

Strengthening Nova Scotia's Clean Energy Economy

AN ICTC POLICY BRIEF

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PREFACE

The Information and Communications Technology Council (ICTC) is a not-for-profit, national centre of expertise for strengthening Canada’s digital advantage in a global economy. Through trusted research, practical policy advice, and creative capacity-building programs, ICTC fosters globally competitive Canadian industries enabled by innovative and diverse digital talent. In partnership with an expansive network of industry leaders, academic partners, and policymakers from across Canada, ICTC has empowered a robust and inclusive digital economy for over 30 years.

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Researched and written by Allison Clark (Research and Policy Analyst) and Todd Legere (Economist and Research Analyst) with generous support from Erik Henningsmoen (Research and Policy Analyst) and the ICTC Research & Policy team. Report designed by Raymond Brand.

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



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Foreword

Over the past two years, the Information and Communications Technology Council (ICTC) has been researching the complex socioeconomic mechanisms needed to decarbonize the Canadian economy. Recognizing the need for a skilled workforce in a net-zero future, ICTC set out to better understand labour market demands and the implications of this transition.

Focusing on key sectors undergoing transformative changes in response to climate mitigation targets, ICTC began exploring in-demand jobs and skills in the energy, agriculture, transportation, and supply chain sectors. Our research on the energy and agriculture sectors began in April 2022 and concluded in June 2023.¹ Labour market research on the transportation and supply chain sectors began in April 2023 and is set to conclude in March 2024.

The findings from these studies highlight the vital role of digital technologies in decarbonizing high-emitting sectors. Some thought leaders refer to this as the “twin transition,” whereby information technologies (IT) and data can be used to amplify environmental sustainability at the organizational and sectoral levels.² Importantly, digital technologies are considered helpful to maintaining economic prosperity during the transition to net-zero.³

Building upon this concept, ICTC began supplemental research to explore the twin transition and its implications on the labour market. This included the development of a *Digital-Green Competency Framework*, which seeks to classify key skill sets resting at the intersection of the digital and green economies. This framework is set to be published in the spring of 2024. While there is value in building a broad-scale competency framework, it is also important to understand the nuances of the twin transition at regional and sectoral levels.

This policy brief discusses regional and sectoral nuances of the transition to net-zero by covering the labour market, technological, public policy, and socioeconomic mechanisms needed to help advance Nova Scotia's clean energy economy.

This brief draws on key findings from a clean energy roundtable held in Halifax, Nova Scotia, in January 2024. This roundtable event convened 14 industry leaders in the province's clean energy sector, including employers of clean energy companies

¹ Clark, Allison and Matthews, Mairead, “Clean Energy and Pathways to Net-Zero: Jobs and Skills for Future Leaders,” April 2023, ICTC, <https://www.digitalthinktankictc.com/reports/clean-energy-and-pathways-to-net-zero>; Clark, Allison and Matthews, Mairead, “Canadian Agri-Food Sustainability: Skilled Talent Needed to Meet Food Demand and Reduce Environmental Impacts,” April 2023, ICTC, <https://www.digitalthinktankictc.com/reports/canadian-agri-food-sustainability>

² Blüm, Sjoerd, “What is the ‘twin transition’ - and why is it key to sustainable growth?” October 2022, World Economic Forum, <https://www.weforum.org/agenda/2022/10/twin-transition-playbook-3-phases-to-accelerate-sustainable-digitization/>

³ Ibid.



and supporting organizations. Attendees were asked what political, socioeconomic, and labour market challenges Nova Scotia's clean energy sector faces, as well as what changes are needed to strengthen the clean energy economy in the province. This brief also draws upon a subset of data from five labour market surveys ICTC administered to employers across Canada's green economy. Two surveys took place in the summer of 2022, while three surveys took place in the summer of 2023.

The background section of this brief provides a high-level overview of climate change in Nova Scotia and the need for climate mitigation. Section I: Clean Energy and Pathways to Net-Zero in Nova Scotia, details the province's energy mix, climate targets, and pathways to building a clean energy economy in Nova Scotia. This section also details the role of digital technologies in facilitating the transition to net-zero. Section II: Challenges and Recommendations to Advance Nova Scotia's Clean Energy Economy provides insight into the unique challenges Nova Scotia faces in advancing clean energy and details recommendations for industry, policymakers, civil society, and post-secondary education institutions. All recommendations are informed directly by industry leaders who attended ICTC's Halifax clean energy policy roundtable.



Background

Industrial activities, such as burning fossil fuels for energy, have released excessive amounts of heat-trapping greenhouse gases (GHG), such as carbon dioxide (CO₂), into the atmosphere.⁴ Since pre-industrial times, global average CO₂ concentrations have increased from 280 parts per million (ppm) to 424 ppm in 2023.⁵ This unprecedented shift has resulted in widespread climate change, threatening ecosystems and societies worldwide.⁶ Despite ambitious targets like the Paris Agreement,⁷ it has been difficult to mobilize intergovernmental climate mitigation efforts, and communities across the globe are feeling the effects of climate change. In 2023 alone, record-breaking heat waves, forest fires, droughts, heavy rainfall, and extreme floods affected many communities in Canada and the world.⁸

Nova Scotian communities are among those feeling the effects of climate change. In recent years, the maritime province has experienced a myriad of extreme weather events atypical to the region's historical climate trends.⁹ In February 2023, Nova Scotia experienced a polar vortex, which brought wind chills below -40°C, killing off many horticultural crops in the province.¹⁰ In May 2023, the province saw its most devastating wildfire season, with over 25,000 hectares burned and approximately 200 homes destroyed.¹¹ In July 2023, torrential rainfall (with 250mm of rainfall over 24 hours) and flash flooding resulted in a province-wide state of emergency and severe infrastructural damages.¹² In February 2024, the province experienced extreme snowfall, with parts of the province buried under 150 cm of snow and yet another state of emergency called into effect.¹³ On top of this, Nova Scotia has experienced an increase in the frequency and severity of hurricanes and post-tropical storms, such as Hurricane Dorian (2019),¹⁴ Hurricane Fiona (2022),¹⁵ and Hurricane Lee (2023),¹⁶ bringing strong winds, heavy rainfall, and storm surges that accelerate coastal erosion.¹⁷

⁴ Intergovernmental Panel on Climate Change (IPCC), "Climate Change 2021: The Physical Science Basis," The Working Group I - IPCC Sixth Assessment Report, August 2021, <https://www.ipcc.ch/report/ar6/wg1/>

⁵ Lindsey, Rebecca, "Climate change: atmospheric carbon dioxide," May 2023, Climate.gov, <https://www.climate.gov/news-features/understanding-climate/climate-change-atmospheric-carbon-dioxide>; Climate.gov, "Broken record: Atmospheric carbon dioxide levels jump again," June 2023, <https://www.climate.gov/news-features/feed/broken-record-atmospheric-carbon-dioxide-levels-jump-again>

⁶ Intergovernmental Panel on Climate Change (IPCC), "Climate Change 2022: Impacts, Adaptation and Vulnerability," The Working Group II - IPCC Sixth Assessment Report, February 2022, <https://www.ipcc.ch/report/sixth-assessment-report-working-group-ii/>

⁷ United Nations, "The Paris Agreement," United Nations Climate Change, <https://unfccc.int/process-and-meetings/the-paris-agreement>

⁸ Wu, Shuang-Ye, "2023's extreme storms, heat and wildfires broke records – a scientist explains how global warming fuels climate disasters," December 2023, <https://theconversation.com/2023s-extreme-storms-heat-and-wildfires-broke-records-a-scientist-explains-how-global-warming-fuels-climate-disasters-217500>.

⁹ Department of Environment and Climate Change, "Weathering What's Ahead: Climate Change Risk and Nova Scotia's Well-being," Province of Nova Scotia, December 2022, <https://climatechange.novascotia.ca/sites/default/files/uploads/climate-change-risk-report.pdf>

¹⁰ <https://www.cbc.ca/news/canada/nova-scotia/nova-scotia-cold-weather-friday-february-3-2023-1.6735529> Horticulture Nova Scotia, "Polar Vortex Industry Recovery Guidelines", 2023, <https://horticulturens.ca/who-we-are/polar-vortex-industry-recovery-program/>; "Bundle up - It's about to Get Dangerously Cold in Nova Scotia," CBC news, February 2023, <https://www.cbc.ca/news/canada/nova-scotia/nova-scotia-cold-weather-friday-february-3-2023-1.6735529>.

¹¹ "Nova Scotia saw its most devastating wildfire season on record in 2023," CBC news, October 2023, <https://www.cbc.ca/news/canada/nova-scotia/nova-scotia-most-devastating-wildfire-season-ever-1.7010205>

¹² "Nova Scotia wrestles with aftermath of devastating floods," Reuters, July 2023, <https://www.reuters.com/business/environment/atlantic-canada-province-wrestles-with-aftermath-devastating-floods-2023-07-23/>

¹³ "Nova Scotia's massive snowfall — from your perspective," CBC news, February 2024, <https://www.cbc.ca/news/canada/nova-scotia/nova-scotia-s-historic-snowfall-from-your-perspective-1.7105284>; "As planet warms, ferocious snowfalls could increase," Canadian Press, February 2024, <https://atlantic.ctvnews.ca/as-planet-warms-ferocious-snowfalls-could-increase-1.6759222>

¹⁴ "Remembering Dorian: How the 2019 storm left a trail of destruction," CBC news, September 2020, <https://www.cbc.ca/news/canada/nova-scotia/snoddon-dorianrecap-weather-1.5712159>

¹⁵ "It is surreal: Canada's Atlantic coast residents describe devastation as Fiona wipes away homes and knocks out power for thousands," CNN, September 2022, <https://www.cnn.com/2022/09/24/weather/hurricane-fiona-canada-saturday/index.html>

¹⁶ "Lee has departed, but thousands in Nova Scotia still have no power," CBC news, September 2023, <https://www.cbc.ca/news/canada/nova-scotia/post-tropical-storm-lee-aftermath-sept-17-1.6969500>

¹⁷ Department of Environment and Climate Change, "Weathering What's Ahead: Climate Change Risk and Nova Scotia's Well-being," Province of Nova Scotia, December 2022, <https://climatechange.novascotia.ca/sites/default/files/uploads/climate-change-risk-report.pdf>



Not only is climate change a concern for the natural environment and human safety, but it also poses risks to the economy. The 2023 wildfires in Tantallon, Nova Scotia, (excluding those in Shelburne County and other areas of the province) caused over \$165 million in insured damage.¹⁸ The flash flooding in July 2023 resulted in \$170 million in insured damage.¹⁹ Meanwhile, Hurricane Fiona of 2022 cost Atlantic Canada a minimum of \$1.07 billion in insured losses.²⁰ Overall damage costs, cleanup costs, emergency relief costs, and losses in economic productivity due to Hurricane Fiona further impacted the Atlantic Canadian economy.²¹

Under a high emissions scenario (CMIP5),²² Nova Scotia will experience a warmer and wetter climate, with the average annual temperatures in Halifax projected to rise by 2.3 °C and average annual precipitation expected to increase by 13% over the next 30 years.²³ The frequency and severity of extreme weather events, such as forest fires, flash flooding, and hurricanes, are also predicted to increase.²⁴ It is therefore paramount that efforts be made to reduce greenhouse gas emissions and mitigate climate change.

