

April 22, 2016

Via Electronic Mail and Federal Express

Ms. Luly Massaro  
Division Clerk  
Division of Public Utilities and Carriers  
89 Jefferson Boulevard  
Warwick, RI 02888

**RE: PUC Advisory Opinion to Construct the Clear River Energy Facility -  
Docket No.: 4609**

Dear Luly:

On behalf of Invenergy LLC, enclosed please find an original and ten (10) copies of Invenergy LLC's Supplemental Response to CLF's Data Request 1.3 for filing in the above docket.

Please note that the confidential documents that are referenced in the response are being submitted and protected pursuant to the PA Consulting documents and supporting materials that the EFSB has protected from public disclosure, pursuant to the EFSB Protective Order issued January 12, 2016.

Please let me know if you have any questions.

Very truly yours,



ALAN M. SHOER  
[ashoer@apslaw.com](mailto:ashoer@apslaw.com)

Enclosures

cc: Service List *(via e-mail)*

**STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS**

**PUBLIC UTILITIES COMMISSION**

**IN RE:            INVENERGY THERMAL DEVELOPMENT LLC    )**  
**APPLICATION TO CONSTRUCT AND            )**            **Dkt. 4609**  
**OPERATE THE CLEAR RIVER ENERGY            )**  
**CENTER, BURRILLVILLE, RHODE ISLAND            )**

**INVENERGY THERMAL DEVELOPMENT LLC's**

**Supplement to Responses to CLF Data Request 1.3:**

1.3:                    This Data Request pertains to PowerPoint Slide 21 used by Invenergy at the January 12, 2016 Preliminary Hearing, specifically this sentence: "By displacing older, inefficient plants Clear River is projected to save ratepayers \$280 million in cumulative savings between 2019 and 2022."

- (a)            Please confirm that the cumulate savings referred to pertain to: (1) the value of energy, not capacity or ancillary services; (ii) ratepayers in the Rhode Island load zone, not rest of pool; and (iii) the ISO-NE Capacity Commitment Periods 10, 11 and 12.
- (b)            Explain in detail how the \$280 million figure was derived, and provide all work-papers used in the calculations.
- (c)            Identify all inputs into these calculations derived from outside sources, and identify the outside source(s).
- (d)            For all inputs that were not derived from outside sources (that is, assumptions made by Invenergy), identify the assumption and explain why Invenergy believes the assumption to be reasonable.
- (e)            identify the principal person(s) responsible for this calculation.
- (f)            Identify additional person(s) involved in this calculation and generally the role of each one.

RESPONSE:            (a) The \$280 million is the approximate savings to Rhode Island ratepayers in cumulative energy and capacity costs resulting from the participation of Clear River in the energy and capacity markets from 2019 through 2022 (four calendar years). The capacity market savings are realized in Forward Capacity Auctions ("FCA") 10, 11, 12 and 13 (partial year given the FCA 13 delivery year is June 2022 through May 2023)

**SUPPLEMENTAL RESPONSE (4/22/2016): Following the FCA 10 results PA Consulting Group, Inc. (“PA”) has revised its calculations on the savings to Rhode Island ratepayers. Please see the testimony of Ryan Hardy, filed with the RI PUC in Docket 4609.**

(b) Invenenergy retained PA Consulting Group, Inc. (“PA”) to complete the market analysis associated with Clear River. The ratepayer savings analysis is explained in the EFSB Application, in Section 5.0 (Project Benefits) and in Section 7.0 (Need)( Section 7.2.3 of the EFSB Application -- Analysis of Need – Rhode Island Ratepayer Cost Impact).

The \$280 million represents the difference in total capacity and energy costs to Rhode Island-only load resulting from the Clear River capacity addition, as measured by comparing cost results from capacity and energy modeling cases (a) with Clear River starting in 2019; and (b) without Clear River.

