



*INTERIM REPORT:*

# TOWARDS A CLEAN POWER ROADMAP FOR ATLANTIC CANADA

August 2020



# CLEAN POWER PLANNING COMMITTEE

## Co-CHAIRS

Natural Resources Canada

Nova Scotia Department of  
Intergovernmental Affairs

## COMMITTEE CONTRIBUTORS

Privy Council Office of Canada

PEI Energy Corporation

Atlantic Canada Opportunities Agency

Nova Scotia Power

Infrastructure and Communities Canada

Énergie NB Power

Canada Infrastructure Bank

Newfoundland Labrador Hydro

Nova Scotia Department of Energy and Mines

Maritime Electric

New Brunswick Department of Natural Resources  
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Newfoundland and Labrador Department  
of Natural Resources

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## OBSERVERS

Gouvernement du Québec

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## EXECUTIVE SUMMARY

Building on a long history of collaboration, in March 2019, the Atlantic Provinces and the federal government agreed to develop a Clean Power Roadmap for Atlantic Canada. The Roadmap is intended to outline a collective vision for how jurisdictions may collaborate over the coming decades to build a clean power superhighway across the region.

The development of the Roadmap is being overseen by an Atlantic Clean Power Planning Committee, consisting of senior officials from federal and provincial governments as well as provincial utilities. Given their strong linkages to the Atlantic region, senior representatives from the Government of Québec and Hydro-Québec have also been invited to participate in Committee meetings. This Interim Report takes stock of the Committee's work since June 2019 and outlines next steps towards the development of a Clean Power Roadmap for Atlantic Canada.

Atlantic Canada is on a path to transition its power systems to cleaner forms of non-emitting energy, such as wind, hydro, solar, tidal, and nuclear energy. Governments and utilities across the region have been making significant investments to reduce greenhouse gas emissions and transition to a future where clean energy powers more of the region. These significant and sustained investments have helped Atlantic Canada reduce its greenhouse gas emissions 24% below 2005 levels with further reductions expected from the Muskrat Falls project. In fact, since 2005, New Brunswick and Nova Scotia have reduced their emissions more than any other province or territory.

But success has not come without a cost. Electricity rates in parts of Atlantic Canada are among the highest in the country. Electricity rates in Nova Scotia rose more than 70% from 2004 to 2014. Newfoundland and Labrador is on course to eliminate baseload generation from its oil-fueled Holyrood thermal generation station and make the province's generation 98% renewable, but at a substantial cost to the province. Ratepayers in Newfoundland and Labrador are facing significant additional costs resulting from investments in new clean generation and transmission infrastructure.

Building upon these recent investments, Committee members agree to a shared vision of an interconnected clean power grid that would serve as the foundation for a competitive, electrified economy across the region. The integrated grid would provide Atlantic Canadians with an affordable and reliable supply of clean power, underpinned by a regionally-integrated, modern electricity system that better optimizes supply and demand through smart grid technology and energy storage. It could lead to more efficient investment and management of costs; more choices and economies of scale in building new sites; better coordination of system maintenance, and increased reliability.

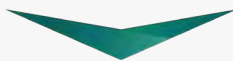
A key element of achieving this vision is the strengthening of the Atlantic Regional Transmission Loop to serve as a clean power superhighway connecting existing and new power supplies across the region to places that need it, and to form the backbone of a smarter and more resilient regional grid (see Figure below). It will also require shared investments to upgrade existing and new non-emitting electricity capacity; planned transitions on time frames that control costs without causing volatility in electricity rates, and; maintaining public confidence that the expansion occurs in an environmentally responsible manner.

Moving forward, over the course of the next year the Committee is undertaking work in the following four areas to inform development of the Roadmap:

- Identify transmission alternatives (i.e., optimal size, route and technologies) to advance the vision of an Atlantic Regional Transmission Loop;
- Electricity demand from increasing levels of electrification of vehicles, heating and other energy uses across the region;
- Policy and enabling frameworks to improve regional coherence to support the energy transition; and,
- Financing models for large electricity infrastructure projects that appropriately allocate risks and benefits.

Interim Report

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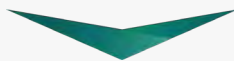
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Section One

# CONTEXT | PURPOSE



In taking action to respond to the challenges from climate change, Atlantic Canada is on a path to supply increasing amounts of clean power from non-emitting sources, such as wind, hydro, solar, tidal, and nuclear energy. To accelerate the transition to a net-zero future, Atlantic Canada is working toward a vision where clean energy powers more of their economy.

To achieve this vision, sustained economic development, population growth and a high quality of life in Atlantic Canada requires strong collaboration between the federal and provincial governments. In the spirit of cooperation and with an acknowledgment of common interests, discussions at the January 2020 Council of Atlantic Premiers' stressed the importance of clean power to the future success of the Atlantic Growth Strategy. They agreed on the need to produce and use more clean power in the region, while ensuring that electricity remains both reliable and affordable for the approximately 1 million electricity customers, including businesses and households, across Atlantic Canada.

To increase interprovincial electricity transmission and further integrate markets, the Government of Quebec was welcomed into discussions on the Clean Power Roadmap for Atlantic Canada.

Building upon the efforts of the Government of Canada's sponsored Regional Electricity Cooperation and Strategic Infrastructure (RECSI) dialogue in collaboration with the Atlantic provinces, in March 2019, for the first time in history, governments agreed to develop a Clean Power Roadmap for Atlantic Canada. The roadmap will outline a vision for how jurisdictions can collaborate over the coming decades to build a clean power network across the region, utilizing a plan that will provide economic and environmental benefits in support of the Atlantic Growth Strategy. Regulatory and policy initiatives from governments in the Atlantic Region will guide and support future investments by utilities in electricity infrastructure. This includes transmission interconnections, next-generation hydro, tidal and wind generation, small modular reactors, smart grid and energy storage technologies and electric vehicle charging infrastructure.



The development of the Clean Power Roadmap is being overseen by an Atlantic Clean Power Planning Committee, consisting of senior officials from provincial governments and their respective utilities as well as the federal government. Given their strong linkages to the Atlantic region, senior representatives from the Government of Québec and Hydro-Québec have also been invited to participate in Committee meetings. As part of the process, the Committee's work will include:

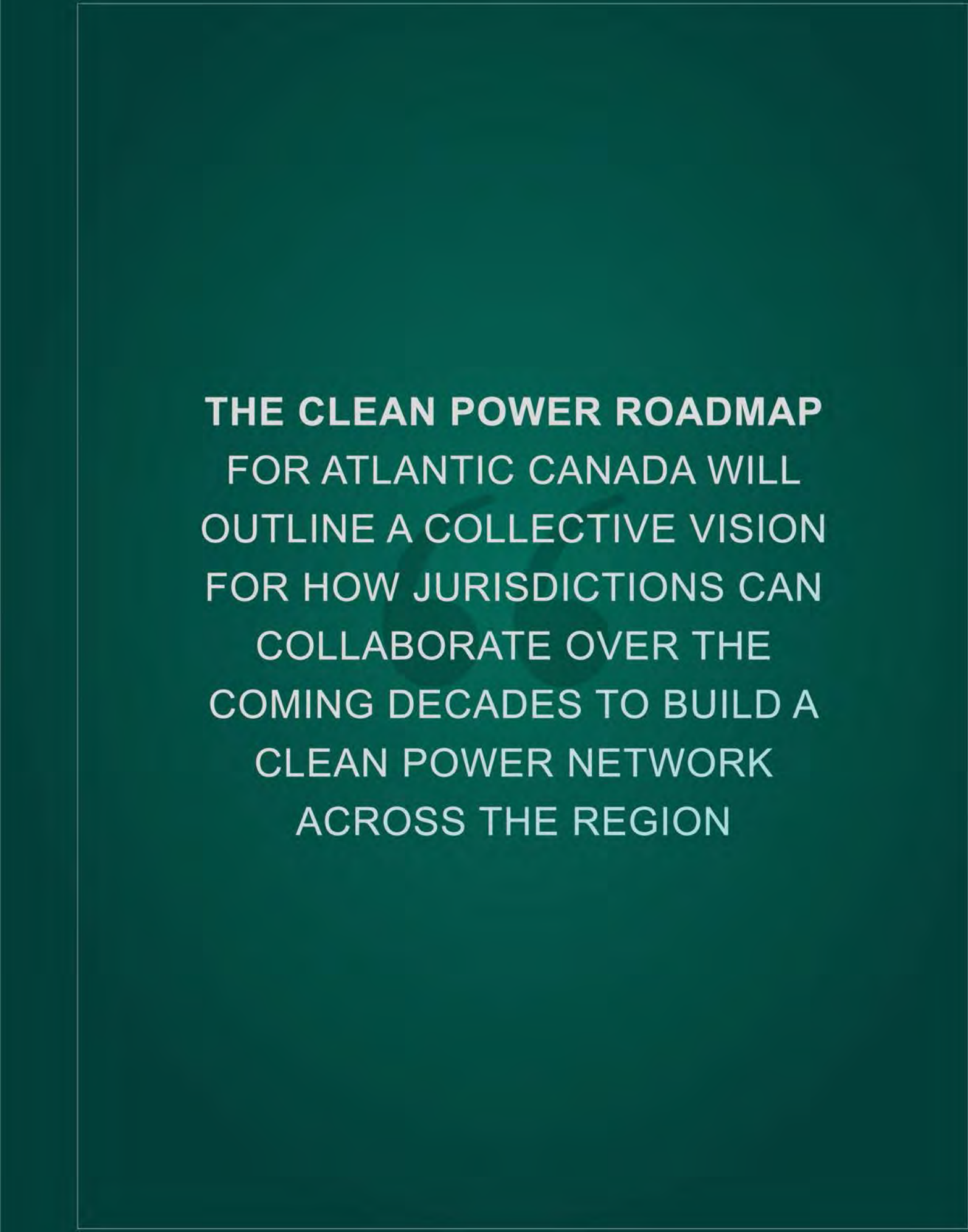
- Forecasting electricity demand across the region over the coming decades, including potential changes in demand from electrification of vehicles, demand side management programs and heating.
- Evaluating different options to develop new clean electricity supplies (including renewable and small modular nuclear reactor technology, energy storage technologies, and demand response measures) across the region (with consideration given to Québec's potential role in the region).
- Identifying the most cost-effective and critical transmission projects, including interprovincial interties, needed to move power across the region and better integrate markets.

This Interim Report takes stock of the Committee's work to date and outlines next steps towards the development of a Clean Power Roadmap for Atlantic Canada. The federal government has committed up to \$2 million over two years to support the development of the Roadmap, including studies and analysis that would need to be undertaken. The Committee's Final Report will be completed by March 2021.

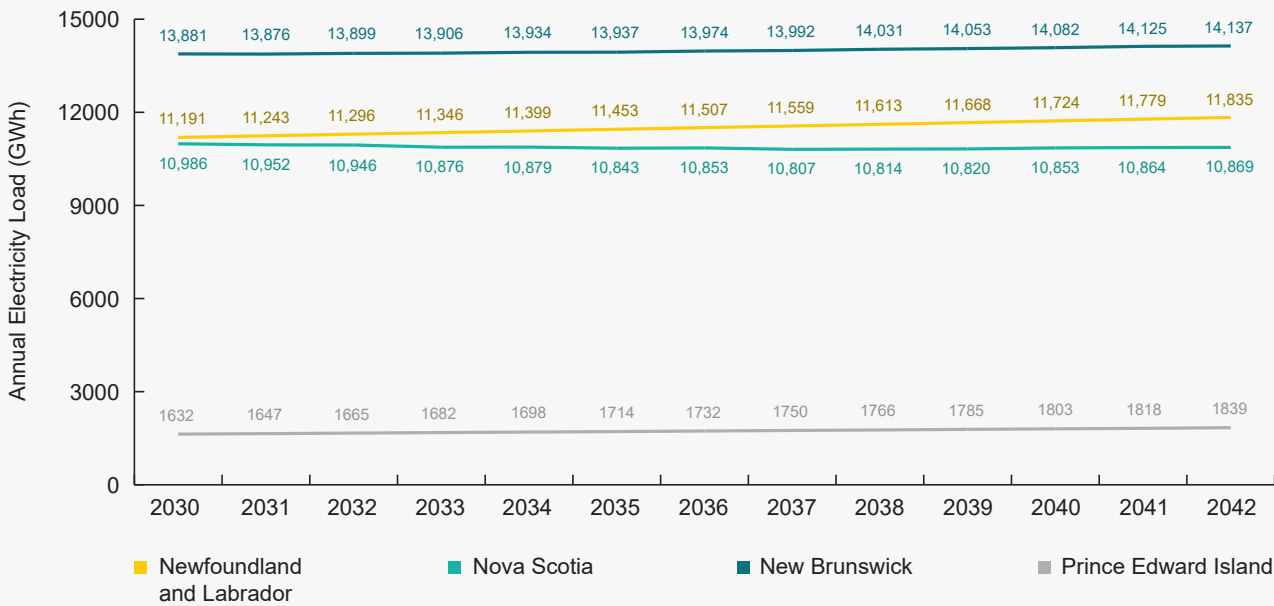
**RESPONDING IN TIMES OF CRISIS**

As the world tries to contain the devastating impacts of COVID-19, all governments across the country are prioritizing the health and well-being of their citizens and working together to ensure all Canadians have the vital protection and support they need – when they need it and where they need it. At the same time, governments are developing economic plans to protect jobs, help people who have been laid off, and support businesses during this difficult time.

Through the Atlantic Clean Power Planning Committee, representatives are working to monitor and assess the implications of COVID-19 on the power sector across the region. While the pandemic is creating new challenges and constraints to regional collaboration, the longer-term goal that all jurisdictions aspire to remains unchanged - a clean power superhighway across Atlantic Canada. The Atlantic Clean Power Planning Committee will offer advice on appropriate measures to implement that could address both short- and long-term goals in the region.

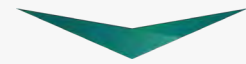


Atlantic Region: Electricity Demand Forecast



## Section Two

# CLEAN POWER IN ATLANTIC CANADA



### CANADA IS ON THE PATH TO NET-ZERO

Governments across Canada consider climate change a defining challenge of the 21st century. Provinces, territories, and the federal government have committed to taking significant steps to tackle climate change. Canada will reduce greenhouse gas emissions to 30 percent below 2005 levels by 2030 as part of its signature responsibilities under the *Paris Climate Agreement*. The federal government has also worked with provinces and territories to create the *Pan-Canadian Framework on Clean Growth and Climate Change*, which provides a national plan to meet Canada's 2030 emission reduction target.

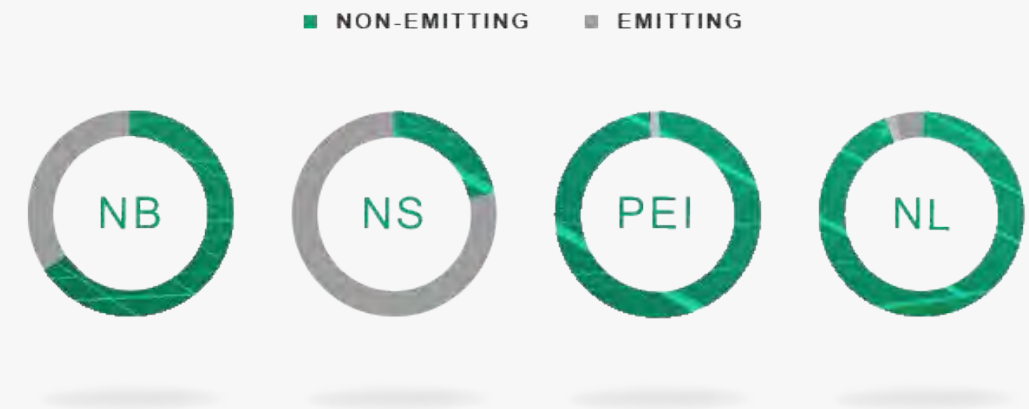
#### Atlantic Canada is Leading the Way to Net-Zero

Atlantic Canada has enjoyed a long history of interprovincial partnerships that fostered the development of diverse non-emitting fuel generation (Point Lepreau Participation Agreement between NB and PEI), increased renewable generation integration (NB and PEI Balancing Agreement, NB and NS Joint Dispatch Agreement, NL and NS Muskrat Falls Agreement) and increased innovation and transmission interconnections (First commercial high voltage solid state direct converter station, QC and NB, first

deployment of very high voltage AC transmission, QC and NL, PEI-NB original and upgraded cables, Labrador Island Link and Maritime Link, NS and NL).

