ATLANTICA CENTRE FOR ENERGY

Atlantic Canada's Electricity Future Discussion Series

Part I: Electricity Supply

Discussion Series – Part I

JUNE 2022

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Executive summary

The purpose of this discussion paper is to help Atlantic Canadians better understand how federal regulatory changes, aimed at achieving net-zero emissions by 2050, will impact the supply of electricity in Atlantic Canada. This paper uses publicly available federal data through the Canada Energy Regulator's Energy Futures 2021 report.

Utilities across the region have developed their own electricity forecasts and resource planning studies and are taking steps to meet the challenges posed by federal regulatory changes. These efforts include planning to produce and purchase more clean electricity to enable the phase-out of coal assets and meet increasing demand, while ensuring our electricity supply remains reliable. This transition will ultimately require significant new investments and could lead to cost increases without federal support.

As provincial governments and utilities prepare for our net-zero futures, Atlantic Canadians need to understand how federal policies, such as the phase-out of coal-generated electricity or the incoming Clean Electricity Standard, could impact day-to-day lives. For example, the federal government stated that the phase-out of coal-generated electricity alone will cost Nova Scotia and New Brunswick $1.221 billion and $561 million respectively[1].

Select findings from this discussion paper, absent of additional investment in new sources of lower-emitting electricity, include:

- Nova Scotia's electricity capacity is forecasted to drop over half between 2029-2035 driven by the phase-out of coal-generated electricity (Forecast 2);
- New Brunswick's electricity capacity is forecasted to drop by nearly half between 2029-2035 driven by the elimination of oil-generated electricity (Forecast 2);
- Prince Edward Island is forecasted to remain reliant on electricity imports despite increases in renewal electricity capacity and generation; and,
- Newfoundland and Labrador is forecasted to continue being a net exporter of clean electricity around the region.

After reading this discussion paper, it is clear these regulations and policies will have significant impacts on the supply of electricity in the region.

Moving forward, the federal government must work collaboratively with Atlantic provincial governments and utilities to source more accurate electricity data to better understand how federal policies will impact the region, and to better prepare for the transition to net-zero emissions. Governments and utilities must then take fast action to plan, produce and trade more clean electricity, while ensuring new regulations are agile enough to keep up with new and emerging technologies to help deliver the most cost-effective solutions for Atlantic Canadians.

Introduction

Transitioning Canada to net-zero emissions by 2050 is one of the top priorities for the current federal government. Over the last seven years, there has been a corresponding shift in policy-making as governments at every level begin to plan for what actions will be needed to reach the ambitious goal.

With the objective of producing no more greenhouse gas emissions than Canada can sequester, capture or use, it is abundantly clear that life for all Canadian households and businesses will undergo significant change through this transition to net-zero.

Several federal policies to help reach net-zero emissions by 2050 have already been announced and implemented, while some are still being developed. The federal government's 2030 Emissions Reduction Plan was released in March 2022, outlining the expectations of governments, industries and citizens. A Clean Electricity Standard is in development and is anticipated to require all electricity produced in Canada to be net-zero beginning in 2035[2].

The Atlantica Centre for Energy is dedicated to increasing energy literacy for Atlantic Canadians, while also helping the region realize opportunities associated with the energy sector. The Centre is developing a series of discussion papers on the future of electricity in Atlantic Canada to help residents and businesses better understand the supply, demand and costs of electricity in the transition to net-zero.

This first discussion paper looks at the future electricity supply across New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland and Labrador until 2050 to illustrate how current and incoming federal policies could impact electricity capacity and generation.

Which regulations are shaping Canada's path to net-zero electricity?

In pursuit of reaching net-zero emissions by 2050, the federal government (and provincial governments) have already created many policies, regulations and funding programs to help reduce emissions, and invest in new technology and infrastructure, among others. Additional programs and regulations are still being developed, and it is widely expected that additional actions will be needed in order to achieve these ambitious goals[2,3].

The following policies and regulations have been developed to help Canada reach net-zero emissions by 2050 (this list is not comprehensive).

Emission reduction targets:

The Government of Canada's overarching goal is to reach net-zero emissions by 2050, as set out in *The Canadian Net-Zero Emissions Accountability Act*. This *Act* also establishes more immediate targets, including reducing greenhouse gas emissions by 40 to 45 percent below 2005 levels by 2030, which is Canada's 2030 Nationally Determined Contribution as required under the Paris Agreement[2].

Canada's 2030 Emissions Reduction Plan was released in March 2022 and provides a roadmap to help reach 2030 targets. Future emission reduction targets will be gradually announced for 2035, 2040 and 2045[2].

In Atlantic Canada, the provincial governments in Nova Scotia and Newfoundland and Labrador have committed to reaching net-zero emissions by 2050. The Government of Prince Edward Island has released its 2040 Net Zero Framework to help the province reach net-zero emissions by 2040[4]. The Government of New Brunswick has announced it intends to release a revised Climate Change Action Plan in 2022, which will demonstrate its plans for achieving net-zero.

Carbon pricing and output-based pricing:

The federal government requires each province to price fossil fuels based on each fuel's relative greenhouse gas emissions. The emissions pricing will steadily increase each year from $50 per tonne of CO_2e in 2022 to $170/t in 2030. Provinces can develop their own plans or use the federal backstop plan. The carbon price comes two-fold; a carbon tax for fuels, including gasoline, diesel, and natural gas, which is collected by the government and provided back to the economy through various measures such as tax cuts or investing in green infrastructure. In addition, an output-based pricing system (OBPS) is in place for large emitters, which can generate or purchase credits depending on whether they emit more or less than established annual limits.

The Atlantic provinces have enacted different policies to meet federal carbon pricing requirements. In New Brunswick and Newfoundland and Labrador, both provinces have provincial carbon tax plans and provincial output-based pricing systems. Prince Edward Island has a provincial Carbon Levy, with the federal OBPS[5,6].

In contrast, Nova Scotia has a provincial cap-and-trade program that sets annual limits on the total greenhouse gas emissions allowed from 2019 to 2022. These allowances decline each year and can be sold or purchased depending on the participants' emissions[5,6].

Clean Fuel Standard:

The Clean Fuel Standard (CFS) is an incoming federal regulation which will require liquid fuel (gasoline and diesel) suppliers to reduce the carbon intensity of the fuels they produce for Canada. The CFS will decrease the carbon intensity of these fuels by 13 per cent (below 2016 levels) by 2030. Businesses may be able to reduce their emissions and generate credits under the system by using carbon capture and storage, on-site renewable electricity, ethanol or biodiesel, among others[7].

Carbon offset credits:

Canada's Greenhouse Gas (GHG) Offset Credit System allows qualifying projects to generate one tradeable offset credit for every tonne of emissions they reduce or remove from the atmosphere. For example, a landfill will generate offset credits if it begins recovering landfill gas (about 50% methane) from its operation and repurposes it into energy, such as injecting it into a natural gas network. These offset credits can be sold to facilities that fall under the federal Output-Based Pricing System explained previously[8].

To generate credits, offset projects must have started after 2016, and "*go beyond common practices and legal requirements, and must not already be incentivized by carbon pollution pricing*[8]."

Zero emission vehicles:

The federal government has set mandatory targets for all new light-duty cars and passenger truck sales to be zero-emission vehicles (ZEVs) by 2035. Progressive sales targets are also in place for ZEVs to make up at least 20 per cent of new sales by 2026 and at least 60 per cent by 2030[9]. Some provinces have established complementary requirements, such as Nova Scotia. The federal government has also announced plans to develop ZEV regulations for medium-and heavy-duty vehicles to require 100 per cent of sales by 2040 (based on feasibility)[2].

Phase-out of coal generation for the electricity grid:

In 2018, the federal government announced regulations to phase out traditional coal-fired electricity by 2030 and greenhouse gas emission targets for natural gas-fired electricity. The requirement to phase-out coal will have a significant impact in Nova Scotia and New Brunswick, as it makes up a large share of each province's electricity generation relative to others (coal made up 58% of electricity generation in Nova Scotia in 2018 and 21% in New Brunswick)[1]. Regulations for natural gas-fired electricity aim to encourage utilities to convert coal units to natural gas ahead of their end-of-life; however, existing natural gas infrastructure in Nova Scotia and New Brunswick remain hundreds of kilometres away from coal generation plans, making the conversation largely unfeasible[10].

Clean Electricity Standard:

The federal government is currently developing Canada's Clean Electricity Standard (CES) to require a net-zero electricity grid by 2035. Canada already has one of the cleanest electricity grids in the world, with 82 per cent of the electricity that Canadians use coming from non-emitting sources[11].

The CES will require the phase-out of all conventional fossil fuel electricity generation. The incoming regulations will aim to prevent locking in new fossil fuel infrastructure that would persist beyond 2035. Flexibility for natural gas generation may allow for exceptions for emergency events, backup power, and peaking[12].

The CES Discussion Paper acknowledges significant regional differences in current electricity generation across Canada, and that New Brunswick and Nova Scotia will be disproportionally impacted by the incoming regulations[12].

Funding Programs:

In its 2022 Budget, the federal government announced several multi-year funding programs to support the various goals of Canada's 2030 Emissions Reduction Plan including funding or loans for energy infrastructure and research. Tax credits and other financial incentives have also been created to encourage green technology development (e.g., CCUS) as well as building supply chains such as mining for minerals necessary for battery production[13].

Understanding the forecasts

For supply forecasts, this discussion paper uses the latest data publicly available through Canada's Energy Regulator (CER). The CER regulates energy development, trade and pipelines across Canada. The information collected is from CER's latest Canada's Energy Future 2021 report (EF2021). The EF2021 report uses data primarily from Statistics Canada, Environment and Climate Change Canada, and Natural Resources Canada, as well as provincial data sources[3,14]. All graphs are included in the Appendices and will be referenced based on Forecast 1 or Forecast 2. Capacity forecasts are cited in Megawatts (MW), and generation forecasts are for annual totals cited in Gigawatt hours (GWh).

- Canada's Energy Future 2021 – Report[14]
- Canada's Energy Future 2021 – Open Data Portal[15]
- Canada's Energy Future 2021 – Key Assumptions for the Evolving Policies Scenario[16]
- Canada's Energy Future 2021 – Detailed Domestic Policy Assumptions for the Evolving Policies Scenario[3]
- Canada's Energy Future 2021 – Overview of the Energy Futures Modeling System[17]

The first supply forecast for each province (Forecast 1) in this discussion paper illustrates data from the EF2021 report's Evolving Policies Scenario. This scenario assumes policy actions to reduce greenhouse gas emissions continue to increase at a pace similar to recent history. For example, the federal price on carbon continues to increase by $15/t annually from $170/t of CO_2e in 2030 to $470/t by 2050. This scenario does not model climate goals or targets, so ambitious goals like net zero by 2050 are unlikely to be met. All policies included in this scenario were announced by August 1, 2021[3,16].

Forecast 2 in the discussion paper builds on the Evolving Policies Scenario to also include important federal goals of phasing-out electricity generated from coal by 2030, as well as no fossil fuels used to directly generate electricity by 2035. This second assumption is based on the Clean Electricity

Standard which is being developed, but provides an oversimplification of the net-zero electricity for illustrative purposes[3,16].

It is important to note that these supply forecasts, especially regarding electricity generation and interprovincial trade, are related to the EF2021 electricity demand forecasts. Atlantica's second electricity discussion paper to be released in summer 2022 will explore net-zero electricity demand forecasts in more detail. However, it is likely electricity demand will increase at a greater rate than EF2021 forecasts in this scenario. Canada's 2030 Emissions Reduction Plan notes: "*multiple reports have estimated that, by 2050, Canada will require two to three times the current generating capacity*[1]."

