IN RE: INVENERGY THERMAL DEVELOPMENT LLC :

APPLICATION TO CONSTRUCT AND

OPERATE THE CLEAR RIVER ENERGY : SB-2015-06

CENTER, BURRILLVILLE, RHODE ISLAND

INVENERGY THERMAL DEVELOPMENT LLC'S SUPPLEMENTAL RESPONSES TO THE OFFICE OF ENERGY RESOURCES' THIRD SET OF DATA REQUESTS

OER 3-1:

Pre-filed testimony submitted by Ryan Hardy of PA Consulting Group, Inc. ("PA") on behalf of Invenergy summarized the results of PA's analysis of the Clear River Energy Center ("CREC") on the New England electricity markets. Mr. Hardy's analysis concluded that the addition of CREC "will lead to an average annual reduction of 1,037,000 short tons of CO₂, 2,399 short tons of NOx, and 2,984 short tons of SO₂ in the New England and New York region over the 2019-2022 timeframe." For New England alone, the analysis revealed that average annual reduction in CO₂ due to the addition of CREC would be 135,000 short tons. (See p. 16 of 30.) Exhibit RH-2 (Confidential) to Mr. Hardy's testimony, dated April 22, 2016, provides details of the analytic method. Please address the following with respect to Exhibit RH-2:

- (a) What was the source of the load forecast data for New England and New York in PA's analysis? Are more recent forecasts publicly available?
- (b) What was the source and vintage of the natural gas price forecasts for Henry Hub, Algonquin Basis and Algonquin Delivered shown in Table 1 of Exhibit RH-2? Please provide an updated gas price forecast.
- (c) What was the source and vintage of the projected Regional Greenhouse Gas Initiative ("RGGI") CO₂ allowance prices shown in Table 3? Please provide an updated CO₂ allowance price forecast, in light of recent RGGI auctions, the 2016 RGGI Program Review, and other regulatory and market developments.
- (d) Please provide an update to Tables A.4(a) and A.4(b), firm capacity additions and retirements summary, in light of recent market developments, including the results of FCA #11, and new renewable and clean energy resources procured through state initiatives.

APRIL 25, 2017 RESPONSE

- (a) For ISO-NE: 2015 CELT Load Report. FOR NYISO: 2015 Load and Capacity Data Report. PA Consulting Group (PA) will be updating its analysis by the end of June utilizing market assumptions from the ISO-NE's 2017 CELT Report, which is scheduled to be released by May 1, 2017. The CELT load forecast is a primary input within PA's modeling and could have material impact on the forecasted market outlook used to calculate capacity pricing, energy pricing, and emissions savings, among other results.
- (b) Henry Hub natural gas prices for 2016-2017 are sourced from NYMEX forwards as of 12/30/15, and long term natural gas prices

IN RE: INVENERGY THERMAL DEVELOPMENT LLC :

APPLICATION TO CONSTRUCT AND

OPERATE THE CLEAR RIVER ENERGY : SB-2015-06

CENTER, BURRILLVILLE, RHODE ISLAND

INVENERGY THERMAL DEVELOPMENT LLC'S SUPPLEMENTAL RESPONSES TO THE OFFICE OF ENERGY RESOURCES' THIRD SET OF DATA REQUESTS

(2022+) are sourced from BTU Analytics' December 2015 forecast, with the interim years interpolated (2019-2021). Algonquin natural gas basis prices for 2016 are sourced from NYMEX forwards as of 12/31/15. For Algonquin Basis 2017-2025: BTU Analytics. PA will also update its analysis with natural gas price assumptions as of 4/30/17.

- (c) For RGGI 2015: Clearing price from RGGI Auction 30, 12/2/2015. For RGGI 2016-2025: Trends from RGGI Auction 30 clearing price in 2015 to PA's internally developed forecast for 2021-2025. PA will also update its analysis with RGGI CO2 assumptions as of 4/30/17.
- (d) PA will update its analysis, including firm capacity and retirements and

other impacts of FCA#11 when the ISO-NE 2017 load forecast is released

in the first week of May.