The Atlantic Provinces and the federal government are collaborating to reduce greenhouse gas emissions and improve the resiliency of the grid and availability of clean power. Energy from the *Muskrat Falls Hydro Generating Station* in Labrador will move onto the island of Newfoundland across the *Labrador-Island Link* (connecting Newfoundland to the continental grid for the first time) and will continue on to Nova Scotia across the *Maritime Link*. These two subsea connections demonstrate the potential for collaborative transmission projects to make significant contributions toward the region's energy resource options and emissions reduction targets. Energy from the Muskrat Falls station will increase the proportion of renewable electricity delivered to Nova Scotians to more than 40 percent, and will enable the retirement of the first of Nova Scotia Power's eight coal-fired generating units through the delivery of firm generating capacity. In Newfoundland, Muskrat Falls could enable the shutdown of the heavy fuel oil fired *Holyrood Generation Station*.

### ATLANTIC CANADA GENERATION MIX



#### Impact of Past Investments on Electricity Rates

Success for Atlantic Canada in its efforts to reduce greenhouse gas emissions have come at a cost to provincial electricity ratepayers. Increasing global fossil fuels prices, as well as the cost of paying for more renewable generation to reduce coal, contributed to an increase in electricity rates in Nova Scotia by more than 70 percent between 2004 and 2014. In response, the Government of Nova Scotia implemented measures for price stabilization. The completion of the Muskrat Falls project could enable Newfoundland and Labrador to retire its oil-fueled Holyrood thermal generation station and make the province's generation 98 percent renewable, however the costs of the project will mean higher future electricity rates.

The Government of Canada and the Government of Newfoundland and Labrador are collaborating on measures to mitigate the impact of increasing electricity rates in the province. New Brunswick invested more than \$2 billion in the world's first CANDU-6 nuclear generation station life extension, avoiding the construction of two new coal plants and allowing for the decommissioning of two other coal plants saving 6.3 megatonnes of greenhouse gas emissions a year.





## IDENTIFYING THE CORRECT PATHWAYS

Federal regulations on the retirement of coal-fired generation in Canada by the year 2030 present a significant challenge to NS Power and NB Power because of the high electricity rates necessary to pay for and integrate new renewable generation from a small population of ratepayers, limited transmission connections between the NB Power and NS Power system, existing large amount of intermittent wind generation within the system, and the price and availability of natural gas in the region. Furthermore, while wind and solar represent renewable sources of energy, they are not strong sources of capacity. New sources of energy and capacity would be required to replace coal-fired generation in order to reliably deliver electricity when it's needed to homes and businesses in the region.

For the Atlantic Provinces, using natural gas as the main transition fuel toward a low-carbon future presents a challenge. Natural gas prices in New Brunswick and Nova Scotia are higher and more unpredictable than other parts of Canada, especially in winter. This is a result of winter energy demand peaking in the region, and Atlantic

Canada's location on the periphery of New England's gas distribution system. Prince Edward Island has no direct connection to a source of natural gas. Going forward, Atlantic Canada expects to see a decline in local natural gas production, compounding the problem. Expanding upon existing gas links with New England would require financial support for the new assets from the region's low population and increase already high prices for consumers. While the current gas infrastructure and supply pose a significant challenge, Newfoundland and Labrador and New Brunswick have substantial natural gas deposits, which could be developed. Despite these constraints, some natural gas fired generation may be required for grid stability as part of a transition strategy away from coal.

The Government of Canada and the Atlantic Provinces are cognizant of the need for affordable, reliable electricity in the region for businesses and residents during and after the transition to clean power. The potential pathways to net-zero will be assessed and optimized to provide the cleanest electricity at the lowest possible cost to ratepayers.

## RECENT INVESTMENTS WILL ACCELERATE THE TRANSITION

### Government of Canada

The Government of Canada is investing in Atlantic Canada's energy future. Following on the results of the 2011–2012 Atlantic Energy Gateway initiative, the federal government recognizes the benefits that can be achieved through enhanced cooperation. The federal government's objective is to model a more integrated view of the region. Atlantic Canada's renewable energy potential for wind, solar, tidal, small modular nuclear, hydro and transmission from Québec and/or Newfoundland and Labrador is very exciting, and the federal government's investments in Atlantic Canada are meant to advance the integration and optimization of new existing clean sources of power.

To realize the potential of increased Atlantic regional collaboration, the federal government has sponsored dialogues such as the *Regional Electricity Cooperation Strategic Initiative*. As part of *Green Infrastructure Phase I* spending, the federal government allocated \$2.5 million to fund studies meant to identify promising electricity infrastructure projects.

Through the Green Infrastructure initiative, in 2017, the federal government also launched a suite of clean power programs that are investing in areas such as smart grid and storage technologies, electric vehicle charging infrastructure, diesel reduction in off-grid communities and emerging forms of renewable energy across the country.



Atlantic Region

The Atlantic Region has made significant investments to reduce greenhouse gas emissions. New Brunswick and Nova Scotia presently lead Canada in GHG reductions, having reduced their greenhouse gas emissions by more than 30% below 2005 levels. The Atlantic region has seen reductions on the order of 24% below 2005 levels with further reductions expected from the Muskrat Falls project. New Brunswick and Nova Scotia have already exhausted lower cost GHG abatement opportunities in the electricity sector, as acknowledged in a report from Auditors General. As an example, NB Power has already reduced its emissions by over 60 percent of 2005 levels. The following Provincial actions demonstrate their concerted efforts to reorient their energy systems to a clean power future.

16 Perspectives on Climate Change Action in Canada: A Collaborative Report from Auditors General [http://www.oag-bvg.gc.ca/internet/English/parl\\_otp\\_201803\\_e\\_42883.html](http://www.oag-bvg.gc.ca/internet/English/parl_otp_201803_e_42883.html)

Nova Scotia and Newfoundland and Labrador

The Labrador-Island Link and the Maritime Link will allow Nova Scotia to import electricity from the Muskrat Falls generating station in Labrador (*Lower Churchill Project* ). The federal government provided a \$9.2 billion loan guarantee that could enable the retirement of Newfoundland’s Holyrood thermal plant, and provide a supply of clean electricity from Labrador to the island of Newfoundland, and into Nova Scotia via the Maritime Link.

Smart Energy Communities

Nova Scotia Power and New Brunswick Power, in partnership with Siemens Canada, are allocating over \$92 million toward research and development of smart grid technology. These projects reinforce the Atlantic commitment of creating smart, integrated and resilient networks and grids. The project will receive a \$35 million investment from the federal government through its *Strategic Innovation Fund*<sup>13</sup>. It will reduce GHG emissions and the dependency on fossil fuels, meet peak demand times in both provinces at the lowest possible cost, and network share for greater efficiency of the metered infrastructures. Primary components include deployment and operation of:

- Two community-scale solar installations—one with battery storage
- Six municipal/industrial buildings with varying DER configurations
- 500-home pilot exploring load control, generation, and storage
- Smart charging municipal electric vehicle fleet
- Cyber-security approaches to secure energy systems

Demand side management actions in the region are reducing energy use. Nova Scotia has operated significant energy efficiency programming in the electricity sector that has ramped up cover the past decade. Since 2008, over \$300 million of spending on efficiency programming in Nova Scotia has produced an estimated cumulative energy savings 1.2 TWh (terawatt hours). This has flattened the electricity sales growth in the province; however, system demand continues to trend upward over the same period. Nova Scotia’s efficiency organization also offers rebates on a variety of tools and appliances to help homeowners convert to cleaner home heating. They offer up to \$5,000 in rebates for different styles of heat pumps, enabling Atlantic residents to benefit from modern and inexpensive heating solutions.

The *Halagonia Tidal Project*<sup>14</sup> will install 9 MW of energy capacity off the coast of Nova Scotia and will demonstrate the world leading floating tidal generation technology. The federal government allocated \$29.8 million in support of this project. Nova Scotia Power is piloting an *Intelligent Feeder Program*<sup>15</sup> in Elmsdale, Nova Scotia using Tesla batteries for energy storage, with the possibility of expansion elsewhere in the province. The private utility, Emera, funded 14 EV fast charging infrastructure projects, allowing drivers to travel across the province without worrying about the next charging location.

