

STATE OF CONNECTICUT  
CONNECTICUT SITING COUNCIL

IN RE:

APPLICATION OF NTE CONNECTICUT, LLC  
FOR A CERTIFICATE OF ENVIRONMENTAL  
COMPATIBILITY AND PUBLIC NEED FOR  
THE CONSTRUCTION, MAINTENANCE AND  
OPERATION OF AN ELECTRIC POWER  
GENERATING FACILITY OFF LAKE ROAD,  
KILLINGLY, CONNECTICUT

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: DOCKET NO. 470  
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: DECEMBER 8, 2016

**REBUTTAL TESTIMONY OF MICHAEL BRADLEY**

1 **INTRODUCTION**

2 **Q. PLEASE STATE YOUR NAME, BUSINESS TITLE AND BUSINESS ADDRESS.**

3 A. My name is Michael Bradley. I am Senior Vice President of Commercial Services at NTE Energy.

4 My business address is 75 5<sup>th</sup> St NW, Atlanta, Georgia.

5 **Q. PLEASE SUMMARIZE YOUR QUALIFICATIONS.**

6 A. I have over 25 years of experience in the electricity and natural gas industries. I lead the development  
7 and execution of NTE Energy's overall commercial strategy, which includes the management of power  
8 purchase agreements, electricity hedging, risk identification and management, power and fuel contract  
9 restructuring, power and fuel origination, and power and fuel contract negotiation activities for NTE  
10 Energy's development projects. My resume was provided to the Council in NTE Connecticut, LLC  
11 ("NTE")'s pre-hearing submission on October 27, 2016.

12 **Q. ON WHOSE BEHALF ARE YOU TESTIFYING?**

1 A. My testimony is on behalf of the applicant, NTE, in support of their Application for a Certificate of  
2 Environmental Compatibility and Public Need (the “Application”) from the Connecticut Siting Council  
3 to construct the Killingly Energy Center (“KEC”) project in Killingly, Connecticut.

4 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

5 A. To respond to assertions of Mr. Robert Fagan in his Pre-Filed Direct Testimony, filed on November  
6 15, 2016 on behalf of Not Another Power Plant (“NAPP”) and the Sierra Club.

7 **Q. PLEASE SUMMARIZE YOUR TESTIMONY?**

8 A. My testimony demonstrates the following:

- 9 • There is a winter reliability need in ISO-NE, as evidenced by comments from ISO-NE’s CEO  
10 and ISO-NE’s 2016 Regional Electricity Outlook. KEC’s dual-fuel capability and firm contract  
11 for natural gas supply and transport will help address that need. This is addressed in the first  
12 section below, where I also discuss inaccuracies in Mr. Fagan’s testimony and statements he  
13 makes in direct contradiction to statements from ISO-NE.
- 14 • There is a renewable integration need in ISO-NE, as evidenced by comments from ISO-NE’s  
15 CEO and ISO-NE’s 2016 Regional Electricity Outlook. KEC’s 6,500 Btu/kWh full load heat  
16 rate and 29 MW per minute turbine ramp rate will help address that need. This is addressed in  
17 the second section below, where I also discuss inaccuracies in Mr. Fagan’s testimony regarding  
18 ISO-NE’s renewable integration need and statements he makes in direct contradiction to  
19 statements from ISO-NE.
- 20 • There is a need to reduce CO<sub>2</sub> emissions in Connecticut and ISO-NE. KEC will help address  
21 that need through lower regional CO<sub>2</sub> emissions by displacing more inefficient power generation.  
22 This is addressed in the third section below.

23

1 **THERE IS A WINTER RELIABILITY NEED IN ISO-NE AND KEC WILL HELP ADDRESS**

2 **IT**

3

4 **Q. WITH WHAT TESTIMONY REGARDING WINTER RELIABILITY DO YOU DISAGREE?**

5 A. Beginning on Page 9, Line 16, Mr. Fagan incorrectly asserts “*there is no winter reliability need*” for  
6 KEC because the region has “*plentiful winter capacity reserves.*” This assessment ignores the unique  
7 vulnerabilities that ISO-NE faces in winter, when increased demand for natural gas can reduce (and at  
8 times eliminate) interruptible natural gas supply to natural gas-fired power plants during peak gas  
9 demand periods. This means that ISO-NE’s “*plentiful winter capacity reserves*” may not be available to  
10 meet demand for electricity during peak gas demand periods.

