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State of Skills Report

Sustainable jobs for economic growth

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KEY INSIGHTS

1. Green-related skills and knowledge are growing in significance and are becoming widespread across many sectors and occupations, requiring more workers to upskill by building upon their existing competencies.
2. Non-technical skills, like problem solving and communication, will continue to be important as a complement to these green-related skills and are key to ensuring individuals can take advantage of new opportunities in the transition to a net-zero economy.
3. Education and training institutes need to overcome capacity constraints and integrate green skills and knowledge into a wide range of existing curricula and programs.
4. Effective skills and workforce development policies that address the needs and challenges of individuals, sectors and regions can mitigate inequities and make sure that everyone has equitable access to new opportunities that arise from the transition.

The Issue

Canada is already experiencing significant impacts from climate change, with its warming rate being twice the global average. In recent years, Canada has experienced more frequent and severe weather events ranging from flash floods due to heavy rainfall, destruction from intense storms and persistent wildfires—all of which are having wide-ranging impacts on communities, economies, and individuals and their livelihoods. Recent estimates put the insured costs of the July 2024 floods in Toronto at close to $1 billion and the Jasper wildfire at $700 million. Moreover, the consequences of climate change are only expected to intensify unless efforts are made to transition to a low-carbon economy.

There are, however, ongoing efforts to mitigate the effects of climate change and facilitate this transformation. As part of its commitment to achieving net-zero greenhouse gas emissions by 2050, Canada aims to transition away from industries and processes that significantly contribute to these emissions. An important element of this ambitious goal is the plan to achieve a net-zero electricity system by 2035.

The transition to a low-carbon economy will necessitate substantial adjustments across and within many sectors, resulting in uncertainty and potential inequities for regions and individuals. This shift is poised to significantly affect Canada's labour market by altering employment levels and the skill composition of jobs. In the absence of strategic interventions across a range of disciplines, Canada will struggle to minimize the negative impacts on workers and adequately prepare its labour force to seize new economic opportunities. To navigate these changes effectively, it is crucial to better understand how the transformation will impact communities and individual livelihoods. Comprehensive efforts are needed to ensure that supports are in place to facilitate an equitable and inclusive transition.

What We Investigated

In the context of the challenges and opportunities presented by the greening of the economy, it is important to bear in mind that the vast majority of Future Skills Centre (FSC)-supported projects, while not explicitly focused on the green transition, are nevertheless designed to help workers, communities, and firms, especially small- and medium- sized enterprises, adapt to an evolving and dynamic world of work. Through our State of Skills series, there are a number of valuable lessons learned on a range of topics related to, for instance, occupational mobility, cutting-age labour market intelligence and sectoral and community sustainability, which offer insights into how to effectively manage workforce transitions and support skill development.

However, given the extensive and critical nature of the shift to a net-zero economy, there is a need for targeted research and innovation. Consequently, more than a dozen of FSC-funded projects have been directly related to the net-zero transition and sought to improve understanding of how workforce development policies and programs must evolve to support Canadian workers, sectors and communities and facilitate the transition to a low-carbon society.

Evidence to inform workforce development needs for the green economy
The rapid pace of change in green technologies and policies, coupled with the shifting dynamics of the labour market, creates a challenging landscape for understanding and predicting the specific skills and qualifications needed in the future. This lack of robust, forward-looking research hampers efforts to effectively address skill gaps, prepare workers for new roles and ensure that educational and training programs are responsive to the needs of a low-carbon economy. In response, several research initiatives were launched to help close this knowledge gap:

- The Smart Prosperity Institute, the Diversity Institute and FSC collaborated on a foresight exercise, "Jobs and skills in the transition to a net-zero economy," to analyze the potential impact that transitioning to a net-zero emissions future would have on the Canadian economy, job creation and skills requirements across sectors. It sought to improve our understanding of different pathways for structural transformations, job redistribution and new employment opportunities, and to identify crucial skills for the evolving economic landscape associated with various decarbonization scenarios.
- FSC supported a project by the Conference Board of Canada, "Green occupation pathways: From vulnerable jobs to rapid-growth careers", which examined the feasibility and desirability of transitioning workers from occupations susceptible to automation to rapidly growing occupations —particularly in the clean economy. A related project, "Hiring green: An analysis of the demand for green skills in Canada", analyzed the demand for green skills in Canada across regions, sectors and occupations.
- FSC invested in "Upskilling for Canada's climate transition," a research effort by the Academy for Sustainable Innovation and the Resilience by Design Lab. This initiative took a more broad-based approach and sought to identify the challenges and opportunities surrounding a pan-Canadian, rapid-upskilling approach for climate action leadership development.

