

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
ENERGY FACILITY SITING BOARD

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

Docket No. SB-2015-06

**INVENERGY THERMAL DEVELOPMENT LLC'S RESPONSES TO
THE TOWN OF BURRILLVILLE'S 42nd SET OF DATA REQUESTS**

Regarding Ryan Hardy's Pre-Filed Supplemental Testimony dated November 20, 2017:

Request 42-1 Please provide copies of all communications between Ryan Hardy and
Invenergy that relate to his supplemental testimony of November 20, 2017.

Response 42-1 Please see **Exhibit 42-1 (Confidential)**.

RESPONDENT: John Niland, Invenergy Thermal Development LLC
Ryan Hardy, PA Consulting Group

DATE: January 9, 2018

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
ENERGY FACILITY SITING BOARD

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

Docket No. SB-2015-06

**INVENERGY THERMAL DEVELOPMENT LLC'S RESPONSES TO
THE TOWN OF BURRILLVILLE'S 42nd SET OF DATA REQUESTS**

Request 42-2 Please provide the analysis and all supporting documentation that allegedly supports the statement that "CREC Unit 2 is expected to clear FCA 13 with an online date of June 1, 2022" as referred to on page 2, lines 10-11.

Response 42-2 See attached **Exhibit 42-2 (Confidential)**, entitled "PA - Clear River - Market Projections - 12-19-2017.xls" containing all of the relevant assumptions and results from PA's latest analysis supporting Ryan Hardy's supplemental testimony. In particular, the 'ISO-NE Supply-Demand' tab in the attached file outlines PA's projected supply (including additions and retirements) and demand for FCA-13. The 'With Clear River' case has CREC 2 clearing FCA-13 with the resulting capacity prices for FCA-13 presented on the 'Capacity Prices - DY' tab. It should be noted that the resulting capacity prices are based on the assumptions of supply entry and retirement, as well as the other key underlying assumptions including natural gas prices (see 'Fuel Price Projections' tab), allowance prices (see 'Allowance Price Projections' tab), and other key market assumptions. To the extent that any of these key assumptions change, we would likely see changes to the resulting capacity prices. For this reason, PA also ran a scenario that assumed additional retirements in the ISO-NE market.

RESPONDENT: Ryan Hardy, PA Consulting Group

DATE: January 9, 2018

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
ENERGY FACILITY SITING BOARD

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

Docket No. SB-2015-06

**INVENERGY THERMAL DEVELOPMENT LLC'S RESPONSES TO
THE TOWN OF BURRILLVILLE'S 42nd SET OF DATA REQUESTS**

Request 42-3 Have you reviewed the construction schedule for CREC Unit 2?
a. If yes, provide the schedule.

Response 42-3 I have not reviewed the construction schedule for CREC Unit 2.

RESPONDENT: Ryan Hardy, PA Consulting Group

DATE: January 9, 2018

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
ENERGY FACILITY SITING BOARD

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

Docket No. SB-2015-06

**INVENERGY THERMAL DEVELOPMENT LLC'S RESPONSES TO
THE TOWN OF BURRILLVILLE'S 42nd SET OF DATA REQUESTS**

Request 42-4 Please provide the following information relating to the claimed capacity cost savings of CREC as cited at page 4, lines 12-14 and 17-19:

- a. Overview of methodology used by PA Consulting Group, Inc. ("PA")
- b. Capacity market model
 - i. Provide a description of the model
 - ii. Explain how exactly capacity is cleared in the model
- c. Provide all key assumptions used in the capacity market model
 - i. Peak demand forecast
 - ii. Supply curve slope where it crosses the demand curve
 - iii. Provide the modeled supply and demand curves for FCAs 10, 11, 12, 13, and 14 without CREC and with CREC
- d. Results in Excel format
 - i. Provide clearing prices in FCAs 10, 11, 12, 13, and 14 without CREC and with CREC

Response 42-4

- (a) PA provided two memos outlining its methodology for both energy and capacity price forecasting. Please see attached files labeled **Exhibit 42-4(a) (Confidential)** and **Exhibit 42-4(b) (Confidential)**.
- (b) Please see **Exhibit 42-4(a)**.
- (c) Please see **Exhibit 42-2**.
- (d) Please see **Exhibit 42-2**.

