2030-revised.pdf>



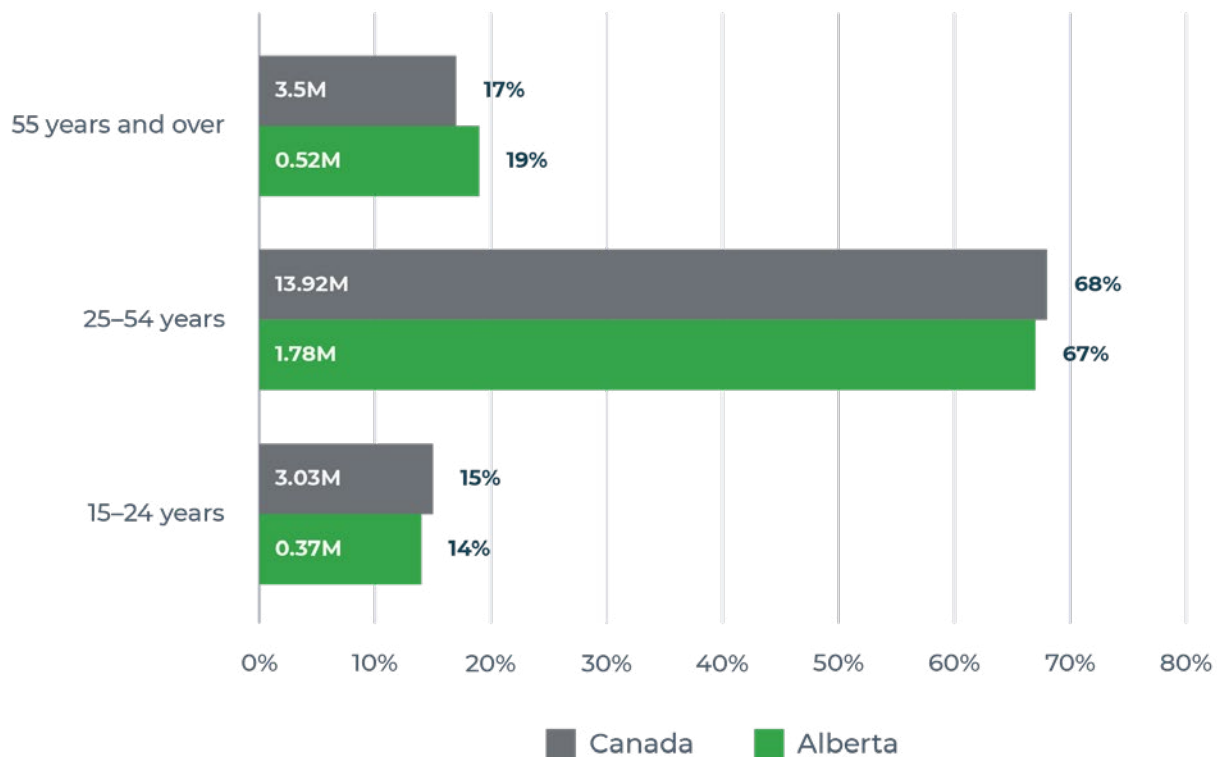
The 2021-2030 Occupational Outlook anticipates more job openings than job seekers in many occupations that are integral to Alberta's electricity sector. They include, but are not limited to, the following:

- Civil engineering technologists and technicians
- Electrical and electronics engineering technologists and technicians
- Electrical mechanics
- Industrial electricians
- Industrial engineering and manufacturing technologists and technicians
- Industrial instrument technicians and mechanics
- Mechanical engineering technologists and technicians
- Power engineers and power systems operators
- Power system electricians
- Welders and related machine operators

## Portrait of the Workforce – Canada and Alberta

As Figure 8 illustrates, as of December 2023 slightly more than two-thirds (68%) of Alberta's economy-wide labour force were between 25 and 54 years of age, while 17% were 55 years of age or over. The remaining 15% were between 15 and 24 years of age.

**Figure 8: Labour Force in 1,000,000s (Seasonally Adjusted) by Age Category (December 2023) Alberta and Canada**



In 2023, Alberta’s labour force participation rate for those between 25 and 54 years of age was 93.5%. The rate for those between 15 and 24 years of age was 63.5%, whereas it was 36.1% for those over 55 years of age.<sup>109</sup>

In 2022, 110,667 people were employed in the generation, transmission and/or distribution (NAIC 2211) of electricity in Canada.<sup>110</sup> Alberta had the third largest share (12.1%) of

such employment, behind Ontario (40.6%) and Quebec (22.5%). It is interesting to note that, between 2018 and 2022, an additional 5,095 to 6,905 Albertans were employed in the electric power engineering construction industry.

From 2017 to 2022 electricity sector employment expanded more in Alberta (2.6%) than Canada as a whole (2.3%), on an average annual basis.

**Table 11:**  
**Employment in Canada’s Electricity Sector (Generation, Transmission & Distribution) by Province, Annual (1,000s) 2022**

Province	2022	Share of 2022 Employment
Alberta	13,354	12.1%
British Columbia	9,979	9.0%
Manitoba	4,798	4.3%
New Brunswick	3,302	3.0%
Newfoundland & Labrador	2,709	2.4%
Nova Scotia	2,416	2.2%
Ontario	44,958	40.6%
Prince Edward Island	260	0.2%
Quebec	24,938	22.5%
Saskatchewan	3,662	3.3%
Yukon	140	0.1%
Nunavut	150	0.1%
<b>Canada</b>	<b>110,667</b>	

Source: Statistics Canada, Labour Force Survey, 2022.

109 <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1410032701&pickMembers%5B0%5D=1.10&pickMembers%5B1%5D=2.9&cubeTimeFrame.startYear=2019&cubeTimeFrame.endYear=2023&referencePeriods=20190101%2C20230101>

110 NAIC is an acronym that represents the North American Industry Classification System

**Table 12:  
Establishments by Employment Type and Province/Territory (2022) in  
Electric Power Generation, Transmission and Distribution (NAIC 2211)<sup>111</sup>**

Province/ Territory	Employers	Share	Non-employers/ Indeterminate <sup>112</sup>	Share
Alberta	159	22%	194	6.8%
British Columbia	59	8%	186	6.4%
Manitoba	23	3%	14	.58%
New Brunswick	30	4%	27	.93%
Newfoundland & Labrador	23	3%	13	.45%
Northwest Territories	4	.55%	3	.10%
Nova Scotia	28	3.9%	59	2%
Nunavut	4	.55%	0	0%
Ontario	298	41.2%	2,199	75.9%
Prince Edward Island	7	.97%	6	.21%
Quebec	68	9.4%	172	5.9%
Saskatchewan	19	2.6%	22	.76%
Yukon	2	.28%	3	.10%
<b>Canada</b>	<b>724</b>	<b>100%</b>	<b>2,898</b>	<b>100%</b>

Table 12 indicates the number of employers (incorporated and unincorporated) in Canada’s “electric generation, transmission and distribution” industry, by province in 2022. The data can be used to infer the competitiveness of

each provincial or territorial electricity market. It shows that Alberta had the second-highest percentage (22%) of Canada’s 724 employers, next to Ontario (41.2%). Quebec (9.4%) and British Columbia (8%) had smaller shares.

<sup>111</sup> <https://ised-isde.canada.ca/app/ixb/cis/businesses-entreprises/2211>

<sup>112</sup> The establishments in the “indeterminate” category do not maintain an employee payroll but may have a workforce which consists of contracted workers, family members or business owners. They also include employers who did not have employees in the last 12 months.

Table 13 indicates the number of employer establishments by employee size, in the electricity sector by province and territory, in 2022.<sup>113</sup> In Alberta (Canada), 26% (34.2%) of establishments had less than five employees, whereas

61% (50%) had between 5 and 99 employees. Medium-sized establishments (i.e.: those with 100 to 499 employees) comprised 10% (11.6%) of the total, whereas those with more than 500 employees represented 3% (4%).

**Table 13:**  
**Electric Power Generation, Transmission and Distribution Employer Establishments by Employment Size Category and Province/Territory (2022)<sup>114</sup>**

Province/Territory	Micro (1-4)	Small (5-99)	Medium (100-499)	Large (500+)
Alberta	41	97	16	5
British Columbia	28	21	6	4
Manitoba	4	11	3	5
New Brunswick	4	22	3	1
Newfoundland & Labrador	2	12	8	1
Northwest Territories	0	4	0	0
Nova Scotia	10	15	2	1
Nunavut	0	4	0	0
Ontario	127	131	33	7
Prince Edward Island	2	4	1	0
Quebec	27	31	6	4
Saskatchewan	3	10	5	1
Yukon	0	1	1	0
<b>Canada</b>	<b>248</b>	<b>363</b>	<b>84</b>	<b>29</b>
<b>Percent Distribution</b>	<b>34.2</b>	<b>50.1</b>	<b>11.6</b>	<b>4</b>

113 An “establishment” is a single physical location where business is conducted and/or services provided. A company or organization can have several establishments.

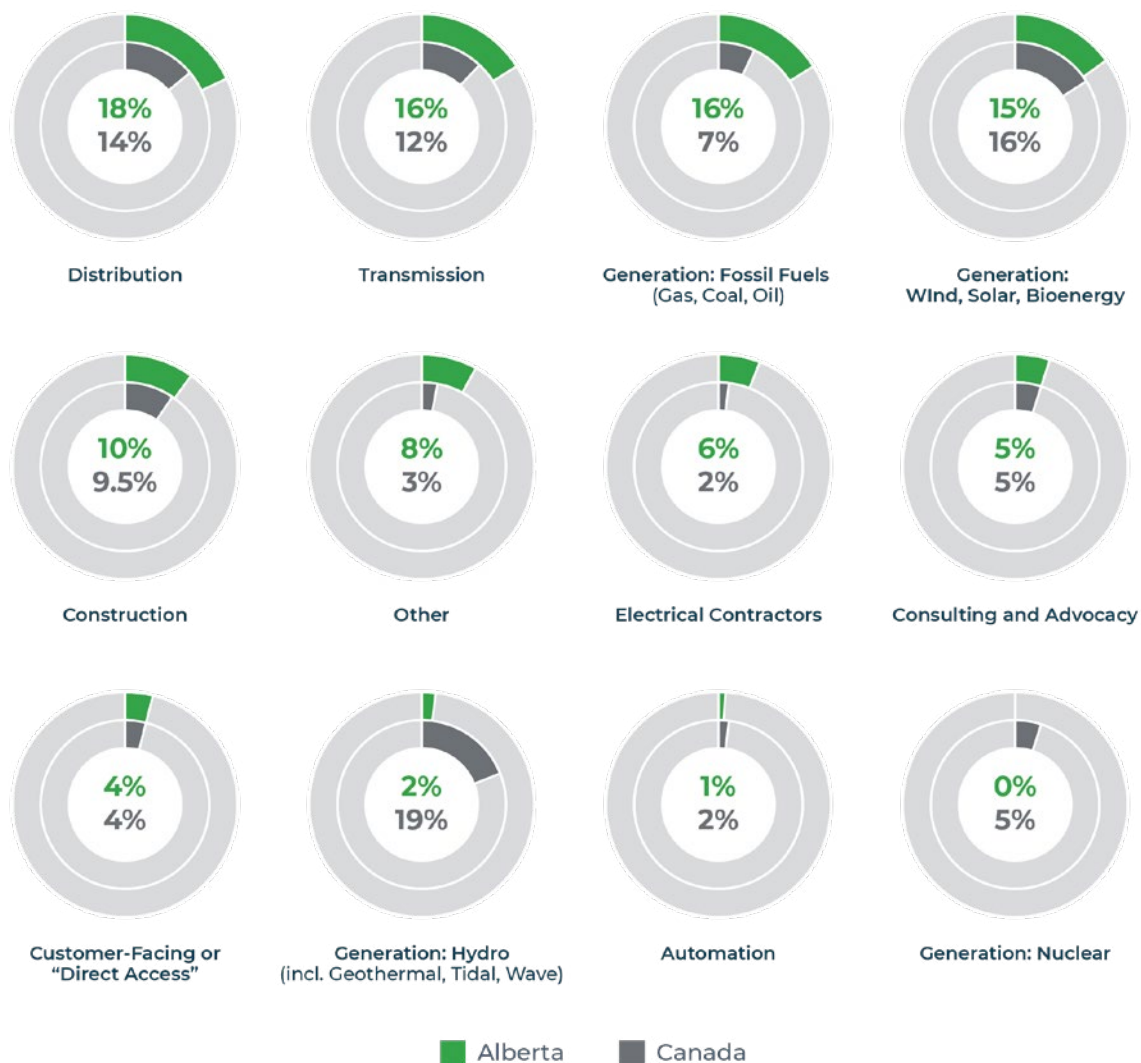
114 <https://ised-isde.canada.ca/app/ixb/cis/businesses-entreprises/2211>

Figure 9 illustrates the various lines of business that organizations in Alberta’s electricity sector are involved in (based on EHRC’s 2023 Employer Survey). It shows that 33% and 18% of the firms generate and distribute electricity, respectively, while about one-sixth (16%) transmit it.

The distribution of employment by the type of fuel source used to generate electricity differs significantly between Alberta and Canada.

In Alberta, electricity generated from fossil fuels accounts for 16% of sectoral employment. Hydroelectric generation represents 2% of such employment in Alberta, whereas the corresponding figure for Canada is 19%. Nuclear generation reflects 5% of such employment at the national level, but 0% in Alberta. In contrast, the share of employment that corresponds to renewable generation is relatively constant across Alberta and Canada (15%-16%).

**Figure 9:**  
**Estimated Employment Share in Alberta’s Electricity Sector by Business Line**



Source: EHRC Survey of Alberta Electricity Employers 2023

# Profile of the Workforce

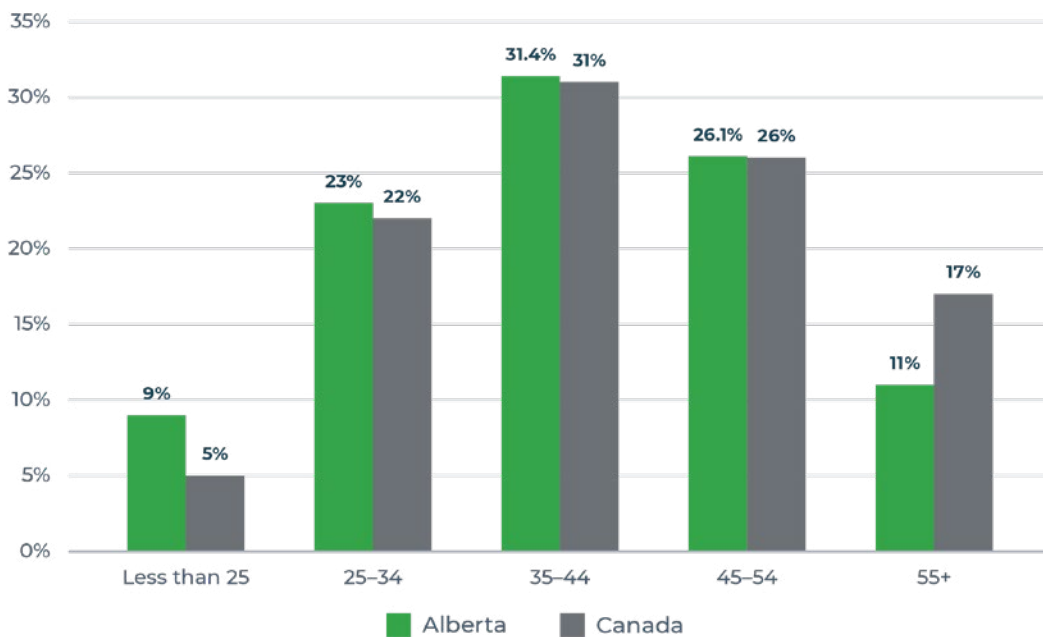
A significant proportion of Alberta’s traditional (i.e.: fossil fuel) electricity workforce is unionized. The unions include, but are not limited to, the International Brotherhood of Electrical Workers (IBEW), the Alberta Union of Provincial Employees and the Canadian Union of Public Employees (CUPE). Their members perform many of the jobs that have historically been integral to the sector. They include electricians, control centre operators, power line technicians, linemen, groundmen, equipment operators, boiler operators, welders, control room operators, and dispatchers. Unions fund and provide the space and equipment required to teach many of the trades. It is important to acknowledge the Electrical Contractors Association of Alberta. It is not a union, but

rather a self-governing body that promotes its members’ education, safety, and stakeholder engagement.

