

Testimony before the
Joint Standing Committee on Environment and Natural Resources
L.D 640 – Resolve, To Require a Study of Greenhouse Gas Emissions Reductions from the
Proposed Central Maine Power Company Transmission Corridor
March 15, 2019

Chair Carson, Chair Tucker, and members of the Committee, my name is Thorn Dickinson of Avangrid Networks, and I am here today to testify in opposition to LD 640. I appreciate the opportunity to share with you information that demonstrates not only that there will be regional greenhouse gas reductions from the NECEC, but also that the impact of the NECEC on greenhouse gas emissions has been analyzed extensively by experts at the Maine Public Utilities Commission, including Staff's independent consultant London Economics International, and the additional DEP review provided for in this bill would be duplicative.

The question of whether the NECEC would reduce greenhouse gas emissions was the subject of three separate studies by three different experts representing three different parties at the PUC. The first study was conducted by CMP's expert Daymark Energy Advisers; the second study was conducted Energyzt Energy Advisors on behalf of the owners of the thermal electric generation plants; and the third study was conducted by the PUC's own independent consultant, London Economics International (or LEI). These experts all modeled how generators would be dispatched with and without the NECEC and calculated the greenhouse gas emissions reductions that would result from the NECEC's injection of 9.45 TWhs of clean hydroelectric energy into ISO-NE. While the precise levels of greenhouse gas emissions reductions varied, all of these expert studies found that the NECEC would reduce greenhouse gas emissions in New England by at least 3 million metric tons per year.¹ Even using the results from the Energyzt analysis submitted by the Generators who oppose the project, the NECEC would result in approximately 255,000 metric tons of GHG reductions per year in Maine, which is roughly equivalent to taking 54,140 passenger vehicles off the road in Maine every year.² (It is important to note that NRCM, the Maine Renewable Energy Association and the Sierra Club hired the same Energyzt experts to do a report on the NECEC's greenhouse gas impacts, which incorporated and did not change the conclusions from Energyzt's prior study.) Even Calpine Corporation's Director of Government and Regulatory Affairs, John Flumerfelt, testified in the

¹ Daymark concluded that adding the NECEC-delivered hydropower to the supply mix in New England will induce annual CO2 emission reductions of approximately 3.1 million metric tons across New England and the net emissions from the portion of regional generation serving Maine load will be reduced by approximately 264,000 metric tons per year (July 13, 2018 Daymark Rebuttal at 40:18-41:2 (citing Exhibit NECEC-5 (Daymark Report) at 4 of 98)); LEI's analysis found even greater emissions reductions from the NECEC-delivered clean energy, stating that the NECEC could reduce CO2 emissions in New England by approximately 3.6 million metric tons per year (May 21, 2018 LEI Report at 12 of 85); The Energyzt/Calpine modeling likewise found that the NECEC-delivered clean energy will result in an annual reduction of 3 million metric tons of CO2 emissions in New England (April 30, 2018 James Speyer Direct Testimony, Exhibit JMS-4, Technical Report: New England Clean Energy Connect (NECEC) Regional Carbon Emissions Impacts at 3 (Apr. 2018)).

² February 2, 2019 CMP Brief at 104.

PUC hearing on the Stipulation that the NECEC will reduce carbon emissions in Maine and New England.³

Opponents of the NECEC project argue that Hydro-Québec would have to reduce exports to other markets in order to supply energy to Massachusetts via the NECEC transmission line and therefore any greenhouse gas emissions reductions in New England will be offset by increased emissions in other regions such as New York or Ontario. There is abundant evidence both in the PUC proceeding and in the public domain demonstrating that this argument is flawed because Hydro-Québec has more than enough clean hydropower energy to supply the 9.45 TWhs of energy via the NECEC without diverting energy from other regions. Over a little more than the past decade, Hydro-Québec has been pursuing a 15-year plan of investment in clean energy generation and it has added nearly 5,000 megawatts of new capacity to the Hydro-Québec system. In the past 5 years, Hydro-Québec has added 1,455 MW of capacity. Therefore, Hydro-Québec has enough energy to export to New England via the NECEC without taking energy exports away from other markets.

But you don't need to take our word for it, in a letter submitted to the PUC that I have attached to this testimony,⁴ Hydro-Québec stated that in 2017 and 2018, it spilled substantial amounts of water due to lack of economic transmission. This means that Hydro-Québec let the water bypass the dams without feeding it through the turbines to generate energy because they didn't have a way to export that energy other markets. In fact, Hydro-Québec stated in that letter that they spilled 4.5 TWhs of energy in 2017 due to lack of economic transmission and that in 2018, they spilled water equaling approximately 10.4 TWhs of energy for that same reason. 10.4 TWhs of energy is more energy than is required to supply the NECEC and if the NECEC were built, this water could be used to generate energy for the NECEC. In fact, Hydro-Québec President and CEO Eric Martel was on television in Québec by the Journal de Québec and in that interview (which was in French but we had it transcribed into English) Mr. Martel said "we are in surplus. It takes US lines to export that. I don't want to throw ten terawatt-hours of water away every year and not monetize it. It's the lack of lines."⁵ This is wasted energy. Wasted energy that, with every hour, could have been used to displace greenhouse gas emissions in New England.

³ 3/7/19 Hearing Tr. at 75:18-22 ("MR. TANNENBAUM: But would that mean that the NECEC will reduce carbon emissions? MR. FLUMERFELT: NECEC will certainly reduce carbon emissions in New England by displacing existing fossil fuel generation both in Maine and across New England.").

⁴ Kelly-004-001 Attachment 1 (December 14, 2018 Hydro-Québec Letter submitted to the PUC in response to data requests from Dot Kelly, citizen intervenor).

⁵ See Le Journal de Québec, Video Interview With Eric Martel (in French), "Hydro-Québec donne la priorité à l'exportation" [Hydro-Québec gives priority to exportation] (Nov. 21, 2018), located at <https://www.journaldequebec.com/2018/11/21/entrevue-avec-eric-martel--hydro-quebec-donne-la-priorite-a-exportation>, with translated English transcript.

Additionally, Hydro-Québec is adding even more capacity to its system in the coming years that will add even more ability to generate energy - above-and-beyond what it can generate today. In fact, it was undisputed in the PUC proceeding that Hydro-Québec will be adding the 245 MW Romaine 4 unit that is expected in service in 2020 and additional capacity upgrades that will result in additional 500 MW that are expected to be in service by 2025. Thus, this evidence shows not only that Hydro-Québec will not need to divert energy from other markets to supply the NECEC because Hydro-Québec is already spilling more than what would be needed to supply the NECEC, but also that Hydro-Québec is going to add over 700 MW of capacity over the next six years, above-and-beyond what Hydro-Quebec is able to generate today.

This evidence shows that the NECEC energy will be incremental and not just diverted from other markets to supply the NECEC. As Daymark explained in their July 2018 rebuttal testimony in the PUC proceeding, the Generators' own Energyzt analysis shows that if you assume that the NECEC energy is incremental, the NECEC will result in greenhouse gas reductions not only in New England, but also in other markets such as the New York ISO, PJM and Ontario.⁶ Thus, asking the DEP to study this issue yet again is duplicative and unnecessary, and is meant to delay the project. Imposing such an additional regulatory hurdle would also have the negative effect of delaying Maine and the region's receipt of the guaranteed GHG reduction benefits provided by the NECEC. That result is entirely inconsistent with the admirable measures taken and goals set by legislatures throughout the region to de-carbonize and reduce GHG emissions. The NECEC is ready for development today and can help us achieve those goals. We should not impose additional regulatory requirements to delay those benefits.

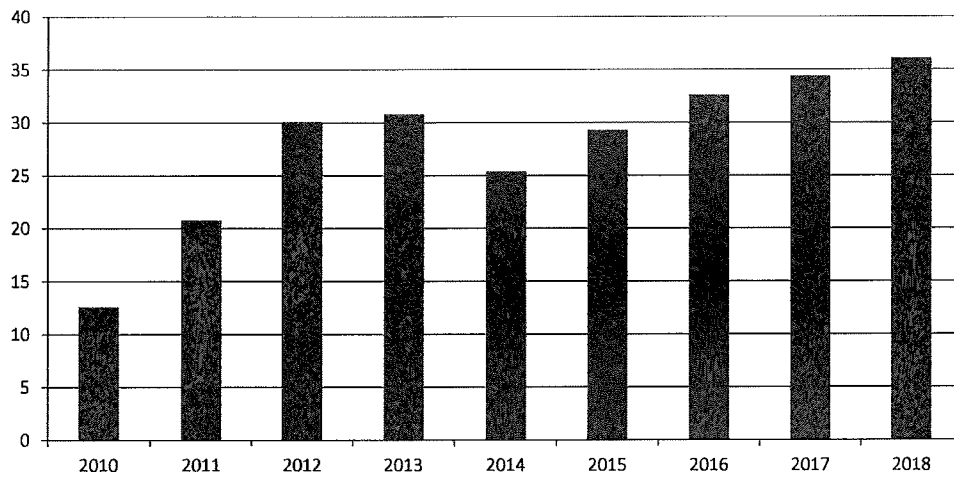
And as a final point, it's important to consider the signal this Resolve would send to anyone—whether a business or a private citizen—about the state of regulation in Maine. It sends a chilling message that it is risky to invest in Maine because the normal regulatory permitting process could be upended after more than a year into the process. Any business or private individual seeking state permits should be able to rely on a stable and predictable process with clear standards from the outset. In this instance, LD640 would introduce what clearly seems like a political agenda into a regulatory proceeding on a specific project very late in the game. That should be alarming to anyone doing business in Maine, because it sends the signal that you cannot necessarily count on fair treatment or a predictable regulatory process when you decide to invest in our State. We submit that Maine should be encouraging investment and new jobs, not changing the rules of the game at the 11th hour and scaring away potential new investment.

Thank you for the opportunity to address the Committee on this important issue, and I would welcome your questions if I can be of assistance.

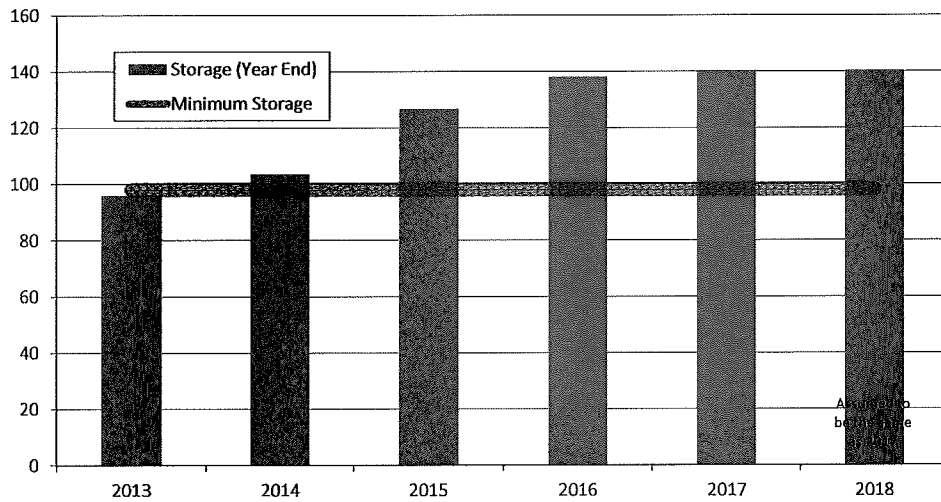
Thorn Dickinson

⁶ July 13, 2018 Daymark Rebuttal at pages 42-43.

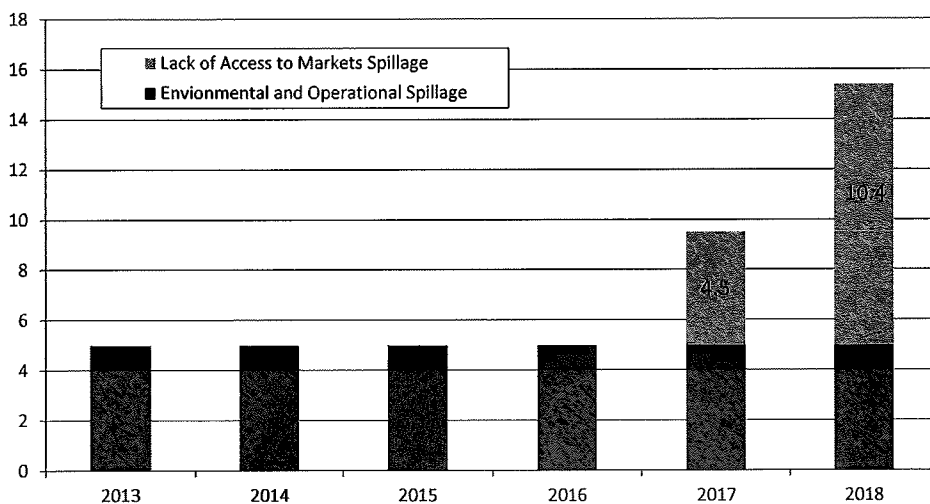
Hydro Quebec Net Electricity Exports (TWhs)



Hydro Quebec Storage (TWhs)



Hydro Quebec Spillage (TWhs)





December 14, 2018

Thorn Dickinson
Vice President, Business Development
Iberdrola USA Management Corporation
52 Farm View Drive
New Gloucester, Maine 04260

Good Afternoon Thorn:

You have requested Hydro-Québec's assistance in responding to certain data requests pertaining to Hydro-Québec operations received in the CPCN proceeding for the New England Clean Energy Connect ("NECEC") project.