Given that greenhouse gas emissions are not bound by borders, each jurisdiction has a role to play in climate mitigation. While Nova Scotia is situated on the periphery of a densely populated and highly industrialized region of North America, it is imperative that the province also reduces its own greenhouse gas emissions. This will require growth in the clean economy, such as clean energy production, electrifying supply chains, modernizing grid infrastructure, adopting clean technologies, and increasing transmission capabilities.²⁵ Workforce development efforts, industry collaboration, cultural shifts, and changes in policies and programs will be needed to advance Nova Scotia's clean energy economy.

¹⁸ "Tantallon wildfire causes over \$165 million in insured damage," Insurance Bureau of Canada, July 2023, <https://www.ibc.ca/news-insights/news/tantallon-wildfire-causes-over-165-million-in-insured-damage>

¹⁹ "Nova Scotia flooding causes over \$170 million in insured damage" Insurance Bureau of Canada, August 2023, <https://www.ibc.ca/news-insights/news/nova-scotia-flooding-causes-over-170-million-in-insured-damage>

²⁰ "Hurricane Fiona and its Impacts on Atlantic Canada and the Maritime Shipping Industry," GSTS, October 2023, <https://gsts.ca/resources/blog/hurricane-fiona-and-its-impacts-on-atlantic-canada-and-the-maritime-shipping-industry/>

²¹ "Economic fallout from Hurricane Fiona to reach \$2B to \$4B in Canada," United Press International, September 2022, [https://www.upi.com/Top_News/World-News/2022/09/28/canada-Hurricane-Fiona-damage-economy/1941664365697/#:~:text=AccuWeather%20founder%20and%20CEO%20Joel%20N.%20Myers%20estimates,impact%20estimate%20that%20AccuWeather%20issued%20for%20Puerto%20Rico;Nova%20Scotia's%202023%20provincial%20budget%20allocated%20\\$6.0%20million%20for%20Hurricane%20Fiona%20cleanup,%20and%20\\$10.8%20million%20for%20Hurricane%20Fiona%20damage%20repairs.](https://www.upi.com/Top_News/World-News/2022/09/28/canada-Hurricane-Fiona-damage-economy/1941664365697/#:~:text=AccuWeather%20founder%20and%20CEO%20Joel%20N.%20Myers%20estimates,impact%20estimate%20that%20AccuWeather%20issued%20for%20Puerto%20Rico;Nova%20Scotia's%202023%20provincial%20budget%20allocated%20$6.0%20million%20for%20Hurricane%20Fiona%20cleanup,%20and%20$10.8%20million%20for%20Hurricane%20Fiona%20damage%20repairs.)

²² CMIP5 or Coupled Model Intercomparison Project Phase 5 is a climate model that includes long term simulations of twentieth-century climate, as well as projections for the twenty first century and the twenty second century. The model is widely used by climate modelers and climate scientists, including the Intergovernmental Panel on Climate Change (IPCC). CMIP5 climate modelling was first used in the IPCC Fifth Assessment Report on Climate change. See: Emori, Seita, Taylor, Karl, Hewitson, Bruce, Zermoglio, Fernanda, Juckes, Martin, Lautenschlager, Michael, and Stockhause, Martina, "CMIP5 data provided at the IPCC Data Distribution Centre, Fact Sheet of the Task Group on Data and Scenario Support for Impact and Climate Analysis of the Intergovernmental Panel on Climate Change, September 2016, https://www.ipcc.ch/site/assets/uploads/2020/11/TGICA_Fact_Sheet_CMIP5_data_provided_at_the_IPCC_DDC_Ver_1_2016.pdf

²³ "Climate Data – Halifax, NS," Climatedata.ca, 2024, https://climatedata.ca/explore/location/?loc=CBUG&location-select-temperature=tx_max&location-select-precipitation=1mm&location-select-other=frost_days&dataset_name=cmip6

²⁴ Intergovernmental Panel on Climate Change (IPCC), "Climate Change 2022: Mitigation of Climate Change" The Working Group II - IPCC Sixth Assessment Report, April 2022, <https://www.ipcc.ch/report/sixth-assessment-report-working-group-3/>

²⁵ Department of Environment and Climate Change, "Province Releases Climate Change Plan for Clean Growth," Province of Nova Scotia, News release, December 2022, <https://news.novascotia.ca/en/2022/12/07/province-releases-climate-change-plan-clean-growth>

²⁶ Clark, Allison and Matthews, Mairead, "Clean Energy and Pathways to Net-Zero: Jobs and Skills for Future Leaders," April 2023, ICTC, <https://www.digitalthinktankictc.com/reports/clean-energy-and-pathways-to-net-zero;>



Clean Energy and Pathways to Net-Zero in Nova Scotia



Nova Scotia has some of the most ambitious climate targets in the country.²⁶ Informed by a climate risk assessment and community consultations, the province's *Climate Change Plan for Clean Growth* includes several actions aimed at "responding to climate change impacts, reducing greenhouse gas emissions, and seizing opportunities for a cleaner, sustainable economy."²⁷

In terms of GHG emissions reduction targets, by 2030, the province intends to reduce GHG emissions by 53% below 2005 levels and is committed to net-zero by 2050.²⁸ Beyond this, Nova Scotia is committed to phasing out coal and coke-fired electricity by 2030 and seeks to reduce GHG emissions from the electricity sector by 90% by 2035.²⁹ To achieve this goal, at least 80% of Nova Scotia's electricity will need to come from renewable sources by 2030, and the province will need to reduce oil for home heating by 20%.³⁰ Furthermore, electric vehicles will need to make up 30% of new vehicle sales in Nova Scotia by 2030 for the province to hit GHG emissions reduction targets.³¹

While these climate mitigation targets are impressive, Nova Scotia still has a long way to go in achieving such goals. Approximately 62% of Nova Scotia's electricity comes from fossil fuels, with 47% coming from coal and coke, and 14% coming from natural gas (Figure 1). Meanwhile, 38% of the province's electricity share comes from renewable and low-emitting energy sources. Comparatively, Canada's electricity generation, as a whole, comes primarily from renewable and low-emitting energy sources, with 81% of the country's electricity coming from hydro, wave, tidal, uranium, solar, biomass, geothermal, and wind. Nova Scotia's clean energy sector is lagging compared to the rest of the country.

²⁶ Department of Natural Resources and Renewables, "Nova Scotia's 2030 Clean Power Plan," Province of Nova Scotia, Presentation, October 2023, <https://beta.novascotia.ca/sites/default/files/documents/1-3582/nova-scotia-clean-power-plan-presentation-en.pdf>

²⁷ Department of Environment and Climate Change, "Province Releases Climate Change Plan for Clean Growth," Province of Nova Scotia, News release, December 2022, <https://news.novascotia.ca/en/2022/12/07/province-releases-climate-change-plan-clean-growth>

²⁸ Ibid.; Department of Environment and Climate Change, "Our Climate, Our Future: Nova Scotia's Climate Change Plan for Clean Growth," Province of Nova Scotia, December 2022, <https://climatechange.novascotia.ca/sites/default/files/uploads/ns-climate-change-plan.pdf>

²⁹ Department of Environment and Climate Change, "Our Climate, Our Future: Nova Scotia's Climate Change Plan for Clean Growth," Province of Nova Scotia, December 2022, <https://climatechange.novascotia.ca/sites/default/files/uploads/ns-climate-change-plan.pdf>

³⁰ Ibid.

³¹ Ibid.



Electricity Generation Share in Nova Scotia and Canada

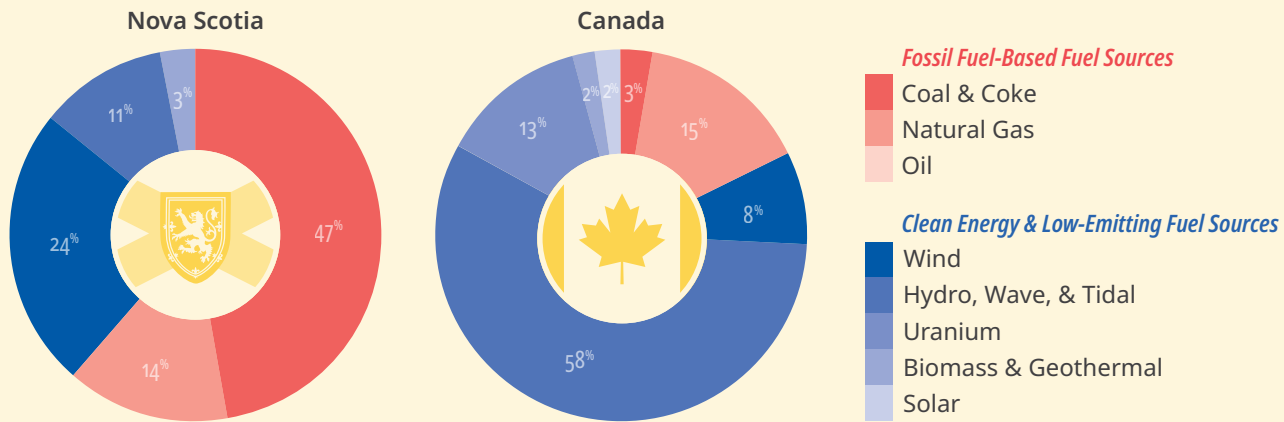


Figure 1. Estimated share of electricity generation (%) by fuel source in Nova Scotia and Canada in 2023. Data courtesy of Canada Energy Regulator, 2021.³²

While GHG emissions are declining in Nova Scotia, emissions could be further reduced with a shift to clean energy. In 2005, GHG emissions in Nova Scotia peaked at approximately 23 Megatons of CO₂ equivalent (MT of CO₂e).³³ By 2020, total GHG emissions had decreased to 14.6 MT of CO₂e, representing the province's meaningful efforts to decarbonize the economy. Still, in 2020, 88% of Nova Scotian emissions stemmed from the use of fossil fuels in electricity generation (43.4%), transportation (32.2%), and heating buildings (12.4%).³⁴ If fossil fuels are successfully phased out in the province, Nova Scotia would be very close to achieving net-zero by 2050.

