

COMMONWEALTH OF MASSACHUSETTS
Energy Facilities Siting Board

Petition of NRG Canal 3 Development)
LLC to Construct a New Generating) EFSB 15-06
Facility in the Town of Sandwich)
Pursuant to G.L. c. 164, § 69J¼)
_____)

Petition of NRG Canal 3 Development)
LLC for Exemptions from the Zoning) D.P.U. 15-180
Bylaw of the Town of Sandwich)
Pursuant to G.L. c. 40A, § 3)
_____)

TENTATIVE DECISION

Robert J. Shea, Esq.
Presiding Officer

June 20, 2017

On the Decision:

Charlene de Boer
Samrawit Dererie
Andrew Greene
John Young

APPEARANCES:

John A. DeTore, Esq.
Robert D. Shapiro, Esq.
Lauren A. Liss, Esq.
David C. Fixler, Esq.
Rubin and Rudman LLP
50 Rowes Wharf
Boston, MA 02110
FOR: NRG Canal 3 Development LLC
Petitioner

Jeffrey M. Bernstein, Esq.
Jo Ann Bodemer, Esq.
Audrey Eidelman, Esq.
BCK Law, P.C.
271 Waverley Oaks Road, Suite 203
Waltham, MA 02452
FOR: Town of Sandwich
Intervenor

David S. Rosenzweig, Esq.
Matthew A. Sanders, Esq.
Keegan Werlin LLP
265 Franklin Street
Boston, MA 02110
FOR: NSTAR Electric Company d/b/a Eversource Energy
Intervenor

David K. Ismay, Esq.
Conservation Law Foundation
62 Summer Street
Boston, MA 02110
FOR: Conservation Law Foundation
Intervenor

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ABBREVIATIONS

| | |
|-----------------------------|---|
| AGT | Algonquin Gas Transmission Company |
| amsl | above mean sea level |
| API | American Petroleum Institute |
| BACT | Best Available Control Technology |
| <u>Berkshire Power</u> | <u>Berkshire Power Development, Inc., D.P.U. 96-104 (1997)</u> |
| BMPs | Best Management Practices |
| <u>Braintree Electric</u> | <u>Braintree Electric Light Department, EFSB 07-1/D.T.E./D.P.U. 07-5 16 DOMSB 78 (2008)</u> |
| Btu | British thermal unit |
| Btu/kWh | British thermal unit per kilowatt-hour |
| <u>Cabot Taps</u> | <u>New England Power Company, D.P.U. 14-128/14-129 (2015)</u> |
| Canal Generating Facility | Existing 1,120-MW generation facility |
| Canal Generating Facilities | Proposed Facility and Existing Facility combined |
| CCC | Cape Cod Commission |
| CCS | carbon capture and sequestration |
| 2020 CECP | Clean Energy and Climate Plan for 2020 (issued in 2010) |
| 2020 CECP Update | update of 2020 CECP (issued in 2015) |
| CELT | Capacity, Energy, Loads, and Transmission |
| CEMS | continuous emissions monitoring system |
| CFR | Code of Federal Regulations |
| CLF | Conservation Law Foundation |
| C.M.R. | Code of Massachusetts Regulations |
| CO ₂ | carbon dioxide |

| | |
|---------------------------------|---|
| CO ₂ e | carbon dioxide equivalents |
| Company | NRG Canal 3 Development LLC |
| CPA | Comprehensive [Air] Plan Approval |
| CTG | combustion turbine generator |
| d/b/a | doing business as |
| dba | A-weighted decibels |
| DEIR | Draft Environmental Impact Report |
| DLN | dry-low-NO _x |
| DOMSB | Decisions and Orders of Massachusetts Energy Facilities Siting Board |
| DOMSC | Decisions and Orders of Massachusetts Energy Facilities Siting Council |
| Department | Massachusetts Department of Public Utilities |
| DCMM | declining cap mitigation mechanism |
| Draft Air Permits | The Draft PSD Permit, together with the Proposed Air Plan Approval |
| DRI | Development of Regional Impact (Cape Cod Commission) |
| EEA | Executive Office of Energy and Environmental Affairs |
| EFSB | Energy Facilities Siting Board |
| EIA | U.S. Energy Information Agency |
| EIR | Environmental Impact Report |
| EEA | Executive Office of Energy and Environmental Affairs |
| EENF | Expanded Environmental Notification Form |
| EENF Certificate | certificate on the EENF |
| Environmental Zoning Provisions | zoning provisions related to environmental control over the ongoing operation of a facility |
| EPC | Engineering, Procurement and Construction |
| ERCs | Emission Reduction Credits |

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| ERPG-1 | American Industrial Hygiene Association’s Level 1 Emergency Response Planning Guideline |
| Eversource | NSTAR Electric Company d/b/a Eversource Energy |
| <u>Eversource Hopkinton</u> | <u>NSTAR Electric Company d/b/a Eversource Energy, D.P.U. 15-02 (2015)</u> |
| Eversource Switchyard | Existing 345 kV switchyard south of Freezer Road Site |
| <u>Exelon West Medway</u> | <u>Exelon West Medway LLC and Exelon West Medway II, LLC, EFSB 15-01/D.P.U. 15-25 (2016)</u> |
| Existing Facility | Existing 1,120-MW generation facility |
| FAA | Federal Aviation Administration |
| Facility Site | 12-acre site for the Facility, in Sandwich, Massachusetts |
| FCA | Forward Capacity Auction |
| FEIR | Final Environmental Impact Report |
| FEMA | Federal Emergency Management Administration |
| FIRM | FEMA Flood Insurance Rate Map |
| FRM | Forward Reserve Market |
| FRP | Facility Response Plan |
| <u>Footprint Power</u> | <u>Footprint Power Salem Harbor Development LP, EFSB 12-2, 19 DOMSB 151 (2013)</u> |
| Freezer Road Site | 52-acre site owned by NRG Canal LLC in Sandwich, Massachusetts |
| G.L. c. | Massachusetts General Laws chapter |
| GE | General Electric |
| GEP | Good Engineering Practice |
| GHG | greenhouse gases |
| 2016 GHG Inventory | MassDEP’s 2016 statewide GHG emissions inventory |
| GHG Policy | MEPA Greenhouse Gas Emission Policy and Protocol |

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| <u>GSRP</u> | <u>Western Massachusetts Electric Company</u> , EFSB 08-2/ D.P.U. 08-105/08-106, 18 DOMSB 7 (2010) |
| GSU | generator step-up (transformer) |
| GWSA | Global Warming Solutions Act, St. 2008, c. 298 |
| H ₂ SO ₄ | sulfuric acid |
| <u>Hampden County</u> | <u>New England Power Company</u> , EFSB 10-1/D.P.U. 10-107/108, 18 DOMSB 323 (2012) |
| HCA | Host Community Agreement [19 Oct 2016] |
| ISO-NE | ISO-New England |
| JRWA | Jones River Watershed Association |
| <u>Kain</u> | <u>Kain v. Department of Environmental Protection</u> , 474 Mass. 278 (2016) |
| kV | kilovolt |
| kW | kilowatt |
| kWh | kilowatt-hour |
| L ₉₀ | sound level exceeded during 90 percent of a measurement period |
| L _{eq} | average sound level |
| LAER | Lowest Achievable Emission Rate |
| lb/MMBtu | pounds per million British thermal units |
| lb/MWh | pounds per megawatt-hour |
| LNG | liquefied natural gas |
| LOS | Level of Service (functioning of traffic flow at an intersection) |
| LSCSF | Land Subject to Coastal Storm Flowage |
| MAAQs | Massachusetts Ambient Air Quality Standards |
| MADPH | Massachusetts Department of Public Health |
| MassDEP | Massachusetts Department of Environmental Protection |

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| MassDOT | Massachusetts Department of Transportation |
| MCP | Massachusetts Contingency Plan, 310 C.M.R. § 40.00 <u>et seq.</u> |
| MEPA | Massachusetts Environmental Policy Act |
| $\mu\text{g}/\text{m}^3$ | micrograms per cubic meter |
| mG | milligauss |
| MGD | million gallons per day |
| MHC | Massachusetts Historical Commission |
| MLW | mean low water |
| MMt | million metric tons |
| <u>Montgomery Energy</u> | <u>Montgomery Energy Billerica Power Partners LP</u> , EFSB 07-02, 16 DOMSB 317 (2009) |
| MOU | memorandum of understanding |
| MW | megawatts |
| MWh | megawatt-hour |
| <u>MVRP</u> | <u>New England Power Company d/b/a National Grid</u> , D.P.U. 15-44/15-45 (2016) |
| NAAQS | National Ambient Air Quality Standards |
| NAVD 88 | North American Vertical Datum of 1988 |
| NEP | New England Power Company |
| NNSR | Nonattainment New Source Review |
| NO ₂ | nitrogen dioxide |
| NO _x | nitrogen oxides |
| NOAA | National Oceanic and Atmospheric Administration |
| NPDES | National Pollutant Discharge Elimination System |
| NRG | NRG Canal 3 Development LLC |

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| NRG Energy | NRG Energy Inc. |
| NSPS | New Source Performance Standards |
| NY Central Railroad | <u>New York Central Railroad v. Department of Public Utilities</u> , 347 Mass. 586, 592 (1964) |
| NYSDEC | New York State Department of Environmental Conservation |
| OSHA | U.S. Occupational Safety and Health Administration |
| Petition/Petition to Construct | Company's petition to construct pursuant to G.L. c. 164, §69J¼ |
| Petitions | Petition to Construct and Zoning Petition, together |
| PILOT | Payment in Lieu of Taxes |
| PM | particulate matter |
| PM _{2.5} | particulates 2.5 microns or smaller |
| PM ₁₀ | particulates 10 microns or smaller |
| <u>Princeton</u> | <u>Princeton Municipal Light Department</u> , D.T.E./D.P.U. 06-11 (2007) |
| Project | Construction of new 350 MW generating facility |
| Proposed Facility | Proposed new 350 MW generating facility |
| ppm | parts per million |
| PSC | public service corporation |
| PSD | Prevention of Significant Deterioration |
| psig | pounds per square inch gauge |
| Public Hearing Notice | Notice of Public Hearing/Notice of Adjudication for the Project |
| <u>PVEC</u> | <u>Pioneer Valley Energy Center</u> , EFSB 08-1, 17 DOMSB 294 (2009) |
| RECs | Renewable Energy Certificates |
| RGGI | Regional Greenhouse Gas Initiative |
| <u>RPS</u> | <u>Renewable Portfolio Standards</u> |
| <u>Russell Biomass 2008</u> | <u>Russell Biomass LLC</u> , D.T.E./D.P.U. 06-60 (2008) |

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| <u>Russell Biomass/WMECO</u> | <u>Russell Biomass LLC/Western Massachusetts Electric Company, EFSB 07-4/D.P.U. 07-35/07-36, 17 DOMSB 1 (2009)</u> |
| <u>Salem Cables</u> | <u>New England Power Company d/b/a National Grid, EFSB 13-2/D.P.U. 13-151/D.P.U. 13-152, 20 DOMSB 129 (2014)</u> |
| <u>Save the Bay</u> | <u>Save the Bay, Inc. v. Department of Public Utilities, 366 Mass. 667 (1975)</u> |
| SCR | selective catalytic reduction |
| Secretary | Secretary of EEA |
| SEMA/RI | Southeastern Massachusetts/Rhode Island (load zone) |
| SILs | Significant Impact Levels |
| <u>Sithe Mystic</u> | <u>Sithe Mystic Development, LLC, EFSB 98-8, 9 DOMSB 101 (1999)</u> |
| Siting Board | Massachusetts Energy Facilities Siting Board |
| SJC | Supreme Judicial Court of Massachusetts |
| SO ₂ | sulfur dioxide |
| SPCC Plan | Spill Prevention, Control and Countermeasure Plan |
| SWPPP | Storm Water Pollution Prevention Plan |
| TMNSR | Ten Minute Non-Spinning Reserve |
| TMOR | Thirty Minute Operating Reserve |
| TMP | traffic management plan |
| Town of Truro | <u>Town of Truro v. Department of Public Utilities, 365 Mass. 407, at 410 (1974)</u> |
| TPS | Technology Performance Standards |
| tpy | tons per year (short tons) |
| ULSD | ultra-low-sulfur distillate oil |
| USACE | U.S. Army Corps of Engineers |
| USEPA | U.S. Environmental Protection Agency |

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| VOCs | volatile organic compounds |
| WMA | Massachusetts Water Management Act |
| WPA | Massachusetts Wetlands Protection Act |
| <u>Woburn Substation</u> | <u>NSTAR Electric Company, D.P.U. 15-85 (2016)</u> |
| Zoning Bylaw | Zoning Bylaw of the Town of Sandwich, Massachusetts |
| Zoning Petition | Company petition pursuant to G.L. c. 40A, § 3 |

Pursuant to G.L. c. 164, § 69J¼, the Massachusetts Energy Facilities Siting Board (“Siting Board”) hereby [approves], subject to the conditions set forth below, the Petition of NRG Canal 3 Development LLC to construct a 350 megawatt simple-cycle, dual-fuel peaking electric generating facility and NRG’s ancillary facilities on the same 52-acre site of the existing Canal Generating Station located on Freezer Road in Sandwich, Massachusetts. Pursuant to G.L. c. 40A, § 3, the Siting Board also [approves] NRG’s Petition for certain specific exemptions from the Town of Sandwich Zoning Bylaw as well as a comprehensive exemption from said Bylaw.

I. INTRODUCTION

A. Description of the Proposed Project

NRG Canal 3 Development LLC (“NRG,” or “Company”) proposes to construct a new electric generating facility, capable of generating 350 megawatts (“MW”) of electricity, and ancillary facilities (together, “Proposed Facility”) in Sandwich, Massachusetts (“Project”).

1. The Proposed Facility Site

The Company proposes to locate the Facility on an approximately twelve-acre site (“Facility Site”) within a larger 52-acre parcel of land owned by the Company’s affiliate, NRG Canal LLC, on Freezer Road in Sandwich, Massachusetts (“Freezer Road Site”) (Exh. NRG-1, at 1-1). A 1,120 MW electric generation facility (“Canal Generating Facility” or “Existing Facility”), consisting of two steam-electric generation units, is located on the western portion of the Freezer Road Site (*id.* at 1-2; Exh. EFSB-4, at 3).¹ The Existing Facility is served by a single 498-foot exhaust stack, several aboveground fuel oil storage tanks, two aqueous

¹ The Canal Generating Facility has been in operation since the 1960s, and it is fueled by No. 6 fuel oil and natural gas (Exhs. NRG-1, at 1-2, 1-8; NRG-6, at 1-2). The Company would lease the Facility Site from NRG Canal LLC (Exhs. NRG-1, at 1-1 n.1; EFSB-G-30). Existing Unit 1 and Unit 2 were placed into service in July 1968 and February 1976, respectively (Exh. NRG-1, at 1-6). Unit 1 is fueled with No. 6 fuel oil; Unit 2 uses No. 6 fuel oil as its primary fuel, with natural gas as a backup fuel (*id.*). NRG Canal LLC is a separate legal entity from the Company, and the former owns the Canal Generating Facility (together, the “Canal Generating Facilities”) (*id.* at 1-1 n.1).

ammonia storage tanks, and other appurtenant structures and infrastructure (Exh. NRG-1, at 1-2).²

2. The Proposed Facility and Ancillary Facilities

The Proposed Facility would be a dual-fuel (natural gas and ultra-low-sulfur distillate oil (“ULSD”)), simple-cycle, fast-start,³ peaking facility, capable of generating 350 MW (nominal) of electricity (Exh. NRG-1, at 1-1, 1-5).⁴ The main component of the Proposed Facility would be one General Electric (“GE”) 7HA.02 simple-cycle combustion turbine generator (“CTG”) (id. at 1-1; Exh. EFSB-G-1(S1)). The CTG can achieve full power within ten minutes of a cold start on either fuel (id. at 1-7). The CTG would be equipped with state-of-the-art emissions control equipment including selective catalytic reduction (“SCR”) for nitrogen oxides (“NO_x”), an oxidation catalyst system for carbon monoxide, and a continuous emissions monitoring system (“CEMS”) (id. at 1-1). The Company has proposed the installation of a 220-foot-tall exhaust stack (id.).

Other major components of the Project include a one-million-gallon demineralized water tank, a 360,000-gallon aboveground storage tank for service/fire water, a 20,000-gallon underground wastewater holding tank, and a 4,000-gallon combustion turbine water holding tank (id. at 1-1, 1-8). The on-site supply wells that currently serve the Existing Facility would also supply water to the Proposed Facility, principally for NO_x control and inlet cooling (id. at 1-2, fig. 1.6-1; Exhs. EFSB-W-1; EFSB-W-2). ULSD would be stored in an existing 5.7-million-gallon aboveground storage tank and in an existing 1.8-million-gallon aboveground day tank (Exh. NRG-1, at 1-2). Aqueous ammonia to be used in the SCR system would be stored in two

² In 2001, the Siting Board approved a petition that would have upgraded Unit 2 to a larger natural-gas-only facility. Southern Energy Canal LLC, EFSB 98-9 (2001). That upgrade was never constructed.

