COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC UTILITIES

Petition of NSTAR Electric Company and Western Massachusetts Electric Company, each d/b/a Eversource Energy, for approval of long-term contracts for renewable energy, pursuant to Section 83D of An Act Relative to Green Communities, St. 2008, c. 169, as amended by St. 2016, c. 188, § 12.	)))))))	D.P.U. 18-64
Petition of Massachusetts Electric Company and Nantucket Electric Company d/b/a National Grid for approval of long-term contracts for renewable energy, pursuant to Section 83D of An Act Relative to Green Communities, St. 2008, c. 169, as amended by St. 2016, c. 188, § 12.	)))))))	D.P.U. 18-65
Petition of Fitchburg Gas and Electric Light Company d/b/a Unitil, Massachusetts Electric Company for approval of long-term contracts for renewable energy, pursuant to Section 83D of An Act Relative to Green Communities, St. 2008, c. 169, as amended by St. 2016, c. 188, § 12.	))))))	D.P.U. 18-66

JOINT SURREBUTTAL TESTIMONY OF
CHRISTOPHER RUSSO,
ROBERT STODDARD
AND
STEPHEN WHITLEY

EXHIBIT NEER-RSW-S-1

February 15, 2019

JOINT SURREBUTTAL TESTIMONY OF CHRISTOPHER RUSSO, ROBERT STODDARD AND STEPHEN WHITLEY

Q. Are you the same Christopher Russo, Robert Stoddard, and Stephen Whitley who submitted Direct Testimony in this proceeding?

A. Yes, we provided Direct Testimony in this docket on December 21, 2018.

Q. On whose behalf are you testifying in this case?

A. This testimony is offered on the behalf of NextEra Energy Resources, LLC ("NextEra" or "NEER").

Q. What is the purpose of your Surrebuttal Testimony?

A. The purpose of our joint Surrebuttal Testimony is to address the February 1, 2019 Rebuttal Testimony submitted by Mssrs. Waltman, Baldenko, Brennan, and Furino related to the New England Clean Energy Connect ("NECEC") project and its satisfaction of the Section 83 D eligibility and Massachusetts Global Warming Solutions Act ("GWSA").

Q. Please summarize your joint Surrebuttal Testimony.

A. This surrebuttal testimony is organized into the following sections:

1. The NECEC as it relates to the GWSA and greenhouse gas emissions ("GHG");
2. Incremental Hydro definitions per the Power Purchase Agreements ("PPAs") and H.Q. Energy Services (U.S.) Inc.'s ("HQUS") ability to deliver incremental energy;
3. Massachusetts Department of Environmental Protection ("MADEP") review and the PPA as they relate to the goals of 83D and the GWSA;

4. The PPA as a put option/winter price spikes;
5. The inability of NECEC to contribute to the reliability of the Commonwealth; and
6. The 83 D selection process.

Q. What exhibits are you sponsoring?

A. We are offering:

RSW-S-1: Décision, Régie de l'Énergie de Québec, D-2018-084 R-4045-2018 (13 July 2018) with English translation.

1. GWSA AND GHG IMPACTS

Q. The Joint Rebuttal Testimony of Waltman et. al. at 8, lines 19-20 describes your testimony as resting upon a "general assertion that carbon is a global pollutant and that GHG emissions must be measured at a global level." Do you agree with this characterization of your testimony?

A. No. The scientific evidence is clear that (a) carbon emissions into the atmosphere is the chief source of global warming and (b) the impact of such emissions is on global-level climatic systems.[1] In this regard, CO_2 is far different than, say, NO_x, SO_2 or particulate matter emitted by generators, where the effect is principally localized. Consequently, the Electric Distribution Companies' ("EDCs") selection of NECEC is not reducing the Commonwealth's contribution to adverse climate effects, as NECEC involves merely

[1] See, e.g. Intergovernmental Panel on Climate Change, *Climate Change 2014: Synthesis Report* available at https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf.

"tagging" existing and ongoing zero-emission power generation, and not the contracting for new and incremental clean energy.

Q. Does the 83 D legislation recognize this aspect of carbon emissions?

A. Yes, but only indirectly. The EDCs' Joint Testimony at 8:19-9:12 narrowly interprets the 83 D legislation's goals as only pertaining to the Commonwealth, which does not square with the reality of the impact of CO_2 regionally and globally. Thus, the EDCs' narrow reading ignores basic scientific facts about carbon and interregional effects and the clear intent of the legislation, which is to use the purchasing power of the Commonwealth's utilities to be a leader in *solving* global warming—which requires lowering global emissions of CO_2. Spending billions of ratepayers' dollars to merely relabel existing power flows as somehow incremental because it is, in part, new to New England does not further the Commonwealth's CO_2 reduction goals.

Q. Under the EDCs' logic, could regional or global CO_2 emissions increase and the EDCs' meet the requirements of the GWSA?

A. Yes. Given the structure of the 83 D legislation and how relabeling of existing resources could qualify, under the EDCs' reasoning, overall carbon emissions could change not one bit, and the letter of the law still be satisfied. Extending the EDCs' reasoning even further, ratepayers could incur a large cost for zero benefit, and the goals of the procurement would be satisfied. This is particularly concerning, given that there were many clean energy projects that were passed over in favor of NECEC that would clearly been new and incremental, thus directly contributing to CO_2 emissions reductions.

Q. The Joint Rebuttal Testimony of Waltman et. al. at 6:3-5 describes your analysis framework as "self-serving." Do you agree with their characterization?

A. No. Our framework recognizes basic scientific facts and the alternatives available under the 83 D procurement. We do not dispute the validity of the 83 D legislation, but it is our opinion that rather than actually "moving the needle" on global warming solutions, the EDCs' NECEC selection simply reinforces the status quo.

Q. The Rebuttal Testimony of Waltman et. al. at 9:3-6 claims that:

> **The GWSA is a Massachusetts law, not regional and the Distribution Companies, both in evaluating the bids received in response to the RFP and in entering into the PPAs, are bound by the requirements of the GWSA and the Department's regulations regarding the Section 83D solicitation.**

Do you agree with this testimony?

A. While it is true that the EDCs are bound by the laws of the Commonwealth and the regulations of the Department, mere "check the box" compliance with narrow interpretations of Massachusetts laws and regulations does not match the reality of how CO_2 emissions impact Earth does not satisfy the intent of the GWSA. While the GWSA is a Massachusetts law, pertaining to Massachusetts GHG emissions, it is false to claim that the evaluation of the 83 D solicitation was bound by the policy in a way that would consider *only* Massachusetts in the analyses. The idea that the Request for Proposals ("RFP") was so narrowly focused on meeting the criteria of the GWSA, while the extent of global greenhouse emissions impacts were overlooked, seems unreasonable and illogical.

