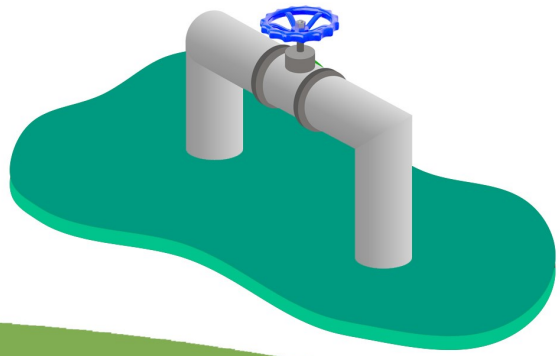

January 31, 2024

IMPLICATIONS FOR ATLANTIC CANADA'S ECONOMY IN THE PURSUIT OF NET-ZERO EMISSIONS

Economic Opportunities with Existing Clean Energy Technologies

Atlantic Economic Council

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Economic Opportunities with Existing Clean Energy Technologies

Highlights

- The energy sector is an important part of Atlantic Canada's economy. Atlantic governments and businesses are significantly investing in the development of clean technologies to support the net-zero transition.
- Future economic opportunities associated with clean technologies will depend on the direction of government regulation, resource availability and investment costs.
- Onshore wind investment is expected to grow strongly over the next decade. Economic opportunities are limited as most major wind farm components are imported.
- Offshore wind projects could create larger local benefits, compared to onshore wind projects, as a much bigger share of the work can be completed locally. Efforts are underway to adapt the current regulatory environment to accommodate the management of offshore wind projects.
- New hydroelectricity projects in our region are largely limited to Newfoundland and Labrador. These projects would generate large economic benefits if they move forward, but challenges remain to lessen risks around costs and regional integration.
- Natural gas is an important fuel that can support the shift to net-zero. Blending natural gas with lower emission fuels, adding renewable natural gas and utilizing carbon capture and storage may extend the use of natural gas in the region. The largest economic opportunity for natural gas would come from the development of onshore and offshore reserves.

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The Atlantic Economic Council is the source for independent research, providing the insights and ideas that are vital to supporting a healthy, inclusive and sustainable Atlantic Canadian economy.

Atlantic Economic Council

Will new cleaner energy sources drive economic growth in Atlantic Canada?

The Canadian government and all four Atlantic provinces committed to achieve net-zero emissions by 2050. Prince Edward Island is targeting 2040. They are implementing various climate actions to reduce emissions across the economy and within specific sectors.

Many proposed solutions for sectors like electricity generation and buildings are based on existing energy sources. Electrical utilities are already making significant investments to meet provincial renewable electricity targets. But much more needs to be done to comply with federal regulations that mandate the phase out of coal-fired power by 2030 and the proposed emissions standard for electricity generation starting in 2035.

Replacing fossil fuels with electric alternatives, a process known as electrification, is a key net-zero solution. Electrification is especially important to reduce emissions in transportation and buildings. The federal government has imposed a carbon price to discourage the use of fossil fuels. In Atlantic Canada oil for home heating is exempt. Federal and provincial governments are also offering financial incentives to accelerate the adoption of electric vehicles and heat pumps.

This report examines potential economic opportunities and challenges in Atlantic Canada associated with further development of three existing clean energy technologies: wind power, hydroelectricity and natural gas. A future report will assess economic opportunities related to three emerging technologies. Many energy technologies will be needed to help the region advance its net-zero ambitions. These reports focus on ones with the greatest economic potential for our region.

Economic contribution of energy production and use

The energy sector significantly contributes to economic activity in Atlantic Canada. Our recent report on the importance of energy in Atlantic Canada discusses the scope of the industry in the region and the implications of the transition to a net-zero economy. The energy sector accounts for 32% of output in Newfoundland and Labrador and an average 4% of output for the Maritime provinces. Each Atlantic province has a different energy mix and its own challenges in reducing energy-related emissions.

The shift to net-zero is already presenting significant new business and economic opportunities. The transition to heat pumps for home heating has resulted in an increase in the demand for installers and electricians. Demand for these workers is expected to surge in the next decade as adoption increases and more larger buildings convert to heat pumps.

Electric vehicle production and supply chains are growing globally. There are opportunities for the Atlantic region to provide the critical minerals for electric vehicle batteries, solar and wind power components. Building a network of charging stations will provide new economic activity at refueling stations, new apartments and retail outlets.

The transition could create some negative impacts. Car dealerships contribute over $600 million to the Nova Scotia economy. However, the shift from gas to electric vehicle sales may have a negative impact on dealerships as maintenance costs are lower. Wholesale parts suppliers may also lose revenues as electric vehicles have fewer components.

