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May 17, 2019

**VIA HAND DELIVERY AND ELECTRONIC MAIL**
Mr. Todd A. Bianco
Coordinator
State of Rhode Island Energy Facilities Siting Board
89 Jefferson Blvd.
Warwick, RI 02886

**Re: SB 2015-06, Invenergy Thermal Development LLC's Application to Construction the Clear River Energy Center Power Plant in Burrillville, RI**

Dear Mr. Bianco:

Please find enclosed an original and six (6) copies of the Rhode Island Building and Construction Trade Council's memorandum in support of Invenergy Thermal Development LLC's application to construct the Clear Energy Center power plant.

Please let me know if you have any questions. Thank you.

Very truly yours,

Gregory A. Mancini

cc: SB 2015-06 Invenergy CREC Service List

**STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS**
**ENERGY FACILITY SITING BOARD**



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| **RE: SB 2015-06, INVENERGY THERMAL DEVELOPMENT, LLC APPLICATION TO CONSTRUCT AND OPERATE THE CLEAR RIVER ENERGY CENTER IN BURRILLVILLE, RHODE ISLAND** | ) ) ) ) ) | **Docket No. SB-2015-06** |

**MEMORANDUM IN SUPPORT OF INVENERGY THERMAL DEVELOPMENT, LLC'S APPLICATION TO CONSTRUCT THE CLEAR ENERGY CENTER POWER PLANT**

The Rhode Island Building and Construction Trades Council (RIBCTC) intervened in this proceeding to support approval of the proposed Clear River Energy Center project (CREC) in Burrillville, Rhode Island. The State of Rhode Island Energy Facility Siting Board (EFSB) granted their motion because of the "Council's interest in employment opportunities created by this project [which] is an interest not likely to be adequately represented by another party in this matter." *See*, EFSB Order No. 80. Additionally, the RIBCTC was subsequently granted the ability to provide rebuttal testimony on cost and need. *Id.* at Order No. 120.

## I. The CREC Enhances the Socio-economic Fabric of the State of Rhode Island

During the hearings the RIBCTC submitted testimony of four (4) witnesses to demonstrate that the CREC will enhance the socio-economic fabric of the State of Rhode Island.

### A. RIBCTC Witnesses

Michael Sabitoni, president of the RIBCTC, a voluntary federation of seventeen (17) local construction trade unions with approximately 9,500 members that live in and around Rhode Island, was the organization's first witness. RIBCTC Ex. No. 2 at 2; 11-16. Andrew Cortes was RIBCTC's second witness. He is the executive director of Building Futures, a domestic non-profit

corporation "that provides a comprehensive construction pre-apprenticeship program for disadvantaged Rhode Island residents for placement in" construction trade apprenticeship programs. RIBCTC Ex. No. 10 at 1;14, 2; 20-22. Lastly, the RIBCTC submitted the joint testimony of Drs. Gentile and Vatter. Their testimony supports the socio-economic impact analysis presented by PA Consulting and Mason Smith[1] and describes additional socio-economic impacts. RIBCTC Ex. No. 3 at 4;81-83.

*Michael Sabitoni*

According to Mr. Sabitoni, if approved, CREC will be the "largest construction project in the history of the State of Rhode Island". RIBCTC Ex. No. 1 at 3;15-16. It will be "constructed under an all-union RIBCTC PLA [project labor agreement] with union scale wages and benefits." *Id.* at 3; 22-24.[2] Under the terms and conditions of the agreement, all "local unions in the State of Rhode Island … have first preference, first recognition or first referral to" the project. July 19, 2018 Tr. at 93; 7-19, 118; 19-24, 119; 1-10. "There are provisions in the recognition clause [of the PLA] that the exhausting of the local [Rhode Island] union hiring hall must happen first at which time then the hall can clear in workers from neighboring local unions from neighboring states." *Id.* at 96; 8-13. This "will require the owner and contractor[s] to contact our [Rhode Island] union hall for any and all hires for this project. RIBCTC Ex. No. 1 at 3; 23-24. Potential workers from local unions outside of Rhode Island will only get an opportunity for employment after referrals from Rhode Island have been exhausted. July 19, 2018 Tr. at 119; 1-9. Therefore, Mr. Sabitoni estimates that eighty percent (80%) of the workforce that will be employed on this project will be Rhode Island residents. July 19, 2018 Tr. at 94; 1-5, 18-22. Mr. Sabitoni also said that if an

[1] Mr. Edinaldo Tebaldi had been slated to testify, but became unavailable, and Mr. Smith fully adopted Mr. Tebaldi's pre-filed testimony. July 19, 2018 Tr. at 135:17-136:15.