Below is information in response to questions 004-001 and 004-002.

004-001

Regarding the existing hydro-electric facilities that will provide electricity for NECEC, have those dams spilled water instead of generating electricity due to a lack of economic transmission in any of the years 2012-2017? If so,

- a. Please provide a volume estimate per year of that spillage.
- b. Please provide the reason(s) for that spillage.

Answer:

Yes, in 2017 Hydro-Québec spilled water due to a lack of economic transmission.

The quantity of spilled water in 2017 for this reason represents approximately 4.5 TWhs worth of energy. In the normal course of business, Hydro-Québec uses water to generate electricity. Excess water not used to generate electricity is stored in large reservoirs for use in later periods. As the reservoirs become full, and storing water is no longer an option, water is spilled.

In this category to date in 2018, Hydro-Québec has spilled approximately 10.4 TWhs worth of energy. Without additional transmission export capability, the quantity of spilled water in future years is expected to be comparable to the quantity of spilled water in 2018 under comparable market and operational conditions.

For the 2050 horizon, independent meteorological studies indicate that average flows in northern Québec are expected to increase by approximately 12%. This could lead to additional spilling¹.

¹ https://www.ouranos.ca/publication-scientifique/Synthesis_Summary.pdf

004-002

Does Hydro-Québec have an estimate of the maximum export capacity that existed at the end of 2017, without the existence of the NECEC line? (If that estimate is not available, but an estimate from a different year is, please provide that).

- a. Please provide that estimate in aggregate or to the four export markets of Ontario, ISO New England, Maritimes, and New York ISO.
- b. Please provide a discussion of factors that formed the basis of the estimate.

Answer:

Hydro-Québec's maximum export capability during 2017 is estimated at 34.4 TWh. Below is the breakdown of these exports to Hydro-Québec's primary external markets:

- Ontario: 4.6 TWh
- New England: 18.2 TWh
- Maritimes: 2.1 TWh
- New York: 7.9 TWh
- PJM/MISO/Other: 1.6 TWh

Many factors determine the maximum export capability for Hydro-Québec's hydropower system including the following:

- Water levels in individual Hydro-Québec reservoirs
- Specific transmission availability within Québec
- Specific generation availability
- Transmission availability to external markets
- Transmission congestion in external markets
- Wholesale market prices and demand in Hydro-Québec's export markets
- Operational constraints in Hydro-Québec's export markets

Please don't hesitate to contact me if you have any questions about this information.

Sincerely,



Simon Bergevin
Director, Energy Transactions
Hydro-Québec
75 René Levesque Blvd
Montreal, QC H2Z 1A4

Now let's talk about Hydro-Québec, which has a number of cases.

That's still the case, however. A lot of cases on the sketch board. We have the opportunity, with us today, to ask all the questions because the president, Éric Martel, is here.

- Good morning, Mr. Martel. - Good morning, Mr. Dumont.

Let us start with a very simple issue that has been a major issue in the news.

- The famous overpayments. - Overpayments.

Some people said, "Well, Mr. Legault, he had complained about overpayments. Once elected, Hydro will send us cheques." You have to accept first of all what overpayments are when you talk about them.

You know, every year, we go before the Régie de l'énergie and work with them on a budget, and we say, for example, we will provide you, Quebeckers, with full service, for example, \$12 billion.

- At the end of the year... - This determines the price.

It determines the price. That's how we calculate the rate based on it.

It's never a perfect calculation. A budget will happen - We in general, we reach 99.5 on average, over the last 10-15 years, of that budget.

We always do it at a lower cost.

We are providing the same service that we promised Quebeckers.

But it costs a little less than expected, about \$50 million.

Because you're budgeting too high. So some would say too cautious.

Exactly. You could say that. But imagine the opposite, that we are over \$200 million, and then we turn around and say you owe us \$200 million for next year. So there, at that point, it would be - - We would complain. - We'd complain too. Achieving 100% is almost impossible. So we usually arrive, perhaps in a conservative way, but we always get into our budget.

So, over seven - eight years, these sums that you spent a little less than expected each year, it was one and a half million - - One and a half billion. - A billion and a half, I'm sorry, - what we called overpayments. - Exactly.

So it's true that we received that as an extra, but at the same time, it's a service that we have to measure. We provided the service we said we would provide to Quebeckers, but we often made efficiency gains. We did it more efficiently.

And the previous government had said: "We are in a deficit situation.", when they took power, "We're going to keep all these sums." It had been like that for several years.

So they went into the public treasury.

- It went into the public treasury. - Via the Ministry of Finance.

The good news is that it does not go into the pockets of a wealthy shareholder because Hydro-Québec belongs to us and it is obviously redistributed, the state redistributes it, in health services and elsewhere.

So that money is not in the vaults of the basement - the Hydro-Québec building. - Not at all.

In treasure chests We wrote the cheque, but in Quebec City. So, Quebec City has it.

What is happening now is that there was a change in the law that took shape last year. Now we share them.

Last year, we shared, from memory, about 45 million dollars that we gave back to the people.

Now, we don't write a check to everyone or send you a check for a few dollars. Let's put it back into the new tariff case.

It's like a credit. We start the new year with a credit.

- On the rates. - On the rates.

So, how many more years do we have to have a credit like that - on rates? - Oh, well, the law tells us, - every year - - Every year.

Half of the overpayments we had before, we say, you will give it back to Quebeckers and the rest will keep it for you because, as I tell you, it still remains in the taxpayers' pockets.

Let's move on. Let's talk about rates because people are always complaining about the electricity bill and now it's already getting cold by November 15. It doesn't look good this year.

How do you rate our rates? What do you promise us for the next few years?

The good news is that I made a promise when we started about three and a half years ago together.

We're going to make you rate increases under inflation.

- So we're happy to say - - Is that what it's been like so far?

This is the fourth year that we have just filed our rate case.

This year we are at 0.3, next year we asked for 0.8.

So, we're at the bottom of inflation four years ago.

- You're below 1%. - Yes, we're below 1%.

So, we're very happy about that. We delivered our promise on that and at the same time, the company is doing well because we have succeeded...

You may have seen our financial results last week, we are 18% more profitable than last year. So, it's going well.

We have to say to ourselves, at Hydro-Québec, we have good financial results and we have succeeded in lowering rates. Our rates are still today and even widening the gap, the lowest rates in North America.

Even when compared to the European Union, we have the lowest rates.

So, we can say that, we can be happy about that, and these rates, what is interesting to say is that when we look at... When I took office, we were about 13% better than the second ones and now we're 17, 18% better. So we're digging that gap.

It is a competitive advantage for Quebec as well.

First, we know that we heat with electricity, but it also allows us to attract companies, and that is our mission to keep them down.

Well, I'm going to go through the news. There are so many subjects.

The famous Apuiat project. Wind power project in collaboration with the Innu of the North Shore. The government did not want to, but what is happening now, what people were told at home, that it was Martel who did not want to, is the president of Hydro-Québec who started putting in Legault's head that this is a bad project. True or false?

Listen, I, what I did, as the person responsible for managing Hydro-Québec with my team, we had to make sure, with the former government, that we put the facts on the table and say, "Look, we are in a surplus situation." - So we don't need it. - We don't need it.

That's clear and I'm not coming back for that and I'm not hiding.

We don't need it this year, Mr. Dumont, we spilled 10 terawatt hours of electricity.

That means we didn't turbinate water, we let it pass by the dams because we had too much.

How much could it cost if we could sell this?

If we sell it on the American market right now, maybe \$500 million in additional revenue.

- That we let it flow there. - Hence the importance of having additional transmission lines because we have energy.

It's here... We have to sell it to the Americans.

And I will come back to our export projects later.

But to repeat your question on the Apuiat project, we don't need it.

We have a surplus for a long time to come.

There was a letter that went out in the media under your name, I don't know if you're going to tell me it's real or not.

- It was the real letter. - Was that the real letter?

That was about the loss over the term of the contract, - a billion and a half, two billion. - To the government, the message is exactly that, Mr. Dumont, it was: "We don't need it." But the government owns Hydro-Québec.

In the end, I have to respect that, but I have to put the facts on the table.

They were informed, at that time, that they would say: "Look, if we ever move forward, it will cost Hydro-Québec between \$1.5 billion and \$2 billion in net income.

- Those were real numbers. - They were real numbers.

In fact, our own number was 1,667,000, but here, - there are more optimistic scenarios - - I understand, I understand.

It's between 1.5 and 2 and that's what I had to say.

So we said it. Unfortunately, the letter leaked and there was an outcry.

We were in the middle of an election campaign. You know, when you're in charge of Hydro-Québec or the caisse, we always try not to interfere in the election campaign.

We knew we had a long list of topics. This one, unfortunately, has become a campaign issue. - It still brought up the idea that there was between you and the new Prime Minister, Mr. Legault, an accomplice, a lot of chemistry.

Did you have any privileged or unique meetings with him before the election campaign?

I haven't had any meetings with Mr. Legault.

I know there were rumours going around that we were seen at the restaurant, maybe I have a

look-alike, but it didn't happen.

- That is not true. - That is not true.

That is completely false. Mr. Legault and I, like all party leaders, and I made that clear when I arrived at the head Hydro-Québec, I meet everyone. I met Mr. Legault in Hydro-Québec's offices, but it was a year or so - before the campaign. - Not a secret restaurant.

- No, no, no, no. - At the office.

And the government knew about it. I met Mr. Péladeau at the time, I met Mr. Lisée too.

I took my precautions, I run Hydro-Québec, I'm not politicized, and I made sure to keep everyone informed about our cases and what we were doing and to listen to them too, to hear them.

Since we are talking about the new government, I will take you to these projects.

A willingness to export, to sell to Americans, Ontarians, potentially even to develop new dams, something that had not been discussed much in recent years.

Does that make sense, does it fit into your business plan?

It's absolutely in our plan. The plan we tabled three years ago in the National Assembly, which was approved, is that we said, "Look, priority number one, we are in surplus.

It takes us lines to export that." I don't want to throw ten terawatt-hours of water away every year and not monetize it.

It's really our inability to transport it.

- Absolutely. - It's the lack of lines.

Quebec is saturated. Obviously, we have growth in Quebec.

We work hard to bring in data centres, people who consume a lot, and that has had some success.

In the last quarter, we had about 4-5% of our growth coming from the efforts we made, but exports, we need lines to go down more.

That's why we're happy at the beginning of the year, we won our biggest lifetime contract with Massachusetts.

- We signed - - We still have a problem, no one wants to have the line on their property.

But that's part of it, you see, it's long term projects with Maine. We're getting there, getting

permits - - We're going around New Hampshire. - We'll find somewhere else.

And we have yet another solution, a plan C, if necessary.

You're not worried that we're going to do this line.

We're going to make it, they want it. We were still in Massachusetts last week, you know the Prime Minister was there.

So what the Prime Minister is saying is that we have to export and we are completely in this.

Our strategic plan, which is also a three-year plan, will have to be looked at over the next five years, Hydro-Québec, to see on which river we could go on another major project. I've always said - But now we're already in surplus. If we do another big project, it must be sold in advance.

It has to be sold, and it has to be profitable.

And at the same time, it takes 15 to 18 years to build a new project.

I can easily see that in 21, 22 we will have to make a decision to perhaps build something that would be ready in 38, 39, 40,

but don't forget that there are major milestones coming in 2040.

What is happening with aluminum smelters? There are several contracts that are ending. What's going on with Churchill Falls post 41. So there are some big questions that are open to us to answer and we are preparing for that. We will be ready in 2021-22, Hydro-Québec, we say if we have to build for the future, here is the project we recommend.

Let's talk about internal management: do you pay irregular bonuses that are not recorded in your executives' official remuneration books?

So, look, it's been positioned a little like a secret, etc.

It's no secret at all. We did a mea culpa last week.

We did... This is a mistake. We have a compensation policy in place since 1997. In 2008, new rules were introduced in a decree that affected part of our policy.

- It was from the government. - It came from the government on the variable pay policy.

We had an interpretation. Our compensation people, our experts at the time, looked at it and said: "There are things we can do, there are things we can no longer do." But there have been interpretations of data on so-called retention bonuses. And now I'm correcting right now, it's not just on executives.. We have a duty...

Of the 75 people affected by this case, we have about 13 who are executives; the others are

employees.

- Employees who - - What's so special about them?

That's it, that's it. They are employees who arrive with specific skills.

Manage a pension plan. Manage, for example, all the exports we make. You know we have a group of about 40 people on the phone.

It is a transitional floor where we sell imported energy. It's people - a rare pearl species that's hard to replace.

Absolutely. So we are willing to pay them more because we keep the retention and we want to have the best too, because I don't want to come back in a year and say, "Look, we mismanaged our pension plan or our exports.

It cost us two, three hundred million dollars." It wouldn't be good for anyone.

Because we didn't have the right employee, we put an incompetent one in.

Exactly. It's better to have competent employees.

It costs us about \$1.9 million a year.

Why is that in the news? Now you're explaining it to me, - That's a good question. - like a hidden thing.

Our auditor, it's his job to do that.

He checks all our processes to ensure that...

You know, at Hydro-Québec, we have to be whiter than white and he discovered that. He asked himself questions and his questions were true, were fair.