Q. The Joint Rebuttal Testimony of Waltman et al. at 7-8 indicates that the terms of the GWSA were applied, because NECEC did not receive credit for the 2020-specifc GWSA emission goals in the evaluation. Does this adequately relieve the concerns regarding the Project's benefits as evaluated by the EDCs?

A. It does not. The mere fact that the qualitative score for NECEC was reduced to reflect its late in-service date does not fully address the concerns we raised in our rebuttal testimony. In particular, the EDCs have not provided an analysis showing that NECEC will result in the operation of NECEC supporting a reduction of CO_2 emissions in the Commonwealth. We do know, however, that customers are being asked to pay billions of dollars to HQUS and Central Maine Power Company ("CMP") for what appears to be little to no GHG reduction.

Q. How could the Department alleviate this issue?

A. To address the issue of timeliness, the EDCs could have selected projects that are fully permitted and have a credible in-service date in 2020. Also, to address the issue of impact to the Commonwealth, the EDCs could have selected clean energy projects with injection sites in the Commonwealth or project in close proximity to the Commonwealth that were truly incremental.

Q. Would such projects replace or lead to the retirement of existing fossil generators in the Commonwealth?

A. We have not analyzed this specific question, but it seems likely. Renewable generation typically offers into the energy market at price of zero (or lower, reflecting Production Tax Credits). Adding truly incremental, zero-priced generation into the dispatch stack for southern New England would tend to lower energy and capacity prices, thereby reducing the profitability of incumbent generators. Over 2 gigawatts of generation were submitted as retirement bids into the most recent Forward Capacity Auction[2] Such additional negative price pressure impacting generator revenues could lead to permanent retirement of fossil-fired generation in the region.

Q. Would a direct injection transmission project and/or more local projects provide other benefits to Massachusetts?

A. Yes. Economic and employment benefits would be greater for a transmission line or generation project located in Massachusetts. In-state projects would directly create jobs, both during construction and for maintenance over the lifetime of the projectsThese new jobs would indirectly add other jobs through a multiplier effect. Moreover, in-state projects would enhance property value, which, together with additional jobs, would increase the tax base of the Commonwealth.

Q. Did the EDCs' quantitative evaluation consider these tangible economic benefits?

A. No.

2. INCREMENTAL HYDRO AND DELIVERY

Q. Do the EDCs dispute your assertion that the NECEC project will not result in incremental flows equal to its full capacity?

A. No, our contention that NECEC will not result in 9.55 terawatt-hours ("TWh") of incremental renewable energy to New England is uncontested. In the Joint Rebuttal

[2] ISO New England, "New England's Forward Capacity Auction Closes with Adequate Power System Resources for 2022-2023" press release, issued Feb. 6, 2019. Available at https://www.iso-ne.com/static-assets/documents/2019/02/20190206_pr_fca13_initial_results.pdf

Testimony of Waltman et al. 26–27, the EDCs offer an alternative calculation that indicates NECEC would result in an incremental 5.6 TWh per annum of flow relative to historical deliveries; we estimated that it would be 3.9 TWh per year. Both of these figures are significantly below the contracted 9.55 TWh per year. Thus, the Commonwealth will not receive the full benefit of NECEC's capacity or the energy purchased under the PPAs.

Q. Do you agree with the assertions in the Joint Rebuttal Testimony Waltman et al. at 27 that historical deliveries are not the correct benchmark, but rather HQUS deliveries should be compared to a lower amount that might be "otherwise expected"?

A. No, the PPAs' Exhibit H requirements for "Minimum Required Baseline Hydroelectric Generation Imports" grant HQUS substantial latitude to reduce historical flows, allowing a relabeling of customary sales from HQUS to New England as contract sales. As the Joint Rebuttal Testimony Waltman et. al. state at 27, the 5-year average imports from HQUS to New England are 13.4 TWh. Yet the National Grid PPA *caps* the required baseline at 9.45 TWh, with generous allowances for HQUS to reduce that baseline for many reasons. The Unitil and Eversource Exhibit Hs provide no such allowances, but set the baseline at merely 3 TWh, fully 10.4 TWh lower than historical imports. Thus, these two PPAs would not require *any* additional imports from HQUS to meet the terms of the PPA.

Q. The Joint Rebuttal Testimony Waltman et al. at 27:10-15 notes that the bulk of these historical imports have been "made on a non-firm basis and are dependent on market conditions and transmission service." Is the EDCs' position sufficient rationale to slash the baseline requirement?

A. No. The analysis included in the Joint Rebuttal Testimony of Waltman et al. at 35 claims that the market prices in ISO New England have been the most attractive export market for HQUS in the substantial majority of hours. By the EDCs' logic, HQUS would chooseto continue to sell power into New England going forward, absent a substantial and unforeseen shift in market fundamentals or transmission topology. Considering these factors together, the EDCs have simply conceded to HQUS an unjustified reduction in the required baseline of nearly 4 TWh (for National Grid) or 10 TWh (for Unitil and Eversource).

Q. Do the EDCs make claims regarding NECEC meeting the RFP definition of "Incremental Hydroelectric Generation"?

A. Yes. At Joint Rebuttal Testimony of Waltman et al. at 18, the EDCs claim that the NECEC bid effectively indicated HQUS's ability to deliver Incremental Hydroelectric Generation, noting their "vast amount of existing hydroelectric resources." There is no explanation of how this "vast amount" translates into actual benefits to the Commonwealth, or where the PPAs provide sufficient safeguards. For example, the PPAs do not grant EDCs any audit rights over books and records of HQUS and its affiliates to assure that all deliveries in fact were sourced from hydroelectric facilities.

Q. The Joint Rebuttal Testimony of Waltman et al. at 35-36 asserts that the degree to which HQUS would choose to export, or not, could be judged by the price spread between markets. Do you agree?

A. The EDCs' assertion reflects a fundamental misunderstanding of how HQUS and hydro systems operate. The price spread *between hours* is as important as the price spread *between markets.* Attempting to analyze how HQUS would choose to allocate its power across markets by looking at price spreads in the same hours is an invalid approach. HQUS, like other hydro operators, has the unique ability to store energy. A rational market operator in HQUS' position would look at not only the price spreads between markets, but also projections of future prices in other markets. In other words, the choice is not simply which market to export to, but also whether to export at all. If the price spread between markets today is small, but a particular market is known to have a high price tomorrow, HQUS may choose to simply reduce or curtail exports today for a more favorable price later.

This distinction is particularly important in understanding the option value to HQUS created by the PPAs. The generally higher prices in New England have provided HQUS the most profitable market *on average* for its sales. But savvy energy traders also take opportunities to shift both the timing and location of sales. The fact that the PPAs include only cover damages remedy when the supposedly firm deliveries are interrupted simply makes the decision of whether to deliver contract power a matter of economics and profit maximization for HQUS, without regard to the reliability or cost to the EDCs.

Q. Does the EDCs' analysis in their rebuttal testimony inform in any way the question of how HQUS would choose to operate?