[2] Although a PLA has not yet been entered into for CREC, Invenergy Thermal Development LLC (Invenergy) has executed a letter of intent guaranteeing that a PLA will be entered into. July 19, 2018 Tr. at 92:16-93:2, 96:21-97:4, 111:21-112:15.

expedited schedule is needed, the trades would work double or triple shifts, depending on the need and necessity of the owner. *Id.* at 115; 10-13. Also, included in the PLA is a requirement that the general contractor utilize apprentices trained through Building Futures, a domestic non-profit corporation dedicated to recruiting, training, and placing local [meaning Rhode Island] residents. RIBCTC Ex. 1 at 4; 7-13. According to Mr. Sabitoni, in total, "this project will probably account for 15-20% of the entire commercial construction market in the State of Rhode Island for two (2) plus years. RIBCTC Ex. 1 at 4.

The hundreds of construction jobs created by CREC will be well-paying construction jobs, that, by construction standards, will last for an extended period of time.[3] Each one of these jobs will pay at least $60,000 in wages and another $30,000 in health and retirement benefits" annually. RIBCTC Ex. 1 at 4; 1-4. The $60,000 "is a low estimate"; the wages are higher for more skilled craftsmen and women. July 19, 2018 Tr. at 98; 1-6.

*Andrew Cortes*

"If approved, this project will implement an apprenticeship utilization requirement that will ensure fifteen percent (15%) of the total hours worked will be completed by apprentices. Any new apprentices referred to this project will be Building Futures graduates. RIBCTC Ex. No. 10 at 3-4, meaning there will be at least forty-eight (48) and as many as one-hundred and eighty (180) apprentices on this project. *Id.* At 4. These workers will start with a base wage of $17 per hour and by the time they graduate will be making (depending on the trade) approximately $37 per hour. *Id.* at 3. The benefit package is "on top of that." July 19, 2018 Tr. at 130. Based on previous experiences, approximately half (1/2) of these apprentices will be Building Futures graduates. According to Mr. Cortes, Building Futures has the capacity to provide the registered apprentices

[3] According to Mr. Sabitoni, "power plants are known as the ultimate referral...because of the longevity of employment" by construction standards. July 19, 2018 Tr. at 107; 2-7.

that this project will require; and, all of the apprentices referred will be Rhode Island residents. RIBCTC Ex. No. 10 at 5; July 19, 2018 Tr. at 131.

*Dr. Ralph Gentile and Dr. Marc Vatter*

While their testimony focused on construction-related employment impacts, they did "discuss other socio-economic benefits associated with" the project. RIBCTC Ex. No. 3 at 5; 104-05. Their primary source for estimates of employment impacts in the building trades was data from the Construction Labor Market Analyzer (CLMA). *Id.* at 6; 107. These experts compared the project job estimates with CMLA data for a standard 1,000-megawatt combined cycle power plant to analyze the methodology utilized by PA Consulting, and to also ascertain the job impacts that the CREC will have. *Id.* at 6; 107-12. They also utilized the National Renewable Energy Laboratory's Jobs and Economic Development Impact Model (JEDI) "to verify the reasonableness of the relationship" between statewide impacts and the use of inputs to the construction and operation of CREC, and they performed an independent analysis using the Organization for Economic Cooperation and Development's (OECD) Structural Analysis (STAN) database to estimate "value added and labor input for a large number of industrial categories" of inputs used to build and operate CREC; *Id.* at 6; 114-18.

Under this methodology, they estimated employment impacts in "multiple stages", which are conventionally defined in this type of analysis. *Id.* at 6-7; 127. The first set of impacts is "direct effects"—"onsite labor and professional service jobs." *Id.* at 7; 128-29; the second are "indirect effects"—jobs, income, output, and fiscal effects created from the initial spending in constructing and operating the facility, not including labor; *Id.* at 7; 134-36; and the third set of impacts are "induced effects"—secondary impacts on jobs, earnings, output, and fiscal benefits

created by household spending of income earned either directly from the facility or indirectly from businesses impacted by it. *Id.* at 7; 138-40.

