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Hiring Green

An Analysis of the Demand for Green Skills in Canada

Data briefing | June 6, 2024





The Future Skills Centre – Centre des Compétences futures (FSC-CCF) is a forward-thinking centre for research and collaboration dedicated to preparing Canadians for employment success. We believe Canadians should feel confident about the skills they have to succeed in a changing workforce. As a pan-Canadian community, we are collaborating to rigorously identify, test, measure, and share innovative approaches to assessing and developing the skills Canadians need to thrive in the days and years ahead.

The Future Skills Centre was founded by a consortium whose members are Toronto Metropolitan University, Blueprint, and The Conference Board of Canada.

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Key findings

- Employers look for 35 specific green skills and competencies when hiring. *Wastewater processing* and *renewable energy* are the top areas of green expertise that employers seek.
- Demand for green skills is not yet widespread, with only 1.15 per cent of job postings in 2023 requiring them. However, green skills are highly demanded in some industries. Up to 16 per cent of advertised jobs in key sectors like mining and utilities require green skills.
- The largest number of job postings requiring green skills are found in the professional services sector. The occupations requiring green skills the most are administrative officers, civil and electrical engineers, and corporate sales and business managers. Most of these roles are projected to experience above-average growth in employment by 2040.
- Ontario has the highest number of job postings that require green skills, with twice as many as the runner-up, British Columbia. However, the jurisdiction with the largest share of job postings requiring green skills is the Northwest Territories.
- Most green jobs require post-secondary education credentials, but more than half of jobs require a college diploma or less, indicating opportunities at all levels of education.
- Canadian post-secondary institutions (PSIs) are generally focused on developing the green skills most in demand in the labour market. Apparent gaps in Canadian PSI programs relate to third party standards or certifications, such as ISO (International Organization for Standardization) 14000 and Leadership in Energy and Environmental Design (LEED).



Green transition

The threat of climate change is driving an urgent need to decrease reliance on unsustainable practices and technologies in the workplace. The transition to the green economy is expected to create new employment opportunities and surging demand for green expertise for the sustainable jobs of today and tomorrow.¹

While green skills are important for the future of work, there is a lack of clarity on the types of expertise that are needed and how the demand might vary across regions, sectors, and occupations in Canada.² A better understanding of this demand is especially important for post-secondary leaders and educators, who are central to facilitating skills acquisition and shaping a sustainable workforce.

In this study, we discuss the top green skills needed in Canada drawing upon data from Vicinity Jobs, a Canadian labour market data and analytics company that uses a directory of 35 skills to identify jobs in environmental and social sustainability (i.e., green jobs).³ We also examine the prevalence of green skills teaching across higher education programs to identify potential gaps between the demand for green skills in the labour market and green skills training at the post-secondary level.



What are green skills?

Green skills encompass various dimensions of environmental awareness and are broadly defined as "the knowledge, abilities, values and attitudes needed to live in, develop and support a sustainable and resource-efficient society."

Source: United Nations Industrial Development Organization, "What Are Green Skills?"

1 Sonmez, Thomson, and Gresch, Green Occupation Pathways.

² Canadian Institute for Climate Choices, Canada's Net Zero Future.

³ We use the term "skills" to capture what employers are asking for in job postings. This also includes competencies, certifications, knowledge, and abilities related to sustainability.

Green skills in demand

Clean water and clean energy are top of mind for Canadian employers

Employers across Canada are looking for skills in wastewater processing and various forms of renewable energy, including solar power and wind power generation. (See Chart 1.) As one of the world's largest per capita consumers of energy, Canada has committed to have 90 per cent of its electricity from renewable and non-emitting resources by 2030.⁴ Therefore, the demand for skills in renewable energy will likely grow as Canada further transitions to clean energy sources. Employers are also looking for workers who are familiar with environmental management and green standards. A green skill in high demand is the understanding of ISO 14000, an environmental management system with requirements for achieving green standards in product manufacturing, performance, and disposal.⁵ Expertise in LEED, the most widely used green building rating system in the world,⁶ is also desired. LEED provides a framework for healthy, efficient, and cost-saving green buildings. With increasing the housing supply and restoring housing affordability by 2030 being a national priority for Canada,⁷ understanding green building standards will become increasingly important.

Chart 1

Clean water, clean energy-top 10 green skills in demand (number of job postings, 2023, by green skill type)



Note: Data were collected from online job postings in environmental and social sustainability. Sources: The Conference Board of Canada; Vicinity Jobs.

4 Employment and Social Development Canada, "Sustainable Development Goal 7."

5 International Organization for Standardization, "ISO14000 and Related Standards."

6 U.S. Green Building Council, "Guide to LEED Certification."

7 Canada Mortgage and Housing Corporation, "Canada's Housing Supply Shortage."

Green skills on the map

How does employer demand for green skills vary across the country?

Ontario has the highest number of job postings requiring green skills. However, when examining the share of jobs requiring green skills by region, the Northwest Territories is in highest need of green expertise. (See Exhibit 1.)