In 2019-20, NB Power Served 80 Percent of its Electricity Load with Carbon-Free Sources

Since 2005, NB Power has reduced its carbon emissions by 61 percent. It has achieved this through the decommissioning of fossil fuel electric generators, the addition of renewable energy sources, the life extension of its nuclear facility, the importation of clean energy, and through continued support in its energy efficiency programs, which make up its greatest annual capital expenditure. For the fiscal year ending in March 2020, NB Power has served 44 percent of its provincial load with renewable sources, and when combined with its nuclear production, a total 80 percent of provincial load was served with carbon-free sources.

In 2015, NB Power began offering energy efficiency programs. These programs target all consumer fuels and have saved customers some 585 million kilowatt-hours of electricity and 265,000 gigajoules of other consumer residential fuels for a combined total of 2.4 million gigajoules in energy savings and 300,000 tonnes of greenhouse gas emissions savings. These reductions were made possible by NB Power investing some \$89 million of ratepayer money and funding from the governments of New Brunswick and Canada. These investments allowed New Brunswickers to make efficiency improvements which will save over \$150 million in lifetime energy costs. Approximately two-thirds of New Brunswick residential homes have already electrified their space and water heating needs and NB Power offers financial incentives for customers to select more efficient heating sources. It is expected that momentum will continue to build with sustained investments and leveraging funding opportunities such as the Government of Canada’s Low Carbon Economy Fund.

The Province of New Brunswick and NB Power, in partnership with the Government of Canada, are developing an exciting investment and research environment by conducting clean energy technology research in small modular reactors (SMRs). SMRs have inherently safe characteristics, simpler designs, lower costs, the ability to recycle used fuel, and will have superior ability to follow the intermittent variable output from renewable power sources. It is widely noted that small modular reactors present a path to a net-zero electricity system that could benefit all Canadians.

New Brunswick is the first fully connected province with a DC fast charging network for electric vehicles, meaning drivers can travel freely and enjoy their EVs without worrying about where their next charge

might be found. The average distance between charging stations is just 65 kilometres. With the assistance of the federal incentive of \$2,500-\$5,000 to purchase EVs, and continued build out of public charging infrastructure, New Brunswick expects to have 20,000 EVs on the road by 2030.

In 2020, NB Power entered into an agreement to purchase an additional 47 terawatt-hours of clean energy over the years 2020 to 2040 from Hydro-Québec. They will also collaborate on the technical refurbishment of the proposed Mactaquac Generation Station life achievement project. This technical collaboration is intended to share learnings and expertise and de-risk the project should the project obtain the necessary approvals to allow the station to achieve its useful life of at least 2068, saving up to 1.3 million tonnes of greenhouse gases annually.

Prince Edward Island

PEI’s energy efficiency organization, efficiencyPEI, is offering rebates for homeowners to install electric heat pumps as well as other Energy Star appliances. EfficiencyPEI programming is the most significant GHG emission reduction initiative in the Prince Edward Island’s portfolio, with anticipated emission reductions of at least 144 ktonnes by 2030. The heat pump rebates cover anywhere in the range of \$1,200–\$7,500.

The *Interconnection Upgrade Transmission Project*<sup>18</sup> allows Prince Edward Island to import electricity from New Brunswick through two new 180 MW submarine cables, overhead transmission lines, substation upgrades and more. The submarine cables are owned by the Province of Prince Edward Island and are operated by Maritime Electric.

A new 21 megawatt solar energy farm and associated energy storage system will be constructed in Summerside. The new energy sources will allow Summerside to meet 62 percent of its electricity needs from renewable energy sources and reduce carbon dioxide emissions by 21,000 tonnes per year.

Through Natural Resource Canada’s Electric Vehicle and Alternative Fuel Infrastructure Deployment Initiative, six fast chargers were installed across PEI. Drivers can now freely travel across the entire province while always being in close proximity a fast charger.



# Newfoundland and Labrador

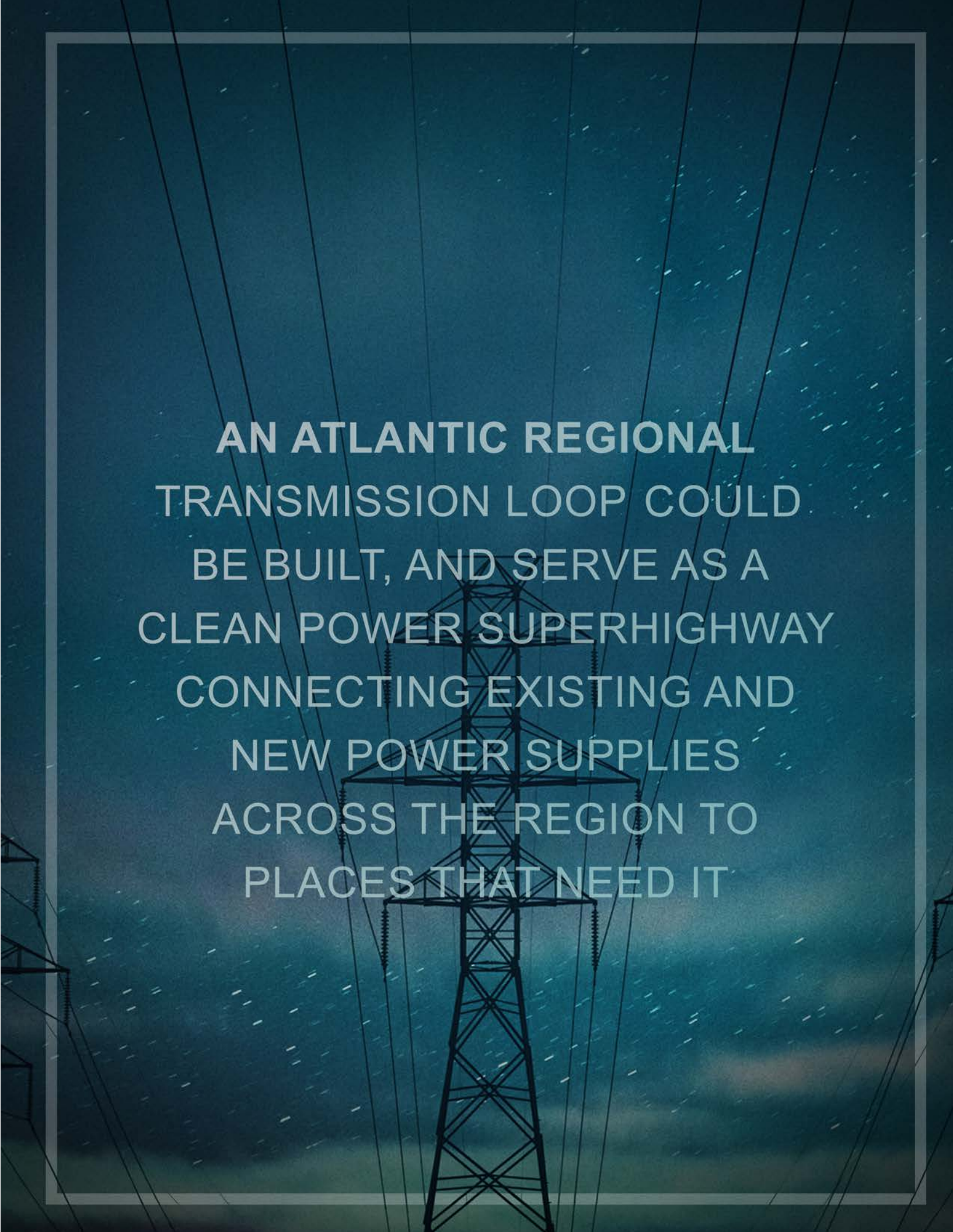
Newfoundland and Labrador is in the process of developing the Muskrat Falls project—an 824 MW hydroelectric generating facility located on the Lower Churchill River. Once in service, power from Muskrat Falls will help meet the province’s long-term energy needs by providing clean, renewable energy for future generations.