Their analysis supported "the Hardy and Tebaldi testimonies in terms of job creation. If anything, it suggests slightly higher numbers of onsite construction jobs." *Id.* at 8; 156-58. Using the CLMA data, Gentile and Vatter estimated that a 1,000 MW combined cycle natural gas fired power plant would create an average of three-hundred twenty-eight (328) jobs per year in the trades alone, with a total of twelve hundred and three (1,203) annual FTE over the period of construction. *Id.* at 9; 161-63.[4] Using the OECD's STAN database, they estimated that the project would directly and indirectly create eight-hundred fifty-two (852) jobs per year over the period of construction, not including induced effects. *Id.* at 2; 39-40. This result comports with the assessment of The Rhode Island Statewide Planning Program. *Id.* at 19; 353-56. Accordingly, they concluded that Hardy's assertion that the construction and operation of CREC would create an average of six-hundred five (605) full-time direct and indirect jobs per year for four (4) years "is reasonable." *Id.* at 9; 165-69.

Using the OECD's STAN database, they estimated that natural gas-fired generation is somewhat less labor-intensive than solar photovoltaic generation, but significantly more labor-intensive than wind. *Id.* at 15; 271-73.

For the period of construction, they estimated that the project would add $154 million per year to the Rhode Island economy. *Id.* at 2; 41-42. "This does not include any effects of lower electricity prices, which are included in Hardy and Tebaldi's estimated $133 million per year effect on output...." *Id.* at 2-3; 41-44. Invenergy Ex. No. 36 at 28; 20-21.

[4] Industrial projects such as CERC "require very skilled workers" who will be in the upper percentile of industry wages. *Id.* at 10; 184-190.

When asked if "...we're in a tight labor market for skilled craft workers," (July 24, 2018 Tr. at 37; 14-17), Dr. Gentile responded that "[o]ur labor market is not anywhere near as tight as people think." July 24, 2018 Tr. at 38; 2-3. He referred to approximately 6.3 million U.S. workers who were either "marginally attached to the labor force" or available for work but not looking; these workers do not count as being in the labor force or unemployed, according to the Bureau of Labor Statistics. *Id.* at 38;15-39;4. Dr. Vatter added that labor force participation had never recovered from the Great Recession, either nationally or in Rhode Island, that the right opportunity, as with Building Futures, can draw people into the labor force, and that this represented slack in the labor market that was not reflected in the unemployment rate. *Id.* at 38;15-39;4.

**B. CREC Will Enhance the Socio-Economic Fabric of Our State**

In its advisory opinion, Statewide Planning reviewed the analysis and assessed the conclusions of PA Consulting Group and reviewed the economic impacts of recently constructed power plants in Massachusetts and Connecticut. It concluded that Invenergy's methodologies and analyses were reasonable and with "a finding of positive impact for the state" for CREC. Drs. Gentile and Vatter also concurred with PA Consulting's conclusions relative to employment. Statewide Planning Advisory Opinion at 12. Based on EFSB precedent, this Board has concluded that there is a positive socio-economic impact. *See, In Re: RI Hope Energy Limited Partnership,* EFSB SB-98-1; *In re: Tiverton Power Associates, LP,* EFSB SB-97-1; *In Re: Application of Narragansett Elect. Co. and New England Power Co.,* EFSB SB-89-1; *In Re: Application of Ocean State Power,* EFSB SB-87-1.

Additionally, under the terms and conditions of the all-union PLA that this project will be constructed under, ***Rhode Island union workers will have the "first preference" for hiring on this project.*** Also, under the terms of the PLA there is a requirement that apprentice workers will

be utilized for fifteen percent (15%) of all labor hours. The first source of referral for these new workers is Building Futures, a domestic non-profit corporation that ***only recruits Rhode Island residents***. These are additional assurances and benefits that were not taken into consideration by Statewide Planning's "positive impacts" determination that this project will have for the state.