- Capacity costs to Rhode Island-only load are allocated by ISO-NE based on the capacity auction clearing price and Rhode Island’s share of the system-wide peak demand. Rhode Island’s share of the system-wide peak demand is calculated by multiplying Rhode Island’s peak demand by (1 + Actual Reserve Margin). This accounts for the excess capacity that ISO-NE procures in the Forward Capacity Market (“FCM”) in order to ensure peak demand is met even if outages occur. To calculate any capacity cost savings under ISO-NE’s capacity cost allocation methodology, PA started by comparing the annual projected FCM Rest of Pool (“ROP”) clearing prices from the “With Clear River” and “Without Clear River” scenarios for auctions starting with FCA 10 (the 2019/2020 delivery year). The difference in clearing prices between the two scenarios in each delivery year was then multiplied by Rhode Island’s share of the system-wide peak demand to determine the savings to Rhode Island-only load as a result of Clear River.
- The energy cost to Rhode Island-only load for each case was calculated using projected Rhode Island-area energy prices from PA’s fundamental production cost analysis (utilizing the AURORAxmp<sup>1</sup> software and PA’s underlying market assumptions) for the two analyzed cases (i.e., “With Clear River” and “Without Clear River”).

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<sup>1</sup> The AURORAxmp Electric Market Model, developed by EPIS, Inc.

- Please see the accompanying worksheet calculations.

**SUPPLEMENTAL RESPONSE (4/22/2016): Please Note: Following the FCA 10 results PA Consulting Group, Inc. (“PA”) revised its calculations on the savings to Rhode Island ratepayers. Please see the Pre Filed Testimony of Ryan Hardy, filed with the RI PUC in Docket 4609.**

**For the pre-FCA 10 analysis, PA has prepared three separate work paper documents that explain how PA derived the ratepayer savings, using pre-FCA 10 results. The first workpaper (Summary – Energy and Capacity Cost Savings to Rhode Island Ratepayer as a Result of Clear River) shows the calculations that support PA’s analysis of energy and capacity cost savings to RI Ratepayers, as shown on slide 21 and 24. The second and third workpapers (Invenergy Clear River Energy Center Market Results, With and Without Clear River – dated April 2016) provide the underlying market based assumptions and inputs used to derive the ratepayer savings calculations. These are confidential documents that are being provided pursuant to the non-disclosure agreement between CLF and Invenergy.**

(c) PA employs a wide range of public and proprietary data to keep its various market models up to date, such that the universe of inputs cannot be easily divulged.

The inputs used by PA are described in the EFSB Application, Section 5.0 (Project Benefits) and in Section 7.0 (Need) (Section 7.2.3 -- Analysis of Need – Rhode Island Ratepayer Cost Impact) and in the documents prepared by PA Consulting and filed with the EFSB.

Key input drivers include the following:

- Peak Energy and Load: “2015-2024 Forecast Report of Capacity, Energy, Loads, and Transmission” (“2015 CELT Report”) from ISO-NE;
- Auction Parameters: ISO-NE FCA 10 auction parameters (sourced from ISO-NE website);
- Natural Gas Prices: PA’s base case forecast for delivered natural gas prices. Algonquin Citygate pricing is approximately \$5.50/MMBtu in 2019, escalating to approximately \$7.25/MMBtu by the 2022 timeframe (all

figures in nominal dollars, assuming 2.2% per annum inflation rate); and

- RGGI CO<sub>2</sub> Prices: PA's base case forecast assumes RGGI pricing averaging approximately \$6-7/short ton in the 2019-2021 period (all figures in nominal dollars, assuming 2.2% per annum inflation rate).

**SUPPLEMENTAL RESPONSE (4/22/2016): All of the key inputs used by PA are also described in the confidential PA Memos, dated June 16, 2016 and July 29, 2016, which are being provided to CLF pursuant to a non-disclosure agreement.**

(d) All market assumptions were from PA's independent base case forecast for the ISO-NE market as of the date of the analysis, with the exception of Clear River's unit performance characteristics. The primary variables include the unit's output or capacity, the variable Operation and Maintenance ("O&M") costs, and unit's heat rate, which were provided to PA by Invenergy. The unit capacity and heat rate were based off of proposals received for the subject equipment and the variable (O&M) costs were based on Invenergy's experience with similar technology and by comparing these costs to our actual costs that we have seen at our other combined cycle facilities.

**SUPPLEMENTAL RESPONSE (4/22/2016): Key market assumptions used by PA are also described in the confidential PA Memos, dated June 16, 2016 and July 29, 2016, which are being provided to CLF pursuant to a non-disclosure agreement.**

(e) This calculation was completed by PA, and primarily Ryan Hardy, Mark Repsher, and Mason Smith.

(f) PA has a team of power market experts in its Global Energy and Utilities practice that contributed to this analysis.

RESPONDENT: Ryan Hardy, Mark Repsher, and Mason Smith, of PA Consulting, John Niland, for Invenergy

DATE: January 28, 2016, as supplemented on April 22, 2016