Despite some questions regarding electricity generation forecasts, it is important to understand the electricity produced today in Atlantic Canada is not a direct reflection of the capacity to produce electricity. For example, New Brunswick produces much less electricity than possible with its coal- or oil-burning facilities. Fossil fuels are relied upon more to meet peak demand, like during cold winter months.

This discussion paper ignores the long-term sharing agreements between utilities in different provinces or states. For example, it may seem Newfoundland and Labrador produces enough clean electricity to help all Atlantic provinces in the transition to net zero, but ignores the long-term agreement to supply most of the electricity generated by the Churchill Falls Dam to Hydro-Québec until 2041[18].

Forecasts 1 and 2 only recognize energy supply on a yearly basis. These forecasts ignore differences in electricity generation between peak and off-peak times, as well as the variable supply from different energy sources. Wind and solar energy play important roles today and for our future energy mix but cannot be solely relied upon to meet our energy demands for baseload power year-round.

> *"Although wind is an excellent source of low-cost energy, the analysis demonstrates wind generation is not a good source of capacity. As more wind power is added to the system, its value for capacity planning declines."*
>
> ***- NB Power's 2020 Integrated Resource Plan[19]***

For example, New Brunswick's in-province load reached 3,328MWs between 8:00-9:00AM on January 27, 2022. Over this hour period, just 24MWs were available of NB Power's 535MWs of contracted wind power due to low wind speeds and outages. NB Power's 2020 Integrated Resource Plan forecasted New Brunswick's capacity planning credit of wind energy to be 24 per cent of current installed capacity and 12 per cent if the utility adds additional wind generation[19]. Similarly, Nova Scotia Power's 2020 Integrated Resource Plan credits the effective load-carrying capacity of existing wind to be 19 per cent and 11 per cent for new wind[20]. Therefore, baseload energy capacity and generation must play an important role in the future, such as hydro and nuclear, among others.

Last, but not least, stakeholders from across the Atlantic region raised questions and concerns regarding the accuracy of some assumptions in the Energy Future 2021 report. While the EF2021 report provides a wealth of publicly available information to all Canadians, the Atlantica Centre for Energy does not expect the provincial supply forecasts to be completely accurate for 2021 or 2022.

Forecast notes

These notes refer to Appendices 1.1 to 1.9.

Nova Scotia:

The Government of Nova Scotia established *The Environmental Goals and Climate Change Reduction Act* after the Energy Futures 2021 report was completed. This *Act* includes goals to have 80 per cent of electricity in Nova Scotia supplied by renewable energy by 2030, and to phase-out coal-generated electricity by 2030[1]. As a result, the Nova Scotia Electricity Capacity – Forecast 1 and Nova Scotia Electricity Generation – Forecast 1 graphs may not be accurate given current information.

On February 11, 2022, the Government of Nova Scotia announced a request for proposals for projects to generate 350 megawatts of low-cost renewable energy for the province. Once these projects are operational, it is expected that 70 per cent of the province's electricity will be generated by renewable electricity[21].

It is also important to note Nova Scotia recently began importing significantly more hydroelectricity from Newfoundland and Labrador through the Maritime Link (500MW capacity).

New Brunswick:

The graphs, New Brunswick Electricity Capacity – Forecast 1 and New Brunswick Electricity Capacity – Forecast 2, both show a notable drop in nuclear electricity generating capacity in 2041 and 2043. This is likely due to the EF2021 report expecting a second refurbishment of the Point Lepreau Nuclear Generating Station. Both generation forecasts for New Brunswick also show a corresponding drop in nuclear power generation over this same period. It is important to note the 2008 refurbishment of Point Lepreau was not captured in capacity forecast graphs, although there was a distinct drop in the New Brunswick Electricity Generation – Forecast 1 and New Brunswick Electricity Generation – Forecast 2 graphs between 2008 and 2011.

The natural gas capacity in New Brunswick Electricity Capacity – Forecast 1 ends after 2040, which may correspond with a forecasted lifecycle end for the Bayside Generating Station. Similarly, the drop-off of oil-generated capacity in the same graph is likely because Coleson Cove Generating Station reached its end-of-life in 2040.

Based on the current prices of coal and natural gas, it is reasonable to expect coal- and- natural gas generation in the short-term to be larger than those for oil in both New Brunswick Electricity Generation – Forecast 1 and New Brunswick Electricity Generation – Forecast 2 graphs. Absent are any interruptions to hydroelectricity capacity or generation, despite the Mactaquac Dam needing work to extend its lifecycle beyond the 2050 forecast period[19].

Prince Edward Island:

Both Prince Edward Island Electricity Capacity – Forecast 1 and Prince Edward Island Electricity Capacity – Forecast 2 graphs show increasing renewable capacity leading up to 2050. Similarly, both Prince Edward Island Electricity Generation – Forecast 1 and Prince Edward Island Electricity Generation – Forecast 2 graphs show increasing renewable production over this same period.

Interestingly, Prince Edward Island Electricity Generation – Forecast 1 shows a sharp temporary increase in oil generation between 2041 and 2043. This increase likely corresponds with the forecasted refurbishment of the Point Lepreau Nuclear Generating Station as Maritime Electric purchases electricity from Point Lepreau.

It is also important to recognize Maritimes Net Interprovincial Electricity Out-Flows – Forecast 1 graph shows Prince Edward Island currently imports a significant amount of electricity (roughly half as much as it produces). Prince Edward Island is forecasted to continue relying on off-island electricity generation until 2050.

Newfoundland and Labrador:

Newfoundland and Labrador Electricity Capacity – Forecast 1 and Newfoundland and Labrador Electricity Generation – Forecast 1 show increases in its hydroelectricity capacity and generation leading up to 2023, likely due to the Muskrat Falls project nearing completion. Net Interprovincial Electricity Out-Flows – Forecast 1 graph projects the province's electricity exports will continue increasing over this timeframe.

No capacity, generation or interprovincial trade forecast graphs for Newfoundland and Labrador recognize the significant supply contract between the Churchill Falls Dam to Hydro-Québec, which is in place until 2041. The Government of Newfoundland and Labrador created an expert panel to recommend potential approaches to ensure maximum long-term benefits from the Churchill Falls assets[18].

Interprovincial Trade:

Net Interprovincial Electricity Out-Flows – Forecast 1 graph illustrates the integrated grid between the Atlantic provinces and Québec, as well as an established history of trading electricity across the region. Newfoundland and Labrador, and Québec have a wealth of natural resources to trade electricity with the Maritime provinces. Interprovincial trade can also help improve the reliability of supply across the region.

However, these forecasts are also used, in part, by the Energy Futures 2021 report to help balance excess supply or demand between provinces and should not be considered an accurate demonstration of the actual trade that will happen.

Forecasted electricity trade between the Atlantic provinces and Québec for 2022 reveals expected trade between some provinces such as New Brunswick and Prince Edward Island. However, these forecasts also show incorrect trade between New Brunswick and Québec (Québec importing 1,514GWh from New Brunswick in total). In contrast, it is more likely that New Brunswick will be a net importer of electricity from Québec in 2022. Furthermore, the trade between Newfoundland and Nova Scotia is likely an overestimate and would be possible only under ideal scenarios (Table 2).

Table 1: Interprovincial electricity trade, by province, 2022, Forecast 1

Exporter		Importer	GWh
New Brunswick	→	Prince Edward Island	1,000
New Brunswick	→	Québec	2,176
Québec	→	New Brunswick	662
Newfoundland	→	Québec	36,007
Newfoundland	→	Nova Scotia	3,539
Nova Scotia	→	New Brunswick	76

It is important to recognize that the four Atlantic provinces and Québec are interconnected and have a long history of trading electricity. For example, Newfoundland is forecasted to trade roughly 36,000 GWh of electricity to Québec in 2022 and an additional 3,500 GWh to Nova Scotia. New Brunswick will also trade 1,000 GWh to Prince Edward Island this year.

What do these net-zero policies mean for the supply of electricity in Atlantic Canada?

Looking at the Nova Scotia Electricity Capacity – Forecast 2 and New Brunswick Electricity Capacity – Forecast 2 graphs illustrates the transformative change the federal regulation to phase-out of coal-generated electricity will have on the two provinces.

"The Maritimes would be most affected by the proposed Amendments [phase-out of coal-generated electricity by 2030], with over three quarters of the incremental costs occurring in Nova Scotia and New Brunswick. The majority of this cost would come from the increase cost to supply their customers with electricity, either through higher fuel costs or by purchasing power from another region."

- Canada Gazette, Part I, Volume 152, Number 7[22]

For the phase-out of coal, Nova Scotia will be more impacted than New Brunswick. Nova Scotia's forecasted capacity would drop by nearly a third in 2030, while generation would drop by nearly 45 per cent. Similarly, the introduction of the Clean Electricity Standard would impact all four Atlantic provinces, but especially New Brunswick and Nova Scotia.

The change resulting from the phase-out of coal-generated electricity is expected. The federal government's own Regulatory Impact Assessment stated that both provinces will need to increase their supply of electricity or purchase power from another region accordingly. The Regulatory Impact Assessment forecasted this change alone to cost Nova Scotia and New Brunswick $1.221 billion and $561 million, respectively, which would in turn see annual residential electricity bills increase by $200 and $184 on average, respectively in 2016 prices[22].

For context, under Forecast 2, Nova Scotia's capacity would be effectively unable meet its own peak demand (2022) beyond the phase-out of coal in 2030 (see Table 2). New Brunswick's capacity would be unable to meet its own 2022 peak demand beyond 2035. Prince Edward Island's capacity would not be able to satisfy its peak demand beyond as it would be reliant on variable wind and solar production, and will likely continue to be reliant on imports to meet peak load. It is important to note individual peak demand in Nova Scotia, Prince Edward Island and Newfoundland and Labrador has been even higher than examples provided in Table 2.

In contrast, Newfoundland and Labrador produces enough hydro electricity to meet its demand over the entire forecast period but has long-term sharing agreements in place to send electricity to Québec and Nova Scotia.

Table 2: Peak electricity demand by province (example taken morning of January 27, 2022)[23,24,25,26]

	New Brunswick	Nova Scotia	Prince Edward Island	Newfoundland and Labrador
Demand (MW)	**3,328**	**2,043**	**303**	**1,563**

The Atlantic provinces typically use fossil fuels to produce added electricity to meet peaking demand, such as during cold winter months when homes and businesses need to be heated. This fossil fuel electricity production is readily available, so the Atlantic provinces cannot rely solely on wind or solar generation as a replacement. It is imperative to add more low-emitting sources to the Atlantic region's energy mix, but these renewable options require non-emitting backstops.

> "*At present, there are no affordable or commercially available low-carbon baseload generation (SMRs, hydrogen combustion, natural gas with carbon capture and storage (CCS)) options and limitations to the electricity system's ability to integrate variable renewable resources*."
>
> **- Clean Power Roadmap for Atlantic Canada: Final Report[27]**

The Clean Power Roadmap for Atlantic Canada: Final Report also recognizes new electricity generation will be needed to meet expected demand increases across the region, in addition to what will be needed to replace existing coal and other aging infrastructure[27].

There are currently no low-carbon baseload generation options that fit Atlantic Canada. For example, while advanced Small Modular Reactor technology is progressing positively in New Brunswick, there are no guarantees that this alternative will be ready to deploy on a wide-scale basis in 2030[23]. Low-carbon baseload generation options may become available over time through innovation and economies of scale, and could include green hydrogen, geothermal, and battery storage, among others.

An 'Atlantic Loop' transmission project has been proposed as a potential solution to help share more electricity around the Atlantic region. More hydroelectricity imports would not fully replace the need for additional local capacity but may be beneficial if cost-effective[27]. Nova Scotia Power modelling also demonstrates regional integration as a component of the lowest-cost scenarios in the region[28].