RESPONDENT: Ryan Hardy, PA Consulting Group

DATE: January 9, 2018

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
ENERGY FACILITY SITING BOARD

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

Docket No. SB-2015-06

**INVENERGY THERMAL DEVELOPMENT LLC'S RESPONSES TO
THE TOWN OF BURRILLVILLE'S 42nd SET OF DATA REQUESTS**

- Request 42-5 Please provide the following information relating to the energy savings:
- a. Overview of methodology used by PA
 - b. Version of AURORA_{xmp} and database used
 - c. Study area footprint and topology
 - i. Modeled control areas
 - ii. Zones modeled within each control area
 - d. Transmission linkages
 - i. Zonal transfer limits and the sources of information
 - ii. Interface transfer limits (i.e., multilinks) and the sources of information
 - e. Planned backbone transmission projects in each of the modeled control areas
 - i. Transfer limits of each project with the sources of information
 - ii. Assumed in-service date with the sources of information
 - f. Study region imports and exports
 - i. Explain the methodology (e.g., using hourly fixed schedules based on historical flows)
 - g. HVDC lines with adjacent modeled control areas
 - i. Existing lines (e.g., CSC, Neptune)
 - ii. Any new proposed projects (e.g., Northern Pass, Granite Link, etc.) with timing, capacity, etc.
 - h. Load Forecast
 - i. Specify the source of the load forecast in all modeled control areas (e.g., ISO-NE, NYISO, PJM)
 - i. Generation addition and attrition:
 - i. Provide the list of the new and planned for retirement resources for all modelled control areas and the source of the information.
 - j. Fuel price forecast:
 - i. Specify the sources for natural gas, oil, coal, and nuclear fuel price forecasts and describe any adjustments.

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
ENERGY FACILITY SITING BOARD

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

Docket No. SB-2015-06

**INVENERGY THERMAL DEVELOPMENT LLC'S RESPONSES TO
THE TOWN OF BURRILLVILLE'S 38th SET OF DATA REQUESTS**

- k. Results in Excel format:
- i. Provide the energy market price forecast (monthly, annually, on-peak, off-peak) without CREC and with CREC

Response 42-5

- (a) PA developed a market price forecast for the ISO-NE region using AuroraXMP. PA ran a case that included CREC 1 entering operation in June 2020 and CREC 2 entering operation in June 2022. PA also ran a case assuming CREC 1 and 2 never enter operation. The resulting difference in the power price projections for the ISO-NE Rhode Island zone was then used to calculate the ratepayer savings from CREC entering operation. Please see attached file labeled **Exhibit 42-4(b)** for a more detailed description of the energy market modeling and **Exhibit 42-4(a)** for the capacity market modeling.
- (b) AURORAXmp version 12.0.1072.
- (c) Please see **Exhibit 42-2**.
- (d) Please see **Exhibit 42-2**, containing all of the relevant assumptions and results from PA's latest analysis supporting Ryan Hardy's supplemental testimony. PA's transfer limits are derived from ISO-New England Tie Benefits Study: Assumptions and Methodology, for 2017/18 ARA3, dated July 28, 2016. Where the PA model transfer links do not correspond directly with the listed transmission interfaces, power flow analysis including ATC and contingency analysis has been used to determine link values by PA.
- (e) New England backbone projects that impact transfer limits are listed in the attached **Exhibit 42-2**. Changes to transfer limits were obtained from the ISO-New England Tie Benefits Study: Assumptions and Methodology, for 2017/18 ARA3, dated July 28, 2016.

New England project in-service dates were obtained from the ISO-New England Tie Benefits Study: Assumptions and Methodology, for 2017/18 ARA3, dated July 28, 2016.