Although Nova Scotia has reduced coal and coke-fuelled electricity generation by 24% in the last 20 years,³⁵ the province must further reduce its reliance on imported coal and shift to renewable energy and clean fuels. Shifting to a clean energy grid will also provide Nova Scotia energy security against the price volatility of imported coal and other fossil fuels.³⁶

Nova Scotia's 2030 Clean Power Plan details actions that must be taken to increase renewable energy production.³⁷ The plan explains how to increase renewable energy capacity from its current roughly 600 megawatts (MW) to almost 2000 MW by 2030.³⁸ This will involve adding 1000+ MW of wind capacity and 300+ MW of solar capacity (Figure 2).³⁹ By 2030, Nova Scotia's electricity grid is predicted to include 41%

³² Canada's Energy Future Data Appendices, "Macro Indicators – Global Net-zero Scenario," 2023, Canada Energy Regulator <https://doi.org/10.35002/zjr8-8x75>

³³ Canada Energy Regulator, "Provincial and Territorial Energy Profiles – Nova Scotia," June 2022, <https://www.cer-rec.gc.ca/en/data-analysis/energy-markets/provincial-territorial-energy-profiles/index.html>

³⁴ Department of Environment and Climate Change, "Our Climate, Our Future: Nova Scotia's Climate Change Plan for Clean Growth," Province of Nova Scotia, December 2022, <https://climatechange.novascotia.ca/sites/default/files/uploads/ns-climate-change-plan.pdf>

³⁵ "Nova Scotia Power says it now generates 30% of its power from renewables," The Canadian Press as posted on CBC news, June 2019, <https://www.cbc.ca/news/canada/nova-scotia/nova-scotia-power-renewable-energy-milestone-1.5169246>

³⁶ Christensen, Lasse and Dusyk, Nichole, "Why Canada's Energy Security Hinges on Renewables," International Institute for Sustainable Development, Re-Energizing Canada, October 2022, <https://www.iisd.org/articles/deep-dive/canadian-energy-security-renewables>; Department of Natural Resources and Renewables, "Nova Scotia's 2030 Clean Power Plan," Province of Nova Scotia, Presentation, October 2023, <https://beta.novascotia.ca/sites/default/files/documents/1-3582/nova-scotia-clean-power-plan-presentation-en.pdf>

³⁷ Ibid.

³⁸ Ibid; "News Release: New 2023 data shows 11.2% growth for wind, solar & energy storage," CanREA, January 2024, <https://renewablesassociation.ca/news-release-new-2023-data-shows-11-2-growth-for-wind-solar-energy-storage/>

³⁹ Ibid.



hydroelectricity, 42% wind electricity, and 5% solar electricity—for a total electricity mix of 88% renewables, exceeding renewable energy targets set by the province (Figure 2).⁴⁰

Nova Scotia's 2030 Renewable Energy Mix

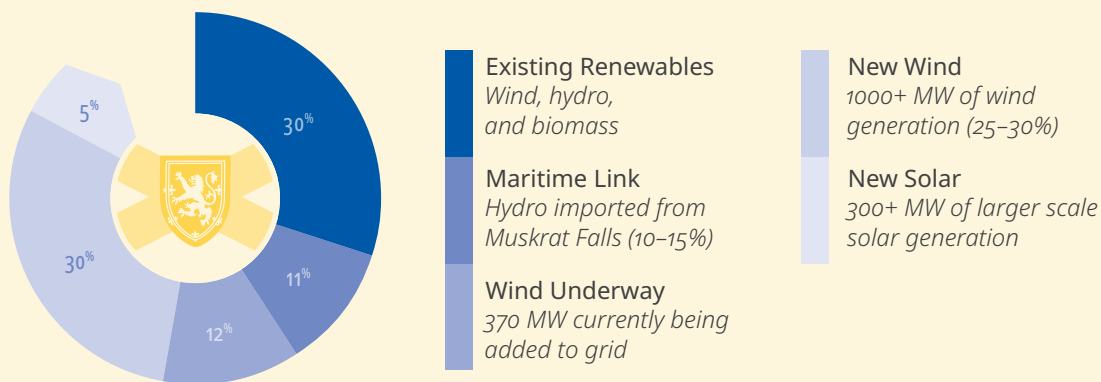


Figure 2. Nova Scotia's 2030 Renewable Energy Mix. Source: figured reproduced from the Government of Nova Scotia's Clean Power Plan: nova-scotia-clean-power-plan-presentation-en.pdf (novascotia.ca)

Shifting to net-zero will create a complex energy environment with a more decentralized grid and increased reliance on new and emerging technologies.⁴¹ The new system will rely on interprovincial transmission, with a “new 345 kilovolt (kV) reliability line to New Brunswick to help manage renewables” slated for 2027.⁴² Additionally, grid stability and reliability at peak demand times will require fast-acting generators (likely powered by fossil fuels for emergencies), battery storage capacity, and smart technologies for monitoring energy supply and demand.⁴³

As global efforts to decarbonize electricity generation are accelerating, new technologies are emerging and are being mainstreamed to support clean energy development. These technologies will enable customers to use smart devices that communicate with one another and allow the province's electrical system to operate more efficiently. Access to and adoption of these smart technologies will be essential in Nova Scotia's transition to a clean energy economy.

Achieving a technology-facilitated transition to net-zero in Nova Scotia will require capital investments, industry collaboration, and a skilled workforce. With climate change posing immediate threats to Nova Scotia, decision makers and key stakeholders must consider potential challenges and obstacles that could constrain the province's ability to achieve net-zero. Key challenges and recommendations related to Nova Scotia's transition are considered and discussed in the next section.

⁴⁰ Department of Natural Resources and Renewables, “Nova Scotia's 2030 Clean Power Plan,” Province of Nova Scotia, Presentation, October 2023, <https://beta.novascotia.ca/sites/default/files/documents/1-3582/nova-scotia-clean-power-plan-presentation-en.pdf>

⁴¹ Ibid.

⁴² Ibid.

⁴³ Ibid.





Challenges and Recommendations to Advance Nova Scotia's Clean Energy Economy

Attendees at ICTC's clean energy roundtable identified a variety of challenges that could constrain Nova Scotia's ability to advance the clean energy economy.⁴⁴ Common challenges—finding and retaining skilled talent, government programs being at odds with industry needs, and the province's lagging business culture—are explored in this section. For each challenge area, ICTC presents recommendations that key stakeholders, including government, industry, higher education, and civil society, can implement to help advance Nova Scotia's clean energy economy.

CHALLENGE

TROUBLE FINDING AND RETAINING SKILLED TALENT

As clean energy production increases so too will the demand for skilled labour. According to a 2021 study by Clean Energy Canada, roughly 430,500 people are employed in the clean energy sector, and this is expected to increase to 639,200 people by 2030.⁴⁵ The rapid growth of the clean energy sector's labour market is outpacing that of the Canadian economy, with the energy sector growing by 4.8% per year between 2010–2017 and the total economy growing by 4% annually during the same time frame.⁴⁶ Labour market projections indicate that the clean energy labour force will continue to grow by 4% annually until 2030.⁴⁷ As Nova Scotia's electricity generation moves toward a renewable energy mix, this presents immediate job opportunities in solar and onshore wind energy; the potential of offshore wind energy emerges after 2030, as do opportunities for green hydrogen development in the future.⁴⁸

⁴⁴ This roundtable event was hosted by the Information and Communications Technology Council (ICTC) in Halifax, Nova Scotia, in January 2024. The event brought together 14 clean energy leaders to discuss key challenges and recommendations related to strengthening Nova Scotia's clean energy economy.

⁴⁵ "A Renewables Powerhouse," Clean Energy Canada, February 2023, https://cleanenergycanada.org/wp-content/uploads/2023/01/RenewableCost_Report_CleaEnergyCanada_Feb2023.pdf

⁴⁶ Ibid.

⁴⁷ Clean Energy Canada, "The New Reality," June 2021, https://cleanenergycanada.org/wpcontent/uploads/2021/06/Report_CEC_CleanJobs2021.pdf

⁴⁸ Department of Natural Resources and Renewables, "Nova Scotia's 2030 Clean Power Plan," Province of Nova Scotia, Presentation, October 2023, <https://beta.novascotia.ca/sites/default/files/documents/1-3582/nova-scotia-clean-power-plan-presentation-en.pdf>



Unfortunately, clean energy employers in Nova Scotia and across Canada struggle to find workers with the right skill sets.⁴⁹ Roundtable attendees noted that most students coming out of universities and colleges are not completely workforce-ready and lack the industry domain knowledge needed to start a career in clean energy. As noted by one roundtable participant, “There’s lots of talent in Nova Scotia, just not the right type of talent.”

Roundtable participants also noted difficulties finding mid-level clean energy talent. One attendee stated that “there is a large cohort of young people, but there is a skill gap at the intermediate level; there is a missing middle.” Other attendees expressed challenges finding senior-level talent with significant experience in clean energy—a common trend experienced by clean energy employers across the nation.⁵⁰ Some roundtable attendees attributed these challenges to the rapid growth of the clean energy sector. New policies and programs are driving growth in the clean economy, increasing the demand for specific clean energy skills, many of which are not readily available in the workforce.