A. No. The EDCs' analysis specifically looked only at prices *in the same hour*, which, as we described above, is a flawed and inadequate approach.

Q. How would HQUS deliver energy above the PPA flows into New England to take advantage of this time arbitrage?

A. To take advantage of the price arbitrage, HQUS needs two things: a way to store power and a way to transmit and deliver it in higher-priced hours. HQUS' generation affiliate, Hydro Quebec Production, has the ability to store power, given the substantial reservoir capacity on its affiliate's system. Regarding transmission, it might at first appear that HQUS has no options. After all, when prices are higher in Maine than New York, HQUS will have the economic incentive to flow the entire 1,090 MW on NECEC. Even in these hours, though, HQUS will be able to sell additional energy into New England both on historical transmission routes (Highgate, Phase II and wheeling through New Brunswick and New York) as well as the incremental 110 MW of NECEC that HQUS will control on a merchant basis. These additional transmission pathways allow the arbitrage across time that we discussed above. Therefore, the EDCs' selection of NECEC and agreement to delivery flexibility in the PPAs willenable HQUS to increase its opportunities to arbitrage.

Q. Joint Rebuttal Testimony of Waltman et al. notes at 34 that diverting more than 20% of firm deliveries could trigger a breach of contract. Does this fact change your conclusion about the optionality inherent in the contract?

A. No, not materially. The greatest value of arbitrage opportunities are when prices are high and volatile. In the northeastern markets, such opportunities are clustered during extreme weather events, typically mid-winter and high summer. Just having the flexibility to short deliveries by 1.9 TWh annually, as the PPAs do, provides HQUS a substantial opportunity to profit from these limited arbitrage windows.

Q. The Joint Rebuttal Testimony of Waltman et al. at 20 contends that because HQUS has spilled water equivalent to 4.5 TWh in 2017 and 10.4 TWh in 2018, there is evidence that HQUS will deliver incremental hydroelectric generation. Does this spillage provide assurance that HQUS will in fact deliver incremental hydroelectric generation?

A. It does not. As we describe below, there have been incidents during the past several weeks when HQUS reduced its flows to New England, which is inconsistent with the claims of excess "spillage." As we explained in our direct testimony at 19, lines 16-21, "hydroelectric generators spill, or bypass, dams for many reasons, which may result from flood control, environmental concerns, seasonal effects or internal transmission constraints. Even if it is true that Hydro Quebec spills water from time to time, it is not necessarily evidence that there is incremental capacity to generate power on its system, nor that this incremental capacity is sufficient to deliver an incremental 9.55 TWh/year on NECEC."

Q. Do the energy regulators of Hydro Quebec view its spillage capacity in the same way as set forth by the EDCs?

A. No. In June of 2018, Hydro Quebec applied for a fixed price and service conditions in for cryptographic usage, resulting in approximately 2.2 TWh increase in load. In response, the Régie de l'énergie (Quebec energy regulator) recognized that Hydro Quebec had insufficient generation resources to accommodate this demand. Régie de l'énergie also found that the 10.4 TWh of excesses estimated in 2020 by Hydro Quebec are expected to decline gradually, and warned that the proposed cryptocurrency usage could tip the excess energy balance of 2020 into a deficit. (See Exhibit RSW-S-1).

Q. Do you agree with the energy regulator?

A. Yes. We concur that spillage is not a necessary measure of excess capacity, especially given time-of-year. For example, spillage in the spring or particularly wet months does not result in available excess capacity in the winter to be sold to Massachusetts via NECEC – or cryptographic usage, for that matter.

Q. Should the EDCs' speculation about HQUS' future behavior be the basis for assumptions about the effectiveness of this contract?

A. Good question. In fact, Joint Rebuttal Testimony of Waltman et al. at 9:13-10:1 attempts to address this question, but they fail to recognize the implications of their own conclusions:

> …it would be inappropriate for the [EDCs] to have attempted to account for future potential actions by HQUS in these, or any other, states. Any such attempt would have been rife with so many assumptions and caveats regarding the actions of not only HQUS, but also the actions and/or reactions of other generators, traders, policymakers, control areas operators and their stakeholders, so as to render the end result essentially meaningless.

The fact that the EDCs are referring to other markets undercuts their own argument even further. In asserting that HQUS would always choose to export to New England, they are specifically analyzing exports to New York to justify their conclusions about New England exports. Even though the EDCs acknowledge that they cannot predict the behavior of HQUS, they base their belief that HQUS will continue to deliver power over NECEC on predictions of how HQUS, generators, and other traders will distribute their exports to different markets.

Q. Is there evidence in the EDCs' testimony of this fundamental inconsistency of what future deliveries from HQUS would be, absent these PPAs?

A. Yes. The Joint Rebuttal Testimony of Waltman et al. at 27 speculates that it would be "in HQUS's best interest to maintain the level of imports", and further speculates about HQUS' "ability to earn a rate of return."

Q. The Joint Rebuttal Testimony of Waltman et al. at 29:12 claims the PPAs are delivering "firm" power. Do you agree?

A. No. Simply labeling something "firm" doesn't make it so. The PPA is not consistent with commonly accepted definitions of firm power. The simple fact is that the PPAs do not *require* HQUS to deliver power in all hours, but the EDCs *believe* that it will because of economic incentives created by modest costs of Cover Damages. Predicating multi-decade PPAs on the EDCs' speculation about HQUS' internal business decisions is unduly risky.

Q. How should the PPAs have strengthened the provisions for firm power to assure delivery?

A. There are several ways that the PPAs could have been structured to provide greater assurance of firm delivery. Consistent with ISO New England's standards for capacity imports, the PPAs could have required curtailment priority *pro rata* with native load in Québec.[3] The PPAs could also have required HQUS to make all reasonable efforts to schedule firm deliveries through ISO New England (without exception for low generation at the HQ Power Resources) and provided an actual penalty with some "teeth" in the Cover Damages, rather than merely making HQUS pay limited, enumerated costs of the EDCs created by delivery shortfalls. The PPA also could have ensured that the actual delivery of power to New England was truly incremental (rather than creating an implausibly low baseline as we discussed above), so that Commonwealth ratepayers realize the full benefits of the project by ensuring that a full 9.55 TWh is delivered to New England.

3. MADEP AND PPA REVIEW OF SYSTEM SALES

Q. Did the EDCs address your prior concerns that the electricity coming from HQUS isnot guaranteed to be 100% hydro-generated electricity?

A. They did in part. The Joint Rebuttal Testimony of Waltman et al., at 12, lines 20-21, states "the PPAs contain strict provisions requiring satisfaction of unit-specific accounting of Environmental Attributes."

[3] The Hydro Quebec Transmission Service Agreement nominally provides such parity but also has loopholes that allow for curtailing exports before native load.