When we looked at this, the compensation people said it was okay. We double-checked that and said that maybe we stretched the elastic, and maybe we couldn't do it.

Corrective measures are being taken to ensure that this is done in the right way. We must ensure that we do not lose these employees who make a significant contribution to Hydro-Québec.

So, we're in this right now, but there was nothing secret, no bad faith and no bad intention to hide it.

When we saw it, we said to ourselves that there was a problem, that we had just realized it, that we were simply going to manage it.

Éric Martel, thank you very much for being with us today.

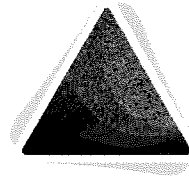
- Thank you, Mr. Dumont. - Goodbye.

Goodbye.

STATE OF MAINE PUBLIC UTILITIES COMMISSION

DOCKET NO. 2017-00232

**CENTRAL MAINE POWER COMPANY REQUEST FOR A CERTIFICATE OF PUBLIC
CONVENIENCE AND NECESSITY FOR THE CONSTRUCTION OF THE
NEW ENGLAND CLEAN ENERGY CONNECT (NECEC) TRANSMISSION PROJECT**



**NEW ENGLAND
CLEAN ENERGY
CONNECT**



**CENTRAL MAINE
POWER**

**REBUTTAL TESTIMONY OF
DAYMARK ENERGY ADVISORS:
DANIEL PEACO, DOUGLAS SMITH AND JEFFREY BOWER**

On Behalf of Central Maine Power Company

July 13, 2018

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EXHIBITS

EXHIBIT NECEC-31: Resume of Jeff Bower

CONFIDENTIAL HIGHLIGHTING KEY

 - Protective Order No. 7, NextEra Critical Energy Infrastructure Information (CEII)

 - Protective Order No. 8, Confidential and Proprietary Information of London Economics International, LLC (LEI)

 - Protective Order No. 9, NextEra Highly Confidential Information

1 **I. INTRODUCTION**

2 Central Maine Power (CMP or the Company) offers the following rebuttal testimony of
3 Daniel Peaco, Douglas Smith, and Jeffrey Bower of Daymark Energy Advisors (Daymark).¹

4 CMP retained Daymark to prepare an analysis of the economic benefits to Maine and
5 Maine electricity consumers that would be realized from the implementation of the New
6 England Clean Energy Connect (NECEC) and the delivery of clean energy from Hydro-
7 Québec to the Massachusetts electric distribution companies (Massachusetts EDCs). Our
8 analysis (the Daymark Report) quantified benefits including impacts on wholesale energy
9 and capacity market prices in Maine, and the hedging benefits on those prices in the event
10 of high natural gas price events. That analysis demonstrated that the NECEC would cause
11 significant energy and capacity market benefits to Maine electricity consumers.

12 In addition, CMP asked Daymark to assess the impact that the NECEC would have on
13 regional carbon dioxide (CO₂) emissions and energy congestion. Our analysis
14 demonstrated that there will be significant CO₂ emissions reduction benefits to Maine and
15 the region. Our congestion analysis demonstrated that the NECEC operation will not lead
16 to any material congestion in the Maine power system. Our analyses also showed that the
17 NECEC would reduce demand for natural gas in the electric sector.

¹ Mr. Peaco is a Principal Consultant, Mr. Smith a Managing Consultant, and Mr. Bower is a Senior Consultant at Daymark. See **Exhibit NECEC-1** to CMP's September 27, 2018 Petition for a Certificate of Public Convenience and Necessity (CPCN) for the New England Clean Energy Connect (NECEC) Transmission Project for Mr. Peaco's and Mr. Smith's curriculum vitae. Mr. Bower's curriculum vitae is provided as **Exhibit NECEC-31**.

1 Lastly, we addressed other benefits qualitatively, including ancillary services
2 savings and the benefits to all natural gas consumers resulting from the reduction in
3 natural gas consumption in the electric sector.

4 The Report submitted by London Economics International (LEI)² and testimony
5 offered by the Generator Intervenors³ (GI) and NextEra Energy Resources, LLC (NextEra)
6 offer alternatives analyses and critiques of the methods and assumptions employed by
7 Daymark.

8 This report contains Daymark’s assessment of the LEI Report, the GI and NextEra
9 testimony and our rebuttal to issues raised in those testimonies, including evidence offered
10 in response to data requests and in technical conferences.

11 **II. SUMMARY OF CONCLUSIONS**

12 We find that the evidence offered by LEI, GI and NextEra supports the conclusions
13 initially offered in the Daymark Report. As described in this rebuttal testimony, we
14 conclude that the asserted problems with our analysis or asserted adverse impacts on
15 Maine generators either are not well founded or do not change the conclusion that the
16 NECEC is beneficial to Maine. The evidence supports the conclusion that the NECEC offers
17 significant savings to Maine electricity consumers in the energy and capacity markets, as
18 well as providing potential ancillary services benefits and a hedge against higher natural
19 gas prices in Maine. These electricity consumer savings come at no cost to Maine electricity

² London Economics International, LLC, Independent Analysis of Electricity Market and Macroeconomic Benefits of the New England Clean Energy Connect Project (May 21, 2018) (“LEI Report”).

³ The Generator Intervenors are Calpine Corporation (Calpine), Vistra Energy Corporation (f/k/a Dynegy, Inc.) (Vistra Energy), and Bucksport Generation LLC (Bucksport Generation).

1 consumers.⁴ The evidence demonstrates that the NECEC also helps advance Maine policy
2 with respect to reducing CO₂ emissions in Maine and in reducing demand for natural gas in
3 the electric sector. Lastly, the evidence shows that the NECEC will have no significant
4 adverse impacts on existing Maine generators.

5 As discussed in this rebuttal testimony, we find that the evidence supports the
6 following conclusions regarding key issues raised regarding the NECEC:

- 7
- 8 • The NECEC is required in order to provide the transfer capability necessary
9 to deliver the 9.45 terawatt-hours (TWh) of clean energy contracted for by
10 the Massachusetts EDCs under purchase power agreements (PPAs).
11 Assertions that existing ties between Québec and New England have
12 available transfer capability for this energy are in error and not consistent
13 with historical operations of those ties.
 - 14 • The NECEC will not have any material adverse impact on congestion in Maine
15 or across key interfaces to the south. Assertions to the contrary were based
16 on analyses that were flawed.
- 17

18 We observe that there is agreement that the NECEC offers economic benefits to
19 Maine electricity consumers:

- 20
- 21 • Maine electricity consumers will pay less for wholesale energy if the NECEC
22 is operating than in a future without the NECEC. All parties offering analysis
23 on this issue agree that this is a benefit to consumers. The parties only differ
24 on the magnitude of those benefits based on alternative methods and
25 assumptions.
 - 26 • Maine electricity consumers may pay less for capacity if the NECEC capacity
27 clears in the forward capacity market (FCM) primary auction. In no event
28 will the NECEC increase the cost of capacity to Maine electricity consumers.
29 The parties differ only on the likelihood of the NECEC clearing in the primary
30 auction.
 - 31 • The NECEC represents a hedge on wholesale electric energy prices in Maine
32 in the event that higher natural gas prices delivered to generators in the
33

⁴ See Rebuttal Testimony of Thorn Dickinson, Eric Stinneford and Bernardo Escudero at Section III(H).

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1 region and in Maine result from congestion in the natural gas supply
2 network. The parties differ on the assumed reference forecast for natural gas
3 prices, but do not dispute that this assumption is subject to uncertainty.
4 We observe that the NECEC will have no material adverse impact on existing

5 Maine generators:

- 6 • The NECEC will not force any existing Maine generators to retire early.
7 Parties that asserted that this could occur provided no supporting analysis
8 and relied on misunderstandings of the rules regarding the forward capacity
9 market primary auction, the Minimum Offer Pricing Rules (MOPR), and the
10 voluntary substitution auction.
11
- 12 • The NECEC does not create any material congestion in the energy market and
13 existing Maine generators will not be precluded from participating in the
14 energy markets when it is economic for them to do so with the NECEC in the
15 system. Parties asserting congestion issues relied on analysis that we show
16 to be flawed.
17

18 We observe that the NECEC will make positive contribution to Maine's greenhouse
19 gas reduction and natural gas pricing polices:

- 20 • The NECEC will produce significant CO₂ emission reductions in Maine and
21 New England. No party disputes that there are savings in the region. The
22 party asserting that other markets would have increased emissions was
23 based on an incorrect assertion that the NECEC energy would be energy
24 diverted from existing exports to New York.
25
- 26 • The NECEC will reduce the consumption of natural gas in the electric sector
27 in Maine and New England, mitigating the exposure to higher natural gas
28 prices to Maine natural gas consumers resulting from high demand.
29
30

31 This rebuttal testimony discusses each of these points in the sections below.

32 **III. ANALYTICAL FRAMEWORK**

33 Our analytical framework has been called into question in this proceeding. Three
34 modeling decisions we made were raised during the technical conferences:

- 1 • Modeling 20 years;
- 2 • Modeling two cases, a Base Case without the NECEC and a Change Case that
- 3 adds the NECEC; and
- 4
- 5 • Energy and capacity market modeling that provide feedbacks between the
- 6 models.
- 7

8 We made the first choice, to model 20 years of impacts, to represent the full 20-year
9 life of the proposed (and now executed) NECEC PPAs to sell clean energy to the
10 Massachusetts EDCs.

11 The GI analysis focused on a single year, 2023, the first year of the proposed NECEC
12 PPAs and, as presented by the GI witnesses, did not attempt to derive the benefits that
13 would accrue over the duration of the NECEC PPAs. Further, this single year approach does
14 not adequately reflect the impacts that the NECEC can have over time, as the changes in
15 load, retirements, generation additions, and other factors are important to such an analysis
16 and 2023 is not representative of the system in all 20 years.

17 The LEI analysis considered the first 15 years of the NECEC PPAs. While the 15-year
18 analysis does capture significant dynamics of the New England markets over time that the
19 GI's single year analysis does not, it still did not model the full impact of the NECEC over the
20 entire 20-year NECEC PPAs.

21 The second decision we made was to select a modeling approach designed to
22 capture the impacts of the NECEC on the New England markets and, in particular, in Maine.
23 Daymark constructed a 20-year base case that assumed no NECEC in that period and an

1 NECEC case that included the NECEC transmission and the PPAs between HQUS⁵ and the
2 Massachusetts EDCs. This is the technique used by all witnesses offering analyses of
3 NECEC economic benefits in this case.⁶

4 Ms. Green from CLF challenged LEI on the use of this approach, asking why the base
5 case did not assume a similar project in the region.⁷ As Ms. Frayer discussed with Ms.
6 Green in that technical conference, analyzing the impact of a single project is frequently
7 done by constructing a base case without the project and a change case with the project.
8 This approach, frequently referred to as “with and without”, allows modelers to capture the
9 market impacts of the project in question. We agree with the explanation offered by LEI
10 and object to the notion that an analysis comparing a future with the NECEC the project to a
11 future with an alternative, but fundamentally similar, project has any value in assessing the
12 merits of proceeding with such a project.

13 Finally, in any situation where new capacity is being considered, it is important to
14 capture the energy and capacity market impacts in a manner that reflects the feedback
15 mechanisms between those two markets. While this decision has not been directly
16 challenged, both Mr. Russo and Ms. Bodell have discussed impacts across the energy and
17 capacity markets without explicitly modeling both markets to test their theories. Expected
18 energy prices impact capacity market bids by generators, and the results of capacity

⁵ HQUS replaced HRE as the counterparty for the PPAs. HQUS is a U.S. corporation organized and existing under the laws of the State of Delaware.

⁶ Daymark, LEI, and GI each used this “with and without” approach. As discussed in Section V.D., the NextEra analysis presented by Mr. Whitley did not properly model the change case. Nonetheless, his analysis was an attempt to produce a “with and without” set of model runs.

⁷ See 6/14/18 Tech. Conf. Tr. at 50:20-53:15 (Frayer).

1 auctions impact the amount and types of generation available for future energy production,
2 making such modeling important for ensuring quality analysis.⁸ Only LEI and Daymark
3 produced analyses that utilized this technique.

4 For these reasons, we believe the 20-year analysis, comparing cases with and
5 without the NECEC project and considering the interactions between the energy and
6 capacity market is the proper structure of the analysis for this proceeding. This approach
7 is the one used in the Daymark Report and is the only analysis presented in this proceeding
8 that includes all elements of this approach.

9 **IV. ENERGY MARKET BENEFITS**

10 The Daymark Report provided a detailed analysis of the wholesale energy market
11 benefits of the NECEC for electricity consumers in Maine and throughout the region based
12 on a set of assumptions typical of those used in the region for reference case analysis. We
13 concluded that the import of clean, low-cost energy will lower wholesale energy and retail
14 energy prices in Maine and throughout the region, providing \$496 million net present value
15 (NPV) of benefits to Maine electricity consumers over 20 years in our reference case
16 scenario.⁹ The LEI Report and GI and NextEra rebuttal testimonies explored alternative
17 assumptions to those included in our analysis, indicating that the level of energy benefits
18 we derived could be lower and that there is a range of uncertainty around any forecast of

⁸ Ms. Frayer noted this as well in her technical conference, saying, "It's great to have models, and that's why we use them, to make sure we can vet the theories that we put out there." See 6/14/18 Tech. Conf. Tr. at 93:13-15.