SUPPLEMENTAL RESPONSE:

- (a) For ISO-NE: 2017 CELT Load Report. For NYISO: 2017 Load and Capacity Data Report. These are the most recent forecasts that are publically available. Please see the confidential Excel file titled "PA Clear River Market Assumptions 06-08-2017.xlsx," attached as **Exhibit A**.
- (b) Henry Hub natural gas prices for 2017-2018 are sourced from NYMEX forwards as of 4/28/17, and long term natural gas prices (2023+) are sourced from GPCM (Gas Pipeline Competition Model) Q3 2016, with the interim years interpolated (2019-2022). Algonquin natural gas basis prices for 2017 are sourced from NYMEX forwards as of 4/28/17. For Algonquin basis 2018-2025: GPCM. Please see **Exhibit A** (confidential).
- (c) For RGGI 2017: Clearing price from RGGI Auction 35, 03/08/2017. For RGGI 2018-2025: Trends from RGGI Auction 35 clearing price in 2017 to PA's internal forecast 2021-2025. Please see **Exhibit A (confidential).**
- (d) Please see **Exhibit A** (confidential).

IN RE: INVENERGY THERMAL DEVELOPMENT LLC :

APPLICATION TO CONSTRUCT AND

OPERATE THE CLEAR RIVER ENERGY : SB-2015-06

CENTER, BURRILLVILLE, RHODE ISLAND :

INVENERGY THERMAL DEVELOPMENT LLC'S SUPPLEMENTAL RESPONSES TO THE OFFICE OF ENERGY RESOURCES' THIRD SET OF DATA REQUESTS

RESPONDENT: Ryan Hardy, PA Consulting Group

Date: June 23, 2017

IN RE: INVENERGY THERMAL DEVELOPMENT LLC :

APPLICATION TO CONSTRUCT AND

OPERATE THE CLEAR RIVER ENERGY : SB-2015-06

CENTER, BURRILLVILLE, RHODE ISLAND

INVENERGY THERMAL DEVELOPMENT LLC'S SUPPLEMENTAL RESPONSES TO THE OFFICE OF ENERGY RESOURCES' THIRD SET OF DATA REQUESTS

OER3-2:

For each subpart (a) through (d) in Data Request 3-1 above, describe how applying the information updated since April 22, 2016 to PA's analysis would change Mr. Hardy's conclusions regarding the average annual reduction of CO₂ emissions in New England and New York, and New England alone, ascribable to the addition of CREC.

APRIL 25, 2017 RESPONSE 3-2:

- a) PA has not yet evaluated the impact of an updated load forecast, but plans to do so in May 2017. Overall, the addition of Clear River Energy Center (CREC) to ISO-NE will still result in a more efficient market, so it is our expectation that CREC will still result in lower CO2 emissions.
- b) PA has not yet evaluated the impact of an updated natural gas price forecast, but plans to do so in May 2017. Overall, the addition of CREC to ISO-NE will still result in a more efficient market, so it is our expectation that CREC will still result in lower CO2 emissions.
- c) PA has not yet evaluated the impact of an updated CO2 price forecast, but plans to do so in May 2017. Overall, the addition of CREC to ISO-NE will still result in a more efficient market, so it is our expectation that CREC will still result in lower CO2 emissions.
- d) PA has not yet evaluated the impact of revised additions and retirements, but plans to do so in May 2017. Overall, the addition of CREC to ISO-NE will still result in a more efficient market, so it is our expectation that CREC will still result in lower CO2 emissions.

SUPPLEMENTAL RESPONSE:

- a) PA continues to project significant CO2 savings from the addition of Clear River, with average annual reductions in CO2 emissions in New York and New England over 2020-2024 of ~1% per year. Please see the attached confidential Excel file titled "Clear River Emissions Generation and Heat Input Results 06-14-2017," attached as **Exhibit B**.
- b) Please see the response to 3-2 (a) above.
- c) Please see the response to 3-2 (a) above.
- d) Please see the response to 3-2 (a) above.