Electrification of homes and vehicles is dependent upon substantial upgrades to increase capacity of the electricity grid. Electric utilities have the opportunity to redesign and invest in cleaner systems that will be more efficient and collaborative.

Will Atlantic Canada be able to capitalize on opportunities to develop its own cleaner energy sources?

Several challenges could impede their development. Governments are creating and updating energy regulations to align with the net-zero transition. Regulatory uncertainty complicates private sector decision-making, such as investments regarding offshore wind or onshore natural gas. High interest rates, elevated construction costs, a shortage of several construction trades and supply chain challenges are increasing project budgets, risks and timelines. Many projects globally are subsidized by governments to accelerate renewable energy production. The pace of development would slow if governments delay or reduce support for renewable energy projects.

A clear regulatory framework is required so project developers know the basis on which applications will be approved and to accelerate approval wait times. Project proponents need to engage early with local communities and potential Indigenous partners to help find a balance between economic growth and the community impact.

Wind power

Our assessment of opportunities in Atlantic Canada

Role in net-zero energy transition: **high**
> Wind power will be a leading source of carbon free emissions as the region transitions to net-zero. > The technology is proven, cost-effective and scalable.
Potential economic impact of onshore wind: moderate
> The construction of new onshore wind farms will have a positive impact on the region's economy over the next decade. > The overall economic benefit is limited due to our lack of wind power manufacturing in the region.
Potential economic impact of offshore wind: high
> Offshore wind power offers greater economic potential, compared to onshore wind, due to offshore installation, subsea work, research and development and other supply chain support. > Higher construction costs may limit growth in the near term.

Role in the net-zero energy transition

Wind power is expected to be the leading energy source in the Maritime provinces by 2050. The Canadian Energy Regulator projects wind power generation to grow from about 6% of electricity production in Atlantic Canada in 2022 to 70% by 2050 in its Canada net-zero scenario. That is over ten times the 2022 level of production. Nova Scotia is expected to experience the largest growth in the region at 11 times the 2022 level. However, Nova Scotia Power's modelling scenarios have a less dramatic increase in wind production and a broader mix of electricity sources compared to the regulator's projections. While the scenarios vary, wind would increase from about 600 megawatts currently to 3,300 megawatts by 2050 an increase of about 5.5 times the current level.

Wind power is an intermittent electricity source. Increased integration of intermittent sources poses challenges in aligning electricity supply and demand. Dispatchable generation sources, such as natural gas, are important for reliability as wind energy expands. Battery storage also has the potential to be a key reliability solution.

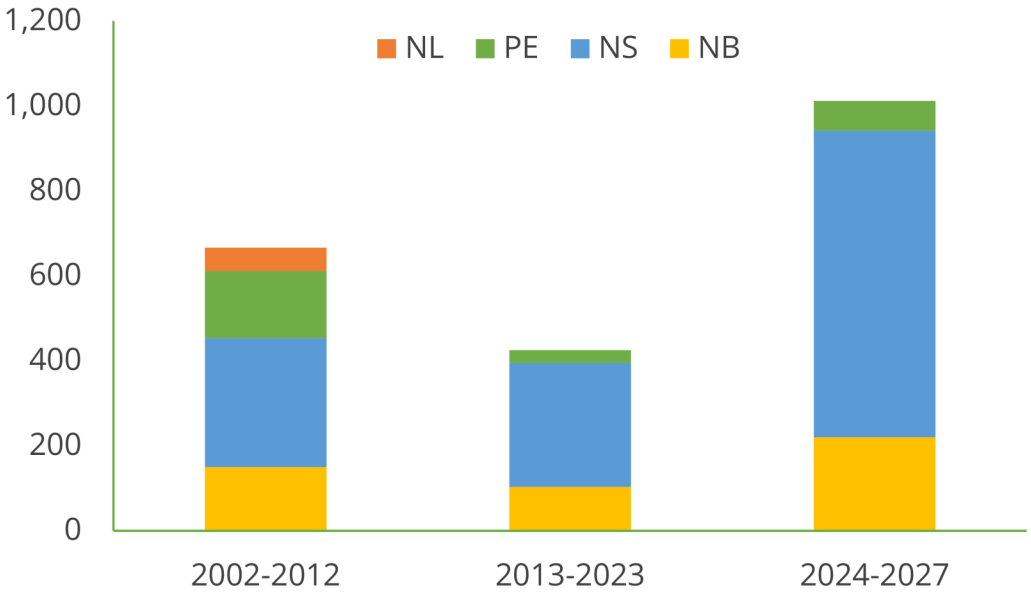
The cost of new wind power had been falling steadily since 2010 until 2022. The average installed cost per megawatt for onshore wind fell from about US$2.2 million in 2010 to about US$1.3 million in 2022. The cost for offshore wind in shallow waters fell from US$5.2 million per megawatt in 2010 to US$3.5 million in 2022.