- (f) AURORAXmp is a power market simulation tool designed to forecast power prices over both the short and long term. The core of the product is an hourly-dispatch model that simulates the dispatch of power plants in a chronological, multi-zone, transmission constrained system.

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
ENERGY FACILITY SITING BOARD

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

Docket No. SB-2015-06

**INVENERGY THERMAL DEVELOPMENT LLC'S RESPONSES TO
THE TOWN OF BURRILLVILLE'S 38th SET OF DATA REQUESTS**

- (g) The Cross Sound HVDC line (CSC) has been modeled between ISO-NE SWCT and NY Zone K, with a bidirectional capacity of 330 MW. The Neptune HVDC line has been modeled between PJM EMAAC and NY Zone K, with a bidirectional capacity of 660 MW. The Hudson Transmission Project (HTP) HVDC line has been modeled between PJM EMAAC and NY Zone J, with a bidirectional capacity of 660 MW.

While several major HVDC projects are in varying stages of development in the New England and New York areas, none of these projects have reached the threshold of development to be included in this study.

- (h) The source of the ISO-NE load forecast is the 2017 CELT Load Report.

The source of the NYISO load forecast is the 2017 Load & Capacity Data Report (Gold Book).

- (i) See **Exhibit 42-2**, containing the firm capacity additions and retirements from PA's latest analysis supporting Ryan Hardy's supplemental testimony.
- (j) See **Exhibit 42-2**, containing the relevant fuel price assumptions from PA's latest analysis supporting Ryan Hardy's supplemental testimony. PA develops its natural gas price assumptions internally using the GPCM model and works in conjunction with HellerWorx to develop coal price assumptions. PA develops its oil price forecast using the EIA Annual Energy Outlook.

RESPONDENT: Ryan Hardy, PA Consulting Group

DATE: January 9, 2018

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
ENERGY FACILITY SITING BOARD

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

Docket No. SB-2015-06

**INVENERGY THERMAL DEVELOPMENT LLC'S RESPONSES TO
THE TOWN OF BURRILLVILLE'S 42nd SET OF DATA REQUESTS**

Request 42-6 Provide the following information from the forecasts that PA made with respect to claimed energy cost savings associated with CREC as referred to at page 4, lines 4, 15, 21, and 22 including the following:

- a. Date of the conclusion
- b. Estimated energy and capacity services
- c. Estimated generation output from CREC
- d. Concluded estimated actual or forecast clearing prices in FCAs 10, 11, 12, 13, and 14 with CREC and without CREC
- e. Energy market price forecasts (monthly, annually, on-peak, off-peak) with CREC and without CREC

Response 42-6

- (a) October 26, 2017
- (b) See **Exhibit 42-2**, containing all of the relevant assumptions and results from PA's latest analysis supporting Ryan Hardy's supplemental testimony.
- (c) See **Exhibit 42-2**, containing all of the relevant assumptions and results from PA's latest analysis supporting Ryan Hardy's supplemental testimony.
- (d) See **Exhibit 42-2**, containing all of the relevant assumptions and results from PA's latest analysis supporting Ryan Hardy's supplemental testimony.
- (e) See **Exhibit 42-2**, containing all of the relevant assumptions and results from PA's latest analysis supporting Ryan Hardy's supplemental testimony.

RESPONDENT: Ryan Hardy, PA Consulting Group

DATE: January 9, 2018

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
ENERGY FACILITY SITING BOARD

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

Docket No. SB-2015-06

**INVENERGY THERMAL DEVELOPMENT LLC'S RESPONSES TO
THE TOWN OF BURRILLVILLE'S 42nd SET OF DATA REQUESTS**

Request 42-7 Provide each forecast provided by PA for any purpose relating to the future operation of CREC, including the date of each forecast and the outputs of such forecast including, but not limited to, number of megawatt-hours produced by CREC, revenues, expenses, and cash flows, and/or contribution margin.

Response 42-7 See **Exhibit 42-2**, containing all of the relevant assumptions and results from PA's latest analysis supporting Ryan Hardy's supplemental testimony.

