STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
PUBLIC UTILITIES COMMISSION

IN RE: Application of
Invenergy Thermal Development LLC's
Proposal for Clear River Energy Center

Docket No. 4609

RESPONSE OF CONSERVATION LAW FOUNDATION TO INVENERGY'S FIRST SET OF DATA REQUESTS

Regarding Robert Fagan's Testimony

Invenergy Request 1-1: Please provide your projections of peak demand and supply (including a breakout of existing supply, expected retirements, new thermal adds, new renewable adds, EE, DR, and storage) that support the statement on pg. 6 that "near term and long term reliability of RI and NE electric power sectors can be assured without reliance on the proposed power plant"?

Response: I rely upon ISO NE forecasts of loads, resources, and installed capacity requirements to support my statement that near term and long term reliability of RI and NE electric power sectors is assured without reliance on the proposed plant.

As seen in Attachment F to my pre-filed Direct Testimony, for the near-term year of 2019/2020 (year beginning June 1, 2019), the results of ISO NE's tenth FCA show that there is "Excess Capacity Above NICR [net installed capacity requirement]" equal to 1,416 MW. Without the proposed plant, the excess capacity above the NICR is roughly 931 MW (1,416 minus 485) for the 2019/2020 period. Thus, even without Invenergy's proposed plant, a near-term resource surplus exists.

For the longer term, I rely on ISO NE's most recent 2015 Regional System Plan (2015 RSP), which had projected resource surpluses for all years through 2023/24, and a shortage of 31 MW for 2024/2025. This is seen in Figure 12 of my pre-filed Direct Testimony. This ISO NE 2015 RSP included resources through the ninth FCA. As noted in my testimony at Table 2 (page 31), and in the text on pages 31-32, this most recent ISO NE RSP relied on the 2015 CELT forecast, which has now been superseded by the 2016 CELT forecast. Accounting for the lower ISO NE forecasted 50/50 peak load for 2024/25 in the 2016 CELT, the resource shortage of 31 MW seen in Figure 12 would become a resource surplus of 732 MW for 2024/25 (i.e., 763 MW adjustment to the 50/50 peak load forecast (as seen in Table 2), minus the resource shortage of 31 MW), even before consideration of any resource additions that cleared in the tenth ISO NE FCA.

Thus, since the net installed capacity requirement can be met without the proposed plant – ISO NE data indicates a significant capacity resource surplus in 2024/25 – reliability needs can be met without the proposed plant. As noted in ISO NE's notations to their Table 4-7 in that 2015 RSP (presented as Figure 12 in my pre-filed Direct Testimony), additional resources would be required if existing resources retired or less capacity imports obtained CSOs [capacity supply obligations]. That is not the case currently for 2020/2021 (see e.g., ISO NE, "Assumptions for Calculating the Installed Capacity Requirement (ICR) Values for the 2020-2021 Forward Capacity Auction (FCA11)", available at http://www.iso-ne.com/static-assets/documents/2016/05/PSPC_05262016_ICR_Resource_Load_Assumption_A5_2.pdf), which does not indicate any significant retirements for the next forward capacity auction. Also, notably, the information in Figure 12 excludes the effect that any future renewable resource additions not included in the 2015 CELT forecast - such as the potential for new Canadian hydro resources, or offshore wind – would have on capacity resource balances in the longer term.

The foregoing response was prepared by Robert Fagan.

There was no Request 1-2 in Invenergy's Data Requests.

Regarding Christopher Stix's Testimony

Invenergy Request 1-3: Please provide the quantitative calculation for how the 300 MW estimate was derived as specified on pg. 32?

Response: On page 32, lines 14-15, of my Pre-Filed testimony I said: "In order to be quite conservative, I estimated the ICR for FCA-11 to be only 300 MW lower than the ICR was in FCA-10."

The most significant component of the ISO's ICR calculation is summer peak load. As I explained in my testimony on pages 31 and 32, the ISO's 50-50 forecast for peak load during the Summer of 2020 (the period that applies to FCA-11) dropped from the 2015 CELT forecast to the 2016 CELT forecast. (By definition, the ISO's 50-50 forecast is 50% likely to not be exceeded.) Specifically, the 50-50 forecast for gross peak load dropped from 30,575 MW (in the 2015 CELT Report) to 30,276 MW (in the 2016 CELT Report), that is, a drop of 299 MW for the same CCP between two consecutive CELT Reports. However, when the impacts of Passive Demand Response and Behind the Meter Solar Not Reflected in load, the actual drop in the ISO's 50-50 forecast reflected in the same two CELT reports was 611 MW.