⁹ CMP's September 27, 2018 Petition for a Certificate of Public Convenience and Necessity (CPCN) for the New England Clean Energy Connect (NECEC) Transmission Project (Petition), **Exhibit NECEC-5** (NECEC Transmission Project: Benefits to Maine Ratepayers) at 17 of 98.

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1 this nature. However, none of the witnesses dispute the fact that there will be energy
2 benefits to Maine electricity consumers. We believe the record is clear that the benefits are
3 positive and significant.

4 **A. LEI Analysis of Energy Market Benefits**

5 LEI reviewed and critiqued Daymark’s energy market benefits analysis and
6 conducted its own analysis quantifying the potential energy market benefits of the NECEC
7 using LEI’s proprietary production cost model. LEI’s analysis of the potential wholesale
8 energy market benefits of the NECEC which is structurally similar to Daymark’s analysis.
9 LEI used PoolMod, its proprietary production cost model, to model a status quo Base Case
10 and a Project Case including the incremental generation and transmission upgrades
11 associated with the NECEC. As in the Daymark analysis, the primary output of this analysis
12 is a calculation of wholesale energy market savings.

13 While the analyses are structurally similar, there are some key differences which led
14 to variation in results from the LEI and Daymark analyses, including:

- 15 • **Topology:** LEI’s PoolMod analysis only modeled ISO-NE zones, with
16 interchange from other regions (New York, New Brunswick, and Québec)
17 modeled as **[Begin Confidential PO 8]** [REDACTED]
18 [REDACTED] **[End Confidential PO**
19 **8]**.¹⁰ By contrast, Daymark’s analysis models loads and generation for more
20 areas within the Eastern Interconnect, including NYISO, New Brunswick,
21 Québec, PJM, MISO, etc.
22
- 23 • **Natural gas prices:** LEI’s assumptions regarding natural gas prices differed
24 from the U.S. Energy Information Administration (EIA) Annual Energy
25 Outlook (AEO) forecasts used by Daymark. LEI’s gas price analysis relies on
26 near-term forward prices and AEO growth rates to develop a Henry Hub

¹⁰ Confidential 6/14/18 Tech. Conf. Tr. at 183:8-184:18.

1 index price. On top of this forecast LEI adds a transportation adder to
2 develop an Algonquin Citygate price.¹¹ The adder used by LEI for this
3 analysis assumed incremental pipeline capacity is added in New England
4 which has not yet been fully permitted and approved.¹² In addition to these
5 differences in forecast method, there were some differences in how LEI and
6 Daymark applied natural gas price forecasts to individual resources
7 depending on location and unit type.
8

- 9
- 10 • Generation portfolio: LEI and Daymark used different forecasts of generator
11 retirements and resource additions (both thermal and renewable). These
12 differences were due, in part, to the outputs of capacity models used by each
13 party (discussed below). Another aspect of the difference was that **[Begin**
14 **Confidential PO 8]** [REDACTED]
15 **[End Confidential PO 8]**.

16 The LEI Report includes additional discussion of the drivers of the difference in
17 results between the Daymark and LEI analyses.¹³

18 Similar to the results of the Daymark analysis, the LEI analysis concluded that there
19 are likely to be significant benefits to electricity consumers: \$122 million NPV in benefits to
20 Maine electricity consumers over 15 years¹⁴ and \$1.2 billion NPV in benefits to the New
21 England region as a whole.

¹¹ LEI Report at 20, 42-43.

¹² 6/14/18 Tech. Conf. Tr. at 21:8-19.

¹³ *Id.* at 38-46.

¹⁴ LEI's quantification of the NECEC benefits assumed a 15-year operations period for the NECEC, from 2023 to 2037. However, the Massachusetts EDCs have contracted for 1090 MW of transmission capacity on the NECEC for the first twenty years of the Project and the Hydro-Québec has committed to deliver up to 1,090 MW of energy to the Massachusetts EDCs in every hour of each day for the first twenty years of the NECEC. Rebuttal Testimony of Thorn Dickinson, Eric Stinneford and Bernardo Escudero at Section II(A).

1 **B. GI Analysis of Energy Market Benefits**

2 GI also conducted independent analysis of the potential energy market benefits of
3 the NECEC. The GI witnesses, with the support of Calpine personnel, used the UPLAN
4 model to conduct its analysis.

5 As with the LEI modeling analysis, the GI analysis uses a methodology similar to the
6 approach used by Daymark, modeling a future with and without the NECEC and assessing
7 potential economic and environmental impacts by comparing the changes between those
8 two cases. Also, as with the LEI analysis, there are some differences in approach and
9 assumptions which led to variation in results from the GI and Daymark analyses:

- 10 • Study period: GI only evaluated the impact in 2023, the first year of operation
11 of the NECEC.¹⁵
12
13 • Topology: GI's UPLAN modeled loads and generation in New England, New
14 York, PJM, MISO, and Ontario. Interchange from Québec and New Brunswick
15 were reflected as fixed hourly shapes.¹⁶ The interchange from Québec to
16 Ontario was not modeled.¹⁷
17
18 • Natural gas prices: GI's natural gas price assumptions are the result of a
19 Calpine internal forecast and differed from the EIA AEO forecasts used by
20 Daymark. In addition, as with the LEI analysis, there were some differences
21 in how GI and Daymark applied natural gas price forecasts to individual
22 resources depending on location and unit type.¹⁸
23

¹⁵ Bodell Direct Testimony at 5.

¹⁶ 6/20/18 Tech. Conf. Tr. at 56:2-18.

¹⁷ 6/20/18 Tech. Conf. Tr. at 65:11-66:7.

¹⁸ See, e.g., zonal gas price inputs defined in GI Response to Data Request EXM-004-006, Attachment *EXM-004-006_UPLAN Results.xlsx*.

1 • CO₂ prices: GI's CO₂ forecast was \$5/metric ton for the RGGI states, with a
2 \$15/metric ton price for Massachusetts generators.¹⁹ Daymark used a
3 forecast beginning at approximately \$15/metric ton and growing over time.
4

5 • Generation portfolio: GI and Daymark assumed different forecasts of
6 generator retirements and renewable resource additions.²⁰
7 GI evaluated three scenarios and three cases for each scenario.²¹ One scenario used
8 Calpine's standard assumptions regarding fuel prices, carbon prices, and resource
9 portfolio. The second scenario built from the first one, altering several inputs in an attempt
10 to replicate some of the Daymark assumptions in the year 2023. The assumptions that GI
11 modified were natural gas prices, CO₂ pricing, and the renewable buildout. The third GI
12 scenario used the CO₂ price and resource buildout assumptions from the second scenario,
13 but used the lower natural gas prices assumed by Calpine in the first scenario. The
14 modeling cases for each scenario included a Base Case, an NECEC case in which the NECEC
15 energy represents incremental exports from Québec, and an NECEC case in which the
16 energy exported to Maine displaces energy exported to New York.

17 From the production cost modeling, GI calculated the change in Maine LMPs
18 resulting from the addition of the NECEC. This was done twice for each scenario: once by
19 comparing the results of the "incremental" NECEC case to the Base Case and once by
20 comparing the results of the "constant" NECEC case to the Base Case. "Incremental" meant
21 that the 9.45 TWh of NECEC generation was added to the model without any reductions to

¹⁹ GI Response to Data Request EXM-004-006, Attachment *EXM-004-006_UPLAN Results.xlsx*.

²⁰ GI Response to Data Request EXM-004-006, Attachment *EXM-004-006_UPLAN Results.xlsx*.

²¹ ENERGYZT Technical Report, Section 3 (UPLAN Market Analysis), submitted in response to CMP-004-001, Attachment 4. *See also* 6/20/2018 Tech. Conf. Tr. at 8:2-10:18.

1 Hydro-Québec exports to other regions. “Constant” meant that the 9.45 TWh of NECEC
2 generation led to a one-for-one elimination of MWh otherwise being exported to New York.
3 The results found that the average hourly LMP reduction in Maine across these scenarios
4 ranged from \$2.30/MWh to \$3.21/MWh.²²

5 GI did not translate this LMP reduction to a total benefit to Maine electricity
6 consumers. However, we estimated the GI annual impact to Maine electricity consumers
7 using the ISO-NE forecast of 2023 Maine load, to yield a range of \$26.5 million –
8 \$36.1 million²³ in benefits to Maine load in 2023. These benefits are almost identical to the
9 2023 benefits calculated by Daymark of \$30-35 million.²⁴

10 From this analysis, GI’s witness Ms. Bodell concludes that “[c]hanging key conditions
11 such as natural gas prices, carbon prices and renewable buildout illustrates how benefits
12 can be significantly altered by market conditions and policy decisions.”²⁵

13 **C. NextEra Comments on Energy Market Benefits**

14 NextEra witness Christopher Russo critiqued Daymark’s calculation of the benefits
15 associated with the Project using a delivered gas price in New England, rather than price
16 for Algonquin Citygate.²⁶ Mr. Russo testified that if gas prices are lower than those used in

²² GI Response to Data Request EXM-004-006, Attachment *EXM-004-006_UPLAN Results.xlsx*.

²³ Calculated based on data in EXM-004-006 and the ISO-NE 2018 load forecast data for the Maine zone (Gross-PV-EE).

²⁴ Daymark reported 20 year levelized benefits of \$40-44 million per year. As can be seen in IECG_004_001_At 3 CONFIDENTIAL, the 2023 values were less and the benefits rose throughout the study period as gas prices increase.

²⁵ Bodell Direct Testimony at 23:3-5.

²⁶ Russo Direct Testimony at 9, 11-12.

1 the analysis, benefits are likely lower as well. Additionally, and without performing any
2 modeling to rely upon, he referred to the Daymark model calculations of energy market
3 benefits as “speculative.”²⁷

4 **D. Conclusions Regarding Energy Benefits of the NECEC**

5 LEI and GI have each offered analyses assessing the potential energy market
6 benefits of the NECEC and both parties concluded that there are significant benefits under a
7 variety of futures. LEI evaluated the benefits over a 15-year study period and evaluated the
8 “significant additional value” of the NECEC during weather-driven system stress events.²⁸
9 GI evaluated the benefits of the NECEC using a variety of different assumptions for natural
10 gas prices, CO₂ prices, renewable resource buildout, and levels of Québec exports to other
11 markets. The GI’s “constant HQ exports” NECEC cases do not provide material evidence for
12 this docket as they were based on a flawed assumption regarding Hydro-Québec’s inability
13 to produce incremental hydro power for the NECEC. As discussed in the rebuttal testimony
14 of Mr. Dickenson, Mr. Stinneford, and Mr. Escudero, the hydropower production will be
15 incremental to historical base line exports, which invalidates the “constant HQ exports”
16 assumption underlying much of the GI analysis.²⁹ Yet even in that flawed case, and in each
17 of the other scenarios, GI’s UPLAN analysis found significant energy benefits in 2023, the
18 one year evaluated by GI.

²⁷ *Id.* at 9:12:20

²⁸ LEI Report at 27-30.

²⁹ Rebuttal Testimony of Thorn Dickinson, Eric Stinneford and Bernardo Escudero at Section III(D).

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1 The claims made by Mr. Russo that the energy market benefits of the NECEC are
2 speculative are nothing more than recognition that natural gas prices, and therefore energy
3 market prices, might vary over a wide range in the future. The primary support for his
4 argument appears to be linked to criticism that the EIA AEO natural gas price forecast used
5 by Daymark is too high.³⁰

6 While it is true that, in general, lower natural gas prices would reduce the benefits of
7 the NECEC energy, this does not mean that the benefits themselves are speculative. In
8 total, three parties have conducted production cost modeling to quantify the benefits of the
9 NECEC. Each analysis used a different natural gas price, with LEI and GI specifically noting
10 that they used lower natural gas price forecasts than the EIA forecast used in Daymark's
11 analysis. In addition, LEI's lower New England natural gas price assumptions assume the
12 completion of incremental pipeline capacity that has not yet been permitted and approved,
13 and therefore may underestimate regional natural gas prices in the future.

14 Despite the differences in assumptions, all analyses have found significant energy
15 market benefits for Maine electricity consumers. Specifically, the LEI Report showed
16 NECEC energy market benefits of \$13 million per year,³¹ the GI analysis showed NECEC
17 energy market benefits of \$26 – 36 million in 2023³² and the Daymark analysis showed
18 NECEC energy market benefits of \$40 – 44 million per year.³³ The precise level of benefits

³⁰ LEI Report at 14; Russo Direct Testimony at 9, 11-12; Bodell Direct Testimony at 23:17-23:7.

³¹ LEI Report at 11, Figure 1.

³² Calculated based on data in EXM-004-006 and the ISO-NE 2018 load forecast data for Maine zone (Gross-PV-EE).

³³ See **Exhibit NECEC-5** at 3 of 98.

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1 that will accrue to Maine electricity consumers over the next 20 years or more is not
2 knowable today. The results of each forecast conducted by parties in this case is dependent
3 on the input assumptions. However, this does not mean that the existence of benefits is
4 speculative, and no party has suggested that the NECEC will increase energy prices for
5 Maine electricity consumers. Rather, each analysis has found millions of dollars in benefits
6 for Maine electricity consumers after the NECEC is constructed.