³ ISO-NE defines a quick-start, or fast-start, facility as “a generation unit that can start up and be at full load in less than 30 minutes, which helps with recovery from contingencies and assists in serving peak demand.”
[<https://www.iso-ne.com/participate/support/glossary-acronyms>]

⁴ The electrical output of the turbine varies by temperature; the gross output of the Proposed Facility would range from approximately 330 MW at high ambient temperatures to 365 MW at very low ambient temperatures (Exh. NRG-1, at 1-9).

existing 60,000-gallon ammonia tanks (*id.*). Furthermore, the Project would also incorporate an evaporative inlet air cooling system, a tempering air fan system, a natural gas pre-heater and compressor system, carbon dioxide (“CO₂”) and hydrogen storage cylinders and associated piping, a generator step-up (“GSU”) transformer, an auxiliary equipment cooling fan module, a 500 kilowatt (“kW”) emergency diesel generator, two emergency fire pumps, and a stormwater collection and infiltration system (*id.* at 1-1, 1-2). In addition, the Company will construct a new building to enclose the two existing 60,000-gallon ammonia tanks, and install buildings/enclosures for the CTG, the SCR catalyst, the gas compressor, and the water treatment area (*id.* at 1-2, fig. 1.1-3). The Proposed Facility would connect to the grid through an existing 345 kilovolt (“kV”) switchyard owned by NSTAR Electric Company d/b/a Eversource Energy (“Eversource”) and located south of the Freezer Road Site (“Eversource Switchyard”) (*id.* at 1-2). NRG would construct an approximately 1,850-foot 345 kV overhead transmission line from a circuit breaker at the new GSU transformer within the Facility Site to the Eversource Switchyard (Exh. NRG-6, at 1-2).⁵

The Proposed Facility would obtain natural gas via an interconnection to the existing Algonquin Gas Transmission Company (“AGT”) pipeline located within the Freezer Road Site (Exh. NRG-1, at 1-2). NRG would construct a new twelve-inch diameter, 3,590-foot-long natural gas pipeline with a maximum allowable operating pressure of 750 pounds per square inch gauge (“psig”) within the Freezer Road Site from the existing AGT pipeline to a new gas compressor building (*id.*; Exh. EFSB-G-15).

The other fuel, ULSD, would be transported to the Proposed Facility by barge (Exh. NRG-1, at 1-2). The Company would construct a new approximately 4,000-foot, eight-inch-diameter pipeline to connect the above-referenced 5.7-million-gallon ULSD storage tank, the day tank, and the CTG (*id.*). There would be two sections of pipeline: one that would

⁵ In its brief, Eversource requests that the Siting Board also approve specific upgrades within the Eversource Switchyard to interconnect the Proposed Facility (Eversource Brief at 5). Eversource is not a petitioner or co-petitioner in the case, and the Petitions do not request approval of upgrades to the Eversource switchyard. In addition, the Notice of Adjudication does not include Eversource’s upgrades. Because Eversource did not originally petition for approval of work at the switchyard, and this work was not duly noticed, the Siting Board declines to approve the work proposed by Eversource. See Exelon West Medway LLC and Exelon West Medway II, LLC, EFSB 15-01/D.P.U. 15-25, at 3 n.3 (2016) (“Exelon West Medway”).

run from the ULSD storage tank to the ULSD day tank, operating at 150 psig, and another that would run from the ULSD day tank to the CTG, operating at 600 psig (Exh. EFSB-G-16).

NRG stated that the primary purpose of the Proposed Facility would be to provide additional capacity to the Southeastern Massachusetts/Rhode Island (“SEMA/RI”) load zone in ISO-New England (“ISO-NE”) to help meet energy demand during peak times (Exh. NRG-1, at 1-3). NRG successfully bid 333 MW of capacity into the ISO-NE’s Forward Capacity Auction (“FCA”) 10 (Exhs. NRG-TEA-1, at 3; EFSB-A-44(1)). Consequently, the Proposed Facility has a capacity supply obligation commencing on June 1, 2019 (Exh. NRG-TEA-1, at 3). Furthermore, because the Proposed Facility can achieve full load within ten minutes of startup, it is qualified to supply both the Ten Minute Non-Spinning Reserve (“TMNSR”) and the Thirty Minute Operating Reserve (“TMOR”) markets (*id.*).

B. Procedural History

Pursuant to G.L. c. 164, § 69J¼, the Company filed its petition to construct the Proposed Facility (“Petition to Construct” or “Petition”) with the Siting Board on December 3, 2015. On December 15, 2015, the Company filed its Petition for Exemption from the Zoning Bylaw of Sandwich (“Zoning Petition”) pursuant to G.L. c. 40A, § 3. The Petition to Construct and the Zoning Petition are referred to collectively as the “Petitions.” On December 16, 2015, the Chairman of the Department of Public Utilities (“Department”) issued an Order consolidating the Zoning Petition with the Petition to Construct and referring the matter to the Siting Board for review and decision.

The Siting Board conducted a public comment hearing in Sandwich regarding the Petitions on February 10, 2016.⁶ Pursuant to instructions provided by the Presiding Officer, the

⁶ At the public comment hearing, three Sandwich residents spoke. One was the Chairman of the Board of Selectmen, the second was the Town Manager, and the third was an abutter (Public Comment Hearing Transcript at 21-26). All three spoke in favor of the Project (*id.*). The Chairman of the Board of Selectmen and the Town Manager specifically noted the advantages of increased tax revenues and increased regional reliability (*id.*). On February 29, 2016, the Jones River Watershed Association (“JRWA”) submitted written comments. The JRWA requested that the Siting Board use NRG’s Petition for unit 3 as an opportunity to remove units 1 and 2 from service on the grounds that they are “outdated and environmentally harmful.” February 29, 2016, letter from the JRWA to the Presiding Officer at 1.

Company published a Notice of Public Hearing/Notice of Adjudication for the Project (“Public Hearing Notice”) weekly for two consecutive weeks in the Bourne Courier, the Sandwich Broadsider, and the Cape Cod Times (Affidavit of Compliance of Publication, Posting, Service, and Placement at 1). Furthermore, the Company posted the Public Hearing Notice for viewing at the offices of the Town Clerks of Sandwich and Bourne (id.). The Company also placed copies of both the Public Hearing Notice as well as the Petitions in the Sandwich and Bourne public libraries (id.). In addition, the Company sent the Public Hearing Notice by first class mail on January 20, 2016, to all owners of property located within one-half mile of the twelve-acre Facility Site as they appeared on the most recent Town of Sandwich tax list (id.). On January 20, 2016, the Company mailed copies of the Public Hearing Notice to the planning boards for the towns of Sandwich, Bourne, Falmouth, Mashpee, and Barnstable, and to the Board of Selectmen for the towns of Sandwich and Bourne (id.).⁷

Three entities filed timely motions to intervene in this proceeding: the Town of Sandwich, Eversource, and Conservation Law Foundation (“CLF”). The Presiding Officer allowed all three motions.

During the discovery phase of this proceeding, Siting Board staff issued three sets of information requests to the Company and one set of information requests to CLF. The Company issued one set of information requests to CLF, while CLF issued two sets of information requests to the Company. Siting Board staff conducted eight days of evidentiary hearings between August 30, 2016, and September 20, 2016. NRG presented testimony from the following witnesses: Daniel Peaco, Principal Consultant at Daymark Energy Advisors; Thomas E. Atkins, Vice-President of NRG Energy, Inc. (“NRG Energy”); Lisa Carrozza, Senior Project Manager at Tetra Tech, Inc.; Peter M. Dillon, Senior Hydrogeologist at Tetra Tech; Mark Fobert, Senior Project Manager at Tetra Tech; Elizabeth Hendrick, Senior Consultant at Tetra Tech; Erik Kalapinski, Environmental Noise Consulting Engineer at Tetra Tech; George Lipka, Consulting Engineer at Tetra Tech; Frederick M. Sellars, Vice-President at Tetra Tech; Dr. Christopher Long, Principal Scientist at Gradient; and Dr. Peter Valberg, a Principal

⁷ There are no neighborhoods that meet Environmental Justice criteria located within five miles of the Proposed Facility (Exh. NRG-1, at 5-13). Therefore, the Petitions are not subject to enhanced public participation under the Environmental Justice Policy of the Executive Office of Energy and Environmental Affairs (“EEA”) (id.).

at Gradient. CLF presented testimony from three witnesses: Robert M. Fagan, Principal Associate at Synapse Energy Economics; Christopher T. Stix, financial analyst for CLF; and Carling Hay, joint postdoctoral fellow in the Departments of Earth and Planetary Science at Rutgers University and Harvard University.

On October 25, 2016, the intervenors CLF, Eversource, and the Town of Sandwich submitted initial briefs. NRG submitted its initial brief on November 15, 2016. On November 29, 2016, CLF and Eversource submitted reply briefs. NRG submitted its reply brief on December 13, 2016.

The Town of Sandwich entered into a Host Community Agreement (“HCA”) with NRG on October 19, 2016. Shortly thereafter, on October 31, 2016, NRG submitted the HCA as a supplemental response to an information request, and the HCA has been designated as Attachment EFSB-G-34(S1)(1) in the exhibit list. In its initial brief – filed on October 25, 2016, before NRG filed the HCA as an exhibit – Sandwich requested that the Siting Board: (1) “incorporate” the HCA into the Final Decision; (2) take official notice of the HCA; and (3) include specific provisions of the HCA as conditions in the Final Decision (Sandwich Brief at 1, 2). For its part, the Company treats the HCA as a binding contract, but does not explicitly request that the Siting Board incorporate or take any other action relative to the HCA (Company Brief at 88 n.22, 105 n.31, 107-109).

The HCA is part of the record evidence in this proceeding and, in its analysis of the Proposed Facility, the Siting Board relies on several specific Company commitments in the HCA. The Siting Board refers to certain provisions of the HCA within its Final Decision, and incorporates some of the HCA provisions as Conditions. However, the HCA is a private agreement between two parties to this proceeding, NRG and Sandwich, and therefore the Siting Board declines to incorporate the full HCA into the Final Decision regarding the Proposed Facility, and also declines to assume enforcement responsibilities for the HCA, except for those HCA provisions explicitly adopted as Conditions of this Decision. Where any future deviations from the HCA’s provisions alter material facts or assumptions relied upon by the Siting Board in the Final Decision, the Company is obligated to notify the Siting Board in writing so that it may consider whether further inquiry is required (see Section IX, below). As to the Town’s request that the Board take official notice of the HCA, the Siting Board notes that the filing of the HCA

as an exhibit establishes it as a part of the record, and therefore there is no need for the Siting Board to take official notice of the document.

Siting Board staff prepared a Tentative Decision and distributed it to Siting Board members and all parties for review and comment on June 20, 2017.⁸ The parties were given until _____, 2017, to file written comments on the Tentative Decision. The Siting Board received written comments from _____. The Siting Board held a public meeting to consider the Tentative Decision on _____, 2017, at which the parties were invited to present oral comments. _____, _____, and _____ presented oral comments. After deliberation, the Board directed staff to prepare a Final Decision [approving] the Petitions, subject to certain conditions set forth below.

C. Jurisdiction and Scope of Review pursuant to G.L. c. 164, § 69J¼

NRG filed its Petition to Construct the Proposed Facility pursuant to G.L. c. 164, § 69J¼. Pursuant to G.L. c. 164, § 69J¼, no applicant shall commence construction of a “generating facility” unless a petition for approval of construction of that generating facility has been approved by the Siting Board. Pursuant to G.L. c. 164, § 69G, a jurisdictional “generating facility” is defined as:

any generating unit designed for or capable of operating at a gross capacity of 100 megawatts or more, including associated buildings, ancillary structures, transmission and pipeline interconnections that are not otherwise facilities, and fuel storage facilities.

Because the Proposed Facility is capable of operating at a gross capacity of 100 MW or more, it is a “generating facility” requiring Siting Board approval under G.L. c. 164, § 69J¼. In accordance with G.L. c. 164, § 69J¼, before approving a petition to construct a generating facility, the Siting Board must determine that the applicant has met five requirements.

First, the Siting Board must determine that the applicant’s description of the site selection process used is accurate (see Section II, below). Second, if the expected emissions from the Proposed Facility do not meet Technology Performance Standard (“TPS”) criteria, the Siting

⁸ The citations in this Decision to past Siting Board decisions reference the page numbers to be found in the original decisions rather than the page numbers in the Decisions of the Massachusetts Siting Council (“DOMSC”) and Decisions of the Massachusetts Siting Board (“DOMSB”) volumes. DOMSC and DOMSB citation references are provided only in the “Abbreviations” section of the Decision.

Board must determine, based on a comparison with other fossil fuel generating technologies, that the proposed generating facility, on balance, contributes to a reliable, low-cost, diverse regional energy supply with minimal environmental impacts (see Section III, below). Third, the Siting Board must determine that the applicant's description of the proposed generating facility and its environmental impacts is substantially accurate and complete (see Section IV, below). Fourth, the Siting Board must determine that the proposed generating facility will minimize environmental impacts consistent with the minimization of costs associated with mitigation, control, and reduction of the environmental impacts (see Section IV, below). Fifth, the Siting Board must determine that plans for construction of the proposed generating facility are consistent with current health and environmental protection policies of the Commonwealth and with such energy policies as are adopted by the Commonwealth for the specific purpose of guiding the decisions of the Board (see Section V, below).

II. SITE SELECTION

A. Standard of Review

The Siting Board's overall mandate, set forth in G.L. c. 164, § 69H, requires the Board to determine whether a proposed energy facility contributes to a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost.

G.L. c. 164, § 69H. In the case of a proposed generating facility, G.L. c. 164, § 69J^{1/4}, requires the Siting Board to determine whether "plans for the construction of [the] facility minimize the environmental impacts consistent with the minimization of costs associated with the mitigation, control, and reduction of the environmental impacts of the proposed generating facility."

G.L. c. 164, § 69J^{1/4}. This Section also requires the Siting Board to determine whether an applicant's description of the site selection process used for the proposed generating facility is accurate. G.L. c. 164, § 69J^{1/4}. An accurate description of an applicant's site selection process must include a complete description of the environmental, reliability, regulatory, and other considerations that led to the applicant's decision to pursue the facility at the proposed site, as well as a description of other siting and design options the applicant considered. Exelon West Medway LLC and Exelon West Medway II, LLC, EFSB 15-01/D.P.U. 15-25 (2016) ("Exelon West Medway") at 8; Footprint Power Salem Harbor Development, LP, EFSB 12-2 (2013) ("Footprint Power") at 10; Montgomery Energy Billerica Power Partners, LP, EFSB 07-2

(2009) (“Montgomery Energy”) at 8. Thus, site selection, together with project design and mitigation, is an integral part of the process of minimizing the environmental impacts of a proposed generating facility, and therefore integral to determining whether the facility contributes to a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost, in accordance with G.L. c. 164, § 69H.

B. Company Proposal

1. Identification and Initial Evaluation of Sites

NRG stated that its site selection process was guided by a number of key factors, including parent company NRG Energy’s corporate development philosophy, market factors, and certain cost and environmental considerations (Exh. NRG-1, at 1-3, 3-1).⁹ NRG Energy initially sought sites: (1) where an electric generating facility has operated, indicating appropriate zoning and community acceptance; (2) with at least ten to 15 acres of land available for a new electric generating facility; (3) with access to an adequate fuel source and connectivity to the electric grid; and (4) with access to an adequate water supply to meet the facility’s pollution control needs (*id.* at 3-2). Additionally, NRG stated that since a resource shortfall had been identified within the SEMA/RI load zone by FCA 9, sites located in this electrical zone were given the highest priority (*id.*).

NRG Energy identified and evaluated 17 sites as potential locations for a new facility, including twelve sites within its former and existing fleet, and five sites of other electric generating facilities that it had evaluated over the last few years (*id.* at 3-1). NRG indicated that by focusing on sites that currently host electric generating facilities, NRG Energy was able to avoid the significant environmental, community, and cost impacts associated with clearing and adapting a “greenfield” site to power generation (*id.* at 3-2). In addition, the Company stated that this approach minimizes or eliminates the need for new infrastructure to connect the Proposed Facility to fuel sources and the electric grid (*id.*). Furthermore, by limiting initial consideration to sites it owns, formerly owned, or previously evaluated, NRG stated that its

⁹ In section three of the Petition, the Company represents that NRG Energy is “the applicant’s parent company” (Exh. NRG-1, at 3-2). However, in section one of the Petition, the Company states that it is “an affiliate” of NRG Energy (*id.* at 1-3). For our purposes this apparent inconsistency is not significant; and we refer herein to NRG Energy as the Petitioner’s parent company.

parent company was able to benefit from enhanced knowledge of site characteristics beyond what might ordinarily be known when screening sites generally, providing confidence in the ultimate selection of a site that would achieve an appropriate balance among reliability, environmental, and least-cost objectives (id.).