In order to be conservative, I used a 300 MW drop in demand.

Other components used in estimating the ICR include imports from Hydro Quebec, and the reserve requirements. The ISO has not yet published these figures for CCP-11, so I kept these constant in my calculations.

Invenergy Request 1-4: Please provide the quantitative calculation of how PDR would reduce ICR by 611 MW as specified on pg. 32-33?

Response: My testimony on pages 32-33 did not say that PDR (Passive Demand Response) would reduce ICR by 611 MW. It did say that the ISO's 50-50 summer peak load forecast for CCP-11 had dropped by 611 MW between the ISO's 2015 CELT Report to its 2016 CELT Report, as discussed in my previous answer. Also, as I noted above, that 611 MW figure takes into account both Demand Response and Behind the Meter PV.

Of the 611 MW difference reflected in those two CELT reports, 283 MW of the change described by the ISO came from an increase in Behind the Meter PV (from 393 MW [in the 2015 CELT Report] to 676 MW [in the 2016 CELT Report]); 30 MW came from an increase in PDR.

I took these figures directly from the ISO's 2015 and 2016 CELT reports.

Invenergy Request 1-5: Please provide back-up documentation for the 92% value referenced on pg. 47?

Response: On page 47, on lines 2 to 4, I said: "If all of these claims of downward pressure on prices actually came true, the variable profit margin (spark spread minus variable operating costs and RGGI costs) for the average fossil plant in New England (natural gas, coal, and oil) would drop by at least 92%."

First, in rechecking my calculations, the appropriate figure is 91%.

My calculation of the variable margin of 91% was derived as follows:

Spark spreads for natural gas generation (on a MWH weighted basis) of $17.02.
per MWH for gas plants (49% of MW hours from all sources and 96% of hours from oil and natural gas).
Spark spreads of ULSD plants of $32 per MWH (2% of MW hours from all sources and 4% of MWH from oil and natural gas).
Weighted average spark spread of $17.61 for fossil fuels.
We assume that no or minimal coal will be generating by 2020; thus natural gas and oil are the only fossil fuel generation.
Variable non-fuel costs of $4.14 per MWH (using the EIA 2013 data for combined cycle plants and escalated to 2020 at 2% annually).

RGGI costs of $3.35 per MWH ($3.31 for natural gas at 1164 lbs/MWH on natural gas and $3.85 for ULSD at 1480 lbs/MWH , both using EPA data from 2015).

Hourly Weighted Average Spark Spread	$ 17.61
Variable Non-Fuel Operating cost	$ (4.14)
RGGI Cost	$ (3.35)
Variable Margin on Fossil Energy	$ 10.12

Claimed savings by the four plants: $9.20

Margin for Fossil fuels in the ISO-NE System: $10.12

Claimed Savings (% of Margin) 91%

I note that other experts on spark spreads think my estimate of spark spreads may be optimistic. In his February 11 report, UBS analyst Julian Dumoulin-Smith said about ISO-NE spark spreads: "We continue to expect power and spark spreads to decline over time as policy efforts explicitly attempt to bring down relatively higher regional power prices." Mr. Dumoulin-Smith is a widely cited analyst and top *Institutional Investor*-ranked utilities analyst. If Mr. Dumoulin-Smith's prediction were to prove accurate, then Invenergy's projected savings would be even more improbable.

Invenergy Request 1-6: What price did you assume Clean Energy Center bid into the FCA 11, and how was this price derived?

Response: The correct name for the project I referred to at the top of page 37 is "Clean Energy Connect." I did not estimate a specific price for its bid into FCA-11. The Clean Energy Connect project is a combination of wind and hydro to offer firm energy. I do note that the ISO's Offer Review Trigger Price (ORTP) for on-shore wind capacity is $5.698/KW-mo. (Source: ISO New England memo entitled "Offer Review Trigger Price Update for Forward Capacity Auction-11," page 1.) (The ORTP is the price over which, pursuant to the ISO's Minimum Offer Price Rule (MOPR) the Internal Market Monitor (IMM) does not review a capacity offer.) This is very close to the Dynamic De-List Price set for FCA-11. I note that it is possible that Clean Energy Connect could bid in to FCA-11 at a figure lower than the ORTP, but in that case, its bid would be subject to review by the IMM.

