



LABOUR MARKET INFORMATION

Atlantic Canada's Green Potential: Jobs and Skills Toward Clean Growth

February 2022

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Executive Summary



Canada has set ambitious targets to rebuild a “greener, more innovative, more inclusive, and more competitive” economy. Federal, provincial, regional and municipal governments, businesses and communities are all working to achieve these goals.

Working towards sustainability or the “greening” of our economy will benefit Canadians and ensure decent jobs. However, while the idea of ‘green jobs’ often inspires visions of transitioning workers to work in and around large renewable energy projects, at present there are limited opportunities for clean energy jobs and there are no major clean energy projects in the construction phase.

The reality is that clean growth is best accomplished when traditional sectors such as Atlantic Canada’s energy, mining and forestry industries widely adopt clean technologies and other green solutions. For many individuals, this means the addition of new skills and experiences to their current roles or taking a new one altogether. Atlantic Canada is also unique given the significant revenue and job potential in the sustainable blue economy. This deep association will influence how the provinces and their jobs will become greener. This report addresses the limited understanding and awareness of how these shifts will impact businesses and workers.

This report identifies ‘green jobs’ and skills in Atlantic Canada based on secondary research and select interviews with traditional industries, emerging sectors such as marine and alternative energy, and green technology and service providers. The report also outlines workforce attraction, retention and development initiatives identified by key regional stakeholders representing employers, governments, educators, trainers and others.

Green Trends and Talent Needs






Environmental priorities, regulations and technologies are still evolving, making it challenging to establish a stable classification of green economy sectors and jobs. While these trends will impact all industries somehow, the pace and pressure to move towards sustainability will vary by how the trends apply in each sector.

A few common trends emerged from the research:

- **Divergent perspectives on the greening** of the organization, its operations and products or services influence how businesses respond to green trends and classify green jobs. Environmental enterprises view their business and some or all workers as inherently green. Some non-environmental firms have embraced green principles and view their operations through a green lens, while others are in the initial stages of greening by seeking expert advice to improve their sustainability and environmental performance.
- **Technology and innovation are instrumental to green growth and talent needs.** Industries and companies will work independently and collaboratively to develop, adopt and adapt technologies to deploy green technologies in partnership with solution providers, accelerators and research and educational institutions.
- **Critical, growing and emerging green jobs and skills are needed.** There will be a heavy reliance on Science, Technology, Engineering, and Math (STEM) occupations such as energy auditors, sustainability advisors, engineers and technology experts across all industries. New jobs are also emerging within distinct sectors or specializations, such as waste auditors and renewable energy engineers. Current and future workers will be looked upon to develop cross-disciplinary skill sets. A few skills and attributes are in-demand, including carbon literacy, digital literacy and skills, innovation and entrepreneurship, project management, communications and public relations, and a sustainability mindset.



Green trends and talent needs specific to each industry include:

 NATURAL RESOURCES	Service providers to producers to improve processing and transportation efficiency Energy efficiency and continuous improvement of operations
 MARINE	Knowledge of global initiatives to reduce emissions and increase energy efficiency, waste management
 ALTERNATIVE ENERGY	Planning, design and construction of projects: <ul style="list-style-type: none"> • Design engineers • Construction and installation trades • Operators and technicians • Retrofits and repairs of equipment • Economic modelling
 MANUFACTURING	Energy efficiency and continuous improvement of operations Retrofits, repair and installation of equipment Automation of equipment and process
 WASTE MANAGEMENT	Waste audit teams: Auditors, Labourers, Technicians Public awareness and education
 OTHER GREEN EXPERTISE & TECHNOLOGY	Sustainability analysis and advice on: <ul style="list-style-type: none"> • Climate change adaptation and mitigation • Green buildings • Sustainable financing and reporting

Based on our findings, we propose that green jobs in Atlantic Canada are defined as new and existing roles that positively and directly contribute to the preservation or restoration of the environment. These can be broadly characterized as “intrinsically green jobs” or “supporting green jobs”.

- **Intrinsically green jobs** – roles that *are necessary for* environmental protection, prudent management of natural resources or environmental sustainability *and require* in-depth green skills, knowledge, attributes and attitudes.
- **Supporting green jobs** – roles that *contribute directly to* green outcomes and *may or may not require* green skills, knowledge, attributes and attitudes.

The types of jobs which will be classified as green jobs will change over time as, with time and advancement, existing jobs that do not currently contribute to green outcomes will be impacted by the green transition and be modified to meet green objectives.

Transforming the Workforce for Green Growth

Accelerating and optimizing green growth in Atlantic Canada requires an adequate supply of skilled and often cross-disciplinary talent across industries, regions and roles. Employers, governments, educators and trainers should seek strategic alliances and ongoing collaboration to attract, retain and develop green talent. Areas for potential partnerships include:

- Career awareness, experiential learning, and targeted recruitment that starts with early school levels and continues with new graduates from relevant post-secondary programs, mid-career transitions and under-represented talent sources
- Talent development through enhanced post-secondary programming, agile training and continuing education designed to meet industry needs and accommodate different learning styles and settings. Future-proofing the workforce may include:
 - offering sector-specific or specialized training,
 - supporting worker advancement or transferability to green roles where workers can pivot to augment their interests, skills and attribute,
 - delivering online training and enhancing digital literacy to prepare workers and enable them to upskill or reskill without leaving their communities, and
 - developing targeted, short-term training for adaptive credentialling and upskilling to pick up new skills or upgrade existing ones.

This research was an initial step to learn from the experiences and ideas of stakeholders with a role in the green economy. Further work is required to remain current on trends and drivers of jobs and prioritize solutions that are most effective at addressing green talent needs and gaps.



Introduction



Across the globe, the green transition and decarbonization of economies are taking place at an accelerating pace. Canada is working to keep pace, evidenced by ambitious targets and collaborative initiatives across the federal, regional and municipal governments, businesses and communities. These partnerships include \$185 million allocated to Atlantic Canadian provinces through the *Low Carbon Economy Leadership Fund* and the 2018 launch of the new *Clean Growth Hub*, which has helped Atlantic Canadian companies to access federal clean technology programs, funding and services. Additional support for industries and workers will likely be available in the coming months to help Canada achieve its environmental targets.

THE GREEN ADVANTAGE

Federal investment toward climate action and clean growth has reached over \$100 billion since 2015. In December 2020, the Government of Canada reinforced its commitment through its strengthened climate plan, *A Healthy Environment and a Healthy Economy*, to 'create jobs and support people, communities and the planet'.

The plan recognizes the immense economic opportunities from a green transition and positions skills development as critical to achieving Canada's climate change objectives: "As the world moves towards a net-zero future, Canada's ability to respond to evolving workforce needs and unexpected challenges by upskilling and reskilling workers, increasing workforce participation by underrepresented groups, and attracting international talent, will continue to be a competitive advantage for Canada." (*A Healthy Environment and a Healthy Economy*, 2020)

Every industry and many jobs will be affected by the transition to a green economy. However, there is limited understanding and awareness of how this green shift will impact Atlantic Canadian businesses and workers. This challenge is further complicated due to the unique makeup of the economy, the workforce, and the clean growth opportunities in Atlantic Canada relative to other areas in Canada. Some existing or emerging green jobs in the region are tied inherently to the ocean-based or blue economy, spurring the need for sustainable practices, innovation and skills.

Without a good grasp of what a green or 'sustainable blue' job means in the Atlantic Canadian context, the region is in danger of missing significant opportunities to access programming, resources, and investment.

Research was conducted to contextualize the green job potential in Atlantic Canada, including emerging jobs and diversification within the green economy and consideration of those within the blue economy. The study was designed to,

- Develop a profile of 'green jobs' in the region in both traditional industries such as forestry, fisheries, mining, and oil and gas and in new sustainable development opportunities such as marine renewable energy and marine cleantech.
- Determine workforce initiatives that could benefit the entire region while avoiding duplication of efforts.

WHAT ARE GREEN JOBS?

The International Labour Organization's green job definition helped frame the dialogue:

"Green jobs are decent jobs that contribute to preserve or restore the environment, be they in traditional sectors such as manufacturing and construction, or in new, emerging green sectors such as renewable energy and energy efficiency. Green jobs help: 1) improve energy and raw materials efficiency, 2) limit greenhouse gas emissions, 3) minimize waste and pollution, 4) protect and restore ecosystems, or 5) support adaptation to the effects of climate change." (ILO, 2016)

Since environmental work and jobs are constantly evolving, this research cast a wider net for the green job definition to account for roles not traditionally viewed as green that are integral to an organization's environmental commitments. Ultimately however, the scoping study and research results were contingent on the perspectives of industry informants.

Scope and Methodology

The report structure parallels the key research phases:

1. Determining the green job potential through industry interviews and assessing training gaps through online research and select industry consultations
2. Identifying talent solutions via a roundtable discussion with industries, governments, educators, trainers and other key stakeholders

Primary and secondary research

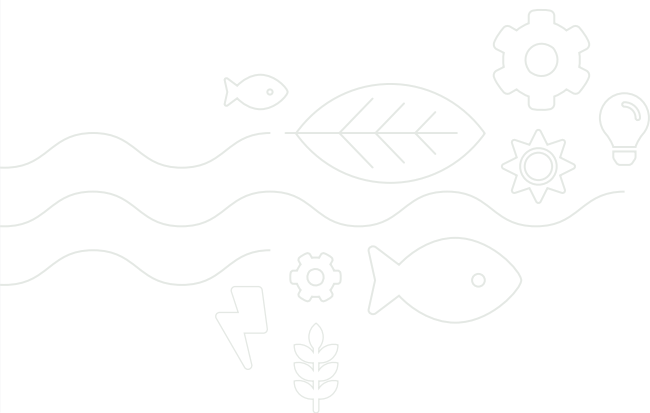
We interviewed 33 industry stakeholders regarding their current and anticipated green job requirements.

While all participating organizations operated across Atlantic Canada, some indicated that a portion of their workforce was based elsewhere in Canada or abroad. Relevant reports and documents from interviewees also provided supplementary information for this study. Overall, this phase helped identify industry trends pertinent to environmental work (and workers) and paint a picture of critical, growing and emerging green jobs and skills across industries and occupations.

The second research phase was aimed at determining training needs and gaps. The study included consultations with five (5) additional industry representatives and an environmental scan of industry-specific, university, and college programs involved in green talent development.