There are even more additional benefits. Drs. Gentile and Vatter also concluded that "[c]onstruction of the CREC will produce a broad range of [socio-economic] benefits to the local community and the state." RIBCTC Ex. No. 3 at 11; 198-201. These include "significant" additional tax revenue from municipal property taxes, and "nearly $4.0 million new income tax revenue from the project alone (regardless of where the workers live, see July 24, 2018 Tr. at 52; 8-10) and $30 million in tax revenue from all jobs related to construction of CREC. RIBCTC Ex. No. 3 at 12-13; 225-32. They estimate that CREC would add $154 million per year to the Rhode Island economy during construction and early operation. *Id.* at 12; 234-37. CREC would lower electricity costs and reduce the likelihood of outages, enhancing the attractiveness of Rhode Island to businesses (and residents), thereby creating employment opportunities. *Id.* at 11; 201-06; also see *Id.* at 12; 221. Having an efficient load-following plant "will make it possible to reliably fill gaps inherent in generation from renewable sources, making it easier for the state to reduce emissions."[5] *Id.* at 11;206-12;208. Accordingly, there is a significant positive socio-economic benefit for this project.

## II. Cost and Need

RIBCTC expert Dr. Marc Vatter testified to rebut direct testimony on cost and need of Mr. Robert Fagan and Mr. Glenn Walker. *See*, EFSB Order No. 121. His testimony stresses a handful of points: A) Economic growth is more important to load growth than Mr. Fagan gives it credit

[5] "Solar generation produces energy when the sun shines, and gas-fired generation fills in the gaps between that output and load." *Id.* at 15; 278-79.

for, it is proceeding more rapidly than it did in the years following the Great Recession, and the ISO's forecast of economic growth is below both current conditions and long-term historical levels; B) past volatility in capacity prices casts doubt on Mr. Walker's pessimistic forecast; C) gas-fired generation is an important tool for filling in the gaps between load and intermittent solar and wind generation, because it is less expensive than battery storage, even accounting for the social costs of emissions of greenhouse gases, and because transmission accessing Canadian hydropower has proven difficult to site; and, D) CREC's dual-fuel capability has a high value in terms of reliability given New England's urgent need for greater security of fuel supplies during winter cold snaps; at those critical times, when CREC might run on oil, it would burn much less oil, and produce far fewer emissions, than other oil-fired generators in New England.

**A. Economic Growth and its Effect on Load Growth, Past and Future**

Dr. Vatter rebutted Mr. Fagan's claim that energy efficiency (EE) and behind-the-meter photovoltaics (BtM PV) were the "dominating factors" explaining a slowdown and reversal in load growth after 2006. RIBCTC Ex. No. 12 at 5; 81-82. Dr. Vatter used ISO data to model the determinants of load growth during that time econometrically. *Id.* at 16-18; 243-80. He showed that the macroeconomy contributed far more than EE and BtM PV to the model's explanatory power (*Id.* at 19; 281-94), and that loads in New England would not have stopped growing if the economy had continued to grow at its pre-recession rate. *Id.* at 6-7; 92-106. He also questioned the ISO's long-term forecast of economic growth, 1.92% p.a. for New England, which, among other things, helps determine the installed capacity requirement in its forward capacity auctions. *Id.* at 8;114-9;127.

Dr. Vatter noted that, since the fourth quarter of 2016, the New England economy had grown at 2.45%, and that had translated into positive load growth of 0.89% p.a. RIBCTC Ex. No.

13 at 8;146-9;157. Dr. Vatter compared actual growth in ISO New England peak load from 2017-2018 of 7.92% to the 0.42% forecast from the ISO's 2018 Capacity, Energy, Loads, and Transmission (CELT) Report. January 17, 2019 Tr. at 209; 6-22. He noted that, for the year ending November of 2018, energy loads had grown at 2.4%. *Id.* at 209; 1-2. He associated this with current economic growth and noted that there has been no acceleration in inflation, suggesting that the current rate of growth could be sustained. *Id.* at 211; 9-23. He observed that, between 1980 and 2017, real gross state product in New England grew by 2.26 percent annually, inflation decelerated, and the Great Recession occurred, suggesting that long-term potential growth is higher than 2.26% p.a. *Id.* at 209; 6-213; 8.[6]