NRG Energy performed an initial evaluation of the 17 candidate sites with regard to several factors: (1) available space; (2) access to adequate natural gas, electric transmission, and water infrastructure; and (3) location within the ISO-NE electrical grid (Exh. NRG-1, at 3-3). Furthermore, the Company stated that site control was considered a secondary factor in its evaluation; i.e., a lack of control alone was not considered sufficient cause for eliminating a viable location, but was considered in combination with other site limitations (Exh. EFSB-SS-1). On this basis, NRG Energy determined the approximately 256-acre Brayton Point site in Somerset, the approximately 88-acre Canal Generating Station site in Sandwich (including a second non-contiguous parcel), and the approximately 60-acre Middletown Station site in Connecticut to be viable locations for a new peaking electric generating unit (Exh. NRG-1, at 3-3 to 3-5, 3-9). The remaining 14 sites were not considered to be appropriate for further evaluation for one or more of a set of reasons, such as unavailability of sufficient natural gas or transmission capacity, insufficient useable land, and/or the need for extensive demolition (id. at 3-3 to 3-13).

2. Final Evaluation of Candidate Sites

Having narrowed the list of candidate sites to three potential locations – the Brayton Point, Canal Generating Station, and Middletown Station sites – NRG Energy proceeded with its final site evaluation, applying the locational, environmental, and community criteria described below (Exh. NRG-1, at 3-13).

a. Locational Considerations

NRG Energy employed the following locational considerations as part of its final evaluation of candidate sites: (1) sufficient readily buildable acreage; (2) proximity to electric load, with the greatest priority placed on access to ISO-NE's SEMA/RI load zone; (3) availability of a sufficient natural gas interconnection within half a mile of the proposed site; (4) availability of a sufficient electrical interconnection within half a mile of the proposed site, with a preference for a 345 kV interconnection; (5) availability of a reliable water supply

sufficient for meeting the Proposed Facility's emissions control requirements; (6) compatibility with local zoning and surrounding uses, including consideration of the number of potential sensitive receptors in the area; and (7) environmental permitting requirements, including the potential for natural or community impacts, and air quality impacts (Exh. NRG-1, at 3-13 to 3-14).

According to the Company, all three sites fared well with respect to the above locational considerations, although NRG Energy preferred the Brayton Point and Canal Generating Station locations to the Middletown site due to their larger size, which would allow for flexibility when siting the Project and potential on-site construction laydown areas (id. at 3-16). NRG further stated that the Brayton Point and Canal Generating Station sites were also preferred to the Middletown Station site due to their electrical connectivity within the SEMA/RI load zone (id.). The Company stated that the Canal Generating Station site has the greatest advantages with respect to its electrical location, as it is the only significant electric generating site on Cape Cod and would be able to provide additional reliability benefits in the event of a significant transmission outage (id.; Tr. 1, at 194-197).

b. Environmental Considerations

NRG Energy employed the following twelve environmental considerations as part of its final evaluation of candidate sites: (1) air quality; (2) wetlands and waterways; (3) zoning and land use; (4) visual impact; (5) solid and hazardous waste; (6) material storage and safety; (7) water use and discharge; (8) noise; (9) historical and archeological resources; (10) traffic and transportation; (11) electric and magnetic field effects; and (12) proximity of construction laydown (Exh. NRG-1, at 3-14).

NRG stated that the three candidate sites were comparable with respect to most of the above environmental considerations (id. at 3-18). However, the Brayton Point and Canal Generating Station locations have advantages over the Middletown Station site with respect to wetlands and waterways issues, archeological sensitivity, and availability of land for Project siting and temporary construction laydown uses (id.). Additionally, the Canal Generating Station and Middletown Station sites have advantages over the Brayton Point site with respect to solid and hazardous waste issues (id.).

c. Community Considerations

Finally, NRG Energy evaluated each of the three candidate sites with respect to the following community considerations: (1) likely support from municipal officials; (2) importance of additional tax revenue; (3) importance of Project-related jobs; and (4) support from neighbors or ample buffer (Exh. NRG-1, at 3-14). All three sites were considered comparable with respect to these community considerations (id. at 3-18). NRG asserted that, because of the presence of an existing generating facility at each site, long-term relationships with local officials and communities are positive, and incremental tax revenue and jobs from a responsibly developed project are expected to be welcomed (id. at 3-18 to 3-19). The Company noted that each of the final candidate sites has nearby neighbors for whom Project-related impacts must be carefully managed (id. at 3-19).

d. Company Conclusion

NRG stated that, through its site selection process, NRG Energy determined that the Brayton Point, Canal Generating Station, and Middletown Station sites are all very good candidates for project development (Exh. NRG-1, at 3-19; Tr. 1, at 198). While all three candidate sites were comparable with respect to most of the assessed locational, environmental, and community considerations, NRG Energy preferred the Canal Generating Station site over the other sites for a number of locational and environmental reasons (Exh. NRG-1, at 3-19). Specifically, NRG stated that its parent company selected the Canal Generating Station site as its preferred location because of: (1) the availability of larger site areas to accommodate facility siting and construction laydown areas compared to the Middletown Station site; (2) fewer wetlands and waterways issues, and lower archeological sensitivity compared to the Middletown Station site; (3) fewer hazardous waste issues compared to the Brayton Point site; and (4) a superior connection to the electrical grid within the Cape Cod portion of the SEMA/RI load zone compared to both the Middletown Station and Brayton Point sites (id.). Additionally, NRG noted that the Brayton Point site is not owned by NRG Energy (id.).

C. Analysis and Findings

The record demonstrates that the Company has adopted the site selection process of its parent company, NRG Energy. On this basis, the Company's site selection process included

locations with existing generation facilities, at least 15 acres of available space, access to adequate natural gas and electric infrastructure, and access to an adequate water supply. The Company gave priority to sites with an electrical connection in the SEMA/RI load zone, as ISO-NE had identified a resource shortfall in this area in FCA 9.

After conducting an initial review of 17 candidate sites, the Company identified three preferred sites, the Brayton Point, Canal Generating Station, and Middletown Station locations. Following an additional investigation involving the application of locational, environmental, and community considerations, the Company selected the Canal Generating Station site for the Project. The Company made its selection based on the availability of useable land at the site, a lower level of anticipated environmental impacts, increased electrical reliability benefits, and NRG Energy's ownership of the site.

With respect to site selection, G.L. c. 164, § 69J¼ provides that a petitioner must ensure that “the description of the site selection process used is accurate.” In Town of Andover v. Energy Facilities Siting Board, 435 Mass. 377 (2001), the Supreme Judicial Court of Massachusetts (“SJC”) affirmed that the Siting Board’s examination with respect to site selection is to determine whether the petitioner’s description of its site selection process is accurate. Here, there is nothing in the record to indicate that the Company’s description of its site selection process is inaccurate. The record shows that the locational, environmental, and community factors that guided the Company’s site selection process, and information gathered in the site selection process, led to the selection of a site that contributes to the minimization of the Proposed Facility’s environmental impacts (see Section IV, below). Accordingly, the Siting Board finds that the Company provided an accurate description of its site selection process and that the site selection process contributes to minimizing the environmental impacts of the proposed Project.

III. TECHNOLOGY PERFORMANCE STANDARD

The Siting Board’s TPS requires a project proponent to prepare an analysis of other fossil fuel generating technologies if the project does not meet all emissions criteria established by the applicable TPS regulation.

A. Standard of Review

G. L. c. 164, § 69J¼, requires the Siting Board to promulgate a TPS for generating facility emissions. The TPS is to be used solely to determine whether a petition to construct a generating facility must include information regarding fossil fuel generating technologies other than the technology proposed by the petitioner. G. L. c. 164, § 69J¼; 980 C.M.R. §§ 12.00 et seq. If expected emissions of the facility meet the TPS in effect at the time of filing, the petitioner is not required to provide a comparison of the proposed generating facility technology with potential alternative technologies. 980 C.M.R. §§ 12.00 et seq. If the expected emissions of the facility do not meet the TPS in effect at the time of filing, the petitioner must include in its petition a description of the environmental impacts, costs, fuel diversity, and reliability of other fossil fuel generating technologies, and an explanation of why the proposed technology was chosen. Id. The Siting Board must then determine whether the technology selection for the proposed generating facility, on balance, contributes to a reliable, low cost, diverse regional energy supply with minimal environmental impacts. Exelon West Medway at 12; Montgomery Energy at 14-15; Braintree Electric Light Department, EFSB 07-1/D.T.E./D.P.U. 07-5 (2008) (“Braintree Electric”) at 76-77.

B. Company Proposal

In the Petition, NRG compared the Proposed Facility’s anticipated emissions with the TPS criteria; the Company also noted that the TPS regulations require such analysis only regarding a proposed project’s primary fuel source (Exh. NRG-1, at 2-1 to 2-4). NRG initially represented that the Proposed Facility would meet the TPS for all criteria pollutants except for carbon monoxide,¹⁰ and that it complied with the TPS for all sixteen non-criteria pollutants (id. at 2-1 to 2-2). The Company therefore included an alternative technologies comparison in the Petition (id. at 2-1, app. A).

Subsequent to the filing of the Petition, NRG stated that GE, the Company’s selected turbine manufacturer, had provided NRG with a guaranteed carbon monoxide emissions rate that is less than the Siting Board’s TPS carbon monoxide criterion (Exhs. EFSB-G-1(S1);

¹⁰ The Company originally proposed to limit carbon monoxide emissions to 0.087 pounds per MW-hour (“lb/MWh”) (Exh. NRG-1, at 2-1).

CLF-2-12).¹¹ Consistent with this guarantee, the Company asserts that the Proposed Facility would fully comply with the TPS for all criteria and non-criteria pollutants and, therefore, the Company is not required to provide an alternative technologies comparison (Exhs. EFSB-G-1(S1); EFSB-TPS-15A; Company Brief at 17). A comparison of the Company's revised predicted emission rates and the Siting Board's TPS criteria is provided in Table 1, below.

Table 1. Comparison of Facility Emissions with TPS for Criteria Pollutants

| Pollutant | Facility Emission (lb/MWh) | TPS (lb/MWh) ¹² |
|-------------------------------|----------------------------|----------------------------|
| Nitrogen Oxides | 0.089 | 0.120 |
| Carbon Monoxide | 0.076 | 0.077 |
| Volatile Organic Compounds | 0.025 | 0.035 |
| Particulates/PM ₁₀ | 0.051 | 0.081 |
| Sulfur Dioxide | 0.015 | 0.021 |

Sources: Exhs. EFSB-G-1(S1); CLF-2-12.

C. Positions of Parties

1. CLF

CLF interprets that the statutory language regarding facility emissions that “do not meet the Technology Performance Standards in effect at the time of the filing” as meaning that at the time the Company filed the Petition, the Company had to demonstrate compliance with the TPS

¹¹ The Company stated that GE will guarantee that the turbine meets the specified carbon monoxide emission limits for a total of 25,000 hours over five years, using gas as fuel (RR-EFSB-24). NRG indicated that GE would be contractually obligated to investigate and take corrective actions if carbon monoxide emissions exceed 0.076 lb/MWh (*id.*). NRG further stated that after the guarantee period, it would be responsible for taking any necessary corrective actions to ensure that the Facility is in compliance with the TPS limits (*id.*). In addition, NRG stated that it will track carbon monoxide emissions in its continuous monitoring system (*id.*).

¹² Pounds per megawatt-hour (“lb/MWh”), based on 100 percent load at 50 degrees Fahrenheit.

criteria (CLF Brief at 2). Absent such a showing of compliance at the time of filing, CLF maintains, the Petition must include a description of the environmental impacts, costs, and reliability of other fossil fuel generating technologies, as well as an explanation of why the proposed technology was chosen (*id.*). Furthermore, CLF contends that the lack of a showing of compliance at the time of filing also requires the Siting Board to determine whether the construction of the Proposed Facility on balance contributes to a reliable, low-cost, diverse, regional energy supply and does so with minimal environmental impacts (*id.*).

2. Company

NRG argues that CLF misconstrued the statutory language, and asserts that the Project as fully developed meets the TPS criteria that were in effect on the filing date, thus complying with the statutory language quoted by CLF (Company Brief at 20). The Company further argues that CLF's interpretation would discourage future petitioners from seeking guarantees (or adding mitigation and/or controls) designed to decrease air emissions and ensure TPS compliance after a petition to construct has been filed (*id.* at 21).¹³

D. Analysis and Findings

The record shows that in NRG's initial filing, the Proposed Facility complied with the TPS for all criteria pollutants other than carbon monoxide and for all sixteen non-criteria pollutants. The Company therefore included an alternative technologies comparison in the Petition. However, subsequent to the filing of the Petition, NRG obtained a reduced carbon monoxide emissions rate guarantee from the turbine manufacturer that demonstrates the Proposed Facility's compliance with TPS limits for carbon monoxide. The Siting Board agrees with the Company that it is acceptable for NRG to establish TPS compliance during the Siting Board proceeding. Based on a review of the evidence, the Siting Board finds the GE carbon monoxide emissions rate guarantee to be sufficient to establish TPS compliance.

¹³ NRG asserts that, in the alternative, should the Siting Board conclude that it is required to make alternative technologies determination, the record evidence demonstrates that the Company submitted an alternative fossil fuel technologies comparison satisfying the statutory requirements (Company Brief at 21)

See 980 C.M.R. § 12.02(1). Consequently, the Siting Board finds that the Proposed Facility's emissions would meet the TPS criteria.

Accordingly, the Siting Board finds that the Company is not required to provide a comparison of the technology for the Proposed Facility relative to potential alternative technologies. See 980 C.M.R. § 12.02. Given that the Proposed Facility meets the TPS criteria, the Siting Board finds that the Company's technology selection, on balance, contributes to a reliable, low cost, diverse regional energy supply with minimal environmental impacts.

IV. ENVIRONMENTAL IMPACTS

A. Standard of Review

G. L. c. 164, § 69J¼, requires the Siting Board to determine whether the plans for construction of a proposed generating facility minimize the environmental impacts of the proposed facility consistent with the minimization of costs associated with the mitigation, control, and reduction of the environmental impacts of the proposed generating facility. In order to make this determination, the Siting Board assesses the impacts of the proposed facility in eight areas prescribed by its statute – air quality, water resources, wetlands, solid waste, visual impacts, noise, local and regional land use, and health – and determines whether the applicant's description of these impacts is substantially accurate and complete.¹⁴ G. L. c. 164, § 69J¼.

The Siting Board also assesses the costs and benefits of options for mitigating, controlling, or reducing these impacts, and determines whether mitigation beyond that proposed by the applicant is required to minimize the environmental impacts of the proposed facility consistent with the minimization of costs associated with the mitigation, control, and reduction of the environmental impacts of the proposed generating facility. Compliance with other agencies' standards does not necessarily establish that a proposed facility's environmental impacts would be minimized.

Finally, the Siting Board assesses any trade-offs that need to be made among conflicting environmental impacts, particularly where an option for mitigating one type of impact has the effect of increasing another type of impact. An assessment of all impacts of a facility is necessary to determine whether an appropriate balance is achieved among conflicting

¹⁴ The Siting Board also typically reviews impacts of a project with regard to traffic and safety. See Exelon West Medway at 29 n.22.

environmental concerns and between environmental impacts and cost. A facility proposal that achieves this balance meets the Siting Board's statutory requirement to minimize environmental impacts consistent with minimizing the costs associated with the mitigation, control, and reduction of the environmental impacts of the proposed generating facility. Exelon West Medway at 29; Footprint Power at 17; Montgomery Energy at 22.

B. Air Impacts

In this Section, we address air impacts of the Proposed Facility as compared with various state and federal standards and regulations. We first address criteria pollutant impacts from the Proposed Facility and mitigation of those impacts. To assess the impact of criteria pollutants, the Company: (1) identified applicable federal and state air quality requirements; (2) characterized baseline ambient air quality conditions at the Facility Site and surrounding area; (3) projected air emissions from the Proposed Facility; (4) modeled the dispersion of the projected emissions from the Proposed Facility as well as combined emissions from the Proposed Facility and the Existing Facility, and compared the results with the applicable state and federal air quality standards and regulations; (5) evaluated dispersion from a variety of stack height options; and (6) evaluated construction air impacts. Finally, we describe the Massachusetts Department of Environmental Protection ("MassDEP") draft air permit requirements for the Project with respect to criteria pollutants.

Also in this section, we address greenhouse gas ("GHG") emissions from the Proposed Facility. Other non-criteria pollutant impacts are discussed in Sections and IV.H and IV.I, below.