RESPONDENT: Ryan Hardy, PA Consulting Group

DATE: January 9, 2018

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
ENERGY FACILITY SITING BOARD

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

Docket No. SB-2015-06

**INVENERGY THERMAL DEVELOPMENT LLC'S RESPONSES TO
THE TOWN OF BURRILLVILLE'S 42nd SET OF DATA REQUESTS**

Request 42-8 Provide each forecast provided by any market expert for any purpose relating to the future operation of CREC and its revenue, expenses, cash flows, and/or contribution margin.

Response 42-8 See **Exhibit 42-2**, containing all of the relevant assumptions and results from PA's latest analysis supporting Ryan Hardy's supplemental testimony.

RESPONDENT: Ryan Hardy, PA Consulting Group, Inc.

DATE: January 9, 2018

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
ENERGY FACILITY SITING BOARD

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

Docket No. SB-2015-06

**INVENERGY THERMAL DEVELOPMENT LLC'S RESPONSES TO
THE TOWN OF BURRILLVILLE'S 42nd SET OF DATA REQUESTS**

Regarding John Niland's Pre-Filed Supplemental Testimony dated November 20, 2017:

Request 42-9 Please provide any correspondence, recordings, memoranda, or notes that relate to communication between John Niland and the ISO-NE relating to the qualification of CREC Unit 2 in any Forward Capacity Auction ("FCA").

Response 42-9 Please see **Exhibits 41-1 (Confidential) and 41-10 (Confidential)** to Invenergy's responses to the Town's 41st Set of Data Requests. Please also see **Exhibit 42-10 (Confidential)**.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 9, 2018

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
ENERGY FACILITY SITING BOARD

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

Docket No. SB-2015-06

**INVENERGY THERMAL DEVELOPMENT LLC'S RESPONSES TO
THE TOWN OF BURRILLVILLE'S 42nd SET OF DATA REQUESTS**

Request 42-10 Please provide any correspondence, recordings, memoranda, or notes John Niland prepared relating to the qualification of CREC Unit 2 to participate in any FCA.

Response 42-10 Please see the information prepared by John Niland included in Invenergy's responses to CLF's Data Requests, Nos. 10-1, 10-2, 10-6, 10-7, 10-9 and Invenergy's responses to the Town's Data Requests, Nos. 41-3 and 41-5.

Please also see **Exhibit 42-10 (Confidential)**.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 9, 2018

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
ENERGY FACILITY SITING BOARD

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

Docket No. SB-2015-06

**INVENERGY THERMAL DEVELOPMENT LLC'S RESPONSES TO
THE TOWN OF BURRILLVILLE'S 42nd SET OF DATA REQUESTS**

Request 42-11 Please provide any correspondence, recordings, memoranda, or notes that relate to any communications between John Niland and any transmission owners relating to the interconnection for CREC Unit 2, including the interconnection agreement.

Response 42-11 Please see **Exhibit 42-11(a) (Confidential)**. This exhibit contains critical energy/electricity infrastructure information ("CEII") which is protected under federal law. Please see the Motion for Protective Treatment, filed concurrently with these data responses. Invenergy will file one (1) copy of Exhibit 42-11(a) under seal with the Board. Until the attorneys and expert consultants that will be reviewing this information have signed request forms and non-disclosure agreements and received confirmation from National Grid and ISO-NE, Invenergy is not at liberty to disclose the CEII information contained in Exhibit 42-11(a).

Please also see **Exhibit 42-11(b) (Confidential)**.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 9, 2018

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
ENERGY FACILITY SITING BOARD

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

Docket No. SB-2015-06

**INVENERGY THERMAL DEVELOPMENT LLC'S RESPONSES TO
THE TOWN OF BURRILLVILLE'S 42nd SET OF DATA REQUESTS**

Request 42-12 Please provide any correspondence, recordings, memoranda, or notes John Niland prepared relating to the interconnection for CREC Unit 2, including the interconnection agreement.