- *Appendix A* contains a list of environmentally related university and college programs available in the region.
- Relevant industry training and green certification programs are also outlined in *Appendix B*.

The secondary research also involved a literature review of relevant publications from the International Labour Organization (ILO), the European Centre for the Development of Vocational Training (CEDEFOP) and various government reports.



Green Skills have been defined by the United Nations Industrial Development Organization as the knowledge, abilities, values, and attitudes needed to live in, develop and support a sustainable and resource-efficient society (UNIDO, 2021).

The following table highlights the industries consulted, including the number of completed interviews/submissions.

	NATURAL RESOURCES aquaculture (2), fisheries (2), forestry (1), mining (4), oil & gas (1)
	MARINE oceans (2), port (2), marine services (1)
	ALTERNATIVE ENERGY large scale renewables (2), small scale renewables (2), nuclear (1), power generation (1)
	MANUFACTURING (3)
	WASTE MANAGEMENT/RECOVERY waste management (3), value from waste (1)
	OTHER GREEN EXPERTISE AND TECHNOLOGY climate change adaptation/mitigation (3), green building (3), cleantech (3), bioeconomy (1), water and wastewater management (1)

Note: Interviews and consultations are valuable methods for exploring research topics in detail, but a small sample of stakeholders with any qualitative research is not necessarily reflective of the entire industry or economy.

Roundtable discussion

Representatives from industries, governments, educators, trainers and special groups met in November 2021 for a virtual strategy session. About 24 individuals from 18 organizations dialogued on green talent attraction, retention and development challenges, opportunities and strategies for the region.

Session participants contemplated several collaborative solutions through large and small group discussions. Where possible, participants outlined concrete actions and identified top barriers, risks and opportunities for implementation.

As research was undertaken in the context of a post-pandemic recovery, stakeholders focused on immediate opportunities and challenges. Still, they considered emerging trends and the predominance of a “greening” economy and workforce as key imperative across many industries.

Green Trends and Talent Needs

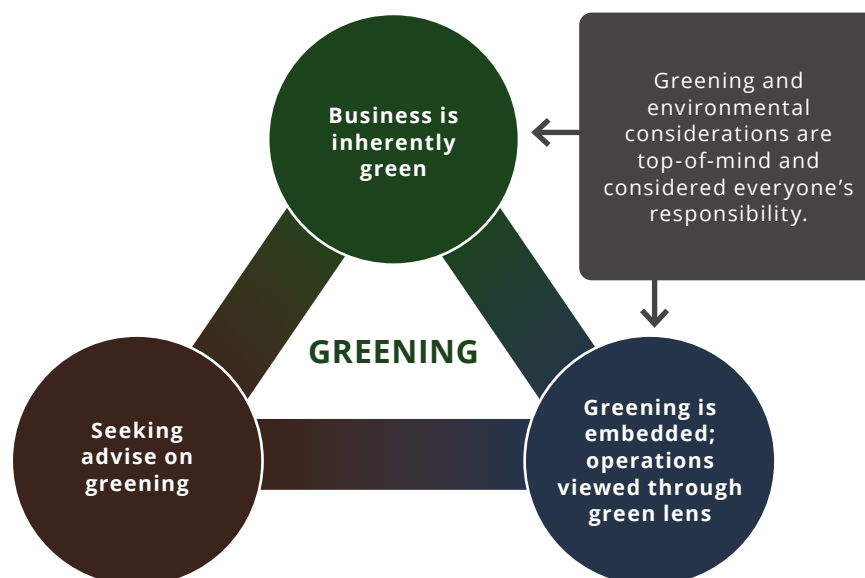


A few general and industry-specific themes emerged from the research regarding green trends and their impact on labour and skill requirements:

Key Findings Across All Industries

1. Divergent perspectives on greening

Generally, there were three distinct perspectives on the greening of organizations. First, some organizations are inherently green (e.g., clean technology or cleantech firms) and greening, sustainability, and environmental considerations are top-of-mind as part of their business model. Second, other organizations felt that greening and sustainability are embedded in their organizations—their operations are viewed through a green lens and greening is considered everyone's responsibility. Third, other organizations are in the early stages and seek or rely on an environmental advisor or another expert on greening and sustainability considerations.



These divergent perspectives are demonstrated by how organizations are responding to green trends. Many stakeholders indicated that they have internal environmental policies or sustainability initiatives. For some, such as mining and heavy industrial, it is a requirement for their operations. For others, it is a core organizational value or part of their larger corporate social responsibility. Companies have developed robust environmental, health, and safety programs to protect the environment and the workforce. Some organizations also incorporated health and wellness programs to promote employee well-being.

Throughout our research, participants used a variety of definitions of 'green jobs.' Some expressed uncertainty and hesitancy regarding defining green jobs and the challenge of transitioning their workforce to support green growth. Others indicated that their workers might not see their jobs as green jobs, even though the organization's operations may be inherently green.

Several stakeholders noted that it was not always easy or clear how to reduce GHG emissions, noting difficulties in identifying their current carbon footprint, achievable targets, and required actions.

"We are a company that is open to the next great (environmental) idea and implement it into our work."

Industry informant

"It (the environment) is the root of everything we do."

Industry informant



"The term 'green jobs' is thrown around a lot... but its intangible in pinning down what that is and maybe what is a green job basically for a lot of people."

Industry informant

2. Technology and innovation will drive green growth and talent needs

Innovation has become more important for increasing efficiency and creating environmental solutions for both traditional sectors such as agriculture and emerging sectors such as ocean technology. This entails widespread development and deployment of green technologies by entrepreneurs, incubators and accelerators.

Natural resources, alternative energy, waste management, marine and manufacturing stakeholders also highlighted the critical role technology plays in greening their operations and goals. While green technology may have obvious environmental outcomes, there are often additional benefits for an organization's bottom line. Technology contributing to sustainability goals and offering financial benefits (e.g., electrification) makes a great business case for potential adopters.

THE NEED FOR EVIDENCE-BASED ENVIRONMENTAL POLICIES AND LEGISLATION

Overall, government has a large role to play in ensuring policy and regulation help to break down barriers that hinder the growth of green industries and the transition of traditional industries to green practices and operations. Ensuring businesses are supported in meeting evidence-based regulations will be critical to the expansion of green activities and jobs in Atlantic Canada.

Innovative businesses working to develop new and alternative energy sources and technologies to reduce GHG emissions and create climate change solutions identified the need for supportive regulatory environment to push new inventions to market and keep innovative companies in the region. Stakeholders noted that jurisdictions that provide regulations, funding, training and policies that support green business activities are the most successful attracting and retaining green businesses and talent in their regions.

Government regulations were also cited as a key factor for driving traditional industries to reduce their carbon footprint. Funding and incentive programs to support transitioning business operations to reduce GHG emissions, training to build in-house capacity to calculate carbon footprints, and laws or policies that require adoption of sustainable practices will drive industries and companies to become greener. *"Until government requires a company to (calculate GHG emissions, make climate change adaptation), or they're incentivized to do it, then they're not doing it,"* one stakeholder noted. Another mentioned, *"Our industry is driven by provincial policy and if the provincial policy is there, then there's enough talent that can be grown or pre-existing that can be deployed on the projects. The only thing standing between us and a built project is policy which provides the contract."*

The right people in policy-making roles were also highlighted as critical to the region's green economic future. For example, government investment in large-scale renewable energy projects such as offshore wind will attract private investors, businesses and talent to this prime opportunity in the region.

Partnerships across industries, governments and technology companies could help accelerate green growth and solutions. Companies strive to find the right balance between running their business and conducting research and development (R&D) to advance technology that improves operations. A stakeholder in natural resources noted that collaboration and relationship building with local tech and start-up communities could help address current and anticipated sector-specific challenges. Another stakeholder indicated that companies could be incentivized to invest more in R&D to reduce the financial burden and de-risk private sector investments in technology.

ELECTRIFICATION

Several organizations noted a move towards electrification to green their operations, where practical and possible. Some organizations plan to upgrade their vehicle fleet to electric, rather than diesel or another fossil fuel. This change may translate to a change in skill sets for workers, such as electrical mechanics instead of typical mechanics, which could require some additional training of existing workers.

Further electrification in industrial areas such as manufacturing, heavy construction, mining, etc. may require more electricians and electrical engineers and fewer industrial mechanics and millwright. Others noted that a blend of skill sets would be advantageous, such as millwrights with additional training on electrical equipment and components.

3. Many green jobs and skills are critical, growing or emerging

The relationship between green growth and talent needs is complex, and it is expected that many existing occupations will adapt to include new practices, standards and responsibilities. While the fundamental skills required of the existing workforce will remain the same, there is a need for upskilling to incorporate environmental awareness, sustainable practices, use of new technologies and digital literacy across many roles or occupations, including trades workers and operators.

“We believe technology will play a role in nearly every industry and business globally when it comes to being competitive in a green economy.”

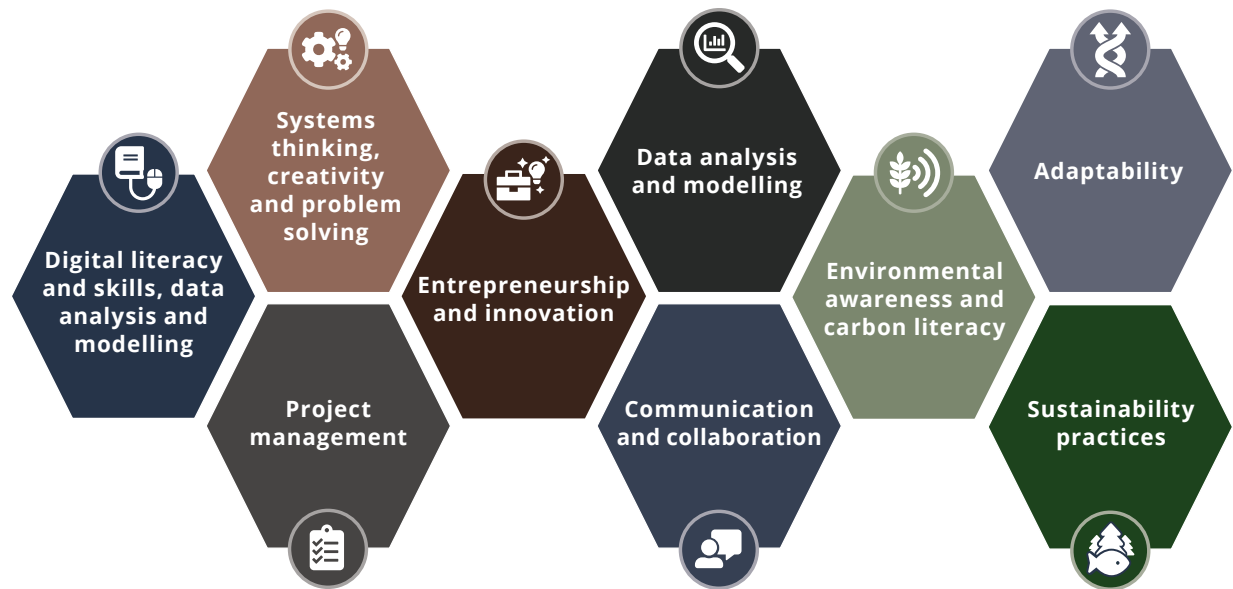
Industry informant

“We have a burgeoning tech sector and opportunities to align with addressing environmental issues with industry.”