In addition to Muskrat Falls, the new Labrador-Island Link (LIL) will carry electricity from the generating facility at Muskrat Falls to the island of Newfoundland. It is a 1,100 km, 900 MW High Voltage direct current (HVdc) transmission line running from central Labrador, crossing the Strait of Belle Island, and extending to Soldiers Pond on the Avalon Peninsula.

Newfoundland and Labrador is home to valuable and abundant developed and undeveloped renewable energy resources, including wind and hydro. 98 per cent of the province’s electricity will be generated from renewable energy when the Muskrat Falls project enters service. This project will also result in approximately 3.5 terawatt hours of energy per year that is surplus to Newfoundland and Labrador’s current electricity needs. Given this abundance of renewable energy, electrification of the province’s economy is a key energy policy priority for the Government of Newfoundland and Labrador in order to switch users of fossil fuels to renewable electricity from the interconnected grid. These electrification opportunities include switching fuel oil-heated buildings as existing furnaces and boilers reach the end of their useful life, and increasing the number of electric vehicles in the province. These efforts are underway including deploying support for home heating pump installation, electric vehicle charging stations, and fuel switching for provincial public buildings. Other opportunities include electrifying marine ports, truck stops and public transit.

The Government of Newfoundland and Labrador is also working to reduce diesel in its 19 regulated electricity-isolated diesel-powered systems along the province’s coasts that are not connected to each other or to the province’s interconnected system. These diesel systems serve approximately 4,400 customers and have a total installed capacity of approximately 42 megawatts (MW). Efforts to reduce diesel in these communities include, but are not limited to: supporting the Nunatsiavut Government’s pursuit of renewable energy in its five communities; engaging in a request for proposals process for the remaining 14 diesel systems; supporting the installation of a hydro-solar-battery storage project in Mary’s Harbour to reduce diesel consumption by 30 percent or 300,000 litres; and working with the Nunatsiavut Government to pursue federal funding for a high efficiency wood stoves in communities; and a feasibility study for the use of high efficiency wood stoves in other communities with diesel systems.

Undeveloped renewable energy resources in the province include a wide range of hydro, wind, solar, and biomass generation. These resources present opportunities to expand the market for renewable energy resources within the province, and to export surplus energy throughout the Atlantic region and beyond. Undeveloped large-scale hydro potential includes various generation facility upgrades and new hydro developments on the Island and in Labrador, and in 2041 the Churchill Falls Renewal Contract with Hydro Québec will expire, resulting in approximately 30 terawatt hours of additional surplus energy available from Newfoundland and Labrador. The Government of Newfoundland and Labrador recognizes the value of the province’s developed and undeveloped renewable energy resources and has committed to work with industry and other stakeholders to develop a renewable energy plan that supports transitioning to a lower-carbon economy, creating employment opportunities for the people of the province, and further positioning Newfoundland and Labrador as an important renewable energy supplier to eastern North America.



AN ATLANTIC REGIONAL  
TRANSMISSION LOOP COULD  
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## MOVING TOWARDS A CLEAN POWER ROADMAP

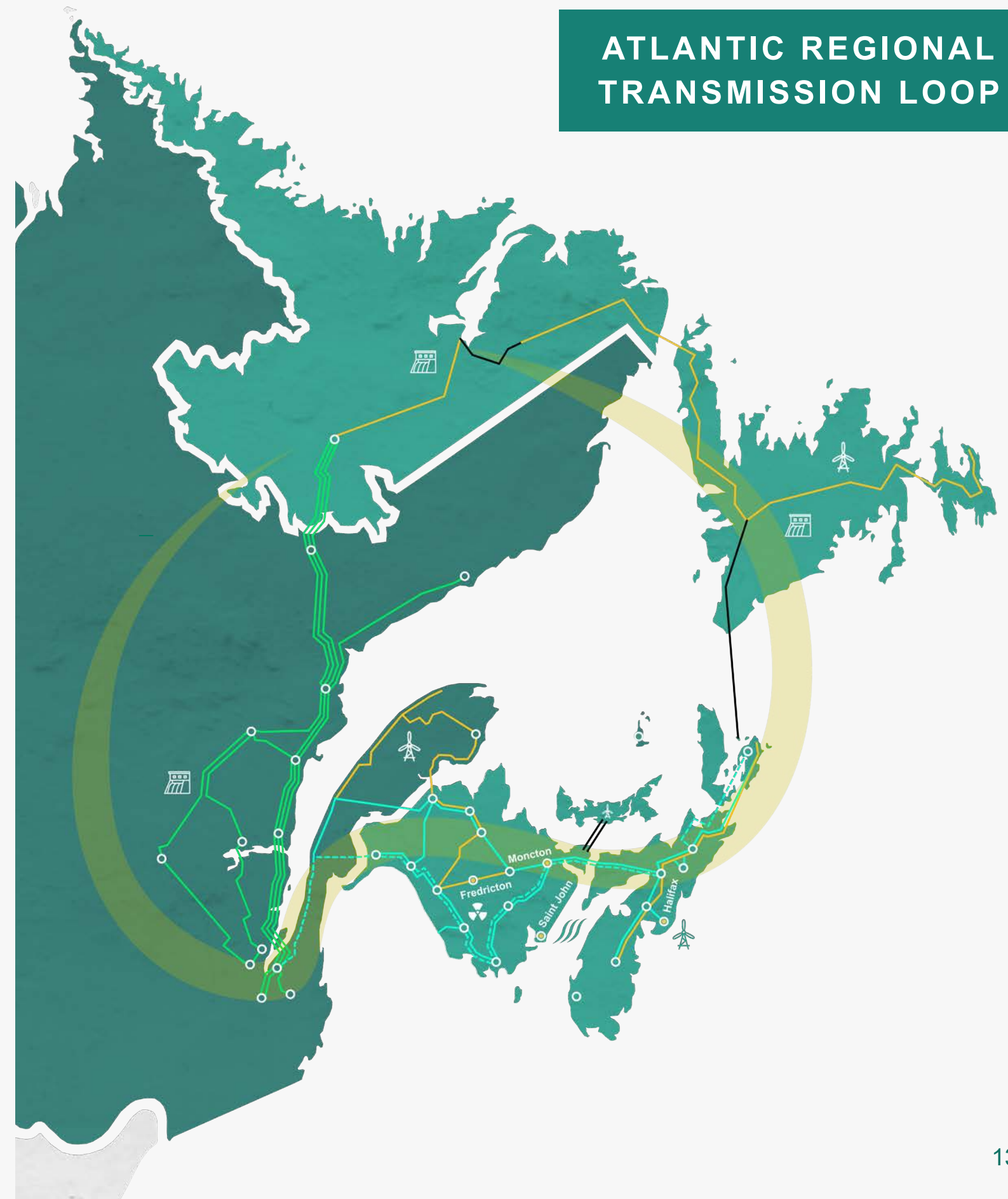
### SETTING THE VISION:

Before establishing a Roadmap, it is essential to know the destination. As such, an important focus of the Committee's work-to-date has been to develop a shared vision for Atlantic Canada's electricity future endorsed by all jurisdictions. Building upon these recent investments, Committee members agree that a collective vision of a shared, interconnected power grid across Atlantic Canada could serve as the foundation for a competitive, electrified economy across the region and a sustainable future high-quality of life for all its residents.

It would provide Atlantic Canadians with an affordable competitively priced and reliably supply of clean power, thanks to a regionally-integrated, modern electricity system that better optimizes supply and demand through smart grid technology and energy storage. It would lead to more efficient investment and management of costs; more choices and economies of scale in building new sites; better coordination of system maintenance, and increased reliability.

As part of the discussions, Committee members agree that the vision should include the following core elements:

## ATLANTIC REGIONAL TRANSMISSION LOOP





1. Generation:

- Atlantic Canada is powered almost entirely from clean, non-emitting sources including hydro, nuclear, wind, and solar.
- Coal generation is phased out across the region.
- Atlantic Canada continues integrating high levels of affordable renewables (e.g. wind, hydro and solar).
- Harnessing regional strengths and abilities, the region is a hub for clean energy innovation, including technologies such as small modular nuclear, tidal energy, smart grids and energy storage.
- Atlantic Canada's 20 remote, off-grid communities have access to clean energy systems to replace diesel generation.

2. Transmission:

- The *Atlantic Regional Transmission Loop* is strengthened to serve as a clean power superhighway connecting existing and new power supplies across the region to places that need it.