## Age Distribution

The age distribution of employees in Alberta’s electricity industry is like that of other industries in the province. However there are differences in age distribution between Alberta’s and Canada’s electricity workforce. As Figure 10 illustrates, Alberta has a higher percentage of workers (9%) under 25 years of age than Canada (5%). Moreover, 11% of Alberta’s workers are above 54 years of age, whereas the corresponding national figure is 17%.

**Figure 10:**  
**Age Distribution of Electricity Sector Workforce (%) in Alberta and Canada, 2022**

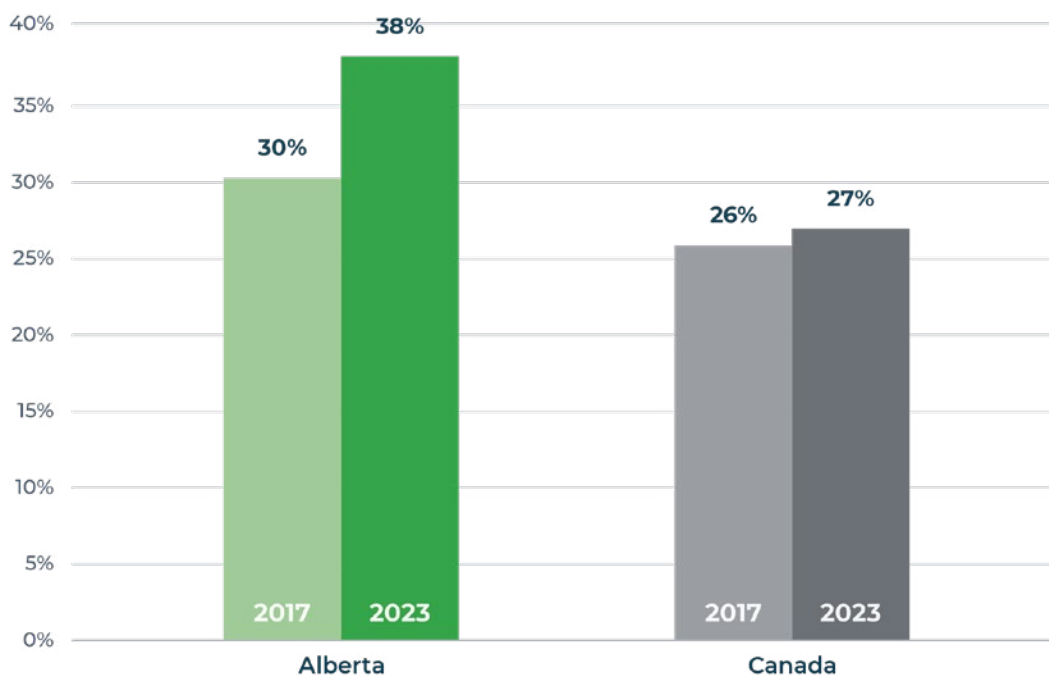


Source: Statistics Canada, Labour Force Survey, 2022.

# Diversity, Equity, and Inclusion

Within the electricity sector, Alberta has a greater percentage of female employees than Canada (38% vs. 27%). As Figure 11 illustrates, since 2017, female participation in Alberta’s workforce has increased more than that of Canada. However, it remains below Canada’s economy-wide female participation rate, which is 48%.

**Figure 11:**  
**Percentage of Electricity Sector Workforce that is Female in Alberta and Canada**



Source: Statistics Canada, Labour Force Survey, 2022.

Most organizations in Alberta’s electricity sector view diversity, equity, and inclusion (DEI) as a business priority. Removing systemic barriers that prevent diverse employees (e.g.: women, visible minorities, Indigenous peoples, persons with disabilities) from having meaningful and prosperous careers benefits them as well as the organizations that employ them.<sup>115</sup> An inclusive workforce drives performance, creativity, innovation, and value, and leads to higher employee retention rates.

EHRC’s 2023 employer survey, which reflects the views of approximately 50 representatives of Alberta companies, shows that 43% of respondents utilize formal measures to increase their workforces’ gender and minority representation. This represents a significant increase relative to the corresponding figure (20%) from five years ago. Women and Indigenous Peoples are the primary focus of Alberta’s DEI efforts. According to the survey, about 5% of Alberta’s electricity workers are Indigenous,

<sup>115</sup> Disabilities refers to a physical, mental, sensory, intellectual or learning impairment which, in interaction with various barriers, may hinder labour market participation.

which is on par with their national representation, and slightly below their representation in Alberta<sup>116</sup> (6.5%).

To increase the representation of females, Indigenous peoples and other historically underrepresented groups in the workforce, employers in Alberta’s electricity sector use

a range of recruitment methods. Table 14 outlines the percentage of respondents to EHRC’s survey who responded affirmatively when asked if they used a specific method to increase workforce DEI. The province’s efforts in this regard are more pervasive than those of Canada. Nevertheless, more concerted efforts are required.

**Table 14:**  
**Initiatives to Increase the Inclusion of Under-Represented Groups in Alberta’s Electricity Sector Workforce (% of Organizations)<sup>117</sup>**

	Explicit recruitment efforts	Hiring or wage subsidies	Partnerships with organization
Women	90%	30%	70%
Indigenous peoples	80%	30%	70%
Racialized groups	60%	30%	20%
Persons with disabilities	50%	20%	40%
Gender diverse people	40%	30%	20%
Internationally trained workers*	20%	0%	0%
Serving, transitioning and former military members	10%	10%	10%

Source: EHRC Survey of Alberta Electricity Employers 2023

Within the electricity sector, the percentage of organizations making an effort to employ internationally educated workers is 7% in Alberta and 19% at the national level.

The percentage of employees in Alberta’s electricity sector who identify as racialized (25%)

slightly exceeds the corresponding national figure (22%). The percentage of electricity sector workers who identify as Persons with Disabilities is approximately 4% in Alberta and 1% in Canada, respectively. This discrepancy may reflect underreporting and differences in definitions

116 <https://www.sac-isc.gc.ca/eng/1647614714525/1647614742912>

117 The color gradient ranging from deep green to light green represents the range of high to low shares of organizations indicating the implementation of abovementioned initiatives.



across jurisdictions. Gender-diverse individuals comprise roughly 2% and 3% of the sector's workforce in Alberta and Canada, respectively.

Within the electricity sector, occupational segregation appears to be more common in Canada than Alberta. More than one-half (55%) of women employed in the province's electricity sector work in corporate positions, whereas the corresponding national figure is 60%. Nearly one-half (46%) and 68% of Indigenous People in Alberta and Canada, respectively, work in the trades. In Alberta 41% of internationally educated workers are employed as engineers, whereas the percentage at the national level is 61%.

The results of EHRC's survey indicate that, although Alberta's electricity sector workforce has become more diverse and inclusive during the past five years, more concerted efforts are required to reduce occupational segregation and increase the participation of internationally trained workers.

## Recruitment, Attraction, Retention

Organizations seek employees who have a certain combination of education, skills and work experience. Some employers report that they are unable to find workers with the required credentials and sector-specific knowledge. Others complain that some potential employees lack skills, such as writing, oral communications and the ability to interact well with colleagues. Many employers refer to their inability to find "work-ready" employees. According to the Organisation for Economic Co-operation and Development (OECD), "Skill shortages arise when employers are unable

to recruit staff with the required skills in the accessible labour market and at the going rate of pay and working conditions due to a lack of an adequately qualified workforce."

There is evidently a shortage of people with the competencies and skills required to fill many of Canada's emerging jobs. According to the Survey of Employers on Workers' Skills 2021, more than half (56.1%) of Canadian businesses reported employing personnel who were not fully proficient to perform their job at the required level, while more than two-fifths (44.5%) of businesses experienced difficulties finding candidates who possess the skills needed to do the job at the required level. A smaller percentage of businesses in Alberta (37.7%) reported facing such difficulties.<sup>118</sup> According to the above-noted survey carried out by the Alberta Chambers of Commerce, less than 50% of the organizations in Alberta that hired staff the previous year would rate the technical skills and competencies of those hired directly from colleges/polytechnics (49%) or high school (20%) as excellent/good. Employers in small and rural communities often have a more difficult time attracting and retaining sufficiently trained talent.

Employers in Alberta's electricity sector utilize many methods to attract, recruit and retain qualified personnel. They include job fairs, social media outreach, leveraging positive aspects of an organization's reputation and publicizing its efforts to support employees' continuing education and career growth. In past years it was easier for Alberta's employers to recruit workers, due to the relatively stable employment and above average remuneration that the sector provides. According to Alberta Career and Employment (2021), the average

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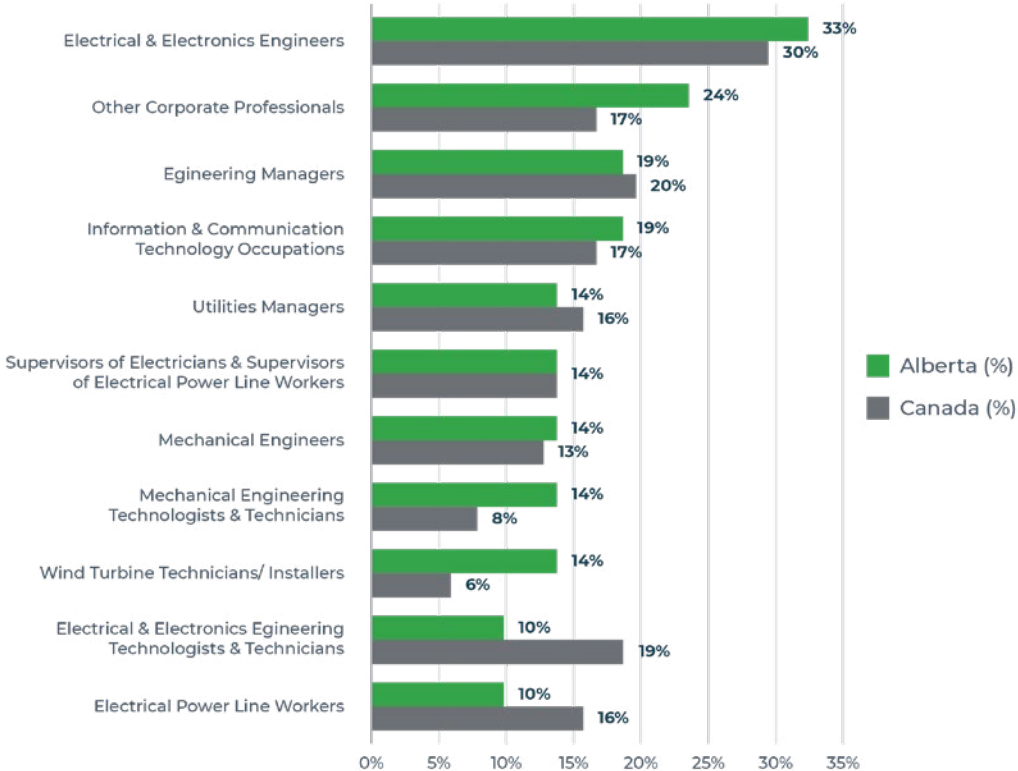
118 <https://www150.statcan.gc.ca/n1/daily-quotidien/221003/dq221003d-eng.htm>

starting annual salary for an electrician in the province is \$77,000.<sup>119</sup> However, competition for workers has intensified in recent years. Oil and gas companies, construction firms and organizations in other sectors of the economy increasingly compete for employees with similar skills. Employers realize that their attraction, recruitment, retention, and succession efforts must be continuously refined, since potential and current employees are constantly exposed to alternative career opportunities. Many of them are aggressively pursued by firms within and beyond the electricity sector. Even the most satisfied employees eventually

retire, and employers often need to invest considerable time, effort and resources to replace them.

The following figure indicates the percentage of employers (based on EHRC’s 2023 survey) in Canada and Alberta who have experienced difficulties attracting and/or recruiting personnel, by occupation. In Alberta, the four occupations for which it is most difficult to recruit staff are electrical and electronics engineers (33%); other corporate professionals (24%); engineering managers (19%) and information and communications technology occupations (19%).

**Figure 12:**  
**Percentage of Electricity Sector Employers in Canada and Alberta Experiencing Difficulties Attracting and/or Recruiting Job Candidates, by Occupation, 2023<sup>120</sup>**



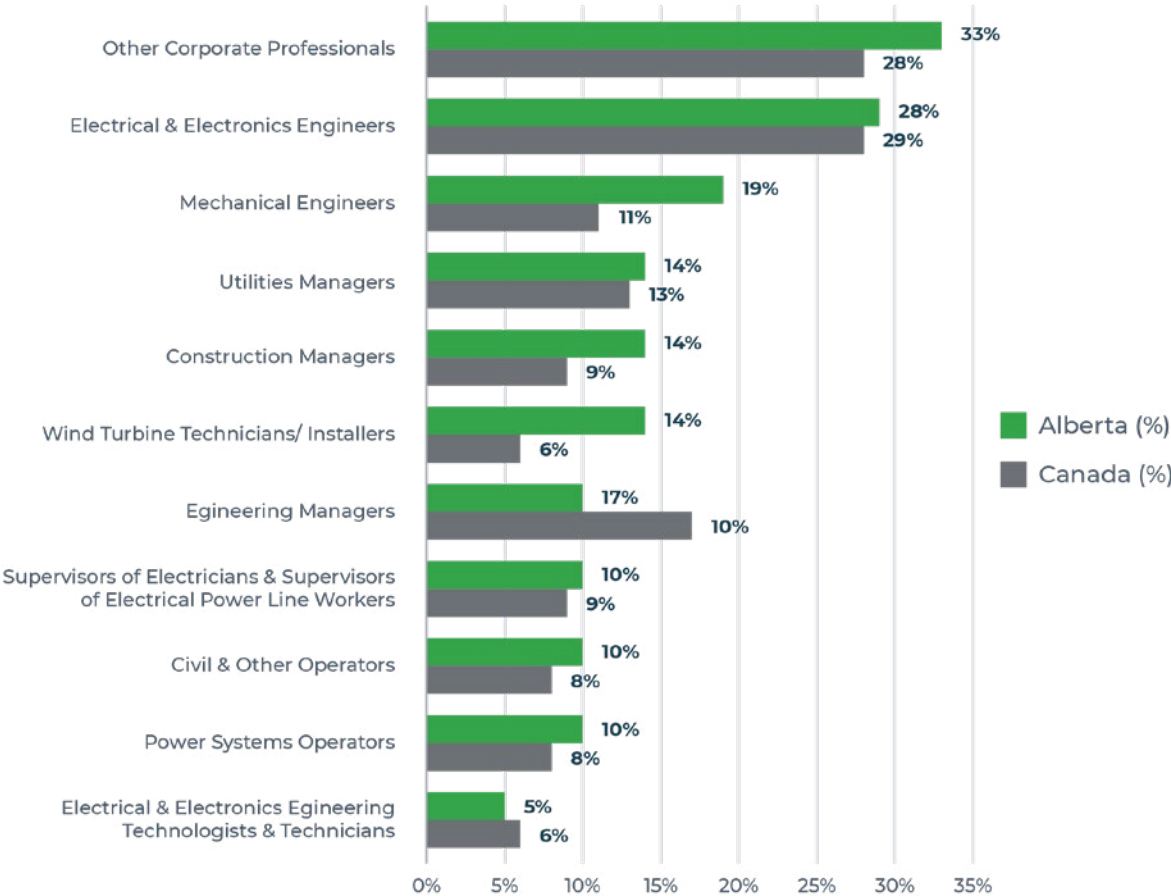
Source: EHRC 2023 Employer Survey

119 “Group helps Indigenous clients ‘fill the gap in construction trades; Trade Winds to Success program places ‘job ready’ trainees with employers”, Jan 20, 2024, Postmedia Network Inc.  
 120 EHRC 2023 Employer Survey

Respondents to EHRC’s employer survey expect that the most challenging occupations to recruit for, in the next five years, will be Engineers and Renewable Energy occupations. It’s anticipated that recruiting employees for ICT occupations will be moderately to highly challenging, while doing so for Other Corporate Professionals will be somewhat easier. When respondents were asked about their expectations regarding retention, a similar picture emerged.

Figure 13 indicates the percentage of respondents (to EHRC’s survey) in Canada and Alberta who have had difficulties retaining employees, by occupation. In Alberta the three occupations for which it is most difficult to retain personnel are other corporate professionals (33%); electrical and electronics engineers (28%); and mechanical engineers (19%).