Industry informant

Green workers are also expected to develop cross-disciplinary skills to work with a broader network of service providers, technology developers and other organizations to ensure a resilient and robust future for Atlantic Canada's green and blue economies.

Commonly sought-after skills include:



Carbon literacy: There is an opportunity to better support organizations in climate change initiatives by helping calculate emission and energy-use baselines to identify GHG reduction targets and improve their carbon footprint. As previously mentioned, some businesses need a better map or plan to address GHG emissions that starts with the current state assessment.

Entrepreneurship and innovation: Atlantic Canada needs to foster an ecosystem that encourages environmental solutions and climate change adaptation. The status quo is not sustainable, and Atlantic Canada requires bright minds that are supported to solve these challenges in the region. Individuals with STEM skillsets, business acumen, entrepreneurial expertise, and spirit can take advantage of this need for new products and technology to improve sustainability across sectors.

"We're going to have a different environment going forward and hopefully its one we can all live in and thrive in, but there will be technology that needs to be created to allow for that and also maybe to repair some of the damage that we've done."


Industry informant

Project management: Spanning all industries is the need for sustainable project management practices. Some training and certifying bodies provide information and articles on corporate social responsibility surrounding megaprojects, climate change, and new sustainable building methods in construction. For those who do not have formalized project management training and certification, it remains with the individual and the company to upskill and reskill for green project management.

Communications and public relations: Communication will be key going forward in the green economy as companies increasingly engage with regulatory bodies, Indigenous communities and many other stakeholders. Companies use a 360-degree approach to project development which now includes who needs to be informed, consulted, engaged, and empowered throughout the development and consent stage of the planning.

The other side of a communication role is with investors and the public. Sustainability reporting and ensuring progress toward sustainability is trending upwards. Most large companies have sustainability teams to manage increased pressure to ensure corporate governance is aligned with sustainability practices and environmental, social and governance (ESG) priorities at the executive and board levels. Not only does the industry need qualified people to draft these sustainability reports, but there is also the data gathering of specific information set out by Global Reporting Initiative (GRI) standards.

Sustainability mindset: Individuals with a sustainability solution mindset can positively affect the environment and the organization's long-term bottom line. Coincidentally, jobs requiring this attribute could attract youth who may seek roles that achieve a higher outcome such as supporting environmental protection and resource management.



“The enthusiasm, hard work and vision of youth are shaping Canada’s future... Youth—above all—will get us to net-zero.”

The Honourable Seamus O’Regan Jr.
Minister of Labour (former Minister of Natural Resources)

PROJECT MANAGEMENT FOR THE ENVIRONMENTAL PROFESSIONAL

econext’s Environmental and Regulatory Compliance Project Management course, which is customized to the regulatory conditions and requirements of Newfoundland and Labrador, is a well-received example of project management training specific to the environmental professional in Atlantic Canada and could be used as a template for courses in other provinces.

Roles that drive green growth in Atlantic Canada are predominantly tied to Science, Technology, Engineering, and Math (STEM) occupations. Informants recognized the critical role energy auditors, sustainability advisors, and several engineering and technology experts play across various industries.



Energy Auditor/ Advisors

Overview

Energy auditors or advisors use a systemized approach to measure, record, and evaluate the flow of energy. They determine if it is being used efficiently and pinpoint where it is being wasted.

Demand insights

Government initiatives and grants aimed at retrofitting or developing green buildings and homes often require an energy audit. However, stakeholders indicate there are not enough energy auditors to keep up with the demand.

Job requirements

May include post-secondary studies in engineering, environmental science, architecture or a related field, domain specific knowledge (e.g., residential construction, building envelope), technical skills (e.g., HOT 2000, risk management), communication and interpersonal skills. Other requirements may include an Energy Advisor designation, as well as a connection to a business registered as a service organization.



Environmental/ Sustainability Advisors

Overview

Environmental or sustainability advisors are typically consultant roles that advise companies on environmental regulations. These roles may also complete environmental applications and reports on a company's behalf (e.g., an impact assessment for oil and gas, mining, or oceans-based projects). Sustainability is built on three pillars – economic, social, and environmental – each of which is important.

Demand insights

These positions are currently in high demand and are expected to continue to be as the Atlantic provinces introduce new or enhance existing environmental regulations.

Job requirements

May include a degree in Environmental Science or a related field; industry, project-specific, regulatory and technical knowledge; project management; quality control analysis; verbal and written communication; and many others.



Engineers

Overview

Engineers support the development of regulatory filings and reporting. They manage the design and execution of capital projects and analyze operational or product performance and proactively address maintenance needs. Ultimately, engineers develop effective solutions to issues involving pollution, efficiency, public health, and sustainability

Demand insights

Engineers (mechanical, electrical and environmental in particular) have been highlighted as critical to the growth of the environmental goods and services sector. Wind farms, solar farms, and offshore wind farms would all require engineers to design mechanical and electrical functions.

Job requirements

May include Bachelor of Engineering + provincial designation, industry knowledge, process management, system design and analysis, leadership and collaborative skills, and critical thinking.



Technology Experts

Overview

Technology positions, such as software developers, software engineers, and technology specialists implement, maintain and operate technological applications to company operations.

Demand insights

Companies across Atlantic Canada will be looking to add technology jobs to their staff to make operations efficient and green.

Job requirements

May include a Bachelor of Computer Science or related degree, thorough knowledge of software applications and development practices, strong mathematical and problem-solving skills, knowledge of multi-platform applications, communication skills and ability to teach staff how to operate technology, and domain knowledge depending on sector (e.g., oceanography for oceans tech jobs).

While industry informants do not expect green growth to translate to new *occupations*, green *jobs* or *skills* are emerging within existing occupational classifications. Stakeholders recognized that some environmental areas are becoming more complex, resulting in highly specialized **roles**. For example,

- **Waste auditors or waste auditing** could become more in demand as waste management companies find innovative ways to decrease the amount of waste that ends up in landfills while concurrently reducing their own 'operation's carbon footprint. Possible opportunities for diverting more waste include commercial composting and expanding metal recycling to include ships.
- **Renewable energy engineers and technical specialists** such as solar energy systems engineers, wind technicians, and a seemingly endless list of new job titles are being created as the region diversifies its energy sources
- With climate change mitigation, adaptation and resilience as an increasing priority, many more **climate change specific roles** are sought after within each industry. Specializations may include climate change impact assessment and decarbonization analysts.

REDUCING CARBON FOOTPRINT

Green Economy New Brunswick offers support for companies looking to reduce their carbon footprint through a four-step process (Green Economy New Brunswick, n.d.):

- 1 Engagement,
- 2 Measurement,
- 3 Goals Setting, and
- 4 Results.

Through this organization, members can develop strategies to reduce their carbon footprint in a tangible way. The organization also offers education and networking events for companies to upskill and reskill their employees while networking with other companies. This type of consultation process may benefit organizations looking to become more sustainable while also increasing their network of sustainability leaders across the region.



SPOTLIGHT: Sustainability in Service Industries



Tourism in Atlantic Canada is supplying more genuine experiences, sustainable practices of foraging, leaving no waste behind and limiting the number of onsite people at sites of interest. Ecotourism is also on the rise, which focuses on educating visitors regarding wildlife conservation and ways to enjoy the environment without harm. The Gros Morne Institute for Sustainable Tourism provides best practices and online courses to tourism organizations throughout Canada (GMIST, 2021).



The fast-food industry is making changes in packaging and moving away from single-use plastics. Some are even promoting their commitment to using only sustainable farmers as suppliers, minimizing food waste through donations, increasing energy efficiency, and increasing water and waste management strategies. Harvest, a sustainably sourced eatery in Nova Scotia, prepares quality food in a fast-casual environment. The company harvests food year-round from their portable, in-door hydroponic farm that uses 90% less water than traditional farming. The company plans to expand their business, farming techniques and franchising opportunities across Atlantic Canada and inspire other regions to pursue sustainable practices for food production and consumption (Aim2Flourish, 2022).



Grocery stores moving towards using less plastic, increasing the availability of bulk items, and finding opportunities to reduce food waste throughout the supply chain. Reporting practices are improving, with companies like Sobeys releasing sustainability reports and committing to more sustainable practices (Sobeys, 2021). Companies are changing to meet consumer demand by offering more organic or green products and services, greener packaging, and environmentally friendly and socially responsible products. Workers in this industry need more awareness of sustainable practices and employer-specific knowledge of available products.





SPOTLIGHT: Sustainability in Service Industries Continued



Leaders in Environmentally Accountable Foodservice (LEAF) certification is available across Canada for sustainability in the food service industry. However, there are currently no restaurants certified in Atlantic Canada. LEAF offers three levels of certification for restaurants that encompass sustainability practices, including reducing water and energy use and waste management. It also reflects how products are sourced, including ingredients, tools of the trade and operation of the restaurant, including human resource practices (LEAF, 2021).



Though there is no specific training on Zero Waste kitchens, some chefs at Atlantic Canadian restaurants encourage sustainable practices at home and at restaurants to reduce the amount of food waste produced. Aside from targeting those working in kitchens, these grassroots initiatives also educate the public through youth engagement, cookbooks, and social media. These chefs also focus on sustainable approaches such as farm-to-table and the return to locally sourced ingredients and traditional hunting and gathering methods through foraging workshops, seminars, and food experiences.

“Social license to operate will become increasingly important.”