> *"Regional Integration (i.e. investment in stronger interconnections to other jurisdictions) is an economic component of the lowest cost plans under each load scenario. Both the Reliability Tie, which strengthens Nova Scotia's connection to the North American electrical grid, and a Regional Interconnection, which enables access to firm capacity and energy imports, are shown to have value."*
>
> ***- Nova Scotia Power's 2020 Integrated Resource Plan[28]***

Recommendations

It is clear that the transition off coal-generated electricity by 2030 and to net-zero electricity by 2035 will take a collaborative effort between the Atlantic provinces and federal government. The transition will also require governments to work increasingly with the private sector and communities.

The Atlantica Centre for Energy offers the following policy recommendations to help guide governments and utilities in better managing the supply of electricity in this transition:

- **AGILE REGULATIONS:** Provincial and federal governments must improve regulatory agility. Agile regulations remove barriers to investment and speed the development and construction of projects necessary to meet the 2030 and 2035 deadlines. Policy changes should be predictable and consistent to provide the private sector with added certainty for large investments.

- **COOPERATION:** Cooperation between the Atlantic provinces, federal government and First Nations partners is critical to meeting ambitious net-zero goals. Some provinces have more access to clean hydro, nuclear expertise, or efficient wind energy, for example; sharing these clean energy resources must be a part of the transition to net zero.

- **POLICY CERTAINTY:** The federal government and Atlantic provinces must quickly finalize policies and clear up any remaining uncertainty in net-zero regulations. Companies, utilities and communities must begin to undertake project planning, applications and construction immediately in order to reach the ambitious 2030 and 2035 targets.

- **BETTER DATA:** Electricity stakeholders across Atlantic Canada have raised questions and concerns about assumptions involved in the Energy Futures 2021 report. The federal government must work closely with provincial governments and utilities to ensure the data used to develop net-zero policies accurately reflects what is happening in the Atlantic region.

- **PARTNERSHIPS:** Innovative partnerships can unlock investment and federal funding such as the collaboration between the Tobique First Nation, Natural Forces and Saint John Energy to develop the Burchill Wind Project[29]. Provincial utilities should consider additional collaborative efforts with private sector energy companies to ensure Atlantic Canada attracts the capital, technology and skills needed to be leaders in the transition to net zero.

- **INNOVATION:** Regulatory framework used to guide new or evolving technologies such as Small Modular Reactors, hydrogen projects, renewable natural gas, or geothermal energy should be a top priority. Regulatory frameworks for these technologies and others are largely absent across Atlantic Canada.

These recommendations are not comprehensive, and the Atlantica Centre for Energy will share additional policy recommendations for the federal government, provinces and utilities in the electricity discussion papers to follow.

Closing thoughts and next steps

Absent of utilities actively planning to produce and purchase more clean electricity to deal with retiring assets and increasing demand, it is clear current and incoming federal policies would otherwise significantly impact the supply of electricity across Atlantic Canada, both in terms of capacity and generation.

New Brunswick and Nova Scotia will require new clean sources of electricity constructed or purchased to ensure their electricity capacity and generation do not drop over the next thirteen years, given their relative reliance on fossil fuels.

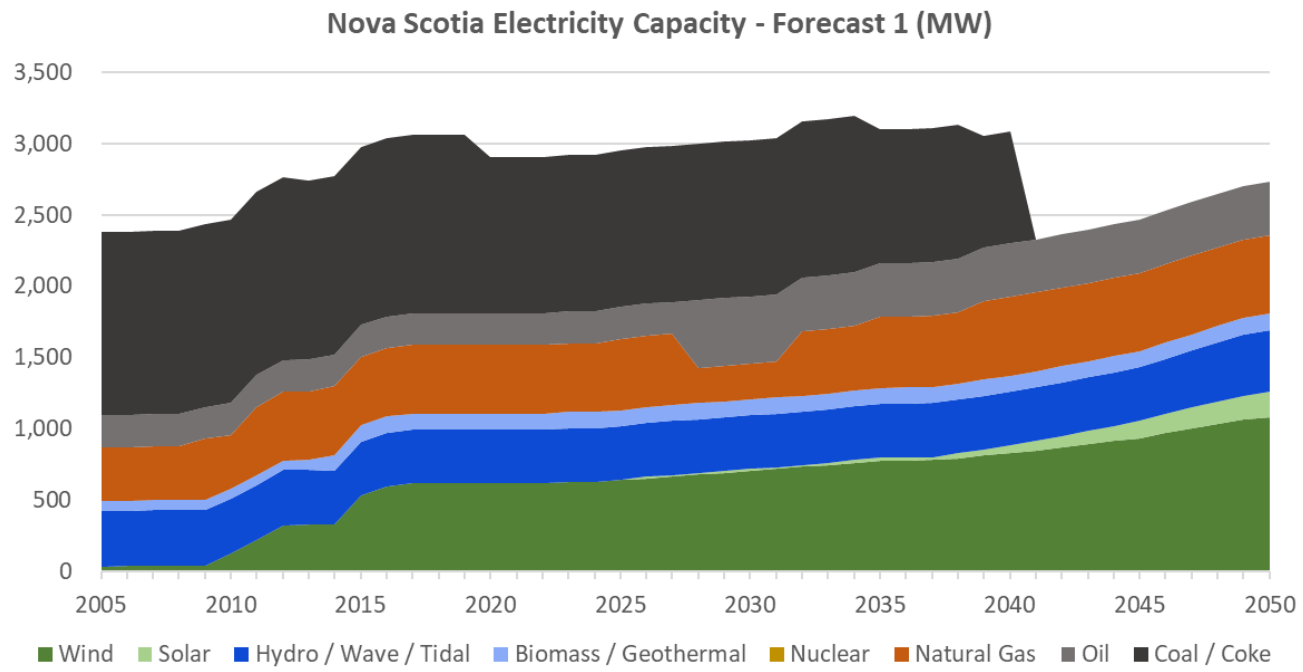
It is also apparent, given that the first significant 2030 target is just seven-and-a-half years away, governments and utilities must work faster to meet these ambitious goals. This is an incredibly short amount of time for the planning, approval, and construction necessary to complete the associated projects, and the Clean Electricity Standard has not yet been finalized.

Regional collaboration and regulatory agility will play important roles in ensuring this transition can happen as efficiently as possible. And, governments and utilities must work closely with stakeholders such as private industry, First Nations groups and communities to ensure projects are as successful as possible.

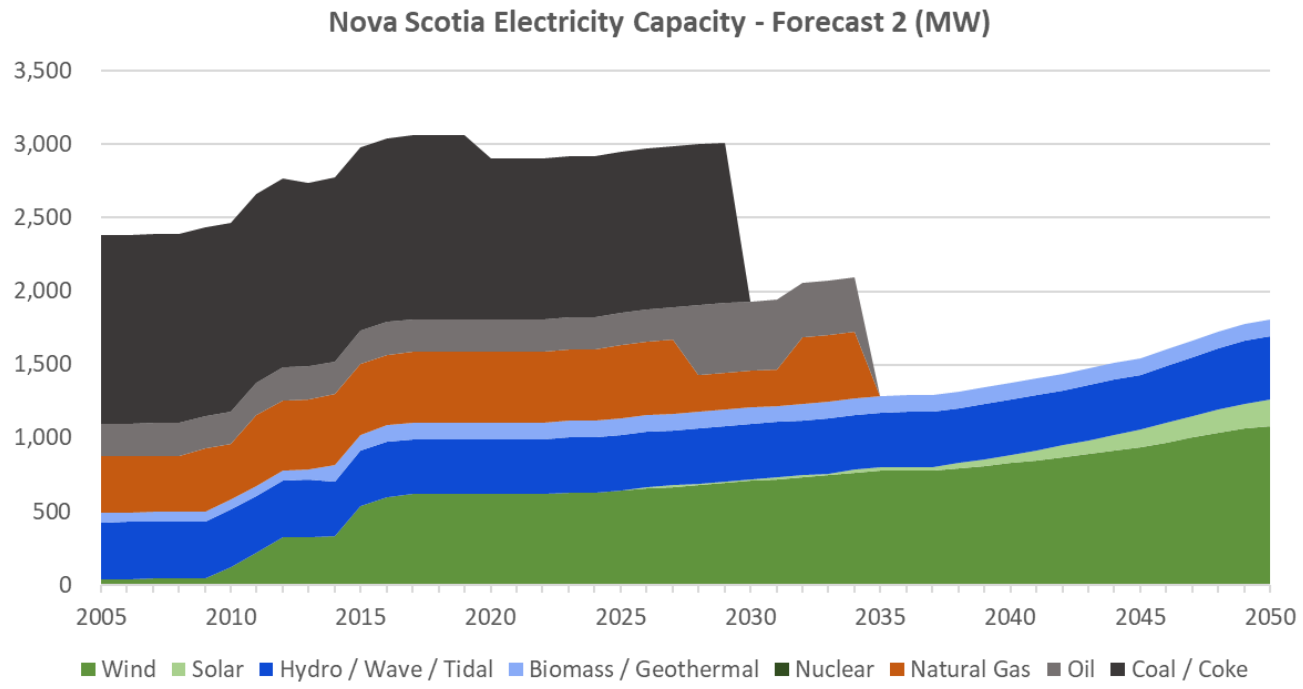
Next, we must better understand how the demand for electricity will increase across Atlantic Canada to reach net-zero emissions by 2050. Once the gaps between the future supply and demand of electricity in the region are understood, the most cost-effective ways for each Atlantic province to reach this ambitious target can be determined. The Clean Power Roadmap for Atlantic Canada: Final Report projected that both demand for electricity and the cost will increase leading up to 2050 but did not include tangible examples to help residents and businesses understand how these demand and cost increases will impact their lives.

The Atlantica Centre for Energy's next two electricity discussion papers will focus on forecasting future electricity demand and pricing across the four provinces to help residents, businesses and leaders to better prepare for this transformational change.

Appendix 1.1: Nova Scotia forecasts



Source: Canada Energy Regulator, Canada's Energy Future 2021, Evolving Policies Scenario.



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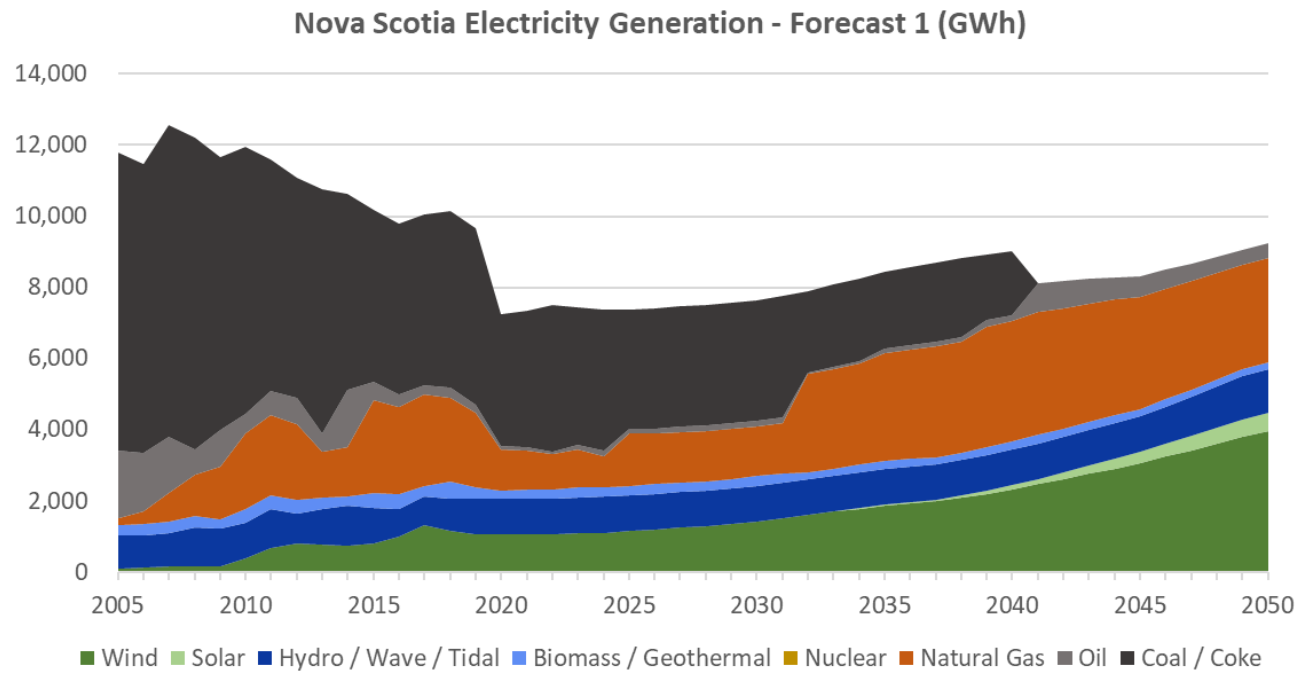