**Figure 13:**  
**Percentage of Electricity Sector Employers in Canada and Alberta**  
**Experiencing Difficulties Retaining Employees, by Occupation, 2023<sup>121</sup>**



Source: EHRC 2023 Employer Survey

121 EHRC 2023 Employer Survey

Employers in Alberta’s electricity sector encounter difficulties attracting, recruiting, and retaining employees in the same occupations that are problematic at the national level. The main factors cited in EHRC’s survey, by

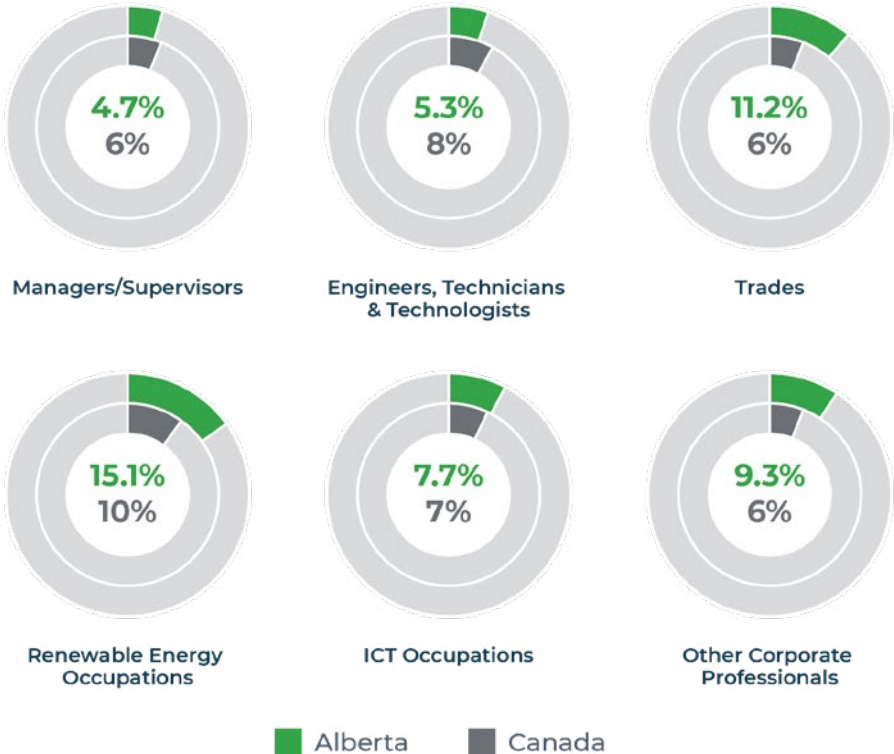
percentage of Alberta respondents, were: competition for talent (32%); inadequate wages (19%); unsuitable job location (14%); and applicants lack the right mix of skills (13%).

## Employee Turnover

Within the electricity sector employee turnover rates are somewhat higher in Alberta than Canada. The discrepancy is most apparent in the renewable energy space, as well as corporate professions and trades, where the annual turnover rates in Alberta (Canada) are 15.1% (10%) and 9.3% (6%) and 11.2% (6%), respectively.

Turnover is generally greater among younger electricity sector workers, partly because of the higher expected number of years remaining in their career (relative to older age groups). This is consistent with the corresponding situation at the economy-wide level.

**Figure 14:**  
**Employee Turnover Rates of Electricity Sector Employers in Canada and Alberta, by Occupation July 2023<sup>122</sup>**

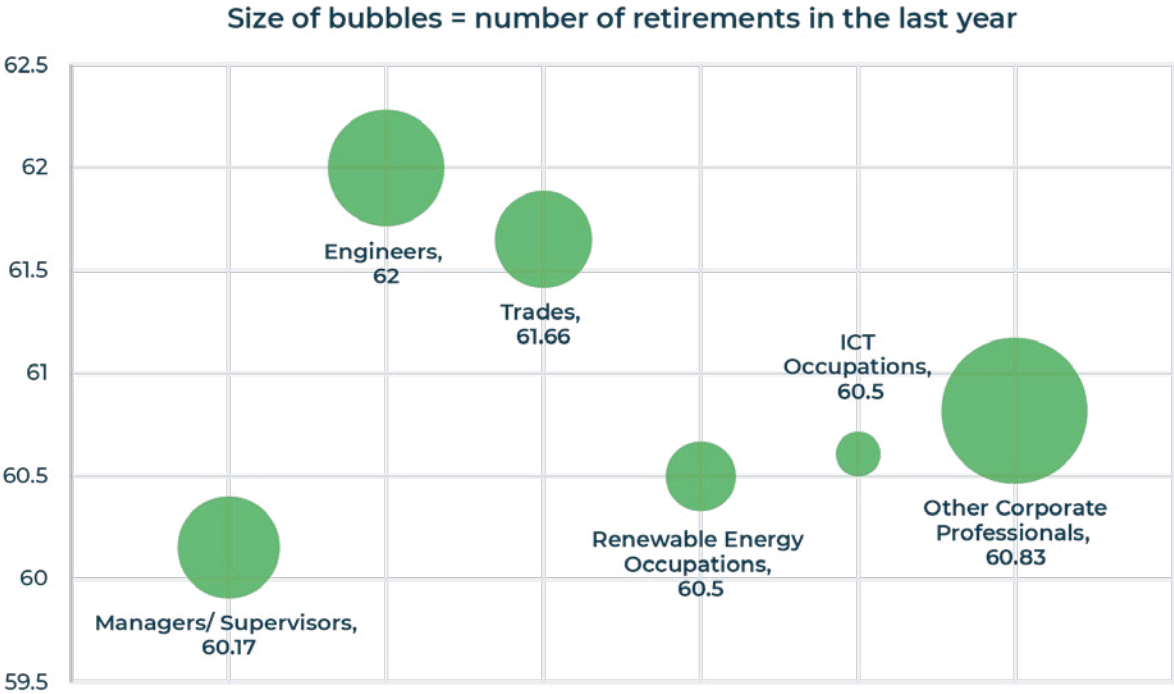


Source: EHRC 2023 Employer Survey

122 EHRC 2023 Employer Survey

The average length of a career for Engineers and Tradespeople in Alberta’s electricity sector—is two years longer than that of Canada. Employees typically retire between the ages of 60 and 62.

**Figure 15:  
Average Retirement Age of Employees in Alberta’s Electricity Sector**



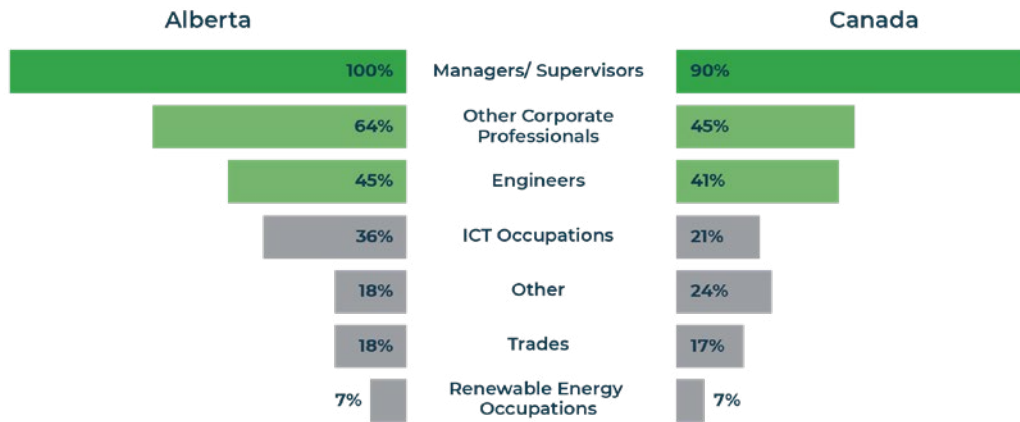
Source: EHRC Survey of Alberta Electricity Employers 2023

In 2020 baby-boomers comprised 19% of Alberta’s workforce.<sup>123</sup> Consequently, employers in the electricity sector consider succession planning a particularly important aspect of human resources management. It is critical for the competitiveness and long-term success of many businesses. Figure 16 indicates the percentage of employers in the sector—in Alberta and Canada—that have succession

plans, by occupation. Virtually all organizations in Alberta and 90% in Canada, have them for managerial and supervisory positions. About two-thirds of the province’s employers have them for “other corporate professionals”. The corresponding ratio for Alberta’s engineers is 45%. The percentage of employers that have succession plans for ICT positions is 36% in Alberta and 21% in Canada.

123 <https://open.alberta.ca/dataset/8987e228-9ffa-4a2e-9f79-a9b869df2ccb/resource/8331ba6e-d402-49e9-9f5e-52dfd0906da8/download/jet-albertas-occupational-outlook-2021-2030-revised.pdf>

**Figure 16:**  
**Percentage of Electricity Sector Employers With Succession Plans by Occupational Group—Alberta and Canada<sup>124</sup>**



Source: EHRC 2023 Employer Survey

## Outsourcing

*Approximately 17% of the 50 Alberta-based respondents who participated in EHRC’s 2023 survey provide services exclusively within the province. More than one-half serve other provinces, whereas 30% operate internationally.*

Among the Alberta-based electricity generators who responded to the survey, 30% and 27% provide solar power and wind power, respectively. A further 19% produce electricity using natural gas, coal and/or oil. EHRC’s survey revealed that 11% of Alberta’s respondents provide contracting services, while more than 15% provide engineering consulting services. More than 10% offer other types of consulting or advocacy services.

## Use of Consultants and Contractors

In the past few decades, interactions between many organizations and their workers have evolved from being relationship-based to transaction-based. Many people have opted to work part-time, rather than full-time, or to work on a contract or freelance basis. Therefore, it is not surprising that a significant percentage of organizations in Canada’s electricity sector utilize the services of consultants and/or contractors. More than one-third (35%) of those surveyed by EHRC reported that the

124 EHRC 2023 Employer Survey

temporary nature of their projects necessitates outsourcing. At the national level, 11% of respondents cited “challenges recruiting staff” as the main reason for outsourcing.

Approximately one quarter (26%) of the respondents from Alberta indicated that they utilize the services of contractors. The most frequent reasons cited were “operational reasons” (22% across occupational groups), and for budgeting, planning, and design purposes

(21%). Many respondents disclosed that they required the services of Tradespeople and Engineers (27% sought services from both occupational groups)—and Corporate Professionals (24%). These results differ significantly from those of EHRC’s prior (2018) survey of Alberta employers, which revealed that contract workers were frequently hired to provide ICT services, as well as facilities, maintenance and construction services.

**Table 15:  
Use of Contractors by Alberta-based Electricity Sector Organizations  
by Functional Area and Occupational Group**

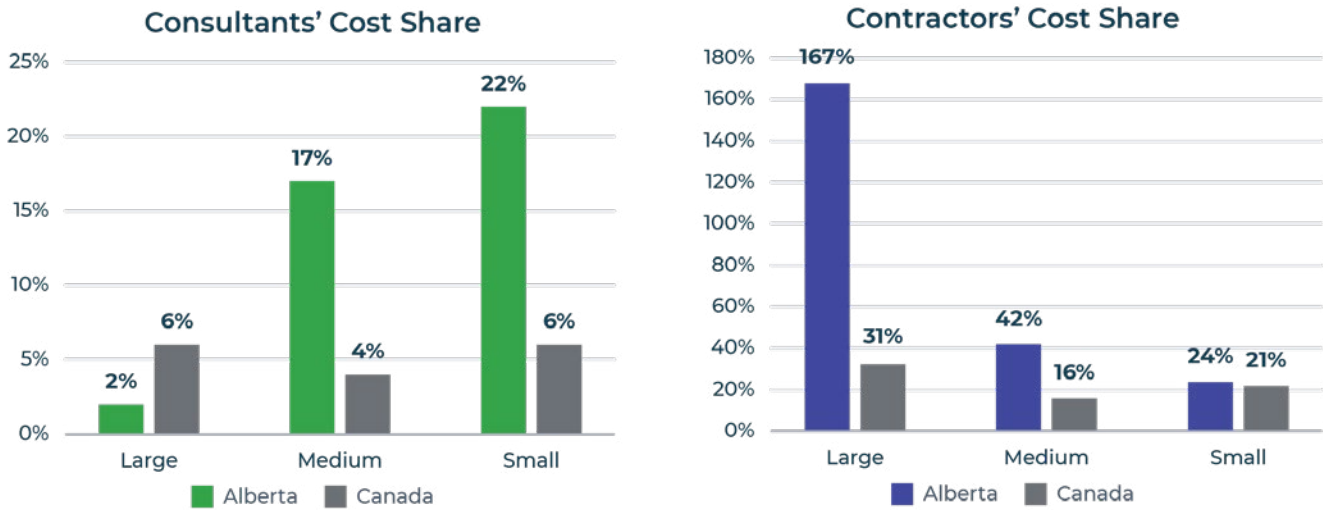
	Corporate Professions	Engineers	ICT Occupations	Renewable Energy Occupations	Trades
Budgeting/ Planning/ Design	6%	7%	3%	3%	3%
Disposal	3%	2%	0%	0%	5%
Inspection/ Maintenance/ Repair	1%	6%	2%	1%	8%
New Construction	3%	5%	1%	2%	6%
Operations	5%	5%	3%	3%	6%
Regulatory compliance	8%	2%	2%	2%	0%

Source: EHRC Survey of Alberta Electricity Employers 2023

Figure 17 enumerates the share of costs spent on outsourcing by size of organization, including small (1-99), medium (100-499), and large (500+) organizations. In Alberta’s electricity sector a correlation exists between the size of an organization and its expenditures

on contracting services, although this is not the case at the national level. Moreover, in Alberta an inverse relationship exists between organization size and the amount it spends on consulting services.

**Figure 17:**  
**Distribution of Outsourcing Costs in Electricity Sector by Organization Size**  
**Alberta – Canada**

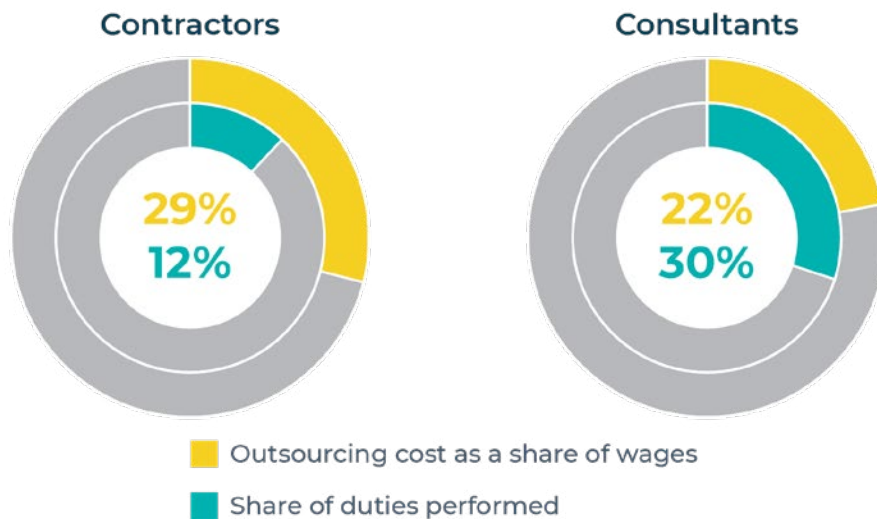


Source: EHRC 2023 Employer Survey

As shown in Figure 18, Alberta-based organizations estimate that contractors perform less of the work commissioned (12% vs 30%) than consultants, despite receiving a greater share

of the monies spent on in-house personnel (29% vs 22%). (It is important to note that this is a subjective estimate of the share of duties performed.)

**Figure 18:**  
**Outsourcing Cost Share vs. Share of Duties, by type of outsourcing**



Source: EHRC Survey of Alberta Electricity Employers 2023



# Alberta's Postsecondary Environment

Education and training are the foundation of Alberta's economic, social, and environmental progress. Its 26 publicly funded post-secondary institutions include 11 public and five private institutions. There are seven universities, 11 community colleges, as well as two polytechnic institutions; five private universities; and the Banff Centre—a specialized arts and cultural institution.<sup>125</sup> Each public college in Alberta offers certificate, diploma and apprenticeship programs suited to the needs of the regional labour market, and contributes to the social and economic development of the community. The province also has 190 private career colleges, which compete to some extent with public colleges, in that they offer certificates and diplomas in many of the same vocational program areas. Together these postsecondary institutions offer a wide array of academic programs and credentials that cover a multitude of disciplines. Most of the credentials awarded by colleges are certificates and diplomas, whereas universities tend to confer degrees.

Public universities focus on undergraduate and graduate education and are the main producers of scientific research within the postsecondary educational system. Colleges provide practical education and training and connect students to opportunities with local employers. Businesses and industries collaborate with them to develop consistent, sector-wide approaches to ensure skill requirements and challenges are identified, mapped and consistent with their needs.