7 **V. TRANSMISSION CONGESTION ANALYSIS**

8 The Daymark Report provided an assessment of the impact of the NECEC generation
9 and transmission upgrades on congestion at key network interfaces in Maine and in the
10 region, demonstrating that the NECEC enables full delivery of the PPA energy from Hydro-
11 Québec with minimal congestion throughout the system.³⁴ The purpose of this analysis is
12 to demonstrate that the project will not have material adverse consequences on existing
13 Maine generators due to significant size or duration of periods of non-zero congestion in
14 the LMPs. This analysis also demonstrates that the wholesale market price benefits to
15 electricity consumers are the result of lower values for the energy component of LMPs, not
16 the congestion component.³⁵

17 LEI, GI, and NextEra all provide alternative assessments of congestion on key Maine
18 interfaces, most notably the Surowiec South and Maine-New Hampshire interfaces. The
19 results of these analyses support Daymark's conclusion.

³⁴ Exhibit NECEC-5 at 33 of 98.

³⁵ If congestion were to occur, it would provide further benefits to electricity consumers, while lowering the prices that Maine generators would realize.

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1 **A. Review of Daymark Analysis**

2 Using both zonal and nodal analyses, we evaluated the impact of the NECEC on
3 congestion on the primary interfaces between the point of interconnection of the project
4 and the points of delivery in Massachusetts: Surowiec South, Maine-New Hampshire, NNE-
5 Scobie+394, and New England North-South.

6 Our analysis found that the interfaces were uncongested in at least 99 percent of all
7 hours studied, and that the energy from the NECEC could freely flow to load centers in
8 southern New England.³⁶

9 **B. LEI Analysis and Conclusions**

10 As described above, LEI also conducted production cost modeling using its PoolMod
11 model. LEI used the output of that model to address the congestion impacts of the
12 NECEC.³⁷

13 The LEI results agree with the Daymark results that there is no congestion at the
14 Surowiec South interface after the NECEC generation and transmission upgrades are added
15 to the system. The LEI analysis shows slightly higher levels of congestion at the Maine-New
16 Hampshire interface than the Daymark analysis, though the average of 4.3 percent of
17 congested hours still represents minimal congestion.

18 There are multiple possible explanations for the higher congestion levels resulting
19 from the LEI analysis. First, as previously discussed, **[Begin Confidential PO 8]** ██████████

³⁶ Exhibit NECEC-5 at 31-33 of 98.

³⁷ LEI Report at 24-25.

1 [REDACTED]
2 [REDACTED] [End Confidential PO 8] The addition of the
3 inframarginal NECEC energy will reduce wholesale market prices in Maine, which could
4 lead to some reduction in economic imports of energy from New Brunswick. This would
5 reduce the amount of energy trying to flow across the Maine-New Hampshire interface to
6 the load centers in southern New England.

7 In addition, LEI's modeling assumptions included [Begin Confidential PO 8] [REDACTED]
8 [REDACTED] [End Confidential PO 8]
9 that Daymark did not model.³⁹ The output of this new capacity without associated
10 transmission upgrades increases energy flows north to south across the Maine system and
11 increases the potential for congestion at the Maine-New Hampshire interface.

12 C. GI Analysis and Conclusions

13 As part of the UPLAN analysis previously described, GI evaluated the impact of the
14 NECEC on congestion on major interfaces. This analysis is summarized in the direct
15 testimony of Tanya Bodell.⁴⁰

16 The analysis assesses the hourly flows on the Surowiec South and Maine-New
17 Hampshire interfaces to identify the hours in which the interface flow is at or near its limit.
18 This assessment was conducted for both the Base Case and the Project Case, adding the

³⁸ Confidential 6/14/18 Tech. Conf. Tr. at 183:8-184:18.

³⁹ LEI's Response to Data Request CMP-011-005, Attachment *CMP-011-005_Attachment_1_CONFIDENTIAL.xlsx*, "New Entry_Retirements" tab.

⁴⁰ Bodell Direct Testimony at 18:1-19:3.

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1 NECEC generation and increasing the transfer limit at Surowiec South due to the
2 transmission network upgrades associated with the project.

3 According to Ms. Bodell's testimony, the results of the analysis show that there is no
4 congestion at the Maine-New Hampshire interface in the Base Case (without the NECEC)
5 under any of the scenarios.⁴¹ In the NECEC Cases, Ms. Bodell concludes that the flows over
6 the interface are at or within 5-10 percent of the interface limit in a small percentage of
7 hours⁴² of the year using the Calpine's assumptions.⁴³

8 There are two primary issues with the GI analysis that make these results an
9 unreliable representation of the potential congestion impact of the NECEC.

10 The first issue relates to the Maine-New Hampshire interface limit used in various
11 pieces of GI analysis. The UPLAN analysis modeled the Maine-New Hampshire interface at
12 1,960 MW in the north-to-south direction.⁴⁴ However, when Ms. Bodell conducted the
13 analysis described above, in which she determined the number of hours at or near the
14 interface limit, she used an interface limit of 1,900 MW.⁴⁵

15 To determine the impact that this discrepancy has on the results reported in
16 Ms. Bodell's testimony, we recalculated the results presented in her testimony, correcting
17 the inconsistency by using the 1,960 MW Maine-New Hampshire interface limit, consistent

⁴¹ *Id.* at 18:10-20.

⁴² Even in her flawed analysis, Ms. Bodell only found Maine-New Hampshire congestion in less than 5 percent of the hours. As discussed below, there are no hours of congestion when her analysis is corrected to reflect the modeled interface definition.

⁴³ Bodell Direct Testimony at 18:10-20.

⁴⁴ GI Response to Data Request EXM-004-006, Attachment *EXM-004-006_UPLAN_Input Assumptions (2017-232).xlsx*, "Interfaces" tab, Row 4. *See also* 6/20/2018 Tech. Conf. Tr. at 2:21-3:16 (Bodell Confidential).

⁴⁵ Bodell Direct Testimony at 19, Figures 5 and 6.

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1 with the limit actually used in the UPLAN model. These corrected results are presented in
2 the table below.

3 **Table 1. GI congestion analysis results, corrected for 1,960 MW**
4 **Maine-New Hampshire Interface limit**

	CURRENT CONDITIONS		DAYMARK REPRODUCTION		DAYMARK REPRODUCTION WITH LOWER GAS PRICES	
	Base – No NECEC	With NECEC (Incremental)	Base – No NECEC	With NECEC (Incremental)	Base – No NECEC	With NECEC (Incremental)
At Limit	0	0	0	0	0	0
Within 5% of Limit	0	537	0	354	0	235
Within 10% of Limit	0	918	0	579	0	436

5
6 The first row, “At Limit”, is the number of hours per UPLAN case where there was
7 actual congestion on the Maine-New Hampshire interface. These corrected results show
8 that the GI model produced no hours in which the flow over the Maine-New Hampshire
9 reached the modeled limit of 1,960 MW, as opposed to Ms. Bodell’s claims of several
10 hundred hours of actual congestion.⁴⁶

11 The other two rows relate to the unsubstantiated premise that if flows are within 5
12 or 10 percent of the interface limit, it will cause negative system consequences. Ms. Bodell
13 presents the results of the interface flow data counting the number of hours within those
14 thresholds, but does not provide any support for the significance of those levels.

15 Additionally, Ms. Bodell testified that those levels do not relate to any particular ISO-NE

⁴⁶ ENERGYZT Technical Report, Figure 16, submitted in response to CMP-004-001, Attachment 4.

1 rules or operational procedures.⁴⁷ Despite the lack of support for the relevance of these
2 numbers, the corrected table above shows that even if they do represent some economic
3 impact to Maine prices, such impact is only in a limited number of hours. Finally, any
4 impact would only serve to lower prices in Maine, producing additional Maine electricity
5 consumer benefits.

6 In addition to the modeling performed and her post processing calculation of
7 potential impacts, Ms. Bodell argues that there are historical price differences between
8 Maine and New Hampshire (and the region more generally). She asserts that the lower
9 prices, combined with higher gas prices in Maine, harms the competitiveness of Maine
10 generators. She suggests that the NECEC will create congestion that will exacerbate these
11 price differentials.⁴⁸

12 In her testimony, Ms. Bodell presents an analysis of the zonal LMPs in Maine and
13 New Hampshire showing a histogram of zonal LMP differentials in the 2013 to 2017 period.
14 This histogram compares the Maine and New Hampshire zonal LMPs, counting the number
15 of hours over a five-year period in which the LMPs differed between the zones. Ms. Bodell
16 notes that “[l]ower prices in Maine tend to be due to congestion and losses.”⁴⁹

17 Ms. Bodell’s historical analysis and testimony misrepresents the historical data. The
18 issues include:

⁴⁷ 6/20/2018 Tech. Conf. Tr. at 93:15-94:10.

⁴⁸ Bodell Direct Testimony at 15:4-18:20.

⁴⁹ Bodell Direct Testimony at 16:4.

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- 1 1) The analysis does not distinguish between the congestion and loss components
- 2 of the LMPs;
- 3 2) The analysis ignores material changes in transmission topology during the 2013
- 4 to 2017 period.

5 With respect to the first issue, the LMP price differences between Maine and New
6 Hampshire can *only* be the result of congestion or losses.⁵⁰ The GI workpapers include the
7 difference in LMP broken out into the congestion and loss components.⁵¹ The data
8 Ms. Bodell presented in her testimony combined the congestion and loss components.⁵²
9 **Figure 1** below is copied from Ms. Bodell's workpapers and includes the disaggregated
10 data showing the number of hours where the congestion and losses components of zonal
11 LMPs (the congestion component or MCC and the marginal loss component or MLC)
12 differed between Maine and New Hampshire. The MCC differences are shown in grey on
13 the stacked bar chart and the MLC differences of the same magnitude are stacked in orange.
14 These data show that congestion caused differences in the zonal LMPs in only 12 percent of
15 the 43,824 hours in the five-year data set, with 38,476 of the hours (88 percent of the time)
16 showing no differences in MCC between Maine and New Hampshire. However, the loss
17 factor causes differences in the zonal LMPs in 98 percent of the time over that five-year

⁵⁰ LMPs consist of three components, the Energy Component, Congestion Component, and Loss Component. The Energy Component is equal for all nodes across the system.

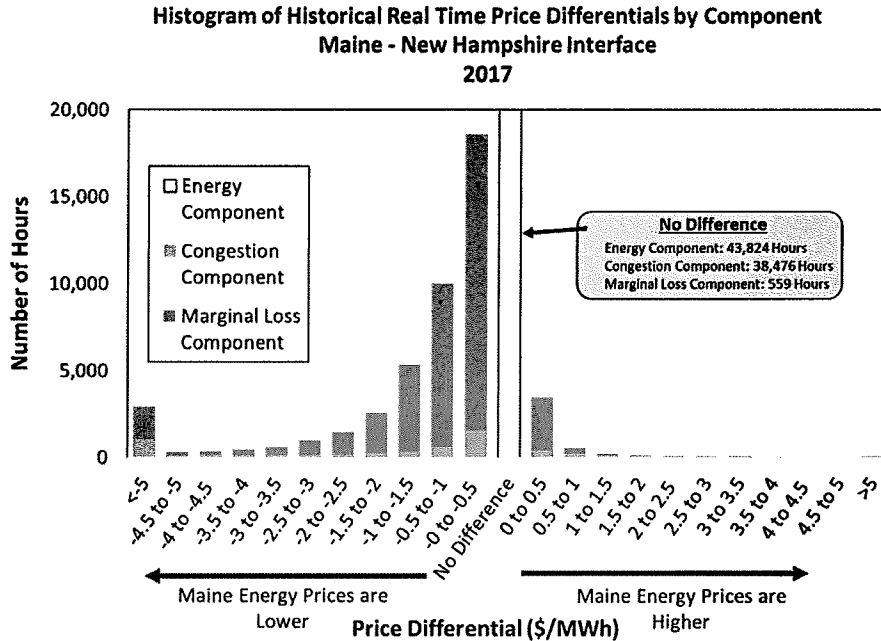
⁵¹ GI Response to Data Request CMP-004-001, Attachment *CMP-004-001_ENERGYZT_ISO-NE Zonal LMP Analysis.xlsx*

⁵² Bodell Direct Testimony at 16, Figure 3.

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1 period, with only 559 hours (less than 2 percent of the time) showing no differences in MLC
 2 between the two zones.

3 **Figure 1. Historical price differential between Maine and New Hampshire by LMP**
 4 **component**



5
 6 This figure shows clearly that the vast majority of occurrences of zonal price
 7 difference between Maine and New Hampshire is due to the loss component, rather than
 8 congestion, an important observation that was not apparent in the figure Ms. Bodell
 9 included in her testimony. In fact, over that historical period, there was very limited
 10 congestion difference between Maine and New Hampshire zonal LMPs.

11 With respect to the second issue, the historical period that Ms. Bodell examined
 12 includes data from periods that pre-dates the completion of Maine Power Reliability
 13 Program (MPRP) in 2015. The 2013 to 2015 period of the data is based on a materially
 14 different transmission topology and a period when significant transmission construction,

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1 including several necessary transmission outages, was conducted. Ms. Bodell indicated she
2 chose the 2013 – 2017 period because it was the most recent five years and asserted that it
3 is representative of current conditions.⁵³ However, Ms. Bodell did not consider these
4 significant changes in the system in her analysis.