Mapping the demand for green skills





Wastewater processing is the top area of green expertise needed in all jurisdictions except British Columbia, Newfoundland and Labrador, and Prince Edward Island. (See Table 1.) Expertise in renewable energy is also in high demand across Canada, but often expressed by employers in different ways (e.g., renewable energy, solar power, energy conservation).

Table 1

Top three green skill sets in demand in 2023, by province/territory

Ontario	Wastewater processing	Renewable energy	ISO 14000
British Columbia	Renewable energy	Wastewater processing	ISO 14000
Quebec	Wastewater processing	ESG (Envirnomental, Social and Governance)	Leadership in Energy and Environmental Design (LEED)
Alberta	Wastewater processing	Solar power	Renewable energy
Nova Scotia	Wastewater processing	Energy efficiency	Renewable energy
Saskatchewan	Wastewater processing	Renewable energy	Air quality
New Brunswick	Wastewater processing	Renewable energy	Solar power
Manitoba	Wastewater processing	Renewable energy	Solar power
Newfoundland and Labrador	Renewable energy	Wastewater processing	Leadership in Energy and Environmental Design (LEED)
Northwest Territories	Wastewater processing	Renewable energy	Solar power
Prince Edward Island	Solar power	Wastewater processing	Energy conservation

Green skills in the field

Resource extraction and utilities are the sectors with the highest need for green skills

Mining, oil, and gas extraction is the sector with the highest need for green skills, with 16 per cent of job postings requiring green expertise. This is a sector that traditionally relies on non-renewable energy and has significant emissions. However, there is increasing pressure globally and domestically from regulators, consumers, business partners, and employees to significantly transition toward more sustainable practices.⁸ The sector is expected to see more demand for workers with green skills as companies seek to meet regulatory requirements for sustainability and explore ways to reduce their carbon footprint.

The utilities sector follows closely behind, with almost 15 per cent of job postings listing a green skill as a requirement. (See Chart 2.) As the sector responsible for the generation, transmission, and distribution of energy, as well as the treatment and management of water and waste,⁹ it is a key player in the shift to a more sustainable economy and society. There will be an increasing need for workers who possess knowledge and experience with these skills as the sector continues to prioritize the transition to renewable energy and more sustainable practices.¹⁰ The professional services sector is also among the top sectors needing green skills (in absolute terms, it is the sector with the highest number of green job postings). This sector includes many of the engineers and technicians who will design and implement sustainable solutions across all sectors,¹¹ as well as business consultants. As regulations around environmental standards tighten, businesses need experts who can ensure compliance while optimizing operational efficiency. Clients and stakeholders are also increasingly valuing sustainable practices, pushing firms to integrate green skills into their job offerings. This convergence of regulatory, customer, and innovation-driven pressures has elevated the demand for green-skilled professionals to an all-time high.¹²

Chart 2

Top five sectors with demand for green skills (percentage of green jobs among all job postings, 2023, by sector)



- 8 Okeke, "Towards Sustainability in the Global Oil and Gas Industry."
- 9 U.S. Bureau of Labor Statistics, "Utilities: NAICS 22."
- 10 Brody, Rogers, and Siccardo, "Why, and How, Utilities Should Start to Manage Climate-Change Risk."
- 11 Statistics Canada, "Environmental and Clean Technology Products Sector Grew at Twice the Pace as the Total Economy in 2019."
- 12 Natural Resources Canada, "Government of Canada Releases Interim Sustainable Jobs Plan."

What roles are most in need of green skills?

The top roles requiring green skills are administrative officers, civil engineers, corporate sales managers, business managers, and electrical and electronics engineering. (See Chart 3.) According to our projections, most of these roles will experience above-average growth in employment by 2040.

Chart 3

Top 10 roles requring green skills (number of green job postings in 2023, by role)





Green skills and post-secondary education

Most green jobs require post-secondary education credentials

Post-secondary credentials are needed for most green jobs. (See Chart 4.) For example, 44 per cent of green jobs require a college diploma or certificate, and 38 per cent require a bachelor's degree. This is evidence that post-secondary institutions (PSIs) will be instrumental in preparing future graduates with the skills needed in the transition to a green economy. PSIs should consider preparing for surging demand.

Chart 4

Education requirements for green jobs (percentage of education requirements among green jobs, 2023)



Note: Data were collected from online job postings in environmental and social sustainability. Sources: The Conference Board of Canada; Vicinity Jobs.

The shy presence of green skills in the post-secondary curriculum

We created a large database of instructional programs offered across public, private, and non-profit PSIs in Canada. This database includes programs from colleges and polytechnics (n = 7,862), as well as universities (n = 13,670). We aimed to identify all programs available across institutional websites. We then investigated the prevalence of green skills teaching across these programs. Our results show that the green skills from Vicinity Jobs postings are taught in 0.97 per cent of college programs and 0.88 per cent of university programs. These shares are comparable with the finding from the job postings analysis, which shows that 1.15 per cent of job postings require green skills.

The specific skills most needed in the labour market are also the most taught across Canadian PSIs, though ranked in different orders in colleges and universities. (See charts 5 and 6.) Wastewater processing is the top green skill taught in colleges, while renewable energy is the top skill taught in universities. Colleges and universities are generally focused on developing the right skills that are required from their graduates in the labour market.