Canada has one of the world's highest levels of postsecondary educational attainment. In 2023, 63% of Canadians aged 25 to 64 years had college or university qualifications. The corresponding figure for Alberta was 57%.<sup>126</sup> In 2022, more than 20% of the province's workforce had a bachelor's degree, while 11.6% and 19.7% had a trade certificate or college diploma, respectively.

Total enrollments in Alberta's postsecondary institutions were relatively stable between 2012/13 and 2021/22, reaching 270,000 in 2021/22. This occurred despite Alberta's population and GDP increasing by 17% and 7% respectively, during the period.<sup>127</sup>

125 <https://core.ac.uk/download/pdf/344776793.pdf#page=41>

126 <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3710013001>

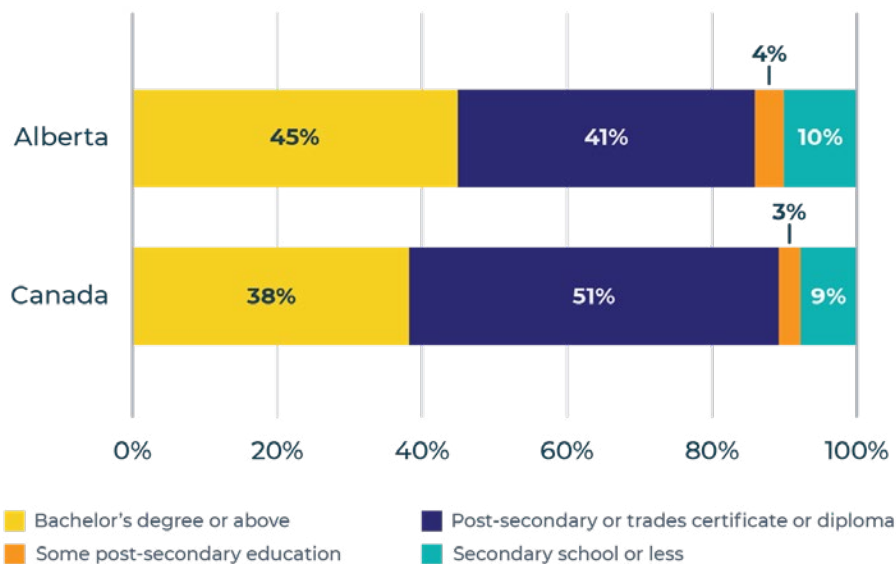
127 [https://www.apsn.ca/\\_files/ugd/3edac2\\_f47be46ff51a41e0b97f59b3a320b5ad.pdf](https://www.apsn.ca/_files/ugd/3edac2_f47be46ff51a41e0b97f59b3a320b5ad.pdf)

**Table 16:**  
**Educational Attainment of Alberta’s Workforce, 2022<sup>128</sup>**

Highest Educational Level Attained	Percentage
High school diploma	22.1%
High school diploma, with some post-secondary	5.5%
Trade certificate	11.6%
College diploma	19.7%
Certificate or diploma below bachelor’s degree	3.2%
Bachelor’s degree	21.8%
Graduate degree	9.3%

Employees in Canada’s electricity sector tend to be well educated. More than one-third (38%) have a bachelor’s degree or above. The corresponding percentage in Alberta is 45%.

**Figure 19:**  
**Educational Attainment of Employees in the Electricity Sector  
 Alberta and Canada**



Source: EHRC Survey of Alberta Electricity Employers 2023

128 Source: Statistics Canada. Table 14-10-0118-01 Labour force characteristics by educational degree, annual; Statistics Canada, Labour Force Survey

According to Statistics Canada, in 2021, 48,369 students graduated from postsecondary academic programs in Alberta. However, only 5.3% (2,598) of the graduates completed programs in engineering, while 129 individuals successfully completed programs in the construction trades. The programs that produced the most graduates (9,798 or 20%) were those in “Business, management, marketing and related support services (except cannabis)”.<sup>129</sup>

Alberta has recently sought to improve its training and education infrastructure to better reflect the evolving needs of employers and the changing work environment. In April 2021 it launched the Alberta 2030: Building Skills for Jobs program, which actively promotes applied job training, careers in trades and the commercialization of research. Its vision is as follows:

*“To equip Albertans with the skills, knowledge and competencies they need to succeed in their life-long pursuits. The system will be highly responsive to labour market needs and, through innovative programming and excellence in research, contribute to the betterment of an innovative and prosperous Alberta.”<sup>130</sup>*

The program’s **key goals** are to:

- (1) improve access and student experience;**
- (2) develop skills for jobs;**
- (3) support innovation and commercialization;**
- (4) strengthen internationalization;**
- (5) improve sustainability and affordability;**  
and
- (6) strengthen system governance.**

Additionally, Alberta 2030 intends to promote and facilitate work-integrated learning initiatives and create tens of thousands of jobs, by diversifying the economy, attracting investment and building core infrastructure.

## Postsecondary Offerings

The reputation that a postsecondary institution has with prospective applicants, employers and other stakeholders largely depends on its ability to offer compelling programs that address the requirements of the labour market. Students and employers must value the skills, knowledge and experiences that will be acquired in an academic program, and believe that their investment of time, resources and effort will be warranted.

Alberta’s industries clearly need more skilled workers. Although the postsecondary system is working diligently to train them, there has recently been insufficient space for aspiring students. Many of the most sought out academic programs are oversubscribed or nonexistent. In recent years it has become increasingly difficult for Alberta’s postsecondary institutions to fund their activities, due to reductions in provincial support. The province reduced postsecondary funding by \$500 million (31%) between 2019 and 2023.<sup>131</sup> Fortunately, Alberta’s 2023 Budget committed \$193 million to create 8,000 new seats in Alberta in high-demand postsecondary programs.<sup>132</sup> It also introduced a non-refundable tax credit of between \$3,000 and \$10,000 for graduates who remain in Alberta to

129 <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3710018302&pickMembers%5B0%5D=1.1&pickMembers%5B1%5D=2.1&pickMembers%5B2%5D=4.1&pickMembers%5B3%5D=5.1&cubeTimeFrame.startYear=2015&cubeTimeFrame.endYear=2018&referencePeriods=20150101%2C20180101>

130 <https://open.alberta.ca/dataset/0b96fe3e-6354-4b49-8377-ab42046e488a/resource/6a12f114-4114-4838-b013-45a7ef503af9/download/ae-alberta-2030-building-skills-for-jobs-what-we-heard-engagement-summary-2021-04.pdf>

131 <https://universityaffairs.ca/features/feature-article/the-political-battle-over-postsecondary-education-in-alberta/#:~:text=The%20government%20announces%20the%20Premier's,current%20and%20future%20industry%20demand>

132 <https://www.unitedconservative.ca/wp-content/uploads/Job-Growth-and-Diversification-Strategy-May-4-2023.pdf>

work after graduation, as well as a \$1,200 signing bonus for certain types of skilled workers, under the “Alberta is Calling” program.<sup>133</sup> The Premier of Alberta’s favourable views towards skilled workers are revealed in the following passage:<sup>134</sup>

*“We need skilled workers. We know that being able to manage growth means that we’ve got to get more boilermakers and millwrights and electricians and welders—and this is going to be our opportunity to tell the rest of the country that we love the professions and the trades, and we want you here.”*

For the purposes of this analysis, it is important to know how many academic programs offered in Alberta inculcate the skills and knowledge required to work in the electricity sector. To obtain such information, EHRC performed a series of keyword searches to ascertain how frequently words or phrases commonly used to describe aspects of work performed in the sector are included in the titles of college and/or university academic programs. The following key words and phrases were used: carbon; electrical; electric or power or renewable; energy; energy; engineer; green; solar; sustainable and wind.

Table 17 indicates the number of academic programs available in Canada and Alberta that include the specific key words or phrases in their title, by credential. It shows that among the 533 (77 in Alberta) programs that include the word “electric”, “power” or “renewable” in their title, 220 (31 in Alberta) are diploma or certificate programs. A further 67 (11 in Alberta) programs include “energy” in their

title, whereas only 23 (1 in Alberta) and 9 contain “nuclear” and “wind” (3 in Alberta), respectively. More than 260 (21 in Alberta) programs contain “electrical” in their title, however only one includes “solar”.

The following exemplifies some of Alberta’s post-secondary institutions that prepare students to work in the electricity sector.

- University of Alberta - The Faculty of Engineering offers programs in Electrical Engineering, with a focus on power systems and energy.
- University of Calgary - The Schulich School of Engineering delivers programs in Electrical Engineering. They may also offer courses or specializations related to energy and power systems.
- The Calgary-based Southern Alberta Institute of Technology (SAIT) - offers the Electrical Engineering Technology and Instrumentation Engineering Technology programs, as well as the Energy Asset Management program (which covers aspects of the energy industry, including electricity and renewables).
- The Edmonton-based Northern Alberta Institute of Technology (NAIT) - provides programs such as Electrical Engineering Technology, Power Engineering Technology, and Alternative Energy Technology, focusing on both traditional and renewable energy sources.
- Red Deer College - offers a Bachelor of Applied Science in Alternative Energy Technology, which focuses on renewable energy sources and sustainable practices.

133 <https://www.theglobeandmail.com/canada/alberta/article-danielle-smith-pitches-new-tax-credits-for-postsecondary-graduates-to/>

134 <https://clra.org/2024/01/go-west-alberta-is-still-calling/#:~:text=The%20province%20is%20planning%20another,skilled%20workers%20to%20the%20province>

- Bow Valley College - offers programs on Instrumentation Engineering Technology, which is relevant to the electrical and energy sectors.
- Mount Royal University—offers a Bachelor of Science—Environmental Science program, which covers aspects of renewable energy.
- Lakeland College - offers the Bachelor of Applied Science Environmental Management, which may include coursework related to renewable energy.
- The Solar Energy Society of Alberta (SESA) offers training courses for professionals who are actively involved or interested in solar PV and solar-related technologies

In January 2024 the Federal Government placed a maximum on the number of new international student permit applications that will be accepted in Canada in the next two years. For 2024, the cap is expected to result in approximately 360,000 approved study permits, 35% below the 2023 limit. The reductions will be allocated to provinces and territories based on their population.<sup>135</sup>



135 <https://www.canada.ca/en/immigration-refugees-citizenship/news/2024/01/canada-to-stabilize-growth-and-decrease-number-of-new-international-student-permits-issued-to-approximately-360000-for-2024.html>

**Table 17:<sup>136</sup>  
Number of Academic Programs in Canada (Alberta)  
with Selected Key Words in Title, by Credential**

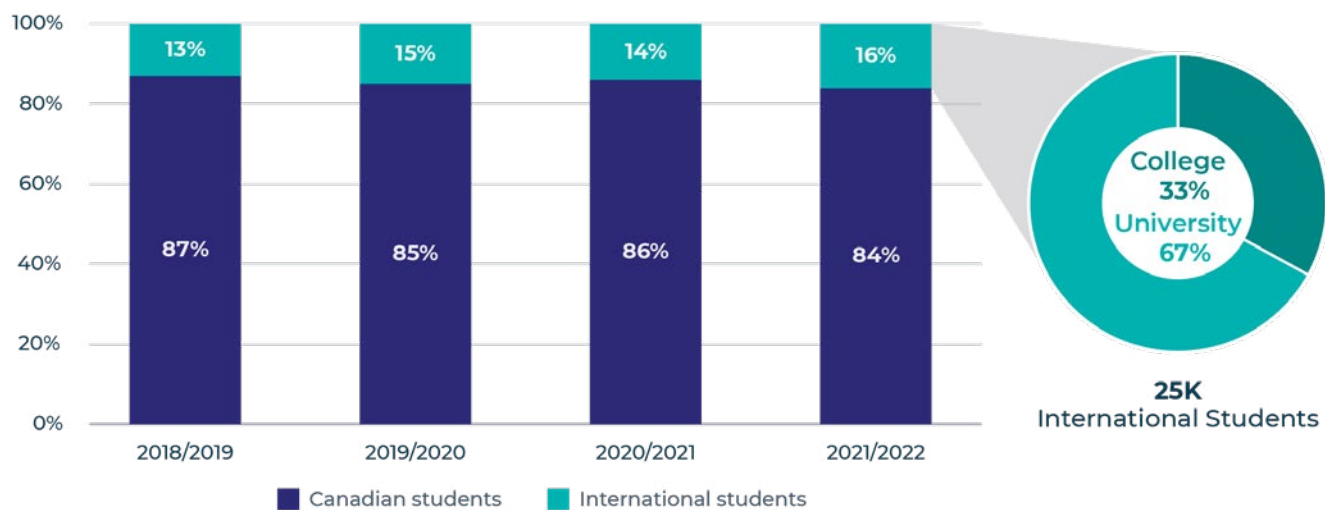
	Carbon	Electrical	Electric or Power or Renewable	Renew. Energy	Energy	Engineer
All Program Levels (Canada)	4	264 (21)	533 (77)	6 (1)	67 (11)	1,822 (166)
All Program Levels (Alberta)	1	21	77	1	11	166
Upgrading /Literacy/ Second Language Training/Apprenticeship	0	19 (2)	110 (23)		(0)	13 (3)
College Diploma/Certificate	1	88 (6)	220 (31)	4 (1)	25 (4)	491 (64)
College Post-Diploma	0	3 (0)	9 (2)		4 (1)	35 (6)
Collaborative Degree Programs/University Transfer/ Other College Level	0	3 (0)	5 (0)		1 (0)	28 (3)
Bachelor's Degree (B.A., B.Sc.)	0	56 (4)	70 (4)	2 (0)	14 (3)	542 (44)
First Professional Degree (LL.B., M.Div.)	0	0 (0)	1 (1)	(0)	0	1 (1)
Undergraduate Certificate /Diploma	0	1 (0)	7 (1)	(0)	0	20 (0)
Licentiate/Testamur/ License/ Other Undergraduate Program	0	0	1 (0)	(0)	0	11 (1)
Master's Degree (M.A., M.Sc.)	1	64 (6)	72 (11)	(0)	15 (2)	474 (31)
Doctorate (Ph.D., D.Mus.)	0	27 (2)	31 (3)	(0)	1 (0)	187 (12)
Post Doctorate	0	0	0	(0)	0	0
Graduate Level Certificate/ Diploma	0	2	5	(0)	6 (1)	39 (0)
Internship/Residency/ Other Graduate Level	2	5 (1)	8 (3)	(0)	2 (0)	26 (2)

<sup>136</sup> <https://tools.canlearn.ca/cslgs-scpse/cln-cln/rep-fit/p/af.p.clsa-eng.do>

**Table 17:  
Number of Academic Programs in Canada (Alberta)  
with Selected Key Words in Title, by Credential (cont.)**

	Green	Nuclear	Solar	Sustainable	Wind
All Program Levels (Canada)	21 (1)	23	1	78 (7)	9 (3)
All Program Levels (Alberta)	1	1	0	7	3
Upgrading /Literacy/ Second Language Training/Apprenticeship				0	1
College Diploma/Certificate	7	4 (1)	1	18 (1)	5 (2)
College Post-Diploma	0	0		7 (1)	2
Collaborative Degree Programs/University Transfer/ Other College Level	0	0		1 (0)	2 (1)
Bachelor's Degree (B.A., B.Sc.)	5	6		18 (4)	0
First Professional Degree (LL.B., M.Div.)	0	0		0	0
Undergraduate Certificate /Diploma	0	0		7 (0)	0
Licentiate/Testamur/ License/ Other Undergraduate Program	0	0		1	0
Master's Degree (M.A., M.Sc.)	3	8		14 (1)	1
Doctorate (Ph.D., D.Mus.)	1	2		4 (0)	0
Post Doctorate	0	0		0	0
Graduate Level Certificate/ Diploma	4	4		6 (0)	0
Internship/Residency/ Other Graduate Level	1	0		2 (1)	0

**Figure 20:  
Distribution of Students in Alberta by Status (2018-2022)**



Source: Statistics Canada. Table 37-10-0163-01 Postsecondary enrolments, by International Standard Classification of Education, institution type, Classification of Instructional Programs, STEM and BHASE groupings, status of student in Canada, age group and gender

The changes are not expected to significantly alter enrolment levels in Alberta’s postsecondary institutions, because most (84%) of Alberta’s postsecondary students are domestic, and more than two-thirds (67%) of international students pursue a university education.