Advancing regional and sector-specific solutions through skills development
The impacts of the transition to a net-zero economy will vary considerably by industry and region. For instance, carbon-emitting sectors like oil and gas will face headwinds in the transition to net zero, which will acutely affect regions like Alberta, Atlantic Canada and Saskatchewan, as well as Northern Canada, where there is a high concentration of mining and resource extraction activity. Similarly, in Ontario the automobile sector is likely to undergo considerable transformation as manufacturers move away from internal combustion engines. Rural and remote communities and regions with less economic diversity, and other communities reliant on a small number of industries, could experience economic and social disruption if measures are not put in place to support the transition for workers and communities and generate new economic and employment opportunities.

Yet signs are already indicating that emerging technologies associated with the move toward net zero are creating new industrial activity and, along with it, quality employment opportunities. Clean energy is expected to make up to 29% of Canada's total energy GDP by 2030, up from 22% in 2020. However, if industry is to take advantage of these new opportunities, a workforce development strategy will need to accompany these sectoral shifts. Indeed, as industries transition toward renewable energy sources and clean technologies, demand will increase for skills in areas such as solar and wind energy, energy efficiency and storage, electric vehicles and smart grid technologies. Labour market and skills development strategies will need to be developed in line with local economic development strategies. To that end, better understanding the changing skill requirements of existing and new jobs is paramount to the success of these industries but will also be central to supporting workers through this transition.

However, uncertainties remain as to how skills compositions of existing and new jobs will emerge in different sectors and regions. A number of our projects aimed to shed light on these sector-specific needs:

- Foresight Cleantech Accelerator Centre's "Building skills for a clean economy" aimed to identify opportunities and learnings to help workers with transferable skills transition from sectors at risk of disruption to the cleantech sector. It focused on identifying in-demand roles and skills shortages in cleantech and finding opportunities for upskilling workers for a transition.

- The Environmental Careers Organization of Canada (ECO Canada)'s project, "Development of Canada's National Occupational Standards for sustainable blue economy", set out to identify and describe the specific skill sets required for workers in high-risk occupations to adapt and thrive in the sustainable blue economy and related sectors. The research sought to understand the current and future workforce requirements and how to ensure workers remain competitive in evolving coastal economies.
- University of the Fraser Valley's research project, "Emerging agricultural technologies and the future of food: Exploring potential" explored the opportunities, challenges and key considerations for developing a cellular agriculture industry, primarily in British Columbia, in ways that support transitions to sustainable food futures.
- A series of initiatives led by the Smart Prosperity Institute aimed to provide insights on skill needs in different sectors across the country, including mass timber in British Columbia, plant-based protein in Manitoba and Saskatchewan and zero-emissions vehicles and battery manufacturing in Ontario. The aim of the research was to provide insights to government, industry and educational institutions on how best to support workers and rural, resource-dependent communities.

How to green the skills development ecosystem

As we navigate the green transition, new green-related skills and knowledge will become an important component of the overall skills lexicon. The growing importance of green skills is already relevant for a number of skilled trades, e.g., construction, where building electrification and utilities infrastructure and moving to green building standards are major economic shifts that will need to happen to achieve net-zero-related targets. At the same time, increased environmental knowledge and expertise regarding sustainable practices will also be highly relevant throughout the economy and workplaces as eco-friendly technologies and practices take hold. A number of FSC-supported projects investigated the role of emerging green skills within the wider skills development ecosystem, including the following:

- Canada Green Building Council's "Workforce 2030: Rapid upskilling for green building" initiative trained new workers for the green-building industry. The project sought to transition workers from sectors like retail and hospitality into green building roles by revamping curriculum design with the support of industry and education partners.
- Business + Higher Education Roundtable's "Navigating net-zero: Faculty perspectives on greening postsecondary curricula" sought to understand how postsecondary institutions are integrating green skills, climate literacy and green career pathways into their programming; the barriers postsecondary institutions face; and opportunities for these institutions to be more responsive to emerging green-economy needs**.**

Distributional consequences of the transition

The employment opportunities created by the transition to net-zero emissions must balance a wide array of needs, priorities and population dynamics. Opportunities must be available to traditionally marginalized groups, including those at greater risk of economic displacement (e.g., older workers, people in rural and remote communities and Indigenous peoples), to help mitigate the hardships they face. Moreover, isolated and marginalized communities may face additional barriers to accessing clean technologies, energy-efficient housing and sustainable transportation options. They may also have poorer access to skills training opportunities overall. While some projects within the FSC portfolio included explicit design consideration for equity-deserving groups, more work needs to be done to better understand what measures are most effective in ensuring that these workers and their communities have significant and meaningful agency and leadership in planning and taking advantage of the net-zero transition.