1. Criteria Pollutants

a. Company Proposal

i. Applicable Regulations and Required Permits

NRG stated that federal (United States Environmental Protection Agency, "USEPA") and state (MassDEP) environmental regulatory requirements that apply to the Proposed Facility include: (1) National and Massachusetts Ambient Air Quality Standards ("NAAQS" and "MAAQS"); (2) Prevention of Significant Deterioration ("PSD") Review; (3) Nonattainment New Source Review ("NNSR"); (4) New Source Performance Standards ("NSPS"); and (5)

Massachusetts Comprehensive Air Plan Approval (Exhs. NRG-1, at 4-2 to 4-9; NRG-3, at 5-1 to 5-11).¹⁵

The USEPA designates every area of the country as attainment, nonattainment, or unclassifiable with respect to the NAAQS for each of the following six criteria pollutants: nitrogen dioxide (“NO₂”); sulfur dioxide (“SO₂”); particulates with a diameter of ten microns or less (“PM₁₀”) or 2.5 microns or less (“PM_{2.5}”); carbon monoxide; ozone; and lead (Exhs. NRG-1, at 4-2; NRG-3, at 5-1). In areas designated as attainment, the air quality with respect to the pollutant is equal to or better than the NAAQS (Exhs. NRG-1, at 4-2; NRG-3, at 5-2). USEPA’s PSD Review program is designed to maintain the attainment status of these areas (Exhs. NRG-1, at 4-2; NRG-3, at 5-2). Conversely, in areas designated as nonattainment, the air quality with respect to the pollutant is worse than the NAAQS, and therefore actions must be taken to improve air quality (Exhs. NRG-1, at 4-2; NRG-3, at 5-2). Areas with limited air quality data are designated as unclassifiable, and treated as attainment areas for regulatory purposes (Exhs. NRG-1, at 4-2; NRG-3, at 5-2).

Barnstable County, the Project location, is presently classified as attainment or unclassifiable for all criteria pollutants except ozone (Exhs. NRG-1, at 3-16, 4-2 to 4-5; NRG-3, at 5-1). Although the area is designated as unclassifiable/attainment for the 2008 eight-hour ozone standard, the Proposed Facility is nevertheless subject to provisions for moderate nonattainment for ozone because Massachusetts is part of the Ozone Transport Region (Exhs. NRG-1, at 3-16, 4-2 to 4-5; NRG-3, at 5-1). A new major source or a major modification of an existing major source of air pollution may be subject to a PSD Review or to the NNSR based on the attainment status of the locality (*i.e.*, county) (Exh. NRG-3, at 5-1 to 5-5).

Under the PSD program, the Proposed Facility is not in and of itself a major source, but is considered a major modification of the Existing Facility, which is a major source facility (*id.* at 5-3). A modification is considered “major” if it has the potential to emit a pollutant in excess of a defined PSD Significant Emission Rate threshold for that pollutant (*id.*; Exh. NRG-7(R) at 3-1). The Proposed Facility is subject to a PSD review for NO_x, PM/PM₁₀/PM_{2.5},

¹⁵ Other state and federal environmental regulatory requirements applicable to the Proposed Facility include: (1) the MassDEP Air Toxic Guidelines; (2) USEPA’s Acid Rain Program; and (3) the Massachusetts Clean Air Interstate Rule (Exhs. NRG-1, at 4-2 to 4-9; NRG-3, at 5-1 to 5-11)

sulfuric acid mist, and CO₂ equivalents (“CO₂e”)¹⁶ (Exh. NRG-7(R) at 3-2).^{17, 18} In order to obtain a PSD permit, an applicant must demonstrate that emissions would be controlled with the Best Available Control Technology (“BACT”) and must include a modeling demonstration of compliance with the NAAQS and PSD Increments¹⁹ (Exhs. NRG-1, at 4-4; NRG-7(R) at 3-2). The Company submitted a PSD application to MassDEP, which subsequently issued a draft PSD permit on January 5, 2017 (Exhs. NRG-3, at 5-5; NRG-7(R); EFSB-18).

With respect to the NNSR, because emissions of an ozone precursor (i.e., NO_x) would exceed 25 tpy, the proposed Project is classified as a major modification with respect to NO_x emissions and, thus, is subject to NNSR for NO_x (Exhs. NRG-3, at 5-1; EFSB-G-1(S2)(1) at 3-1 to 3-2). Under the NNSR regulations, the Proposed Facility must satisfy the following requirements to obtain a permit: (1) application of Lowest Available Emission Rate (“LAER”) controls; (2) procurement of NO_x emission offsets; (3) analysis of Project alternatives; and (4) certification of compliance (Exhs. NRG-1, at 4-5; NRG-3, at 5-5). As described below, the Company submitted an NNSR application to MassDEP as part of its Comprehensive [Air] Plan Approval (“CPA”) application (Exhs. NRG-3, app. E; EFSB-G-(1)(S2)(1)).

¹⁶ GHG expressed as CO₂e, quantifies GHG emissions as an amount of CO₂ that would have an equivalent global warming potential (Exh. EFSB-G-1(S2)(1) at 2-7).

¹⁷ In its Draft Environmental Impact Report (“DEIR”), the Company asserts that, pursuant to the Supreme Court’s decision in Utility Air Regulatory Group v. USEPA, 134 S.Ct. 2427 (2014), GHG emissions, expressed as CO₂e, “cannot determine major source status” (Exh. NRG-3, at 5-4). USEPA issued a Policy Memo dated July 24, 2014, indicating that it intends to apply the current GHG Significant Emission Rate threshold for requiring PSD BACT review for GHG for “anyway” sources of 75,000 tons per year (“tpy”) (i.e., sources that are subject to a PSD review anyway) based on their emission of non-GHG New Source Review regulated pollutants (id.).

¹⁸ The Company originally stated in its Petition and DEIR that the Proposed Facility is subject to a PSD review for carbon monoxide (Exh. NRG-3, at 5-3). However, after obtaining the carbon monoxide stack emissions guarantee from GE, the Company stated that the Proposed Facility would be under the PSD Significant Emission Rate (i.e., 100 tpy) and therefore is no longer subject to a PSD review for carbon monoxide (Exh. NRG-7(R) at 3-2).

¹⁹ PSD Increments are maximum allowable increases in ambient pollutant concentrations, from a new source, in an area that is in attainment of the NAAQS (Exh. NRG-3, at 5-2).

The NSPS regulates the amount of air contaminants that may be emitted by certain new sources, including various categories of newly constructed industrial or commercial equipment (Exhs. NRG-1, at 4-5 to 4-6; NRG-3, at 5-5 to 5-7). NRG stated that NSPS applicable to the proposed CTG are set forth at 40 CFR 60 Subpart KKKK (for NO_x and SO₂) and Subpart TTTT (for GHG) (Exhs. NRG-1, at 4-5 to 4-6; EFSB-G-1(S2) at 3-5). These applicable standards have emission limits and operational restrictions (Exh. NRG-1, at 4-5 to 4-6). With respect to compliance with 40 CFR 60 Subpart TTTT, a facility would be considered a non-baseload unit if the maximum three-year rolling average capacity factor (in percent) does not exceed the CTG's design efficiency (in percent) (id. at 4-6; Exh. NRG-3, at 5-7). For the Proposed Facility, this means the permitted maximum three-year rolling average capacity factor must be less than or equal to 40 percent, which is the design efficiency of the proposed CTG (Exhs. NRG-1, at 4-6; NRG-3, at 5-7).

MassDEP regulations at 310 C.M.R. § 7.02 establish the requirement for a CPA to be issued prior to the construction, reconstruction, alteration, or operation of a facility that may emit contaminants to the ambient air (Exh. NRG-3, at 5-9). The Project exceeds several of the thresholds, thereby requiring that the Company submit a CPA application to MassDEP (id.). The Company submitted its CPA/NNSR application and MassDEP issued a Proposed Air Plan Approval on January 5, 2017 (see Section I.B.1.b, below, for further discussion of the MassDEP draft air permits) (id., app. E; Exhs. EFSB-G-1(S2)(1); EFSB-20).²⁰

ii. Baseline Air Quality

To characterize existing ambient air quality conditions at the Facility Site and surrounding areas, NRG stated that it gathered existing air quality data from the closest available and representative monitoring stations (Exh. EFSB-G-1(S2)(1) at 6-11). The Company stated that it operates an ambient monitoring station in Shawme-Crowell State Park, which is located approximately one mile southeast of the Facility Site (id.). This monitoring station provides data on the existing air quality conditions in the vicinity of the Canal Generating Facility by

²⁰ Other MassDEP air regulations applicable to the Proposed Facility include limits on the sulfur and ash content of fuel, limits on visible emissions, Reasonably Available Control Technology for NO_x, stack testing requirements, and control of dust and odors (Exh. NRG-3, at 5-9 to 5-10).

measuring ambient concentrations for SO₂, NO₂, PM₁₀, and PM_{2.5} (*id.*). For background levels of carbon monoxide and lead, the Company used data from the Myron J. Francis School monitoring station in East Providence, Rhode Island, which is located approximately 44 miles west-northwest of the Facility Site (*id.*). The Company asserted that measurements from the East Providence site are conservative because it is located in a more urban environment than Sandwich, and is affected by a greater level of development (*id.*). NRG stated that measurement results from these monitoring locations show that background air quality concentrations in the vicinity of the Facility Site are below the NAAQS/MAAQs (*id.*).

iii. Projected Project Air Emissions

NRG projected air emissions from the Proposed Facility under three operating scenarios: (1) a maximum permitting scenario for any one-year operation; (2) the maximum permitting scenario for any three-year rolling average period, which the Company called its “base case scenario”; and (3) the Company’s view of a likely operating scenario (Exh. NRG-1, at 4-4). For the maximum permitting scenario for any one-year operation, the Company projected emissions from the proposed Project assuming the following operational limits for the new CTG on a rolling twelve-month basis: (1) operation of the CTG (all fuels) limited to 4,380 hours (*i.e.*, a 50 percent capacity factor); (2) total ULSD firing limited to 720 hours; and (3) a maximum of 180 startup/shutdown cycles on natural gas and 80 startup/shutdown cycles on ULSD (Exh. EFSB-G-1(S2)(1) at 2-7). Furthermore, the Company stated that it assumed an annual operation of 300 hours for the emergency generator and the emergency fire pump associated with the Project (Exh. NRG-1, at 4-4).

For the maximum permitting scenario for any three-year rolling average period, the Company projected emissions from the Project based on a 40 percent capacity factor consisting of a total of 3,500 hours per year average operation at full load with 720 hours on ULSD (*i.e.*, the maximum permitting scenario for any 36-month rolling average period under the NSPS Subpart TTTT requirements) (Exh. NRG-3, at 6-2; RR-EFSB-23). For the operating scenario considered likely by the Company, the Company projected emissions based on a 19.4 percent capacity factor consisting of a total of 1,700 hours per year full load operation including 200 hours on ULSD (Exh. NRG-3, at 6-2; RR-EFSB-23).

The Company stated that emission control technologies proposed for the CTG include dry-low-NO_x combustors and an SCR system to control NO_x emissions, as well as an oxidation catalyst to control emission of volatile organic compounds (VOCs, another ozone precursor) and carbon monoxide (Exh. NRG-7(R) at 2-3). In addition, the Company stated that, to minimize NO_x emissions, it would use water injection when firing ULSD (*id.* at 2-4). A summary of total potential emissions under the three operating scenarios and the proposed air pollution control measures are presented in Table 2 below.

Table 2. Potential Emissions Across Three Operating Scenarios (tpy)

| Pollutant | Maximum MassDEP Permit Scenario for any 12-month period (50% capacity factor & 30 days ULSD) | Maximum MassDEP Permit Scenario for any 36-month period (40% capacity factor & 30 days ULSD) | Likely Operating Scenario for any 12-month period (19.4% capacity factor & 8.3 days of ULSD) | Control Measure |
|--------------------------------|--|--|--|--|
| NO _x | 104.3 | 88.5 | 41.3 | Dry-low-NO _x /water injection and SCR |
| SO ₂ | 11.1 | 8.9 | 4.3 | low sulfur fuel |
| CO | 94.8 | 79.3 | 38.9 | oxidation catalyst |
| VOCs | 24.4 | 19.1 | 9.5 | oxidation catalyst |
| PM | 71.5 | 63.3 | 25.0 | use of natural gas as a primary fuel |
| H ₂ SO ₄ | 12.0 | 9.7 | 4.6 | low sulfur fuel |
| GHG (as CO ₂ e) | 932,477 | 757,917 | 355,530 | low emitting fuel |

Sources: Exhs. NRG-3, at 6-2; EFSB-G-1(S2)(1); RR-EFSB-23.

Under MassDEP application of NNSR regulations, the Project must obtain NO_x emission offsets at a ratio of 1.26 tons of offsets per ton of the Proposed Facility's maximum potential emissions (Exhs. NRG-3, at 5-5; EFSB-G-1(S2)(1) at 3-2). Based on the Proposed Facility's maximum potential NO_x emissions of 104.3 tpy, the Company stated it would be required to obtain 131.4 tpy of NO_x offsets (*i.e.*, 104.3 x 1.26 tpy) (Exhs. NRG-6, at 3-1; EFSB-G-1(S2)(1) at 3-2). NRG stated that it has control of 4,209 tpy of NO_x offsets created from the permanent shutdown of Lovett Generating Station in New York (Exhs. NRG-6, at 3-1; EFSB-G-1(S2)(1) at 3-2; EFSB-A-47). The Company stated it has requested that MassDEP pursue obtaining a

memorandum of understanding (“MOU”) with the New York State Department of Environmental Conservation (“NYSDEC”) to allow the use of these Emission Reduction Credits (“ERCs”) for the Project (Exhs. NRG-3, at 5-5; EFSB-G-1(S2)(1) at 3-2; EFSB-A-47). NRG stated that it does not anticipate difficulty in obtaining approval from MassDEP to use these ERCs (Exh. NRG-6, at 3-2; Tr. 4, at 547-549).

iv. Project Pollutant Dispersion

To establish compliance with the NAAQS and PSD program, the Company modeled dispersion of stack emissions at the proposed stack height of 220 feet (Exhs. NRG-1, at 4-4; NRG-7(R), at 3-3). To predict the maximum ground-level concentration for each pollutant and averaging period, NRG modeled dispersion based on worst case Proposed Facility operating conditions (including load and temperature), using USEPA-recommended AERMOD air modeling software, and five years of historical meteorological data (Exhs. NRG-1, at 4-20; NRG-7(R) at 3-3, 5-4).^{21,22} NRG’s model predicted that maximum criteria pollutant impacts would occur at the Freezer Road Site fenceline or within 2,300 feet of the fenceline (Exhs. NRG-1, at 4-20; NRG-7(R) at 5-12).

USEPA has established Significant Impact Levels (“SILs”) for several of the criteria pollutants and averaging periods (Exh. NRG-3, at 5-2). If the predicted impacts of a new or modified source in Massachusetts are less than the SILs for a particular criteria pollutant and averaging period, then impacts are considered “insignificant” (Exh. NRG-1, at 4-2). If, however, a predicted impact from a new or modified source exceeds the SILs, the applicant is required to

²¹ The Company stated that its modeling analysis was based on an original proposal to operate the CTG for up to 1,440 hours per year on ULSD and 2,940 hours per year on natural gas, as well as the original assumption of CTG carbon monoxide emission rate of 4.0 parts per million (“ppm”) for natural gas firing (Exh. NRG-7(R) at 5-2). The Company stated the resulting air modeling is conservative because it does not reflect the subsequent reduction of ULSD use to 720 hours per year nor the updated carbon monoxide emission rate of 3.5 ppm for natural gas firing, both of which are contained in the Proposed Air Plan Approval (id.).

²² NRG stated that it modeled ground-level impacts on a receptor grid extending from the Canal Property fenceline to a distance of 20 kilometers, which the Company stated is sufficient to characterize maximum impact of the Project (Exh. NRG-1, at 4-20).

conduct a cumulative impact analysis (by including emissions from other major sources in the area identified by the MassDEP) to demonstrate compliance with the NAAQS (id. at 4-2, 4-3; Exh. NRG-7(R) at 3-3, 5-1).

In addition, USEPA has established PSD Increments to ensure that air quality in areas that are in attainment of the NAAQS is not significantly degraded from existing levels (Exh. NRG-1, at 4-22). PSD Increments reflect the maximum increase in pollutant concentrations that a new source is allowed to cause (i.e., above baseline concentrations) for a criteria pollutant (Exh. NRG-3, at 5-44). USEPA considers significant deterioration of air quality to occur when the amount of new pollution from a project, in combination with other PSD Increment-consuming sources, exceeds the applicable PSD Increment (Exh. NRG-1, at 4-22). The Company stated that if maximum predicted impacts from the Proposed Facility are below the applicable SILs, the predicted emissions from the proposed modifications are considered to be in compliance with the PSD Increment requirements for that pollutant (id.). If SILs are exceeded, then PSD Increment modeling is required (id.).

Modeling results show that the Proposed Facility's maximum air impacts would exceed SILs for 1-hour NO₂, 24-hour PM_{2.5}, and 24-hour PM₁₀ (Exh. NRG-7(R) at 5-14). NRG is therefore required to perform a cumulative impact analysis to confirm compliance with the NAAQS, as well as PSD Increment modeling to demonstrate compliance with PSD Increment requirements (id.; Exh. EFSB-A-14). For cumulative modeling, MassDEP requires inclusion of sources with significant emissions (in this case of PM_{2.5}, PM₁₀, and NO₂) within five kilometers of the Facility Site, along with ambient background concentrations and emissions of the Proposed Facility (Exhs. NRG-1, at 4-21; EFSB-20, at 34). However, the Company stated that, other than the Existing Facility, there are no such significant sources within five kilometers of the Proposed Facility (Exhs. NRG-1, at 4-21; EFSB-A-2; EFSB-20, at 34). Therefore, for the Proposed Facility, the cumulative impact (to demonstrate compliance to the NAAQS) is equal to the additive combination of the Proposed Facility, the Existing Facility, and representative ambient background (Exh. EFSB-20, at 34). Table 3, below, shows that modeled Project and cumulative impacts would be below the NAAQS (id. at 34-35; EFSB-A-14).