5 Had Ms. Bodell accounted for these issues, it would have become apparent that the
6 loss component (MLC) is the material cause of differences in LMPs in Maine, not congestion
7 (MCC). Accordingly, Ms. Bodell’s conclusions regarding the impact of the NECEC on
8 congestion are not reliable and should be discarded.

9 **D. NextEra Analysis and Conclusions**

10 NextEra similarly conducted production cost modeling, and used the results to draw
11 conclusions about the impact of the NECEC on congestion in Maine. While this analysis was
12 not described in the testimony of either Stephen Whitley or Mr. Russo, the results were
13 referenced in response to data requests.⁵⁴ Based on our review of the analysis, the
14 analytical structure was flawed, and thus the conclusions related to congestion have no
15 merit.

16 The NextEra analysis utilized ABB’s Gridview model, operated on an hourly nodal
17 basis evaluating 2021 only. The analysis included a Base Case and a Change Case, with
18 1,200 MW of incremental generation injected at the Larrabee Road node in every hour for
19 the Change Case.

⁵³ 6/20/2018 Tech. Conf. Tr. at 14:4-15:5.

⁵⁴ NextEra’s Responses to Data Requests CMP-001-010 and CMP-001-001.

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1 The analysis conducted by NextEra concluded that the NECEC would result in
2 significant congestion at the Surowiec South interface. These results do not provide a
3 reasonable or accurate assessment of potential congestion due to an error in the
4 methodology.

5 Specifically, despite Mr. Whitley's assertions to the contrary,⁵⁵ the modeling
6 workpapers and output files provided in response to ODR-005-001 demonstrate that in
7 modeling the NECEC, **[Begin Confidential PO 7]** [REDACTED]

8 [REDACTED]
9 [REDACTED]
10 [REDACTED]
11 [REDACTED]
12 [REDACTED]
13 [REDACTED]
14 [REDACTED] **[End Confidential PO 7]**

15 Due to the critical nature of this problem with the NextEra methodology, the results
16 of the NextEra congestion analysis do not merit further evaluation or consideration.

⁵⁵ 6/14/2018 Tech. Conf. Tr. at 139:24-140:4.

⁵⁶ NextEra's Response to Data Request ODR-005-001, Attachment HIGHLY CONFIDENTIAL - Surowiec South (With HVDC) HourlyData_Interface.csv. **[Begin Confidential PO 7]**

[REDACTED] **[End Confidential PO 7]**

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1 **E. Conclusions Regarding Transmission Congestion**

2 The Daymark Report provided two separate analyses of congestion. A full 20-year
3 analysis, using a zonal topology, modeled the hourly flows on the Maine interfaces with and
4 without the NECEC project. The results of the analysis concluded that the NECEC does not
5 create material congestion at Maine interfaces, with results showing uncongested
6 deliveries of energy over the Surowiec South and Maine-New Hampshire interfaces in more
7 than 99 percent of all hours.⁵⁷

8 In addition to the long-term zonal results, Daymark also performed a one-year nodal
9 analysis for the year 2025. The nodal analysis not only reviewed the Maine interfaces but
10 also looked at several key downstream interfaces that ISO-NE monitors closely:

- 11 • Surowiec South Interface;
- 12 • Maine-New Hampshire Interface;
- 13 • NNE-Scobie+394 Interface; and
- 14 • New England North-South Interface.⁵⁸

15 The results of the more detailed nodal model confirmed the long-term zonal results,
16 with a conclusion that “[i]n all cases, following the construction of the NECEC Project, the
17 key interfaces were unconstrained a minimum of 99% of the hours in the year.”⁵⁹

18 Daymark’s congestion analysis is supported by LEI’s model, which showed no
19 congestion at the Surowiec South interface and limited congestion at the Maine-New

⁵⁷ Exhibit NECEC-5 at 31 of 98.

⁵⁸ *Id.*

⁵⁹ *Id.*

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1 Hampshire interface, **[Begin Confidential PO 8]** [REDACTED]
2 [REDACTED]. **[End Confidential PO 8]** And finally, the UPLAN model that Ms. Bodell
3 relied upon shows no congestion at Surowiec South, and when the proper interface limit is
4 used for the Maine-New Hampshire interface, there was no congestion in her results either.

5 From a pricing perspective, the only actual impact on LMPs in Maine is due to the
6 loss component of LMPs. Upon examination, Ms. Bodell's historical pricing data show the
7 relative impact of the loss and congestion components in the real-time market historically,
8 and the vast majority of the zonal LMP differences between Maine and New Hampshire are
9 due to the loss component, not congestion. The loss component is a function of the
10 distance between supply and demand, and is unrelated to congestion. Further, Ms. Bodell's
11 analysis includes data from years prior to the completion of MPRP.

12 The record is clear that if the NECEC is properly modeled, there is little to no
13 congestion and substantially all energy flowing through Maine can be delivered south
14 without any negative congestion pricing impacts on existing Maine generators.

15 VI. ELECTRIC CONSUMERS' CAPACITY BENEFITS

16 A. Review of Daymark Analysis

17 The Daymark Report provided an assessment of the potential impact of the NECEC
18 generation and transmission upgrades on the ISO-NE forward capacity market (FCM). In
19 that report, we found that if the NECEC clears the FCM, Maine electricity consumers will
20 realize significant savings through the lowering of the FCM clearing price. Specifically, the
21 Daymark Report states that, "[d]uring the first 8 years of the project, assuming it clears in
22 each year, the NECEC Project Bids produce an average of \$50 million per year in benefits to

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1 Maine electricity consumers, and a total NPV of \$312 million (2023\$) over the 20-year
2 study period.”⁶⁰

3 **B. LEI Analysis and Conclusions**

4 LEI conducted capacity market modeling using their proprietary capacity market
5 model, the FCA Simulator.⁶¹ Based on their model, LEI estimated electricity consumer
6 capacity benefits of \$223 million (2023\$) NPV over the 15-year period studied by LEI.⁶²
7 Furthermore, Ms. Frayer, chief witness for LEI, stated during LEI’s technical conference
8 that, “we were leaning towards it more likely clearing the primary auction.”⁶³

9 **C. GI Analysis and Conclusions**

10 The generator intervenors provided two pieces of testimony that discussed
11 potential impacts of the NECEC on the FCM. Ms. Bodell summarized her position in her
12 direct testimony, where she states that electricity consumer capacity benefits are “[l]ikely
13 to be \$0 – market rules make it unlikely that energy (sic) supply from NECEC will qualify
14 and clear” and “[i]f it does clear, likely to be lower than impact calculated by (Daymark’s)
15 proprietary model due to excess supply and zones/interties which have cleared at lower
16 prices.”⁶⁴ Mr. Fowler summarizes his position by stating that “it is unlikely there will be any
17 capacity market ‘benefits’ to Maine or anywhere else.”⁶⁵

⁶⁰ Exhibit NECEC-5 at 20 of 98.

⁶¹ LEI Report at 67 of 85.

⁶² *Id.* at 10 of 85.

⁶³ 6/14/2018 Tech. Conf. Tr. at 49:25-50:1.

⁶⁴ Bodell Direct Testimony at 11.

⁶⁵ Fowler Direct Testimony at 4:68-69.

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1 Both Ms. Bodell and Mr. Fowler base their conclusion that Maine electricity
2 consumers will not receive capacity benefits upon the assertion that the NECEC will not, in
3 their opinion, clear the primary auction for any FCA over the duration of the NECEC PPAs.
4 No model results or other analysis were provided in support of either claim.

5 **D. NextEra Analysis and Conclusions**

6 The position of NextEra regarding potential electricity consumer capacity benefits is
7 contained in the testimony of Mr. Russo. He summarizes his position with respect to the
8 potential for electricity consumer capacity benefits by stating that:

9 *Given the high cost of the HVDC transmission line, if HRE offers its capacity*
10 *at a cost lower than the cost of capital for the HVDC to financially benefit*
11 *from the ISO-NE capacity market, the BSM⁶⁶ would likely be triggered.*
12 *Should HRE's capacity be mitigated and eliminated from the auction, then*
13 *there will be no benefit to Maine electricity consumers, despite claims by*
14 *CMP and its consultant Daymark of such benefits as a result of HRE's*
15 *generation selling into the capacity market.⁶⁷*

16 Similar to the GI positions, no capacity modeling was performed in support of this
17 position.

18 **E. Conclusions Regarding Capacity Market Benefits**

19 Only two capacity models have been presented as evidence in this docket. The
20 Daymark proprietary capacity model projects the impact on capacity prices between 2023
21 and 2042 (the time during which the NECEC PPAs would be in force) based on a

⁶⁶ Buyer side mitigation rule.

⁶⁷ Russo Direct Testimony at 11:10-15.

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1 presumption that the NECEC will clear in the primary auction of the FCA. The LEI capacity
2 analysis is also premised on the NECEC clearing the primary auction. While LEI did not
3 specifically analyze a cost-based bid that might be approved by the ISO-NE IMM, Ms. Frayer
4 indicated during the LEI technical conference that their analysis also produced forecasted
5 capacity prices that, in her professional judgement meant that, "it's plausible to see a MOPR
6 that would be sufficiently below that capacity price for a project like this."⁶⁸

7 The Daymark and LEI capacity models are two independent proprietary models,
8 each with their own inputs and methodology for forecasting capacity prices. The fact that
9 both models project capacity prices high enough to make the NECEC clearing "plausible"
10 and the fact that no other capacity model has been introduced by any other witness
11 suggests that electricity consumer capacity benefits have a reasonable probability of
12 occurring with the NECEC in service.

13 While Daymark believes it is reasonable to assume a level of electricity consumer
14 capacity benefits commensurate with the LEI or Daymark model results, we do recognize
15 that these benefits are uncertain. It is possible that in any or even all years of the NECEC
16 the hydro capacity will not clear the FCM primary auction, leading to no electricity
17 consumer capacity benefits in that year. However, in that scenario, electricity consumers
18 will not be harmed; there will simply be no capacity market benefits. This means that there
19 is a clear potential for significant electricity consumer benefits with some possibility
20 capacity prices will be unaffected due to the NECEC not clearing. If the NECEC does not

⁶⁸ 6/14/2018 Tech. Conf. Tr. at 50:4-5.

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1 clear the FCA though, capacity prices do not increase. Thus, there is no risk that electricity
2 consumers will pay more in that situation. The record in this docket shows a range of
3 uncertainty of electricity consumer capacity benefits extends from \$0 if the NECEC does not
4 clear to a material positive benefit in the range of \$223 to \$312 million NPV if it does clear.

5 In his technical conference session, Mr. Fowler raised one additional possibility not
6 covered in his direct testimony.⁶⁹ In a discussion between Mr. des Rosiers and Mr. Fowler,
7 Mr. Fowler made the point that, “in some narrow circumstances” the NECEC could cause
8 price separation in the Maine zone without clearing the primary auction. Mr. Fowler was
9 describing a potential situation where the NECEC qualifies for the FCM and causes the
10 ISO-NE to model Maine as a separate zone for capacity market purposes. If that occurs,
11 then the FCM primary auction for Maine will use a local demand curve rather than the
12 ISO-NE demand curve for “rest-of-pool” (ROP) resources. Mr. Fowler pointed out that
13 depending on where the Maine capacity market cleared, the price derived from the local
14 demand curve could differ from the ROP derived price, causing price separation even if the
15 NECEC does not clear.

16 While this situation could occur in some circumstances as Mr. Fowler alleges, there
17 is no situation where this could harm Maine electricity consumers. Section III.13.2.7.2. of
18 the ISO-NE Tariff specifies that “[t]he Capacity Clearing Price in an export constrained
19 Capacity Zone shall not be higher than the Capacity Clearing Price in the Rest-of-Pool
20 Capacity Zone.” This means that in the situation Mr. Fowler identified, the Maine capacity

⁶⁹ 6/19/2018 Tech. Conf. Tr. at 97:1-21.

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1 price can be equal to or less than the Rest-of-Pool price that Maine electricity consumers
2 would have paid but for that circumstance. This outcome, as unlikely as it might be, would
3 reduce the capacity payments made by Maine electricity consumers – a benefit to
4 consumer – while it would also lead to lower revenues for Maine generators.

5 **VII. NECEC IMPACTS ON MAINE GENERATOR RETIREMENTS**

6 **A. Review of Daymark Analysis**

7 In explicitly modeling the 20-year NECEC PPAs through our proprietary energy and
8 capacity models, we considered the potential impacts to Maine generators. The Daymark
9 energy and capacity models are designed to analyze the individual market impacts and the
10 feedbacks between energy and capacity markets to determine from quantitative analysis
11 what the likely impacts would be for a given set of input assumptions. The results of these
12 models showed no retirements of Maine generators caused by the inclusion of the NECEC
13 throughout the study period.⁷⁰

14 **B. LEI Analysis and Conclusions**

15 In similar fashion to the Daymark modeling, LEI produced an analysis based on both
16 its proprietary energy and capacity models, which also work together to produce results
17 consistent with the inputs and results of both models. The LEI study found that “[t]he
18 generation units that are expected to retire early as a result of the NECEC participating in
19 the FCM are located in Connecticut.”⁷¹

⁷⁰ Daymark Report and associated workpapers.

⁷¹ LEI Report at 35 of 85.