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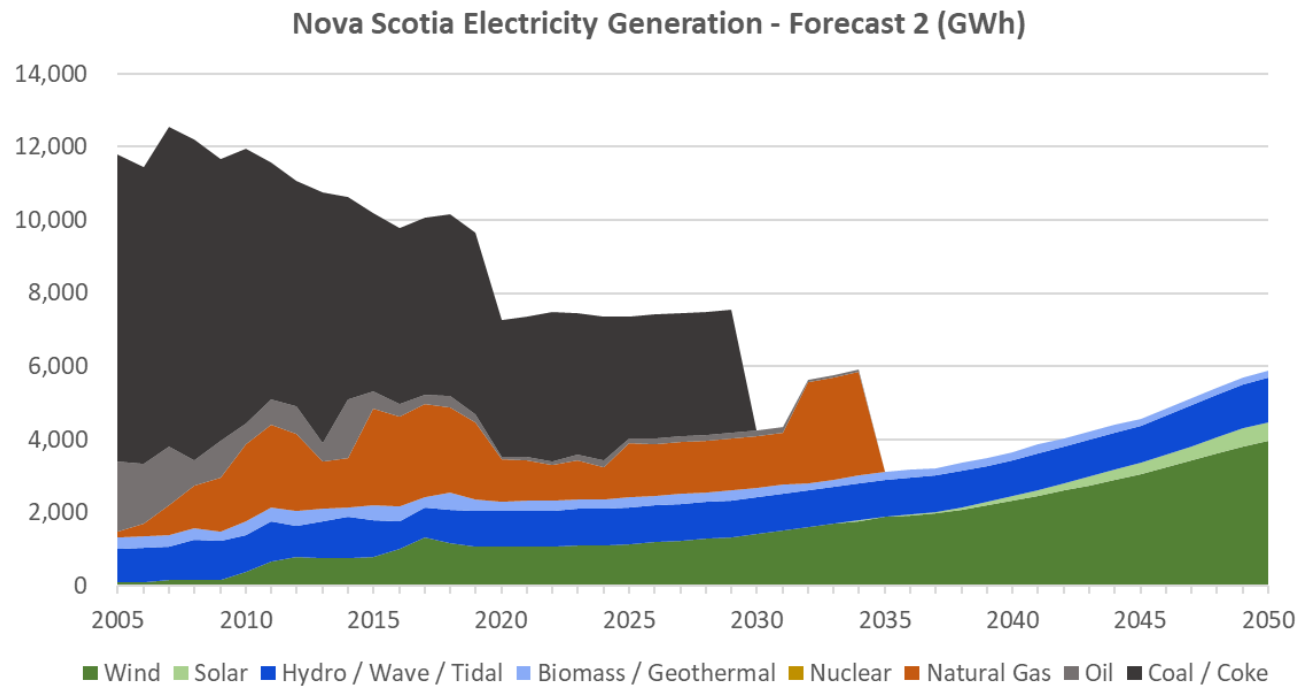
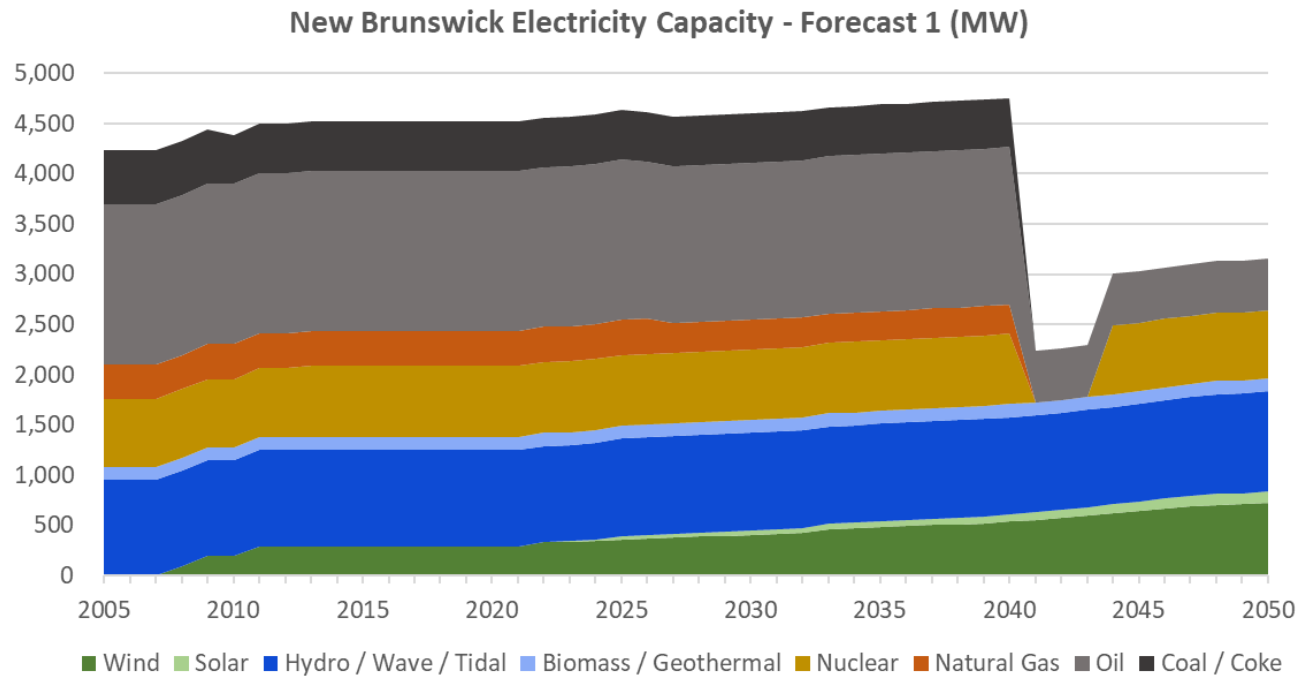


Source: Canada Energy Regulator, Canada's Energy Future 2021, Evolving Policies Scenario.

Appendix 1.2: Nova Scotia Energy Resource Map

Appendix 1.3: New Brunswick forecasts



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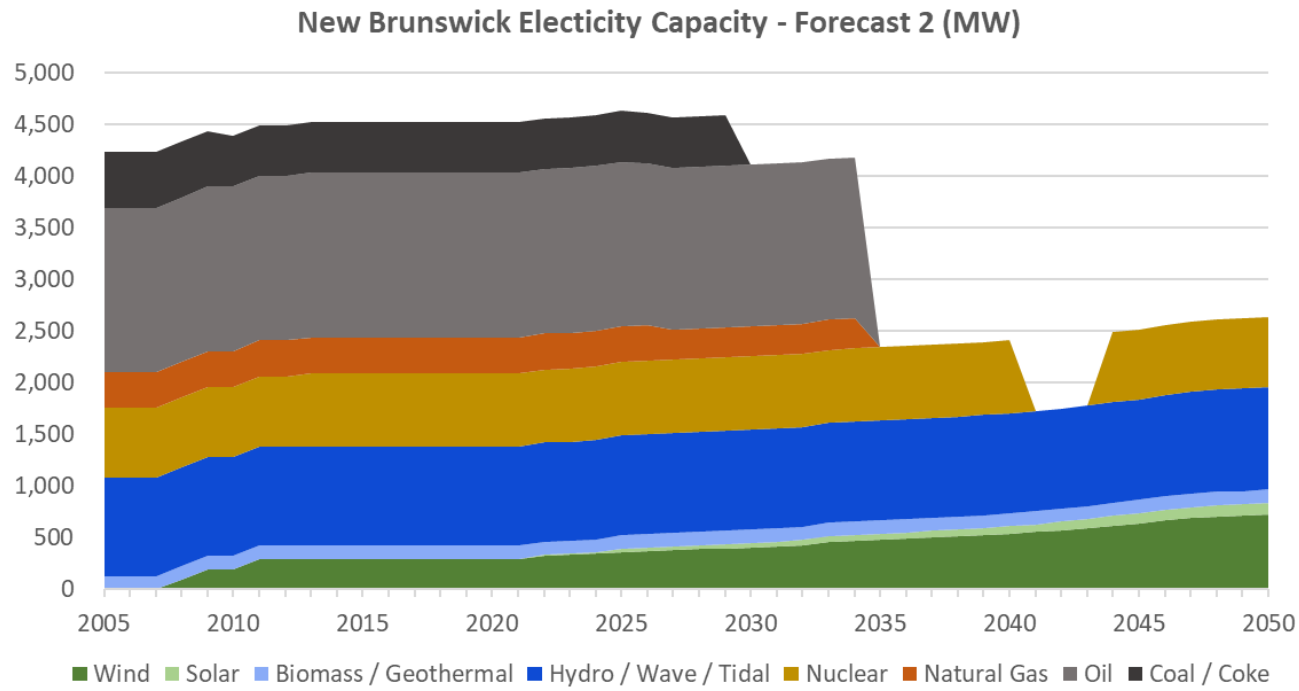

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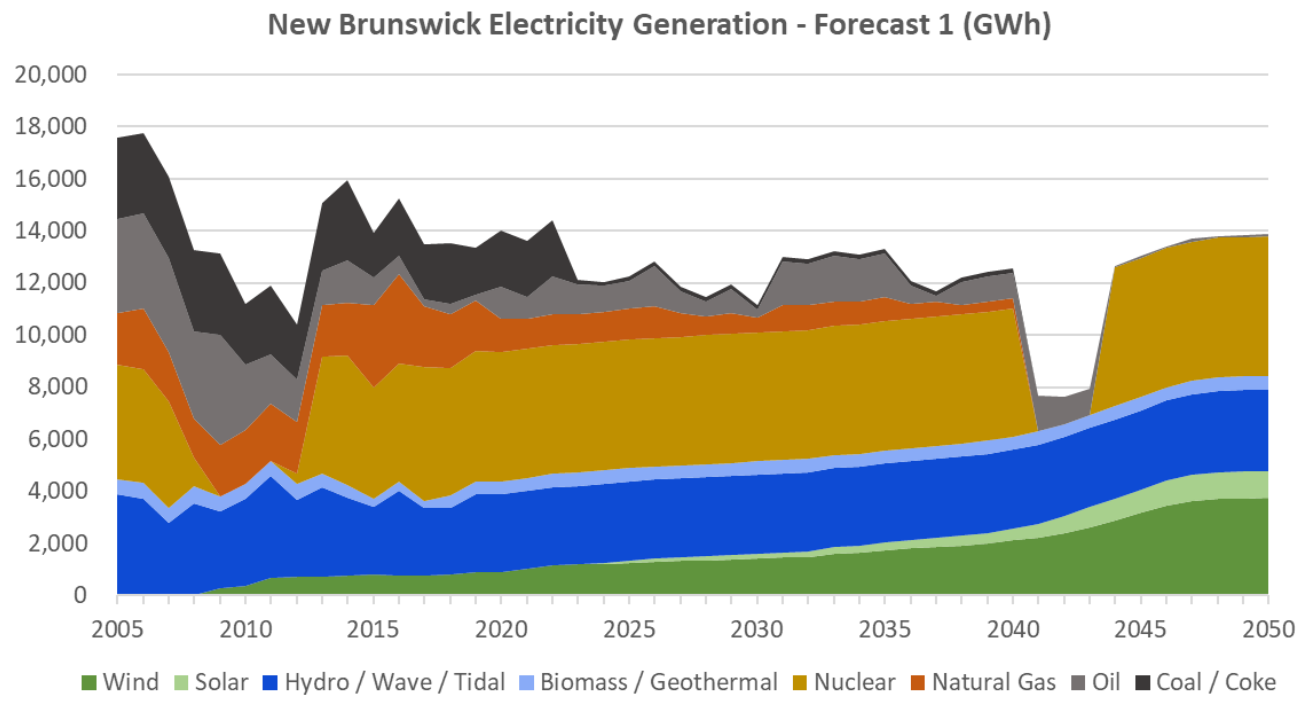