RESPONDENT: Ryan Hardy, PA Consulting Group

IN RE: INVENERGY THERMAL DEVELOPMENT LLC :

APPLICATION TO CONSTRUCT AND

OPERATE THE CLEAR RIVER ENERGY : SB-2015-06

CENTER, BURRILLVILLE, RHODE ISLAND :

INVENERGY THERMAL DEVELOPMENT LLC'S SUPPLEMENTAL RESPONSES TO THE OFFICE OF ENERGY RESOURCES' THIRD SET OF DATA REQUESTS

DATE: June 23, 2017

IN RE: INVENERGY THERMAL DEVELOPMENT LLC :

APPLICATION TO CONSTRUCT AND

OPERATE THE CLEAR RIVER ENERGY : SB-2015-06

CENTER, BURRILLVILLE, RHODE ISLAND :

INVENERGY THERMAL DEVELOPMENT LLC'S SUPPLEMENTAL RESPONSES TO THE OFFICE OF ENERGY RESOURCES' THIRD SET OF DATA REQUESTS

OER 3-3:

Please provide an updated analysis of the Invenergy's proposed CREC project, using the most currently available information on New England and New York markets, including the updates identified in Data Request 3-1. Provide the following information derived from PA's market model in electronic spreadsheet format with all cell formats and cell references intact.

- (a) Provide the annual change in CO_2 , NOx, and SO_2 emissions ascribable to the addition of CREC across New England and New York.
- (b) Provide the emissions of CO₂ for each control area or RTO across the study region, other than New England and New York, for each year of the forecast, with and without CREC.
- (c) Provide the fuel use by type (including but not limited to natural gas, coal, distillate fuel oil, kerosene, jet fuel, residual fuel oil), for each year of the forecast, with and without CREC.
- (d) The data should cover the same years for which Invenergy provides CO₂ impact results.

For each technology type listed below, provide the annual MWh of generation with and without CREC, for ISO-NE and NYISO.

- (1) Combined cycle plants
- (2) Combustion turbines
- (3) Oil-fired steam plants
- (4) Coal-fired plants
- (5) Nuclear
- (6) Wind
- (7) Hydro (excluding pumped storage)
- (8) Solar
- (9) Imports
- (10) Biomass, landfill gas
- (11) Other
- (e) Provide the total annual generation (MWh) for the Rhode Island zone

APRIL 25, 2017 RESPONSE 3-3: As noted above, PA has not yet evaluated the impact of revised market assumptions, but plans to update its analysis in early May 2017, following the release of ISO-NE's updated load forecast.

IN RE: INVENERGY THERMAL DEVELOPMENT LLC :

APPLICATION TO CONSTRUCT AND

OPERATE THE CLEAR RIVER ENERGY : SB-2015-06

CENTER, BURRILLVILLE, RHODE ISLAND :

INVENERGY THERMAL DEVELOPMENT LLC'S SUPPLEMENTAL RESPONSES TO THE OFFICE OF ENERGY RESOURCES' THIRD SET OF DATA REQUESTS

SUPPLEMENTAL RESPONSE:

- a) Heat Input and generation are available from PA's modeling output by groups of unit types (e.g. coal, gas, oil etc.). Heat input results are provided in **Exhibit B** (confidential).
- b) Fuel use data is provided as described in 2-1 (a) above.
- c) Heat Input and generation are available from PA's modeling output by groups of unit types (e.g. coal, gas, oil etc.). Generation results are provided in **Exhibit B** (confidential).
- d) Emissions results are available from PA output only for the target markets evaluated for the Clear River market projections (ISO-NE and NYISO).
- e) Total generation for the Rhode Island Zone, both with and without Clear River are provided. Please see **Exhibit B** (confidential).