Q. Do you believe that these provisions adequately ensure that the sales over NECEC will be 100% hydroelectricity, as opposed to a system sale?

A. They do not. When the MADEP materials and the NEPOOL GIS are considered, it is clear that the EDCs have not sufficiently proven that all electricity sold over the Project will be generated with the HQUS hydroelectric dams, as intended in the original proposal. The MADEP "requirements to provide . . . unit-specific accounting of Environmental Attributes" for MADEP's accounting purposes do not necessitate that this will be purely hydroelectricity coming over NECEC.

Q. Do the PPAs explicitly acknowledge that not all of the energy will come from zero-emission resources?

A. Yes. The defined term "Hydro-Québec Power Resources" means "those existing hydroelectric generating stations … that produce electric energy, which consists *predominantly of low-carbon* and renewable hydro-electric energy…."[4] According to Hydro Quebec's own documents, they generated 305 GWh from thermal power stations in 2017.[5] Consequently the "system sales" approach in the PPAs are insufficient to assure delivery of Clean Energy Standard-compliant energy.

Q. The EDCs discuss how the PPAs will be consistent with the "inventory methodology used by the Massachusetts Department of Environmental Protection". (Joint Rebuttal Testimony at Waltman et al. at 6). Accepting for the

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[4] Exhibit JU-3-B, emphasis added.
[5] Hydro Québec, "Power generation, purchases and exports" filed as Attachment EDC-NEER 1-2-1.2

sake of argument that this is the appropriate standard, how would you measure "incremental hydroelectric generation" under this methodology?

A. The MADEP's inventory methodology counts compliance in two stages. First, it counts contracted resources. Second, it assigns to each EDC a pro rata value of uncontracted resources in the pool. For example, MADEP counts output from the Seabrook generating facility as contributing to compliance even though there is no contract between Seabrook and any Massachusetts EDC for its output. In the same way, spot sales by HQUS into New England are already treated in the inventory as contributing towards environmental compliance, pro rata to Massachusetts' load-ratio share. Thus, the historical imports of power from HQUS are already being counted towards GWSA compliance. The likely reduction in these imports, as we discuss below, and the consequent reduction in the MADEP inventory should be taken into account when calculating the incremental clean energy procured under these PPAs.

Q. Accepting hypothetically the EDCs' own calculations that these PPAs only require 5.6 TWh of incremental deliveries (Joint Rebuttal Testimony of Waltman et. al at 27:5), please explain how much additional clean energy would be counted towards Massachusetts' compliance with the GWSA under this MADEP inventory approach.

A. The historical average deliveries of 13.4 TWh are non-firm, aside from 225 MW of long-term sales to Vermont utilities, which would account for about 1.9 TWh. The remaining 11.5 TWh of non-firm sales are counted by MADEP as uncontracted, system power. Therefore, Massachusetts' load-share ratio, about 5.7 TWh, is already counted as meeting the GWSA goals.

Under the proposed PPAs, all 9.55 TWh of contract power would be counted towards GWSA compliance. But using the EDCs' own math, 4 TWh or more of this power is not incremental and will result in reduced baseline imports. Thus the MADEP inventory of compliant energy would be reduced by about 2 TWh. Therefore, the net addition of clean energy from these PPAs is about 7.5 TWh, not the 9.55 TWh claimed – even accepting that 100% of HQUS's deliveries are in fact from clean sources.

4. PPA AS A PUT OPTION AND WINTER DELIVERY

Q. The Joint Rebuttal Testimony of Waltman et al. at 30-31 contends that the PPAs are not a put option for HQUS. Do you agree?

A. No. A put option is a contract that gives the buyer the right to sell shares of an underlying security at a predetermined price for a preset time period. The seller is obligated to buy the underlying security if the buyer exercises the option to sell on or before the option expiration.[6] A common contractual structure in energy markets is a "take or pay" contract; this agreement is the inverse, in that it is a "sell or pay" contract.

Q. And are the EDCs' PPAs examples of put options?

A. Yes, they are. The unequivocal and undisputed fact is that the PPAs allow, and, in fact, specifically contemplate that HQUS may choose to not deliver to New England for up to several months out of the year and instead cover its position financially.

Q. How so?

A. HQUS can choose to deliver power, or pay the cover damages, which is the power price in New England plus the transmission service charges and the cost of environmental

[6] https://www.nasdaq.com/investing/options-guide/option-types-puts-calls.aspx

attributes. This fact is undisputed and is specifically contemplated in the PPAs. It is thus hard to understand how a common-sense interpretation of the contract would define this as a breach or default. The contract specifically defines failure to deliver in up to 20% of hours of the year as a default, but does not similarly classify HQUS' choice to cover its position through cover damages as a default.

Q. The Joint Rebuttal Testimony of Waltman et. al. at 28:11-12 contends that the PPAs "contribute to reducing winter price spikes." Do you agree?

A. No. The PPAs offered by HQUS and the EDCs do not guarantee that NECEC will contribute to reducing winter price spikes.

Q. Is there any evidence to support your assertion that HQUS might choose to forgo delivery under certain conditions, and, thus not contribute to reducing winter price spikes?

A. Yes. As we will demonstrate, during recent scarcity and "polar vortex" conditions, HQUS appears to have curtailed its exports to New England, just at the point that New England needs the energy to reduce winter price spikes.

Q. Has HQUS reliably provided ISO-NE with energy during winter peaks in the past?

A. No. In the figures below, one can see direct correlations between the price spikes at the ISO-NE Internal Hub and HQUS's exports over the existing Phase II and Highgate interties during the winter months. During these winter price spikes, HQUS often reduced its exports over the Phase II. Furthermore, in some cases HQUS even reduced its exports over Highgate, a line with what we understand to be a firm contract. Like Highgate, NECEC is also a "firm" contract.

Q. The Joint Rebuttal Testimony of Waltman et al. 34:16-23, states:

> **Per the terms of the PPAs, in the event of a Curable Delivery Shortfall, the Shortfall Cure Amount of Qualified Shortfall Energy may only be delivered during the corresponding period of the Shortfall Cure Period during the off peak/on peak, i.e., if the shortfall occurs in the Winter Period as defined in the PPAs, then the delivery of the shortfall cure energy must take place in the corresponding Winter Period of the Shortfall Cure Period (Exhs. JU-3-A; JU-3-B and JU-3-C, § 4.3(c)(vi)). Section 4.3(c) allows for HQUS to cure shortfalls with physical energy flows instead of paying a penalty under the PPAs. Massachusetts customers benefit from these additional measures designed to support the PPAs' firm delivery attributes."**

Do you believe these terms ensure winter delivery?

A. No. For example, HQUS could choose to cure its shortfall on an unseasonably warm 60 degree day instead of a 5 degree day within the same week and satisfy the contract, without actually ever helping with winter price spikes.