## STEM Education

STEM is an acronym that represents the disciplines of science, technology, engineering and mathematics. Employees in these fields create advancements and innovations through the application of knowledge and expertise.<sup>137</sup>

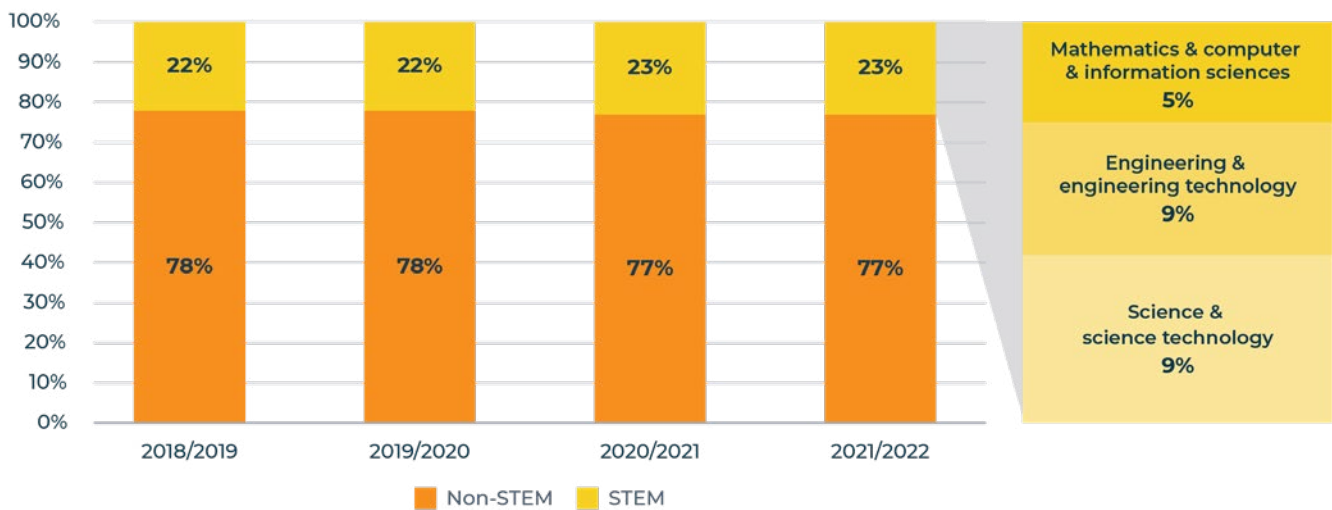
Numerous postsecondary courses and programs prepare students for careers in the STEM fields. College programs tend to be relatively short in duration and focus on hands-on, technical skills, whereas university programs offer more academic and research-based options. In addition to subject-specific learning, such offerings help students develop enquiring minds, the ability to logically reason and collaborate with colleagues.

Many new jobs and career opportunities that have emerged in recent years are STEM-focused. As businesses and organizations seek to innovate, modernize and expand, the demand for employees who are proficient in the STEM fields will likely increase.

137 <https://www23.statcan.gc.ca/imdb/p3VD.pl?Function=getVD&TVD=1369127&CVD=1369128&CPV=A&CST=01052021&-CLV=1&MLV=3>



**Figure 21:  
STEM Programs in Alberta (2018-2022)**



Source: Statistics Canada. Table 37-10-0163-01 Postsecondary enrolments by International Standard Classification of Education, institution type, Classification of Instructional Programs, STEM and BHASE groupings, status of student in Canada, age group and gender

In the past few years, the Governments of Canada and Alberta have launched several initiatives to increase scientific literacy and the participation of their citizens in STEM occupations, particularly those in under-represented groups.<sup>138</sup> Although women comprise roughly one-half of Alberta’s population, they represent only about one-third of enrolments and graduates in STEM programs, and only about one-quarter of employees in STEM fields.<sup>139</sup> This underrepresentation likely contributes to their low level of participation in the electricity industry.

Alberta’s post-secondary institutions produce the third largest number of STEM graduates in the country.<sup>140</sup> Calgary has the highest concentration of STEM degree completions of any city in Canada. In September 2023 Alberta announced a \$5 million investment in the University of Calgary’s Multidisciplinary Science Hub, which is central to its goal of expanding STEM training and development. It will provide classroom and lab space for 2,200 students.<sup>141</sup>

138 <https://ised-isde.canada.ca/site/choose-science/en/government-canada-and-stem>

139 “Alberta government announces \$1 million to support women studying in STEM fields”, Edmonton Journal (Online) Postmedia Network Inc. March 9, 2022

140 <https://investalberta.ca/why-alberta/talent-productivity/#:~:text=Our%20workforce%20is%20the%20youngest,%20engineers%20per%20capita%20in%20Canada>

141 <https://educationnewscanada.com/article/education/level/university/1/1039537/alberta-investing-5-million-in-the-university-of-calgary.html>

Table 18 indicates the percentage of Canada’s population who have attained a postsecondary diploma or degree, by field of study (including STEM), and province/territory. In 2021, 11.3% of the academic credentials awarded in Canada were in STEM fields. The corresponding figure in Alberta was 11.9%.

**Table 18:**  
**Major Field of Study in 2021 (STEM and BHASE, Detailed)<sup>142</sup>**  
**by Geography: Canada, Provinces and Territories (%)**

Province/ Territory	Total	No PSE Diploma or Degree	STEM	Business & Admin	Arts & Humanities
Canada	100	42.8	11.3	11.6	5
Alberta	100	44.3	11.9	10.9	3.7
British Columbia	100	42.9	11	11.1	5.8
Manitoba	100	49.8	8.7	9.6	3.7
New Brunswick	100	48.7	8.2	10.5	3.1
NFLD/LAB	100	48.1	8.6	10.6	2.6
Northwest Territories	100	50.1	8	9.1	3
Nova Scotia	100	43.7	9.8	11.7	4
Nunavut	100	70.4	3.8	6.2	1.9
Ontario	100	42.5	12.5	11.5	5.4
Prince Edward Island	100	44.4	8.8	12.7	3.9
Quebec	100	39.6	10.7	13	5.6
Saskatchewan	100	50.3	7.8	9.6	2.8
Yukon	100	40.3	9.3	9.4	4.8

142 Statistics Canada Table 98-10-0391-01 Major field of study (STEM and BHASE, detailed) by geography: Canada, provinces, and territories.

**Table 18:**  
**Major Field of Study in 2021 (STEM and BHASE, Detailed)**  
**by Geography: Canada, Provinces and Territories (%) (cont.)**

Province/ Territory	Total	Social & Behavioural sciences	Legal Professions & Studies	Health Care	Education & Teaching	Trades, Services, Natural Resources Conserv.
Canada	100	5.5	1.1	7.2	3.7	11.8
Alberta	100	4.3	0.9	7.9	3.8	12.3
British Columbia	100	5.7	1.1	7.5	3.7	11.2
Manitoba	100	4.3	0.7	8.1	4.4	10.7
New Brunswick	100	3.7	0.7	7.5	4	13.6
NFLD/LAB	100	3	0.5	7.1	4.2	15.5
Northwest Territories	100	5	0.7	5.6	4.3	14.1
Nova Scotia	100	4.9	0.8	7.9	4	13.3
Nunavut	100	3.2	0.6	2.4	3.6	7.9
Ontario	100	6.6	1.2	7	3	10.2
Prince Ed- ward Island	100	4.3	0.8	8.1	4	12.8
Quebec	100	5	1.1	6.8	4.2	14
Saskatche- wan	100	3.2	0.6	8	4.7	13
Yukon	100	7	0.9	6.5	<u>5</u>	16.9

## Apprenticeship Training

Apprenticeships, internships, field placements and other forms of postsecondary work-integrated learning helps students acquire practical work experience, improve employability skills and determine their suitability for a potential career in a specific field. It also helps them improve their ability to collaborate, communicate and work in a team environment. Alberta's apprenticeship and industry training system seeks to ensure a highly skilled, internationally competitive workforce in more than 50 designated trades and occupations. It provides a path to careers that demand a high level of skill, judgment and creativity, and offer attractive levels of remuneration. All provinces in Canada have an apprenticeship board or authority responsible for overseeing and regulating apprenticeship programs. They work with employers, educational institutions, and industry stakeholders to facilitate apprenticeship training. In Alberta, this is carried out by the Apprenticeship and Trades Certification Division (ATCD). Eleven public postsecondary institutions (Polytechnic Institutions and Comprehensive Community Colleges) provide most of the technical training associated with apprenticeship programs.

Alberta aspires to become Canada's first province to offer every undergraduate student access to a work-integrated learning opportunity.<sup>143</sup> According to the Canadian Apprenticeship Forum, Alberta's industries will require 26,000 new journey persons and 51,000 new apprenticeships in the top 15 Red Seal Trades, by 2026.<sup>144</sup>

*Each year, the Government of Alberta provides funding for apprenticeship education through its Operating and Program Support Grant. A portion of each grant is used by eleven post-secondary institutions to provide apprenticeship training for classroom instruction. In 2022-23, Alberta invested an additional \$37.3M in such activities.<sup>145</sup>*

In the past three decades, the number of certificates awarded to those who have completed apprenticeship programs in Canada has increased less than the number of new registrants. While the latter figure more than doubled between 1991 and 2019, increasing from 31,368 to 77,573, the number of certificates granted rose 47%, climbing from 35,634 to 52,368. Table 19 indicates the annual change in the number of new registrants and certifications, by province, in 2021. It shows that the numbers increased in every province, including Alberta, with some reaching pre-pandemic levels.

In 2021 Quebec registered more people (24,169) in apprenticeship programs than any other province. The figure represents a significant annual increase (5,169, or 27.2%) relative to the prior year's figure. Ontario (4,317, or 32.7%), Alberta (2,811, or 36.6%), and British Columbia (2,148, or 20.7%), also recorded significant increases in new registrants. In 2021 and 2022, the demand for skilled tradespeople rose to unprecedented levels.

143 <https://open.alberta.ca/dataset/2bd41938-8100-4987-996d-b73d888cdbc/resource/f897376a-95a9-4fe0-bfa7-9900ab815cd8/download/ae-alberta-2030-building-skills-for-jobs-strategy-summary-2021-04.pdf>

144 <https://phoenixhorizoninvestmentscorporation.ca/2023/05/27/alberta-ndp-will-build-the-nait-advanced-skills-centre-to-train-workers-grow-economy/>

145 [open.alberta.ca/dataset/454554be-a790-4b3e-a509-37df849bbdf/resource/796c63fe-1094-4450-812e-971c45b4caf9/download/ae-registrars-report-apprenticeship-and-industry-training-2022-2023.pdf](https://open.alberta.ca/dataset/454554be-a790-4b3e-a509-37df849bbdf/resource/796c63fe-1094-4450-812e-971c45b4caf9/download/ae-registrars-report-apprenticeship-and-industry-training-2022-2023.pdf)

From 2019 until 2021, job vacancies in the “trades, transport and equipment operators and related occupations” requiring at least a trade or apprenticeship credential doubled. Job vacancies in related industries such as construction also reached historic levels. This trend is expected to continue in the next decade as baby-boomers begin retiring in larger numbers.

In 2021, 30% of employees with an apprenticeship in mechanic and repair technologies

or precision production were 55 years of age or older. The corresponding proportions for the construction trades and overall economy were 22% and 23%, respectively. The number of people with an apprenticeship certificate in construction trades climbed between 4.6% and 8.3% in Saskatchewan, Quebec, Manitoba and British Columbia. Conversely, the number of apprenticeships in the Atlantic provinces, Ontario (-3.8%) and Alberta (-3.5%) declined.

**Table 19:<sup>146</sup>  
Annual Change in the Number of New Registrations and  
Certifications, by Province, 2021**

Province	New Registrations	Certifications
Alberta	2,811	2,193
British Columbia	2,148	618
Manitoba	1,380	414
New Brunswick	465	297
Newfoundland and Labrador	252	147
Nova Scotia	258	201
Ontario	4,317	2,118
Prince Edward Island	150	51
Quebec	5,169	5,631
Saskatchewan	285	201

Alberta launched the Trades Pathway Program in July 2022. The 33-month, \$3.2 Million pilot project aims to promote the trades as a prospective career and to produce job-ready skilled workers.<sup>147</sup>

Data from the Government of Alberta shows that in 2022 approximately 16,000 new apprentices were registered, 11,000 more than in 2021. Across Alberta 10,800 employer sites

<sup>146</sup> Statistics Canada, Source(s): Registered Apprenticeship Information System (3154), 2020 to 2021.

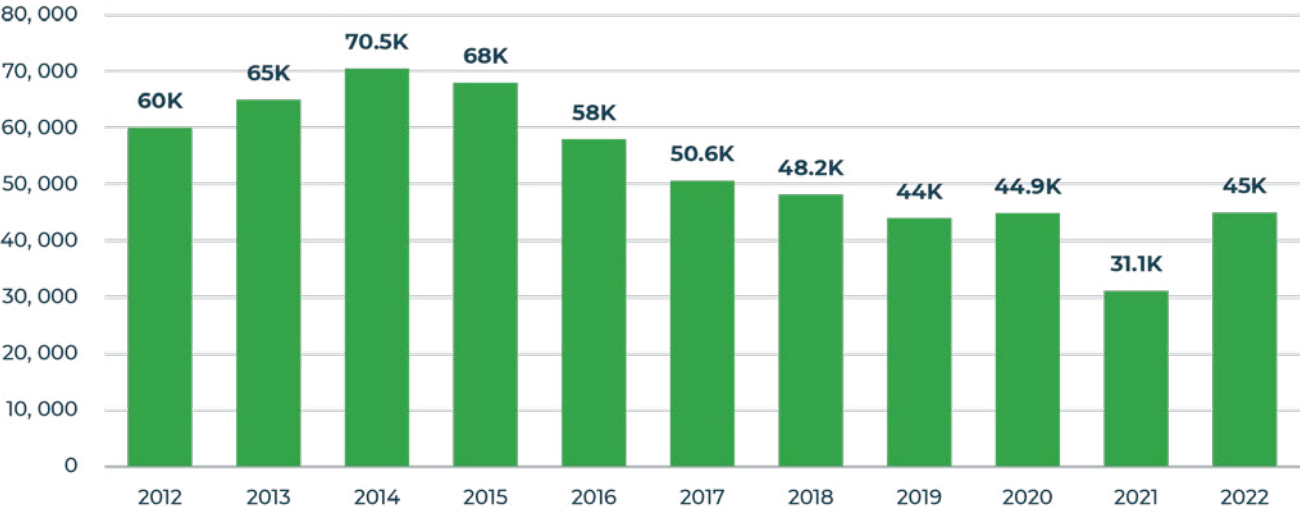
<sup>147</sup> <https://everythinggp.com/2022/07/06/province-targets-construction-industry-to-get-more-albertans-trained-and-working/>

were involved in mentoring apprentices. In 2022 roughly 6,000 people (including completed apprentices and individuals issued occupation and qualification certificates) were certified as apprentices. The Government of Alberta interacted with more than 9,500 employer establishments to promote apprenticeship programs and encourage the successful completion of such education. By December 31, 2022, Alberta had more than 45,200 registered apprentices, of whom 5,700 (13%) were female. This represents

a 20% increase from the prior year’s figure. The ratio has consistently increased during the past decade.

As of December 31, 2022, more than 3,000 (7%) of Alberta’s registered apprentices identified as Indigenous, up from 5.3% the previous year. Alberta’s leading apprenticeship programs, in terms of registered apprentices, were Electrician (7,600); Heavy Equipment Technician (5,300); Welder (3,600) and Automotive Service Technician (3,500).<sup>148</sup>

**Figure 22:**  
**Number of Registered Apprentices in Alberta—2012-2022<sup>149</sup>**



Premier Danielle Smith’s mandate letter to the Minister of Education (dated July 21, 2023) included a directive to “design a ministry specific job attraction strategy that raises awareness for young Albertans (16-24), as well as adults

changing careers, regarding the skilled trades and professions available in each economic sector including pathways for education, apprenticeship, and training”.<sup>150</sup>

148 [open.alberta.ca/dataset/454554be-a790-4b3e-a509-37df849bbdfd/resource/796c63fe-1094-4450-812e-971c45b4caf9/download/ae-registrars-report-apprenticeship-and-industry-training-2022-2023.pdf](https://open.alberta.ca/dataset/454554be-a790-4b3e-a509-37df849bbdfd/resource/796c63fe-1094-4450-812e-971c45b4caf9/download/ae-registrars-report-apprenticeship-and-industry-training-2022-2023.pdf)

149 [open.alberta.ca/dataset/454554be-a790-4b3e-a509-37df849bbdfd/resource/796c63fe-1094-4450-812e-971c45b4caf9/download/ae-registrars-report-apprenticeship-and-industry-training-2022-2023.pdf](https://open.alberta.ca/dataset/454554be-a790-4b3e-a509-37df849bbdfd/resource/796c63fe-1094-4450-812e-971c45b4caf9/download/ae-registrars-report-apprenticeship-and-industry-training-2022-2023.pdf)

150 <https://open.alberta.ca/dataset/bf7f9a42-a807-49b3-8ba3-451ae3bc2d2f/resource/e29f7d8b-73c4-4dd4-af7d-833ae3e01bef/download/ae-mandate-letter-advanced-education-2023.pdf>

Several Ministerial initiatives are highlighted in the letter, including the following ones:

- Investing \$20 million over 4 years in promoting career pathways including:
  - Organizing career fairs for high school students in high demand sectors.
  - Establishing an online career counselling website for students and parents to assist with career and education road mapping.
  - Launching a high school targeted advertising campaign to promote high demand careers.
  - Developing more teacher training for career and technology studies.
  - Collaborating with the Minister of Advanced Education to develop and promote career educational scholarships in areas of labour shortage for Alberta's K-12 students.
- Assisting each ministry to execute on their mandate to design a ministry-specific job attraction strategy that raises awareness for young Albertans, especially those in grades 9-12, and adults changing careers of the skilled trades and professions available in each economic sector including pathways for education, apprenticeship, and training.<sup>151</sup>

In 2023 the Northern Alberta Institute of Technology (NAIT) announced that it will establish a \$750 Million Advanced Skills Centre to address Alberta's critical need for more skilled workers.