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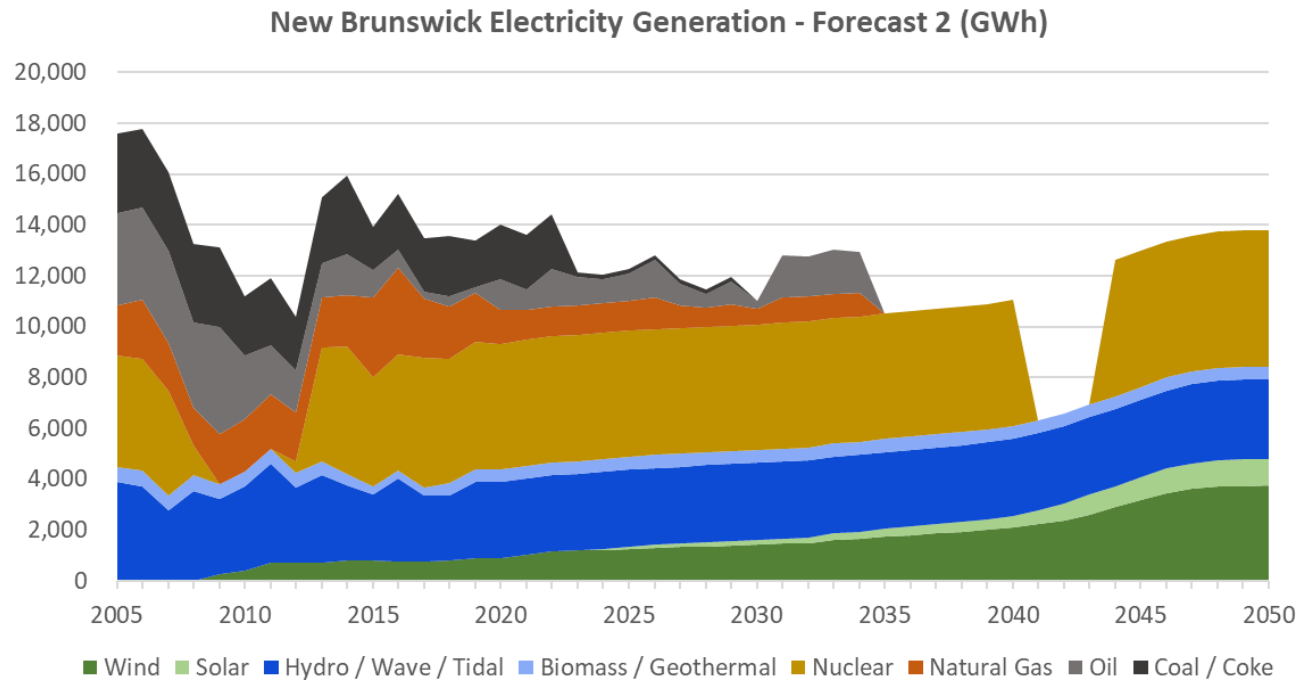
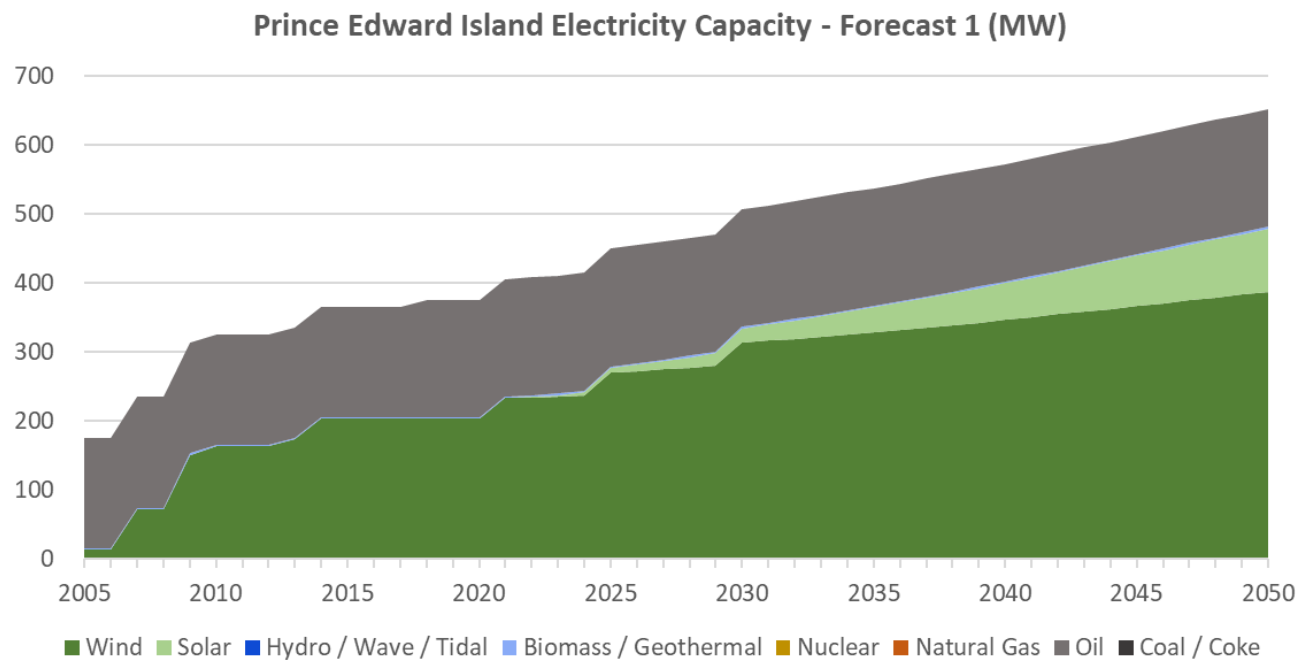


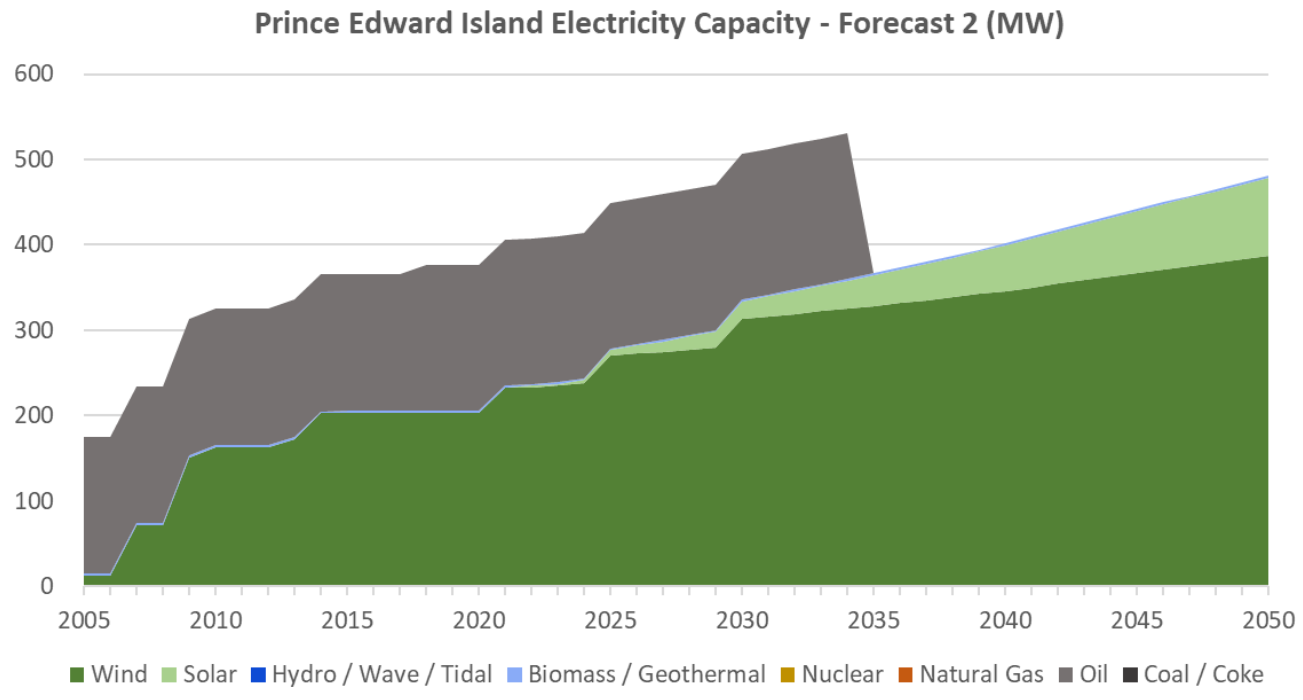
Source: Canada Energy Regulator, Canada's Energy Future 2021, Evolving Policies Scenario.

Appendix 1.4: New Brunswick Energy Resource Map

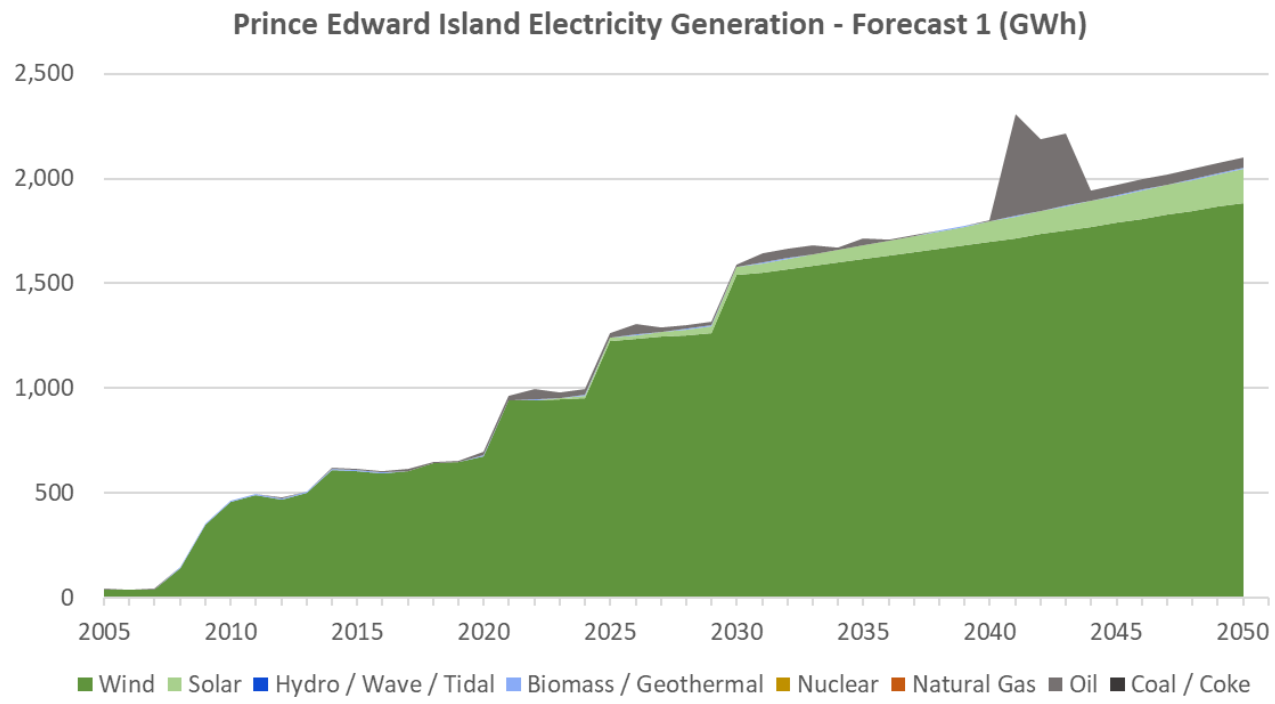
Appendix 1.5: Prince Edward Island forecasts