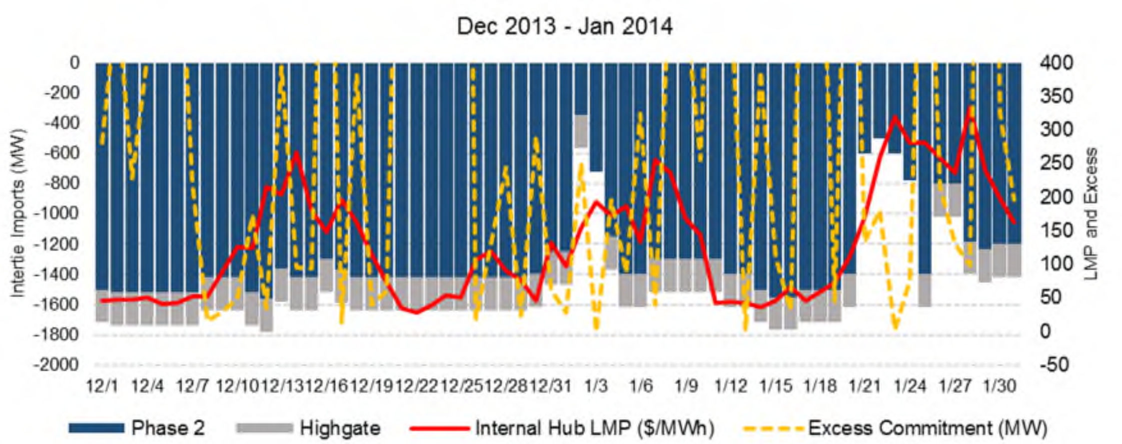
Q. Are there instances in which HQ significantly reduced exports to ISO-NE, when NE needed it most?

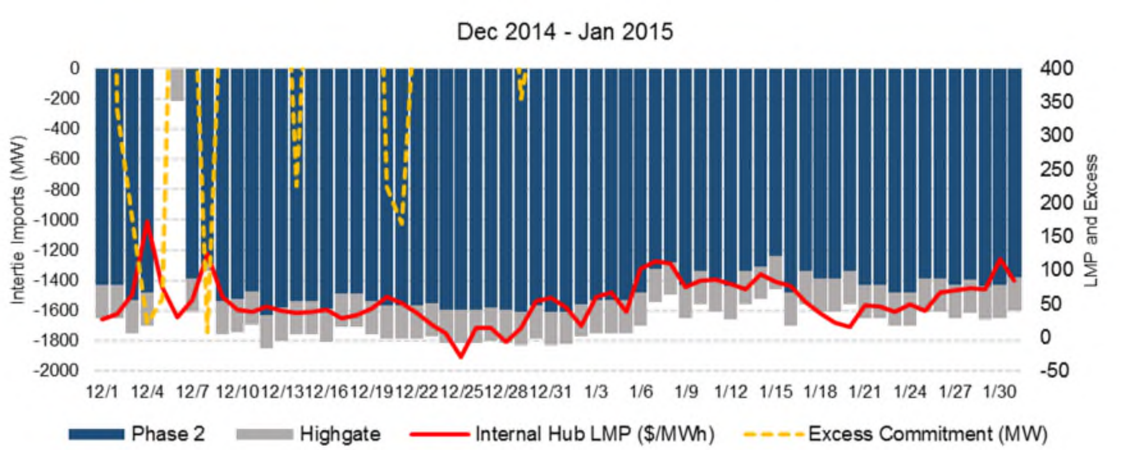
A. Yes. During the polar vortex of January 2014, HQUS reduced exports over both Phase II and Highgate. Described by ISO-NE as a cold snap from December 31, 2013 through January 8, 2014,[7] the polar vortex brought forced outages, fuel supply issues, and generation shortfalls. During this time, Hydro Quebec dramatically reduced its exports

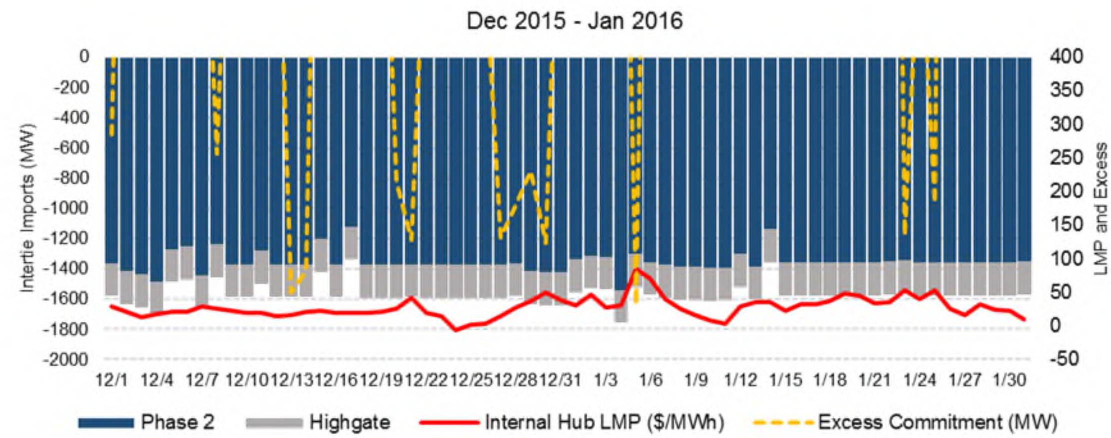
[7] https://www.iso-ne.com/static-assets/documents/pubs/spcl_rpts/2014/iso_ne_response_ferc_data_request_january_2014.pdf; p16

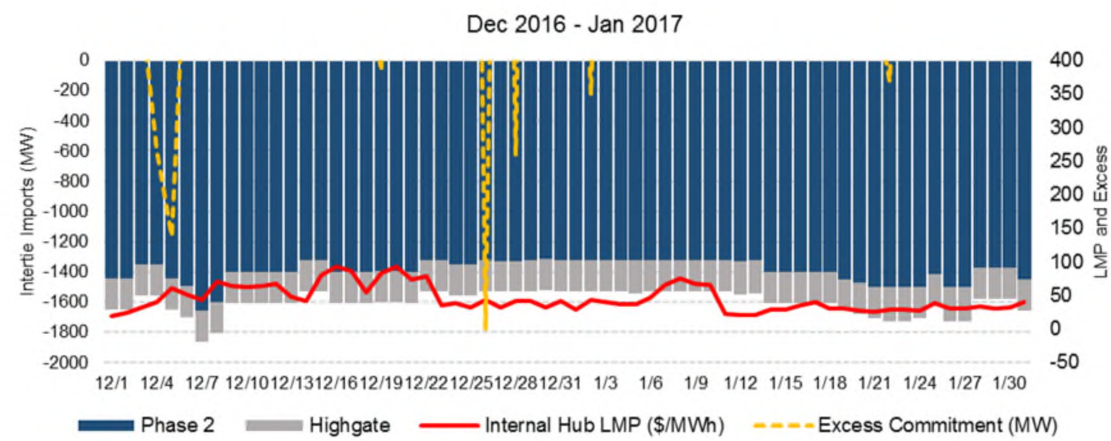
over Phase II, and did so again later in January. This is seen in Figure RSW-1, which depicts the ISO-NE from Hydro Quebec over Phase II and Highgate for the months of December and January of the five years, as well as the ISO Internal Hub LMP. They also reduced their flows over Highgate during these periods. Both flows are closely correlated with the ISO-NE LMP.