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1 **C. GI Analysis and Conclusions**

2 Despite the assertions of both Ms. Bodell and Mr. Fowler that the NECEC was
3 unlikely to clear the primary auction, Ms. Bodell also claims that “NECEC’s participation in
4 ISO-NE energy markets would hasten Maine generating plant retirements.”⁷² Additionally,
5 with respect to the capacity market, Ms. Bodell claims that “any pricing benefits would be
6 offset by retirements required by CASPR.”⁷³ In her technical report, presented as part of
7 the response to the discovery response CMP-004-001, Ms. Bodell further identifies the
8 factors she believes will cause distress to the Maine generators as “lower energy prices,
9 congestion and displacement.”⁷⁴

10 In addition to identifying factors she believes will lead to Maine generator
11 retirements, Ms. Bodell specifies plants she believes are most at risk: “The most likely
12 candidate would be a fossil fuel peaker unit that barely operates – the William F. Wyman
13 Power Plant (‘Wyman’) – which is around 850 MW...”⁷⁵ She also identifies another seven
14 plants, three of which are owned by the GI,⁷⁶ which she believes are at risk of retirement.

⁷² Bodell Direct Testimony at 40:18-19.

⁷³ Bodell Direct Testimony at 41:1-2.

⁷⁴ Technical Report, Analytical Basis for Critique of Impacts from New England Clean Energy Connect (NECEC) at 6 of 61 (May 2018).

⁷⁵ Bodell Direct Testimony at 27:14-17. In this testimony, Ms. Bodell is referring to all four Wyman units together.

⁷⁶ 6/20/2018 Tech. Conf. Tr. at 45:12-19.

Table 2. GI Table on Maine Fossil Fuel Generating Units that Could Retire under CASPR⁷⁷

All Steam Powered Units						
Plant ID	Plant Name	Nameplate (MW)	2016 Net Generation (MWh)	2016 Property Taxes	Capacity Factor	Reported Prime Mover
10491	Mead Rumford Cogen	12.5	-	\$ 367,084	0%	ST
50243	Bucksport Generation LLC	111.6	524	\$ 110,567	0%	ST
50243	Bucksport Generation LLC	186.8	8,720	**	1%	GT
55031	Androscoggin Energy Center	163.5	170,341	\$ 1,580,573	12%	GT
55068	Maine Independence Station	194.6	222,129	\$ 188,739	13%	CA
55100	Rumford Power, Inc	179.4	263,928	\$ 3,285,287	17%	CT
55100	Rumford Power, Inc	95.1	149,305	**	18%	CA
TOTAL		943.5	814,947	\$ 5,532,249		

In addition to Ms. Bodell’s arguments, Mr. Fowler argues that the NECEC’s participation in the FCM will lead to Maine generation retiring. “To obtain a capacity obligation as CMP’s petition assumes, NECEC will have to secure that CSO through the new ‘CASPR’ mechanism; to do that will almost certainly require an equal number of MWs of existing generation inside Maine to retire.”⁷⁸

Similar to GI claims regarding the likelihood of the NECEC clearing the primary auction, no modeling analysis was performed in support of the claims that the energy market or capacity market results would materially impact the chance that Maine generating plants will retire.

D. NextEra Analysis and Conclusions

Neither NextEra witness makes any claim regarding the potential impact of the NECEC on existing Maine generation.

⁷⁷ Bodell Direct Testimony at 28, Table 10

⁷⁸ Fowler Direct Testimony at 4:87-5:90.

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1 **E. Conclusions Regarding Impacts on Maine Generator Retirements**

2 Two energy and capacity models have been produced in this docket that model
3 impacts over time, the Daymark and LEI models. Both of these models show no Maine
4 generator retirements due to the NECEC clearing in the primary auction. Notwithstanding
5 this point, we also investigated other information in the record or available publicly to
6 determine if there was credible evidence that Ms. Bodell's "at risk" generating units would
7 retire due solely to the NECEC or if those units were either not "at risk" or were at
8 significant risk of retirement without the NECEC.

9 To understand the potential signals being sent by generators submitting delist bids
10 into an FCA, it is first important to understand the general types of delist bids available to
11 them. A delist bid of any sort is a price signal that provides the revenue level at which the
12 generator would rather leave the capacity market (and potentially all energy markets
13 depending on delist type). Delist bids generally fall into three categories. They are either
14 bids at the time of qualification for the auction designed to commit the generator for all
15 future capacity periods, bids at qualification designed to commit the generator for only the
16 capacity period of the bid, or bids at auction designed to commit the generator for only the
17 capacity period of the bid.

18 The first type, where the generator is looking for their bid to be binding for all
19 capacity periods going forward, can either be a *permanent delist bid*, which is for the
20 capacity market only, or a *retirement delist bid*, which is for all ISO-NE markets. The second
21 type, which is for one year but is made during qualification, has a few types, but for a

1 generator will ordinarily be a *static delist bid*. The final type, where the bid is made at
2 auction, is a *dynamic delist bid* and is for only that commitment period.

3 The first piece of data to consider with respect to the Maine generators is their
4 capacity situation with respect to the recently completed FCA 12. The results of that
5 auction were provided as part of the response to CMP-004-001. Four units in Maine had
6 dynamic delist bids accepted in FCA 12. These units are the Wyman 1&2 units (owned by
7 NextEra), the Rumford Power plant and the Maine Independent Station (owned by Vistra
8 Energy). As discussed above, a dynamic delist bid is a bid to remove capacity from the
9 current auction and does not preclude participation in future auctions (*i.e.* the unit is not
10 obligated to permanently retire). However, it is an indicator of units that may have a
11 willingness to retire. ISO-NE, in discussing the results of FCA 12, noted that “[t]he
12 submittal and clearing of a static or dynamic delist bid may be an indication of a future
13 retirement.”⁷⁹ Whether or not these delists bids are actually a precursor to an upcoming
14 retirement decision, they are certainly clear indication that some power plants in Maine are
15 sending price signals regarding potential retirements without the NECEC. Several of those
16 units are on Ms. Bodell’s “at risk” list. So, while it appears reasonable to consider them at
17 risk for retirement, there is no basis for the GI assertion that the cause of the risk is the
18 NECEC or that the NECEC materially exacerbates that risk.

⁷⁹ Twelfth Forward Capacity Auction for the 2021/2022 Capacity Commitment Period; Results Summary & Trends, March 13, 2018, Slide 16. https://www.iso-ne.com/static-assets/documents/2018/04/a3_fca_12_results_summary.pptx

1 That being said, we have attempted to investigate, through the discovery process,
2 market and financial information from the GIs in an effort to determine whether the
3 generation units owned by the GI and NextEra are “at risk” or are expected to be “at risk” of
4 retirement in the base case scenario where the NECEC is not constructed.⁸⁰ Despite CMP’s
5 best efforts, such information has not been produced by the GIs and is the subject of the
6 ongoing Motion to Compel data responses.

7 Even accepting for the sake of argument the GI’s claim that the NECEC will lower
8 energy prices, thereby causing or accelerating the retirement of existing generating units in
9 ISO-NE, this impact is materially identical to the impact of any other procurement of 9.45
10 TWh of clean energy. The impact is also unlikely to be material for most Maine generators,
11 as Ms. Bodell’s evidence shows the majority of them have very low capacity factors,
12 therefore not being dependent on net energy market revenues for most of their operating
13 margins.⁸¹ As was discussed above in Section IV, the modeling and historical evidence
14 presented in this docket all points to the fact that any energy pricing disadvantages for
15 Maine generators derive from the loss component of LMPs, not by congestion.
16 Furthermore, the Daymark, LEI, and GI models all show little to no new congestion created
17 by the NECEC. Accordingly, if Massachusetts was to procure 9.45 TWh of clean energy
18 from any source besides the NECEC, whatever incremental financial stress such a

⁸⁰ Such requested information included historical and forecast data relating to the participation of the GI’s ISO-NE generation units in the energy and capacity markets, as well as historical and forecast data with respect to the revenues, costs and net profits of each of these units. See Data Request Sets CMP-006, CMP-008, and CMP-009.

⁸¹ 6/20/2018 Tech. Conf. Tr. at 18:19-25.

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1 procurement would produce through reduced energy and capacity prices in the market
2 would be similar to the NECEC impacts.

3 Another claim, discussed by Mr. Fowler and Ms. Bodell, is that the potential for the
4 NECEC to participate in the CASPR substitution auction will cause Maine generating plants
5 to retire. While Maine generating units may or may not choose to participate in the
6 substitution auction and may or may not shed their obligation, it is important to note that
7 their participation in the substitution auction is entirely voluntary, meaning there is no way
8 for the NECEC to force any retirements or cause these generators to be retired against the
9 owners' will.⁸² Participation is required of any unit that enters a retirement delist bid, a bid
10 to permanently exit all ISO-NE markets, into the primary auction, but entering such a delist
11 bid is in itself a voluntary choice that the generator makes. The requirement to participate
12 only occurs if the generator first elects that permanent retirement option.

13 Furthermore, there are two methods for indicating interest in participating in the
14 substitution auction. A generator can either enter a retirement delist bid (which
15 automatically requires them to participate in the substitution auction) or they can indicate
16 interest through other delist bids.⁸³ Of the two methods, only a unit entering the
17 substitution auction through a retirement delist bid is required to retire from all ISO-NE
18 markets. According to the ISO-NE Tariff, resources that shed their CSO through the
19 substitution auction must retire from at least the capacity market, and from all New

⁸² Mr. Fowler acknowledged as much in his response to Data Request CMP-005-012.

⁸³ 6/19/2018 Tech. Conf. Tr. at 102:7-16.

1 England markets if they submitted a retirement delist bid.⁸⁴ While some Maine generation
2 may choose to shed their CSO through the substitution auction, they will only be required
3 to fully retire if they chose to enter the substitution auction through a retirement delist bid
4 in the primary auction, in which case they were seeking to permanently retire in any event.

5 Additionally, Ms. Bodell raised the potential issue that if a different state sponsored
6 resource, outside of Maine, were to come online instead of the NECEC, the impacts to Maine
7 generators would be different because other generators outside of Maine could sell their
8 CSO instead of just the Maine generators.⁸⁵ That conclusion is not supported by the
9 evidence from FCA 12, where the only northern New England generating units to clear with
10 a delist bid were Maine generation. This suggests that even if the Maine zone does not
11 separate, the units most likely to clear in a substitution auction with the NECEC or any
12 other state sponsored resource would still be the Maine generating units, because they are
13 the units sending a signal that they might exit the capacity market.

14 Finally, while the GI companies have failed to provide any data regarding their
15 specific plant economics, NextEra did provide data regarding the four Wyman units and
16 two Cape GT units. These data are highly confidential, but provide additional insight into
17 those power plants. Given that the Wyman units were specifically identified by Ms. Bodell

⁸⁴ ISO-NE, Market Rule 1, Section III.13.2.8.3.1 states, “A resource, or portion thereof, associated with a cleared demand bid shall be retired from all New England Markets (except that a resource, or portion thereof, associated with a cleared demand bid that is associated with a Proxy De-List Bid and a Permanent De-List Bid which has not been elected to retire pursuant to Section III.13.1.2.4.1(a) shall be retired only from the capacity market) at the start of the Capacity Commitment Period associated with the Forward Capacity Auction.”. Mr. Fowler also confirmed this understanding at the technical conference. 6/19/2018 Tech. Conf. Tr. at 103:25-104:5.

⁸⁵ 6/20/2018 Tech. Conf. Tr. at 148:21-149:7.

1 as “[t]he most likely candidate”⁸⁶ for retirement, we reviewed the provided data to identify
 2 to what extent the plants were at risk, and to what extent those risks would continue to
 3 exist absent the NECEC. For context, it is publicly known that Wyman 3 and 4, Bucksport
 4 and Westbrook did not delist in FCA 12⁸⁷ despite the \$4.63/kW-mo clearing price, from
 5 which we can know that these units were offered into FCA 12 either without a delist bid or
 6 with a delist bid below \$4.63/kW-mo.

7 The NextEra data provides [Begin Confidential PO 9] [REDACTED]
 8 [REDACTED]
 9 [REDACTED]. [End Confidential PO 9]

10 **Table 3** below shows the results for each plant for each component.

11 **Table 3. NextEra unit delist bids, by bid component⁸⁸**

12 [Begin Confidential PO 9]

Cost component	Wyman Units				Cape GT Units	
	#1	#2	#3	#4	#4	#5
Net Going-Forward Costs	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Capacity Performance Payments	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Risk Premium	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Total	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

13

14 [REDACTED]

15 [REDACTED]

16 [REDACTED]

⁸⁶ Bodell Direct Testimony at 27:14-15.

⁸⁷ GI’s Response to Data Request CMP-004-001, Attachment *CMP-004-001 ISO-NE_FCA_obligations (2017-232).xlsx*.

⁸⁸ NextEra’s Response to Data Request CMP-007-009.

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1 [REDACTED]
2 [REDACTED]
3 [REDACTED]
4 [REDACTED]
5 [REDACTED]
6 [REDACTED]
7 [REDACTED]
8 [REDACTED]
9 [REDACTED] **End Confidential PO 9]**

10 Based on all of the evidence related to potential impacts of the NECEC on Maine
11 generators, it is highly unlikely that the NECEC will induce any Maine generators to retire,
12 as both Daymark and LEI models have demonstrated. In addition, if any Maine generators
13 do retire, it will be a voluntary choice of the generator and not an action that is imposed on
14 the generator by the NECEC or ISO-NE. And finally, there is no credible evidence that the
15 NECEC will produce materially different impacts on Maine generator economics as
16 compared to any other state sponsored resource of the same size and characteristics.