The capital cost of wind power is expected to continue to decline over the next decade as adoption increases. However supply shortages are boosting costs over the last year due to challenges in global procurement. A recent auction for offshore wind in the United Kingdom received no bids due to rising costs. Orsted of Denmark cancelled plans for two US wind farms due to current cost and supply chain challenges. In Atlantic Canada, the Burchill Wind Project was delayed due to supply chain issues.

Supply chain issues may take time to balance out since global demand for wind power is growing so quickly. The Global Wind Energy Council expects wind power capacity to increase 12% per year between 2023 and 2027 to help meet this demand.

Atlantic Canada's wind power generation is set to expand

New wind generation added (megawatts)



Source: Canadian Renewable Energy Association, provincial and utility procurement, Atlantic Economic Council

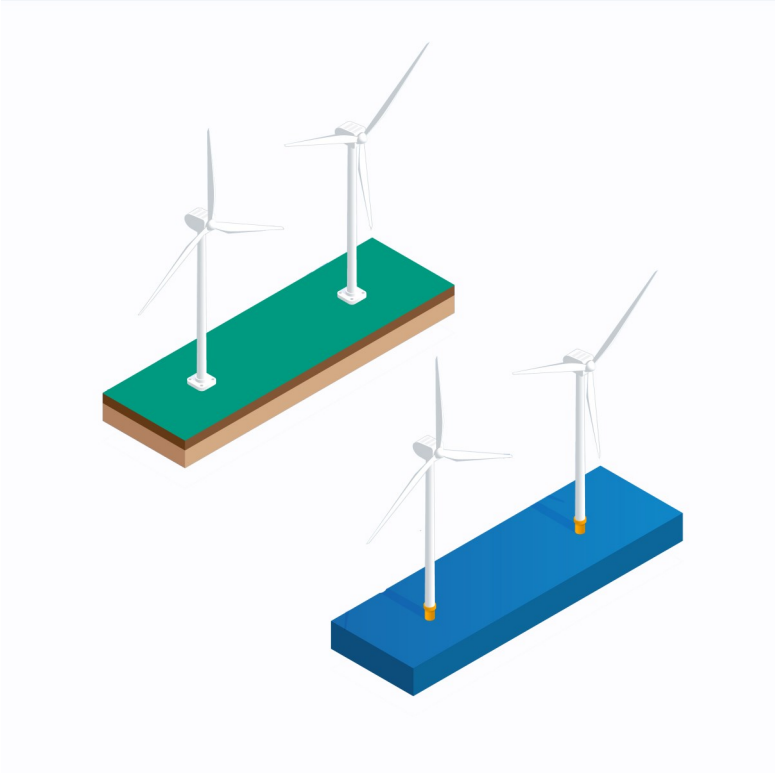
Onshore wind energy plans

Onshore wind has been the main source of renewable energy growth in Atlantic Canada over the last two decades. Wind generation capacity is currently about 1.1 gigawatts. This could nearly double by 2027 based on current plans by utilities and provinces.

Nova Scotia's current round of energy procurement will add 372 megawatts of wind power generation by 2025. A second round will add 350 megawatts of wind and other renewables by 2027. New Brunswick is planning to add 220 megawatts of wind, solar and storage by 2027. Prince Edward Island is planning to add 60 megawatts of wind over the next few years as part of its energy strategy.

Nova Scotia and Newfoundland and Labrador could see several gigawatts of wind power constructed if planned hydrogen projects move ahead. Most of that power would be used for hydrogen and ammonia production but some could be sold back to the grid during peak demand in the winter.

Firms in the region are adding capacity to support the growth of wind power. Irving Equipment is adding cranes to support the installation of new wind turbines, towers and blades. Several local and international wind power firms are expanding operations in the region to support projects. Indigenous communities are heavily involved in wind and other renewable projects and will benefit from the revenues generated.



Offshore wind energy plans

There are currently no offshore wind power generation in Canada. Nova Scotia, Newfoundland and Labrador and New Brunswick are targeting offshore wind power for future generation. Nova Scotia is planning to add five gigawatts of offshore wind by 2030. The wind could be used to for planned hydrogen projects, exported or used to support expected growth in electricity demand in the region.

The offshore petroleum boards in Nova Scotia and Newfoundland and Labrador are being redeveloped to help regulate the offshore wind power industry. The offshore fishery has raised concerns about where offshore wind farms may be located and will need to be consulted before projects can proceed. Any delays in finalizing the new regulation could impact the pace of new project development.