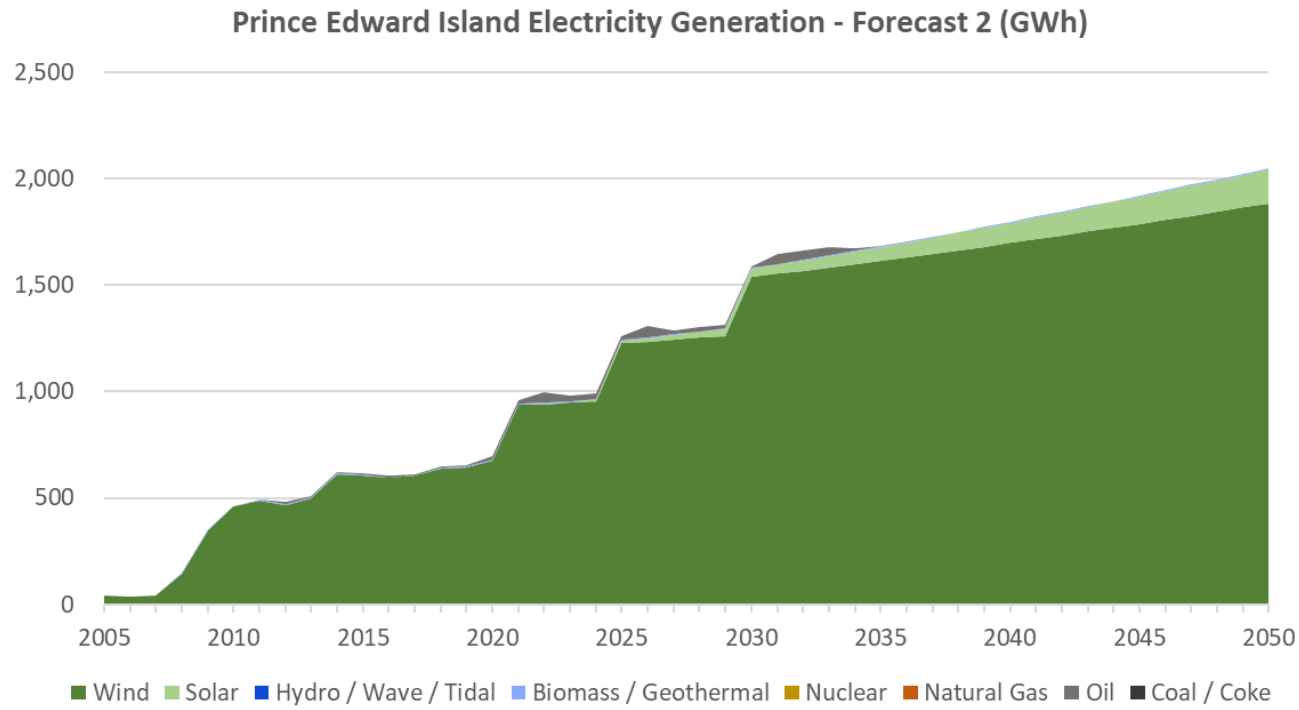
Source: Canada Energy Regulator, Canada's Energy Future 2021, Evolving Policies Scenario.



Source: Canada Energy Regulator, Canada's Energy Future 2021, Evolving Policies Scenario.



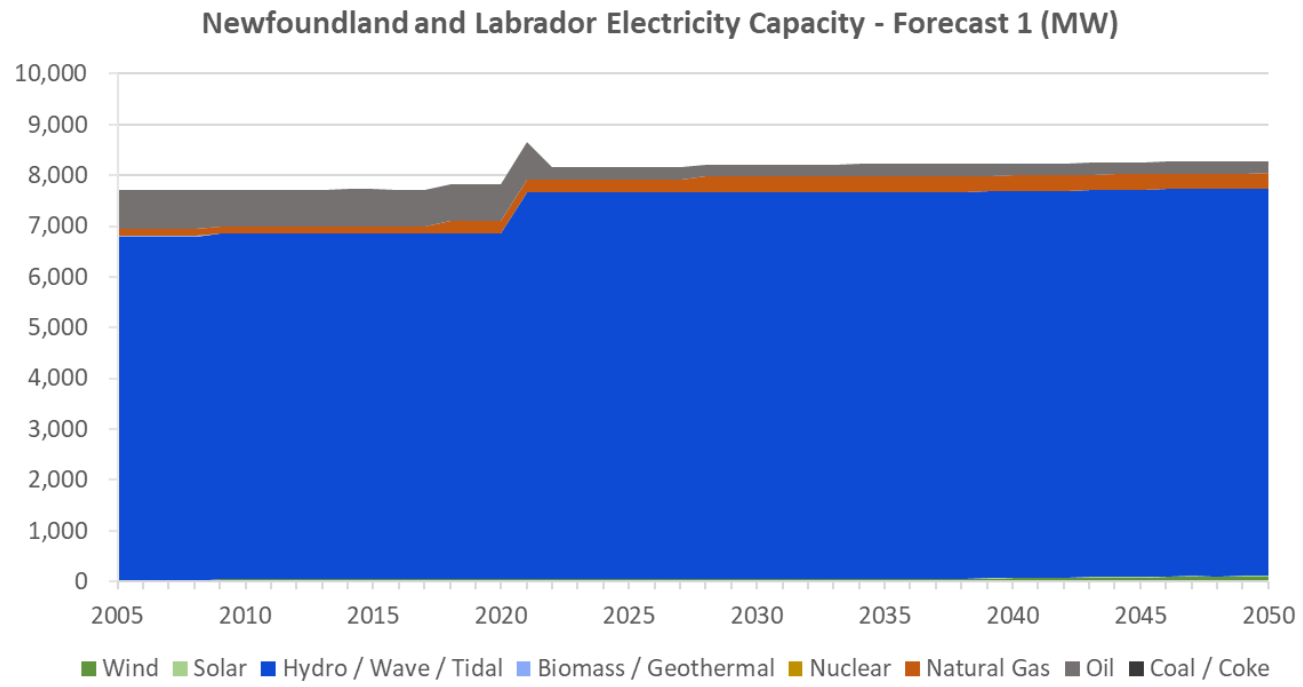
Source: Canada Energy Regulator, Canada's Energy Future 2021, Evolving Policies Scenario.



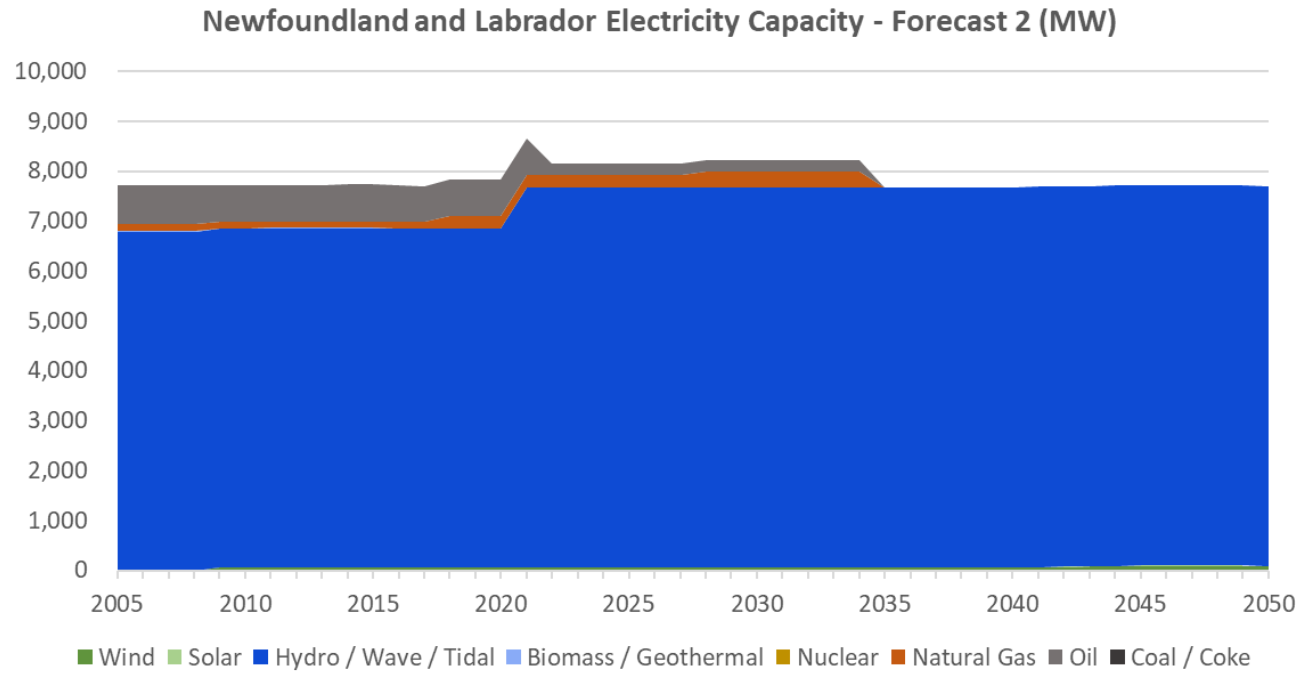
Source: Canada Energy Regulator, Canada's Energy Future 2021, Evolving Policies Scenario.