11 **Q. WHAT DOES ISO-NE STATE REGARDING WINTER RELIABILITY CONCERNS?**

12 A. In its 2016 Regional Energy Outlook, ISO-NE repeatedly discusses ISO-NE’s unique winter  
13 reliability challenges, stating that “*the grid is becoming more vulnerable to unexpected generator or*  
14 *transmission outages in winter.*” (Siting Council Administrative Notice No. 26, p. 14.) More recently, on  
15 September 28, 2016, ISO-NE President and CEO Gordon van Welie said ISO-NE’s “*operating situation*  
16 *is precarious during the winter time and we are concerned that beyond 2019 it may become*  
17 *unsustainable.* . . .” (Applicant’s Administrative Notice No. 2, p. 5, *emphasis added.*) KEC is expected to  
18 come online in 2020.

19 **Q. WHAT DOES ISO-NE INDICATE IS THE BEST WAY TO ADDRESS THESE WINTER**  
20 **RELIABILITY CHALLENGES?**

21 A. In his opening remarks to the 2016 Regional Electricity Outlook, CEO van Welie says “*improving*  
22 *the natural-gas-delivery infrastructure in New England ...will have the most impact on addressing the*  
23 *reliability, price volatility, and negative emission impacts during winter.*” (Siting Council  
24 Administrative Notice No. 26, p. 4.) Such long-term investments in natural gas infrastructure require

1 significant lead times and face regulatory risks. For example, a plan by electric utilities to fund the  
2 proposed Access Northeast gas pipeline was recently vacated (i.e., blocked) by the Supreme Judicial  
3 Court of Massachusetts. In recognition of these types of risks, the 2016 Regional Energy Outlook  
4 acknowledges that “*nongas power resources are critical during winter.*” (Siting Council Administrative  
5 Notice. No. 26, p. 15.)

6 **Q. HOW DOES KEC HELP ALLEVIATE THESE CONCERNS ABOUT WINTER**  
7 **RELIABILITY?**

8 A. KEC provides two primary attributes that contribute to system reliability, especially during the  
9 winter. First, KEC has a firm contract for both transport and gas supply, and this contract is not  
10 dependent on upgrades to the existing natural gas pipelines. As discussed in Section 1.6 of the  
11 Application, KEC’s firm natural gas contract will be sourced directly from the Algonquin Gas  
12 Transmission (AGT) interstate natural gas pipeline, and will provide up to 95,000 million British  
13 thermal units (MMBtu) per day for seven years, starting in 2020. This is enough natural gas to support  
14 KEC’s operations at maximum output for 24 hours per day.

15 Second, KEC is a dual-fuel facility, with the ability to switch operations to ultra-low sulfur diesel  
16 (“ULSD”) in the unlikely event that a gas curtailment impacts those facilities holding firm gas contracts  
17 for short periods of time. By having the ability to switch to ULSD, KEC will be supporting the  
18 reliability of the system and the state of Connecticut through fuel diversity (since KEC will be able to  
19 continue to operate even if gas supply is unavailable).

1 **Q. HOW MUCH DUAL-FUEL GENERATION DOES MR. FAGAN ASSERT CURRENTLY**  
2 **EXISTS IN ISO-NE?**

3 A. Mr. Fagan identifies in Table 7 on Page 51 of his pre-filed testimony approximately 7,000 MW of  
4 dual-fuel generation that “*ensure winter reliability if or as more of the older steam units retire.*” (p. 53).

5 **Q. IS THIS FIGURE ACCURATE?**

6 A. Not as it relates to winter reliability issues. Winter reliability is primarily a concern because natural  
7 gas may not be available to power plants with interruptible gas supply contracts. Mr. Fagan’s Table 7  
8 includes over 3,000 MW of dual-fuel generation from power plants that do not rely on natural gas as  
9 their primary fuel. During periods of peak gas demand ISO-NE is already relying on these facilities to  
10 provide non gas-fired generation. Therefore their dual-fuel capability, which uses natural gas as back-up  
11 and not primary fuel, is not helpful to ISO-NE during these periods of high gas demand.

12 Furthermore, Mr. Fagan’s figures include facilities that by his own admission (on Page 51, Line  
13 10) are not necessarily fully operable on both fuels.<sup>1</sup> Based on these factors there is significantly less  
14 dual-fuel generation in ISO-NE comparable to KEC’s dual-fuel capabilities that can address winter  
15 reliability concerns.