Onshore wind farm development

Most large components for an onshore wind farm are imported. Turbines, blades and towers are built in other countries such as China, Germany, Denmark and the US. About 60% of current turbine production comes from China.

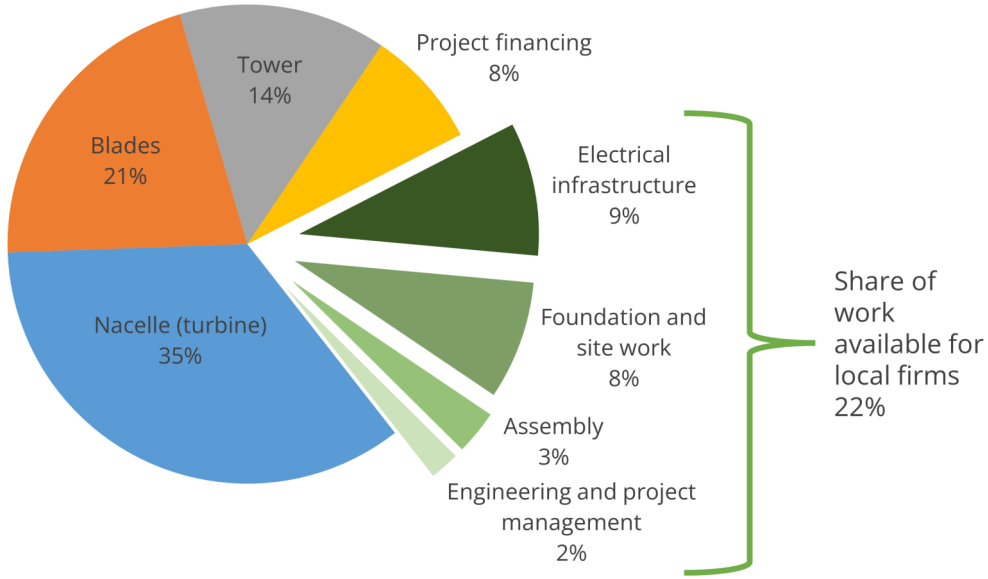
Less than 25% of onshore wind project costs are likely to be spent in the region during the construction phase. Spending in the region would include site preparation, assembly and electrical infrastructure. Occupations required to build and operate these wind farms are as follows: heavy equipment and crane operators, truck drivers, construction labourers, electricians, welders, engineers and wind turbine technicians. Spinoff impacts on the local community would occur during construction include spending on accommodation and food. Governments receive ongoing tax revenues from the projects.

Operational onshore wind farms have modest labour requirements and maintenance costs. Wind turbine technicians monitor and maintain the facility. The annual operating cost is about 3% of the total capital cost.

The volume of wind projects in the region could be considerable if wind projects to support hydrogen development move ahead at the same time as the provinces expand wind power generation. There may be worker and equipment shortages that could delay some projects. Stakeholders should work with training institutions to ensure that there enough workers to keep these projects moving.

Economic benefits of onshore wind limited to on-site work

Share of onshore wind generation installation cost by component, US (%)



Source: National Renewable Energy Laboratory

Atlantic Economic Council

Offshore wind farm development

The number of jobs and share of local spending for offshore wind farms are likely much higher than that for onshore wind. Over half of spending on offshore wind projects could go to local firms. This is based on estimates from a recent study from the National Renewable Energy Laboratory. Using this data we estimate that five gigawatts of offshore wind, as proposed in Nova Scotia, could create about 5,000 jobs in Canada. Offshore projects require additional electrical and subsea work and more complex assembly than onshore wind farms. Marine transportation, logistics and subsea workers would also be needed. Permanent jobs for a new offshore wind farm include wind technicians and data analysts.

Local ocean technology firms and offshore oil support firms may find opportunities in offshore wind here and abroad, including subsea work. St. John's-based Kraken Robotics was awarded a $3 million contract for subsea work on an offshore wind farm in Europe. Canada's Ocean Supercluster has supported several projects focusing on offshore renewable energy.

The region's ports are likely to benefit from wind power expansion, especially as offshore wind develops. The logistics, laydown areas and potentially component manufacturing could develop at port sites in the region. The ports in Halifax, Argentia and Sydney are all being used for large US offshore wind projects.