RESPONDENT: Ryan Hardy, PA Consulting Group

DATE: June 23, 2017

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

One Citizens Plaza, 8th Floor Providence, RI 02903-1345 Tel: 401-274-7200

Fax: 401-751-0604 Dated: June 23, 2017

CERTIFICATE OF SERVICE

I hereby certify that on June 23, 2017, I delivered a true copy of the foregoing responses to Office of Energy Resources' Data Requests via electronic mail to the parties on the attached service list.

/s/ Alan M. Shoer

SB-2015-06 Invenergy CREC Service List as of 06/19/2017

Name/Address	E-mail	Phone/FAX
File an original and 10 copies with EFSB:	Todd.Bianco@puc.ri.gov;	401-780-2106
Todd Bianco, Coordinator	Kathleen.Mignanelli@puc.ri.gov;	
Energy Facility Siting Board	Patricia.lucarelli@puc.ri.gov;	
89 Jefferson Boulevard	Margaret.Curran@puc.ri.gov;	
Warwick, RI 02888	janet.coit@dem.ri.gov;	
Margaret Curran, Chairperson	Catherine.Pitassi@doa.ri.gov;	
Janet Coit, Board Member	Margaret.hogan@puc.ri.gov;	
Assoc. Dir., Div. of Planning Parag Agrawal	susan.forcier@dem.ri.gov;	
Patti Lucarelli Esq., Board Counsel		
Susan Forcier Esq., Counsel	rayna.maguire@dem.ri.gov;	
Rayna Maguire, Asst. to the Director DEM		
Catherine Pitassi, Asst. to. Assoc. Dir. Plann.	Parag.Agrawal@doa.ri.gov;	
Margaret Hogan, Sr. Legal Counsel		
Parties (Electronic Service Only, Unless by		
Request)		
Invenergy Thermal Development LLC	ashoer@apslaw.com;	401-274-7200
Alan Shoer, Esq.		
Richard Beretta, Esq.	rberetta@apslaw.com;	
Elizabeth Noonan, Esq.	enoonan@apslaw.com;	
Nicole Verdi, Esq. Adler, Pollock & Sheehan		
One Citizens Plaza, 8 th Floor	nverdi@apslaw.com;	
Providence, RI 02903	jniland@invenergyllc.com;	312-224-1400
110 (100100), 112 02/00		
John Niland, Dir. Of Business Development	Tthomas@invenergyllc.com;	
Tyrone Thomas, Esq., Asst. General Counsel	Tulomas@invenergyne.com,	
Mike Blazer, Esq., Chief Legal Officer		
Invenergy Thermal Development LLC	mblazer@invenergyllc.com;	
One South Wacker Drive, Suite 1900	generalcounsel@invenergyllc.com;	
Chicago, IL 60600		101.071.1100
Town of Burrillville	Michael@mcelroylawoffice.com;	401-351-4100
Michael McElroy, Esq., Special Counsel		
Leah Donaldson, Esq., Special Counsel		
Schacht & McElroy	<u>leah@mcelroylawoffice.com;</u>	
PO Box 6721		
Providence, RI 02940-6721		
	dimitrilaw@icloud.com;	401-273-9092
William Dimitri, Esq., Acting Town Solicitor		
Conservation Law Foundation	Jelmer@clf.org;	401-351-1102
Jerry Elmer, Esq.	Mgreene@clf.org;	
Max Greene, Esq.	7	
55 Dorrance Street		
Providence RI, 02903		
Ms. Bess B. Gorman, Esq.	Bess.Gorman@nationalgrid.com;	781-907-1834
Assistant General Counsel and Director		
Legal Department, National Grid		