16 **Q. HOW MUCH DUAL-FUEL GENERATION IS COMPARABLE TO KEC?**

17 A. Approximately 5,000 MW.

18 As shown in Figure 1, while ISO-NE identifies nearly 9,000 MW of dual-fuel generation based  
19 on winter capacity ratings, facilities that rely on coal, oil or bio/refuse as their primary fuel make up  
20 nearly 4,000 MW of this amount. As previously discussed, since dual-fuel facilities like coal, oil and  
21 bio/refuse do not use natural gas as their primary fuel they do not address ISO-NE’s winter reliability  
22 concerns. KEC’s use of ULSD as its secondary fuel is better suited to address these concerns.

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<sup>1</sup> Page 51, Line 10: “(1) Gas/oil units are not necessarily fully operable on both fuels.”

1 **Figure 1: ISO-NE Dual-Fuel Generation<sup>2</sup>**

	Winter Capacity (MW)
ISO-NE Total Capacity	33,015
Duel-Fuel Capacity (as reported by ISO-NE)	8,828
Duel-Fuel Primary Fuel - Oil	3,451
Duel-Fuel Primary Fuel - Coal	96
Duel-Fuel Primary Fuel - Bio/Refuse	141
<b>Duel-Fuel Primary Fuel - Gas</b>	<b>5,141</b>
% of ISO-NE Total Capacity	15.6%

2

3 **Q. DO ANY OF THOSE FACILITIES USE THE SAME STATE-OF-THE-ART, EFFICIENT**  
4 **TURBINE TECHNOLOGY AS KEC?**

5 A. No. Of the 5,000 MW of dual-fuel generation that is comparable to KEC, as shown in Figure 1  
6 above, none of the facilities use state-of-the-art Siemens H-class turbines – which KEC plans to do. As  
7 a result, KEC is able to produce electricity with lower CO<sub>2</sub> emissions, due to the higher efficiency of the  
8 Siemens H-class turbines (more than 50%), than the other dual-fuel facilities in ISO-NE.

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10 **THERE IS A RENEWABLE INTEGRATION NEED IN ISO-NE AND KEC WILL HELP**  
11 **ADDRESS IT**

12

13 **Q. WHAT DOES MR. FAGAN ASSERT REGARDING ISO-NE'S ABILITY TO INTEGRATE**  
14 **RENEWABLE SOURCES OF GENERATION?**

15 A. Mr. Fagan's testimony beginning on Page 10, Line 2 states KEC is "*not needed to support the*  
16 *region's integration of increasing levels of renewable resources*" because there are sufficient other  
17 existing supply and demand-side options available to ISO-NE, and Mr. Fagan can therefore find "*no*  
18 *evidence that KEC is required to serve this need.*"

<sup>2</sup> Source: 2016 CELT Report, 2.1 Generator List.

1 **Q. WHAT DOES ISO-NE STATE REGARDING ITS ABILITY TO INTEGRATE INCREASED**  
2 **LEVELS OF RENEWABLE RESOURCES?**

3 A. ISO-NE CEO van Welie identified “*renewable resource integration*” as one of the three “*top*  
4 *reliability risks*” in his September 28, 2016 presentation, and mitigating this risk “*will require a fleet of*  
5 *flexible resources, with an equally flexible fuel system, to reliably balance the variability of renewable*  
6 *resources.*” (Applicant’s Administrative Notice No. 2, p. 16.) It is clear that Mr. van Welie considers  
7 existing supply options insufficient.

8 The 2016 Outlook similarly states that “*adding more wind- and solar-powered resources in New*  
9 *England will paradoxically increase the region’s need for fast-response, flexible resources....*” (Siting  
10 Council Administrative Notice No. 26, p. 4, *emphasis added*.)

11 **Q. HOW WILL KEC SUPPORT ISO-NE’S RENEWABLE INTEGRATION EFFORTS?**

12 A. KEC, which utilizes state-of-the-art Siemens H-class turbines with a 6,500 Btu/kWh full load heat  
13 rate and 29 MW per minute turbine ramp rate<sup>3</sup>, provides the ‘*fast-response, flexible resources*’ that ISO-  
14 NE seeks to integrate increasing amounts of intermittent renewable generation into the electricity  
15 system.

17 **THERE IS A NEED TO REDUCE CO<sub>2</sub> EMISSIONS IN CONNECTICUT AND ISO-NE AND**  
18 **KEC WILL HELP ADDRESS THAT NEED**

20 **Q. WHAT IS THE CONNECTICUT GLOBAL WARMING SOLUTIONS ACT?**

21 A. The Global Warming Solutions Act (“GWSA”) calls for Connecticut statewide CO<sub>2</sub> emission  
22 reductions of at least 10% below 1990 levels by 2020, and at least 80% below 2001 levels by 2050. It

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<sup>3</sup> For context, the 29 MW per minute ramp rate means that KEC can realize full output in approximately 15 minutes. This is faster than ISO-NE’s requirement for most off-line reserve generation, which requires a 30-minute response time.