It aims to do the following:

- Support stronger pathways into skilled trades and technology-based programs for youth, women, Indigenous Peoples, underrepresented groups, and adults changing careers;
- Drive Alberta's reputation as a technology and innovation leader, with a skilled, agile and industry-driven workforce;
- Increase the depth of Alberta's technology and innovation skills to attract investment in Alberta; and
- Advance NAIT's long-term sustainability plan by modernizing and consolidating campuses to reduce its carbon footprint.<sup>152</sup>

The Advanced Skills Centre is being designed in conjunction with industry. It aspires to produce as many as 14,000 graduates annually in skilled trades and technology-based programs that are in high demand in the energy; manufacturing and fabrication; and other sectors. The facility will have the capacity to train 68% more apprentices for the energy industry. As a result of a \$4.9 million investment from the Government of Alberta, NAIT has the capacity to train 9,500 apprentices in the 2023/24 academic year.<sup>153</sup>

In September 2023 the Government of Alberta announced that it will invest \$12.4 million to create nearly 2,000 new apprenticeship seats in the province. This builds on a \$15 million investment announced earlier in the year to fund an additional 1,000 apprenticeship spaces. By the end of 2023, Alberta had 53,922 registered apprentices, 19% more than there were at the end of 2022.<sup>154</sup>

151 <https://open.alberta.ca/dataset/bf7f9a42-a807-49b3-8ba3-451ae3bc2d2f/resource/0ad63305-f39c-4d9a-a2a4-7c1970d2f720/download/educ-mandate-letter-education-2023.pdf>

152 [https://open.alberta.ca/dataset/bf7f9a42-a807-49b3-8ba3-451ae3bc2d2f/resource/0ad633\[...\]-7c1970d2f720/download/educ-mandate-letter-education-2023.pdf](https://open.alberta.ca/dataset/bf7f9a42-a807-49b3-8ba3-451ae3bc2d2f/resource/0ad633[...]-7c1970d2f720/download/educ-mandate-letter-education-2023.pdf)

153 [https://www.nait.ca/nait/about/newsroom/2023/nait-receives-\\$4-9m-to-add-more-than-500-apprentic](https://www.nait.ca/nait/about/newsroom/2023/nait-receives-$4-9m-to-add-more-than-500-apprentic)

154 <https://www.alberta.ca/release.cfm?xID=889900AF07963-0C00-703A-140A13DE0542F75E>

# Labour Market Projections (2023-2028)

A primary goal of this project is to determine how labour market conditions in Alberta's electricity sector are likely to evolve over the next five years. Gauging the future level of employment, as well as the degree to which worker demand/supply imbalances may occur within specific occupations that are integral to the sector, is particularly important.

## Methodological Approach

EHRC identified 21 specific occupations that are core to the generation, transmission and/or distribution of electricity in Alberta. They are officially defined under the National Occupational Classification (NOC) system, and outlined in Appendix A. For the purposes of this analysis, each occupation was assigned to one of five core occupational groups: Managers; Engineers; Technicians and Technologists; Trades; and Information and Communications Technology (ICT). The industry comprises many "other occupations" that don't fit into these categories. Although the functions performed by employees in these other occupations (e.g.: legal, human resources, customer service, physical security) are indispensable to an organization's success, the skills they possess tend to be less domain-specific (and thus more transferable across sectors) than those of the core occupations.

To anticipate future labour market conditions in Alberta's electricity sector we projected the

future level of employment, as well as the number of job openings that will likely materialize, under two alternative (Current Measures, Net Zero) scenarios referenced in Canada's Energy Future 2023. In the Current Measures (or Business as Usual) scenario, all rules, regulations and government policies pertaining to the environment and the electricity sector remain intact. As noted above, the Net Zero Scenario characterizes a situation in which Canada creates a Net Zero electricity grid by 2035, and a carbon-free economy by 2050.

Each scenario specifies the value of key parameters (such as GDP, the volume of electricity generated and fuel mixes) throughout the projection period. Electricity generation is assumed to rise under both scenarios. For the purposes of this analysis, it is important to note that generation expands most rapidly in the first three years of the Current Measures scenario, and the fourth and fifth year of the Net Zero scenario. It's also postulated that GDP increases more under the Current Measures scenario. Population expands at the same rate across scenarios.

For each scenario, the following approach was used to project future labour market conditions in the electricity sector over the next five years: An ARMAX (1,0) model was constructed to simulate Canada's electricity sector (see Forecasting Method on p.139, Electricity in Demand: Labour Market Insights 2023-2028), and to project the future level of aggregate employment in Alberta's electricity sector. To reflect the above-noted



key parameters, coefficients of the ARMAX model were applied to the Canada Energy Regulator’s projections. The anticipated level of employment in the electricity sector was then disaggregated at the occupational level for each year in the projection period.

To project employment within specific occupations in Alberta’s electricity sector, we utilized a

sequential process that leveraged multiple sources of data. They included expansion demand coefficients derived from Alberta’s 2021-2030 Occupational Outlook, as well as Census 2021 employment data. We essentially applied the province’s economy-wide labour market expectations to occupations in the electricity sector. Changes were made, as appropriate, to reflect other lines of evidence compiled in the study.

## Future Levels of Employment at the Occupational Level

As Table 20 indicates, over the five-year period, employment in Alberta’s electricity sector is projected to increase at an average annual compound growth rate (AACG) of 2% and 1.6% under the Current Measures and Net Zero scenarios, respectively. The latter scenario’s lower rate is a consequence of two factors. The percentage of electricity generated from renewable sources is expected to rise, whereas fossil fuel’s share will decline. However, some occupations in the renewable energy space (e.g.: Wind turbine technician, smart grid specialist, and solar PV technician) aren’t reflected in the analysis because official historical employment data—which forms the basis

for such projections—aren’t available for them. They have not been assigned NOC codes by the Federal Government. As many as five years may elapse before a NOC code is created for an emerging occupation. To reduce the effects of this data gap, EHRC utilized information gathered in its 2023 Employer Survey, as well as online job posting data acquired from an external research supplier. Although online job postings reveal much about the demands for occupations and their skill requirements, their utility for forecasting purposes is limited. They are not synonymous with job vacancies and/or employment levels and should not be construed as such.



Under the **Current Measures scenario**, the three occupations expected to exhibit the most AACG in employment during the projection period are:

- **3.9%** Computer, Software and Web Designers and Developers
- **3.6%** Residential and Commercial Installers and Services (includes Solar Panel Installers) and
- **3.1%** Contractors and Supervisors, Electrical Trades and Telecommunications Occupations (3.1%)

The three occupations expected to register the least AACG are:

- **1.2%** Power Engineers and Power System Operators
- **1%** Boilermakers, Welders and Related Machine Operators
- **1%** Pipefitters/Steamfitters

Under the **Canada Net Zero scenario**, the three occupations expected to record the highest AACG in employment are:

- **5.1%** Residential and Commercial Installers and Servicers (includes Solar Panel Installers)
- **3.4%** Computer, Software and Web Designers and Developers and
- **3.1%** Construction Managers

The three occupations expected to record the least growth in employment are:

- **0.7%** Boilermakers, Welders and Related Machine Operators
- **0.7%** Power Engineers and Power System Operators
- **0.5%** Pipefitters/Steamfitters

None of the occupations considered in the analysis are expected to face declining levels of employment in the next five years, under either scenario.

It is important to note that a specific occupation's projected growth rate does not fully reflect its overall significance from a workforce planning perspective. One also needs to consider the proportion of electricity sector employment (i.e.: occupational coefficient) that the specific occupation comprises in the base year of the forecast. Thus, despite their lower growth rates, occupations (e.g. Power Engineers and Power System Operators) that employ relatively large numbers of people may have a greater labour market impact than those with lower coefficients.

**Table 20:  
Current and Forecasted Employment in Alberta's  
Electricity Sector by Occupation**

Group	Occupation	2023	Current Measures Scenario		Canada Net-Zero Scenario	
			2028	Average Annual Compound Growth (%)	2028	Average Annual Compound Growth (%)
Managers	Utilities Managers	844	905	1.4%	884	0.9%
	Engineering Managers	216	234	1.5%	228	1%
	Construction Managers	88	95	1.7%	102	3.1%
	"Contractors and Supervisors, Electrical Trades and Telecommunications Occupations"	172	201	3.1%	197	2.6%
Engineers	Civil and Mechanical Engineers	706	779	2.0%	761	1.5%
	Electrical and Electronics Engineers	754	840	2.2%	821	1.7%
	Industrial and Manufacturing Engineers	40	45	2.1%	44	1.6%
Technicians and Technologists	Electrical and Electronics Engineering Technologists and Technicians	392	427	1.7%	417	1.2%
	Civil, Mechanical, and Industrial Engineering Technologists and Technicians	156	176	2.4%	172	1.9%
	Non-destructive Testers and Inspection Technicians	64	70	1.9%	69	1.4%
Trades	Power Engineers and Power Systems Operators	1,139	1,206	1.2%	1,178	0.7%
	Electricians and Electrical Power Line and Cable Workers	1,735	1,991	2.8%	1,945	2.3%
	Pipefitters/Steamfitters	157	165	1.0%	161	0.5%
	Public Works Maintenance Equipment Operators and Related Workers (includes Utility Arborists)	107	116	1.7%	114	1.3%

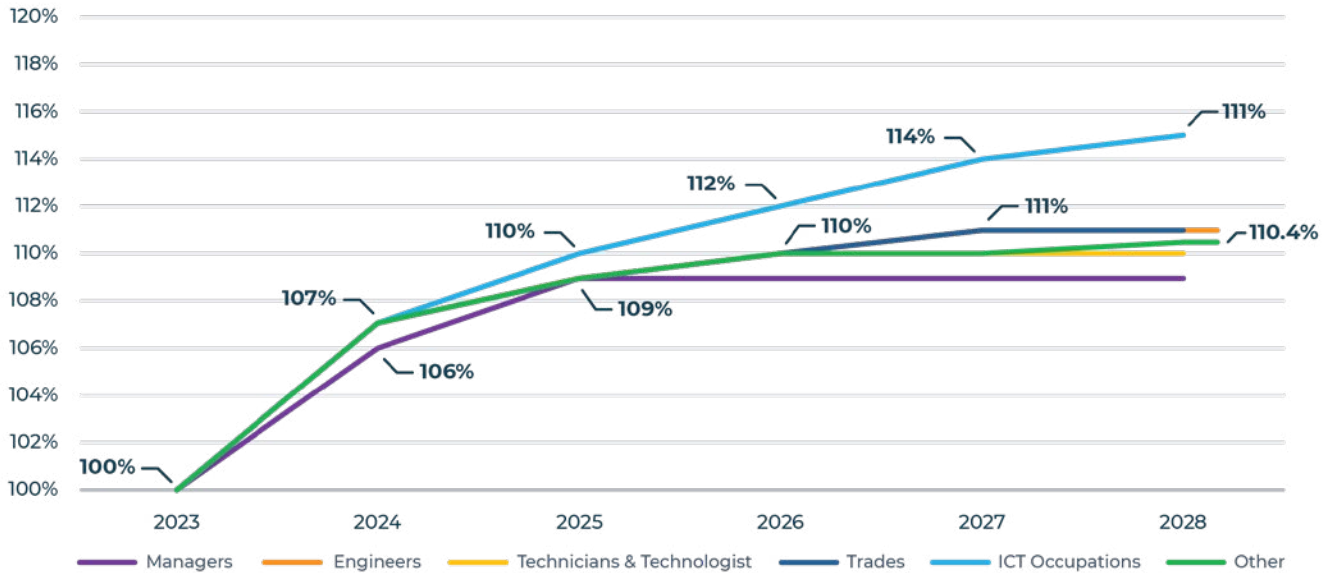
Group	Occupation	2023	Current Measures Scenario		Canada Net-Zero Scenario	
			2028	Average Annual Compound Growth (%)	2028	Average Annual Compound Growth (%)
Trades	Construction Millwrights and Industrial Mechanics	199	217	1.8%	212	1.4%
	Residential and Commercial Installers and Servicers	80	95	3.6%	102	5.1%
	Boilermakers, Welders and Related Machine Operators	56	60	1%	58	0.7%
	Electrical Mechanics	14	16	2.3%	16	1.8%
ICT Occupations	Computer and Information Systems Professionals	472	535	2.6%	523	2.1%
	Computer, Software and Web Designers and Developers	98	119	3.9%	116	3.4%
	Computer Network and Web Technicians	124	143	2.8%	140	2.4%
Other	Other Occupations	5,635	6,221	2.0%	6,058	1.5%
<b>Total</b>		<b>13,250</b>	<b>14,657</b>	<b>2.0%</b>	<b>14,317</b>	<b>1.6%</b>

Source: EHRC

Figures 23 and 24 illustrate the level of employment expected under the Current Measures and Net Zero scenarios, during the 2023 (actual) and 2024-2028 (projected) periods, for the six occupational groups in question. The levels of employment anticipated for each occupational group do not significantly

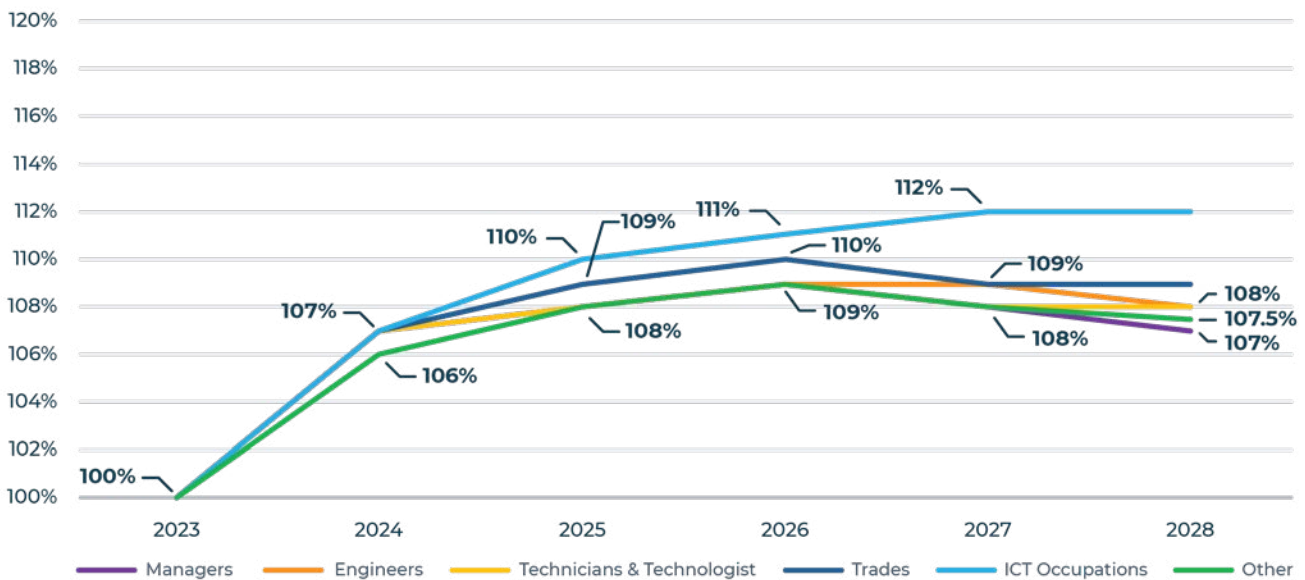
differ across scenarios. In both cases ICT occupations register the highest five-year employment growth (12%-15%), with Engineers and Tradespeople following suit (8%-11%). Managerial occupations exhibit the least growth (6%-9%), which is consistent with the situation at the national level.