High level of capital spending potential in wind power before 2030

Capital spending on wind energy projects, Atlantic Canada

	Time period	Total construction value	Estimated spending by Atlantic firms
		$ billions	$ billions
Completed wind capital spending	2000-2023	2.5	0.55
Planned wind capital spending	2024-2030	4.0	0.85
Onshore wind to support hydrogen projects	2024-2030	4.0	0.85
Offshore wind for hydrogen, grid and export	2024-2030	7.0	3.5

Source: Canadian Renewable Energy Association, provincial and utility procurement, Atlantic Economic Council

Spending on wind power construction is expected to be high between 2024 and 2030. The Atlantic Economic Council estimates that nearly $15 billion could be spent on onshore and offshore wind projects over that period. This could lead to over $5 billion of spending in the region.

Main challenges to wind energy expansion

Onshore and offshore wind

- Delays in securing key components
- Local resistance to siting of wind farms
- Balancing intermittency on the grid
- Labour availability

Additional concerns for offshore wind

- Higher costs relative to onshore wind projects
- Regulatory uncertainty as regulations are currently under development
- Coexistence with fisheries

Hydroelectricity

Our assessment of opportunities in Atlantic Canada

Role in net-zero energy transition: **moderate (NL) / low (NS, NB, PE)**
> No new large-scale hydro projects are expected to be built in the Maritime provinces. > Future large-scale development of hydro in Newfoundland and Labrador will depend on the outcome of negotiations with Quebec over what happens when the existing Churchill Falls agreement expires in 2041. An early renegotiation of that agreement could lead to additional hydro investment in Churchill Falls and/or Gull Island. > Hydroelectricity can help keep electricity costs low as we decarbonize. Canadian provinces with significant hydroelectricity, such as Quebec, Manitoba and British Columbia have the lowest electricity rates in the country.
Potential economic impact: **moderate (NL) / low (NS, NB, PE)**
> The potential economic impact of new hydro projects is largely limited to Newfoundland and Labrador. However, major refurbishment is required for existing facilities, such as the Mactaquac dam in New Brunswick. > Substantial economic benefits can arise during the construction phase of hydroelectricity projects. Large projects have significant financial risk, as Newfoundland and Labrador, British Columbia and Manitoba have learned with recent projects. > Indigenous communities can benefit from construction of the projects but have experienced damage to their lands from flooding. > Cost overruns during the construction of hydroelectric projects, exemplified by the Muskrat Falls project, can lead to substantial short-term increases in electricity rates.

Note: Prince Edward Island does not produce hydroelectricity.

Role in the net-zero energy transition

The Canadian Energy Regulator expects hydroelectricity output to remain stable in Newfoundland and Labrador from 2022 to 2050 under its Canada net-zero scenario. It expects the same in New Brunswick, which is consistent with New Brunswick Power's resource planning scenarios. The energy regulator projects a decline in Nova Scotia's hydropower although Nova Scotia Power's integrated resource planning scenarios project production to remain stable.

The largest potential source for new hydro capacity in Newfoundland and Labrador is the Gull Island project. This proposed project could add 2,250 megawatts of power to the province's grid. Limited new hydroelectricity opportunities exist in the Maritimes, according to Nova Scotia Power's recent Integrated Resource Plan.

Portions of the region's nearly 9,000 megawatts of hydroelectric power capacity may be non-operational by 2050. New Brunswick has to make a final decision on the refurbishment of its largest hydro facility, the 668-megawatt Mactaquac facility near Fredericton. In 2016, New Brunswick Power recommended proceeding with the upgrade of the facility at a cost of $2.9 billion to $3.6 billion. Several of Nova Scotia's larger hydro facilities need upgrades over the next decade that would cost hundreds of millions of dollars in total.

The Churchill Falls contract between Hydro Quebec and the Newfoundland and Labrador government expires in 2041. This agreement requires Quebec to receive 5,400 megawatts of electricity from Churchill Falls. An early renegotiation of that deal is being considered that could include the development of the Gull Island project and/or the expansion of the Churchill Falls project by 1,000 megawatts. Newfoundland and Labrador Hydro is examining an over $500 million expansion at the Bay d'Espoir generating station that would add 154 megawatts around 2030. If the larger projects move ahead, they could lead to the completion of the Atlantic Loop project and provide another source for clean power in the region.

Hydroelectricity dominates generation in Newfoundland and Labrador

Electricity generation from hydro

	Generation	Share of total generation	Generation	Share of total generation
	2022		2050	
	Gigawatt hours	%	Gigawatt hours	%
Newfoundland and Labrador	44,260	99	46,520	99
New Brunswick	2,740	21	2,890	13
Nova Scotia	980	11	510	2
Atlantic Canada	47,980	72	49,920	51

Note: Prince Edward Island does not produce hydroelectricity.
Source: Canada Energy Regulator

Potential economic impacts in Atlantic Canada

New hydro construction opportunities are limited in the Maritimes. Newfoundland and Labrador has two significant project options, the Gull Island project and an expansion of the Upper Churchill project.