**B. Past Volatility and Future Capacity Prices**

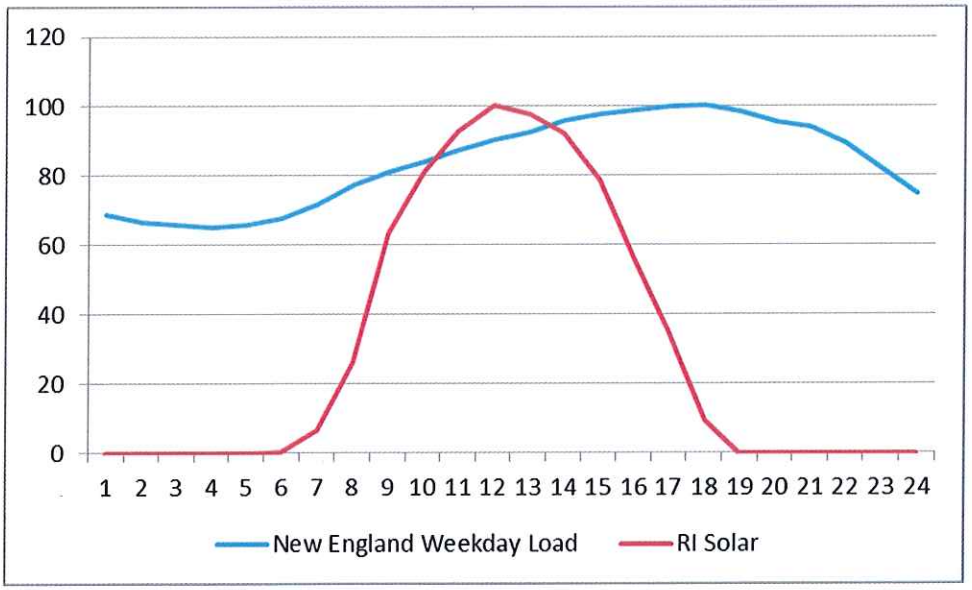
Dr. Vatter questioned Glenn Walker's forecast of $5-6/kW-mo capacity prices for "the next several auctions". RIBCTC Ex. 12 at 12;172-14;203; *also see* Town of Burrillville Ex. No. 2 at 8; 5-8. He extrapolated the trend for the pricing zones including Rhode Island from all previous FCAs and found that it was higher than the price at which CREC Unit 1 cleared FCA 10, $7.03/kW-mo, and that a price one standard deviation above the historical mean would be $11.44/kW-mo. Dr. Vatter acknowledged that the price in FCA 12 was around $5/kW-mo, but observed that, accounting for this, a price one standard deviation above the mean was still $11.08/kW-mo. RIBCTC Ex. 14 at 3; 53-55.

[6] According to advance estimates from the Bureau of Economic Analysis (News Release BEA 19-17; https://www.bea.gov/system/files/2019-04/gdp1q19_adv_0.pdf, accessed April 29, 2019), the U.S. economy grew at a real annual rate of 3.2% in the first quarter of 2019, and inflation was slow at 0.9% p.a. Id. at 11, Table 4, Line 1. Furthermore, this growth was led by growth in net exports, which also represent national savings, so the growth was not "bought" at the price of adding to the nation's indebtedness, as measured by its negative international investment position. This is another reason to regard the current rate of economic growth, which is considerably higher than the ISO's forecast, as sustainable.

### C. The Choice Among Combined-Cycle Gas, Canadian Hydropower, and Lithium-Ion Batteries as Complements to Intermittent Solar and Wind

In direct testimony, Mr. Fagan discussed the need for CREC without reference to the value of its flexibility for filling in gaps between load and intermittent solar and wind generation. CLF Ex. No. 3. Dr. Vatter included Figure 1~~Figure 1~~ in his rebuttal. RIBCTC Ex. No. 12 at 10; 143-44. Solar output and load do not generally coincide, and both solar output and load also exhibit unpredictable variability, making it even harder to "shape" solar output to meet load. RIBCTC Ex. 12 at 9; 140-42. Mr. Fagan repeatedly mentioned Canadian hydropower as being among future additions to the New England resource mix, though he did not discuss its value for shaping the intermittent output of solar and wind, which is, in fact, high. CLF Ex. No. 3 at 6; 8-13. *Id.* at 24; 35. *Id.* at 32; 11-13.