Appendix 1.6: Prince Edward Island Energy Resource Map

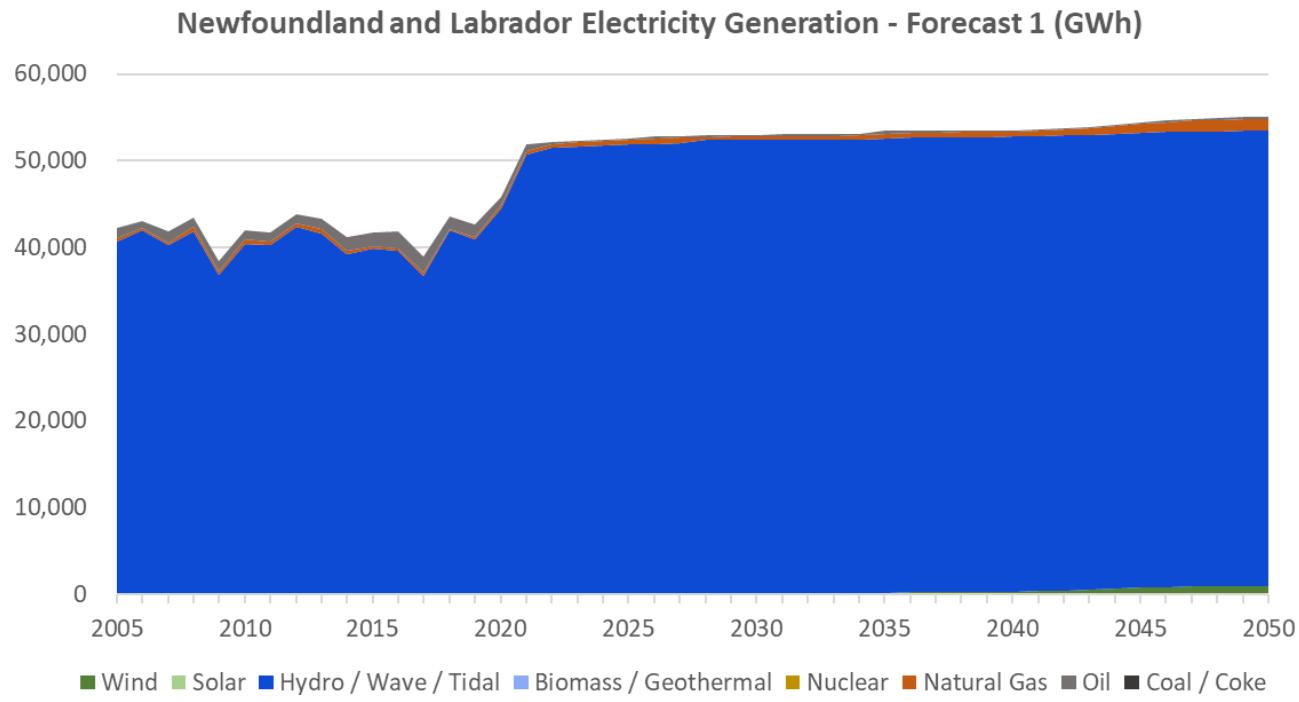
Appendix 1.7: Newfoundland and Labrador forecasts



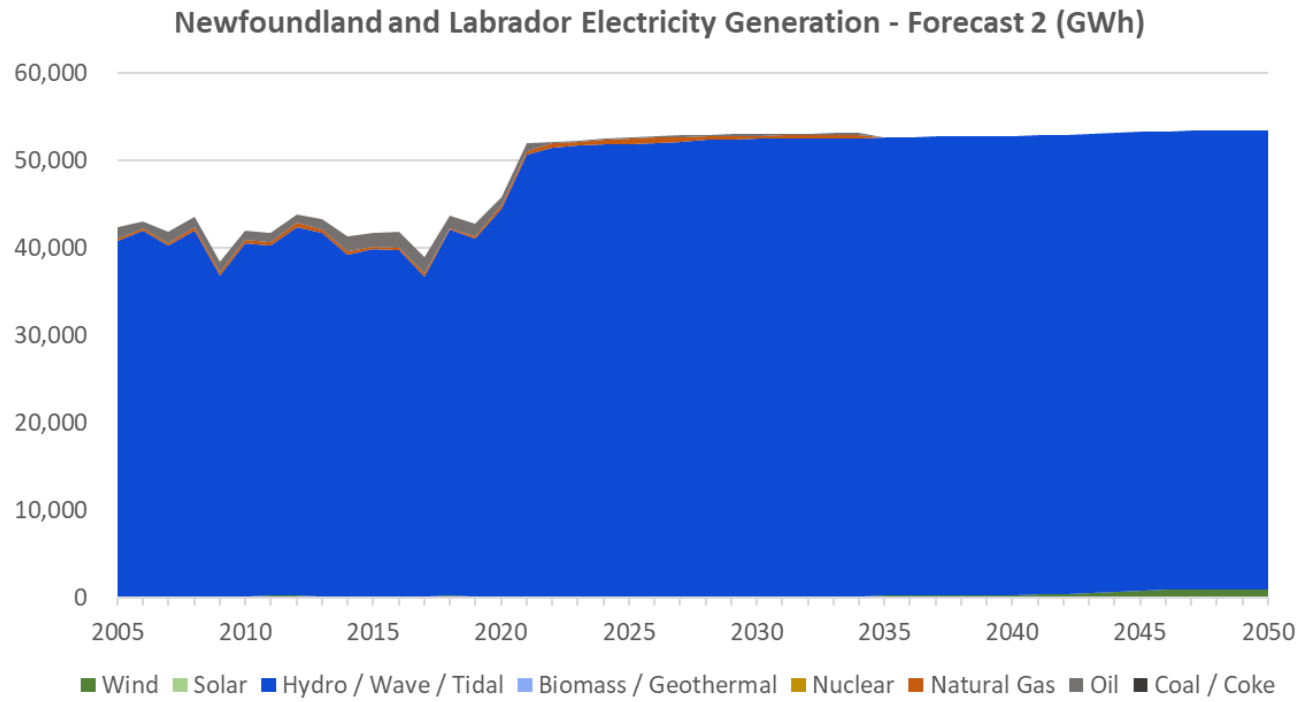
Source: Canada Energy Regulator, Canada's Energy Future 2021, Evolving Policies Scenario.



Source: Canada Energy Regulator, Canada's Energy Future 2021, Evolving Policies Scenario.

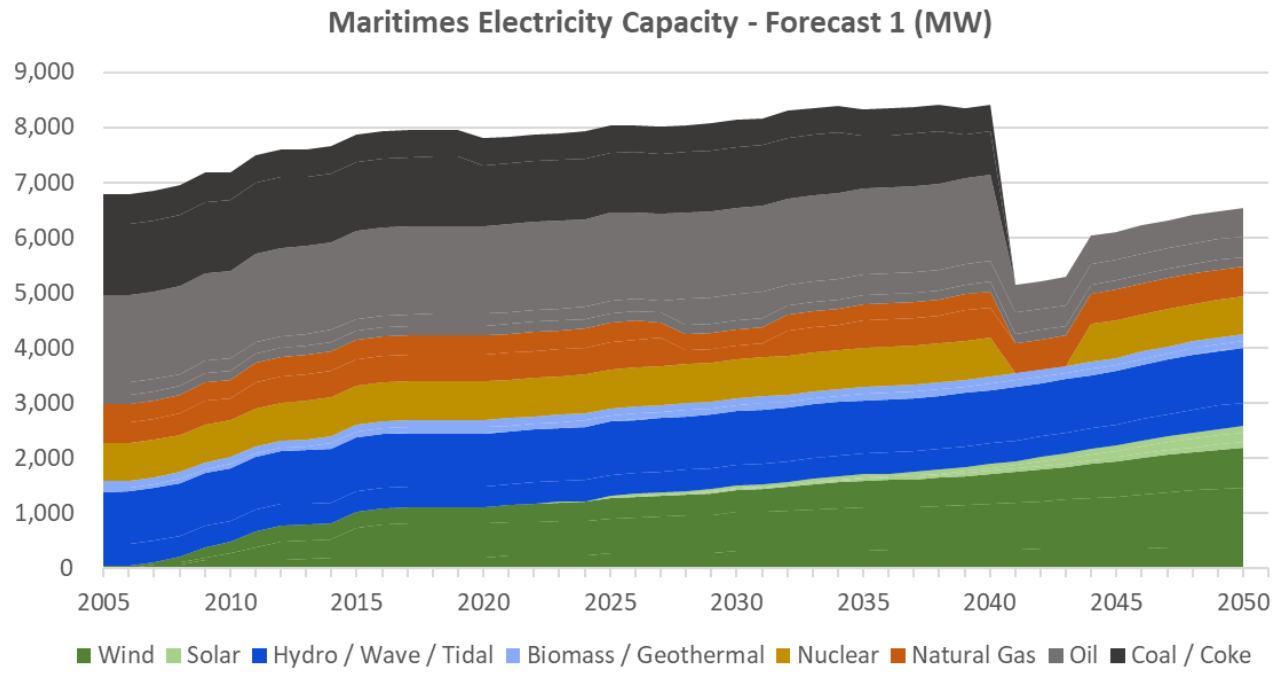


Source: Canada Energy Regulator, Canada's Energy Future 2021, Evolving Policies Scenario.

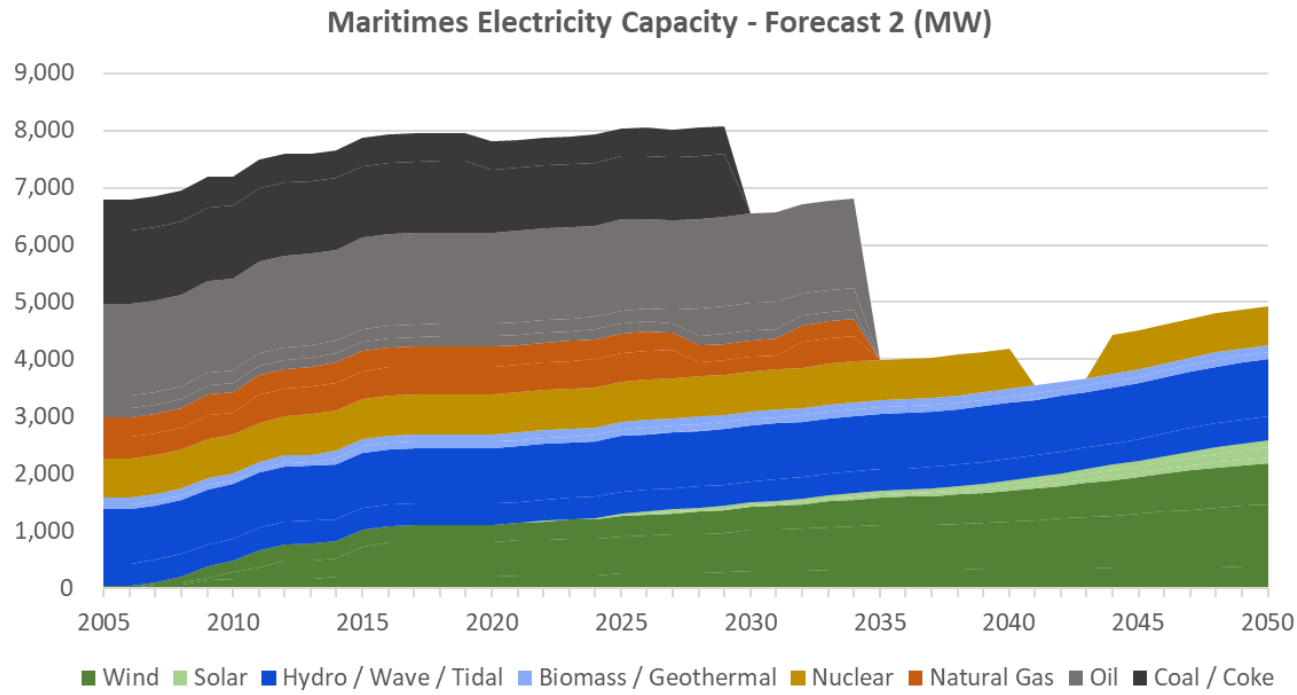


Source: Canada Energy Regulator, Canada's Energy Future 2021, Evolving Policies Scenario.