Table 3. Comparison of Modeled Project and Cumulative Impacts with the NAAQS

| Pollutant | Averaging Period | Modeled Impact of Proposed Facility ($\mu\text{g}/\text{m}^3$)²³ | Background Concentration ($\mu\text{g}/\text{m}^3$) | Cumulative (Proposed Facility + Existing Facility + Background) Impact ($\mu\text{g}/\text{m}^3$)²⁴ | NAAQS ($\mu\text{g}/\text{m}^3$) |
|-------------------------|-------------------------|---|---|--|--|
| NO₂ | 1-hour | 44.28 | 40 | 131.33 | 188 |
| | Annual | 0.71 | 15 | 25.04 | 100 |
| SO₂ | 1-hour | 0.49 | 22 | 150.33 | 196 |
| | 3-hour | 0.61 | 58 | 191.79 | 1,300 |
| | 24-hour | 0.26 | 12 | 57.92 | 365 |
| | Annual | 0.004 | 5 | 9.20 | 80 |
| PM_{2.5} | 24-hour | 2.43 | 11 | 14.85 | 35 |
| | Annual | 0.05 | 5 | 5.79 | 12 |
| PM₁₀ | 24-hour | 8.53 | 23 | 31.71 | 150 |
| | Annual | 0.06 | 9 | 10.01 | 50 |
| CO | 1-hour | 195.16 | 2,346 | 3,024.94 | 40,000 |
| | 8-hour | 42.25 | 1,495 | 1,662.86 | 10,000 |

Sources: Exhs. NRG-3, at 5-45; EFSB-20, at 35.

For the PSD Increment modeling, NRG stated that there are no other PM_{2.5} and PM₁₀ increment-consuming sources in the baseline area for inclusion (Exhs. NRG-7(R) at 5-14; EFSB-A-14).²⁵ The Company stated that MassDEP concurs with the absence of other sources

²³ Proposed Facility air impacts are modeled for the Company's proposed 220-foot stack; the value provided for the Proposed Facility is a high percentile value as specified in regulations for comparison to the NAAQS (see Exh. NRG-3, at 5-45).

²⁴ The cumulative concentration at the location of highest impact is shown; the value provided is a high percentile value as specified in regulations for comparison to the NAAQS (see Exh. NRG-3, at 5-45).

²⁵ The Company stated that USEPA has not established a PSD Increment for 1-hour NO₂ (Exhs. NRG-7(R) at 5-14; EFSB-A-14).

(Exhs. NRG-1, at 4-22; EFSB-A-2). The PSD modeling analysis for 24-hour PM_{2.5} and 24-hour PM₁₀ included impacts from the proposed CTG, emergency generator, and the fire water pump (Exhs. NRG-1, at 4-22; NRG-7(R) at 5-14). According to NRG, its PSD modeling showed that concentrations for 24-hour PM_{2.5}/PM₁₀ would be 8.66 micrograms per cubic meter (“µg/m³”), and that the operation of the Proposed Facility would be protective of the PSD increments (i.e., 9 µg/m³ for PM_{2.5} and 30 µg/m³ for PM₁₀) (Exh. NRG-1, at 4-24).

As part of its demonstration of the Project’s compliance with the NAAQS and PSD Increment, NRG also analyzed the potential secondary formation of PM_{2.5} (from emissions that are precursors to particulate formation – NO_x and SO₂) in accordance with USEPA’s guidance (id. at 4-24 to 4-26; Exh. NRG-7(R) at 5-16). The Company predicted a total (primary and secondary combined) PM_{2.5} PSD Increment of 8.75 µg/m³ for the Project, which it noted would be in compliance with the allowable 24-hour PSD increment of 9 µg/m³, as well as the NAAQS of 32 µg/m³ (Exh. NRG-1, at 4-24 to 4-26).

The Company’s air quality and impact assessment of Project air toxics (non-criteria pollutants) is discussed in Section IV.I.2 below.

v. Stack Height and Dispersion

NRG stated that, before it performed the final air modeling with a 220-foot stack height, it performed a sensitivity analysis with three stack height options (207 feet, 225 feet, and 250 feet) based on preliminary plant design (Exhs. EFSB-A-9; EFSB-A-34; EFSB-A-46; Tr. 3, at 518-519).²⁶ The Company stated that configuration changes were subsequently made to the plant design, and that all final modeling performed with the 220-foot stack reflected the final design (Exhs. EFSB-A-34; EFSB-A-46). The Company stated that it selected a stack height of 220 feet because at this stack height, the Project would meet all the ambient air quality standards, the PSD Increments, the air toxic thresholds, and would result in less visual impact to the

²⁶ The Company stated that prior to performing air quality modeling, it determined that the Good Engineering Practice (“GEP”) height of the Proposed Facility stack would be 498 feet (Exh. EFSB-A-9). While there is no regulatory requirement for building the stack at a GEP calculated height, by choosing a shorter stack, NRG was obliged in its dispersion modeling to assess the potential for downwash, a phenomenon that can increase ground-level pollutant concentrations (id.). The Company stated that the Project with the proposed 220-foot stack complies with all applicable standards and minimizes visual impacts as well as cost (Exh. NRG-1, at 4-16).

surrounding community than a higher stack (Tr. 3, at 505; see Section IV.E for further discussion of stack height).^{27,28} Table 4 below shows a subsequent sensitivity analysis comparing the proposed 220-foot stack with a series of higher stack heights with respect to air emissions, cost, and visual impacts, all based on the same preliminary plant configuration.

²⁷ As further described in Section IV.E, below, the 220-foot stack would be barely visible from the Sagamore Bridge, whereas taller stacks would be progressively more visible; from a number of vantage points to the north and east of the Facility Site, any new stack would have some incremental visibility but be consistent with existing features (Tr. 3, at 505).

²⁸ As further described in Section IV.E.2, Sandwich supports the Company's proposed 220-foot stack (Sandwich Brief at 2).

Table 4. Stack Height Sensitivity Analysis in Comparison to the 220-foot Stack

| Stack Height | 220 Feet ²⁹ | 225 Feet | 235 Feet ³⁰ | 250 Feet |
|---|------------------------|--------------------------|--------------------------------|-----------------------|
| Maximum Air Quality Impacts ($\mu\text{g}/\text{m}^3$)³¹ | | | | |
| 1-hour NO ₂ | 28.55 | 25.77 | 21.97 | 16.38 |
| 24-hour PM ₁₀ | 16.10 | 14.45 | 12.25 | 8.93 |
| 24-hour PM _{2.5} | 11.28 | 10.09 | 8.49 | 6.16 |
| Incremental Cost Compared to 220-Foot Stack | | | | |
| | | \$22,440 more | \$67,320 more | \$134,400 more |
| Expected Change in Visual Impacts Compared to a 220-Foot Stack | | | | |
| | | Not noticeably different | Slightly visible ³² | Somewhat more visible |

Sources: Exhs. EFSB-A-34; EFSB-A-46; Tr. 3, at 514-522.

²⁹ NRG originally performed its stack sensitivity analysis for stack heights of 207 feet, 225 feet, and 250 feet (and not 220 feet), but subsequently altered the Proposed Facility configuration (Exhs. EFSB-A-34; EFSB-A-46). In order to compare impacts with the other stack heights in the stack sensitivity analysis, NRG interpolated the air quality impacts for a 220-foot stack from impacts at 207 feet and 225 feet (Exhs. EFSB-A-34; EFSB-A-46).

³⁰ NRG did not specifically determine air quality impacts or cost of a 235-foot stack height. However, the Company stated that a linear interpolation between 225 feet and 250 feet would provide a reasonable estimate of air quality impacts and cost at a stack height of 235 feet (Tr. 3, at 517). The tabulated maximum air quality impacts for a 235-foot stack height, as well as the associated incremental cost, are interpolated by Siting Board staff.

³¹ NRG noted that the values shown in this table are the actual predicted maximum impact levels, and as such differ from the values used for regulatory comparison shown in Table 3 above, and also differ from the PSD Increment evaluation (Exh. EFSB-A-46).

³² The Company stated that as with the proposed 220-foot stack, the view of a 235-foot stack from the Sagamore Bridge would mostly be screened by the wires at the top of the boiler building (Tr. 3, at 533-535; RR-EFSB-25(7)). NRG stated that because there is already a much larger complex with a 500-foot stack, either a 235-foot or a 250-foot stack would not change the view from the Sagamore Bridge (Tr. 3, at 533-535, 541-542; RR-EFSB-25). See Section IV.E.

NRG maintained that air dispersion modeled from the Proposed Facility and the Existing Facility, along with ambient background levels, showed that the total combined concentration is dominated by the Existing Facility and/or ambient background for all pollutants and averaging periods, with the exception of 24-hour PM₁₀ (Exhs. NRG-1, at 4-23; EFSB-A-9). The Company stated that for 24-hour PM₁₀, the total combined concentration is mostly influenced by the Proposed Facility during start-up conditions (Exh. EFSB-A-9).

The Company's stack sensitivity analysis showed that raising the stack from 220 feet to 250 feet would reduce the concentration of Proposed Facility emissions as a percentage of the NAAQS by 14.6 percent for 24-hour PM_{2.5}, 4.8 percent for 24-hour PM₁₀, and 6.5 percent for 1-hour NO₂ (Exhs. EFSB-A-34; EFSB-A-35).³³ The Company asserted that dispersion modeling results with a 220-foot stack demonstrate that the predicted total combined criteria pollutant concentrations (modeled plus background) are below the NAAQS for all pollutants (Exh. EFSB-G-1(S2) at 6-13).³⁴

NRG stated that the proposed Project's PM_{2.5} PSD Increment consumption of 8.75 µg/m³ would be 97 percent of the maximum allowable PSD Increment of 9 µg/m³ (Exh. NRG-1, at 4-26). According to the Company, the PM_{2.5} PSD Increment consumption at a stack height of 250 feet would be reduced to an estimated level of 3.6 µg/m³ – 40 percent of the allowable PSD Increment (Exh. EFSB-A-35; Tr. 3, at 516).³⁵ The Company however asserted that PSD Increment is not a health-based standard like the NAAQS, and as long as impacts are below the PSD Increment threshold, the Project would be in compliance with MassDEP and USEPA requirements (Tr. 3, at 514-524). The Company noted that the projected total combined PM_{2.5}

³³ Siting Board staff interpolated that raising the stack from 220-foot to 235-foot would reduce maximum Proposed Facility impacts as a percentage of the NAAQS by 7.3 percent for 24-hour PM_{2.5}, by 2.2 percent for 24-hour PM₁₀, and by 3.25 percent for 1-hour NO₂.

³⁴ The Company's air modeling showed that combined concentrations of criteria pollutants as a percentage of the NAAQS range from 7 percent (for 1-hour CO) to 77 percent (for 1-hour SO₂) (Exh. NRG-1, at 4-23).

³⁵ Siting Board staff interpolation showed at a stack height of 235-foot, Project PM_{2.5} PSD Increment levels would be reduced to 6.2 µg/m³, or to approximately 69 percent of the allowable PSD Increment.

impacts with a 220-foot stack would be about 42 percent of the NAAQS (Exhs. NRG-1, at 4-23; EFSB-A-21).

The Company opposes increasing the stack height, citing its desire to incorporate Sandwich's preference for a 220-foot stack and the incremental visual impacts and cost associated with raising the stack height to either 235 feet or 250 feet (Company Brief at 56-57, 85-86). The Company argues that the Project with a 220-foot stack meets applicable ambient air quality standards (*id.*). Referencing Footprint Power, the Company noted "the Siting Board found that where increasing the stack height by 20 feet above the proposed 230-foot stack height would cost between \$200,000 and \$300,000 and have only a small effect on air quality through increased dispersion of pollutants, the proposed 230-foot stack height would minimize air quality impacts consistent with cost, and would also minimize visual impacts of the proposed Project" (*id.* at 57, *citing Footprint Power* at 29). The Company asserted that, similar to the Footprint Power plant case, the proposed 220-foot stack height achieves an appropriate balance among conflicting environmental concerns and between environmental impact and costs (Company Brief at 57).

NRG stated that it has not identified any specific potential off-site PM_{2.5} reduction projects in Sandwich or in the surrounding area (Exh. EFSB-A-21). However, the Company stated that its Canal Community Solar Project represents a significant environmental impact mitigation measure that would help displace existing fossil fuel use and help improve local and regional air quality (*id.*). Furthermore, the Company stated that it expects that a portion of the Project's contribution to the Regional Greenhouse Gas Initiative ("RGGI") funds would be used for energy conservation measures such as reducing heating fuel consumption that would provide benefits to local PM_{2.5} air quality concentrations (*id.*).

vi. Construction Air Impacts

Air quality impacts associated with Project construction activities include air emissions resulting from the demolition of existing structures, open soil and excavation activities, transport of materials, operation of construction vehicles and other powered equipment, and the use of volatile chemicals for construction (Exhs. NRG-1, at 4-34; NRG-3, at 15-1). NRG would require the Proposed Facility construction contractors to follow MassDEP's Clean Air Construction Initiative with the following main requirements: (1) contractors shall use ULSD in

diesel-powered non-road vehicles; (2) all non-road engines used on the construction site shall meet the applicable USEPA non-road engine standard; (3) contractors shall turn off diesel combustion engines on construction equipment not in active use and on dump trucks that are idling for five minutes or more; (4) all contractors shall establish a staging zone for trucks in a location where diesel emissions from the trucks will not be noticeable to the public; and (5) all diesel-powered non-road construction equipment with engine ratings of 50 horsepower and above to be used for 30 days or more over the course of Project construction shall have USEPA-verified (or equivalent) emission control devices, such as oxidation catalysts or other comparable technologies (to the extent that they are commercially available) installed on the exhaust system side of the diesel combustion engine (Exh. NRG-1, at 4-34). The Company stated that its selected construction contractor would maintain water supplies and equipment sufficient to control dust, and would minimize generation of dust during Project construction (id. at 4-45).

b. MassDEP Draft Air Permits

On January 5, 2017, MassDEP issued a Proposed Air Plan Approval that includes an NNSR approval, and a separate Draft PSD Permit (together, “Draft Air Permits”) (Exhs. EFSB-18; EFSB-20). The Proposed Air Plan Approval sets out conditions for emission control systems, emission limits, monitoring and testing, record keeping, reporting, and other requirements for all air contaminants emitted by the Proposed Facility (Exh. EFSB-20). The Draft PSD Permit, issued by MassDEP pursuant to its Agreement for Delegation with the USEPA (dated April 2011), parallels the requirements in the Proposed Air Plan Approval, and specifically addresses federal Clean Air Act requirements and related regulations for the design, construction and operation of the Proposed Facility (id. at 2; Exh. EFSB-18, at 1). MassDEP determined in the Draft Air Permits that air emissions from the Proposed Facility will not cause a violation of federal and state air quality standards, MassDEP Air Toxics guidelines, nor PSD Increments, and that such emissions meet BACT and LAER technology standards and federal standards for Hazardous Air Pollutants (Exh. EFSB-20, at 2-4).

The Proposed Air Plan Approval limits the Proposed Facility’s use of ULSD to situations when: (1) ISO-NE declares an Emergency, as defined in ISO-NE’s Operating Procedures No. 21, No. 4, and No. 7, or declares a Scarcity Condition; (2) the transmission line operator

issues a critical notice that disallows increases in gas nominations; (3) gas supplies cannot be procured or delivered at any price or are not available for purchase or delivery within the timeframe required to support operation of the Project (however, in this situation, the Company is required to use all commercially reasonable efforts to switch to natural gas operation as soon as possible without jeopardizing the safety of equipment or operating personnel); (4) the supply or delivery of natural gas is curtailed by the pipeline operator (however, the Company shall use all commercially reasonable efforts to switch back to natural gas operation as soon as it is again available without jeopardizing the safety of equipment or operating personnel); (5) any on-site or off-site equipment required to allow the turbine to operate on natural gas has failed including a physical blockage of the supply pipeline; (6) during commissioning, when the combustion turbine is required to operate on ULSD pursuant to the turbine manufacturer's written instructions; (7) for emission testing purposes as specified in the Project's Air Plan Approval, PSD Permit, or as required by MassDEP or other regulatory agencies with relevant authority; (8) routine maintenance requires ULSD operation; or (9) ULSD inventory is older than six months and requires turnover (to stay within fuel specifications) (Exh. EFSB-20, at 73-74).³⁶

MassDEP has initiated a process to execute an MOU with the NYSDEC that would allow the Company to use its New York ERCs for the purpose of complying with MassDEP's NO_x offsets requirements (Exh. EFSB-20, at 11). The Proposed Air Plan Approval states that should the MOU between MassDEP and NYSDEC not be finalized by the commencement of commercial operation, then NRG shall use "discrete" ERCs (*i.e.*, ERCs in the MassDEP Mass ERC Bank) (*id.* at 12). Each year, NRG must surrender 131.4 tons of NO_x ERCs from the Mass ERC bank, corresponding to the total annual potential NO_x emissions (*id.*). MassDEP also requires the Company to hold a minimum five-year supply (657 tons) of ERCs in the Mass ERC Bank at all times (*id.*).