What We're Learning

Green skills requirements will permeate sectors and occupations
Despite widespread concern about job loss, our research found that decarbonization is expected to have a minimal impact on employment across most sectors. In fact, employment under a low-carbon scenario is anticipated to be higher than that of the high-carbon scenario. Thus, despite widespread concerns about job loss, we anticipate more jobs requiring different skills in the future. This is partly explained by the fact that large segments of the workforce are employed in sectors that are not energy-intensive or greenhouse gas-intensive—such as retail, finance, healthcare, education, and various services—and will thus undergo less disruption.

At the same time, our research highlights that green skills requirements are becoming widespread across occupations and economic sectors throughout the economy. For instance, the "Hiring green" research project found that in 2023 the largest number of job postings requiring green skills are found in the professional services sector. The roles requiring green skills are wide ranging, from administrative officers to civil and electrical engineers, to corporate sales and business managers. Similarly, our research on the skill needs for workers in Ontario's growing zero-emissions vehicles sector found that manufacturing zero-emissions vehicles in Ontario's automotive sector will require existing workers to upskill rather than undergo full retraining. The research highlighted that the upskilling process is crucial to fill emerging roles.

Non-technical skills will be an important complement to green skills
A key lesson from the suite of FSC-supported projects is the crucial role of non-technical skills alongside technical expertise. Non-technical skills are as important as, if not more important than, technical skills in a net-zero transition. This does not render technical skills inconsequential but underscores the importance of broad-based skills profiles needed for jobs in a decarbonized future.

Similarly, the Foresight Cleantech Accelerator Centre's "Building skills for a clean economy" project revealed that employers in the sector reported that technical skills were less central to many cleantech jobs than common workplace "soft skills." Additionally, a basic understanding of climate change and sustainability principles is considered essential for cleantech employees. This focus on a fundamental base of skills highlights the need for a well-rounded workforce that possesses both technical and non-technical competencies.

Education and training systems need to evolve
To address the changing landscape of skills, both technical and non-technical, it will be crucial for education and training institutes to evolve to meet the demands of a green economy. Adapting curricula and training programs to include green skills and knowledge ensures that the workforce is prepared for emerging roles in sustainable industries. We supported a pilot to embed low carbon skills training into existing programs. The pilot found important efficiencies in skills delivery; however, individuals need the foundational skills and knowledge to grasp low-carbon and green-building content effectively – reinforcing the importance of green literacy.

However, postsecondary institutions are hindered by a lack of agility. Many of the stakeholders interviewed for this research project described the process of updating courses or programs (in order to include climate change and sustainability content) as time consuming and bureaucratic. Interviewees identified that there may be opportunities, notably in terms of capacity building among faculty, to overcome this. The research also revealed that increased participation of student leaders in curriculum development was central to curriculum redesign.

Similarly, the project focused on upskilling for Canada's climate transition found that despite an increase in climate-related programming among postsecondary institutions and other training service providers, few unified standards exist to support such programs. This gap exacerbates learner and employer uncertainty and restricts mobility of credentials across jurisdictions, creating ambiguity between climate action competencies and defined training pathways. A national approach to climate action-related training across Canadian jurisdictions could address these gaps. Improving both recognition and transferability of qualifications would ensure competencies are commonly understood and ease their application to sector-specific curriculum development and training programs of optimal or short duration. To that end, ECO Canada's project on national standards for a blue economy provided concrete insights on the National Occupational Standards and competency profiles needed to support the sustainable blue economy. The project underscored the critical need for targeted skills development and strategic workforce planning in emerging sectors and highlighted the necessity of aligning educational programs and workforce training with the specific needs of industries undergoing rapid technological and environmental transformations.

Ensuring an inclusive transition

The range of different projects has highlighted that certain groups are particularly vulnerable to potential negative impacts from the green transition, e.g., workers in resource-dependent regions, as highlighted by the "Jobs and skills in the transition to a net-zero economy" report. Without targeted assistance, these vulnerable groups are also likely to be among those that may struggle to navigate the shift to a decarbonized economy. Ensuring that these groups receive adequate support is crucial for enabling them to seize new opportunities and participate fully in the evolving job market. By addressing their specific needs and providing tailored training and support, we can help mitigate the risks associated with the transition and foster a more inclusive and equitable green economy.

Beyond skills: The importance of place-based and local solutions

As highlighted above, transitioning to a net-zero economy brings significant economic and labour market development implications that are often specific to different sectors and regions. The "Green occupation pathways: From vulnerable jobs to rapid-growth careers" project underscored that attracting workers to communities in the context of a green transition requires a comprehensive approach that goes beyond just addressing skills. Barriers to transitioning include compensation issues, job security, workers' willingness to retrain and the availability of useful and timely labour market information related to emerging opportunities.