Figure 1: Weekday hourly load and solar generation shapes; % of maximum, RIBCTC Ex. 12 at 10; 144.




Dr. Vatter observed that the resource mix in New England has added a combination of natural gas and Canadian hydro in recent years. RIBCTC Ex. No. 12 at 11; 152. He stated that, going forward, transmission of additional Canadian hydro is proving difficult to site. He reported

that the New Hampshire Site Evaluation Committee (SEC) voted 7-0 in January 2018 against permission for Eversource to construct the Northern Pass project, and that the state of Massachusetts withdrew its plan to use the project in March 2018. RIBCTC Ex. No. 13 at 6; 95-100. Mr. Fagan incorrectly referred to Northern Pass as obviating the need for CREC.[7] CLF Ex. No. 3 at 32; 11-13 and footnote.

Mr. Fagan also referred to the Northeast Clean Energy Connect (NECEC) project in Maine as a way to access Canadian hydro. CLF Ex. No. 3 at 32; 11-13 and footnote. Dr. Vatter described opposition to NECEC from environmental groups in Maine. *Id.* at 6-7; 101-17.

Mr. Walker argued that "CREC's fast start, ramping, and flexibility characteristics" will be supplanted by energy storage technologies during the 2020s. Town of Burrillville Ex. No. 2 at 11; 10-20. Dr. Vatter pointed out that a combined-cycle gas plant like CREC remains significantly less expensive than lithium-ion batteries, even accounting for the social cost of emissions of $CO_2$ and methane, as a way to shape the intermittent output of solar and wind generation.

In Exhibit 12, at 11, 154-62, Dr. Vatter referred to Lazard's *Levelized Cost of Storage – Version 2.0* - December 2016, at 6 and 11[8], which puts the cost of lithium-ion batteries between $267/MWh and $561/MWh, and compares this to $55/MWh for combined-cycle gas. In Exhibit 14, Table 1, at 7, 121, he referred to Lazard's *Levelized Cost of Storage – Version 4.0* – November 2018, at 11[9]. This version puts the cost of lithium batteries between $108/MWh and $140/MWh.

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[7] Eversource is taking issue with the SEC before the New Hampshire Supreme Court. CLF attorney Melissa Birchard "calls [Eversource's] Supreme Court fight a 'last ditch legal appeal" from a zombie project that should remain in the grave." ("Eversource fights to keep Northern Pass alive", Jon Chesto, Boston Globe, April 11, 2019; https://www2.bostonglobe.com/business/2019/04/11/eversource-fights-keep-northern-pass-alive/xSgbqT4XsiYz7b8zgVGu2J/story.html, accessed April 30, 2019).

[8] https://www.lazard.com/media/438042/lazard-levelized-cost-of-storaee-v20.Ddf. accessed August 9, 2017. RIBCTC Ex. 12 at 11; fn. 9.

[9] https://www.lazard.com/media/450774/lazards-levelized-cost-of-storage-version-40-vfinal.pdf, accessed November 26, 2018. *Id.* at 121; fn. a.

Dr. Vatter also referred to Lazard's Levelized Cost of Energy – Version 12.0 – November 2018, at 2[10], which puts the cost of combined-cycle gas turbines between $41/MWh and $74/MWh. Despite the large drop in the cost of batteries, combined-cycle gas is still about $67/MWh less expensive. As to whether the decline in costs for batteries will continue, Dr. Vatter also quoted Lazard as follows: "Industry participants noted rising cost pressures for future deliveries of lithium-ion storage systems due to higher commodity pricing and tightening supply," and "[f]uture declines in the cost of lithium-ion technologies are expected to be mitigated by rising cobalt and lithium carbonate prices as well as delayed battery availability due to high levels of factory utilization."[11] RIBCTC Ex. 14 at 4; 74-78.