40 Sylvan Road	Mark.rielly@nationalgrid.com;	
Waltham, MA 02451	,	
Mark Rielly, Esq.		
Senior Counsel		
Office of Energy Resources	Andrew.Marcaccio@doa.ri.gov;	401-222-3417
Andrew Marcaccio, Esq.		
Nick Ucci, Chief of Staff		
Chris Kearns, Chief Program Development	Nicheles Heei@anager si com	401 574 0100
One Capitol Hill	Nicholas.Ucci@energy.ri.gov;	401-574-9100
Providence, RI 02908	Christopher.Kearns@energy.ri.gov;	
	egc@levitan.com;	
Ellen Cool	Drama McCaha@doo ri com	_
Levitan & Associates	Brenna.McCabe@doa.ri.gov;	
Rhode Island Building and Construction Trades	gmancinilaw@gmail.com;	401-739-9690
Council		
Gregory Mancini, Esq.		
Sinapi Law Associates, Ltd.		
2374 Post Road, Suite 201		
Warwick, RI 02886		
Residents of Wallum Lake Road, Pascoag, RI	ccapizzo@shslawfirm.com;	401-272-1400
Dennis Sherman and Kathryn Sherman		
Christian Capizzo, Esq.	kags8943@gmail.com;	
Shechtman Halperin Savage, LLP		
1080 Main Street		
Pawtucket, RI 02869		
Residents of Wallum Lake Road, Pascoag, RI	jkeoughjr@keoughsweeney.com;	401-724-3600
Paul Bolduc and Mary Bolduc		
Joseph Keough Jr., Esq.		
41 Mendon Avenue		
Pawtucket, RI 02861	oatyss1@verizon.net;	401-529-0367
Paul and Mary Bolduc		
915 Wallum Lake Road		
Pascoag, RI 02859		
Abutter David B. Harris	msendley@cox.net;	401-349-4405
Michael Sendley, Esq.	, and the second	101 6 15 1106
600 Putnam Pike, St. 13		
Greenville, RI 02828		
Interested Persons (Electronic Service Only)		
Harrisville Fire District	ras@sinapilaw.com;	401-739-9690
Richard Sinapi, Esq.	,	
Joshua Xavier, Esq.		
2347 Post Road, Suite 201	jdx@sinapilaw.com;	
Warwick, RI 02886		
, in the second	nickgorham@gorhamlaw.com;	401-647-1400
Residents of 945 Wallum Lake Road, Pascoag, RI (Walkers)	mekgomame gomamaw.com;	+01-04/-1400
Nicholas Gorham, Esq.		
P.O. Box 46	edaigle4@gmail.com;	
North Scituate, RI 02857		
TYOTHI SCHUARE, IXI UZOS /		

Peter Nightingale, member Fossil Free Rhode Island 52 Nichols Road Kingston, RI 02881	divest@fossilfreeri.org;	401-789-7649
Sister Mary Pendergast, RSM 99 Fillmore Street Pawtucket, RI 02860	mpendergast@mercyne.org;	401-724-2237
Patricia J. Fontes, member Occupy Providence 57 Lawton Foster Road South Hopkinton, RI 02833	Patfontes167@gmail.com;	401-516-7678
Burrillville Land Trust Marc Gertsacov, Esq. Law Offices of Ronald C. Markoff 144 Medway Street Providence, RI 02906	marc@ronmarkoff.com;	401-272-9330
Paul Roselli, President Burrillville Land Trust PO Box 506 Harrisville, RI 02830	proselli@cox.net;	401-447-1560
Rhode Island Progressive Democrats of America Andrew Aleman, Esq. 168 Elmgrove Avenue Providence, RI 02906	andrew@andrewaleman.com;	401-429-6779
Fighting Against Natural Gas and Burrillville Against Spectra Expansion Jillian Dubois, Esq. The Law Office of Jillian Dubois 91 Friendship Street, 4 th Floor Providence, RI 02903	jillian.dubois.esq@gmail.com;	401-274-4591
Burrillville Town Council c/o Louise Phaneuf, Town Clerk 105 Harrisville Main Street Harrisville, RI 02830	lphaneuf@burrillville.org;	401-568-4300
Christine Langlois, Deputy Planner Town of Burrillville 144 Harrisville Main Street Harrisville, RI 02830	clanglois@burrillville.org; jraymond@burrillville.org;	401-568-4300
Joseph Raymond, Building Official Michael C. Wood, Town Manager Town of Burrillville 105 Harrisville Main Street Harrisville, RI 02830	mcwood@burrillville.org;	401-568-4300 ext. 115