⁴⁹ Clean Energy Canada, “The New Reality,” June 2021, https://cleanenergycanada.org/wp-content/uploads/2021/06/Report_CEC_CleanJobs2021.pdf

⁵⁰ Clark, Allison and Matthews, Mairead, “Clean Energy and Pathways to Net-Zero: Jobs and Skills for Future Leaders,” April 2023, ICTC, <https://www.digitalthinktankictc.com/reports/clean-energy-and-pathways-to-net-zero>



Nova Scotia and Atlantic Canadian Clean Economy Labour Market Insights

To better understand the labour market needs of clean energy employers in Nova Scotia, ICTC asked roundtable attendees to describe in-demand skill sets. Throughout the roundtable discussion, employers identified seven core competencies that are in demand in Nova Scotia’s clean energy sector, including the following:

1. Soft skills
2. Domain knowledge of the energy sector
3. Business administration and entrepreneurial skills
4. Project management
5. Digital skills
6. Technical skills
7. Environmental sustainability skills

Separate from this roundtable event, ICTC also asked employers across key Canadian green economy sectors, including clean energy, sustainable agriculture, clean transportation, sustainable logistics and supply chain, and clean technology, to identify in-demand skills for their respective organizations. This data was collected through a series of national employer surveys in 2022 and 2023. For the purposes of this policy brief, ICTC has aggregated data from all Atlantic Canadian employers (n=21) who answered these surveys. While the respondents of these employer surveys extend beyond the clean energy economy and encompass broader labour market needs, some similarities were noted in these surveys and in ICTC's clean energy roundtable. As such, green economy employer survey data is used to complement qualitative insights from roundtable attendees and is expanded upon below.

In-Demand Skills and Competencies

Roundtable attendees emphasized **soft skills** as critical for the clean energy economy. Soft skills mentioned by roundtable attendees included work ethic, problem solving, critical thinking, written and oral communication, teamwork, and interpersonal skills. Partly owing to the limited work experience of new entrants in the labour market, clean energy employers said that soft skills were difficult to come by in young talent. As one attendee explained, "Young students have good digital skills, but they lack the more applied soft skills."

Other studies examining in-demand skills for a net-zero economy underscore the value of soft skills. A recent study on in-demand skills for Nova Scotia's net-zero supply chain, ports, and maritime sector noted that soft skills or "socio-cognitive skills" such as self-management, resiliency, and problem solving are increasingly important because of the uncertainty that lies ahead in the transition to a net-zero economy.⁵¹ The study explained that "we are going to need an adaptable, resilient workforce" and that soft skills are critical in ensuring this.⁵² Similar findings were observed in a recent study by ICTC on Canada's clean energy workforce. Clean energy employers engaged in this study explained that technical skills were easier to teach on the job than soft skills.⁵³

In addition to soft skills, Nova Scotian clean energy employers expressed challenges finding candidates with **strong domain knowledge in the energy sector**. Examples of this knowledge include an understanding of energy markets, technical applications in energy,

⁵¹ Scully, Sherry and Young, May, "High Value Skills for a Net-Zero Economy: A Skills Assessment for the Ports, Supply Chain, and Maritime Sector," August 2023, PIER Workforce Development Initiative, <https://www.thepierhfx.com/wp-content/uploads/2023/10/High-Value-Skills-for-a-Net-Zero-Economy.pdf>

⁵² Ibid.

⁵³ Clark, Allison and Matthews, Mairead, "Clean Energy and Pathways to Net-Zero: Jobs and Skills for Future Leaders," April 2023, ICTC, <https://www.digitalthinktankictc.com/reports/clean-energy-and-pathways-to-net-zero>

energy supply chains, economics of the clean energy sector, and the logistics, planning, and development of clean energy projects. Employers engaged in ICTC's roundtable explained that soft skills and industry domain knowledge are transversal skill sets to the clean energy economy. Regardless of your role, technical expertise, or business, having strong soft skills and domain knowledge is valuable.

In terms of **business administration skills**, employers noted a high demand for sales, marketing, and finance skills. Sales and marketing skills are critical for business expansion, while finance skills are needed to understand the economic feasibility of clean energy developments. Several employers specified a need for talent with generalized **entrepreneurial skill sets**, such as problem solving, strategic thinking, and business planning, and noted great difficulties finding individuals with these skills. Business administration and entrepreneurial skills are critical in helping small businesses and innovative startups grow into larger enterprises.

Another core competency was **project management**. Roundtable attendees stated that basic to advanced project management skills were needed across the clean energy sector. Similar sentiments were shared by employers interviewed for ICTC's Canada-wide study on clean energy, with project managers being one of the most difficult roles for employers to fill.⁵⁴ Project managers are difficult to find because they must be well-rounded individuals with "practical experience in the energy sector, an understanding of energy markets, and managerial capabilities."⁵⁵ In addition to this, project managers require technical expertise in engineering, information and communications technology, or skilled trades, depending on the project at hand. Employers noted challenges in finding people with this multidisciplinary background.

Core **digital technology skills** were described as critical to the clean energy economy. Some of the skill sets that were top of mind to employers included information technology (IT), user design and experience (UX), full stack development, software development, data collection, data organization, and data analysis, as well as general digital literacy such as competencies in technology suites like Microsoft O365.

General **digital literacy** was ranked as highly important by Atlantic Canadian green economy employers, as surveyed by ICTC. More than half of Atlantic Canadian survey respondents placed importance on business, management, and customer relations software, followed by cloud infrastructure tools (e.g., AWS, Azure, etc.) and operating systems software (e.g., Linux, Windows, and Bash).

⁵⁴ Ibid.

⁵⁵ Ibid.

While general digital literacy is critical, employers at ICTC's roundtable event noted that they also require individuals with more advanced digital skills, such as computational skills and an understanding of artificial intelligence. **Cybersecurity** was also mentioned as an important digital technology skill, with roundtable attendees expressing that virtual power plants and electricity grids, which are essential in delivering net-zero electricity, will need to be protected against security threats. Other digital skills regarded as "high-value" for Nova Scotia's net-zero economy are detailed in a 2023 study by Dr. Sherry Scully and May Young.⁵⁶ Notable digital skills mentioned in this study include:

- Strong competencies in handling large datasets, including conducting data analysis, visualization, and modelling
- An understanding of diagnostic tools to facilitate problem solving
- Skills related to the Internet of Things (IoT), "such as sensors, processors, software, and other technologies that connect and exchange data with other devices and systems. This includes coding and programming skills"⁵⁷

Technical skills vary by specific role but are also highly in demand for Nova Scotia's clean energy sector. Technical skills are required for hands-on roles, such as engineering, the skilled trades, utilities roles, and research and development roles. Regarding research and development skills, attendees at ICTC's clean energy roundtable noted a need for skilled individuals to build Nova Scotia-made battery storage systems and digital technologies. In terms of engineering, electrical engineers who understand clean energy systems were cited as in-demand. Regarding skilled trades and utilities roles, certified electricians, electrical technicians, construction and maintenance workers, and clean energy installers, such as solar installers, were cited as in demand. Many technical workers currently employed by the fossil fuel industry possess skills that are transferable to the clean energy economy.⁵⁸ It will be important to leverage these transferable skills and provide any necessary reskilling to interested workers.

A broad understanding of **environmental sustainability** was stressed by roundtable attendees as an in-demand skill set. Specifically,

⁵⁶ Scully, Sherry and Young, May, "High Value Skills for a Net-Zero Economy: A Skills Assessment for the Ports, Supply Chain, and Maritime Sector," August 2023, PIER Workforce Development Initiative, <https://www.thepierhfx.com/wp-content/uploads/2023/10/High-Value-Skills-for-a-Net-Zero-Economy.pdf>

⁵⁷ Ibid.

⁵⁸ Ibid.

attendees noted that clean energy workers must understand the environmental, social, and economic nuances of clean energy development. Related to this, ensuring Indigenous engagement and participation in clean energy development in Nova Scotia is critical. Roundtable attendees noted that workers in the clean energy sector should have the skills and knowledge to collaborate with Indigenous communities.

Furthermore, roundtable attendees noted the importance of general environmental literacy, such as understanding climate change and the ecological impacts of new developments. Atlantic Canadian green economy employers surveyed by ICTC also placed a high value on environmental sustainability, as well as understanding “how humans impact the environment,” “environmental legislation and agreements,” “global environmental trends, challenges, and concerns,” and “Canadian environmental business practices.” These environmental sustainability skill sets were similarly noted to be in demand in ICTC’s national clean energy study.⁵⁹

⁵⁹ Clark, Allison and Matthews, Mairead, “Clean Energy and Pathways to Net-Zero: Jobs and Skills for Future Leaders,” April 2023, ICTC, <https://www.digitalthinktankictc.com/reports/clean-energy-and-pathways-to-net-zero>

Roundtable attendees partially attributed the clean energy skills gaps to a lack of opportunities for new entrants to gain relevant educational experience in Nova Scotia. Some explained that curriculum development has not been able to keep up with the fast-paced changes in the clean energy sector—a common theme expressed by employers in the broader green economy across Canada.⁶⁰ Additionally, factors like a lack of educators with real-life industry work experience and limited “seats” in certain high-demand programs (such as the skilled trades) constrain both the quality and quantity of new graduates in Nova Scotia.⁶¹

Despite perceived “great interest” among current students and recent graduates in pursuing careers in sustainability, clean energy, and clean technology, limited mentorship programs and work-integrated learning opportunities contribute to “large skill gaps” when transitioning from post-secondary education to early career employment. As expressed by one participant, “Even bright and passionate students in Atlantic Canada have trouble bridging this gap and launching careers in the field.” This challenge was deemed to be especially acute for youth from racialized,

⁶⁰ Ibid.; Clark, Allison and Matthews, Mairead, “Canadian Agri-Food Sustainability: Skilled Talent Needed to Meet Food Demand and Reduce Environmental Impacts,” June, 2023, ICTC, <https://www.digitalthinktankictc.com/reports/canadian-agri-food-sustainability>

⁶¹ “More Training, Support for Skilled Trades Professionals,” Government of Nova Scotia, February, 2024, <https://news.novascotia.ca/en/2024/02/14/more-training-support-skilled-trades-professionals>



Indigenous, and newcomer backgrounds, who often lack role models with industry experience in the clean energy economy. As one attendee remarked, “You can’t dream it if you don’t know about it!”