1 should be noted that according to the Connecticut Department of Energy and Environmental Protection  
2 (“DEEP”) the power sector made up approximately 15% of total CO<sub>2</sub> emissions in Connecticut in 2013,  
3 while the transportation and residential sectors comprised nearly 50%. (Grouped Party and CEPA  
4 Intervenors Administrative Notice No. 7, p. 9.)

5 **Q. HOW WILL KEC HELP CONNECTICUT MEET THE 2020 TARGET?**

6 A. Based on the analysis performed by PA Consulting Group, as illustrated in Table 1-1 on page 13 of  
7 the Application, KEC is forecasted to reduce annual CO<sub>2</sub> emissions by approximately 300,000 tons –  
8 which is the equivalent of planting 7,000,000 trees.<sup>4</sup> This occurs primarily by KEC displacing older,  
9 more inefficient coal, oil and gas-fired power generation. Mr. Fagan’s testimony does not mention or  
10 acknowledge Connecticut’s first target in 2020 – a 10% reduction in CO<sub>2</sub> emissions from 1990 levels.

11 **Q. TO WHAT TESTIMONY DO YOU TAKE EXCEPTION REGARDING KEC’S ABILITY TO**  
12 **HELP CONNECTICUT MEET SUBSEQUENT TARGETS?**

13 A. Mr. Fagan’s testimony claims that KEC will ‘*hinder*’ Connecticut’s ability to achieve the 2050 target  
14 because KEC will emit (according to Mr. Fagan on pages 66-67 of his testimony) approximately 2  
15 million short tons of CO<sub>2</sub> annually. I disagree.

16 **Q. IS THIS AN ACCURATE ANALYSIS OF KEC’S LONG-TERM CO<sub>2</sub> EMISSIONS?**

17 A. No. Mr. Fagan’s analysis is predicated on the inaccurate assumption that KEC’s capacity factors will  
18 not decline over time, and therefore neither will its CO<sub>2</sub> emissions. This is inconsistent with industry  
19 trends that show nearly all power plants operate less frequently as they get older. For example, Figure 2  
20 below shows how the capacity factors for the 6,000 MW of capacity that ISO-NE has identified as at-  
21 risk for retirement in the 2016 Regional Energy Outlook have decreased over the past 20 years. KEC’s  
22 operations (i.e. capacity factor) and resulting CO<sub>2</sub> emissions are expected to decrease between 2020 and  
23 2050 as new, more-efficient forms of generation enter the market.

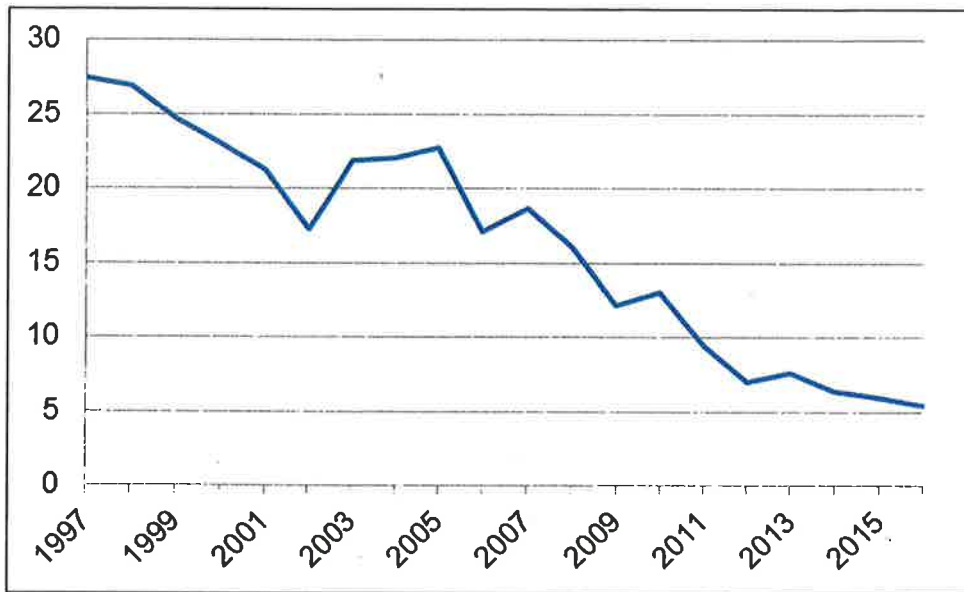
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<sup>4</sup> U.S. EPA’s Greenhouse Gas Equivalencies Calculator.