Skills remain an important component, but addressing these additional factors is crucial for creating a supportive environment that encourages workers to move to and stay in these communities. By taking a holistic view, we can better support the workforce and foster successful community development in line with our environmental goals.To address these challenges effectively, place-based approaches are essential. Lessons from a number of these projects highlighted that collaborating with local partners allows for a nuanced understanding of the unique problems faced by each community and facilitates the development of tailored solutions. By focusing on the specific needs and characteristics of local areas, more effective strategies to support a smooth transition can be created. Take, for example, the University of the Fraser Valley investigated emerging agricultural technologies and the future of food. In this research, project partners fostered relationships among a wide range of stakeholders involved in cellular agriculture. This helped to educate the public, diversify investment and drive broader participation in the industry, and help stakeholders better understand how emerging industries can contribute to environmental and social objectives.

Why It Matters

The energy transition is bringing significant disruptions, requiring industries, communities and individuals to adapt to a low-carbon future. This shift is fundamentally altering the landscape of workforce development, as skilled workers are essential for driving growth in the emerging green economy. Increased emphasis on skills development will be vital for fostering a workforce that can navigate and thrive in a sustainable economy, ultimately contributing to long-term environmental and economic resilience.

At the same time, sectors, regions, communities and workers facing disruption will need support to navigate these changes. Providing workers with effective re-skilling opportunities is crucial not only for individual career prospects but also for fostering community growth, enabling new sectors' growth and contributing to economic stability and sustainable growth. Education and training institutions play a key role in this by updating their curricula to reflect the evolving requirements of the green economy, ensuring that the next generation of workers is equipped with the relevant skills.

Effective implementation of the green transition requires better coordination among key local stakeholders and harmonization of policies across jurisdictions. Diverging policy orientations between federal and provincial governments, outdated regulations (in some instances), and external factors like the US Inflation Reduction Act add complexity to workforce development planning.

Successful adaptation to the green economy hinges on proactive, collaborative planning at the community and regional levels. Engaging Indigenous peoples, small- and midsize enterprises and other stakeholders in economic diversification efforts is crucial for ensuring that the benefits of the green transition are equitably distributed. Governments and employers should work together to support workforce upskilling and technology adoption, overcome barriers to investment and ensure that all communities can participate in and benefit from the green economy. This collaborative approach not only enhances local economic development but also supports broader goals of social equity and environmental sustainability.

What's Next

To start, FSC will continue to improve the collective knowledge base and enhance the relevancy of labour market information related to the net-zero transition. By understanding how job roles and industry requirements are evolving, we aim to better equip workers, communities and sectors with the skills and tools necessary for success in the transition to a low-carbon economy. This ongoing effort will provide valuable insights for decision-makers, enabling them to develop well-informed solutions to the challenges of the net-zero transition.

At the same time, to effectively address the future impacts of the net-zero transition, it is crucial to enhance local and regional dialogue and support various stakeholders in developing comprehensive strategies and working towards implementing sustainable solutions. Strengthening communication and collaboration among these actors will be a priority and will help to ensure that initiatives implemented are tailored to the local needs of various stakeholders.

Finally, we are committed to building partnerships with leading organizations that are shaping viable pathways for Canada to achieve its net-zero objectives. These collaborations will support the monitoring of progress and the identification of best practices. As a national convener, one of FSC's primary roles in this context is to bring together these diverse actors to collaboratively address emerging issues and facilitate the transfer of knowledge across regions and communities. This approach will help to avoid a siloed approach and ensure the integration of diverse insights and strategies necessary for a comprehensive and effective response to the green transition. This pan-Canadian perspective will help ensure that successful strategies and innovations are shared and adapted to various contexts.

Projects in this Report

Smart Prosperity Institute, Jobs and skills in the transition to a net-zero economy: A foresight exercise

Conference Board of Canada, Green Occupation Pathways: From Vulnerable Jobs to Rapid-Growth Careers

Conference Board of Canada, Hiring green: An analysis of the demand for green skills in Canada

Academy for Sustainable Innovation, Building Capacity for Advancing Climate Change Leadership

Foresight Canada, Building skills for a clean economy: Guiding workforce transitions as Canada shifts to net zero emissions

ECO Canada, Development of Canada's National Occupational Standards for a Sustainable Blue Economy

University of the Fraser Valley, Emerging agricultural technologies and the future of food: Exploring potential

Canada Green Building Council, Workforce 2030: Rapid Upskilling for Green-Building Occupations

Business + Higher Education Roundtable, Navigating net-zero: Faculty perspectives on greening postsecondary curricula

Smart Prosperity Institute:

- Skills needs for mass timber production and adoption in British Columbia

- Skills needs for workers in Ontario's growing zero-emissions vehicles sector
- Skills needs for workers in the growing plant-based protein industry in Manitoba and Saskatchewan

Have questions about our work? Do you need access to a report in English or French? Please contact communications@fsc-ccf.ca.

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