Roundtable participants also noted that, on occasion, the timing of specific training, including valuable short-duration training programs, conflicts with the busy season of the clean energy sector. This can make it difficult for industry workers to upskill during the busy season. Attendees also noted how certain clean energy training is not offered in Nova Scotia. This can mean that employers must cover the cost of travel for workers to obtain relevant certifications or that workers themselves lack those certifications, which in turn affects their overall employability. As explained by one employer, “Solar installers should be North American Board of Certified Energy Practitioners (NABCEP) certified, but the training is not offered in Nova Scotia. Concerningly, due to the lack of available training, some clean energy workers are self-taught.”

RECOMMENDATIONS

ADVANCING TRAINING AND WORKFORCE DEVELOPMENT

Investment in clean energy training and workforce development initiatives are needed to address labour market challenges that currently constrain Nova Scotia’s ability to achieve a net-zero future. This should include continued investments from the province to ensure there are more training seats in high-demand trades programs. As noted in a news article by the government of Nova Scotia, there are currently 400 tradespeople on wait lists to complete apprenticeship training. Investing in increasing the number of available seats will help ensure this talent pool is utilized properly in the province.⁶²

Additional investments should be made to adjust clean energy curriculums and develop new curriculums altogether to ensure post-secondary teachings are aligned with industry needs. Curriculum developers and training administrators can consider the core skills and competencies as those described by Nova Scotian clean energy employers engaged in the development of this policy brief. Notably, soft skills and domain knowledge of the energy sector should be encouraged and developed in all clean energy programming, as they are transversal across all clean energy sub-sectors. In addition to engaging in ongoing dialogues with industry, curriculum developers can review labour market studies that are informed by industry. ICTC’s recent study, *Clean Energy and Pathways to Net-Zero: Jobs and Skills for Future Leaders*, provides additional insights into the specific skill sets demanded by clean energy employers.⁶³ Moreover, given the increasing reliance on digital technologies, labour market research that highlights the intersection of digital skills and green skills

⁶² Ibid.

⁶³ Clark, Allison and Matthews, Mairead, “Clean Energy and Pathways to Net-Zero: Jobs and Skills for Future Leaders,” April 2023, ICTC, <https://www.digitalthinktankictc.com/reports/clean-energy-and-pathways-to-net-zero>



should be reviewed, such as ICTC's forthcoming *Digital-Green Competency Framework*, which will serve partially as a tool for curriculum developers.

While reforming post-secondary teachings is important, some skills are better learned on the job. Work-integrated learning (WIL) programs, such as co-op placements or internships, are important in bridging skills gaps for recent graduates.⁶⁴ WIL programs can also help students build practical domain knowledge and explore their interest in clean energy while still in school. Some of these programs can be complemented by professional development seminars, relevant micro-credentials, and mentorships, allowing the student to further develop through the program.⁶⁵ For example, Net Zero Atlantic recently had a "speed mentorship" event for Mitacs-funded students to connect with and learn from industry leaders.⁶⁶ Mentorship and networking events like these can be expanded to further support workforce readiness among post-secondary students and recent graduates.

WIL programs may also help to address some of Nova Scotia's retention challenges. Despite Atlantic Canada's highly regarded universities and colleges, both international and domestic students often move to other provinces for employment following graduation.⁶⁷ By integrating students into the local workforce through WIL programs, employers may have a better chance of retaining local talent.

Given the value WIL programs bring to the clean energy economy, it is recommended that these programs be expanded in Nova Scotia. Clean energy employers are recommended to get involved in WIL programs and mentorship events, and the government is encouraged to continue providing wage subsidies to support the expansion of such programming. Notably, support from programs like the Student Work Placement Program (SWPP) is critical.⁶⁸

⁶⁴ Ibid.; Clark, Allison and Matthews, Mairead, "Canadian Agri-Food Sustainability: Skilled Talent Needed to Meet Food Demand and Reduce Environmental Impacts," June, 2023, ICTC, <https://www.digitalthinktankictc.com/reports/canadian-agri-food-sustainability>; Cutean, Alexandra, Rice, Faun, and Henville, Letitia, "The Impact of Work-Integrated Learning on Student Success and the Canadian Economy: An Evaluation of Canada's Student Work Placement Program," September, 2023, ICTC, <https://www.digitalthinktankictc.com/reports/the-impact-of-workforce-integrated-learning-on-student-success-and-the-canadian-economy>

⁶⁵ "WIL Digital e-Learning Courses," ICTC, 2024, <https://etalentcanada.ca/for-job-seekers/programs/wil-digital-e-learning-courses>

⁶⁶ "Lightning Talks and Speed Mentoring Session", February, 2024, Net Zero Atlantic, <https://netzeroatlantic.ca/outreach/networking/lightning-talks-and-speed-mentoring-session>

⁶⁷ Choi, Youjin, Crossman, Eden, and Hou, Feng, "International students as a source of labour supply: Retention in their province of study," Statistics Canada, June 2021, <https://doi.org/10.25318/36280001202100600003-eng>

⁶⁸ Cutean, Alexandra, Henville, Letitia, and Rice, Faun, "The Impact of Work-Integrated Learning on Student Success and the Canadian Economy: An Evaluation of Canada's Student Work Placement Program," ICTC, August 2023, <https://www.digitalthinktankictc.com/reports/the-impact-of-workforce-integrated-learning-on-student-success-and-the-canadian-economy>





Skills Development for Offshore Wind and Hydrogen

Although the offshore wind energy industry is currently non-existent in Nova Scotia, the province's environmental, geographical, and business characteristics would enable the province to succeed as a leader in offshore wind production.⁶⁹ As noted in Nova Scotia's 2030 *Clean Power Plan*, "There is enormous promise for the use of offshore wind in Nova Scotia after 2030, as well as hydrogen potentially before 2030." Sable Island, located approximately 200 kilometres southeast of Halifax, is surrounded by shallow waters and strong and consistent winds, making it a favourable location for offshore wind energy generation.⁷⁰

As described in a recent report by the Public Policy Forum, "The Sable Island Bank alone could accommodate at least 1000 offshore turbines, each with 15-megawatt (MW) capacity. That adds up to approximately 70,000 gigawatt hours (GWh) of clean, renewable electricity every year."⁷¹ This is a substantial amount of electricity generation, "enough to supply 6.5 million average Canadian homes or almost twice the total electricity currently consumed in Atlantic Canada annually."⁷²

With innovation and commercial efforts, Nova Scotia could leverage this powerful energy source to become a leader in clean energy generation. Fortunately, Nova Scotia is a leader in ocean-based energy research and development (R&D), with world-class research institutions scattered across the province (Figure 5). These institutions are developing innovative technologies and methods to harness offshore wind energy, tidal energy, hydrogen production, and improved energy storage through battery technologies. Expanding these research and development initiatives and partnerships for commercial gain is needed to truly grow the clean energy economy in Nova Scotia.

⁶⁹ Aegir Insights, "Stimulating Offshore Wind in Nova Scotia" Net Zero Atlantic, March 2021, <https://netzeroatlantic.ca/sites/default/files/202212/Stimulating%20Offshore%20Wind%20Development%20in%20Nova%20Scotia%20-%20Final%20Report.pdf>

⁷⁰ Nicholson, Peter, "Catching the Wind: How Atlantic Canada Become an Energy Superpower," Public Policy Forum, October 2023, <https://ppforum.ca/publications/wind-energy-atlantic-canada/>

⁷¹ Ibid.

⁷² Ibid.

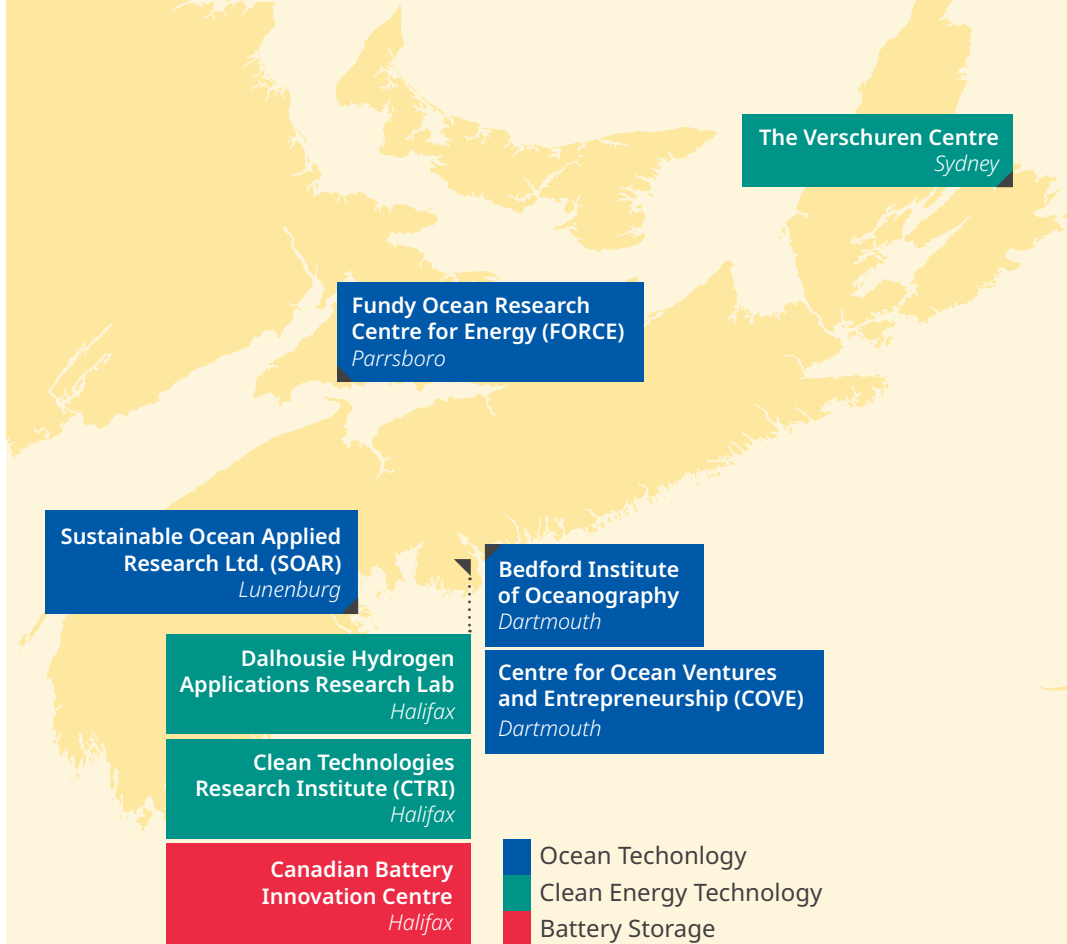


Figure 5. Map of Nova Scotia showcasing cutting-edge research and development (R&D) centres driving innovation in ocean technology, clean energy technology, and battery storage.