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**Figure 2: Average Capacity Factor of At-Risk Capacity, 1997-2016 (%)**<sup>5</sup>



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3 **Q. BESIDES NEW GENERATION ENTERING THE MARKET, IS THERE ANOTHER**  
 4 **MARKET MECHANISM THAT COULD LOWER KEC'S CO<sub>2</sub> EMISSIONS OVER TIME?**

5 A. Yes. Connecticut participates in the Regional Greenhouse Gas Initiative ("RGGI"), along with  
 6 Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island and Vermont.

7 **Q. WHAT IS RGGI?**

8 A. RGGI is the first mandatory market-based program in the United States to reduce CO<sub>2</sub> emissions. It is  
 9 a regional cap-and-trade program that caps CO<sub>2</sub> emissions within its member states and achieves those  
 10 caps via an auction-based emission allowance price – which places a cost on CO<sub>2</sub> emissions from the  
 11 power sector.

12 **Q. HOW DOES RGGI REDUCE CO<sub>2</sub> EMISSIONS FROM GENERATION LIKE KEC?**

13 A. Power generators located in a RGGI state, such as KEC in Connecticut, are required to present  
 14 allowances for each short ton of CO<sub>2</sub> that is emitted. One way to acquire such allowances is to purchase

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<sup>5</sup> Source: PA Consulting Group analysis and ABB's *Energy Velocity*.

1 them via quarterly RGGI auctions, which places an explicit price on a short ton of CO<sub>2</sub> emissions. The  
2 auction price depends on the supply (determined by the states) and demand for allowances.

3 The cost of CO<sub>2</sub> emission allowances is then factored into the operating decision of the power  
4 generator, since the more it operates the more allowances it will need to purchase. All else equal, the  
5 higher the CO<sub>2</sub> emission allowance cost the lower the operations, and therefore the lower the CO<sub>2</sub>  
6 emissions of the power generator. In other words, RGGI establishes a direct relationship between power  
7 generators' operations and associated CO<sub>2</sub> emissions, and the RGGI CO<sub>2</sub> allowance price.

8 **Q. HOW COULD CONNECTICUT USE RGGI TO HELP MEET THE GWSA'S 2050**  
9 **TARGET?**

10 A. Based on the RGGI program's annual emissions cap, there is a fixed amount of RGGI allowances  
11 available each year. This supply of allowances declines over time. The total supply of allowances is the  
12 sum of the individual quantities defined in each RGGI state's applicable statute or regulations, which for  
13 Connecticut is specified in Section 22a-174-31 of the Regulations of Connecticut State Agencies.  
14 Therefore, through this linkage RGGI enables Connecticut to calibrate its CO<sub>2</sub> emission reduction  
15 targets under the GWSA with the RGGI program's annual emissions cap.

16 More specifically, if Connecticut reduces its supply of allowances under the RGGI program, the  
17 total supply of allowances in the program would also decrease. Accordingly, the allowance price in the  
18 RGGI auctions would increase – since there would be less allowances available. If the allowance price  
19 increases, the operating costs of generation like KEC will increase – which will result in lower  
20 operations and less CO<sub>2</sub> emissions.

21 **Q. IN OTHER WORDS, RGGI OFFERS CONNECTICUT A DIRECT MARKET-BASED**  
22 **MECHANISM TO ACHIEVE THE GWSA'S 2050 TARGET?**

23 A. That is correct. KEC in no way hinders Connecticut's ability to meet the GWSA's 2050 targets.

1 **Q. WOULD NTE COMPLY WITH POTENTIAL FUTURE STATE-MANDATED CO<sub>2</sub>**  
2 **EMISSIONS REDUCTIONS RESULTING FROM THE GWSA TARGETS?**

3 A. Yes, as my colleague Mr. Tim Eves testified in the November 15, 2016 hearing, NTE would move  
4 forward with KEC even if more stringent 2.5% per year reduction targets, as part of a GWSA  
5 compliance strategy, were mandated by Connecticut.

6 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

7 A. Yes, it does.

8

**CERTIFICATION OF SERVICE**


I hereby certify that on this 8<sup>th</sup> day of December, 2016, a copy of the foregoing was sent via electronic mail, to the following:

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