3. Distribution and End Use:

- Electricity is used to power more of Atlantic Canadians' daily lives, including space heating, and electric vehicles. In doing so, Atlantic Canada will reduce the use of fuel oil for home heating; and build regional electric vehicle charging infrastructure.
- Smarter grids and distribution networks are able to bring more clean sources on board, get consumers the energy they need at the best prices, while ensuring grid stability and reliability.
- Energy costs are affordable for households and businesses across the region, aided by policies that encourage efficiency and conservation measures.
- Atlantic Canada's electricity system is a competitive advantage for businesses operating in the region, as well as potential new businesses that put a premium on clean, affordable and reliable power.

4. Committee Members also agree that Achieving the Vision will Require:

- Shared investments to upgrade existing and build new non-emitting electricity capacity.
- Making electricity grids more connected between jurisdictions, more efficient and much smarter.
- Maintaining public confidence that the expansion occurs in an environmentally responsible manner, while ensuring that power continues to be reliable and affordable.
- Planned transitions on time frames that control costs without causing volatility in electricity rates, and actively supporting those negatively affected by the transition to a low-carbon economy. The Federal Task Force on a Just Transition has made recommendations for governments that will be critical to building a broad consensus for taking action on climate change, and for reassuring Canadians that they will not be left behind.

OUR VISION:

“ATLANTIC CANADA CONTINUES TO BE A LEADER IN THE LOW CARBON ECONOMY OF THE FUTURE. CLEAN, RELIABLE AND AFFORDABLE ELECTRICITY FORMS THE BACKBONE OF A THRIVING ECONOMY AND CONTRIBUTES TO A HIGH QUALITY OF LIFE FOR ALL ATLANTIC CANADIANS. UP TO 2000 MEGAWATTS OF ADDITIONAL CLEAN ELECTRICITY POWERS THE REGION THROUGH A MIX OF INVESTMENTS IN GENERATION, TRANSMISSION, DISTRIBUTION AND STORAGE.

CONDITIONS FOR SUCCESS

Given that such projects present unique and complex challenges, the Atlantic Clean Power Planning Committee has identified the following eight conditions for success to guide collective decision-making on potential projects for achieving the vision:

- I.

**Broad Regional Benefits:** projects should demonstrate that they align with the broader goals and objectives of the region, and that they can provide a range of benefits that extend beyond a single jurisdiction (e.g., new clean capacity, improved reliability, jobs and business opportunities, improved regional markets).

Governments will explore the full range of options that may help to overcome these obstacles, including alternative financing mechanisms involving the Canada Infrastructure Bank.
- II.

**Clean/Non-Emitting:** projects should support federal and provincial efforts to further decarbonize and reduce greenhouse gas emissions from the electricity sector across Atlantic Canada, including efforts to eliminate coal-fired power generation across the region.
- III.

**Affordability:** project decisions should consider the full range of costs and impacts to governments and ratepayers, including the potential impacts on electricity prices across the region. Projects that have long lead times or involve newer technologies typically face a higher risk of cost increases that need to be appropriately assessed. Atlantic electricity ratepayers already face some of the highest electricity prices in the country. Higher prices can exacerbate energy poverty, whereas affordable prices can drive economic competitiveness.
- IV.

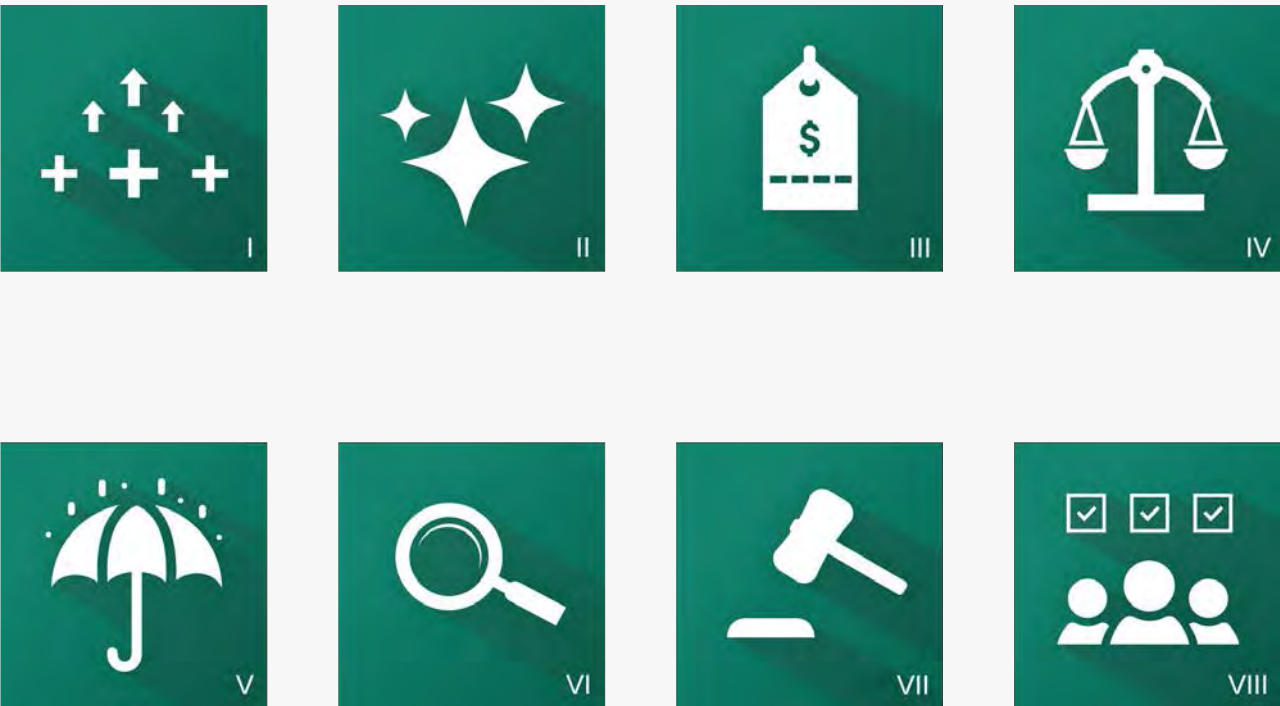
**Fair Allocation of Cost and Benefits:** projects should be subject to cost allocation analysis. Cost incurred from regional projects should be allocated according to benefits accrued to each jurisdiction, including to the federal government. The federal government can play a role to help overcome asymmetries in the costs and benefits that arise from regional projects.
- V.

**Reliability and Resiliency:** project options should be compliant with applicable operational and planning reliability requirements. Further, Atlantic Canada, like all regions, is vulnerable to the impacts of climate change. Regional projects should contribute to the increased resilience of Atlantic Canada’s electricity.
- VI.

**Evidence-Based Decision-Making:** decisions should be informed by the best available evidence on a full suite of possible projects options. This could include independent, expert, public reviews of project proposals that respect commercial sensitivity. Reviews could be performed on options available within or beyond the Atlantic region (e.g., Québec).
- VII.

**Regulatory Cooperation:** projects will need to meet the requirements of provincial regulators, where required. For multi-jurisdictional projects, it will be important for jurisdictions to work together to address challenges and inconsistencies between their respective regulatory frameworks.
- VIII.

**Social Acceptance:** in order for regional energy solutions to proceed, Provinces will be responsible for securing social acceptance for projects that span their provincial border. This includes the necessary steps to reconcile interests with local Indigenous populations.



These eight guiding principles will ensure that all future projects or collaborative efforts recommended by the committee are rooted in a proper, accountable decision-making process. Such a process must respect the unique interests of each partner and their constituents, while remaining cognizant of the wider priorities shared by all participants within the Clean Power Plan for Atlantic Canada, including the federal and provincial government.



MOVING TO NET-ZERO IN ATLANTIC CANADA

The Committee identified the following four regional priorities that will guide collective efforts over the short-to-medium term:

Clean Generation

Atlantic Canada has a diverse portfolio of clean power available and the potential for more from a variety of sources at a reasonable cost to ratepayers. The ongoing or planned refurbishment projects for refurbished or new clean generation reflect both the differing technology of each province’s existing system, and the opportunities afforded by new advances in hydro generation, nuclear technology enhancements, energy storage technology, solar, wind, and tidal energy generation.