In FCA-10, Invenergy bid below the ORTP for gas combined cycle plants, which was $9.17/KW-mo. (Source: ISO New England memo entitled "Offer Review Trigger Price Update for Forward Capacity Auction-10.") Since Invenergy actually cleared one turbine in FCA-10 at a bid lower than the ORTP, Invenergy's bid must have been reviewed and approved by the IMM.

I reasoned that it is entirely possible that Clean Energy Connect could bid into FCA-11 at or below $5.50, though I acknowledge that review by the IMM would be required before such a bid were accepted by the ISO.

Invenergy Request 1-7: How much capacity retired from FCA-10?

Response: In FCA-11, there are a total of 27 MW of Non-Price Retirements and permanent de-list bids. In FCA-10, there were 777 MW of Non-Price Retirements. In FCA-10, there were also 311 MW of static de-list bids cleared, very close to the average of the five most recent auctions of 336 MW.

Invenergy Request 1-8: How much renewable and demand response capacity did you assume to clear FCA-11?

Response: I did not make a separate estimate for renewables and demand response clearing in FCA-11. I did include all the capacity that cleared in FCA-10 as clearing in FCA-11, except for the estimate of 363 MW of Non-Price Retirements, permanent delist and static de-list bids cleared. I did include Clean Energy Connect and all of the renewable and demand response cleared in FCA-10 in my initial calculations. Clean Energy Connect represents 600 MW of base load capacity by combining new wind with existing hydro capacity. No other new capacity was included in my forecast for FCA-11.

Because it is a mix of both wind and existing hydro capacity in New York, it is unclear whether or what portion of the Clean Energy Connect project would qualify for the ISO's Renewable Technology Resource (RTR) Exemption from the MOPR. This program allows a limited quantity of renewable resources (defined as receiving certain state or federal Out of Market (OOM) subsidies) to bid into the Forward Capacity Auction free of the constraints of the ORTP under the MOPR. For the convenience of the reader, I provide (at the end of this document) the portion of the ISO's Market Rule 1 that is relevant to the RTR.

Following FCA-10, 528 MW of new capacity under the RTR exemption is available for FCA-11 (Source: Forward Capacity Auction 10 (FCA 10) –2019/2020 Capacity Commitment Period Results, Summary and Trends, Page 6, Maria Winkler, March 23, 2016.)

Even if Clean Energy Connect was reduced to 528 MW of capacity, my estimate of the closing price in FCA-11 would be $5.50.

Invenergy Request 1-9: What was the Dynamic De-List threshold in FCA-7? Was this value below what is being proposed for FCA-11 (pg. 40)?

Response: "In FCA-7, there were 201 Dynamic De-List Bids (approximately 1301 MW) were [sic] submitted during the auction at prices less than 0.8X CONE (or below $4.844/kW-mo), all were accepted." March 19, 2013 presentation by Carissa P. Sedlacek, Manager Resource Analysis and Integration, ISO-New England.

The Dynamic De-List price for FCA-11 is $5.50.

Invenergy Request 1-10: Describe specifically how the 35,804 MW capacity will remain in the FCA-11 auction and result in a clearing price of $5.50/kW-mo, as described on pg. 40?

Response: First, pages 28 to 40 of my testimony describe in considerable detail how I estimated the clearing price in FCA-11. Please refer to those pages.

More specifically, on page 40, at lines 11 to 17, I explain why some amount of capacity is likely to leave the auction in FCA-11 at the dynamic de-list threshold, just as capacity has left previous auctions at that threshold. Thus, somewhat less than 35,804 MW is likely to clear at $5.50/kW-mo.

Let me now take you through the mechanics and details of my calculation.

First, as described in the testimony at pages 30-36 of my Pre-Filed Testimony, the scaling factor for FCA-11 is likely to occur at an estimated ICR of 33,851 MW and a net CONE of $11.64. This anchors the demand curve.

I then used the shape of the proposed FCA demand curve, as published on the ISO-NE web site in a spread sheet dated March 2, 2016, and applied the shape anchored at the point of the scaling factor.

Applying this curve, I determined that the demand curve would reach the price of $7.03 (where the curve becomes horizontal) at a capacity of 34,510 MW.

I then applied the rules described in the proposed changes to Market Rule I, III.12.3.3.1(2) filed with FERC on April 15, 2016. For the convenience of the reader, I provide (at the end of this document) Market Rule I, III.12.3.3.1(2).