Luckily, Nova Scotia already possesses many of the skills needed for offshore wind, and hydrogen production. In addition to strong research and development skills, the province’s port infrastructure and ocean-based economy have led to a highly skilled workforce with relevant expertise in ocean tech, clean tech, and battery technologies.⁷³ Nova Scotia is also well-equipped with shipbuilding and engineering expertise for the naval sector, offshore oil and gas, and tidal energy.⁷⁴ By leveraging the transferable skill sets of workers in these industries, Nova Scotia will be able to accelerate offshore wind energy and other ocean-based clean energy developments.

⁷³ Aegir Insights, “Stimulating Offshore Wind in Nova Scotia” Net Zero Atlantic, March 2021, <https://netzeroatlantic.ca/sites/default/files/202212/Stimulating%20Offshore%20Wind%20Development%20in%20Nova%20Scotia%20-%20Final%20Report.pdf>

⁷⁴ Ibid; Department of Natural Resources and Renewables, “Nova Scotia’s 2030 Clean Power Plan,” Province of Nova Scotia, Presentation, October 2023, <https://beta.novascotia.ca/sites/default/files/documents/1-3582/nova-scotia-clean-power-plan-presentation-en.pdf>

That said, labour requirements for offshore wind energy production are much more intensive than onshore wind production.⁷⁵ Developing adequate talent pathways, including upskilling programs, will be critical in supporting this emerging industry's long-term needs. With the upcoming volume of wind projects in the region, and especially if hydrogen developments move ahead, a close working relationship between stakeholders and training institutions will be needed to ensure there is a pipeline of workers to keep projects on track.

⁷⁵ Stefek, Jeremy et al., "U.S. Offshore Wind Workforce Assessment," National Renewable Energy Laboratory, 2022, <https://www.nrel.gov/docs/fy23osti/81798.pdf>, as noted in Atlantic Economic Council, "Implications for Atlantic Canada's Economy in the Pursuit of Net-Zero Emissions: Economic Opportunities with Existing Clean Energy Technologies," January 2024, <https://atlanticeconomiccouncil.ca/page/NetZeroExistingtechnologyJan2024>

CHALLENGE

INCENTIVES AND GOVERNMENT PROGRAMS, A DOUBLE-EDGED SWORD

To help achieve net-zero targets, tax investment credits, incentives, and clean energy financing programs have taken root across Canada. These programs exist at the federal, provincial, and municipal levels, and primarily comprise programs for energy efficiency and renewable energy retrofits and installations. Such programs add value to the clean energy economy by de-risking personal and organizational investments in clean energy and energy efficiency. As noted by an employer at ICTC's roundtable, "For solar, government funding is essential."

Nova Scotia has several financing programs, incentives, and rebates to choose from (see Appendix, Table 1). Compared to other Canadian provinces, Nova Scotia is a leader in energy efficiency programs, has strong renewable energy programs and has moderately strong clean transportation programs.⁷⁶ Many programs are administered by Efficiency Nova Scotia, with funding from the provincial or federal governments. Other programs are funded by municipalities or by supporting organizations, like the Clean Foundation programs,⁷⁷ Solar City HRM (Halifax Regional Municipality) program,⁷⁸ or Switch Property Assessed Clean Energy (PACE) Atlantic.⁷⁹

⁷⁶ Gaede, James, Nippard, Alyssa, Haley, Brendan, and Linders, Annabelle, "2022 Canadian Energy Efficiency Scorecard: Provinces and Territories," Efficiency Canada, Carleton University, November 2022, <https://www.scorecard.efficiencycanada.org/>

⁷⁷ "Clean Energy Financing," 2021, Clean Foundation, <https://cleanenergyfinancing.ca/>

⁷⁸ "Solar Projects," 2024, Halifax Regional Municipality, <https://www.halifax.ca/home-property/solar-projects/steps-solar-city-participation>

⁷⁹ "PACE programming made simple for Canadian municipalities & homeowners," 2024, SwitchPACE A Community Interest Corporation, <https://switchpace.org/>



The Government of Canada also plays a key role in clean energy rebates and incentives. Typically, the federal government provides funding through the Low Carbon Economy Fund to provinces and territories, who then distribute and administer the funding.⁸⁰ That said, the Government of Canada also administers some of its own clean energy programs, rebates, and incentives, such as the Canada Greener Homes Grant,⁸¹ the Canada Greener Homes Loan,⁸² and more (see Appendix, Table 2).

While there are benefits to these programs, there are also drawbacks. The first drawback noted by roundtable attendees is that incentives, rebates, and financing programs can contribute to an uncompetitive business environment. As explained by one roundtable attendee, “There need to be winners and losers in an economy. That’s what makes us stronger.” Widespread incentives with limited constraints or prerequisites can lead to a situation where “everyone is a winner” or a levelling of the playing field, which ultimately does a disservice to innovation and competition.

“ The cycle of incentives is horrible for building industrial stability.

Halifax Clean Energy Employer

Incentives can further impact business competition when the regulations of government programs are unclear or unevenly enforced. When the regulations of a government program lack clarity, the level to which each company complies with regulations may differ. As detailed in a 2019 study by Deloitte Canada, companies that do not comply fully with regulations save time and money associated with regulatory compliance. This can create an unfair advantage for those that do not comply over those that do comply.⁸³

In addition to this, roundtable attendees said that some clean energy programs developed at the municipal, provincial, and federal levels conflict with one another. As one attendee noted, “There are multiple sources of funding, but they are not developed thoughtfully in harmony with one another.” More specifically, attendees noted that different streams of funding have different standards, regulations, and financing terms, creating confusion in the industry. Similar frustrations have been voiced by interviewees engaged in an ICTC study on procurement mechanisms for smart city development.⁸⁴ Here, interviewees voiced concerns that public

⁸⁰ Environment and Climate Change Canada, “The Low Carbon Economy Fund,” Government of Canada, January 2024, <https://www.canada.ca/en/environment-climate-change/services/climate-change/low-carbon-economy-fund.html>; “Clean Energy Incentives & Rebates Canada,” energyhub.org, June 2023, <https://www.energyhub.org/incentives/#canada-wide>

⁸¹ “Canada Greener Homes Grant”, 2024, Natural Resources Canada, [https://natural-resources.canada.ca/energy-efficiency/homes/canada-greener-homes-initiative/canada-greener-homes-grant/23441](https://natural-resources.canada.ca/energy-efficiency/homes/canada-greener-homes-initiative/canada-greener-homes-grant/canada-greener-homes-grant/23441)

⁸² “Canada Greener Homes Loan,” 2024, Natural Resources Canada, <https://natural-resources.canada.ca/energy-efficiency/homes/canada-greener-homes-initiative/canada-greener-homes-loan/24286>

⁸³ “Making regulation a competitive advantage,” 2021, Deloitte Canada, <https://www2.deloitte.com/content/dam/Deloitte/ca/Documents/finance/ca-en-making-regulation-comp-advantage-pov-aoda-v2.pdf?>

⁸⁴ Farmer, Tyler, Matthews, Mairead, and Rice, Faun, “Procurement Office or ‘Living Lab’? Experimenting with procurement and partnerships for smart cities technology in Canada,” ICTC, February 2021, https://www.icct-ctic.ca/wp-content/uploads/2021/03/ICTC_Report_Smart-Cities_ENG.pdf



procurement processes for technology often occurred in departmental silos as opposed to in a collaborative, mutually beneficial system—creating problems in the integration and scaling of smart city technologies.⁸⁵ Roundtable attendees in Nova Scotia cited that a lack of collaboration between different streams of funding similarly affected the province’s ability to scale widespread clean energy initiatives. As expanded upon in the following case study, there can be unintended consequences when municipal, provincial, and federal programs are created in silos.

“ All programs and policies have unintended outcomes.

Halifax Clean Energy Employer

⁸⁵ Ibid.



CASE STUDY

The Interplay of Municipal and Federal Clean Energy Financing in Nova Scotia

Complimented by provincial and federal programs, Nova Scotians can finance solar energy systems through various programs (see Appendix, Table 3). In the past, Nova Scotians have primarily financed solar photovoltaic (PV) systems through municipal funding streams such as the Halifax Regional Municipality’s Solar City Program⁸⁶ or Switch PACE funding for other municipalities across the province.⁸⁷ In 2020, however, the federal government launched its Canada Greener Homes Loan, which provided Canadians with a higher spending cap (up to \$40,000) and a 0% interest rate. Having more favourable terms, the Canada Greener Homes Loan quickly became the preferred method for financing solar PV installations.

For many tax returns, rebates, and government loans, due diligence must be done before financial support is provided. According to roundtable attendees, it takes approximately three months for the customer to receive funds from the federal government’s Canada Greener Homes Loan after the installation has been completed. Because of this, many contractors and homeowners rely on bridge funding to finance solar PV systems. As explained by one roundtable attendee, “The Solar City Program and municipal SwitchPACE programs

⁸⁶ “Solar Projects,” 2024, Halifax Regional Municipality, <https://www.halifax.ca/home-property/solar-projects/steps-solar-city-participation>

⁸⁷ “PACE programming made simple for Canadian municipalities & homeowners,” 2024, SwitchPACE A Community Interest Corporation, <https://switchpace.org/>

have been relegated to bridge financing... as pretty much everyone would rather finance at a true 0% interest rate [which is offered by the Canada Greener Homes Loan].”

Some roundtable attendees voiced concerns that the Canada Greener Homes Loan was reducing the demand for municipal funding to the point where municipal funding could be eliminated in the future. While federal programming is currently available, some roundtable attendees worried that funding like the Canada Greener Homes Loan could be cut in the future. As discussed by roundtable attendees, if federal funding is cut after the municipal programs are eliminated, the province would lack clean energy financing programs altogether, which would threaten Nova Scotia’s ability to achieve renewable energy targets. These concerns come at a time when the federal government is reforming and cutting public spending, creating uncertainty in the future of government funding for various sectors.⁸⁸

This is just one example of how different financing programs interact and potentially conflict in practice. From a public policy perspective, overlapping programs and regulations at different levels of government can reduce overall insight into the efficacy, trade-offs, and impact of such programs.⁸⁹ As expanded upon in the following section, it is important that the municipal, provincial, and federal governments work collaboratively when developing clean energy programming.