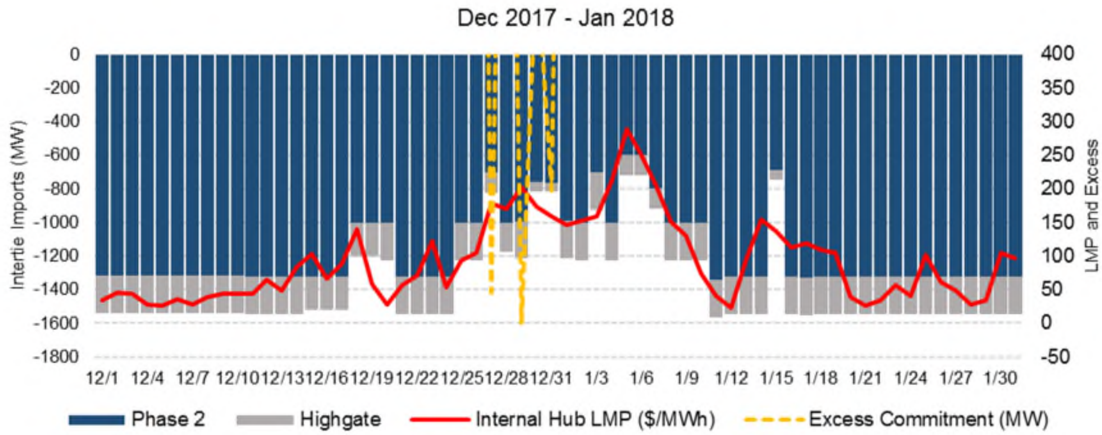
Figure RSW -1: HQ Exports to ISO-NE






Dec 2015 - Jan 2016
Intertie Imports (MW)
LMP and Excess
0
-200
-400
-600
-800
-1000
-1200
-1400
-1600
-1800
-2000
400
350
300
250
200
150
100
50
0
-50
12/1 12/4 12/7 12/10 12/13 12/16 12/19 12/22 12/25 12/28 12/31 1/3 1/6 1/9 1/12 1/15 1/18 1/21 1/24 1/27 1/30
Phase 2
Highgate
Internal Hub LMP ($/MWh)
Excess Commitment (MW)

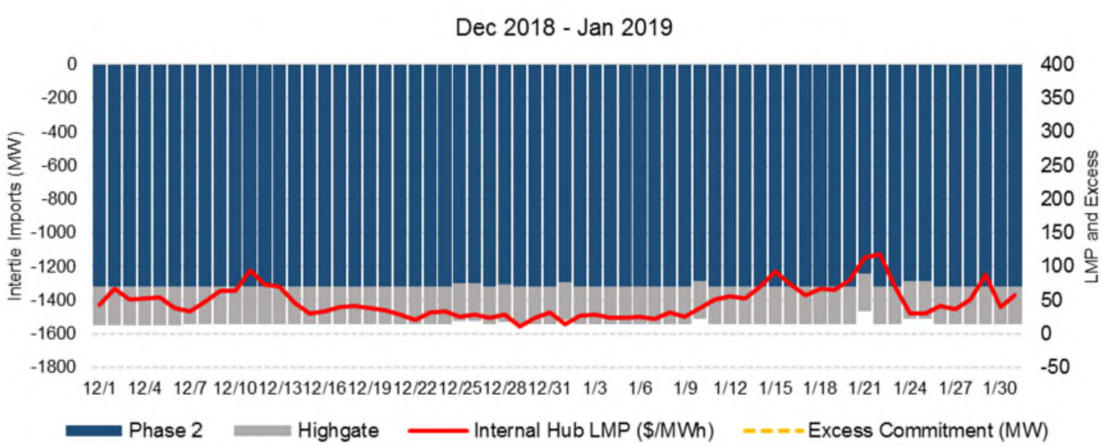

Dec 2016 - Jan 2017
Intertie Imports (MW)
LMP and Excess
0
-200
-400
-600
-800
-1000
-1200
-1400
-1600
-1800
-2000
400
350
300
250
200
150
100
50
0
-50
12/1 12/4 12/7 12/10 12/13 12/16 12/19 12/22 12/25 12/28 12/31 1/3 1/6 1/9 1/12 1/15 1/18 1/21 1/24 1/27 1/30
Phase 2
Highgate
Internal Hub LMP ($/MWh)
Excess Commitment (MW)



Q. Has HQUS backed off deliveries into New England recently?

A. Yes. In the cold snap in January 2019, HQUS again reduced its flows over Phase II when prices spiked in New England, as seen in Figure RSW-2. This is inconsistent with HQUS' assertions in the media that because of spillage there is ample excess power to export to New England.

Figure RSW -2: HQ Exports to ISO-NE (Jan. 2018)



The data shown in Figures RSW -1, -2 provide evidence that HQUS does not export to New England during those times in which it could have contributed to reducing winter price spikes in the Commonwealth. Instead requiring firm deliveries in the winter during all hours and all days to ensure a contribution to winter price spikes, the PPAs do the opposite –Section 4.3, provides the flexibility for HQUS not to deliver and make up those deliveries at some other time, as well as not deliver and pay cover damages. Therefore, at best, there is only speculation as to whether NECEC will contribute to reducing winter price spikes, and more likely than not the evidence shows that HQUS will not deliver when New England needs the energy in very cold winter days. This is particularly true given that while electrical demand peaks in ISO-NE in the summer and in Quebec in the winter, gas demand, and, therefore, electricity prices, peak in ISO-NE in the winter; accordingly, the winter is the period of the year when non gas-fired generation is most valuable. This is precisely the period of the year where HQUS imports have a history of being unreliable.

6. RELIABILITY

Q. Did TCR quantify a NECEC reliability benefit for Massachusetts customers as claimed by the Joint Rebuttal Testimony of Waltman et. al. at 37:15-19 and 41:9-12?