Because of Rhode Island's interest in the issue of climate change, reflected in the Resilient Rhode Island Act of 2014, Dr. Vatter added the social costs of emissions of $CO_2$ and methane to the cost of combined-cycle gas in Exhibit 14 at 4;79-10;164. He converted costs per unit of emissions to costs per MWh. He looked at several measures of the cost of emissions, including the price of Regional Greenhouse Gas Initiative allowances, $1.73/MWh[12], the results of a survey of academic and professional literature in *Energy Economics*, a peer-reviewed journal, $23.18/MWh (Tol, R.S.J.; 2005[13]), the expected case from an interagency working group in the Obama Administration, $21.32/MWh[14], and an estimate "consistent with the Paris temperature

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[10] https://www.lazard.com/media/450784/lazards-levelized-cost-of-energy-version-120-vfinal.pdf, accessed November 26, 2018. *Id.* at 121; fn. b.

[11] Lazard's Levelized Cost of Storage, Version 4.0, p. 3. *Id.* at 4; fn. 4.

[12]RGGI, Inc.; https://www.rggi.org/sites/default/files/Uploads/Market-Monitor/Quarterly-Reports/MM_Secondary_Market_Report_2018_Q3.pdf, accessed November 26, 2018. *Id.* at 5; fn. 6.

[13] The marginal damage costs of carbon dioxide emissions: an assessment of the uncertainties, *Energy Policy* 33:2064–2074. https://doi.org/10.1016/j.enpol.2004.04.002, accessed December 13, 2018. RIBCTC Ex. 14 at 5; fn. 9.

[14] Interagency Working Group on Social Cost of Greenhouse Gases, United States Government, Technical Support Document: - Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis - Under Executive Order 12866 -, p. 25. RIBCTC Ex. 14 at 6; fn. 11.

target" from the Carbon Pricing Leadership Coalition, supported by the World Bank, $16.72/MWh[15]. RIBCTC Ex. 14, Table 1, at 7; 121. All of these estimates fall well short of the $67/MWh difference between the costs of lithium batteries and combined-cycle gas. Even the Obama Administration's high-end, 95th percentile estimate of $64.79/MWh favors the combined-cycle plant. Only the very highest estimates, from the Intergovernmental Panel on Climate Change, would shift the balance toward batteries, but Dr. Vatter pointed out that these estimates are outliers. *Id.* at 8; 122-27.

Regarding methane, Dr. Vatter cited government data showing that emissions of methane have fallen even as gas-fired electric generation has quintupled since 1990. RIBCTC Ex. No. 14, Table 2, at 8-9; 141-42. Using estimates of the social cost of emissions from the Obama Administration working group and of emissions themselves from the International Energy Agency[16], Dr. Vatter found that the costs of methane emissions associated with combined-cycle gas are about $4.00/MWh. *Id.* at 9; 149-50.

Thus, even considering the social costs of greenhouse gas emissions of $CO_2$ and methane, combined-cycle gas is a more economical choice than lithium-ion batteries as a way to fill in the gaps between load and the intermittent output of solar and wind-powered generators. CREC would result in substantially lower costs for electricity than batteries, and greater employment opportunities in Rhode Island.

### D. CREC's Duel-Fuel Capability Contributes Badly Needed Fuel Security to the New England Generating Fleet

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[15] Carbon Pricing Leadership Coalition, Report of the High-Level Commission on Carbon Prices, May 29, 2017; https://static1.squarespace.com/static/54ff9c5ce4b0a53decccfb4c/t/59b7f2409f8dce5316811916/1505227332748/CarbonPricing_FullReport.pdf, p. 3, accessed November 27, 2018. RIBCTC Ex. 14 at 6; 115-16.

[16] Gould, T. and C. McGlade (2017). Commentary: The environmental case for natural gas, https://www.iea.org/newsroom/news/2017/october/commentary-the-environmental-case-for-natural-gas.html, accessed December 1, 2018, p. 6. RIBCTC Ex. 14 at 4; fn.1.

New England experienced a period of cold temperatures in January of 2018. At the height of the "cold snap", the price of natural gas in Massachusetts was $78.35/MMBtu, while it was below $4.00/MMBtu in the Marcellus Shale in Pennsylvania. RIBCTC Ex. No. 13 at 3; 47. The significant difference was almost entirely economic rent on scarce pipeline capacity coming into New England. RIBCTC Ex. 13 at 3; 41-43. CREC would be able to generate 475 MW for three days using fuel oil, rather than natural gas, adding tremendous value at times of high prices for natural gas, which drive locational marginal prices (LMP) for electricity in New England. *Id.* at 4; 58-62. At the height of the cold snap, the average LMP in the real-time market in New England was $287.85/MWh. *Id.* at 3; 47.