Mr. Leo Wold, Esq. Department of Attorney General 150 South Main Street Providence, RI 02903	LWold@riag.ri.gov;	401-274-4400
Public Utilities Commission Cynthia Wilson Frias, Esq., Dep. Chief of Legal Alan Nault, Rate Analyst	Cynthia.Wilsonfrias@puc.ri.gov; Alan.nault@puc.ri.gov;	401-941-4500
Division of Public Utilities and Carriers John J. Spirito, Esq., Chief of Legal Steve Scialabba, Chief Accountant Tom Kogut, Chief of Information	john.spirito@dpuc.ri.gov; steve.scialabba@dpuc.ri.gov; thomas.kogut@dpuc.ri.gov;	401-941-4500
Matthew Jerzyk, Deputy Legal Counsel Office of the Speaker of the House State House, Room 302 Providence RI, 02903	mjerzyk@rilin.state.ri.us;	401-222-2466
Hon. Cale Keable, Esq., Representative of Burrillville and Glocester	Cale.keable@gmail.com;	401-222-2258
Nick Katkevich	nkatkevich@gmail.com;	
Avory Brookins	abrookins@ripr.org;	
Joseph Bucci, Acting Administrator Highway and Bridge Maintenance Operations RI Department of Transportation	joseph.bucci@dot.ri.gov;	
Jared Rhodes, Chief Statewide Planning Program	jared.rhodes@doa.ri.gov;	
Jennifer Sternick Chief of Legal Services RI Department of Administration	Jennifer.sternick@doa.ri.gov;	
Doug Gablinske, Executive Director TEC-RI	doug@tecri.org;	
Tim Faulkner ecoRI News 111 Hope Street Providence, RI 02906	tim@ecori.org;	401-330-6276
Sally Mendzela	salgalpal@hotmail.com;	
Keep Burrillville Beautiful Paul LeFebvre	paul@acumenriskgroup.com;	401-714-4493
Mark Baumer	everydayyeah@gmail.com;	
Nisha Swinton Food & Water Watch New England	nswinton@fwwatch.org;	
Kaitlin Kelliher	Kaitlin.kelliher@yahoo.com;	
Joe Piconi, Jr.	jiggzy@hotmail.com;	

Hon. Aaron Regunberg Representative of Providence, District 4	Aaron.regunberg@gmail.com;
Paul Ernest	paulwernest@gmail.com;
Skip Carlson	scarlson@metrocast.net;
Kathryn Scaramella	kscaramella@outlook.com;
Diana Razzano	Dlrazzano13@verizon.net;
David Goldstein	tmdgroup@yahoo.com;
Douglas Jobling	djobling@cox.net;
Claudia Gorman	corkyhg@gmail.com;
Curt Nordgaard	Curt.nordgaard@gmail.com;
Colleen Joubert	Colleenj1@cox.net;
Matt Smith Food & Water Watch	msmith@fwwatch.org;
Christina Hoefsmit, Esq. Senior Legal Counsel RI Department of Environmental Management	Christina.hoefsmit@dem.ri.gov;
Steven Ahlquist, RIFuture	atomicsteve@gmail.com;
Pascoag Utility District William Bernstein, Esq. Michael Kirkwood, General Manager Robert Ferrari, Northeast Water Solutions, Inc.	mkirkwood@pud-ri.org; Wlblaw7@gmail.com; rferrari@nwsi.net;
Ben Weilerstein Toxics Action Center	ben@toxicsaction.org;
Russ Olivo Woonsocket Call	rolivo232@gmail.com;
Suzanne Enser	svetromile@gmail.com;
Rhode Island Student Climate Coalition	riscc@brown.edu;

EXHIBIT A (REDACTED)

EXHIBIT B (REDACTED)