⁸⁸ Major, Darren, “Public sector union warns of ‘rushed’ plans to cut federal spending,” August, 2023, CBC News, <https://www.cbc.ca/news/politics/public-sector-union-federal-cuts-1.6937217>

⁸⁹ “Making regulation a competitive advantage,” 2021, Deloitte Canada, <https://www2.deloitte.com/content/dam/Deloitte/ca/Documents/finance/ca-en-making-regulation-comp-advantage-pov-aoda-v2.pdf?location=top>

RECOMMENDATIONS

INCENTIVES SHOULD PROMOTE A COMPETITIVE ECONOMY

Transitioning to net-zero is no small undertaking, and support from the government through incentives, rebates, and financing programs has an important role to play. At the same time, industry investment is also required to promote a well-functioning and competitive economy. Given that Nova Scotia struggles with attracting private sector investment and has a generally lagging economy,⁹⁰ it is critical that government incentives are designed with fair and clear regulations that drive competition and do not detract from it.

⁹⁰ Finance and Treasury Board, Government of Nova Scotia, “Daily Stats,” November 2023, <https://www.novascotia.ca/finance/statistics/news.asp?id=19371#:~:text=All%20provinces%20reported%20rising%20real%20GDP%20in%202022,about%20half%20the%20pace%20of%20the%20national%20average>



To ensure government incentives do not detract from competition, clean energy programs should be detailed and specific, with clear guidelines and requirements for accessing funds. To help boost the clean energy economy, government programs can include profitability achievements in key performance indicators and program requirements. Importantly, it is critical that program requirements and regulations are enforced equally across all participating companies to ensure no one company has an unfair advantage. Companies or organizations that fail to comply with regulations or meet program requirements should face consequences. Proper enforcement is critical to ensuring incentives, rebates, and financing programs build a competitive business ecosystem.

Furthermore, to mitigate the unintended consequences of clean energy programs, it is critical to break down the silos between different levels of government, industry, and community. This will require increased communication and collaboration between municipal, provincial, and federal governments, ensuring relevant parties are consulted when developing and/or decommissioning clean energy programs. Routine meetings, focus groups, or roundtable discussions can be held to ensure that they complement one another and do not conflict with one another.

Bringing key stakeholders together through pilot projects is sometimes the best way to create a continuous dialogue while also driving innovation. Attendees at ICTC's roundtable event suggest that public funding may produce greater impacts when administered for a specific collaborative initiative. Pilot projects will be increasingly important in understanding the utility and applications of new technologies and renewable energy sources in Nova Scotia's clean energy sector.

CHALLENGE

CULTURAL, INFRASTRUCTURAL, AND FIRMOGRAPHIC ISSUES

Employers engaged at ICTC's roundtable event noted the cultural, infrastructural, and firmographic challenges that Nova Scotia faces in clean energy developments. Notably, the remote location and smaller size of the province create unique difficulties in developing new projects and procuring important equipment for clean energy.

Clean energy development opportunities are typically concentrated in rural areas of Nova Scotia, where natural resource industries, such as forestry and fisheries, dominate. Often, community buy-in is challenging due to the perceived negative impact on legacy industries and a lack of awareness surrounding the economic benefits clean energy could bring to rural communities. Employers noted that these challenges can be further exacerbated by a lack of dialogue between clean energy companies and community members. Notably, the disconnect between industry and the community may hinder the attraction of workers to the clean energy sector, resulting in skills gaps in rural communities where clean energy projects will be concentrated. Furthermore, many rural communities across the province lack strong broadband connectivity, making it challenging to integrate information and communications technologies into electricity systems.



While Nova Scotia has the potential to harvest marine renewable energy sources, like tidal energy and offshore wind, the economic benefits of these endeavours have not been communicated to coastal communities. Due to the lack of communication and engagement, roundtable attendees feared that both the public and investors had lost confidence and interest in marine renewables. Some employers said this may be due to the lack of policy mechanisms and regulatory guidance to support marine renewable energy initiatives.

Roundtable attendees also noted that the smaller nature of Nova Scotian firms presents a challenge for scaling clean energy developments. More specifically, clean energy employers cited difficulties accessing and procuring the technologies and supplies needed to do business. For instance, some employers said they were keen to adopt new technologies but couldn't purchase certain types of software because their business was too small and they didn't meet enterprise size thresholds. Other roundtable attendees noted that Nova Scotian firms lag in technology adoption, partly because of the high capital costs or upfront costs associated with the implementation of emerging technologies.

Lastly, roundtable participants said that supply chain difficulties and disruptions have constrained company growth in recent years. Difficulties securing materials may be further challenged by the geographic concentrations of critical minerals and increased global demand for clean energy supplies. Roundtable attendees worried that the increased demand for these materials would further inflate prices, perpetuating challenges for these small clean energy businesses.

RECOMMENDATIONS

ADVANCE RELATIONS AND LEVERAGE TECHNOLOGIES TO ENHANCE ECONOMIC BENEFITS

Scaling clean energy projects in Nova Scotia will require collective action and collaboration between all stakeholders. Communities where clean energy developments will be concentrated must be engaged in the decision-making process. This is especially true for coastal communities that may be positively or negatively impacted by marine renewable energy developments. Awareness and education initiatives targeted at the community level will play a critical role in advancing awareness and buy-in of clean energy projects. Successfully engaging Nova Scotian communities in the clean energy development process may also help better position the industry as an attractive investment opportunity for the private sector. Moreover, engaging rural communities through awareness campaigns may help to attract Nova Scotian youth to work in the sector.

In addition to obtaining community buy-in, Nova Scotia must leverage new and emerging technologies and develop and strengthen key clean energy infrastructure to meet net-zero targets. Digital technologies such as smart grid applications that measure energy volumes and directions of flow through a network will be critical in



ensuring a stable and efficient clean energy grid.⁹¹ To properly harness the benefits of a virtual power grid, however, broadband infrastructure, especially in rural areas, must be enhanced. Upgraded transmission lines and new electricity storage facilities will be needed to further ensure the success of Nova Scotia's clean energy economy.

However, technology adoption and infrastructure upgrades can be costly. Roundtable attendees noted how adopting new technologies into their businesses is not often feasible due to their organization's size and perceived high cost. To ensure that upfront costs do not prevent important technology adoptions, clean energy employers in Nova Scotia should reflect upon the return on investment of new and emerging technologies, as well as the risks of not adopting such technologies.

As detailed by Dr. de Lange of Toronto Metropolitan University, investments in renewable energy innovation and investments positively contribute to GDP.⁹² Given the importance of technological adoption in advancing renewable energy innovation, it is critical that both industry and government invest in the infrastructure and technologies needed to become leaders in clean energy innovation. Importantly, investments in clean energy innovation should be paired with divestments in the fossil fuel industry; continued investments in fossil fuel would likely negate any meaningful investments in renewable energy.⁹³

“ Fostering novel scientific discoveries in clean energy innovation should be prioritized while reducing non-competitive industry formations and organizations, such as fossil fuel oligopolies and industry associations.”⁹⁴

Dr. Deborah de Lange, Toronto Metropolitan University

As onshore and offshore wind will be the predominant sources of clean energy for Nova Scotia over the next decade, supply chain resiliency related to wind energy supplies should be prioritized. Coordination and partnerships among Nova Scotian businesses will be important in strengthening the province's supply chain. Moreover, timely access to capital through expedited application processes and a focus on commercial scale-up opportunities will be vital to supporting supply chain innovation and establishing Nova Scotia as a clean energy hub.

⁹¹ “The ‘green tsunami’ is causing shocks to the energy network, calling for an innovative approach,” 2021, KPMG Advisory N.V., <https://assets.kpmg.com/content/dam/kpmg/nl/pdf/2021/sectoren/the-green-tsunami-is-causing-shocks-to-the-energy-network-calling-for-an-innovative-approach.pdf>; “Unlocking Smart Grid Opportunities in Emerging Markets and Developing Economies,” February, 2024, International Energy Agency, <https://www.iea.org/energy-system/decarbonisation-enablers/digitalisation>

⁹² De Lange, Deborah, “Renewable energy innovation isn't just good for the climate – it's also good for the economy,” February, 2024, The Conversation, <https://theconversation.com/renewable-energy-innovation-isnt-just-good-for-the-climate-its-also-good-for-the-economy-223164>

⁹³ Ibid.

⁹⁴ Ibid.





Harnessing Nova Scotia's Offshore Wind Potential

Nova Scotia plans to offer seabed licences for 5 gigawatts of offshore wind energy by 2030, with the first call for bids beginning in 2025.⁹⁵ To reach this target, the province is developing a three-module framework known as the *Offshore Wind Roadmap* that establishes a regulatory regime, highlights supply chain and infrastructure opportunities, and draws from stakeholder input to guide future engagements.⁹⁶ These modules are anticipated to be completed by Fall 2024, followed by a regional assessment of offshore wind by the provincial and federal governments. In 2025, the provincial and federal governments will release a regulatory framework that will detail expansion plans for offshore wind.⁹⁷

Roundtable attendees anticipate that the launch of this framework will serve as a catalyst for investments and growth in offshore wind, hydrogen, and ammonia over the coming decade. Some attendees also noted that growth in offshore wind could enable further investments in untapped renewables such as tidal energy.

Notably, offshore wind presents an energy export potential Nova Scotia has never seen before, which would have positive ripple effects across Nova Scotia's clean economy and the province's economy at large. The timely implementation of offshore wind regulations will be quintessential to attracting business investment in the region. Creating comprehensive social licensing strategies that enable the rapid acceptance of offshore wind projects among key stakeholders will be a critical driving force in this growth. Local economic development policies that support sectoral advancement through access to goods and services contracts, capacity training, and employment opportunities will also be vital to long-term commercial growth.

As Nova Scotia's clean energy economy grows, the province may want to explore success stories and models of development from similar markets and leverage proven technologies when possible. More specifically, roundtable attendees discussed how the United Kingdom and Denmark have been harnessing offshore wind energy for decades and noted that these models of development should be

⁹⁵ Province of Nova Scotia, "Nova Scotia Offshore Wind Roadmap," Module 1 DRAFT, May 2023, <https://novascotia.ca/offshore-wind/docs/offshore-wind-roadmap.pdf>

⁹⁶ Ibid.