A. No. The Joint Rebuttal Testimony made an incorrect conclusion due to an incorrect reading or understanding of the TCR study. Their statement claims that “One of TCR’s tasks was to quantify that [reliability] benefits flowed to Massachusetts customers. This work was done using a production-cost dispatch model that respected a significant set of known transmission constraints. NECEC showed benefits to the Commonwealth in this model that respects electric system constraints, thereby proving that NECEC enhances electric reliability in the Commonwealth.” They are wrong in two aspects:

1. The dispatch model used in the TCR study is not a reliability analysis model used for a resource adequacy assessment. As stated in the TCR study report (Exhibit JU-6 at 6), "TCR used the ENELYTIX computer simulation software tool to simulate the operation of the New England wholesale markets for energy and ancillary services, forward capacity and RECs under the 83D Base Case and for each Proposal / Portfolio Case." Had TCR used the same model that ISO-NE, North American Electric Reliability Corporation ("NERC"), Northeast Power Coordinating Council ("NPCC")[8] for resource adequacy assessment, TCR would have come to the same conclusion that the resources in exported constrained Maine and/or Northern Northeast zones cannot materially contribute to the reliability of the ISO-NE region.

2. The TCR study did not show that the installed capacity requirements for Massachusetts will be reduced due to the addition of the NECEC. On page 9 of Exhibit JU-6, when using the ENELYTIX, TCR specified the resource adequacy constraints "in terms of installed capacity requirements ("ICR") for the ISO-NE system as whole and for reliability zones within ISO-NE". And, on page 87, "Using statistical data for past resource adequacy analyses performed by ISO-NE, forward projections of electricity demand and future limits on transmission interfaces defining reliability zones, TCR develops forward looking estimates of

[8] NERC, NPCC, and ISO-NE use GE-MARS, a reliability assessment tool for ensuring system resource adequacy to satisfy customer load demand. The power industry has been using this tool to determine whether future resource mixes will comply with the resource adequacy criterion.https://www.geenergyconsulting.com/sites/gecs/files/downloads/GE%20MARS%20Reliability%20Modeling%20Software.pdf

installed capacity requirements for all zones." That shows that the ICR forecasts were used as inputs to ENELYTIX model, not an output. In addition, the TCR study maintained the transmission capacity constant after 2019 without any additional transmission additions, other than those specific to the proposed project(s) in response to the 83 D. Therefore, such projected zonal installed capacity requirements will not materially change from what they are today in 2019, particularly for the import constrained zones such as NEMA/Boston, West and Central Massachusetts, etc. Indeed, Tables 9 and 10 at 103-104 of the TCR study have shown that the TCR Projections for these zones as well as for the ISO-NE as whole are flat with small increases over the years from 2022 through 2025; and much higher from 2029 through 2040. Theoretically, when an efficient investment in reliability is made, the installed capacity requirement, and, hence, the cost to meet the resource adequacy reliability standard should be reduced accordingly to return some benefit to the consumers. Otherwise, the reliability investment would be unjust and unreasonable.

Q. The Joint Rebuttal Testimony of Waltman et. al. at footnote 24 claims that "To date, NextEra has not identified any flaws in TCR's analyses of transmission constraints." Are there flaws?

A. Yes. As we discussed above, the TCR study did not correctly assess system reliability, and, particularly, resource adequacy, in a realistic way. For example, the TCR study met the resource adequacy criterion by assigning new resources in each load zone per today's local ICRs. It assigned new generation into the NEMA/Boston zone and elsewhere in southern New England. Therefore, it did not objectively assess any reliability benefits that NECEC could provide. To properly assess the reliability benefits of the NECEC, there should not have been additional resources assigned to NEMA/Boston or any other locations south of the remaining two binding interfaces. A second run could have been made to evaluate the benefits of NECEC after transmission upgrades are made to eliminate the two constraining interfaces. This would have shown there are no benefits to Massachusetts consumers with the NECEC injection into Maine without completing the upgrades required to eliminate the Maine-New Hampshire and the North-South bottlenecks.

Q. Will NECEC's upgrades to the existing transmission system in Maine benefit Massachusetts customers, as claimed by the Joint Rebuttal Testimony of Waltman et. al. at 37:17-20.

A. No. The system upgrades required to interconnect NECEC inside of Maine do not add reliability benefits to the balance of the region. The generation resources in Maine have been providing reliability benefit to the entire ISO-NE region up to the level limited by either of the three transmission interfaces: the Surowiec-South, the Maine-New Hampshire, and the North-South. Even after the Surowiec-South interface inside Maine is upgraded, the next two interfaces outside of Maine -- the Maine-New Hampshire and the North-South (Refer to Figure B, Joint Direct Testimony of Russo, Stoddard, and Whitley), still effectively constrain the capacity from Maine to Northern New England (e.g., New Hampshire, Vermont) and from Northern New England to the "Rest of Pool" and the Commonwealth, respectively.

Q. Can NECEC deliver capacity to benefit Massachusetts and the ISO-NE region, as claimed by Joint Rebuttal Testimony of Waltman et. al. at 40:14-17; 42:16-19 and 47:5-7.

A. Currently, no. As shown in Figure B of Joint Direct Testimony of Russo, Stoddard, and Whitley, the NECEC is located on the very edge of the ISO-NE system. In order to realize the reliability benefit of the NECEC project to the Commonwealth, the two transmission interfaces between Maine and New Hampshire and between Northern New

England and Western and Central Massachusetts, respectively must be upgraded to open up the constrained capacity resources in Maine and in the Northern New England zones.

If the NECEC project is approved as proposed, the inefficient use of the bottled capacity resources in Maine and Northern New England will lead ISO-NE to require the construction of significant transmission upgrades to ensure the capacity and energy delivered in a remote part of the ISO-NE grid is helping ISO-NE to meet its reliability criteria by actually delivering the NECEC benefit to the entire region.

If NECEC is built as proposed, it is likely that ISO-NE may seek transmission upgrades to eliminate these bottlenecks from a regional transmission planning perspective. Such was the case when ISO-NE implemented transmission upgrades designed to unbottle the generation capacity in SEMA/Rhode Island in the early and mid-2000s. For example, two new 345 kV cables were built into downtown Boston. In addition, a major expansion was made to move power from eastern Massachusetts to Central and Western Massachusetts with the New England east to west projects. There were also two new 345kV lines built into southwest Connecticut. All of these projects were required due to reliability needs in order to unbottle generation and move the generation to the load centers while meeting NERC and NPCC reliability standards. This is the same type and magnitude of transmission upgrades that would be required to unbottle the surplus resources in the Maine and Northern New England, if the NECEC is built as proposed.

Alternatively, there would be a reliability benefit to the Commonwealth if the NECEC line were terminated in a more robust Electric High Voltage network within NEMA/Boston. Instead, the NECEC is proposed to inject 1,090 MW north of the two constrained interfaces, the Maine-New Hampshire and the North-South interfaces. By definition, this results in little/no reliability benefits to the Commonwealth's consumers. Logically, the overall long-term cost of this project could be minimized if the NECEC were terminated within the NEMA/Boston zone, avoiding the cost of transmission upgrades to open up the two constrained transmission interfaces mentioned above.