Pursuant to that rule, the curve is horizontal at $7.03 from 34,510 MW to the point 35,232 MW (34,510 MW plus 722 MW) and the curve is then sloped but not convex from 35,232 MW to a price of $0 at 36,848 MW.

The curve reaches the Dynamic De-List price of $5.50 at 35,580 MW. At this point, I estimate that existing capacity will delist to keep the price at $5.50/kW Month.

I estimate that de-listing will occur at $5.50 based on discussions with a number of industry experts.

Invenergy Request 1-11: Please provide any forecasts of FCA-10 that you conducted for this analysis or analyses supporting other ISO-NE projected developments over the last 12 months?

Response: I never made any ex ante forecasts of the outcome of FCA-10.

The foregoing responses to Invenergy's Data Requests 1-3 through 1-11 were prepared by Christopher T. Stix.

Supplement of ISO Rules Referred To

Here are the relevant sections of the Market Rule 1 related to RTR:

" To participate in the Forward Capacity Market as a Renewable Technology Resource, a Generating
Capacity Resource or an On-Peak Demand Resource (including every asset that is part of the On-Peak
Demand Resource) must satisfy the following requirements:
(a) receive an out-of-market revenue source supported by a state- or federally-regulated rate, charge
or other regulated cost recovery mechanism;
(b) qualify as a renewable or alternative energy generating resource under any New England state's
mandated (either by statute or regulation) renewable or alternative energy portfolio standards as in effect on January 1, 2014, or, in states without a standard, qualify under that state's renewable energy goals as a renewable resource (either by statute or regulation) as in effect on January 1, 2014. The resource must qualify as a renewable or alternative energy generating resource in the state in which it is geographically located;
(c) participate in a Forward Capacity Auction for a Capacity Commitment Period beginning on or
after June 1, 2018 as a New Generating Capacity Resource or New Demand Resource pursuant to
Section III.13.1.1, and;
(d) has been designated for treatment as a Renewable Technology Resource pursuant to Section III.13.1.1.2.9.

An Export De-List Bid or Administrative Export De-List Bid may not be submitted for Generating
Capacity Resources that assumed a Capacity Supply Obligation by participating in a Forward Capacity
Auction as a Renewable Technology Resource."

"If the total FCA Qualified Capacity of Renewable Technology Resources exceeds the cap specified in subsections (b), (c) and (d) the qualified capacity value of each resource shall be prorated by the ratio of the cap divided by the total FCA Qualified Capacity. The ISO shall notify the Project Sponsor or Market Participant, as applicable, of the Qualified Capacity Effective Date: 5/25/2016 - Docket #: ER16-870-000
value of its resource no more than three Business Days after the deadline for submitting Renewable Technology Resource elections.
(b) The cap for the Capacity Commitment Period beginning on June 1, 2018 is 200 MW.
(c) The cap for the Capacity Commitment Period beginning on June 1, 2019 is 400 MW minus the amount of Capacity Supply Obligations acquired by Renewable Technology Resources that are New Generating Capacity Resources pursuant to Section III.13.2 in the prior Capacity Commitment Period.
(d) The cap for each Capacity Commitment Period beginning on or after June 1, 2020 is 600 MW
minus the amount of Capacity Supply Obligations acquired by Renewable Technology Resources that are New Generating Capacity Resources pursuant to Section III.13.2 in the prior two Capacity Commitment Periods."

"**III.13.2.2.1. System-Wide Capacity Demand Curve.**

During the MRI Transition Period, the System-Wide Capacity Demand Curve shall consist of the following three segments:
(1) at prices above $7.03/kW-month and below the Forward Capacity Auction Starting Price, the System-Wide Capacity Demand Curve shall specify a price for system capacity quantities based on the product of the system-wide Marginal Reliability Impact value, calculated pursuant to Section III.12.1.1, and the scaling factor specified in Section III.13.2.2.4;
(2) at prices below $7.03/kW-month, the System-Wide Capacity Demand Curve shall be linear between $7.03/kW-month and $0.00/kW-month and determined by the following quantities:

(a) At the price of $0.00/kW-month, the quantity specified by the System-Wide Capacity Demand Curve shall be 1616 MW plus the MW value determined under the applicable provision in (b), (c), or (d) of this subsection.

(b) for the Forward Capacity Auction for the Capacity Commitment Period beginning June 1,
2020, at $7.03/kW-month, the quantity shall be the lesser of:

1. 35,437 MW; and

2. 722 MW plus the quantity at which the product of the system-wide Marginal Reliability Impact value and the scaling factor yield a price of $7.03/kW month"