Industry informant

“Customers are starting to demand a move to carbon free/neutral.”

Industry informant



Industry-specific Highlights

1 NATURAL RESOURCES

The natural resources sector encompasses fishery, forestry, mining, aquaculture, and oil and gas. Some organizations in this sector are quite large, with operations in multiple locations in Atlantic Canada or abroad.

Sustainability was a key concept reiterated by stakeholders in this area; harvesting natural resources must be sustainable to ensure continued operations. Others emphasized the impact of climate change on their operations and the importance of understanding the corresponding organizational or operational adaptations that may be needed (e.g., planning for extreme events). Assessing their current carbon footprint and what actions are required to improve is also of interest. Stakeholders in oil and gas noted that opportunities to reduce GHG emissions are assessed and implemented where possible and economical, which ultimately results in the creation of green jobs. Unfortunately, emission reduction performance standards may be difficult for existing operations to achieve without major refits to turbines, power generators or flaring systems which are expensive endeavours and may impact how competitive the industry is compared to other regions.

Several industry informants indicated that their organizations had adopted specific environmental policies to meet regulatory compliance requirements or certify their product as sustainable (e.g., through Marine Stewardship Council). Others noted that their organizations have additional policies and initiatives to support greater corporate social responsibility (CSR) mandates. One participant indicated they follow international best practices in their sector, going above and beyond local environmental regulations. Similarly, another stakeholder noted that operating in an environmentally sustainable way is viewed as best practice and the proper way of doing business. Even in the oil and gas sector, stakeholders indicated that investment capital focuses on the cleanest and least carbon-intensive projects. Most socially responsible producers and companies are increasingly seeking suppliers of goods and services with lower carbon footprints to improve their overall carbon performance.

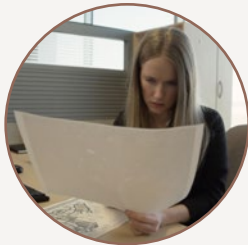
“Companies are studying ways to lower carbon emissions in every aspect of their exploration, production and supply chains, which has led to greater investment in technology, innovation, research and partnerships with companies aligned with those goals.”

Industry informant

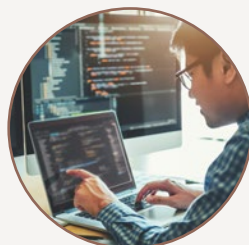
Research and development are critical to the efficiency and competitiveness natural resources sector. Several interviewees in this sector reported partnerships with post-secondary institutions and pilot projects with innovative technology companies to improve efficiency, address environmental challenges, and other aspects related to greener their operations. Technology, R&D, and partnership in this sector are widespread, including initiatives such as:

- improving water recirculating systems through technology
- developing remote communications for data transfer
- gathering environmental data for predictive analytics
- pursuing value-added extraction and by-products from biowaste (e.g., protein extraction, biofuel, etc.)
- investigating packaging alternatives to Styrofoam
- developing smarter cameras to follow and observe fish behaviour and develop algorithms to identify conditions
- developing green ships with scrubbers to reduce nitrous oxide and sulphur oxide
- investing in technology and innovation to support traceability and aquatic stock assessments
- developing sensors for vessels to capture data about ocean variables

Green job opportunities and talent gaps noted by natural resource industry informants include:



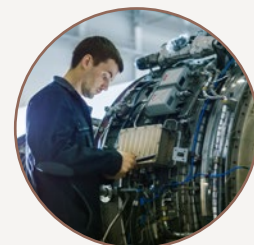
**Environmental
advisors**



**Software
developers and
programmers**



**Science and
engineering**



**Roles related to
industry support
activities (e.g.,
processing and
transport)**

Opportunities exist across the natural resources sector for **environmental advisors** to ensure compliance with environmental policies and regulations, connect and communicate sustainability principles to all workers, and identify greening opportunities for improvement. An environmental advisor would need:

- experience, knowledge and interest in sustainability and climate change, including knowledge of relevant environmental issues, policies and regulations
 - technical writing skills, including preparing documents for government and internal stakeholders
 - quality control or assurance, including field sampling
 - industry, construction or related experience (e.g., heavy civil projects)
-

Sustainable management of natural resources requires growing requirements for specialized software and modelling and analytical activities. Companies indicated a talent gap for **software developers, programmers and data analysts**. Other notable opportunities for green jobs are in support of or as an extension of this sector, such as roles involved in the transport or diversion of product and waste by-products. A forestry representative mentioned a growing role for **scientists** (e.g., chemists) and entrepreneurs to develop new products in the bioeconomy utilizing undersized wood and wood by-products.

The processing of resource products (e.g., minerals, fish) is becoming less reliant on manual labour and increasingly involves technology and related technical skills—a trend that is expected to continue. Additional opportunities are also likely in petroleum process technology, and innovation as new low carbon- emitting facilities are designed. Respondents also anticipate increased demand for digital technology skills such as data analysis, digital or control systems engineering and robotics.

Several stakeholders noted that finding people with the right knowledge and skills in specialized roles or emerging environmental areas was difficult. These are often contracted roles; however, one stakeholder speculated that, in the future, some technical expertise might be needed in-house to augment science and engineering capacity.

In addition to the right combination of knowledge and skills, employers in the natural resources sector frequently need to find workers interested in working outdoors at sea or living in rural areas.

A few other general and workforce-related trends were observed in specific sub-sectors:

Fishing

Canada's fishing industry is directed through government regulations. Regulations are moving toward sustainability through the continued development of the Sustainable Fisheries Framework (DFO, 2021). The federal government also supports the United Nations Decade of Ocean Science for Sustainable Development (Ocean Decade) through a \$9.5 million investment that demonstrate Canada's commitments to the High Level Panel for a Sustainable Ocean Economy and other international ocean science efforts. These initiatives align with Canada's Ocean Agenda and Blue Economy Strategy which aim to "harness our ocean growth potential and create jobs in coastal communities while ensuring our oceans remain healthy" (Fisheries and Oceans Canada, 2021).

As additional government mandates and programs evolve, including improved seafood labelling, transparency, and traceability, Canada's fishing industry must adopt industry best practices and accelerate sustainable solutions and talent strategies to improve their operational and environmental performance.

Large companies in the fishing industry, such as Ocean Choice International, are moving towards more efficient vessels, greater emissions and fuel consumption reporting requirements and seeking certification for their products from the Marine Stewardship Council, the international standard for sustainable fisheries (OCI, 2021).

Innovations through automation and sustainability-enabling technologies to reduce the industry's carbon footprint are also taking place across the value chain. For example, Ashored in Halifax is developing a bottom-bound ropeless fishing system to minimize the risk of whale entanglements and trap loss/damage, while allowing fishers to fish in zones closed to fixed fishing gear. The company also retrofits existing lobster and crab traps with underwater buoys that can be triggered to the surface. The buoys also use machine learning and use sonar and geo-tracking to locate lost traps (Innovacorp, 2021).

Oil and gas


The petroleum sector is an essential industry in Atlantic Canada and has seen increased environmental regulations and requirements. Companies use the Global Reporting Initiative (GRI) standards and complete sustainability reports to demonstrate their commitment to ESG practices to the public and investors. Companies have dedicated environmental departments for compliance and ensure a sustainable approach to resource development, water and waste management, and new emission control, including carbon capture and storage (CCS).

Much discourse has taken place regarding transitioning oil and gas workers to and from the renewable energy sector. Offshore oil and offshore wind are a natural pairing, with significant overlap in skillsets. Expertise in offshore oil and gas or offshore renewables can also be utilized in other areas, such as vessel crews for any offshore or marine activities. While transitioning workers between these sectors may require minimal retraining, transferability should be viewed more holistically to include other factors such as the nature of work, culture, and location. Similarly, environmental work within offshore oil and gas is growing, presenting opportunities for current workers to expand or pivot their roles within the sector.

Mining

Mineral exploration spending and mining jobs in the region have grown in recent years (NRCan and Statistics Canada, 2021). And as technology use increases, the need for minerals grows with it. As with most other industries, larger companies in mining are also using the GRI standards and completing sustainability reports for investors and the public. Junior mining companies are committing to environmentally responsible development with policies and practices that protect the environment, community, and employees. The Mining Association of Canada (MAC) developed a global sustainability program for its members. Members of the association must adhere to the protocols and frameworks set up in the Towards Sustainable Mining standards (TSM). The TSM program provides mining companies with a system to manage, monitor and report on environmental and social responsibility; it demonstrates accountability and transparency in the mining industry. Member companies complete a self-audit annually, and every third year an external performance audit is completed. MAC provides both onsite and online training for member companies, including an online portal for TSM training for those wishing to complete it virtually (MAC, 2021).

Primary research through participants in the mining industry also indicated a shift towards sustainability, new technologies and innovation as it moves into the green economy. There is an increased number of environmental regulations and reporting requirements for the industry. Companies are shifting to paperless operations and digital financial audits and improving energy efficiency at offices, process plants and mining operations. Water use, treatment and disposal are regulated, but there is an increased focus on responsible use. Larger companies use electric vehicles, and some have switched to autonomous vehicles.



**The transferability
of occupations and skills
within and between
industries should take
place as demand warrants.**

As the move into the green economy continues, the workforce will need environmental awareness training; however, the need for digital literacy and training to operate these new vehicles and technologies is greater. Jobs were also noted in mining and mineral processing to support battery production as the demand for electric vehicles intensifies.

As previously stated, greening the economy requires innovation and new technology. Often technology use or testing doesn't fit into government policies, which poses a challenge for the mining industry. Workers in the planning stages of a project need a working knowledge of the regulatory environment and how to apply for licences and permits to carry out the initial testing of equipment. Workers also need to have enough understanding of operational processes for their work and recognize areas for improvement. The fundamental skills are the same when working with green technologies, but workers will need to understand and adapt to improvements and learn new skills to make their jobs easier.

As companies are looking for investors and funding with new projects, the environmental responsibility question is coming up more frequently. Investors and the public want to know that the environmental impact of every project is being assessed. There is a greater environmental responsibility on the workers as well. With increased education on environmental awareness, everyone is responsible for their actions. New perspectives are needed in mining and can be achieved by bringing in talent or advisors from other sectors to provide new insights on improvements that industry veterans may miss. For the mining industry, the most significant changes will come with the push towards remote operations and automation as well as electricity-powered heavy equipment, which will displace the heavy equipment mechanics utilized for mines. Energy efficiency will increase, and water use will decrease. Newly certified workers will be needed to maintain and repair these vehicles. Workers will also need to recognize and buy into the environmental consequences of the status quo and embrace opportunities to gain greening skills.