CREC would also burn oil far more efficiently than older oil-fired plants in New England. "During the first week of 2018, the energy component of the LMPs for New England averaged $192.93/MWh.[17] The price of New York Harbor ultra-low sulfur diesel was $2.07/Gal.[18] At 138,500 Btu/Gal, the implied market heat rate is 12,909 Btu/kwh. CREC's oil fired heat rate is about 7,700 Btu/kwh." *Id.* at 5; 64-68. At those rates, if CREC used all of its two million gallons of stored fuel oil, it would save about 1,353,000 gallons, or 32,212 barrels of regional consumption of oil. *Id.* at 5; 68-71.

ISO New England president Gordon Van Welie stated that, "Fuel security is the greatest challenge to continued power system reliability", and, "Ensuring adequate fuel for the region's generators is New England's most pressing challenge". *Id.* at 2; 31-33. In its operational and fuel

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[17] Source: ISO New England; https://www.iso-ne.com/isoexpress/web/reports/pricing/-/tree/lmp-by-node, accessed March 27, 2018. RIBCTC Ex. 13 at 5; fn. 2.

[18] Source: Energy Information Administration; https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=eer_epd2dxl0_pf4_y35ny_dpg&f=w, accessed March 27, 2018. RIBCTC Ex. 13 at 5; fn. 3.

security analysis for winter 2024/25, the ISO found that, without additional natural gas pipeline capacity, there would be load-shedding in 19 of the 23 scenarios analyzed.[19] *Id.* at 5; 33-35.

### E. Dr. Vatter's Rebuttal Testimony Demonstrates that CREC Is Cost Justified and Needed

In his rebuttal testimony Dr. Vatter demonstrates that economic growth is more important to load growth than Mr. Fagan gave it credit for because it is proceeding more rapidly than it did in the years following the Great Recession; that the ISO's forecast of economic growth is below both current conditions and long-term historical levels; that past volatility in capacity prices casts doubt on Mr. Walker's pessimistic forecast. Dr. Vatter concluded that gas-fired generation is an important tool for filling in the gaps between load and intermittent solar and wind generation, because it is less expensive than battery storage, even accounting for the social costs of emissions of greenhouse gases, and because transmission accessing Canadian hydropower has proven difficult to site; and, that CREC's dual-fuel capability has a high value in terms of reliability given New England's urgent need for greater security of fuel supplies during winter cold snaps. At those critical times, when CREC might run on oil, it would burn much less oil, and produce far fewer emissions, than other oil-fired generators in New England. Along with the record of evidence submitted by Invenergy, the foregoing demonstrates that CREC is cost justified and will produce energy at the lowest reasonable cost to the consumer. *See*, R.I. Gen. Law §42-98-11(b)(2).

## III. Conclusion

In sum, CREC will create hundreds of construction jobs for local residents for an extended period of time (by construction standards), increase economic output, economic development, employment, and tax revenue through purchases of labor and materials for both construction and

[19] See https://www.iso-ne.com/static-assets/documents/2018/02/02272018_pr_presentation_state-of-the-grid_2018.pdf, accessed March 2, 2018.

operation. It would help meet electric load and lower emissions at least cost. This, in turn, would lower the cost of doing business and residing in Rhode Island, creating even more employment opportunities. The CREC would fill the gaps between load and intermittent solar and wind generation, while transmission of Canadian hydro, which could also do that, has proven difficult to site, and while the cost of battery storage is significantly higher, even accounting for the social costs of the CREC's relatively low emissions of greenhouse gases. The CREC would contribute badly needed fuel security to the New England grid and displace less efficient, more expensive, and dirtier generators.

**Rhode Island Building and Construction Trades Council,**
By its attorneys,
**SINAPI LAW ASSOCIATES, LTD.**

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**CERTIFICATION**

I hereby certify that on the **17th day of May 2019** a copy of the foregoing document was caused to be served upon the individuals on the Board's service list as of this date.