⁹⁷ Impact Agency of Canada, "Governments of Canada and Nova Scotia launch regional assessment to support future decisions on offshore wind projects in the province," Government of Canada, News Release, March 2023, <https://iaac-aeic.gc.ca/050/evaluations/document/146966>

assessed for relevancy to the Nova Scotian context.⁹⁸ Recent offshore wind developments in New England may also provide helpful insights for Nova Scotia to draw upon.⁹⁹ As noted by some employers at ICTC's roundtable event, digital twin technology can further support offshore wind energy development, whether by validating strategies through geospatial modelling or by integrative remote asset management technologies that maximize efficiencies and predict maintenance efforts.

In essence, an approach that leverages legislation established in other jurisdictions while providing a framework that is adaptive to proven and nascent technologies will be an important building block for offshore wind development in Nova Scotia.

⁹⁸ International Renewable Energy Agency, "30 Years of Policies for Wind Energy: Lessons from 12 Wind Energy Markets – United Kingdom," January 2013, https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2013/GWEC/GWEC_UK.pdf?la=en&hash=E8BEE8160570AB71ED71D93D515C50883C14C2D5; Collective Wisdom Solutions, exp. Services Inc., and Maritime Tidal Energy Corp, "Marine Renewable Energy Infrastructure Assessment," Nova Scotia Department of Energy, August 2011, <https://energy.novascotia.ca/sites/default/files/Marine-Renewable-Energy-Infrastructure-Assessment.pdf>

⁹⁹ "Nation's first commercial-scale offshore wind project" Vineyard Wind, n.a., <https://www.vineyardwind.com/vineyardwind-1>



Conclusion

Like many regions of the world, Nova Scotia is beginning to experience the effects of climate change. In recent years, the province has experienced extreme weather events such as wildfires, extreme rainfall, flooding, and hurricanes. To mitigate climate change and build a sustainable economy, it is critical that Nova Scotia, alongside the rest of Canada, advance clean energy initiatives.

Nova Scotia has set ambitious targets to reach an 80% renewable energy mix by 2030 and a net-zero emissions economy by 2050.¹⁰⁰ While these targets are positive, the province still has a long way to go in its journey to net-zero. Currently, about 62% of Nova Scotia's electricity is powered by fossil fuels, such as imported coal and coke, making this the province's primary source of greenhouse gas emissions.¹⁰¹

To achieve climate mitigation targets, Nova Scotia has immediate plans to decrease reliance on fossil fuels while increasing renewable energy. The province has immediate plans to increase onshore wind and solar energy production and future plans to develop offshore wind and green hydrogen projects. Complimenting these energy sources will require interprovincial transmission lines, increased battery storage, and widespread adoption of smart technologies to help monitor and manage grid loads.

Unfortunately, some challenges could constrain Nova Scotia's ability to advance its clean energy economy. ICTC convened industry leaders through a roundtable event in Halifax in January 2024 to discuss these challenges and brainstorm recommendations to help advance the province's clean energy economy. Notable challenges identified in this event were related to the labour market, clean energy incentives and government programs, Nova Scotia's unique culture, the province's smaller size, and the lack of supporting infrastructure across the province.

Related to labour market challenges, employers noted difficulties finding candidates with the right mix of skill sets. Employers cited particular challenges in finding individuals with industry domain knowledge, given the recent and emerging nature of clean energy in Nova Scotia. Other skill sets noted to be in demand and hard to find were soft skills, business administration, entrepreneurship, project management, digital skills, technical skills, and environmental sustainability skills. To address these skills gaps, it is recommended that post-secondary educational institutions work to better align their curriculums with industry needs, add seats to their high-demand programs, and work collaboratively with industry to expand work-integrated learning opportunities.

¹⁰⁰ Department of Environment and Climate Change, "Our Climate, Our Future: Nova Scotia's Climate Change Plan for Clean Growth," Province of Nova Scotia, December 2022, <https://climatechange.novascotia.ca/sites/default/files/uploads/ns-climate-change-plan.pdf>

¹⁰¹ Canada's Energy Future Data Appendices, "Macro Indicators – Global Net-zero Scenario," 2023, Canada Energy Regulator <https://doi.org/10.35002/zjr8-8x75>



Roundtable attendees also explained that clean energy incentives, rebates, and financing have both benefits and drawbacks. The benefits to these programs are quite clear: financial support helps reduce the risks of adopting new clean technologies and can help scale net-zero initiatives. While financial support can help drive growth in the clean energy economy, some roundtable attendees expressed concerns that incentives could also constrain growth by reducing business competition. To address these concerns, it is important that clean energy programs have clear requirements and regulations that are enforced equally across the industry. Moreover, there must be consequences for any party that fails to comply with the incentive's regulations. Importantly, different levels of government should work collaboratively to reduce overlap in government programs and regulations.

Finally, roundtable attendees noted that Nova Scotia faces unique cultural, infrastructural, and firmographic challenges. For instance, a lack of community buy-in paired with poor quality broadband connectivity in rural areas where clean energy developments will be concentrated could constrain the province's ability to scale developments. In addition to this, employers cited challenges in adopting and accessing technologies due to a lack of investments and supply chain limitations. To address this, the province should partner with industry to develop awareness campaigns that would help secure community buy-in and clean energy investments. Additionally, clear regulatory frameworks and long-term purchasing plans will be key in driving supply chain resiliency.

Looking into the future, Nova Scotia has the opportunity to become a leading clean energy hub. Regulatory frameworks for offshore wind energy production are underway, as are plans to enhance onshore wind and solar energy. To realize the province's visions for a thriving clean energy economy, Nova Scotia must leverage its existing expertise, scale skills development initiatives, and build collaborative relationships between government, industry, and the community.



Appendix

Table 1. Clean energy incentives, rebates, and financing programs in Nova Scotia

Purpose	Name <i>Linked</i>	Administering Bodies	Details
Energy Efficiency	Home Energy Assessment (HEA) Program	Efficiency NS	Rebates vary in amount (up to \$5000) and support energy efficiency retrofitting, such as the installation of insulation and heat pumps.
	Instant In-Store Rebate Program	Efficiency NS	Offers \$400 instant savings with participating retailers offering energy efficiency products, such as major appliances, lighting systems, ventilation, and more.
	Free Energy Efficiency Products Program	Efficiency NS	Renters and homeowners can use the program to receive \$240 a year toward the installation of energy-efficiency products, such as LED lighting, smart thermostats, hot water tanks, and more.
	Fridge and Freezer Recycling Program	Efficiency NS	Individuals can earn up to \$180 when going through the program to recycle old and inefficient fridges and freezers.
	Heating System Rebate Program	Efficiency NS	Offers up to \$3000 in rebates for the purchase and installation of energy efficient home heating systems.
	SwitchPACE (Property Assessed Clean Energy) Programs	SwitchPACE, in partnership with municipal governments	Depending on the focal area of the municipality, SwitchPACE programs help offer financially viable retrofits, home upgrades, and clean energy installations.
Renewable Energy	SolarHomes Program	Efficiency NS	Offers homeowners a "\$0.30 per watt rebate on the purchase of solar photovoltaic systems." Homeowners can use this program one time and get up to \$3000 off their solar PV system.
	Solar for Non-Profit Pilot	Efficiency NS	A limited offer pilot program that provides registered Nova Scotian non-profit organizations a \$0.60 per watt rebate on the purchase of solar PV systems, with a cap of \$15,000.
	Home Battery Pilot	Efficiency NS	A pilot program offering a "rebate for eligible energy systems paired with a solar PV system." The program provides up to \$2500 in rebates.
	Solar City HRM	Halifax Regional Municipality	Offers homeowners and select organizations within the Halifax Regional Municipality financing programs for the installation of solar energy systems.
	Clean Energy Financing	Clean Foundation	Low-interest financing for energy efficiency retrofits and clean energy installations. The program is administered by select municipalities across the province.
Low-Income Incentives	HomeWarming Program	Efficiency NS	The program offers free energy assessments and retrofits, such as insulation, to low-income households.
	Affordable Multifamily Housing Program	Efficiency NS	Rebate offers up to 80% rebates on energy efficiency retrofits to low-income, multi-unit residential dwellings.



Table 2. Clean energy incentives, rebates, and financing programs in Canada

Name <i>Linked</i>	Details
Canada Greener Homes Grant	Provides homeowners with “up to \$5,000 for the purchase and installation of energy efficiency home upgrades,” such as installing solar PV systems, or upgrading insulation, windows, and doors.
Canada Greener Homes Loan	Provides 0% interest financing over 10 years, up to \$40,000, for eligible clean energy and energy efficiency installations and upgrades.
Oil to Heat Pump Affordability Program	Provides low-income households with up to \$10,000 to support switching from oil heating to electric heat pumps.
Federal GST/HST New Housing Rebate	Allows homeowners to recover some of the GST or HST paid for new homes or renovations that include substantial energy efficiency investments or upgrades.
Federal Tax Incentive for Clean Energy Equipment	Provides eligible businesses with a capital cost allowance to cover the costs of investments in clean energy generation and energy conservation equipment.
Clean Energy Financing Programs	Examples of these financing programs include the Clean Energy Loan and the Mortgage Loan Rebate, which provide financial support to energy efficiency installations, purchases, and retrofits, including solar PV, insulation, air sealing, and more.

Table 3. Municipal and federal financing programs available to support Nova Scotian homeowners in the installation of clean energy systems, such as solar photovoltaic (PV) systems. Specific details on the loan terms, such as spending cap and interest rates, are detailed here.

Program <i>Linked</i>	Loan Terms
Solar City Program	Administered by the Halifax Regional Municipality (HRM). The program provides a loan to pay the upfront costs of solar installations. Residents pay back the loan at a 4.75% fixed interest rate alongside annual property tax bills.
SwitchPACE Program	Administered by SwitchPACE, a Community Interest Corporation (CIC) with seven municipalities across the province. The program offers between \$15,000 to \$20,000 loans at various interest rates, depending on the municipal borrowing rate. Loans can be paid back over 10 years.
Canada Greener Homes Loan	Administered by the federal government. The program provides loans for solar installations to residents across Canada, including Nova Scotians. The loan offers 0% interest financing over 10 years, with a spending cap of \$40,000.