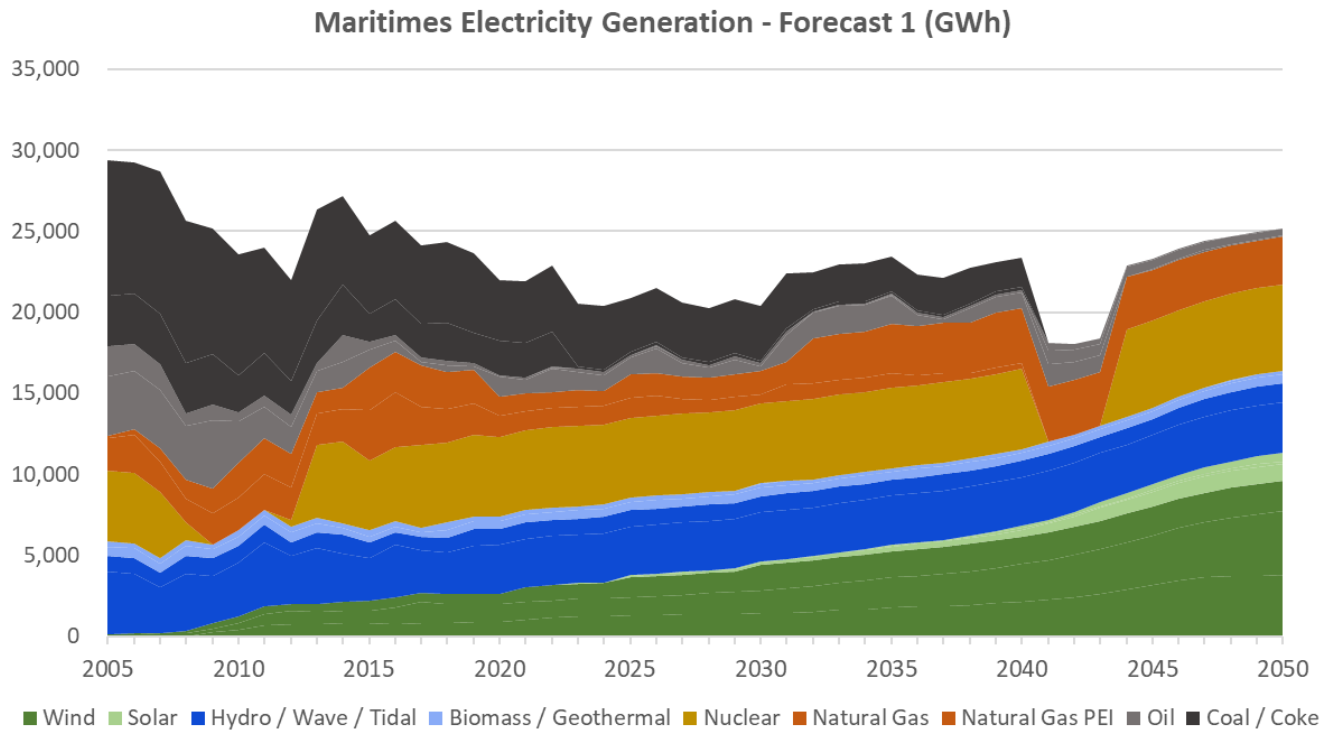
Appendix 1.8: Maritimes forecasts



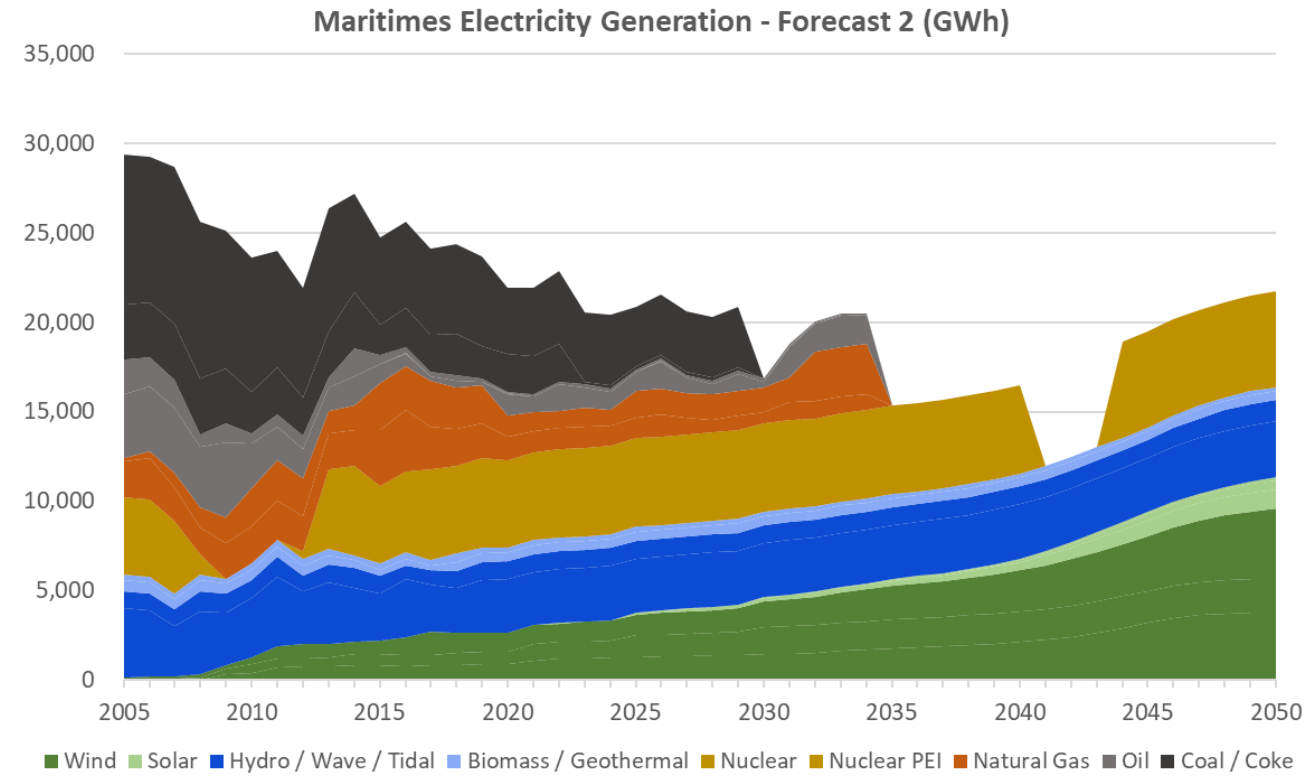
Source: Canada Energy Regulator, Canada's Energy Future 2021, Evolving Policies Scenario.



Source: Canada Energy Regulator, Canada's Energy Future 2021, Evolving Policies Scenario.

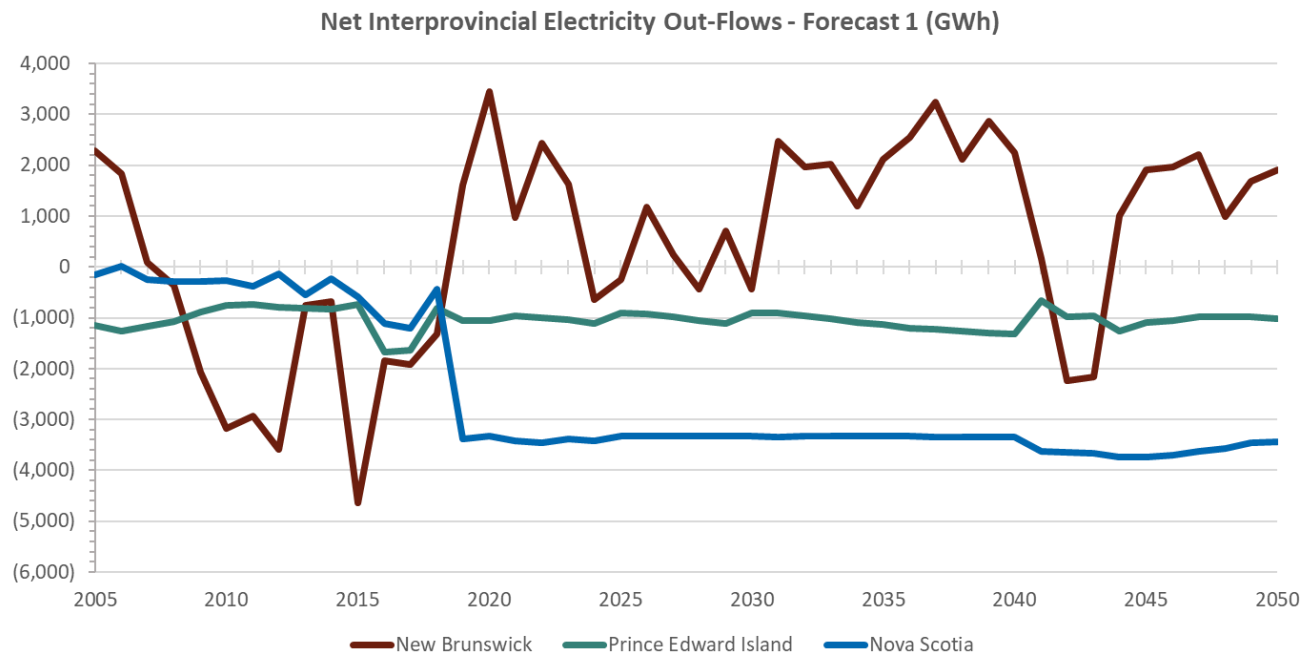


Source: Canada Energy Regulator, Canada's Energy Future 2021, Evolving Policies Scenario.

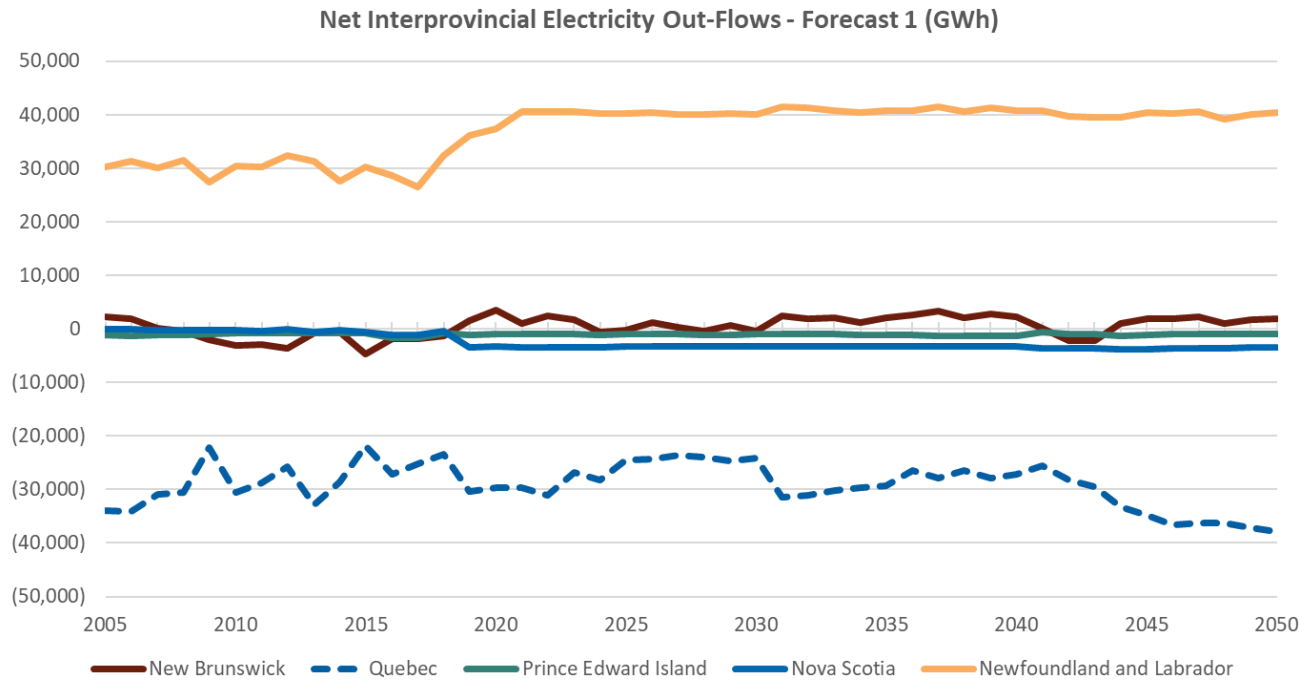


Source: Canada Energy Regulator, Canada's Energy Future 2021, Evolving Policies Scenario.

Appendix 1.9: Interprovincial trade forecast



Source: Canada Energy Regulator, Canada's Energy Future 2021, Evolving Policies Scenario.



Source: Canada Energy Regulator, Canada's Energy Future 2021, Evolving Policies Scenario.

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