Q. The Joint Rebuttal Testimony of Waltman et, al. at 47:16-17 states that "There is no basis to single out one transmission [the NECEC] project to be assigned the cost of this process." Do you have an opinion on this statement?

A. We do not disagree with the statement. The point we are making here is that when NECEC is built, jamming 1,090 MW of capacity behind the transmission interfaces, it is logical for the ISO-NE planning process to conclude that it will fix the transmission system by way of costly system upgrades to address the congestion on the interfaces. The cost allocated to the Massachusetts consumers will be a significant additional cost to what they have to pay for the NECEC as proposed today.

Q. Do you agree with the Joint Rebuttal Testimony of Waltman et. al. at 44-47 that the NECEC upgrades address transmission issues beyond the Maine zone?

A. No. ISO-NE PP-10, cited by the EDC witnesses, states that "The study resource will be responsible for recorded overloads that meet any of the above-listed thresholds where, in relation to the Load Zone to which it is interconnecting"; and "The study resource will not be responsible for increasing the transfer capabilities of interfaces that form the boundaries between existing Load Zones" – which here is the Maine zone. Further, it states "NECEC will be deliverable to the ISO-NE PTF [New England pool transmission facility] when it is built, under the strict [Capacity Capability Interconnect Standards] CCIS interconnection standard" which is not equivalent to delivering the NECEC capacity to Massachusetts to help it in meeting the resource adequacy criterion.

Q. The Joint Rebuttal Testimony of Waltman et. al. at 46 disagrees with NextEra's position that Maine is export constraint. Do you have a response?

A. Yes. NextEra has consistently questioned whether adding capacity to the export constrained zone will materially bring reliability benefits to Massachusetts. The Joint Rebuttal Testimony confuses the two distinctive concepts: capacity for reliability and energy for economic benefits. For example, on page 37, it states that "This [TCR] work was done using a [energy] dispatch model that respected a significant set of known transmission constraints. NECEC showed benefits to the Commonwealth in this model that respects electric system constraints, thereby proving that NECEC enhances electric reliability in the Commonwealth." At the same time, the Joint Rebuttal Testimony of Waltman et. al. reached numerous incorrect conclusions because they rely on TCR's analysis that there is no congestion over the Maine-New Hampshire interface and the North-South interface from TCR energy dispatch studies, and, therefore, there are no capacity export constraints by the same two interfaces in the capacity resource adequacy assessment. This analogy is inaccurate. It is true that the NECEC energy can flow across these interfaces during many of the non-peak hours of the year by backing down other generation in Maine and remaining below these interface limits. However, when winter and summer peak conditions occur, and all of the Maine generation is needed for reliability in New England, these interfaces are binding and additional generation will not flow to Massachusetts. For the winter peak of 2018 (per the ISO-NE CELT report)[9], the peak demand in Maine was just under 2,000 MW. The total available Maine generation from existing resources was over 3,700 MW and a New Brunswick import of

[9] https://www.iso-ne.com/system-planning/system-plans-studies/celt/

208 MW which totals to 3,908 MW. This represents a surplus of 1,908 MW that could be transmitted to southern New England if no other bottlenecks existed. However, the Maine-New Hampshire interface is limited to 1900 MW. If 1090 MW is added into Maine from NECEC, there is no headroom to move this additional capacity south. The North-South interface limits also have the same bottleneck effects on limitations to Northern New England capacity.

Q. Do you agree that with the Joint Rebuttal Testimony of Waltman at 48:4-7 and 49:7-9 that EDCs have effectively analyzed the future upgrades resulting from NECEC?

A. No, they have not. As discussed above, the transmission upgrades by NECEC according to the ISO-NE interconnection process, including the CCIS upgrades, only provide the minimum reliability interconnection standard for the NECEC to be able to reliably interconnect and deliver its capacity and energy to the capacity/load Maine zone. The transmission upgrades were not intended to address the export constraining issues for the Maine-New Hampshire interface and the North-South interface.

We agree that ISO-NE has a robust planning and interconnection processes, which will make the NECEC project able to interconnect into Maine without negatively impacting system reliability. Once the required the system upgrades are implemented according to the CCIS standard, the NECEC capacity can technically be delivered to the Maine Zone. However, the CCIS standard is not the same as a system reliability study being performed to assess if the capacity into the export constrained zones can assist a resource shortage situation in NEMA/Boston, for example. To truly realize the reliability and economic benefit of the existing and the future NECEC capacity in Maine and in Northern New England, the analysis should include the costs of the more likely than not fact that the ISO-NE planning process will identify major transmission expansion needs.

6. THE SELECTION PROCESS

Q. The Joint Rebuttal Testimony of Waltman et al. at 59:16-18, claims that "CMP's knowledge of the selection of TCR as the Evaluation Team Consultant, the selection of the DOER's consultant or the Evaluation Team's consultant, TCR, was not confidential." Does this alleviate your previous concerns regarding the fairness of the selection process?

A. It does not. The EDCs assert that this knowledge *could* have been public and that the EDCs *would* have released information, but only CMP *actually* had it. This does not seem to constitute an equal playing field, given clear discrepancies in knowledge.

Q. When bidders hold asymmetric information, how does this affect the competitiveness of the process?

A. A core premise of competitive bidding situations is that all bidders are similarly situated and have symmetric knowledge. Each bidder will, of course, have private knowledge about its own project, but in a properly constructed competitive auction, all bidders will have the same information about matters that affect them all equally. In this process, however, CMP had knowledge regarding the selection process that other submissions did not. Regardless of whether this information was subject to disclosure to a public records request, such request was not made, and therefore the other companies submitting proposals did not have the same knowledge that CMP did.

Q. Do you believe CMP had an advantage due to it having information that was not publicly known?

A. Yes, it likely did. It is clear from CMP's email (Exhibit RSW-10) that the author thought the information was valuable and that the information gained indicated that the evaluation process would be similar to that used in the Tri-State solicitation. There is little question that the author was passing on this information so that CMP could refine its bid.

Q. Is it accurate, as the Joint Rebuttal Testimony of Waltman et al. at 60:13-61:7 claims, that the transmission information in Exhibit RSW-11 would have been available to all proposals and their sponsors?

A. No, it is not. The CEII information regarding the evaluation team was only available to those with PAC/RC CEII access. Also, there was no showing by the EDCs that all bidders have this access nor that they knew this information would be valuable for their bids.

Q. The Joint Rebuttal of Waltman et al. at 72 asserts that the EDCs selection process was consistent with the statutory requirement that "[e]very distribution company shall jointly and competitively solicit proposals for clean energy generation…" In your opinion, was this process competitive?

A. No. Although the EDCs received a reasonable number of bid packages, each and every portfolio given full and final consideration had at its core the same energy source: HQUS. When there is only one seller, a solicitation cannot be considered competitive.

Q. Does this conclude your Surrebuttal Testimony?

A. Yes, it does.