Transmission Interconnections

Improving transmission across the region will be critical in order to leverage existing sources of hydro power in Québec and Newfoundland and Labrador. The Québec–New Brunswick, New Brunswick–Nova Scotia, and the Maritime Link between Nova Scotia and Newfoundland and Labrador will be the backbone of a more resilient, regional in scope, clean power network that will be ready to meet the needs of 21<sup>st</sup> century Atlantic Canadians. Prince Edward Island has already completed work to improve its interconnection with NB through a shared \$140M provincial and federal investment, ensuring that Prince Edward Island has the capacity required for the next 20 years. The *Atlantic Regional Transmission Loop* should be enhanced, and serve as a clean power superhighway connecting existing and new power supplies across the region to places that need it.

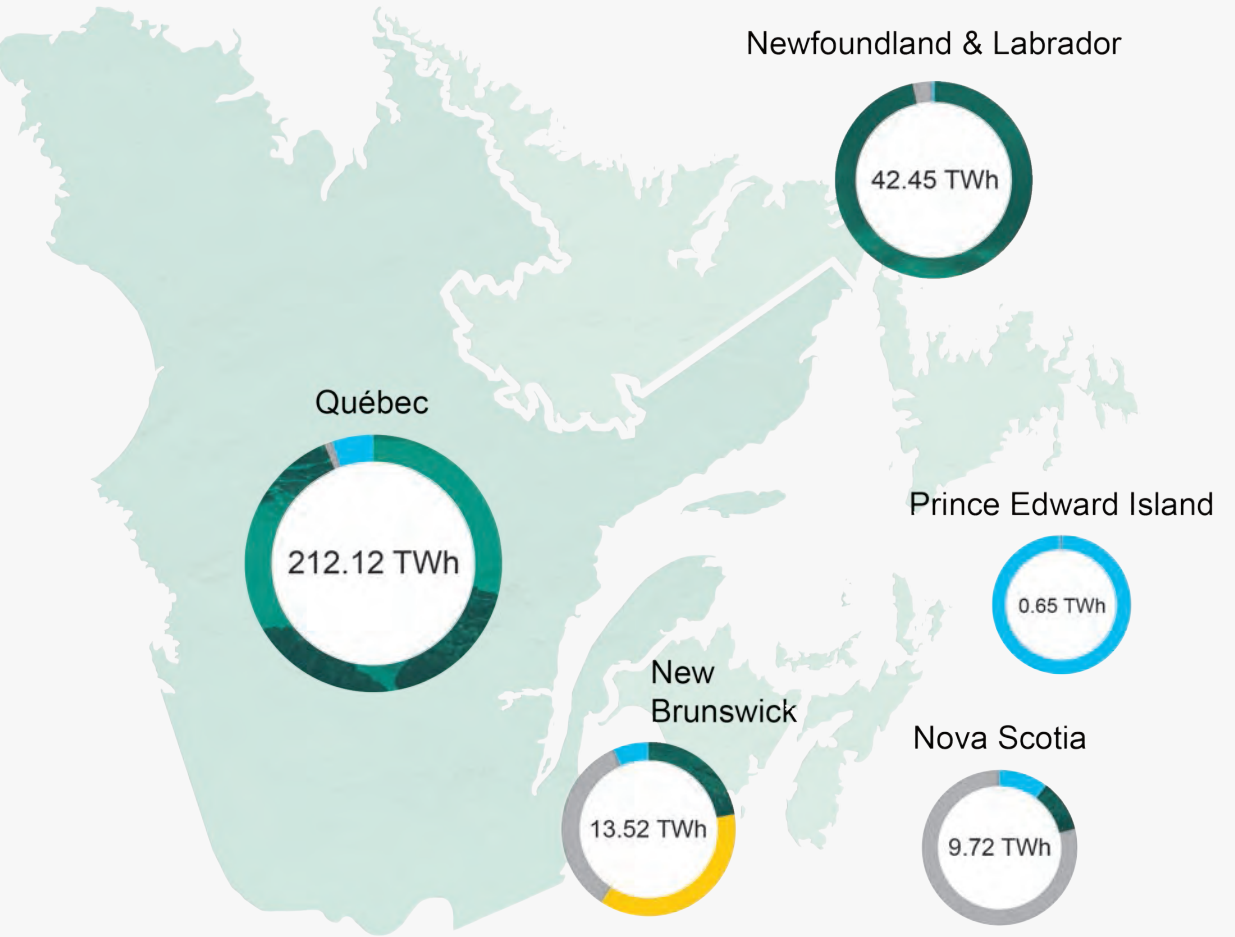
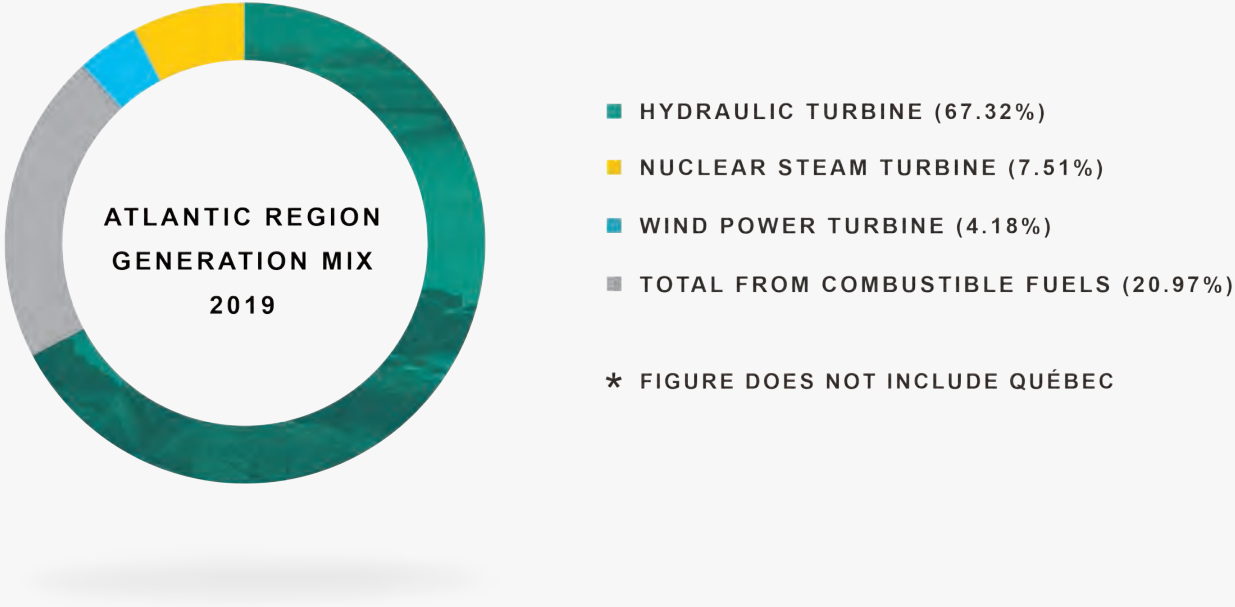
Modernizing the Grid

Projects like the *Collaborative Grid Innovation for Atlantic Smart Energy Communities* will develop, deploy and pilot new distributed energy resource (DER) solutions in communities to help address climate change and build community engagement around energy consumption and energy asset ownership. This demonstration and deployment project will advance new technologies and explore new rate designs, operational and market models, and evolve national building and energy codes. Smarter grids and distribution networks are able to bring more clean sources on board, get consumers the energy they need at best prices, while ensuring grid stability and reliability.

Electrifying End Use

As the region transitions to low-carbon energy, Atlantic Canadians are lowering their greenhouse gas emissions and increasing efficiency through smart grid technology, peak shaving, and electrification of heating and transport.

Additionally, investments will be made in demand side management, including support for more distributed generation, such as residential solar and batteries. To reduce diesel dependency in rural and remote communities, energy efficiency and conservation measures could help to reduce overall demand for diesel and provide savings to communities. Modern diesel-gas hybrid systems or local renewable energy such as wind, solar, hydro or biomass can replace diesel, reduce environmental and health impacts, and create local economic development opportunities.