2 MARINE

Marine sector informants indicated that a transition to greener activities or operations impacts the existing workforce more than creates new jobs. For example, one stakeholder noted the importance of cross-disciplinary skills such as core digital and project management skills for many positions.

Stakeholders reiterated the importance of science, engineering and technology skillsets, including marine science and ocean mapping technicians. Increased electrification in lieu of mechanical activities translates to jobs that require electrical skill sets. One interviewee mentioned involvement in a collaborative research lab that relies on interpersonal and multi-disciplinary skills to work with other companies to tackle supply chain challenges such as decarbonization. The existing innovation system used for oceans R&D through Canada's Ocean Supercluster was also cited as helping to advance innovation to support greening the marine sector. Other opportunities for green jobs include:

- collecting and properly disposing of the plastic that's already in the environment
- environmental analysts/consultants and energy analysts
- air quality engineers
- infrastructure, design and construction of storage and transport of alternative fuel sources, such as hydrogen or hydrogen derivatives (e.g., ammonia) should hydrogen production for export materializes

Marine transportation

Regulations drive change in the maritime industry. Recent regulatory changes are driving environmental improvements in the industry and increasing the need for green skills. Ballast control, reduced greenhouse gases, decreased overall carbon footprint, and increased energy efficiency are mainly achieved through green technology and innovation.

Skills needed in marine transportation include technical knowledge for installing, operating and maintaining new technologies. Knowledge of industry regulations and global initiatives to reduce emissions and achieve net zero, increase energy efficiency, apply sustainable water and waste management is also required.

Elsewhere in the world, vessels are equipped with new propulsion systems, such as batteries and hydrogen. However, in Atlantic Canada, there is limited infrastructure, services, and expertise related to these technologies, making it difficult to bring in new vessels. Recent projects funded by Natural Resource Canada's Emissions Reduction Fund are exploring the potential of incorporating hybrid electric technology into existing vessels. Nonetheless, whether the green transition comes in the form of new or modified existing vessels, changes in engine and fuel types, installation of fuel scrubbers and adoption of other new technologies to optimize a ship's operation will all require new skills to understand and operate.

Another area of focus for Canada is the development of autonomous technologies in shipping. As global interest in maritime autonomous surface ships (MASS) intensify, Canada is also seeking to understand and improve the performance and safety of MASS technologies, particularly in ice and harsh environments. Other unmanned technologies, such as remotely operated vehicles (ROVs) and autonomous underwater vehicles (AUVs), are helping revolutionize marine transportation and deepwater exploration. Use of automation technology does not necessarily mean elimination or reduction of jobs—however, different skillsets may be required to operate and maintain these technologies. The greatest benefits to advancing these technologies are the reduction of worker safety incidents, operational costs, and environmental footprint. They can also help automate some decision making and enhance situational awareness for a faster and more efficient response time.

Key informant interviews indicated that Atlantic Canada's marine industry lags European countries in new technologies and green innovations adopted. Similarly, experience and expertise in new technologies are limited in Atlantic Canada. New technologies are coming, but the industry is not prepared to sustain its use due to the lack of training. New green vessels are being built for Atlantic Canadian companies, but the challenge remains that few are trained to run the equipment in the area.

Certification in Canada's marine transportation industry is limited to the Green Marine Certification, which calls for more sustainable practices and transparent reporting through 14 key indicators that must be monitored for improvement year over year. Except for formal education, there is also little to no opportunity for green jobs and skills training in Atlantic Canada. There are, however, courses sold through the International Maritime Organization (IMO) offering education on various environmental awareness and skills. Although there will be new skills required for the greening of the shipping industry, CEDEFOP (2018) suggests adapting existing skills is equally important. The sector must upskill and reskill employees to meet these changing demands.



Like land-based transportation, energy saving logistics techniques in marine transportation include optimizing routes to avoid certain areas and times, lowering speeds, and shipping fewer empty containers.

3 ALTERNATIVE ENERGY

Alternative energy informants include organizations in large-scale renewables, small-scale renewables, and nuclear energy. Large scale renewables contacts indicated that their work is project-based and reactive to market demand, resulting in job opportunities in construction and consulting (e.g., wind farms). Small scale renewables and nuclear contacts differed in that renewables are the core of their business, rather than one of their areas of expertise.

Increasing renewable energy demand would require companies to grow their workforce, not necessarily create new positions. Retrofitting and repairs were viewed as areas of opportunity for various trade occupations (e.g., concrete workers). Small scale renewable projects with municipalities or First Nations opportunities were also identified as local leaders seek energy sources aligned with their values and priorities, such as developing small-scale wind farms or solar projects. The Federal Low Carbon Economy Fund was noted as a funding source to incentivize municipalities and First Nations to transition to greener energy sources.

One interviewee indicated that the appetite for large-scale renewables is diminished in certain regions because of the inability to sell electricity back to the grid—making that opportunity less attractive for companies. Another noted that electricity pricing in the marketplace dampens the business case for renewable energy (wind and solar). This stakeholder pointed out that some markets in Atlantic Canada were more favourable for grid-connected solar or storage. Still, in areas where a single organization effectively has a monopoly on the sale of electricity, it is difficult for small-scale renewables to gain a piece of the utility market. Another stakeholder noted that economic modelling and scientific research could help inform policy and the green transition in renewable energy.

Green opportunities and challenges heard from contacts in alternative energy, mirrored the feedback of those in natural resources. These include:

- Demand for environmental advisors with technical writing skills, driven by challenges in identifying carbon footprint, GHG emissions and targets, and actions needed to achieve targets
- Demand for jobs due to scaling up operations as energy projects in wind, solar, and storage increase

Engineers are vital to the development and design of alternative energies. Skilled trades, technicians, or installers are required for construction and installation phases, while operators and technicians will be needed to maintain energy systems. Noted talent gaps include:

- Environmental advisors or planners
- Technicians with blended skillset (e.g., millwright/electrical)
- Millwrights
- Industrial electricians
- Electrical engineers
- Electrical engineering technologists—for work on building transformers, small substations, or small transformers
- Climate change specialists—modelling, developing mitigation plans, etc.
- Solar installers
- Environmental technicians for field work such as collecting and analyzing water samples

The demand for workers in this sector is dependent on the appetite for alternative forms of energy. An uptick in projects could lead to a dramatic increase in relevant jobs; however, the pace of adoption of alternative energy is heavily influenced by market demand, procurement, policies, regulations, and other requirements of provincial governments in the region.

Regarding wind farms: “We have the skills in how, we just need to grow to meet the demand.”

Industry informant

“Decentralization of electrical infrastructure is going to be a big thing as well.”

Industry informant

“Low or net zero carbon model is going to be the main thing on our radar for the next decades I would say. This is something that is going to be transformative.”

Industry informant

4 MANUFACTURING



Manufacturing industry informants were diverse, producing products that support sustainability initiatives and others unrelated to the green economy. Their imperative is to create what the market demands—which may or may not be a green product. At the same time, stakeholders noted the potential for growth and diversification through green products and opportunities to optimize the supply chain from both cost management and greening perspectives.

Some participants indicated that they were moving towards greening their facilities, employing technology such as heat pumps for heating office areas or retrofitting equipment to improve the efficiency of their operations, which positively impacts their bottom line.

One stakeholder noted that the organization seeks to reduce waste and improve efficiency as part of continuous improvements to its facilities. These continuous improvements entail the adoption of new technologies, including automation, to be utilized by manufacturing workers. However, employers typically contract externally for projects (e.g., energy modelling and management) rather than develop in-house skills.

Generally, stakeholders were supportive of improvements to the sustainability of their operations, provided there is a financial incentive such as reduced operating costs or grants to reduce capital costs for upgrades. For some, the business case of going green has not been established; changes to their operations need to increase, not decrease, competitiveness.

5 WASTE MANAGEMENT AND RECOVERY

This sector includes organizations focused on recycling and other forms of waste diversion, including extracting value from waste. The movement towards zero waste is expected to promote further growth in the sector. Advancements in technology and equipment enable extracting and recycling more waste products, reducing the volume of waste to the landfill. A participant speculated that the sector would transform as the industry becomes responsible for waste after consumer use.

Waste audits, which assess what waste is being generated and identify opportunities to reduce waste, are growing in popularity. A waste audit team may include labourers to gather waste material and waste auditors or technicians to sort and weigh material and recommend approaches for reducing or eliminating waste. As in other sectors, advancements in technology can improve operations and increase the amount of divertible waste or efficiency of the process. Technology solutions include equipment for extracting recyclable material, sorting equipment, route optimization, smart bins, etc. Several stakeholders also noted that data collection and reporting on waste is becoming more commonplace so that organizations are aware of their waste and have the data to hold themselves accountable for waste production. Another data trend is tracking various waste streams (i.e., recycled, otherwise diverted, landfill) and assessing GHG impacts of diversions, rather than just economic benefits.

As in other sectors, a transition to a green economy in waste management/recovery necessitates shifts in worker skill sets rather than a host of new jobs. One stakeholder noted that requirements varied between labourer and technician roles, with technicians requiring higher levels of education and skill level. Still, a passion for waste reduction and sustainability is essential for all workers. Several stakeholders reported difficulties recruiting labourers, including warehousing and material handlers.

Traits well aligned with this sector:

- ✓ Passion for sustainability
- ✓ Creativity
- ✓ Problem solving

An interviewee discussed the significant potential of capturing and recycling metal from abandoned ships following environmental, health, and safety guidelines. A facility dedicated to cutting vessels could mean new job opportunities for labourers, skilled workers such as equipment operators, material transport workers, tradespeople (e.g., mechanics, welders), and technicians. Another firm was exploring a facility for commercial composting, focused on Interdisciplinary Collaboration and Innovation (ICI) buildings that would potentially have larger volumes of food waste.

One stakeholder noted that there might be opportunities for more jobs focused on public awareness and education about waste reduction. Another mentioned prospects on the policy side as emissions tracking become increasingly crucial for accountability to GHG targets. Current policies and regulations also impede some firms from growing their business and legally purchasing biological waste products from other sectors (e.g., moose harvest or waste from fisheries). If this issue could be resolved, they could scale up their operations and create R&D and product development (e.g., mechanical engineering, fabrication, applied mechanical, sciences), procurement and logistics, processing, sales and marketing, and public education jobs.