Hydroelectric projects carry significantly more financial and technical risk than most other electricity projects due to their complexity and size. They typically exceed their original budget due to delays, rising costs and poor operational oversight. A green light for the Gull Island project will be challenging given cost and time overruns at the Muskrat Falls project. Muskrat Falls was delayed several years and was $4 billion over its capital budget. The Site C hydro project in British Columbia, which is currently under construction, was expected to cost $8 billion and is now likely to cost more than $16 billion. Two projects in Manitoba are about $4 billion over budget.

The $10 billion Muskrat Falls hydro project provided over 40 million person hours of employment in Newfoundland and Labrador by the end of 2021. This included nearly five million hours for Indigenous workers. Over $3.6 billion of spending on the project occurred in Newfoundland and Labrador. The project was an important economic engine for the province, especially in Labrador. However, the project was well over its initial budget. The Gull Island or Churchill Falls expansion projects will provide a significant boost to the Labrador economy if they move ahead, especially for Indigenous workers. Large hydroelectric projects often have Impacts and Benefits Agreements with Indigenous communities, which result in royalty sharing, supply chain opportunities, and employment and training.

Main challenges to hydroelectricity expansion

- Higher cost and risk of cost overrun compared to other electricity generation options
- Lack of available locations for new projects
- Local resistance to projects
- Challenge in finalizing Indigenous benefits agreements and environmental approval
- Potential necessity for successful negotiations between Newfoundland and Labrador and Quebec to advance new projects in Newfoundland and Labrador

Natural gas

Our assessment of opportunities in Atlantic Canada

Role in net-zero energy transition: **moderate (NS, NB) / low (NL, PE)**
> Natural gas can support dispatchable generation for peak demand and intermittent wind power. > This proven energy source can help manage the cost of lowering emissions, as households and businesses push back on rising energy costs during this early stage of the transition. > Distributors are planning to introduce hydrogen blended with natural gas and renewable natural gas, which will help lower emissions and diversify the energy mix. > The extent to which natural gas is used during the transition mainly hinges on costs and technological advancements of renewable natural gas, battery storage and non-emitting energy sources such as hydrogen. It also depends on the direction of government climate policies and whether provincial moratoriums on natural gas development are lifted.
Potential economic impact: **moderate (NS, NB) / low (NL, PE)**
> Blending traditional natural gas with cleaner fuels and employing carbon capture technologies would support job growth and foster expansion opportunities. > Our natural gas is largely imported from the US, as moratoriums currently restrict developing reserves in three Atlantic provinces. Lifting these restrictions would increase energy security and economic opportunities.

Note: Nova Scotia and New Brunswick are the only two Atlantic provinces connected to a natural gas distribution pipeline. This assessment assumes that natural gas development moratoriums remain in place in Nova Scotia, New Brunswick and Newfoundland and Labrador.

Role in the net-zero energy transition

Natural gas is an important energy source in larger cities and towns of Nova Scotia and New Brunswick. It is used for electricity generation, industrial processes and in homes. Newfoundland and Labrador and Prince Edward Island have never been connected to a natural gas distribution pipeline. This type of energy plays a much smaller role in our region than in the rest of the country.

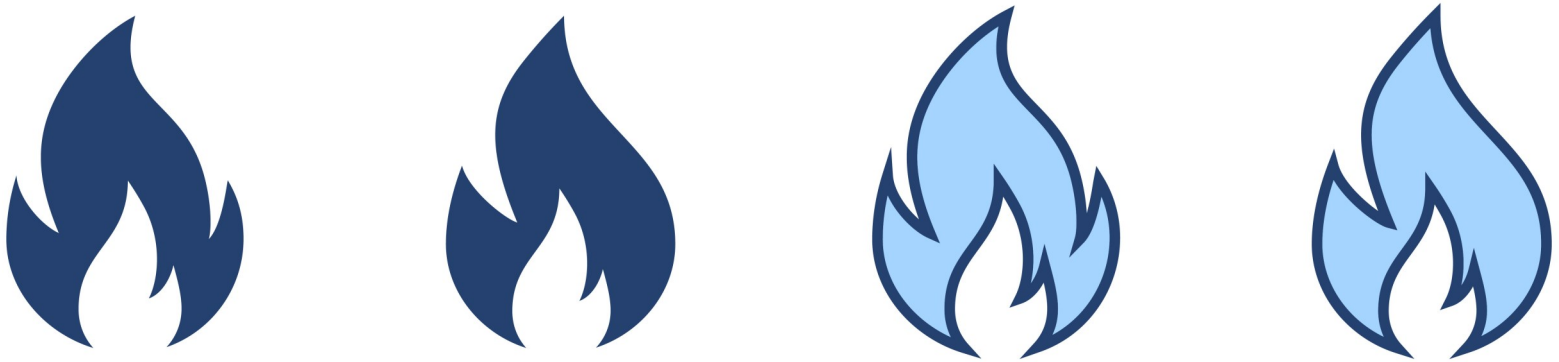
Most other provinces in Canada have had access to relatively cheap natural gas for many decades via early development of distribution systems that did not reach Atlantic Canada. This has supported higher adoption rates of natural gas for heating and electricity generation in those provinces.