17 **VIII. CO₂ EMISSIONS IMPACT OF THE NECEC**

18 **A. Review of Daymark Analysis**

19 The Daymark analysis found that adding the NECEC to the supply mix in New
20 England yielded reductions in regional CO₂ emissions. Using the results of the previously
21 discussed energy market modeling, we determined that the NECEC Project will induce
22 annual CO₂ emission reductions of approximately 3.1 million metric tons across New

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1 England and the net emissions from the portion of regional generation serving Maine load
2 will be reduced by approximately 264,000 metric tons per year.⁸⁹

3 **B. LEI Analysis and Conclusions**

4 In similar fashion to the Daymark modeling, LEI produced an analysis of NECEC
5 induced reductions in CO₂ emissions in New England. Their energy model results
6 determined that the “NECEC could reduce CO₂ emissions in New England by approximately
7 3.6 million metric tons per year.”⁹⁰

8 **C. GI Analysis and Conclusions**

9 The energy market model used by Mr. Speyer in his analysis of the impact of the
10 NECEC on CO₂ emissions shows reductions in New England emissions. In fact, according to
11 the Technical Report Mr. Speyer sponsored, “[i]n all cases, the results for New England
12 match the analysis performed by Daymark, coming in at around a 3 million MT reduction in
13 carbon emissions.”⁹¹

14 Despite the savings in New England emissions, Mr. Speyer states that “[u]nder all
15 scenarios, NECEC increases total carbon emissions.” He reaches this conclusion by
16 assuming the NECEC generation will not be incremental to current Hydro-Québec exports,
17 instead reducing New York imports of Hydro-Québec hydropower in amounts equal to the
18 imports of NECEC power. He then states that, “[a]ny reduction in carbon emissions

⁸⁹ Exhibit NECEC-5 at 4 of 98.

⁹⁰ LEI Report at 12 of 85.

⁹¹ Speyer Direct Testimony, Exhibit JMS-4, Technical Report: New England Clean Energy Connect (NECEC) Regional Carbon Emissions Impacts, at 3.

1 resulting from the NECEC transmission line in Maine and New England would be offset by
2 higher emissions in other markets.”⁹²

3 **D. NextEra Analysis and Conclusions**

4 Neither NextEra witness makes any claim regarding the potential impact of the
5 NECEC on CO₂ emissions.

6 **E. Conclusions Regarding CO₂ Emissions Savings**

7 All three models showed reductions New England CO₂ emissions. In fact, the three
8 estimates are very similar, ranging from a low value of approximately 3 million metric tons
9 per year to a high of approximately 3.6 million metric tons per year.

10 With respect to Mr. Speyer’s claim that the NECEC generation will not be
11 incremental, and therefore the New England benefits will be offset with increases
12 elsewhere, the Rebuttal Testimony of Thorn Dickinson, Eric Stinneford and Bernardo
13 Escudero presents evidence that the generation will, in fact, be incremental to existing
14 Hydro-Québec exports, contrary to Mr. Speyer’s assumption.⁹³ Mr. Speyer did run a case
15 where the NECEC energy was treated as incremental, so his workpapers provide
16 information that allowed us to prepare a version of Figure 2 from Mr. Speyer’s “Technical
17 Report: New England Clean Energy Connect (NECEC) Regional Carbon Emissions Impacts”
18 that is consistent with the fact that the imports will be incremental. **Table 4** below
19 presents these results from Mr. Speyer’s own analysis, showing CO₂ reductions of almost

⁹² Speyer Direct Testimony at 4:2-4.

⁹³ Rebuttal Testimony of Thorn Dickinson, Eric Stinneford and Bernardo Escudero, Section III(D).

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1 4.2 million metric tons across the modeled region when the NECEC energy is properly
2 considered incremental:

3 **Table 4. GI analysis of regional CO₂ emissions, NECEC as incremental energy**

State/Region	Carbon Emissions (MT)		Net Carbon Emissions Impact
	Without NECEC	With NECEC	MT
ISONE	26,808,907	23,287,431	(3,521,476)
NYISO	25,820,742	25,520,246	(300,496)
PJM	396,772,050	396,422,315	(349,735)
MISO	351,004,059	351,049,282	45,223
Ontario	3,600,282	3,553,804	(46,478)
NE+NY+PJM+MISO+IESO	804,006,040	799,833,078	(4,172,962)

4 As discussed in the Rebuttal Testimony of Thorn Dickinson, Eric Stinneford and
5 Bernardo Escudero, the one possible exception to the NECEC generation being fully
6 incremental is that a small amount of reduction in exports from Hydro-Québec to Ontario
7 could occur if Hydro-Québec's planning and preparation for deliveries under the NECEC
8 PPAs prove to be insufficient in any contract year.⁹⁴ While this is not the anticipated result
9 for Hydro-Québec, it is a possible outcome. Given the results in **Table 4** above, this is not a
10 significant concern with respect to regional emissions. Mr. Speyer's incremental analysis
11 shown in that table concludes that the NECEC saves the region almost 4.2 million metric
12 tons of CO₂. The savings in Ontario are only about 46,000 metric tons. This is because the
13 supply portfolio in Ontario is already significantly clean, contributing less than one half of
14 one percent of the region's emission in both the with and the without NECEC cases.

⁹⁴ *Id.*

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1 Even if Hydro-Québec must divert small amounts of power from Ontario to New
2 England, New England and the broader region would still see significant savings with the
3 NECEC in place.

4 **IX. OTHER ITEMS**

5 **A. Availability on Existing Lines in from Hydro-Québec**

6 In his technical conference, Mr. Speyer made references to uncertainties regarding
7 headroom on existing tie lines between Hydro-Québec and New England.⁹⁵ However, the
8 historical data clearly demonstrates that the existing ties between Hydro-Québec and New
9 England are near full capacity and do not have much room for additional imports, much
10 less an additional 1,200 MW that would be required without NECEC. With respect to
11 Hydro-Québec's ability to export additional hydro into the New England market, the
12 existing tie lines provide very little room for incremental power. The following figure,
13 produced by ISO-NE, represents the extent to which the transfer capabilities are already
14 being utilized, comparing the annual average real-time net interchange to the annual total
15 transfer capability (TTC) on each interconnection:

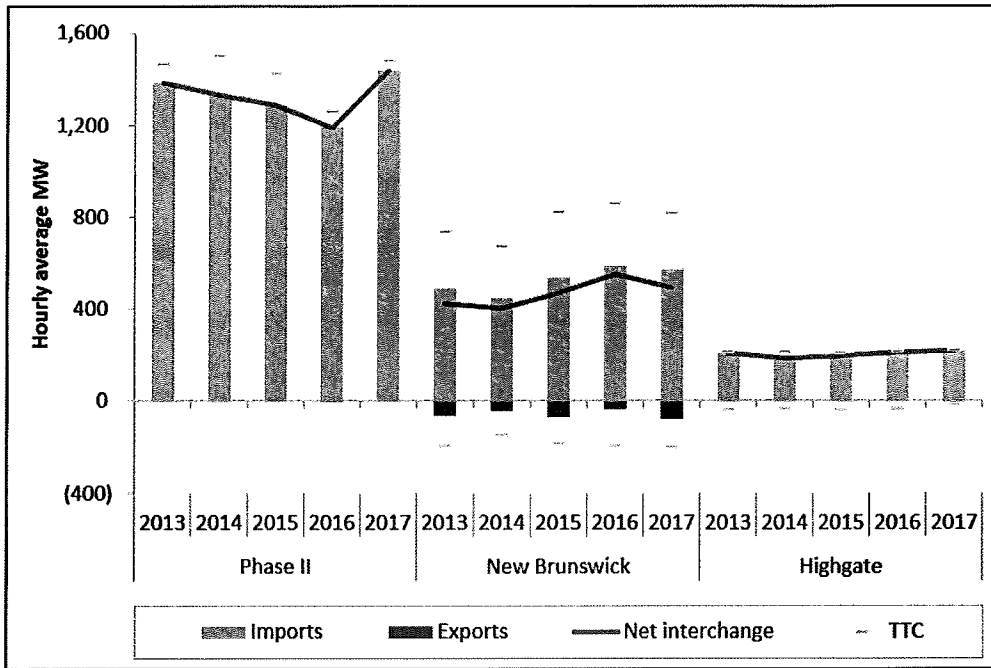
⁹⁵ See 6/28/18 Tech. Conf. Tr. at 28:10-14.

MR. DES ROSIERS: Could HQ inject into New England an additional 9.45 terawatts over the existing interties without an additional line from Québec to New England?

MR. SPEYER: We haven't done that analysis so I can't definitively say whether they could or not.

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1 **Figure 2: Real-Time Net Interchange at Canadian Interfaces (ISO-NE⁹⁶)**



2

3 The figure clearly shows that the two direct interties between Hydro-Québec and
 4 New England, Phase II and Highgate, are both substantially fully loaded over the past 5
 5 years. This demonstrates that a new interface is needed in order for Hydro-Québec to sell
 6 1,090 MW (9.45 TWhs) of hydropower as baseload into New England.

7 **B. The NECEC Acts as a Hedge Against Potentially Rising Natural Gas Prices**

8 Both LEI and the GI witnesses argued for a forecast of benefits based on lower
 9 natural gas prices. As discussed in Section IV above, even assuming the lower gas prices,
 10 the NECEC still creates significant energy market savings for Maine electricity consumers.

⁹⁶ ISO-NE 2017 Annual Markets Report, at 120; <https://www.iso-ne.com/static-assets/documents/2018/05/2017-annual-markets-report.pdf>

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1 However, the history of New England natural gas prices and pipeline projects
2 indicate that the region cannot count on continued low natural gas prices. Whether it is a
3 shift in market fundamentals that leads to higher prices or a short-term shock, higher
4 natural gas prices have occurred in New England in the past and are likely to occur again,
5 especially given the difficulty the region has experienced related to potential new natural
6 gas pipeline. Maine has a history of trying to be a leader in establishing a regional objective
7 for building new natural gas pipelines, and to date that effort has not been successful.
8 Natural gas pipelines have been difficult to build in New England, and the region is at the
9 end of the line from a transportation perspective. The combination of those two factors
10 means that higher natural gas prices are likely to occur during periods when natural gas
11 supply gets tight, such as many winter hours.⁹⁷

12 The NECEC, as has been shown in all production cost models run, reduces the
13 capacity factors of natural gas generation in New England, thereby reducing electric
14 generator demand for natural gas. It is also providing inframarginal power in all hours.
15 For these reasons, the NECEC provides a hedge against rising natural gas prices.

16 The analysis performed by Daymark shows that in the event of an increase in
17 natural gas prices relative to the current market, the NECEC provides strong benefits to

⁹⁷ These issues were identified in the Concurrence of Commissioner Cheryl A. LaFleur on the ISO New England Waiver Request Regarding Mystic Units 8 and 9, where Commissioner LaFleur stated: “Since 2000, the region’s resource mix transitioned very quickly to natural gas-fired generation, but has not seen commensurate investment in natural gas infrastructure to support the regional need for gas. Moreover, large-scale development of renewables and transmission intended to offset the reliability impacts of the gas constraints has been delayed.” (FERC Docket ER18-1509-000, Statement published July 2, 2018).

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1 electricity consumers as a hedge against rising electricity prices that would otherwise
2 occur due to rising natural gas prices.

3 **C. Why There is No Market Cliff**

4 Mr. Whitley and Mr. Russo both discuss the concern about a “market cliff.” Mr.
5 Whitley defines this cliff in his testimony by stating that, “at the end of the 15-20 year
6 commercial arrangement, there is a scenario in which CMP and Maine find itself with a
7 HVDC transmission line that has no market use, resulting in an abandoned asset that is
8 occupying a prime transmission corridor in the state of Maine.”⁹⁸

9 This view of the relative impact of the NECEC on markets out in years 21-40 is
10 flawed for several reasons. First, as has been discussed in the Rebuttal Testimony of Chris
11 Malone, Scott Hodgdon and Justin Tribbet,⁹⁹ an HVAC line sized to the needs of the
12 Massachusetts EDCs will not have any room on it for additional renewables to interconnect,
13 making the distinction Mr. Whitley makes moot. Furthermore, Hydro-Québec is reserving
14 the full capacity of the HVDC line for years 21-40, which is a substantial economic
15 investment. This investment by Hydro-Québec shows a commitment to use of the line
16 beyond the initial 20-year NECEC PPAs, making any potential “cliff” highly unlikely. Finally,
17 the continued use of Phase II, well beyond its original PPA, provides historical evidence
18 that the claims of Mr. Whitley and Mr. Russo are highly speculative and extremely unlikely
19 to occur. New England has historically been an attractive market for Hydro-Québec due to
20 its proximity and market prices. There is no reason to expect a significant change in the

⁹⁸ Whitley Direct Testimony at 6:22-25.

⁹⁹ Rebuttal Testimony of Chris Malone, Scott Hodgdon and Justin Tribbet, Section III.

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- 1 relative commercial viability of the various markets to which Hydro-Québec exports
- 2 energy, and therefore no reason to anticipate that Hydro-Québec will eliminate or even
- 3 significantly reduce its energy sales across the NECEC at the end of the 20-year NECEC
- 4 PPAs.