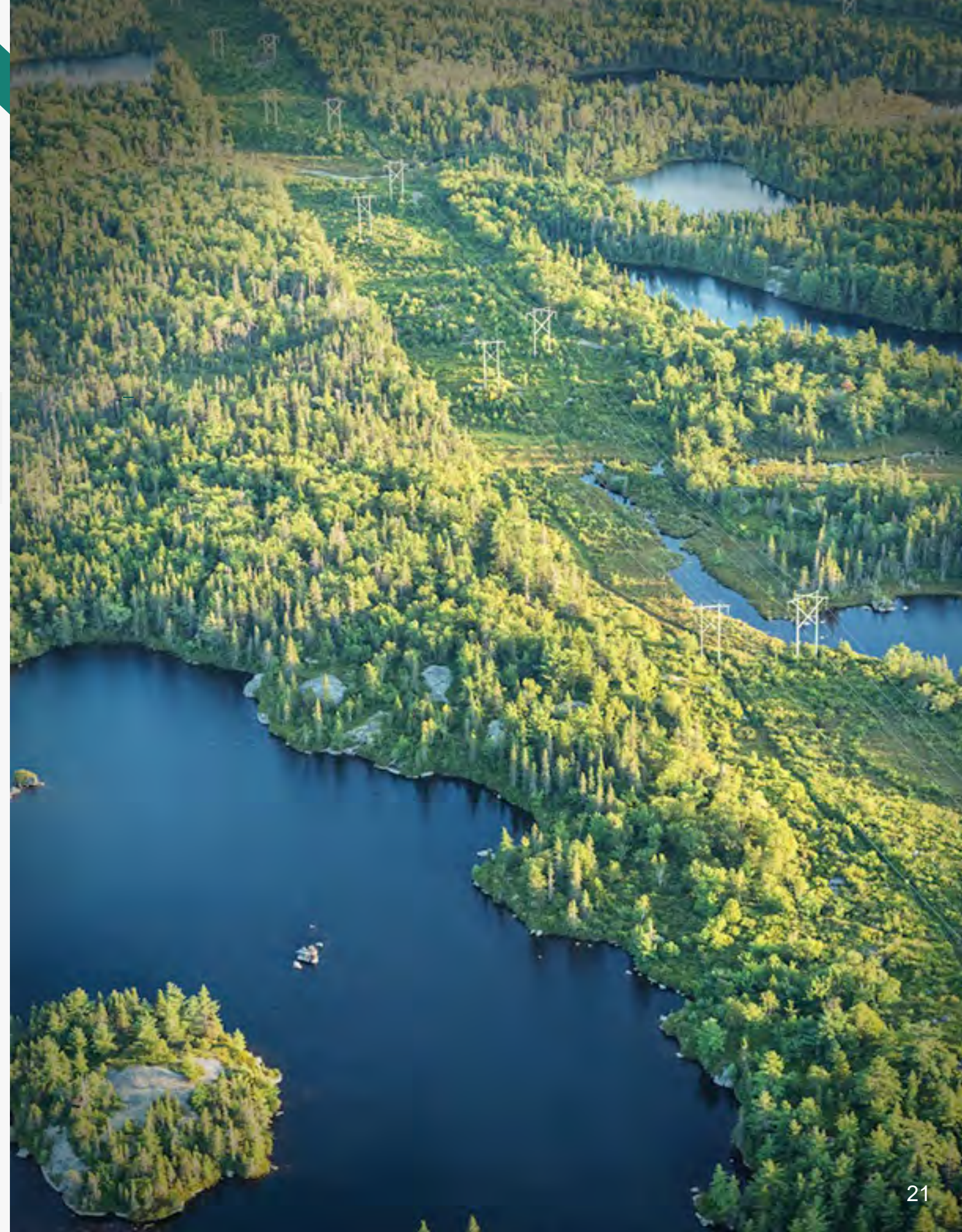
## Section Four NEXT STEPS

To inform the Roadmap, over the course of the next year, the Committee will undertake work in the following five areas:

### 1. CONNECTING CLEAN POWER TO PLACES THAT NEED IT

To advance the vision of an Atlantic Regional Transmission Loop that can improve connections from existing and new power supplies across the region to places that need it, the Committee will synthesize a series of transmission studies that will evaluate options for moving more clean power from Québec and Newfoundland and Labrador into New Brunswick, Nova Scotia, and Prince Edward Island where it can assist these jurisdictions in reliably and affordably phasing out coal-fired electricity generation. These studies will assess transmission alternatives with the goal of identifying the optimal size, route and technologies.

The Council of Atlantic Premiers is currently conducting complementary work to improve transmission networks in the region. At their January 2020 meeting, Atlantic Premiers were joined by the Premier of Québec to discuss opportunities to develop, transmit, and exchange Eastern Canada's clean energy resources.





## 2. ELECTRIFICATION:

Achieving the vision outlined earlier in the report will mean using electricity to power more of the daily activities at home and in industries across the region. It will also mean increasing supplies of non-emitting electricity while ensuring that grid stability and affordability aren't compromised. To that end, the Committee will oversee development of a regional electrification impacts and resource options study that will examine how demand for electricity in

Atlantic Canada may grow in response to increasing levels of electrification of vehicles, heating and other energy uses. The study will then explore electricity supply options that meet this increased demand, including increasing generation of electricity from resources sources with Atlantic Canada, energy storage and other grid flexibility alternatives and imports of electricity from Québec via transmission alternatives identified in the first line of investigation.

## 3. CREATING AN ENABLING POLICY ENVIRONMENT

The energy transformation implied through the Clean Power Roadmap for Atlantic Canada will require supportive policy frameworks at both the federal and provincial levels. Regional electricity projects that are cost-effective and in the public interest will need the support of governments and their respective regulators to approve, permit and construct infrastructure in a timely manner.

Utilities will have to pursue commercial arrangements so that clean power can flow from where it is generated to where it is needed. Recognizing the importance of moving from a shared vision to action, the Committee will review the policy environment with the intention of ensuring regional coherence to support the energy transformation.

## 4. FINANCING REGIONAL ELECTRICITY PROJECTS

Realizing the vision of a clean electric future for Atlantic Canada will require major infrastructure investments across the region sustained over time frames that control costs to ensure that power continues to be reliable and affordable for households and businesses. Shared investments will be required to upgrade existing and to construct new non-emitting electricity capacity and transmission.

Through the Integrated Bilateral Agreements (IBA) under the Investing in Canada Infrastructure Program the federal government has committed to supporting increased capacity to manage more renewable energy, increased access to clean energy infrastructure, and increased generation of clean energy.

Atlantic Provinces can allocate IBA funds to support energy projects that mitigate GHG emissions. Provinces have begun to advance projects such as the City of Summerside solar and storage integration project; the New Brunswick Micro Turbine Project in Dalhousie; and the Menihek Transmission Line Project in Newfoundland and Labrador.

The new \$5 billion Clean Power Fund, sourced through the Canada Infrastructure Bank, could also be used to support projects that move more clean electricity between provinces and support the electrification of Canadian industries.

Going forward, the Committee will be working to assess various financing models for large electricity infrastructure projects that appropriately allocates risks and benefits. The Committee's work will also inform federal decisions on how best to structure the Clean Power Fund in a way that aligns with shared federal and provincial priorities.

## 5. REGULATORY COOPERATION and INNOVATION

Going forward, regulatory cooperation and innovation across the Atlantic Provinces will grow in importance as the region transitions to cleaner electricity. New market and regulatory approaches may be studied to realize the full value of increased electricity connectivity or to drive sustained utility investment in grid modernization.

Nova Scotia and New Brunswick are already experimenting with joint dispatch and have agreements in place for sharing benefits across their electric systems. With increasing connectivity, there are opportunities to consider the benefits of mechanisms to integrate and balance variable renewable sources of energy. Such mechanisms enable utilities and market operators to better balance electricity generation from variable renewables and to realize the full value of their generation portfolios.

Going forward, the Committee will study how such mechanisms could be applied in Atlantic Canada to the benefit of all jurisdictions.

Regulatory innovation will be equally important as Atlantic Canada continues to modernize its electricity grid through investments in smart grid technologies, energy storage and other technologies that enable increasing electrification of energy end uses, such as electric vehicles. Modernizing utility regulation and regulatory review of utility investment in such technologies will become increasingly important to ensure ongoing investment grid modernization. The Committee plans to explore this topic in more detail in 2020-21.