The use of natural gas is expected to continue in the medium term, as stated in NS Power and NB Power energy forecasts. Natural gas is significantly less carbon-intensive than coal and oil. Replacing higher emitting fuels with natural gas can help reduce emissions in electricity generation, buildings and transportation. Environmental advocates see it as a temporary solution that we should not depend on or further develop as it still emits carbon.

Uncertainty exists about how important natural gas will be in the future. The use of natural gas could grow if costs remain elevated for new lower emitting sources or if natural gas is paired with carbon capture and underground storage.

Natural gas can be used to create hydrogen. This process produces emissions, but when combined with carbon capture utilization and storage, the process effectively becomes net-zero. Blending hydrogen into natural gas pipelines could extend the use of natural gas in the region by lowering emissions from natural gas services. Renewable natural gas from organic matter is expected to replace some conventional natural gas.

The role of natural gas in the energy transition is hampered by a lack of clarity on its permitted role in current federal regulations. These include the draft Methane Regulations and details on the Carbon Capture Utilization and Storage Investment Tax Credit. Current draft regulations do not consider how Atlantic Canada differs from the rest of the country. For example, we have smaller firms and have a different energy mix than in other parts of the county.



Electricity generation

Natural gas accounted for 16% of 2022 electricity generation in New Brunswick and 13% in Nova Scotia. Nova Scotia Power is considering converting the 154-megawatt facility at Point Tupper from coal to natural gas before 2030. Other coal-fired power plants in Nova Scotia and New Brunswick are less likely to be converted to natural gas as they do not have pipeline access nearby.

Natural gas generation remains important in Nova Scotia and New Brunswick

Natural gas power generating stations operating in Atlantic Canada

Facility	Owner	Location	Province	Generating capacity (megawatts)	Construction or conversion date
Tufts Cove	NS Power	Dartmouth	NS	500	2000/2004
Bayside	NB Power	Saint John	NB	284	1999
Grandview	TC Energy	Saint John	NB	95	2001

Note: Tufts Cove also burns oil
Source: NS Power, NB Power, TC Energy

Natural gas is a less emissions-intensive option than coal and oil for dispatchable generation. This energy source enables easier integration of intermittent renewables into the electricity system and can help manage peak demand during winter months. Dual-fuel capability, such as burning natural gas and oil at one facility, is important for energy security and cost management.

Traditional natural gas will persist in the short term. Lower emitting forms of natural gas such as hydrogen blending, fuel switching with biodiesel, renewable natural gas and hydrogen will eventually overtake use of traditional gas.

Residential usage

Only 5% of single-family homes in Nova Scotia and 3% of homes in New Brunswick are heated with natural gas, compared to 44% of homes nationally. Natural gas distributors will continue to expand services to homes in urban areas in these two provinces, as gas is a cost-effective option for heating, hot water and cooking, especially in new multi-unit construction projects. Natural gas in hybrid heating systems can also be used to reduce electricity peak demand periods.

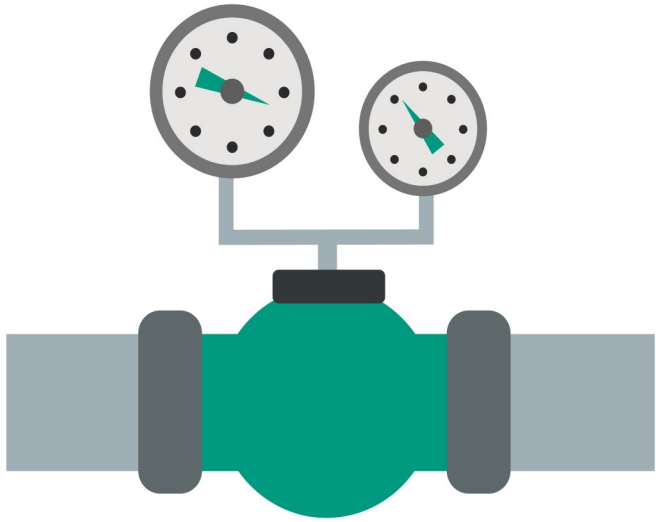
Industrial usage

Industries, including their electricity use, consume about 70% of the region's natural gas. Larger companies use natural gas for industrial purposes. It will be important to find ways to reduce natural gas emissions in industrial activity to support the net-zero transition, as electrification is more challenging for heavy industries.