The Proposed Air Plan Approval includes annual declining CO₂e caps on all sources of GHGs included in the Project (*id.* at 77-78). The Proposed Air Plan Approval requires NRG to

³⁶ A new waiting period for when ULSD can be used pursuant to this condition will commence once ULSD firing is stopped (Exh. EFSB-20, at 73-74). In addition, the use of ULSD burned pursuant to this condition will be limited to 4,000,000 gallons per rolling four-year period (rolling calendar years) which corresponds to 160 hours of 100 percent load operation over four years at the 0 degrees Fahrenheit firing rate on ULSD (*id.*).

comply with the declining annual CO₂e caps by either controlling the Project's operations to limit actual CO₂e emissions below the applicable year's CO₂e cap, or using over-compliance credits created when the Project's actual annual project-wide emissions of CO₂e are less than the Project's applicable yearly CO₂e cap (id.). MassDEP's annual declining CO₂e cap is further discussed in Section IV.B.2, below.

c. Analysis and Findings

The record shows that current background ambient conditions in the vicinity of the Facility Site are below the NAAQS. Based on predicted maximum Project emission levels, the Proposed Facility would be subject to a PSD review for NO_x, PM/PM₁₀/PM_{2.5}, sulfuric acid mist, and CO₂e, and to the NNSR for NO_x.

The Siting Board notes that, under USEPA rules, as a project subject to a PSD review, the Company's proposal must demonstrate that emissions would be controlled with BACT for all pollutants, and must include a modeling demonstration of compliance with the NAAQS and PSD Increments. NRG's dispersion modeling for the Proposed Facility evaluated worst-case operating parameters (including load and temperature) to predict the maximum ground-level concentration for each pollutant and averaging period, and was based on higher than proposed annual ULSD usage. Although Project impacts would exceed SILs established for 24-hour PM_{2.5}, 24-hour PM₁₀, and 1-hour NO₂, which required the Company to conduct cumulative impact analysis, no nearby emission sources other than the Existing Facility were identified for inclusion in the cumulative modeling. The air dispersion modeling shows that the total combined concentrations (i.e., from the Proposed Facility, Existing Facility, and ambient background combined) of criteria pollutants would be below the NAAQS and MAAQS. This is consistent with MassDEP's preliminary findings in the Proposed Air Plan Approval. MassDEP in its Comprehensive Plan Approval will render a final determination on whether the proposed Project meets BACT requirements and is in compliance with the NAAQS. MassDEP will also issue a final PSD Permit.

The record shows that compliance with the NNSR requires the Company both to apply LAER controls and to procure NO_x emission offsets. In its Proposed Air Plan Approval, MassDEP found that the Project's proposed emission limits represent LAER; MassDEP will render a final determination in its Comprehensive Air Plan Approval. The Company will be

required to obtain 131.4 tpy of NO_x offsets for the proposed Project, and currently has 4,209 tpy of New York NO_x ERCs. Execution of an MOU between the MassDEP and NYSDEC would allow the Company to use its New York ERCs to satisfy MassDEP NO_x offsets requirements. If MassDEP does not finalize an MOU with NYSDEC before commercial operation of the Proposed Facility, the Proposed Air Plan Approval requires NRG to hold a minimum of five years of “discrete” ERCs (i.e., 657 tons) in the Mass ERC Bank upon commencement of commercial operation and each subsequent year.

The Siting Board notes that NRG conducted a preliminary stack height sensitivity analysis of pollutant dispersion for the Project for stack heights of 207 feet, 225 feet and 250 feet, and subsequently selected a 220-foot stack height, considering air impacts, visual impacts, and cost. Results of the air dispersion modeling show that worst-case maximum combined concentrations of criteria pollutants in the receptor grid are dominated by ambient background and/or the Existing Facility, and that impacts of the Proposed Facility exceed impacts of the Existing Facility for only 24-hour PM₁₀.

While the Proposed Facility with a 220-foot stack complies with the NAAQS for all pollutants across the regulatory averaging periods, with respect to both primary and secondary generation of particulates from the Proposed Facility, the record shows that, with the proposed 220-foot stack, the total Project 24-hour PM_{2.5} PSD Increment consumption would be 8.75 µg/m³, or 97 percent of the allowable limit of 9 µg/m³, exceedance of which represents a “significant deterioration” of air quality. Raising the stack height from 220 feet to 235 feet would reduce the Project’s total 24-hour PM_{2.5} PSD Increment consumption to 6.2 µg/m³, providing a 28 percent reduction in the Project’s 24-hour PM_{2.5} PSD Increment consumption relative to the allowable PSD Increment limit. Raising the stack height from 220 feet to 250 feet would provide a 57 percent reduction in the Project’s 24-hour PM_{2.5} PSD Increment consumption relative to the allowable 9 µg/m³ limit. The Siting Board notes that the Proposed Project as designed at 220 feet consumes almost all of the allowable PSD Increment, so that raising the height of Proposed Facility’s stack would reduce Project’s PSD Increment consumption, which would allow for future development within the vicinity and related airshed of the Facility Site. See Clean Air Act, §165, 42 U.S.C. §7475(a) (2013).

While the Company did not model cumulative impact of a 235-foot stack, the record shows that in the context of the NAAQS, the Project has limited contribution to cumulative

PM_{2.5} impacts, and therefore, raising the Proposed Facility stack height to either 235 feet or 250 feet would only moderately reduce cumulative concentration of 24-hour PM_{2.5} impacts. Whether at 235-feet or 250-feet tall, the proposed stack would be adjacent to a large power plant block and the Existing Facility's 500-foot stack, lessening the visual impact of the Project for either stack height variation. The Siting Board notes that Sandwich prefers to keep the Proposed Facility's stack no higher than 220 feet. Compared to the proposed 220-foot tall stack, 235-foot and 250-foot stacks are estimated to cost an additional \$67,320 and \$134,400, respectively.

The record shows that raising the stack height from 220 feet to 235 feet would provide a moderate mitigation of cumulative air quality impact (in the context of the NAAQS) and would substantially reduce Project's 24-hour PM_{2.5} PSD Increment consumption, with only a slight increase in visual impacts and a relatively low incremental cost.³⁷ The record also shows that raising the stack height further from 235 feet to 250 feet would result in additional reductions in Project 24-hour PM_{2.5} impacts, albeit with somewhat greater visual impact and cost. Considering Sandwich's concerns about visual impacts from higher stacks, the Siting Board finds that a 235-foot tall stack would provide an appropriate balance among conflicting environmental concerns and between environmental impact and cost. Although increasing the stack height goes beyond MassDEP requirements (as reflected in MassDEP's Proposed Air Plan Approval), the Siting Board finds this outcome to be an appropriate exercise of its statutory responsibility to minimize environmental impacts consistent with the minimization of costs associated with the mitigation, control, and reduction of the environmental impacts of the proposed generating facility. Accordingly, the Siting Board directs the Company to increase the proposed stack height to 235 feet.

Since 2010, the Siting Board has required that all jurisdictional projects comply with a diesel retrofit condition in order to limit particulate emissions associated with construction equipment. The Company has committed to using ULSD in its construction equipment and to limiting vehicle idling to no more than five minutes. The Company has also committed to

³⁷ While in Footprint Power, the Siting Board did not require a change in stack height from the stack height proposed by Footprint Power, the Siting Board directed Footprint Power to contribute at least \$300,000, an amount related to additional costs that would have resulted from the Siting Board requiring a 20-foot increase in stack height, to an off-site emission reduction program targeted to minimize GHGs, PM_{2.5} and other pollutants. Footprint Power at 32 and 32 n.34. See also Exelon West Medway at 43.

ensuring that all diesel powered non-road construction equipment with engine horsepower rating of 50 and above, and that are to be used for 30 or more days over the course of Project construction, have USEPA verified (or equivalent) emission control devices, such as oxidation catalyst or other comparable technologies (to the extent that they are commercially available) installed on the exhaust system side of the diesel combustion engine.

The Siting Board finds that with the proposed mitigation, including the use of oxidation catalyst for VOCs and carbon monoxide control, and water injection and SCR for NO_x control, procurement of NO_x offsets, and the proposed operational restrictions, the Proposed Facility is expected to meet BACT, LAER, NNSR, and NSPS requirements. In addition, air dispersion modeling shows that the Proposed Facility is expected to meet the NAAQS. The Siting Board finds that, with a 235-foot stack, minimization of air quality impacts would be balanced appropriately with minimization of visual impacts and costs. Additionally, as set forth in Condition B, below, the Company shall submit to the Siting Board a copy of the final Air Plan Approval and final PSD Permit for the Proposed Facility when issued by MassDEP. As noted above, construction vehicle emissions would also be minimized. The Siting Board finds, with the implementation of the above mitigation measures, air emissions impacts for all criteria pollutants would be minimized. GHG emissions impacts are addressed below.

2. Greenhouse Gas Emissions

a. Legislative, Judicial, and Regulatory Context

The Siting Board has a statutory obligation to ensure that the Proposed Facility will minimize the environmental impacts consistent with the minimization of costs associated with the mitigation, control and reduction of the environmental impacts of the proposed generating facility under Section 69J¼. In addition the Siting Board must ensure that, in approving any facility proposed under G.L. c. 164, § 69J¼, “the plans for the construction of the proposed generating facility are consistent with current health and environmental protection policies of the commonwealth and with such energy policies as are adopted by the commonwealth for the specific purpose of guiding the decision of the board.” Since enactment of the Global Warming Solutions Act, St. 2008, c. 298 (“GWSA”), the Siting Board has recognized the GWSA as a “policy of the Commonwealth” and made findings regarding the consistency of the proposed facilities with the GWSA. See Footprint Power, at 103; Exelon West Medway, at 132-133; and

Colonial Gas Company d/b/a National Grid, EFSB 16-01 (2016) (a/k/a Colonial Mid-Cape Pipeline).

The GWSA is a comprehensive statutory framework to address climate change in Massachusetts.³⁸ The GWSA mandates that the Commonwealth reduce its statewide GHG³⁹ emissions by 10 to 25 percent below 1990 levels by 2020, and by at least 80 percent below 1990 levels by 2050. G. L. c. 21N, §§ 3(b), 4(a). The GWSA authorizes the establishment of legally binding limits on GHG emissions in the Commonwealth, and designates the Secretary of Energy and Environmental Affairs (“Secretary”) and MassDEP as the entities primarily responsible for implementing the GWSA. G. L. c. 21N, §§ 2-5.

The GWSA provides regulatory authority to MassDEP and the Secretary to establish regulations to achieve the requirements of the GWSA. The GWSA addresses emissions including those from the electric sector. In particular, G. L. c. 21N, § 3(c) states that “emission levels and limits⁴⁰ associated with the electric sector shall be established by the executive office [of Energy and Environmental Affairs] and the department [MassDEP], in consultation with the department of energy resources, based on consumption and purchases of electricity from the regional electric grid, taking into account the regional greenhouse gas initiative and the renewable portfolio standard.” General Laws c. 21N, § 3(d) requires MassDEP to “promulgate regulations establishing a desired level of declining annual aggregate emission limits for sources or categories of sources that emit greenhouse gas emissions.” Section 16 of the GWSA states that the Section 3(d) regulations promulgated by MassDEP “shall take effect on January 1, 2013, and shall expire on January 1, 2020.” St. 2008, c. 298, § 16.

³⁸ Section 6 of the GWSA is codified at G.L. c. 21N, as the “Climate Protection and Green Economy Act.”

³⁹ The GWSA defines GHGs as: “any chemical or physical substance that is emitted into the air and that [MassDEP] may reasonably anticipate will cause or contribute to climate change including, but not limited to, carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride.” G.L. c. 21N, § 1.

⁴⁰ G.L. c. 21N, § 1 defines a “GHG Emissions Limit” as an “authorization, during a specified year, to emit up to a level of greenhouse gases specified by the secretary, expressed in tons of carbon dioxide equivalents.”

In addition, several other sections of the GWSA contain provisions relating specifically to the electric sector. For example, G.L. c. 21N, § 1 defines “statewide greenhouse gas emissions” as follows:

The total annual emissions of greenhouse gases in the commonwealth, including all emissions of greenhouse gases from the generation of electricity delivered to and consumed in the commonwealth, accounting for transmission and distribution line losses, whether the electricity is generated in the commonwealth or imported; provided, however, that statewide greenhouse gas emissions shall be expressed in tons of carbon dioxide equivalents.

With regard to emissions reporting for the electric sector, G.L. c. 21N, § 2(a) requires that:

[MassDEP] shall monitor and regulate emissions of greenhouse gases with the goal of reducing those emissions. [MassDEP] shall adopt regulations to require the reporting and verification of statewide greenhouse gas emissions and to monitor and enforce compliance with this chapter. The regulations shall ... require reporting of greenhouse gas emissions from generation sources producing all electricity consumed, including transmission and distribution line losses from electricity generated within the commonwealth or imported from outside the commonwealth; provided, however, that this requirement shall apply to all retail sellers of electricity, including electric utilities, municipal electric departments and municipal light boards as defined in section 1 of chapter 164A.

G.L. c. 21N, § 2(c)(3)(a) establishes a requirement for MassDEP to “triennially publish a state greenhouse gas emissions inventory that includes comprehensive estimates of the quantity of greenhouse gas emissions in the commonwealth for the last 3 years in which data is available.” G.L. c. 21N, § 3(a) requires MassDEP to “determine the statewide greenhouse gas emission level in calendar year 1990 and reasonably project what the emission level will be in calendar year 2020 if no measures are imposed to lower emission other than those formally adopted and implemented as of January 1, 2009.” MassDEP issued the most recent inventory, titled “Statewide Greenhouse Gas Emissions Level: 1990 Baseline and 2020 Business As Usual Projection,” in July 2016 (Exh. EFSB-5) and an update in March 2017 (Exh. EFSB-16).

G.L. c. 21N, § 4(b) provides that in making the required determination of the 2020 GHG limit, the Secretary:

shall analyze the feasibility of measures to comply with the emissions limit established in subsection (a). Such measures shall include, but not be limited to, the electric generating

facility aggregate limit established pursuant to section 12,⁴¹ direct emissions reduction measures from other sectors of the economy, alternative compliance mechanisms, market-based compliance mechanisms and potential monetary and nonmonetary incentives for sources and categories of sources that the secretary finds are necessary or desirable to facilitate the achievement of reductions of greenhouse gas emissions limits.

G.L. c. 21N, §§ 1 and 5 address the possibility that a reduction of GHG emissions in the Commonwealth could result in offsetting, higher GHG emissions outside the Commonwealth, and defines this as “leakage.” G.L. c. 21N, § 5 requires the Secretary to report every five years on (among other things) “whether state actions minimize leakage.”⁴²

With regard to electric service reliability, G.L. c. 21N, § 9 specifies that:

Nothing in this chapter shall affect the authority of the public utility commission or the obligation of an electrical utility to provide customers with safe and reliable electric service. Nothing in this chapter shall preclude, prohibit or restrict the construction of a new facility or the expansion of an existing facility subject to regulation under this chapter, if all applicable requirements are met and the facility is in compliance with regulations adopted pursuant to this chapter.

Section 7 of the GWSA includes modifications of Massachusetts Environmental Policy Act (“MEPA”) requirements in G.L. c. 30, § 61 relating to climate change and predicted sea-level rise. This provision states that:

In considering and issuing permits, licenses and other administrative approvals and decisions, the respective agency, department, board, commission or authority shall also consider reasonably foreseeable climate change impacts, including additional greenhouse gas emissions, and effects, such as predicted sea level rise.”^{43,44}

⁴¹ The reference to “section 12” appears to be erroneous as there is no “section 12” of G.L. c. 21N. The GWSA contains no other use of the phrase “electric generating facility aggregate limit.” While the GWSA itself contains a Section 12, that section does not establish or even mention any emission limit. Rather, Section 12 of the GWSA relates to the implementation schedule for GHG reporting requirements. Therefore, the legislature’s intended meaning of the phrase “electric generating facility aggregate limit” in this provision is unclear.

⁴² The concept of leakage is especially relevant to the electric sector, which is the only GHG-emitting sector identified in the GWSA as taking place in a regional market context.

⁴³ G.L. c. 164, § 69I states that “neither said [D]epartment [of Public Utilities], the [Siting B]oard, nor any other person, *in taking any action pursuant to sections 69I to 69J*¼,

Pursuant to G.L. c. 21N, § 3, the Secretary issued the Massachusetts Clean Energy and Climate Plan for 2020 in 2010 (the “2020 CECP”) and an update on December 31, 2015 (the “2020 CECP Update”) (Exh. NRG-CLF-1-15(1) at 2). In the 2020 CECP, the Secretary set the 2020 statewide GHG emissions limit at 25 percent below 1990 levels and established strategies and policies to achieve the 2020 limit (*id.*). In the 2020 CECP Update, the Secretary added new strategies and revised or eliminated others to ensure the 2020 limit would be met (*id.* at 4).