**Figure 23:**  
**Actual (2022-2023) and Forecasted (2024-2028) Electricity Sector Employment in Alberta, in Core and Non-Core Occupational Groups: Current Measures Scenario**



Source: EHRC

**Figure 24:**  
**Actual (2022-2023) and Forecasted (2024-2028) Electricity Sector Employment in Alberta, in Core and Non-Core Occupational Groups: Net Zero Scenario**



Source: EHRC

# Job Openings

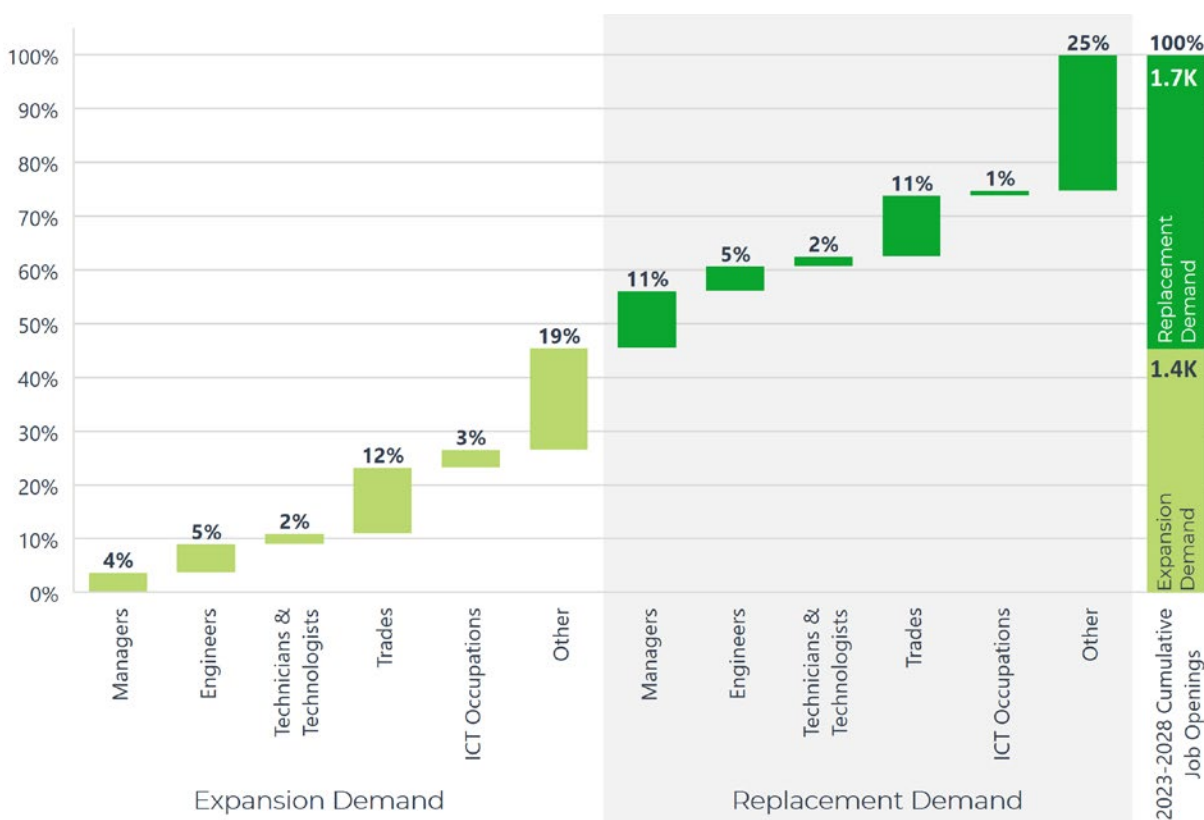
The analysis assumes that job openings arise for two different reasons. If the electricity sector expands (or contracts) due to economic, business, regulatory and/or other developments, employees must be hired (or dismissed). When employees decide to retire from the workforce, employers must replace them with new hires. Figures 25 and 26 illustrates the distribution of projected job openings in Alberta’s electricity sector, by core occupational group and type (expansion or replacement), under the Current Measures and Net Zero scenarios.

Over the 2023-2028 period 3,100 job openings are projected under the Current Measures Scenario. Nearly two-thirds of them, or 1,700

openings, are due to the need to replace retiring workers, while the remaining job openings occur because of industry expansion. The three occupational groups expected to register the most job openings are “other occupations” (1,368); Trades (731); and Managers (443).

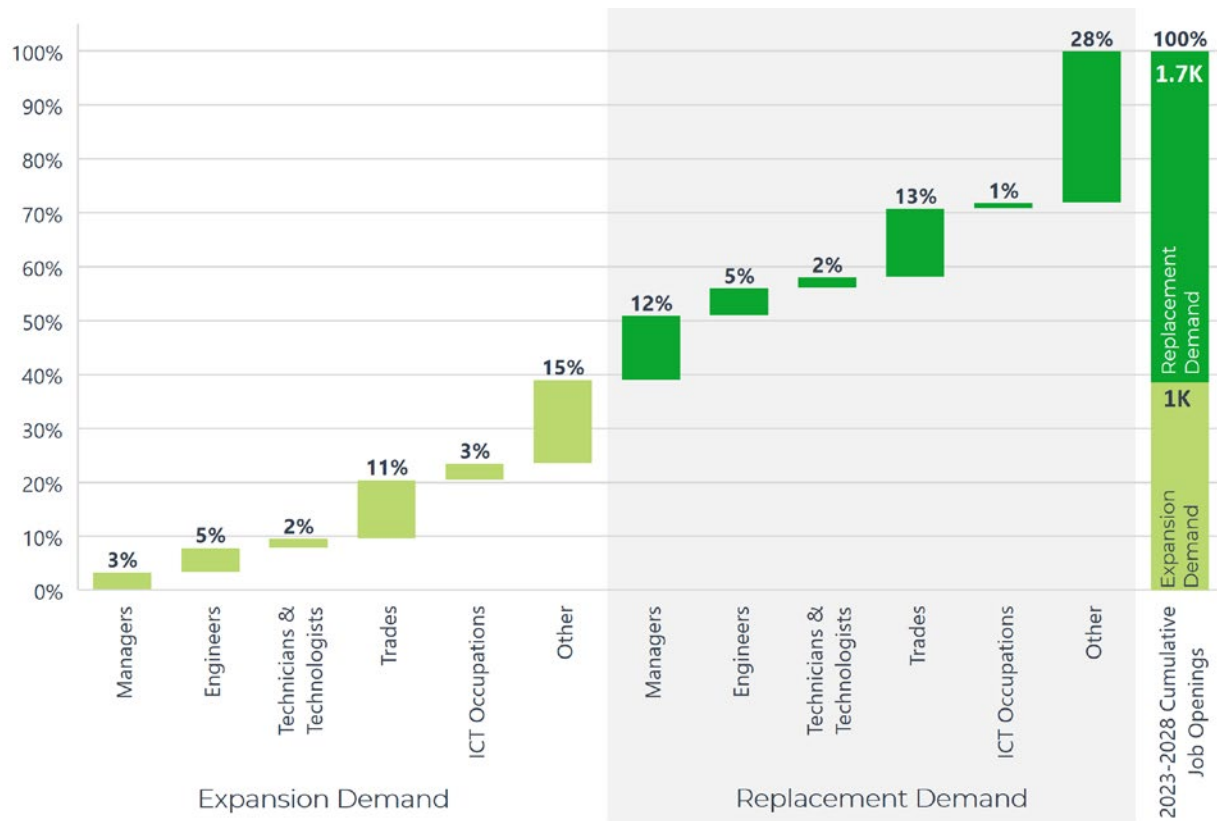
Under the Net Zero Scenario, 2,700 job openings are expected to materialize during the 2023-2028 period. The majority (61%) of them reflect the need to replace retiring workers. The remaining openings occur due to expansion demand caused by economic and population growth, electrification of industries and/or fuel-switching. The occupations expected to register the most job openings are “other occupations” (1,195), trades (647) and managers (416).

**Figure 25: Composition of Job Openings by Core Occupational Groups in Alberta’s Electricity Sector: Current Measures Scenario (2023-2028)**



Source: EHRC

**Figure 26:**  
**Composition of Job Openings by Core Occupational Groups in Alberta's Electricity Sector: Canada Net Zero Scenario (2023-2028)**



Source: EHRC

## Labour Market Imbalances

When labour markets operate efficiently prospective employees are well informed about emerging job opportunities. Employers and job seekers can find each other. Organizations can hire the required number of employees with the skills, aptitudes, knowledge and professional experience they seek. However, reality dictates that there will inevitably be imbalances or gaps between the demand and supply of qualified workers at the municipal, regional, occupational and/or industrial level. Even under the best circumstances, when “structural” unemployment is at a minimum, a certain amount of “frictional” unemployment will exist.<sup>155</sup> The imbalances can create higher costs and/or lost profit opportunities for employers. Not being able to find work can create financial hardship, distress and uncertainty for unemployed individuals and their families.

To determine the likelihood of there being an excess demand or excess supply of workers (or disequilibrium conditions) in an occupation, among other things, it is necessary to gauge the extent to which recent economic conditions will continue or change during the projection period. Examining the trajectory of key indicators, such as employment, unemployment, vacancy rates, and the number of graduates emerging from postsecondary institutions by discipline and field of study, is instructive, but not determinative.

If there are significantly more job openings than job seekers in an occupation, a labour shortage will develop. Conversely, if there are more job seekers than job openings, an excess supply of labour will ensue. It is important to recognize

that the magnitude of the imbalance in a labour market or occupation is not directly correlated with the relevant level of employment. An occupation that is experiencing rising employment can have an excess supply of workers, whereas one with declining employment can exhibit excess demand. The extent of the imbalance (i.e.: disequilibrium) reflects the magnitude of the gap between the number of job openings and job seekers.

To project the magnitude of future labour market imbalances in Alberta’s electricity sector, we quantified the deviation of each relevant occupation’s unemployment rate (based on Census 2021 data) from the province’s economy-wide unemployment rate in 2021.

The results were assigned to one of the following **five categories**, based on the extent of the imbalance.

1. High Excess Supply
2. Moderate Excess Supply
3. Balanced Market
4. Moderate Excess Demand
5. High Excess Demand

Annual deviations were projected for each occupation of interest, based on economy-wide labour market forecasts carried out for Alberta. Table 21 enumerates the projected labour market conditions for each occupation, over the 2023-28 period.

<sup>155</sup> Structural unemployment is a more persistent form of unemployment caused by economic shifts and/or technological and competitive factors, or changes in public policy. Frictional unemployment arises when workers are searching for new jobs or are transitioning from one job to another.



**Table 21:  
Projected Labour Market Conditions in  
Alberta's Electricity Sector, by Occupation 2023-2028**

<b>Electricity Sector Occupations</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>	<b>2027</b>	<b>2028</b>
Boilermakers, Welders and Related Machine Operators	1	1	1	1	1	1
Civil and Mechanical Engineers	4	5	5	5	5	5
Civil, Mechanical, and Industrial Engineering Technologists and Technicians	3	3	3	3	3	3
Computer and Information Systems Professionals	4	4	4	4	5	5
Computer Network and Web Technicians	2	2	2	2	2	2
Computer, Software and Web Designers and Developers	5	5	5	5	5	5
Construction Managers	4	4	4	4	4	4
Construction Millwrights and Industrial Mechanics	3	3	3	3	3	3
Contractors and Supervisors, Electrical Trades and Telecommunications	4	4	4	4	5	5
Electrical and Electronics Engineering Technologists and Technicians	3	3	3	3	3	3
Electrical and Electronics Engineers	4	4	4	4	4	4
Electrical Mechanics	4	4	4	4	4	4
Electricians and Electrical Power Line and Cable Workers	3	3	3	3	4	4
Engineering Managers	3	3	3	3	3	3

Electricity Sector Occupations	2023	2024	2025	2026	2027	2028
Industrial and Manufacturing Engineers	4	4	5	5	5	5
Non-destructive Testers and Inspection Technicians	3	3	3	3	3	3
Pipefitters/Steamfitters	3	3	3	3	3	3
Power Engineers and Power Systems Operators	3	3	3	3	3	3
Public Works Maintenance Equipment Operators and Related Workers	4	4	4	5	5	5
Residential and Commercial Installers and Servicers	2	2	2	2	2	2
Utilities Managers	2	2	1	1	1	1

Source: EHRC

Significant imbalances are expected to occur in many occupations considered in the analysis. Moderate or high excess demand situations typically occur when a sizable percentage of employees are expected to retire during the projection period. The occupations expected to face such conditions include Civil and mechanical

engineers; Computers and information system professionals; Construction Managers; Contractors and supervisors; and Electricians and electrical powerline and cable workers. Two occupations (Utility Managers and Boilermakers, Welders and Related Machine Operators) are expected to encounter a surplus of labour.

## Proposed Workforce Strategy

Alberta's electricity sector is dynamic, highly competitive, technologically innovative and resilient. However, like its counterparts in other provinces, territories and countries, it faces serious challenges related to societal efforts to

combat climate change and decarbonize the economy. These and other initiatives are having profound implications for employers, educators, policy makers and other stakeholders. The research and analysis carried out in this study

suggests that Alberta’s electricity sector would greatly benefit from the development and implementation of an integrated workforce strategy. The strategy’s effectiveness and success will be maximized if Alberta’s main electricity sector stakeholders (i.e.: government, employers, postsecondary institutions and major unions) closely collaborate in the process. The strategy should address key issues such as the collection and dissemination of sector-specific labour market information; attraction; recruitment and retention; diversity, equity and inclusion; skills development, education and training; and succession planning. Each participant should ensure

that its inputs and actions related to the strategy: i) are aligned with its mandate and priorities; ii) are mutually beneficial (i.e.: do not function at cross-purposes); and iii) appropriately balance the needs of electricity sectors stakeholders (i.e.: employers, employees, consumers, students). The workforce strategy should include measurable, realistic and attainable goals agreed upon by its collaborators. Its utility, cost-effectiveness and progress should be periodically evaluated by its collaborators or a trusted third party. The strategy should include, but not be limited to, the following elements:

## Improving the Availability/Dissemination of Sector-specific Labour Market Information

- Monitor changes in occupational structure and skill requirements of the workforce;
- Improve coordination, collaboration and sharing of LMI with key stakeholders;
- Advocate to update NOC system

Due to economic, competitive, regulatory, societal and other developments impacting Alberta’s electricity sector, it is increasingly important for its stakeholders to be able to access current and reliable labour market information (LMI). It helps them stay well-informed about employment opportunities, skill and labour requirements, employee remuneration, educational options, career paths, and overall labour market conditions. Access to good LMI generally contributes to the efficiency of the labour market and facilitates prudent decision-making.

The occupational structure and skill requirements of Alberta’s electricity sector will inevitably change over time, due to technological innovations, regulatory changes, demographic

developments, environmental considerations, exchange rate fluctuations, domestic/foreign competition, and other endogenous and exogenous factors. Price fluctuations may incentivize research and development efforts and hasten the introduction of new more efficient technologies, which can alter the distribution of jobs within and across occupations. Improving the collection and dissemination of Alberta-centric LMI for the electricity sector will therefore improve the ability of stakeholders to respond to transitory and/or persistent labour market and/or skill imbalances.

*The proposed workforce strategy envisages the systematic monitoring of labour market developments in both the traditional fossil-fuel and renewable energy segments of Alberta’s electricity sector.*

Identifying changes in its occupational structure, skill requirements and demand/supply conditions, should be accorded high priority.

Implementing remedial actions to mitigate problems in a timely fashion should be accorded equal importance. Efforts should be made, in conjunction with Federal authorities, to update the NOC System to reflect emerging renewable occupations. Unless this is done, it will be impossible to monitor and compile statistics on this increasingly important segment of the market, ensure accurate workforce projections, and fully capture labour mobility between occupations and jurisdictions. Since the NOC framework is used to assess labour market impact assessments (LMIA), if employers don't have an appropriate code to map them to, there is a much higher risk that they will not be approved. This will exacerbate the challenge of finding foreign skilled workers to fill positions when no Canadian worker or permanent resident is available.