Blending cleaner fuels like hydrogen with natural gas may be one solution. Several hydrogen projects are currently in development in Atlantic Canada. The most advanced are the Everwind Point Tupper project and the World Energy GH_2 project in Stephenville.

Development of renewable natural gas using agricultural, food and wood waste as well as landfill sites near natural gas pipelines should be examined in Atlantic Canada. Dozens of renewable natural gas projects are planned in Canada. Small scale projects are underway in the region and several Atlantic firms are exploring its future use.

Renewable natural gas is also an option for larger users. Irving Oil recently signed two agreements for supplies of renewable natural gas for use in its facilities. One of the agreements was with a firm in Rhode Island and another was with an Alberta company.



Potential economic impacts in Atlantic Canada

The supply chain exists for natural gas import, distribution, installation and maintenance in Nova Scotia and New Brunswick. The two natural gas distributors in the region, Liberty Utilities and Eastward Energy, employ about a total of 175 people. Liberty Utilities has over 12,000 customers in New Brunswick and Eastward Energy has over 9,000 customers in Nova Scotia. Liberty has spent nearly $400 million in New Brunswick over the last decade expanding its infrastructure. Eastward Energy has invested over $300 million in Nova Scotia over the last two decades. Both companies are expanding in their service areas.

Saint John LNG imports natural gas from international markets to meet winter peak demand in the US northeast, New Brunswick and Nova Scotia. It employs nearly 100 people. Pipeline operators Maritimes and Northeast and Brunswick Pipeline employ dozens of individuals. Headwater Exploration produces and supplies natural gas in the winter months. Several large customers using natural gas in their businesses employ technicians and engineers that specialize in natural gas. A large positive economic impact is unlikely without a major increase in usage, although there may be some new natural gas users in the medium term.

Extraction of natural gas in the region remains the largest potential economic opportunity. New Brunswick and Nova Scotia have large onshore natural gas reserves. Offshore Newfoundland and Labrador has massive pools of natural gas. An LNG export project in Newfoundland that would include a pipeline to offshore fields is planned but is still in the early stages. The project would create up to 1,500 jobs during construction and 400 direct jobs.

Future development of these reserves depends on demand for natural gas in the Atlantic region, the US and Europe. The infrastructure is already in place to utilize onshore natural gas, but provincial moratoriums of fracking in Nova Scotia, New Brunswick and Newfoundland and Labrador prohibit new development of reserves. The region currently imports most of its natural gas from the US via one pipeline.

Main challenges to natural gas expansion

- Uncertainty about evolving federal government climate policies
- Reliance on emerging technologies, such as carbon capture, and new processes to reduce natural gas emissions
- Existence of provincial moratoriums on the development of new natural gas reserves
- Obtaining a social license to extract natural gas on land
- Only one pipeline currently supplies natural gas to most customers in Atlantic Canada

IMPLICATIONS FOR ATLANTIC CANADA'S ECONOMY IN THE PURSUIT OF NET-ZERO EMISSIONS

PREVIOUS REPORTS IN THIS SERIES

> The Economics of Greening your Business

> Why is Energy so Important to our Net-Zero Transition?

> Overcoming Obstacles to a Cleaner and Bigger Electricity System

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> Sectoral Issues: Buildings

> Clean Energy: Emerging Technologies

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Key takeaways

Businesses

> Explore opportunities to partner in onshore and offshore wind supply chains as significant investments are expected in wind power over the next decade.

> Consider transitioning to natural gas for operations if you are a large fossil fuel consumer. Assess the viability of net-zero emitting energy inputs, like hydrogen, in the long term as technology advances and costs decrease.

> Engage Indigenous and community partners early in clean technology project development to secure local support and enhance economic benefits.

Governments

> Clarify the role of natural gas in the net-zero transition and support maximum flexibility so that the cost to business is minimized.

> Consider lifting onshore gas moratoriums to let the private sector assess the economic viability of expanding natural gas under net-zero regulations.

> Support opportunities for carbon capture and storage in Atlantic Canada.

> Ensure timely implementation of offshore wind regulations to support business interests.

> Develop projections for clean jobs, such as heat pump and wind power technicians, and enable sufficient training to support the labour supply.

> Carefully evaluate best procurement and delivery models for potential new hydroelectricity projects to better manage risks.

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