Response 42-12 See response to Data Request, No. 42-11 above.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 8, 2018

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
ENERGY FACILITY SITING BOARD

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

Docket No. SB-2015-06

**INVENERGY THERMAL DEVELOPMENT LLC'S RESPONSES TO
THE TOWN OF BURRILLVILLE'S 42nd SET OF DATA REQUESTS**

Request 42-13 Please provide all communications between Invenergy and transmission owners
as referred to at page 3, lines 9-16.

Response 42-13 See response to Data Request, No. 42-11 above.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 9, 2018

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
ENERGY FACILITY SITING BOARD

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

Docket No. SB-2015-06

**INVENERGY THERMAL DEVELOPMENT LLC'S RESPONSES TO
THE TOWN OF BURRILLVILLE'S 42nd SET OF DATA REQUESTS**

Request 42-14 Please provide all communications between Invenergy and GE relating to the major equipment order as referred to at page 3, lines 20-26.

Response 42-14 Please see **Exhibit 42-14 (Confidential and Redacted)**, which includes copies of all correspondence between Invenergy and GE pertaining to major equipment purchase dates for FCA-12.

(Exhibit 42-14 (Confidential and Redacted) redacts any cost information from the confidential version, as the cost information was not sought in this data request and is highly competitive business sensitive information that, if disclosed, even confidentially, would cause Invenergy and GE substantial harm.)

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 9, 2018

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
ENERGY FACILITY SITING BOARD

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

Docket No. SB-2015-06

**INVENERGY THERMAL DEVELOPMENT LLC'S RESPONSES TO
THE TOWN OF BURRILLVILLE'S 42nd SET OF DATA REQUESTS**

Request 42-15 Please provide a copy of the schedule associated with the "revised commercial operating date for Unit 1" as referred to at page 3, line 25 that is currently being utilized by Invenergy for internal and external planning purposes.

Response 42-15 Please see **Exhibit 42-15 (Confidential)**.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 9, 2018

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
ENERGY FACILITY SITING BOARD

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

Docket No. SB-2015-06

**INVENERGY THERMAL DEVELOPMENT LLC'S RESPONSES TO
THE TOWN OF BURRILLVILLE'S 42nd SET OF DATA REQUESTS**

Request 42-16 Do the transmission and related facility upgrades associated with CREC require filing for permits or approvals in any state other than Rhode Island? If so, please explain.

Response 42-16 The transmission line is the subject of a separate EFSB proceeding, SB-2017-01. It is Invenergy's understanding that the transmission and related facility upgrades associated with CREC do not require filing for any permits or approvals in any state other than Rhode Island.

RESPONDENT: John Niland, Invenergy Thermal Development LLC

DATE: January 9, 2018

INVENERGY THERMAL DEVELOPMENT LLC
By its Attorneys,

/s/ Alan M. Shoer

Alan M. Shoer, Esq. (#3248)

Richard R. Beretta, Jr. Esq. (#4313)

Nicole M. Verdi, Esq. (#9370)

ADLER POLLOCK & SHEEHAN, P.C.

One Citizens Plaza, 8th Floor

Providence, RI 02903-1345

Tel: 401-274-7200

Fax: 401-351-0604

Dated: January 9, 2018

CERTIFICATE OF SERVICE

I hereby certify that on January 9, 2018, I delivered a true copy of the foregoing responses to the Town of Burrillville's 42nd Set of Data Requests via electronic mail to the parties on the attached service list.

/s/ Alan M. Shoer

TOWN 42-1

(REDACTED)

EXHIBIT TOWN 42-2

(REDACTED)

EXHIBIT TOWN 42-4(a)

(REDACTED)

EXHIBIT TOWN 42-4(b)

(REDACTED)

EXHIBIT TOWN 42-10

(REDACTED)

EXHIBIT TOWN 42-11(a)

(REDACTED)

EXHIBIT TOWN 42-11(b)

(REDACTED)

EXHIBIT CLF 10-9 and TOWN 42-14

(REDACTED)

EXHIBIT TOWN 42-15

(REDACTED)