6 OTHER GREEN EXPERTISE AND TECHNOLOGY

Several stakeholders were selected for their expertise in green building, climate change adaptation, mitigation, or other areas. Some had expertise centred around sustainable planning and development.

These stakeholders referenced more advanced activities and policies in other jurisdictions when discussing the landscape of the green economy in Atlantic Canada. One stakeholder noted that demand for green buildings in Atlantic Canada lags other regions, particularly among private developers who may choose not to adopt voluntary green building standards. While greener buildings have lower costs over time, they require more up-front capital costs. Many developers do not want to make that additional investment. Retrofitting was also mentioned as both an opportunity and a challenge. The retrofitting sector is not well developed in the region; it can be confusing for consumers to navigate efficiency upgrades when conducting renovations. Strengthening the retrofitting market to make that process easier for consumers could lead to growth as more homeowners take advantage of efficiency upgrades.

Planning, analysis, and carbon literacy are critical skills for many enterprises, such as constructing green buildings, operating green buildings, developing mitigation plans for climate change, or other initiatives.

“That level of literacy around sustainability, carbon and net zero needs to increase (in the construction sector).”

Industry informant

“The voluntary approach is not driving the market, so we need policy drivers and building code drivers.”

Industry informant

In addition to retraining and upskilling existing trades and technicians to work on technologically advanced green buildings, the potential exists for new jobs in roles such as:

- Energy auditors
- Energy advisors
- Solar installers
- Data analysts to track energy, waste, etc.
- Highly specialized or niche opportunities like artificial intelligence, carbon emissions inventories, energy modelling for climate change adaptation, and hydrology
- Cross-disciplinary skill sets, such as science, engineering, policy and communications

Green buildings

Greening our economy puts demands on the construction industry to reduce GHG emissions, transition to sustainable approaches in water and waste management and increase energy efficiency through the design of the building, materials used in building, and standards reached in construction and operation. In Canada, buildings account for 17% of total carbon emissions (CaGBC, 2020; ECCC, 2016). According to Canada Green Building Council, by continuing to build green buildings and renovating existing buildings to achieve green certifications, there is immense potential to reduce these emissions (CaGBC, 2020). The green building industry in Canada employs over 450,000 people involved in non-residential and residential construction and renovation. The industry will continue to grow as green buildings account for only 28% of non-residential construction. Only 4% of residential builds are certified (CaGBC, 2020), further emphasizing the need for training on these standards.

Net Zero Training is available through Canadian Home Builders' Association (CHBA) Qualified Net Zero Service Organizations. Four online courses have been offered so far: CHBA Net Zero Builder Training, CHBA Net Zero Energy Advisor Training, CHBA Net Zero Sales Training and CHBA Net Zero Renovator Training. Certifications from Natural Resources Canada include R-2000, EnerGuide and Energy Star. Currently, 57 homebuilders in Atlantic Canada hold at least one of CHBA's certifications and 15 service organizations are certified to train for the certifications (NRCan, 2021).

“Growth will be from new positions but also in retraining, upskilling the existing trades and professions as well.”

Industry informant

“(We) need people with the ability to communicate across disciplines and personality types. A huge component of what we do is trying to break down communication gaps between engineers and municipalities or municipalities and funding programs.”

Industry informant

According to the International Labour Organization (ILO, 2011), many skills are transferable in green buildings' construction and trades industry. However, technical knowledge and training are required for the planning and design stages, including architecture, engineering, and applying green standards to the construction of the buildings.

Key informant interviews indicated a need for updated formal training and new regulations and practices so the training can be adapted to emerging standards. To receive training in the construction industry for sustainable practices and innovative approaches, individuals must travel to Nova Scotia, Ontario, or British Columbia.

The housing industry is changing with new digital skills required for modelling and energy efficiency. Workers must be trained in advanced framing techniques and lean building practices. Building envelopes, including windows, framing, insulation, and vapour protection, are designed to work as a system and constructed with new technologies, materials, or techniques. Construction workers need to understand this system, its components and how it all interacts and can affect the environment to move forward in a green economy.

Sustainable financing and reporting

The finance industry has seen significant changes in investment types with the emergence of green, blue, and climate bonds. Investors increasingly consider the environmental, social and governance (ESG) aspects of a project or organization when making investment decisions. With the introduction of Sustainable Accounting Standards Board (SASB) Standards, the finance industry is focusing on "ESG issues expected to have a financially material impact on the company, aimed at serving the needs of most investors and other providers of financial capital" (SASB, 2021). From the organizational perspective, reporting has become more transparent, and many companies are now using Global Reporting Initiative (GRI) standards and completing Sustainability or ESG reports. Companies are also committing to responsible ESG practices making the environment and people part of their core values.

"Green Buildings are any new or existing building that is designed, constructed and/ or renovated and operated to achieve clearly defined environmental and other sustainable objectives that are measurably above code and green building workers are architects and designers, researchers, educators, those who recover and process valuable resources, and policy-makers who create regulations and the local or provincial government staffers who oversee them." (CaGBC, 2020)

"All industries have opportunities for cleantech. Whether it is energy efficiency, clean energy production, new carbon free processes, etc."

Industry informant

Workers' financial skills need to be adapted and upskilled to incorporate the new investment and accounting standards and reporting initiatives. Current workers need to find a credible source for training to acquire this new knowledge and build their skills towards responsible investing and learn the type of information required for the GRI. Training for these new standards and reports can be found online through industry associations like the Responsible Investment Association. Those who create the standards, such as SASB, also provide Fundamentals of Sustainability Accounting (FSA) training, exam preparation and writing. LEAD Canada is dedicated to developing a network of leaders in sustainability and offers online training for GRI standards (LEAD, n.d).



Cleantech and green tech

A critical component of green growth in Atlantic Canada is green technology. Companies directly involved in this sector, including cleantech and the bioeconomy, are developing innovative technology to combat climate change and address sustainability concerns. These organizations are inherently green.

Growth is expected to continue in this sector as organizations develop innovations to address global climate challenges and issues specific industries face. Environmental challenges present opportunities for product development and innovation and opportunities for new businesses and service offerings. One stakeholder noted that the vast demand for carbon credits on the compliance market is undersupplied; this presents an opportunity for carbon capture technology to grow and expand the supply of carbon credits.

"(We have) a high demand for that (software development and programming) skill set."

Industry informant

"We need good storytellers which is essentially marketing. That is going to critical."

Industry informant

"We are big fans of cross-disciplinary skill sets. The future is teams, interdisciplinary groups bringing knowledge to the table"

Industry informant

As companies in this sector grow, job opportunities are primarily related to scaling up the workforce rather than the emergence of new job types. Stakeholders indicated that opportunities would increase for:

- Administrative positions (e.g., accounting, finance, human relations, administrators)
- Marketing, sales, and service roles (e.g., business development, marketing, sales, customer service/support)
- Technical and R&D positions
 - Engineering—electrical, chemical, process
 - Information and communications technology (ICT)—software developers, programmers, data analysts, QA/QC
 - Science—analytical chemist, electrical chemical scientist, metallurgist, ocean science, geologists
 - Product development or product manager
- Cross-disciplinary roles
 - Project managers
 - Business analysts and business development officers
 - Implementers to configure or customize the software for clients

There are also opportunities to support the tech sector through policies and regulations. One stakeholder indicated that policy people are needed to pave the way on regulations for technology. Another noted opportunity for growth in the bioeconomy could translate to new roles as companies expand from traditional products made from natural resources to new products and business opportunities.

Hiring challenges were reported for:

- Software developers and programmers
- Data analysts and roles responsible for commercial evaluations
- Product developers
- Roles requiring interdisciplinary skill sets (e.g., business & science, engineering & business, and science & engineering)

There is intense competition for local talent in the tech sector. Recruiting out of province or internationally has been necessary in some cases, especially when looking for highly specialized roles or experience. Many stakeholders indicated that new grads were a major source of talent, but talent is harder to find for more senior positions. In some cases, employers recruit senior and experienced workers from more established sectors.

Transforming the Economy and Workforce for Green Growth



Every industry will be affected by the transition to a green economy. Despite varying perspectives on the greening of the economy and the workforce in Atlantic Canada, industry informants noted that certain roles are growing or evolving. From administration and accounting practices to materials handling on a mill floor, positions and workers will be affected by this transition through new regulations, policies, technologies and innovation. This study also revealed that, in both growing or emerging areas, there is a green talent shortage and limited training available.

For the future of the green economy in Atlantic Canada, employers and employees across industries—including those in vertical and horizontal markets—will require training to adapt to these changes. Increasing the supply of skilled and adaptable green businesses and talent is also essential in the months and years to come.

Collaboration is key to accelerating and optimizing green growth

Many stakeholders noted the importance of collaboration within and between industries, post-secondary institutions and governments. At the industry level, R&D within some areas was often shared between organizations to better the industry overall. Collaboration across the value chain was also mentioned, as technology advancements can help solve environmental challenges faced by each industry.

“Strategic collaboration with educational institutions and industry can help align skills supply and demand.”

Industry informant

Governments at different levels were also viewed as critical partners in the transition to a green economy. Many stakeholders noted that policy or regulatory misalignment could hinder the green transition and growth. It was deemed imperative that government and industry work together and not in opposition. Incentives to encourage companies to go green, such as Prince Edward Island's tax incentive program, would help attract green companies to the region and encourage existing companies to go green. Traditional sectors seeking to green their operations would also benefit from more guidance beyond hiring or contracting Environmental Advisors. Helping organizations build in-house capacity to calculate carbon footprints, conduct current state assessments, and develop, implement and monitor climate change initiatives will make lasting impacts.

Several stakeholders also noted close partnerships with post-secondary institutions for R&D as well as the supply of talent available through co-ops, internships or new graduates from specific programs or institutions. For industry informants in Newfoundland and Labrador, the Marine Institute, affiliated with the Memorial University of Newfoundland, was frequently cited as a collaborator with industry.

Industries must also partner with associations, educators and trainers so that learning is accessible to broad audiences. Employers and industry associations should also consult and partner with diverse groups to ensure education and training opportunities are inclusive, accessible and relevant to these under-represented pools (e.g., Indigenous collaboration/requirement to consult, promote programs to ensure awareness).