## Addressing Anticipated Labour Market Imbalances

A comparison of Alberta's electricity sector with that of other provinces and territories reveals significant differences in labour market conditions within and across occupations. It suggests that some of the labour and skill shortages expected in Alberta could be mitigated by recruiting workers (from the same or similar occupations) from other sectors within the province and/or other jurisdictions. For example, there is currently a relatively high demand for construction managers in Alberta's electricity sector, although this is not the case at the national level. Several other occupations face a similar situation. They include Mechanical engineers; Contractors and supervisors; and Utility

arborists (part of the "Public Works Maintenance Equipment Operators and Related Workers" occupation). With some upskilling and/or on-the-job-training, Albertans who have some, but not all, of the required skills, could be deployed in such positions within the electricity sector. Examples of such occupations include Utility Managers, Computer Network and Web Technicians, Boilermakers, and Welders. An effective marketing and communications campaign that leverages Alberta's status as a net recipient of interprovincial migrants could attract qualified workers from other provinces and territories to work in its electricity sector.

Primary and secondary research conducted by EHRC suggests that some occupations expected to face shortages in Alberta's electricity sector will experience similar conditions at the national economy-wide level. They include engineering occupations (Electrical and Electronics Engineers, Industrial and Manufacturing Engineers, Civil Engineers), as well as most ICT occupations (Computer Systems and Software Developers and Programmers, Cybersecurity Specialists, Data Scientists, Database Analysts and Data Administrators, Information System Specialists, Software Engineers, and Designers). Such shortages could potentially be addressed by: i) successfully advocating for changes to Canada's immigration policies and procedures to make it easier to hire foreign trained workers (FTWs); ii) expanding the capacity and responsiveness of Alberta's postsecondary system, by creating new courses/programs that meet the evolving needs of industry; iii) increasing the appeal of the electricity sector as a potential employer (i.e.: increasing its "capture rate").

In the next five years FTWs will likely become an increasingly important source of labour for Alberta's electricity sector. It is imperative for

employers and governments at all levels to be fully aware of any barriers that impede their integration into the labour force.

Creating appropriate bridging programs could accelerate their entry into the province's electricity sector. Efforts should be made to improve and expedite the foreign credential recognition process, particularly since many FTWs possess the skills and experience needed to work in high demand occupations within the sector.

*In occupations in which there is a surplus of workers in Alberta's electricity sector, and a shortage at the national level, the outbound migration of labour to other sectors within the province and/or across Canada (within or outside electricity) could reduce intra-jurisdictional imbalances.*

## Increasing Attraction, Recruitment and Retention of Employees

- Target geodemographic groups based on values/goals;
- Retrain, upskill and retain the most experienced workers;
- Implement measures to facilitate employee recognition, work/life balance and mental health

Creating a more diverse, inclusive, sustainable and proficient electricity sector workforce in Alberta necessitates attracting and recruiting new employees from within the province, as well as other provinces/territories, and countries. Since the sector increasingly competes for talent on an international basis, new

innovative approaches are required to recruit, engage, develop, and retain the most talented personnel. Efforts should be targeted to those in specific age groups (e.g.: Millennials, Generation X, Baby Boomers) based on their priorities, values and goals. Although the salaries and benefit packages offered to employees must always reflect the capabilities and professional experience they bring to an organization, some individuals may value workplace flexibility (i.e.: how, where and when work is done) more than remuneration or career advancement opportunities. Since many employees are highly motivated by intangible factors—such as a supervisor's appreciation for a job well done; being involved in decisions that affect them; open communications; the opportunity to carry out interesting and meaningful work; and having positive relationships with colleagues—there are many ways for an organization to transform itself into an “employer of choice”.

Increasing employers' propensity to retain and retrain their most experienced workers can be quite beneficial, particularly in the absence of effective succession plans. Since the most experienced employees often have decades of institutional and industry-specific knowledge, their loss can be quite detrimental to an organization, particularly in the short term. Many baby boomers work past the traditional retirement age, since improved medical interventions and longer life expectancies have extended their working lives. This presents opportunities for “reverse mentoring”, whereby younger employees share their technological or other expertise with senior colleagues, in return for guidance and information on organizational issues, career planning and historical perspectives on the industry.

Organizations in Alberta's electricity sector can also improve their employee retention rates by developing and implementing a formal employee recognition strategy. This is increasingly viewed as a continuous requirement of prudent management practice, rather than a behaviour or activity that occurs only occasionally. It's human nature to want to be appreciated. Organizations that routinely acknowledge and celebrate their employees' achievements and contributions reinforce desired behaviors and tend to have higher rates of employee satisfaction and retention. If properly used and structured, employee recognition can be a key component in creating workplace well-being and transforming an organization into an "employer of choice". It need not be costly or bureaucratically cumbersome to administer such a program. However, careful consideration should be given to its selectiveness, as well as how and when recognition is conveyed.

***Giving employees the opportunity to influence how their work is done; to fully develop their potential; and maintain a healthy work-life balance—contributes to greater employee retention.***

Successful organizations recognize the link between employee well-being and productivity. Giving workers options and resources to balance their personal lives and professional obligations can help reduce stress and favourably affect their engagement, commitment, and satisfaction at work.

The World Health Organization (WHO) defines mental health as "a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is

able to make a contribution to her or his community." The Canadian public is presently much more knowledgeable about the health consequences of stress than it was a quarter century ago. Canadian law increasingly holds employers responsible for protecting their employees' psychological safety. Mental illness affects people of all ages, education, income levels and cultures. The mental health problems affecting Canadians include a broad range of conditions, such as anxiety disorders, depression, post-traumatic stress disorder (PTSD), alcohol and/or substance abuse, and other conditions that can interfere with daily functioning. Its economic impact in the workplace is manifested in lost productivity and disability claims. Building a supportive work environment that promotes mental health and well-being benefits everybody and keeps the workforce strong, resilient and competitive. Enhancing employees' knowledge and mental health skill set can clearly improve their engagement and retention.

An employer's flexibility and willingness to accommodate the demands of an employee's personal life can enhance individual well-being. To fully utilize the talent pool and retain a healthy workforce, employers must strike a balance by rewarding productivity as much (if not more) than being physically present. The line between the "office" and "home" continues to blur as technology provides numerous opportunities to work remotely. Flexible work arrangements allow employees to alter their work schedule; the number of hours they work; their work location; or to take leave from work to meet responsibilities outside of work. Organizations should determine whether the work location can be made flexible, to what extent, and how. Clearly, not all jobs and functions performed by employees in the electricity sector are amenable to such work arrangements.

However, when appropriate, they can offer a way to better manage the competing demands of work and personal responsibilities. When

implemented in a transparent, consistent and equitable way, flexible work arrangements can help to attract and retain talent.

## Increasing Diversity, Equity and Inclusion of the Workforce

*A workforce is diverse if it comprises employees who have a wide range of identities, backgrounds, cultures, perspectives, and experiences that collectively represent Canada's population.*

- Support greater labour force participation of underrepresented groups;
- Make GBA+ training mandatory for all personnel;
- Create more appealing educational/career pathways for students/workers

A diverse and inclusive talent pool is an important component of what attracts new employees to an organization and retains them. Employees, particularly new entrants, often place as much importance on an organization's culture and environment as the compensation and non-pecuniary benefits that it offers. Clearly, the ability of Alberta's electricity sector to attract and retain an adequate number of high-performing workers reflects the inclusiveness of its workforce.

All organizations in Alberta's electricity sector should maintain a safe, diverse and inclusive workplace where employees feel valued and respected. The sector needs to increase the participation of Indigenous People, racialized groups, those with disabilities and other historically underrepresented groups in the workforce.

They frequently face discrimination, as well as conscious and unconscious bias. Indigenous People are a particularly underutilized resource in Alberta's workforce. Since they comprise the youngest segment of the population, efforts to increase their participation would greatly benefit employers, as well as the Indigenous community. It would also help to advance the Truth and Reconciliation process.

It is imperative for Alberta's electricity sector to increase its employment of women and normalize their participation in the Trades. Hiring more female employees for entry level, advanced and senior management roles will create role models for youth to look up to and emulate. This should not be difficult since more than half of the women in Alberta have completed a post-secondary education.<sup>156</sup> Other measures that could encourage their greater participation include improved accommodations for pregnant workers and greater access to childcare.

The gender gap in the sector remains persistent, especially in core technical occupations. Working to attract, recruit and retain women and 2SLGBTQ+ individuals in engineering, skilled trades and other technical roles should be accorded high priority in the coming years. All employers should create a work environment that welcomes people of all backgrounds and is devoid of any form of discrimination and/or harassment. To this end Gender Based

156 "2022 Alberta Labour Force Profiles" Government of Alberta

Analysis (GBA) Plus training should be given to all personnel in an organization, particularly those involved in creating, managing and/or evaluating an organization's policies, programs and processes.<sup>157</sup>

Employers and postsecondary institutions should proactively engage with the above-noted communities to create career and educational pathways that offer specific opportunities within the sector. Employees from historically underrepresented groups that avail such opportunities and subsequently have positive experiences working in the industry could serve as models/mentors/exemplars for their peers in the community, who should be viewed as potential entrants to the sector. One of the most effective ways to address the underrepresentation of different groups in the electricity sector is to connect with them as early as possible in the talent pipeline. Reaching out to secondary school students will increase

their awareness of career opportunities in the sector and show them how they can participate in Canada's efforts to combat climate change.

EHRC's 2023 Employer Survey revealed several persistent gaps with respect to the collection of employment data for equity-seeking groups. Many organizations still do not gather such data, or it is limited to gender. Efforts to improve data collection in this area will help shed light on important gaps in DEI and help organizations foster a more inclusive work environment. Organizations need to actively engage with equity seeking groups, to meaningfully use the data they collect to inform their decisions, and to hold their senior managers accountable for implementing change.

***EHRC is mobilizing the industry to act on DEI commitments through its Leadership Accord on Diversity, Equity and Inclusion***



157 GBA Plus is an analytical process used to assess how different women, men and gender diverse people may experience policies, programs and initiatives.



# Educating and Training Alberta's Electricity Sector Workforce

- Revise/update postsecondary curricula to align with evolving skill and labour force requirements;
- Create more WIL opportunities and innovative joint university/college programs;
- Improve accessibility and marketing of relevant education/training programs.

Managers and employees in Alberta's electricity sector should assume joint responsibility for maintaining and developing the skills and competencies required to achieve their work objectives and career aspirations. Many jobs require employees to engage in intermittent retraining and professional development to keep up with the rapid pace of technological change. Employees should be afforded every opportunity to learn important skills on the job and acquire organizational and sector-specific knowledge. This will enable them to perform at their highest level and have more productive, meaningful and rewarding careers. Investing in professional development can yield significant dividends for employees, as well as employers. It supports attraction, recruitment and retention efforts, and tends to increase loyalty to an employer.

Technological, competitive, regulatory and societal changes are profoundly affecting the electricity industry. Educational institutions must ensure that real world experiences and industry best practices are reflected in their curricula, and that the quality of their programs maximize their graduates' employment prospects and career options. It is incumbent on Alberta's

postsecondary system to recruit, train and produce an adequate number of job-ready graduates to meet the long-term human resources requirements of employers in the electricity sector, regardless of their size (small, medium or large) location (urban, rural or remote) or line of business. Using appropriate delivery methods (i.e.: traditional classroom setting, online, hybrid learning) academic institutions must offer inspiring and compelling programs that capture the imagination of potential applicants in different student populations and demographic groups (e.g.: Indigenous People, newcomers to Canada, mature students, students with disabilities, indirect entrants).<sup>158</sup> Providing distance and technology enhanced learning opportunities is particularly beneficial for the province's Indigenous Peoples, many of whom live in rural and remote areas. Labour market shortages, and low adult education levels, as well as the requirements of a rapidly expanding population, create an urgent need for such programs. Teaching the residents of communities such as Fort Chipewyan (located 200 km north of Fort McMurray) new skills and processes will help build local trade capacity; enable small and medium-sized enterprises to compete more effectively in the market; and ultimately contribute to local economic development. It will also support their efforts to reduce their reliance on diesel fuel for generating electricity and facilitate the shift towards renewable sources, such as solar and wind power.

Employers in Alberta's electricity sector increasingly value employees who have a range of technological, computational, entrepreneurial and interpersonal skills. They must be able to multi-task and properly apply knowledge to specific situations. To maximize graduates' employability and ability to contribute to the organizations they work for, postsecondary

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<sup>158</sup> Indirect students are those students that do not enter a postsecondary institution directly from high school.

institutions must educate students about all aspects of entry-level (and some advanced) positions in sufficient breadth, depth and detail. They must equip students to foster client relationships, understand organizational needs and effectively present technical information to nonprofessional audiences. Students must also learn how to work effectively across different cultures, disciplines, and borders.

Although most graduates of academic programs will aspire to work for an organization, some will choose to work on a self-employed basis and/or create their own business. Therefore, as well as developing the skills and abilities necessary to succeed in a particular field of study, such students must become knowledgeable about the legal, financial, human resources, marketing and other aspects of operating a profitable business within the electricity sector.

Alberta's employers, postsecondary institutions and various levels of government need to work together to create more work-integrated learning programs that reflect the skill requirements and priorities of the electricity industry, as well as evolving regulatory requirements. To the extent possible, postsecondary institutions should integrate experiential learning into all academic programs relevant to the sector, through apprenticeships, field placements, co-ops, job-shadowing, and applied research opportunities. Where appropriate Alberta's colleges and universities should jointly develop and deliver collaborative programs that teach both the theoretical and practical aspects of relevant disciplines. There is an urgent need for multi-disciplinary programs that combine academic studies, technical skills and practical experience. This will create better quality, more well-rounded and employable graduates.

Alberta's postsecondary institutions should implement more effective marketing and communications campaigns to educate employers and potential applicants about the distinctive attributes of their electricity sector-oriented academic offerings. Programs that teach the skills required to work in high demand and/or emerging renewable occupations could rapidly achieve credibility among employers and potential applicants—particularly if they are developed in close consultation with industry. Over time they could become “signature programs” that attract applicants from the local catchment area, across Canada and beyond.

There are at least two types of students who may apply to academic programs that are relevant to the electricity sector. The first type comprises those currently working in the sector who wish to enhance their knowledge and skills through further education. It includes (but is not limited to) people who have worked in the traditional fossil-fuel segment of the industry and wish to develop the skills and competencies required to work in the renewable space. Alberta's reliance on fossil fuel exceeds that of all other provinces in Canada.<sup>159</sup> The second category includes those who lack industry-specific knowledge, experience, and education, but aspire to work in the electricity field. Postsecondary education and appropriate training may help them successfully enter the workforce. Both types of potential applicants may include displaced workers who are interested in retraining opportunities or pursuing a new career. There are a growing number of courses and academic programs available to enable potential and current workers to upskill and/or re-skill to provide value to organizations in Alberta's electricity sector. Employers and academic institutions should inform them about the many educational paths and opportunities that can lead to a rewarding and fulfilling career in the sector.

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159 “Steady Path: How a transition to a fossil-free Canada is in reach for workers and their communities”, January 2021, Environmental Defence

NAIT defines a micro-credential as “A certification that recognizes specific skills, learning outcomes or competencies that are valued by industry and employers”.<sup>160</sup> Micro-credentials promote greater labour mobility between employers and regions, and therefore contribute to greater labour market efficiency. Research carried out by EHRC shows that they are best delivered by postsecondary institutions (due to the credibility of their training programs, which support the credential), through programs grounded in industry competency models. Micro-credentials can be ladderized to verify competencies as technologies and/or workplace training requirements evolve over time.

*EHRC is currently in the process of creating and implementing an accreditation initiative that aims to enhance training outcomes for in-demand positions not currently covered by accreditation programs in Canada. It will benefit employers, employees and educators in Alberta, as well as other provinces, especially in the renewable energy sector.*

## Evaluating the Effectiveness of the Workforce Strategy

- Periodically assess the relevance, utility and cost-effectiveness of the workforce strategy;
- Modify as required, based on current/anticipated conditions

On at least a bi-annual basis, representatives of Alberta’s government, electricity sector, postsecondary institutions and major unions involved in creating and implementing the workforce strategy should formally evaluate its utility and cost-effectiveness. The purpose of the evaluation is to provide independent, objective and actionable evidence to electricity sector stakeholders. It will document the factors that have impacted the strategy’s relevance and value, and/or could affect its future viability. The evaluation will determine if: i) has achieved its objectives; ii) has adequately addressed the human resources requirements of Alberta’s electricity sector; and iii) should continue in its current form. Evaluators can then decide if the strategy should be terminated, altered, or integrated with another initiative that has similar or complementary objectives.

<sup>160</sup> <https://www.nait.ca/micro-credentials#:~:text=A%20micro%2Dcredential%20is%20a,%E2%80%9Chow%20you%20do%20it%E2%80%9D>

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### **Kevin Burgemeister**

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### **Michelle Branigan**

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The Province of Alberta is working in partnership with the Government of Canada to provide employment support programs and services.

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