However, knowledge of ISO 14000 and LEED, which are in the top five most in-demand by employers, are notably absent themes from PSI programs. While PSIs appear to do relatively well in preparing graduates to meet industry demands, there may be skills gaps to be addressed. With the expected rise in demand for green expertise over the next decades, PSIs should leverage their employer engagement forums to identify and mitigate gaps, ensuring students are prepared for the future of work and fostering a smooth transition to the green economy.

Chart 5

Top skills mentioned in Canadian college and polytechnic programs (percentage and number of programs with green skills demanded by employers)



Note: Data were collected from college and polytechnic program descriptions online. Source: The Conference Board of Canada. PSIs and employers wishing to collaborate should consider a reciprocal dialogue: PSIs have an important role to play in meeting industry demands, but employers also can learn from PSIs about skills that could be beneficial to their industry in the future.

Chart 6

Top skills mentioned in Canadian university programs (percentage and number of programs with green skills demanded by employers)



Note: Data were collected from university program descriptions online. Source: The Conference Board of Canada.



Appendix A Methodology

Job postings data

We based our analysis on job postings data from Vicinity Jobs, a Canadian big data analytics company specializing in real-time tracking of regional and national labour market trends.¹ Using artificial intelligence and natural language processing, it monitors online job postings and provides information on employer demand based on industry, occupation, skills, education, and other data. Effectively, the job postings data allow for a comprehensive look at the real-time employer demand on the Canadian job market. In this study, the dataset we used consists of jobs posted between January and December 2023. Data were available for the 10 provinces and the Northwest Territories.

The focus of our analysis was on the demand for green skills. There is, however, no clear definition of green skills in the Vicinity Jobs database. Instead, Vicinity Jobs takes a bottom-up approach, tagging keywords related to environmental and social sustainability from job postings.

Table 2 summarizes the full list of terms that are categorized as green skills, or Environmental and Social Sustainability skills. There is a total of 35 specific skills in this category, which range from understanding certain sustainable building standards to the ability for assessing climate risks.

Table 1

Vicinity Jobs green skills directory

Skill group	Skills (35)	Note
Environmental and Social Sustainability (ESS)	Air quality	
	BOMA (Building Owners and Managers Association) BEST	A green building certification program
	BREEAM	A sustainable building assessment method
	Clean energy	
	Climate risk assessments	
	Contaminated sites	
	Ecological risk assessments	
	EnerGuide	An energy performance rating system
	Energy conservation	
	Energy efficiency	
	Energy Star	An energy efficiency program
	Environmental site assessments	
	ESG (Environmental, Social and Governance)	
	GHG emissions	
	Green energy	
	Green Globes	
	GRESB (Green Real Estate Sustainability Benchmark)	
	ISO 14000	Environmental management standards

(continued ...)



Table 1 (cont'd)

Vicinity Jobs green skills directory

Skill group	Skills (35)	Note
	Leadership in Energy and Environmental Design (LEED)	A green building certification program
	Net zero	
	Novoclimat	A home energy program in Quebec
	Nuclear energy	
	Renewable energy	
	Site remediation	
	Solar power	
	Virtual power plant platform	
	Waste diversion	
	Wastewater processing	
	Water conservation	
	Water resource management	
	WELL building standard	
	Wind power generation	
	Zero carbon	
	Zero energy	
	Zero waste	

Source: Vicinity Jobs.

Employment projections-MOST

The employment forecasts in this data briefing are constructed using the labour market projection tool—the Model of Occupations, Skills, and Technology (MOST)² – developed by The Conference Board of Canada in 2022. MOST generates detailed occupational and industry-level projections for every region in Canada. It can incorporate and isolate the impact of technological change and economic shocks on the employment demand for specific occupations, allowing for an in-depth and holistic view of evolving labour market needs and trends.

ResearchAl

We used <u>ResearchAl</u> to analyze the prevalence of green skills mentioned in college and university programs in Canada. There were two steps to this procedure: (1) scraping institutional websites to create a large database of all Canadian college programs (n = 7,862) and university programs (n = 13,670) available online, and (2) querying the prevalence of green skills (as defined in the Vicinity Jobs directory) across these programs.

For the scraping, two data operators went through each college and university listed by the <u>Canadian Information Centre for International Credentials</u>. Institutional websites rarely used the same language and layout, so automated scraping was not feasible. The data operators entered the program descriptions manually as individual rows.

For the analysis, we used the list of green skills from the Vicinity Jobs directory. A Python-based algorithm searched across program descriptions by identifying direct matches, but only complete word matches. For example, to prevent the word "determining" from being detected when searching for "mining," program descriptions were tokenized (using Python-based SpaCy). Researchers had the opportunity to review the quality of keyword matches and remove inappropriate matches.

The above process was iterative, where researchers could improve the quality of their keywords (e.g., by including synonyms) as the project progressed. All keyword matches are repeatable, replicable, and available in an annex table or an online private dashboard provided by ResearchAI. We were not able to assess green skills at the course level, which is a potential limitation. It is possible that green skills appear more in course descriptions than program descriptions.



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