Talent management implications and considerations

Two main themes emerged around ensuring an adequate supply of skilled and productive green talent is available to meet current and future needs in the region. Initiatives focus on the principles of workforce attraction, retention and development.



Career awareness, experiential learning, and targeted recruitment

Several stakeholders noted that exposing K-12 students to green career options and pathways can be helpful, especially to challenge perceptions about traditional sectors. Career outreach should also reach other talent sources, such as Indigenous peoples, immigrants, and mid-career transitioners. Everyone can contribute to the green transition, which means that some level of sustainability awareness and green/carbon literacy is essential for the broader population, not just among workers. The first step towards a greener economy is understanding Atlantic Canada's greening initiatives, programs and policies, innovation and environmental issues. Conducting green and career awareness initiatives will have a broader impact if done strategically and collaboratively. Industry champions and support will also be needed at senior levels. An excellent starting point is to standardize and promote a green jobs definition for the region or across Canada (refer to the [Spotlight](#) on the next page for our proposed green jobs definition for Atlantic Canada). From here, information resources such as profiles of current and emerging green occupations and specializations could be developed and broadly disseminated.

New grads have been a great source of talent for junior positions. Many organizations reported using co-ops and internships to obtain new talent, and in many cases, hired recent graduates who have had successful placements with them as students. Some start-up companies, particularly those offering green expertise or developing green technologies, highlighted the potential value of having more employment programs (e.g., wage subsidies) for intermediate positions. Workers in these positions tend to have a blend of technical and non-technical skills to take on more complex tasks and help businesses grow. While employment programs exist for certain demographic groups, implementing wage subsidies more broadly would also support a just transition in which no worker is left behind.

Targeted and active recruitment towards green jobs could also help expand the green economy. Niche expertise can be challenging to find. In some cases, employers will poach workers from other organizations to secure talent. Many stakeholders noted that their talent search could be international, often utilizing provincial immigration programs to find and recruit talent.

Several organizations and programs were mentioned as providing employment and hiring resources:

- Industry and related associations
- Wage subsidies, especially provincial (e.g., Jobs NL) and ECO Canada
- Federal government initiatives: ACOA, National Research Council of Canada Industrial Research Assistance Program (NRC IRAP), Youth Employment and Skills Program Agriculture Canada
- Other organizations such as Clean Foundation, Venture for Canada, Mitacs, Magnet Grants, NP Canada, MM, and those providing training grants



SPOTLIGHT: Enhancing the Green Jobs Definition for Atlantic Canada

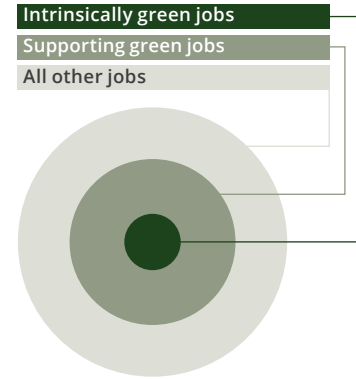
Our research findings indicate that the greening of the region's economy, companies, and jobs are still evolving. Yet, it's critical that an expanded and potentially standardized definition of green jobs is available to guide current and future workers.

Our proposed definition of green jobs includes existing and new roles that positively and directly contribute to the preservation or restoration of the environment. Green jobs include:

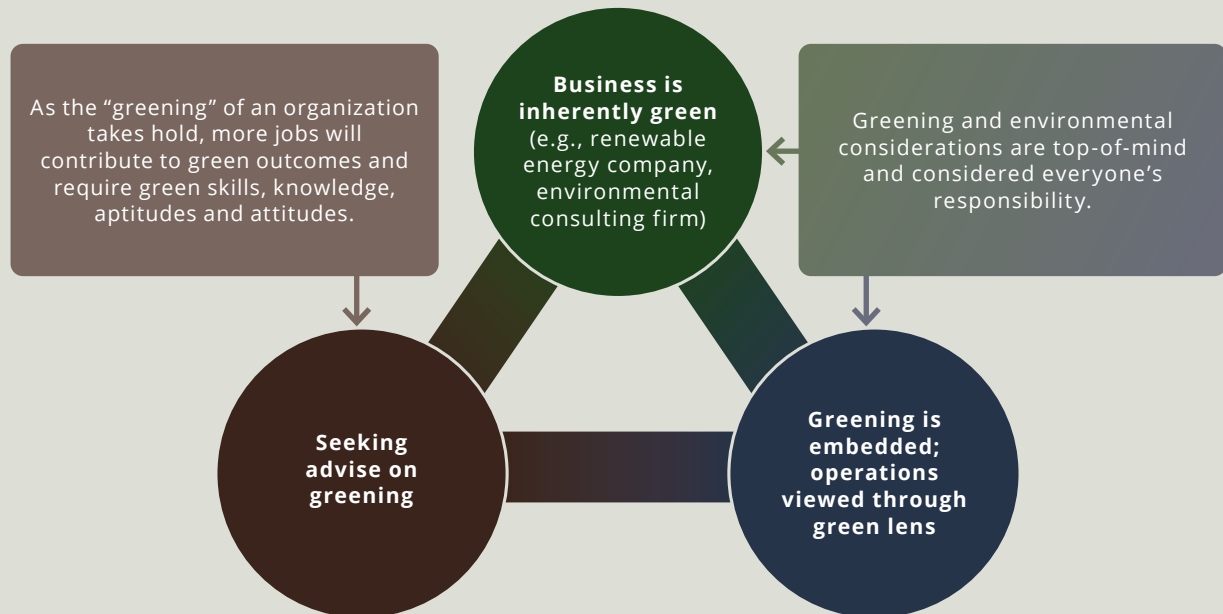
- **Intrinsically green jobs** – roles that *are necessary for* environmental protection, prudent natural resource management or environmental sustainability *and require* in-depth green skills, knowledge, attributes and attitudes. Examples include STEM occupations, highly specialized roles in environmental areas and existing jobs needing green competencies.
- **Supporting green jobs** – roles that *contribute directly to* green outcomes and *may or may not require* green skills, knowledge, attributes and attitudes. Examples include software developers, programmers, and business or administrative support roles.

This is not a static definition as, with time and advancement, existing jobs that do not current require green competencies will begin to be impacted by the transition, increasing the jobs that will need green skills.

Concentration of Green Jobs in Atlantic Canada



Greening of Organizations and Jobs in Atlantic Canada



Talent development through lifelong learning

A concerted, industry-led effort to uncover the knowledge, abilities, values, and attitudes required of workers is the first step. The second step is to design and deliver relevant education and training to individuals and organizations. While industry leaders and decision-makers can champion programs, on-the-ground industry representatives are needed to provide the information to guide education and training programming.

Enhancing post-secondary education

A critical element in preparing the next wave of green talent is aligning and enhancing post-secondary education programs based on broader and industry-specific needs. Ensuring alignment can help address and mitigate talent shortages as jobs in the green and blue economies expand in number and specializations.

Educators have made great strides in promoting alignment and enhancing their programs and services. For example, the Marine Institute offers industry-led programs ranging from technical certificates to master's degrees, along with short courses and industrial response programs designed to help students succeed in the workforce. Other post-secondary educational institutions that participated in our roundtable discussion also offer a variety of environmental programs and continuous education to help students and current workers improve or expand their skill sets. A list of university and college programs providing environmental or environmentally related education programs is included in [Appendix A](#).

In general, post-secondary education stakeholders desire to work more strategically and collaboratively with industries and governments to determine and address workforce requirements now and in the future. Optimizing collaboration and partnership opportunities require involvement from leaders and decision-makers across all stakeholder groups.

Offering agile training and continuing education

Our research also revealed a need and appetite for training opportunities to upskill and reskill employees for the green economy. One stakeholder noted that, instead of recruiting talent with the right skills, they utilized training to diversify existing staff's skill sets ([Appendix B](#) includes a list of organizations and industry associations providing relevant training or certification).

There was, however, a marked lack of workplace-based training programs from our primary and secondary research. Assessing skills needs (i.e., the "what" for a baseline of skills that are cross-sectoral and sector-specific) and characteristics of worker aptitudes needed for green jobs (e.g., adaptability) is essential to building effective training programs.



Key considerations from stakeholders include:

1. Reskill at sectoral level

For increased scalability, it is recommended reskilling efforts occur at the sectoral level. This will allow stakeholders to prioritize upcoming green skills required, offer work-integrated learning, and source subject matter experts for training. Through this approach, an appropriate analysis of the knowledge, abilities, values, and attitudes required within the sector can be ascertained, and training can be provided collectively. Stakeholders could consider developing hands-on training programs to prepare new entrants into the market for specific gaps.

2. Gather employee input

By working directly with employees and stakeholders to understand their perspectives, green opportunities, training initiatives, and effective delivery mechanisms can be uncovered. Training will need to consider the change readiness of individuals and ensure they are appropriately onboarded to the changing skills and understand their role in the green economy. When solutions are developed by the people, for the people, there may be increased buy-in to the shared purpose.

3. Support worker advancement and facilitate worker transferability

Fluctuations in the economy, an ageing population, evolving regulations, and technological advancements could impact talent needs in every industry and province. Understanding talent shortages and surpluses may help employers, educators, trainers, and individuals navigate career development and transition opportunities. When a labour surplus is anticipated, stakeholders could work together to proactively identify green roles where workers can pivot and augment their skills and attributes. Workers may also benefit from understanding the factors influencing employment opportunities. For example, knowing which occupations or skills are needed for each stage of innovation, from product development to deployment, can help workers plan their careers.

Atlantic Canada has an older population and workforce relative to other Canadian regions. Employers are advised to develop comprehensive workforce retention, transition and development strategies to avoid knowledge and productivity losses due to worker retirements. Plans may include encouraging retiring workers to shift instead to advisory and green roles and developing the skills of new and existing workers.

4. Offer proactive training to develop subject matter experts

It is vital to consider proactively training in preparation for the transition to green skills and emerging specializations within Atlantic Canada. In some cases, adopting international training and certification is necessary. Specifically, in the oceans technology sub-sector, Europe is the leader, and Canada seeks to gain ground. Companies will be better equipped to improve and accelerate initiatives if they proactively train individuals to the European standard.

On the other hand, the need to make environmental training and certifications attainable and relevant to provincial realities and future-readiness was raised by industry informants. Stakeholders noted that certification requirements should reflect what is best for regional demands, rather than global standards that don't align with unique circumstances on the ground. For example, a stakeholder noted that the former FITNO program in NL was beneficial to encourage small processors to adopt new technologies to make them more competitive on the global scale.