On May 17, 2016, the SJC issued a decision finding that MassDEP had not yet issued GHG-reduction regulations, as required by GWSA Section 3(d), and it directed MassDEP to do so. See Kain v. Department of Environmental Protection, 474 Mass. 278 (2016) (“Kain”). On September 16, 2016, Governor Charles D. Baker issued Executive Order 569, titled “Establishing an Integrated Climate Change Strategy for the Commonwealth” (Exh. EFSB-17). Executive Order 569 includes a directive that MassDEP issue regulations pursuant to Section 3(d) no later than August 11, 2017, “to ensure that the Commonwealth meets the 2020 statewide emissions limit mandated by the GWSA” (*id.*, at 3).^{45,46} On December 16, 2016, MassDEP

inclusive, shall be subject to any of the provisions of sections 61 to 62H, inclusive, of chapter 30” (emphasis added). Thus, if this were a proceeding under G.L. c. 164, § 69J¼, only, the Siting Board would not be required to make MEPA findings, including the Section 61 finding regarding climate change impacts. However, the Company’s Section 69J¼ petition to construct has been consolidated with its G.L. c. 40A, § 3 zoning exemption petition into a single docket. Accordingly, the Siting Board must comply with MEPA review requirements in this proceeding and make all required MEPA Section 61 findings. See Section VIII, below.

⁴⁴ In 2010, MEPA also issued its Greenhouse Gas Emission Policy and Protocol (“GHG Policy”). The GHG Policy requires certain state agencies to include Section 61 findings, including a finding regarding reasonably foreseeable climate change impacts, in their permits for certain large projects. The Siting Board generally is not subject to the requirements of MEPA, but, in this case, must comply with MEPA. See Section 61 Findings, *infra*.

⁴⁵ Section 2(c) of the Executive Order 569 lists various source categories that MassDEP is to consider in establishing c. 21 N, § 3(d) limits, including (but not limited to): (1) leaks from natural gas distribution systems; (2) the transportation system, including the commonwealth’s vehicle fleet; and (3) gas-insulated switchgear. Executive Order 569 does not specifically mention the electric sector.

issued a set of six proposed regulations for limiting or reducing GHG emissions for several categories of sources in the Commonwealth, including generating facilities (Exhs. EFSB-8; EFSB-9; EFSB-10; EFSB-11; EFSB-12; EFSB-13). See Section IV.B.2.e, below.

In its 2016 statewide GHG emissions inventory (“2016 GHG Inventory”), MassDEP noted that “it is appropriate to consider GHG emissions associated with electricity consumption in regional and more state-specific contexts, since, due to the linked, regional nature of the New England electric grid, electricity generation in a state is not necessarily consumed in that state, even if that state is a net importer of electricity” [as is Massachusetts] (Exh. EFSB-5, at 13). The 2016 GHG Inventory presents two distinct methods for calculating the emissions associated with electricity consumed in Massachusetts: (1) a Massachusetts method; and (2) a regional method (id., at 13-14).

The MassDEP’s Massachusetts method assumes that all electricity generated in Massachusetts is used in Massachusetts (with the exception of in-state generation for which a renewable energy certificate is used in another state) (id., at 13). Massachusetts electric sector emissions in this approach are based on emissions from Massachusetts power plants, plus a portion of emissions from power plants in other New England states and adjacent control areas (e.g., New York, New Brunswick, and Quebec) that generate more electricity than consumed in those states/control areas in a given year (id., at 13). Emissions related to such imported electricity are assigned to Massachusetts using its assumed share of such excess generation and the associated average emissions for the generation portfolio of that state/control area (id., at 13).

Under the regional method, MassDEP considers electric sector emissions in a broader regional context, due to the linked nature of the New England electric grid, in which demand for electricity in one state influences electricity generation in other states (Exh. EFSB-5, at 14). Under the regional method, MassDEP determines the fraction of New England-wide electricity generation (plus net imports from outside New England) that is consumed in Massachusetts (approximately 45 percent in 2014) (id.; EFSB-16). MassDEP then assumes that Massachusetts

⁴⁶ On August 8, 2016, Governor Baker signed into law H. 4568, titled “An Act to Promote Energy Diversity.” The new law requires, among other things, electric distribution companies in Massachusetts to solicit and enter into long-term contracts for the procurement of offshore wind power and other clean energy generation resources. See St. 2016, c. 188.

is responsible for an equivalent share of the total generation-related regional GHG emissions (id.; EFSB-16).

b. Company Proposal

i. Compliance with GHG Regulations

The Company stated that the Proposed Facility is subject to and would comply with a variety of regulatory requirements pertaining to GHG emissions including: (1) the PSD Program and its requirement for use of BACT (40 CFR 52.21); (2) NSPS for electric generating units (40 CFR 60, Subpart TTTT); (3) Massachusetts Air Plan Approval Regulations (310 C.M.R. § 7.02); (4) the Massachusetts CO₂ Budget Trading Program (310 C.M.R. § 7.70), which implements RGGI; and (5) the MassDEP GHG reporting and verification program under 310 C.M.R. § 7.71 (Exh. NRG-3, app. E, at 3-1 – 3-11).

In its Air Plan Application BACT analysis for GHGs, the Company evaluated the following potential control options: (1) carbon capture and sequestration (“CCS”); (2) use of clean fuels; (3) good combustion control; and (4) efficient operation (Exh. NRG-3, app. E, at 5-14 to 5-18). With regard to fuel selection, NRG proposed to burn natural gas primarily, with ULSD as a back-up fuel. Although exclusive use of natural gas (pipeline and liquefied natural gas (“LNG”)) would rank higher as BACT than using natural gas and ULSD, the Company indicated that interstate natural gas pipelines serving the area are constrained and do not have sufficient capacity to reliably support quick start capability for the Project, and that using LNG as a backup fuel would not be feasible at the site (id.).

NRG evaluated CCS for the Project and determined that, while technically feasible, CCS is not currently used commercially with combustion turbine applications (id.). In addition, the Project is located a considerable distance from suitable geological formations where the carbon could be stored. The variety of constraints on CCS use for the Project led NRG to conclude that it was not suitable as a BACT measure for GHGs (id.).

Since 2009, CO₂ emissions from power plants have been regulated in Massachusetts under RGGI. RGGI is currently a cooperative effort of nine Northeast and Mid-Atlantic states to implement a regional cap-and-trade program to control CO₂ emissions from power plants. MassDEP implements RGGI under the provisions of 310 C.M.R. § 7.70. RGGI-applicable units, as defined by MassDEP and the other RGGI states, include fossil-fuel-fired boilers or turbines

servicing a generator with a capacity 25 MW or greater (310 C.M.R. § 7.70). The Company estimated that it would spend \$1.8 million per year at current allowance prices to procure adequate RGGI allowances to ensure compliance (Exhs. NRG-3, at 6-3, 16-3; EFSB-A-21). The Company would also monitor and report CO₂ emissions using methods specified in 40 C.F.R. § 75 (Exh. EFSB-20, at 63).

ii. Expected GHG Emissions and GHG Emissions Displacement Modeling

In the Company's Air Plan Application BACT Analysis and PSD Application, the Company determined that the Project's GE 7HA.02 combustion turbine would have steady-state, full-load CO₂e emission rates of 1,178 lb/MWh burning natural gas, and 1,673 lb/MWh burning ULSD (Exh. NRG-3, app. E, at 5-17).^{47,48} The Company provided the Project's potential annual emissions using "worst-case" assumptions for any rolling twelve-month period, based on a maximum capacity factor of 50 percent of 3,660 hours of full-load operation on natural gas, and 720 hours on ULSD (Exh. NRG-7(R), app. A, Table A-5). Using these assumptions, the turbine would emit 932,325 tpy, the emergency generator engine 123 tpy, and the emergency fire pump engine 29 tpy, for a Project total of 934,041 tpy CO₂e, which also includes 1,561 tpy from methane leaks and 3 tpy from potential SF₆ leaks (*id.*, at 2-8, Table 2-4).

⁴⁷ These Project emission rates were calculated by NRG using default CO₂e emission factors included in 40 CFR 75 of 119 pounds per million British thermal units ("lb/MMBtu") for natural gas and 162.85 lb/MMBtu for ULSD, respectively, reflecting the carbon content of the fuels (Exh. NRG-7(R), app. A, Table A-5). The default rates apply at 59 degrees Fahrenheit, at a pressure of one atmosphere, and 60 percent relative humidity (these three conditions are standard for consistently describing gas turbine performance, per the International Standards Organization) and represent emissions on a gross output basis (*i.e.*, not accounting for the Proposed Facility's parasitic energy requirements) (*id.*, at 2-6, Table 2-1). Per BACT requirements, the GHG emission rates must also take into account: (1) a performance margin that accounts for the possibility that the equipment as constructed and installed may not fully achieve the optimal vendor-specified design performance; and (2) a degradation factor to account for normal wear and tear of the combustion turbine over its useful life, and between maintenance overhauls. The resulting adjustment factors are a performance margin of 5.0 percent and an equipment degradation factor of 2.0 percent, for a combined adjustment factor of 7.1 percent (due to compounding of the effects) (*id.*, at 2-6, 4-4 to 4-15).

⁴⁸ These BACT emission rate limits were also reflected in MassDEP's Draft Air Permits (Exhs. EFSB-18, at 5, Table 2, n.5; EFSB-20, at 53, Table 9).

For purposes of its MEPA analysis, the Company determined that the turbine's full-load net heat rate⁴⁹ on natural gas is 9,503 Btu/kWh, and 9,760 Btu/kWh on ULSD, for emission rates of 1,131 lb/MWh on natural gas and 1,589 lb/MWh on ULSD, all under International Standards Organization conditions (Exh. NRG-6, at 4-4, Table 4-2).⁵⁰ Based on an assumed capacity factor of 19.4 percent (comprising 1,500 hours of full-load operation on natural gas and 200 hours of full-load operation on ULSD) the Company estimated CO₂e emissions of 355,505 tpy (*id.*, at 4-2, Table 4-1).

On behalf of the Company, Daymark Energy Advisors ("Daymark") modeled the Proposed Facility's impact on GHG emissions in the New England region from mid-2019 through 2029 – the first ten years of the Proposed Facility's anticipated 40-year design life (Exh. NRG-1, app. A at 47; Tr. 1, at 169). The Company used the AURORAxmp® energy production cost model from EPIS, Inc., to simulate the dispatch of the Proposed Facility under transmission-constrained conditions that reflect the dynamics and economics of New England electricity markets (Exh. NRG-1, app. A, at 46). According to the Company, like the operation of the actual grid by ISO-NE, the model simulates the hourly dispatch of available generating units (including the Proposed Facility) according to their variable costs, from lowest to highest. The Company maintained that variable production costs reflect the heat rate of a generation facility, the unit cost of the fuel(s) it uses; and its variable operation and maintenance costs, including the cost of RGGI allowances (*id.*, at 45).

The Company included in the model key market variables including fuel and emissions prices, loads, demand-side resources, individual generating unit characteristics, anticipated unit additions and retirements (including additional energy for compliance with Renewable Portfolio Standards ("RPS")), and transmission system congestion and losses (Exh. NRG-1, app. A,

⁴⁹ A heat rate is a measure of the efficiency of a generation unit expressed in British Thermal Units ("Btus") of fuel input per kWh ("Btu/kWh"). The lower the heat rate, the more efficient the unit.

⁵⁰ Unlike the BACT GHG emissions assumptions, the MEPA GHG emissions assumptions use a net basis (which accounts for parasitic energy use) and do not include a manufacturer's margin for guarantee purposes or degradation. NRG stated that this approach enables a proper comparison of the Proposed Facility's efficiency and environmental characteristics with other fossil fuel generating technologies (Tr. 3, at 460-461).

Att. DEP-2, at 3). The Company relied on data inputs for the model from various sources, including EPIS, Inc. (proprietary data); the U.S. Department of Energy's Energy Information Administration; ISO-NE; the New York Independent System Operator, and the New York Mercantile Exchange (Exh. NRG-1, app. A, Att. DEP-2, at 2).

In the dispatch model, the Company used a full-load heat rate of 9,097 Btu/kWh⁵¹ with an associated emission rate of 1,082 lb/MWh of CO₂ for the Proposed Facility, operating on natural gas (Exhs. NRG-1, app. A, at 38, Table DEP-8; app. A, att. DEP-2, at 6). The Company explained that, unlike the heat rate assumptions used for MEPA and BACT purposes, the dispatch model heat rate assumption reflects how the Proposed Facility is expected to perform in actual operations without guarantee and degradation margins used for compliance purposes (Tr. 3, at 477). The Company used the manufacturer's specification sheet for the proposed GE 7HA.02 turbine as the basis for the heat rate assumption. The Company indicated that using manufacturer's specification data for the Proposed Facility is consistent with the heat rate assumptions used for other generating units in the dispatch model, which are provided by the dispatch model vendor in a licensed database (Tr. 6, at 883, 898). The Company stated that it reviewed the vendor's database for accuracy, and made adjustments to the heat rates, if warranted (*id.*, at 883).

According to the Company, the model simulates hourly dispatch to meet load requirements, and does so as if each unit bid its energy into the day-ahead market, with perfect knowledge of the hourly production requirements the following day, and therefore, the ability to schedule gas deliveries as needed on the interstate pipelines for gas-burning units, such as the Proposed Facility (Exh. NRG-TEA-1, at 4; Tr. 4, at 632). The fuel price forecast developed by the Company anticipates natural gas prices below the price of ULSD over the entire forecast period throughout New England (Exh. NRG-1, app. A, Att. DEP-2, at 9-14). The Initial Reference Case results indicate that the Proposed Facility would operate at a capacity factor of between approximately 15 and 20 percent from mid-2019 – 2029 (Exh. EFSB-A-44(2), at 2).⁵²

⁵¹ According to the Company, the 9,097 Btu/kWh heat rate is a Lower Heat Value with ten percent added (Exh. NRG-1, app. A, at 38, Figure DEP-8).

⁵² The DEIR submission by the Company indicates that the Proposed Facility is expected to operate at an average capacity factor of 19.4 percent (Ex. NRG-3 at 6-2 (Table 6.2-1)).

In its Initial Reference Case, the Company estimated the GHG emissions impact of the Proposed Facility, by comparing the monthly CO₂ emissions rates for the Proposed Facility, as determined by the dispatch model, against the monthly marginal CO₂ emission rates set forth in the 2013 ISO-NE Electric Generator Air Emissions Report (Exh. NRG-1, app. A, at 46). The Company included only emitting locational marginal emission units given its view that these units that would be displaced by operation of the Proposed Facility (Exh. EFSB-A-43). Based on this analysis, the Company determined that 143,618 tons of CO₂ would be avoided during the 2019 – 2029 study period throughout the region (Exh. NRG-1, app. A, at 46).

In addition to the capacity and energy markets, ISO-NE also administers two non-spinning reserve markets in the region – Ten Minute Non-Spinning Reserve (“TMNSR”) and Thirty Minute Operating Reserve (“TMOR”). The Company states that since the Proposed Facility will have the ability to start up and achieve full load within ten minutes, it can serve both of these ancillary service markets (Exh. NRG-TEA-1, at 3). ISO-NE procures TMNSR and TMOR capacity twice per year through seasonal auctions within the Forward Reserve Market (“FRM”). Should the Company elect to participate in these reserve auctions and clear the market based on price, then the Proposed Facility would be held in reserve during normal dispatch operations. In practice, this is achieved by ISO-NE requiring FRM units to bid into the day-ahead and real-time energy markets at a proxy heat rate designed to limit operation to an annual capacity factor of up to three percent (Tr. 4, at 655).

The Company states that although FRM units are required to bid into the day-ahead energy market, they do not actually start up and operate during the next day unless they receive a specific real-time dispatch instruction from ISO-NE (*i.e.*, unlike other generating resources, an FRM unit’s day-ahead energy dispatch is not binding) (Tr. 4, at 655). The Company modeled FRM operation of the Proposed Facility, using only ULSD (since gas could not be scheduled in advance when operating as an FRM unit) for a single, representative year (Exh. NRG-DEP-1, at 4). The FRM model showed that the Proposed Facility would have a capacity factor of approximately one percent, and avoids CO₂ emissions of 1,500 tons for that single year (Exh. NRG-DEP-1, at 4).

In response to discovery, the Company revised its dispatch modeling approach to incorporate the 2016 Capacity, Energy, Loads, and Transmission (“CELT”) Report in its

“Updated Reference Case” (Exhs. EFSB-A-44).⁵³ The Company also revised its method of determining the emissions impact for the Proposed Facility by running the Updated Reference Case model both with, and without, the Proposed Facility (*id.*). Without the Proposed Facility in the model, other available units are dispatched to serve load requirements. By comparing the emissions results from these two model runs, the Company determined that the Proposed Facility would lead to a net overall cumulative CO₂ emissions reduction of 142,103 tons from mid-2019 through 2029 (*id.*; EFSB-A-44(2)). The new assumptions in the Updated Reference Case reduced the Proposed Facility’s estimated capacity factor to between seven and ten percent (Exhs. EFSB-A-44; EFSB-A-44(2)).