With regards to greening initiatives, stakeholders seek and utilize training programs and resources in the following areas:

- Erosion and sediment control
- Spill response
- Hazardous waste
- Transportation of dangerous goods

Several stakeholders noted that these training programs are not always available locally. In some cases, the adoption of new technology will require training delivered by the technology provider or provided remotely.

5. Provide online training and strengthen digital numeracy

Online upskilling and reskilling programs would most effectively reach individuals in Atlantic Canada's rural areas. These programs allow individuals to prepare for the greening of their position or a future role while still maintaining employment in their communities.

Concrete actions include:

- Combine online and hands-on learning (think outside the box)
- Provide foundational skills training to increase readiness for online training
- Incorporate technical skills with soft skills required
- Engage learners that may have difficulty accessing in-person training

Barriers and risks mentioned were:

- Access to the internet may be limited in some regions
- Online learning isn't conducive or suitable for every learner
- Training needs to support life-long learning and be integrated with disciplines that are not typically green

As traditional jobs shift to incorporate green practices, an increased focus must be placed on digital literacy. Again, individuals may not have a high level of understanding of or comfort with technology, precluding them from participating in both training and work opportunities without additional intervention and support.

6. Develop short-term, focused programs to support adaptive credentialing

Education and training institutions are increasing their short-term, focused programs, also known as micro-credentials. While these programs existed before 2020, the pandemic has fuelled their growth. These courses can give workers and job seekers a career boost. Micro-credential skills training is often industry-specific and helps workers pick up new skills or upgrade existing ones.

For micro-credentialing to be effective, stakeholders identified the following concrete actions:

- Determine subject-matter expertise requirements that are suited for adaptive credentials
- Assess demand driven by government policy where adaptive credentials will increase the availability of skilled workers (e.g., energy advisors, energy efficiency reporting, climate change modelling)
- Avoid training that is too narrow and specialized to be responsive to change

Sustainability ensures decent jobs for everyone, the environment is protected, conservation is a priority, and our resources are developed responsibly with future generations in mind. The greening of industry and roles along with environmental regulations and technology are still evolving, making it increasingly challenging to nurture green talent as the target is always moving.

Talent attraction, retention and development play vital roles in advancing green growth in Atlantic Canada. Strategies and actions range from understanding what labour and skills are needed across and within industries to ensuring that suitable candidates are sourced and retained in critical roles. Through careful consultation and collaboration, new upskilling and reskilling opportunities can emerge to prepare organizations and individuals for the future of work, which is shaped by technological, generational and environmental shifts.

Appendix A: University and College Programs Related to the Green Economy

Acadia University

- [Environmental and Sustainability Studies \(BA, BCD\)](#)
- [Environmental Geoscience \(BSc\)](#)
- [Environmental Science \(BSc\)](#)

Cape Breton University

- [Environmental Studies \(BET\)](#)
- [Bachelor of Arts and Science in Environment \(BASE\)](#)
- [Master of Education in Sustainability, Creativity and Innovation \(MEd SCI\)](#)

Dalhousie University

- [Environment, Sustainability And Society Program \(Ess\)](#)
- [RBC Sustainability Leadership Certificate](#)
- [Bachelor of Environmental Design Studies, BEDS](#)
- [Environmental Science, Bachelor of Science \(BSc\) or Bachelor of Arts \(BA\)](#)
- [Environmental Sciences, Bachelor of Science \(Agriculture\), BSc \(ax\)](#)
- [Integrated Environmental Management, Bachelor of Science \(Agriculture\), BSc \(Agr\)](#)
- [Earth And Environmental Sciences \(MSc\) \(PhD\)](#)
- [Environmental Engineering \(MEng\) \(MAsc\)](#)
- [Master of Environmental Studies \(MES\)](#)
- [Master of Marine Management \(MMM\)](#)
- [Master of Resource & Environmental Management \(MREM\)](#)

Memorial University

- [School of Science and the Environment](#)
- [Bachelor of Environment and Sustainability \(BES\) Environmental Science or Resource Management](#)
- [Marine Environmental Technology - Diploma of Technology/Bachelor of Technology](#)
- [Master of Arts in Environmental Policy \(MA\)](#)
- [Master of Science in Boreal Ecosystems and Agricultural Sciences \(MSc\) \(PhD\)](#)
- [Master of Science \(Environmental Science\) \(MSc.\)](#)
- [PhD Environmental Science](#)
- [Master of Environmental Science \(M.Env.Sci\)](#)

- [Master of Science \(Sustainable Aquaculture\) \(MSc.\)](#)
- [Master of Applied Science \(Environmental Systems and Engineering Management\) \(MASc.\)](#)
- [Master of Marine Studies Marine Spatial Planning and Management \(MSPM\)](#)
- [Master of Marine Studies Fisheries Resource Management](#)
- [Advanced Diploma in Sustainable Aquaculture](#)
- [Transdisciplinary Sustainability \(PhD\)](#)

Mount Allison University

- [Environmental Science \(BSc.\)](#)
- [Environmental Studies \(BA\)](#)

St. Mary's University

- [Bachelor of Environmental Studies \(BES\)](#)
- [Bachelor of Science in Environmental Science](#)

St. Francis Xavier University

- [Bachelor of Arts and Science \(BASC\) in Climate and Environment](#)
- [Bachelor of Arts \(BA\) or Bachelor of Science \(BSc\) in Aquatic Resources](#)
- [Bachelor of Arts \(BA\) in Development Studies](#)
- [Bachelor of Science \(BSc\) Environmental Science](#)

St. Thomas University

- [Bachelor of Arts \(BA\) Environment and Society](#)

University of Moncton

- [Bachelor of Arts \(BAF\) Forest Management](#)
- [Bachelor in Sustainable Development and Coastal Zone](#)
- [Masters of Environmental Studies](#)

University of New Brunswick

- [Bachelor of Arts \(BA\) International Development Studies](#)
- [Bachelor of Science in Environment and Natural Resources \(BSc\)](#)
- [Bachelor of Science in Forestry \(BSc\)](#)
- [Bachelor of Science in Environmental Biology](#)
- [Bachelor of Science in Environmental Geosciences](#)
- [Bachelor of Science in Environmental Sciences](#)
- [Forestry and Environmental Management \(MScF, MF, MScFE, MFE, MScEM, MEM, PhD\)](#)

University of PEI

- [Bachelor of Science in Applied Climate Change and Adaptation](#)
- [Bachelor of Environmental Studies](#)
- [Bachelor of Science in Sustainable Design Engineering](#)
- [Bachelor of Wildlife Conservation](#)

College of the North Atlantic (CNA)

- [Agriculture Technician](#)
- [Environmental Engineering Technology \(Co-op\)](#)
- [Environmental Engineering Technology - Advanced Diploma](#)
- [Fish and Wildlife Technician](#)
- [Forest Resources Technician](#)

Holland College (PEI)

- [Environmental Applied Science Technology](#)
- [Wildlife Conservation Technology](#)
- [Energy Systems Engineering Technology](#)
- [Wind Turbine Technology](#)

New Brunswick Community College

- [Environmental Technology](#)

Nova Scotia Community College

- [Electrical Technician](#)
- [Energy Sustainability Engineering Technology \(ESET\)](#)
- [Environmental Engineering Technology](#)
- [Horticulture and Landscape Technology](#)
- [Natural Resources Environmental Technology](#)
- [Oceans Resources - Fisheries and Aquaculture](#)

Online

- [Seneca College Online Certificate - Environmental Management](#)

Appendix B: Industry Training & Certification

Training

- [Climate Smart Certification](#)
- [Canadian Institute for Energy Training \(CIET\) – Virtual Real Time Classroom](#)
- [Natural Resources Canada Energy & GHG Management](#)
- [Canada Green Building Council](#)
- [Passive House](#)
- [Leading Green](#)
- [EPIC Educational Program Innovations Center](#)
- [Society for Ecological Restoration Professional Development](#)
- [Certified Sustainability Practitioner](#)
- [Mining Association of Canada: Towards Sustainable Mining](#)
- [Responsible Investment Association \(RIA\)](#)
- [SASB standards \(Sustainability Accounting Standards Board\) Fundamentals of Sustainability Accounting](#)
- [LEAD Canada GRI Standards Certified Training course](#)

Green Certifications

- [Available Certifications for Housing and Buildings in Canada](#)
- [Green Business Certification Inc.](#)
- [LEAF](#)
- [International Organization for Standardization](#)
- [ISO 14064-1 CARBON MANAGEMENT \(GHG Validation & Verification\)](#)
- [ISO 14001:2004 and ECO Warranty Environmental Management](#)
- [ISO 50001 Energy Management](#)
- [Zero Waste Certification](#)
- [Green Marine Certification](#)
- [Marine Stewardship Council: Certified Sustainable Seafood](#)

About the Project Partners

econext (formerly the Newfoundland and Labrador Environmental Industry Association or NEIA) is an association of businesses that accelerates clean growth in Newfoundland and Labrador. econext works on behalf of over 200 members to foster environmentally sustainable economic development. To achieve this, econext focuses its activities and initiatives in six (6) areas by providing:

- a support framework for entrepreneurs and startups;
 - networks to help increase productivity and competitiveness;
 - tools to encourage and foster innovation;
 - export and international business development programming;
 - training and professional development opportunities to build capacity; and
 - leadership on policy and advocacy issues
-

The Maritimes Energy Association (MEA) advances the region and its energy economy by working with key stakeholders, including members, governments and policymakers. The MEA advocates responsible, safe energy development that works for the region and its members as the world moves towards net zero to address climate change.

The MEA works with its members to understand their industry and needs and helps enable sustainable growth and development within the energy sector. The association also collaborates with governments at all levels to help them develop responsible policies that support growth in the region.

ECO Canada is the steward for the Canadian environmental workforce across all industries. From job creation and wage funding to training and labour market research, ECO Canada champions the end-to-end career of an environmental professional. Its efforts promote and drive responsible and sustainable economic growth to ensure that environmental care and best practice are a priority.

ECO Canada is a thought leader in the environmental labour market. Its workforce knowledge spans nationally across all provinces and territories and within major Canadian industries, including energy, forestry, mining, agriculture, manufacturing, and construction. The organization gathers and analyses trends within the environmental workforce and provides relevant data and insights for policy, business, and educational purposes.



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