The Company performed an additional modeling scenario to incorporate the effects of the energy legislation signed into law in August 2016⁵⁴ that would require distribution utilities to procure up to 1,600 MW of off-shore wind and up to 1,200 MW of large hydroelectric resources (Exh. EFSB-A-42). The Company called this the “Canadian/Off-Shore Wind Case” and made these modifications to the Updated Reference Case. With the introduction of significant amounts of new non-emitting resources, the capacity factor of the Proposed Facility fell further, to approximately three to five percent (Exh. EFSB A-44(2) at 3)). The amount of cumulative avoided CO₂ emissions in the Canadian/Off-shore Wind case over the mid-2019 – 2029 period also fell to 89,487 tons (*id.*).

The Company determined that approximately 45 percent of the total regional emissions reductions shown in each of its various modeling runs are “statewide emissions reductions” (Tr. 6, at 1008-1009; 1036-1038). The Company based this calculation on the regional method of GHG inventory accounting that MassDEP routinely calculates and publishes in each of its periodic emissions inventories. Under the regional method, MassDEP assumes that Massachusetts’s share of total New England annual energy consumption is also Massachusetts’s share of New England’s total annual GHG emissions relating to electricity consumption (Tr. 6, at 1008-1009, 1036-1038). Accordingly, the Company attributed 45 percent of the

⁵³ In addition to updated load forecasts, the Updated Reference Case included a revised solar capacity forecast, the new units and retirement results of FCA 10; and an updated RGGI price forecast for CO₂.

⁵⁴ St. 2016, c. 188.

regional GHG emissions reductions shown in its various dispatch model runs as statewide emissions reductions (id.).

At the request of CLF, the Company provided a detailed breakdown of the specific generating units that were displaced by operation of the Facility in both the Updated Reference Case and the Canadian/Off-Shore Wind Case, and then grouped the data, by state, to show the locations of generating units displaced by the Proposed Facility's operations (RR-CLF-9(1); RR-CLF-9(2)). This information is summarized in Table 5 below.

**Table 5: Proposed Facility Emissions, and Net Displacement by State
(2019 – 2029) (Cumulative CO₂ tons)**

| | CT | MA | ME | NH | RI | VT | Regional Change |
|--|----------|-----------|----------|---------|---------|---------|-----------------|
| Updated Ref. Case Displacement | -774,871 | -445,624 | -101,441 | -55,525 | -58,473 | -13,266 | -1,449,199 |
| Proposed Facility CO₂ | n/a | 1,307,096 | n/a | n/a | n/a | n/a | 1,307,096 |
| Net CO₂ Change | -774,871 | 861,473 | -101,441 | -55,525 | -58,473 | -13,266 | -142,103 |
| | | | | | | | |
| Canadian /Off-Shore Wind Displacement | -465,027 | -316,423 | -61,040 | -31,886 | -45,599 | -11,465 | -931,440 |
| Proposed Facility CO₂ | n/a | 841,953 | n/a | n/a | n/a | n/a | 841,953 |
| Net CO₂ Change | -465,027 | 525,530 | -61,040 | -31,886 | -45,599 | -11,465 | -89,487 |

Sources: RR-CLF-9(1); RR-CLF-9(2).

iii. GHG Mitigation Measures

The Company proposed a variety of GHG mitigation measures for the Project. The Company noted that the GE 7HA.02 turbine would have lower heat rates than many existing fossil fuel generating units, and therefore, produce lower GHG emissions (Exh. NRG-1, app. A, at 45). The Project would use waste heat from the turbine exhaust gas for pre-heating the natural gas, and for vaporizing ammonia for use in the SCR system (Exh. EFSB-4, at 13). The Project would also make various efficiency improvements to the existing Training Building and incorporate various efficiency measures in the balance-of-plant beyond the turbine (*id.*). NRG would construct, operate and maintain the on-site natural gas pipeline in accordance with all applicable regulatory requirements to reduce methane emissions (*id.*). NRG is also pursuing the development of a 1.5 MW community solar project on the Freezer Road Site, which is expected to displace 734 tons of CO₂ per year (Exhs. NRG-1, app. A, at 3-15; NRG-6, at 2-3).

c. Positions of the Parties

i. CLF

CLF argues that the Siting Board must deny the Petition because: (1) there is no record evidence that the Proposed Facility will at any time be consistent with the GWSA; and (2) it includes no meaningful mitigation of the Proposed Facility's expected annual CO₂ emissions (CLF Reply Brief at 1). CLF states that the Petition cannot be approved pursuant to G.L. c. 164, § 69J¼, which it contends requires that reasonably foreseeable environmental impacts be minimized, to the extent that feasible, cost-effective mitigation is available (*id.*).

CLF contends that, contrary to NRG's dispatch modeling, the Proposed Facility would not always lead to a net reduction in regional GHG emissions, and even if it did, "such evidence cannot – as a matter of law – establish that the Facility will comply with the GWSA" (*id.*, 21). CLF contends that regional or system-wide economic or environmental effects of the Proposed Facility "lie beyond the scope of the Board's inquiry, which is expressly limited to an examination of the environmental impacts of the proposed facility itself" (*id.*, citing Footprint Power at 6 n.9).

CLF finds numerous flaws in the Company's dispatch modeling approach, and questions whether the results can be relied upon (CLF Reply Brief at 10 n.34; Exh. CLF-1, at 39-43). With regard to the Company's Initial Reference Case, CLF faults the model's use of 2015 CELT data

(rather than 2016 CELT data) and the use of ISO-NE system-wide marginal emission data, rather than use of a differential analysis to determine the emissions displacement by running “with” and “without” the Proposed Facility scenarios (CLF Reply Brief at 21 n.68; Exh. CLF-1, at 6-10).

Although the Updated Reference Case and the Canadian/Off-shore Wind Case used 2016 CELT data and a differential emissions analysis, as CLF recommended, CLF noted other flaws that were not addressed by the Company (Exh. CLF-1(S), at 6-7). In particular, CLF contends that NRG presented no scenarios that test how the electric system would operate under a range of market conditions such as changes in imports, the addition of energy storage, more renewables to meet the long-term needs of the GWSA, additional retirements of high-emitting fossil steam units, or a scenario where, instead of the Proposed Facility, other resources are built to ensure a reliable grid (CLF Reply Brief at 21 n.68, citing Exh. CLF-1(S) at 6). CLF maintains that absent the Proposed Facility, the “market would respond by providing alternative resources that are comparable to, or which would out-perform the Facility” and that NRG “presented no results from any such scenario” (CLF Reply Brief at 21 n.68). CLF argues that the Proposed Facility could operate for 40 or more years, and the modeling time period only spans mid-2019 to 2029, which CLF views as a serious flaw (id., at 21, 26). According to CLF, the Company’s ten-year modeling time horizon provides no basis to evaluate consistency of the Proposed Facility’s operation with the requirements of the GWSA in the 2030 – 2050 time period (Exh. CLF-1, at 40).

In evaluating the iterations of modeling performed by the Company, CLF witness Mr. Fagan observed that the “Canadian/Off-shore Wind Case contains the most reasonably accurate representation of what I consider to be the most likely future conditions in New England between 2019 and 2029 for purposes of such analysis” (Exh. CLF-1(S) at 12). Mr. Fagan noted that, “at best,” the resulting estimate of net displaced regional emissions of 89,487 tons for 2019 to 2029 is a “baseline against which a more robust analysis could – and should – have been performed” (id.).

As requested by CLF, the Company prepared two analyses using: (1) the Updated Reference Case; and (2) using the Canadian/Offshore Wind Case results to evaluate emissions reductions attributable to the Proposed Facility, taking into account regional displacement (RR-CLF-9(1); RR-CLF-9(2)). For the Updated Reference Case, CLF asked NRG to compare the cumulative change from 2019 to 2029 in generating facility emissions in Massachusetts,

inclusive of the Proposed Facility (an increase of 861,473 tons) versus the change in emissions throughout New England (including Massachusetts) (a decrease of 142,103 tons) (RR-CLF-9(1)). A similar analysis performed for the Canadian/Offshore Wind Case yielded a cumulative increase in Massachusetts's emissions of 525,530 tons versus a cumulative regional reduction of 89,487 tons (CLF Reply Brief at 24, citing RR-CLF-9(2)). CLF contends that this comparison shows that, even if "100% of the predicted regional emissions reduction attributable to the Proposed Facility were credited to Massachusetts, in every year, it will be dwarfed by the increase in in-state emissions as a direct result of the Proposed Facility's operation, resulting in an increase each year in Massachusetts total annual emissions" (CLF Reply Brief at 24, citing RR-CLF-9(1); RR-CLF-9(2)).

CLF argues that while there are "at least two possible ways in which electric power sector emissions could be calculated for purposes of determining GWSA compliance" the appropriate method is the Massachusetts method and not the regional method (CLF Reply Brief at 25). Based on the Massachusetts method, CLF concludes that "[a]ccording to the actual and only method by which GWSA compliance is determined by the state, the Facility operations in every year through 2029 result in a substantial increase – between 35,704 and 93,371 tons CO₂ – in the state's annual GHG emissions" (CLF Reply Brief at 25, citing RR-CLF-9(1) and 9(2)).

CLF dismisses the Company's use of the MassDEP regional method for deriving statewide emissions reductions from its various dispatch model runs, noting the Company's own acknowledgement that MassDEP relies on the Massachusetts method for purposes of developing the Massachusetts GHG inventory (CLF Reply Brief at 25 n.78, citing RR-CLF-10; id., n.79 citing Tr. at 979-992).⁵⁵ CLF asserts that it is disingenuous for the Company to assert that it has

⁵⁵ In response to a record request from CLF, the Company stated: "Petitioner agrees that for purposes of developing the updated Massachusetts GHG inventory required by and maintained in accordance with the GWSA, and for no other purposes, the current method used by the Commonwealth to calculate emissions due to Massachusetts' consumption of electricity (including emissions associated with electricity generated out-of-state) is solely the method described on page 13 of the Statewide Greenhouse Gas Emissions Level: 1990 Baseline and 2020 Business as Usual Projection Update (July 2016) that 'assumes that all electricity generated in Massachusetts is used in Massachusetts (with the exception of in-state generation for which a renewable energy certificate is used out-of-state, as discussed further below). Thus, electric sector emissions in this approach are based on emissions from Massachusetts power plants plus a portion of emissions from power plants in other New England states that generate more electricity than they

conducted its modeling consistent with the GWSA's definition of statewide GHG emissions given its response to RR-CLF-10, and the finding in Kain that the "central purpose" of the GWSA is "reducing emissions *in the Commonwealth*" (CLF Reply Brief at 25 n.80, citing Kain at 298 n.25, original emphasis).

CLF contends that the Board has an obligation to mandate mitigation of the Proposed Facility's GHG emissions to ensure that "the Facility's environmental impacts are minimized in a manner that is consistent with the minimization of costs associated with the mitigation, control, and reduction of the environmental impacts of the proposed generating facility" (CLF Reply Brief at 13, citing G.L. §§ 69H, 69J¼, Footprint Power at 10; Brockton Power Project Change at 32-34). CLF further asserts that environmental minimization requirements exist both in the Siting Board's own statutes as well as the GWSA's modification of G.L. c. 30, § 61. CLF notes that in considering and issuing permits, licenses and other administrative approvals and decisions, G.L. c. 30, § 61 requires the respective agency, department, board, commission or authority to consider reasonably foreseeable climate change impacts, including additional GHG emissions (CLF Reply Brief at 20 n. 63).

Citing MEPA regulations, CLF notes that mitigation measures are "physical, biological and chemical measures and management techniques designed to limit negative environmental impacts...of a Project" (CLF Reply Brief at 9, citing 301 C.M.R. § 11.07(j)). CLF faults the Company for suggesting that the Project itself would minimize CO₂ emissions given its use of a highly efficient combustion turbine, and by firing natural gas and ULSD. CLF contends that these are basic features of the Project that define its "baseline emissions," and cannot be considered "mitigation" (CLF Reply Brief at 9). Similarly, CLF contends that the purchase of RGGI allowances by the Project to cover its CO₂ emissions is merely required regulatory compliance under 310 C.M.R. § 7.70, and not mitigation (CLF Reply Brief at 10). CLF points to Siting Board precedent that "compliance with other agencies' standards does not establish that a proposed facility's environmental impacts would be minimized" (id., citing Pioneer Valley Energy Center, EFSB 08-1, at 10 (2009) ("PVEC")). CLF proposes two mitigation measures:

use in a given year and in the adjacent control areas (New York, New Brunswick, Quebec) in years that New England received net imports of electricity from those control areas" (RR-CLF-10).

using on-site LNG rather than ULSD as a backup fuel, and imposing an emissions cap on the Facility (CLF Reply Brief at 12-13).

CLF presented testimony regarding the use of on-site LNG rather than ULSD, which CLF contends would decrease the Proposed Facility's lifetime CO₂ emissions by at least 400,000 tons (CLF Reply Brief at 12, citing Exh. CLF-2, at 10). CLF asserts that using LNG at the Proposed Facility is technically feasible, would result in annual savings to NRG of about \$752,000, and would yield a net present value of \$10.5 million over the life of the Proposed Facility, and would have no material impact on the Facility's ability to provide reliable and cost-efficient energy for the Commonwealth (CLF Reply Brief at 12; Exh. CLF-2, at 9). With a 400,000-gallon tank capacity, CLF argues that LNG would meet the "desired Project performance" of the Proposed Facility as it would have enough LNG on hand for twice the daily fuel requirement for the Proposed Facility's start-up (CLF Reply Brief at 12 n.40, citing Exh. CLF-2, at 8). CLF argues that the Siting Board has an obligation to mandate the use of LNG to ensure that the Proposed Facility's environmental impacts are minimized (CLF Reply Brief at 13).

CLF contends that Siting Board statute and precedent cannot support a decision to approve the Proposed Facility with "unmitigated, in-state environmental impacts based on the potential that the operations of that facility might lessen environmental impacts elsewhere: regional, or system-wide effects – both economic and environmental – lie beyond the scope of the Board's inquiry, which is expressly limited to an examination of the environmental impacts of the proposed facility itself" (CLF Reply Brief at 21, citing Footprint Power at 6 n.9). CLF also maintains that, even if the Proposed Facility did reduce regional emissions, that too, "does nothing to mitigate the substantial direct GHG emissions that the Facility itself will without question produce" (CLF Reply Brief at 11).

CLF points to Kain, where the court dismissed the state's argument that RGGI's declining regional emissions cap fulfills the requirements of G.L. c. 21N, § 3(d) by displacing emissions regionally. CLF observes that the Court held that RGGI does not comport with GWSA §3(d) requirements for "achieving measureable and permanent reductions to emissions in the Commonwealth," and CLF postulates that similar reasoning would apply to the Company's displacement argument in this case (CLF Reply Brief at 22, citing Kain, 474 Mass. at 297-298).

CLF presented two declining cap mitigation mechanisms (“DCMM”): (1) based on data from the Company’s Initial Reference Case dispatch model (based on the day-ahead ISO-NE energy market), and (2) a modified DCMM based on how the Proposed Facility would operate in the real-time energy market or the FRM, premised on use of ULSD for no-notice unit startups when pipeline gas is not available for four-hour start-up periods (Exhs. CLF-2, at 11; CLF-2(S) at 2-3). CLF argues that imposing a declining emissions cap on the Proposed Facility would reduce expected CO₂ emissions between 2019 and 2049 over three million tons at nominal expense and, at most, a net present value cost of 1.9 percent, or about \$7.4 million – and with no material impact on the Proposed Facility’s ability to provide reliable and cost-efficient energy for the Commonwealth (CLF Reply Brief at 13 n.43, citing Exh. CLF-2, at 10-11).

CLF’s DCMM (for the Initial Reference Case) would be set initially in 2031 at an emissions level that corresponds to a 20 percent capacity factor, including a maximum of five days of oil-burning operations (Exh. CLF-2, at 11). For the years prior to 2030, the cap would equal the CO₂ emissions for the Proposed Facility estimated by the Company’s in Exh. EFSB-TPS-13, plus an additional five percentage points (id.). The cap would then decline each year starting in 2031 by the lesser of 17,890 tons or five percent of the annual average of actual CO₂ emissions from the facility between 2027 and 2031. The cap would reach zero by 2051 (id.). To “offset” emissions of the Proposed Facility, the CLF declining cap would allow the Petitioner to reduce facility-wide actual CO₂ emissions at the existing Canal Generating Facility below a baseline level (id., at 12). Alternatively, the Proposed Facility could earn a CO₂ Operating Allowance for each ton that the Proposed Facility’s actual annual CO₂ emissions are less than the Proposed Facility’s annual CO₂ cap. In carrying CO₂ Operating Allowances forward, CLF proposes a schedule of derating the value beginning at 90 percent of the CO₂ allowances earned in years 2020-2023 and decreasing to 50 percent by the years 2038-2047 (id., at 12-13). Under CLF’s proposal, no CO₂ Operating Allowances could be created after 2047 (Exh. CLF-2, at 12-13).

The DCMM would also allow the Proposed Facility to procure Class I Massachusetts Renewable Energy Certificates (“RECs”) to offset emissions based on the megawatt hours represented by the REC pegged to the ISO-NE System Annual Average CO₂ Emission Rate (lb/MWh) as reported in the ISO-NE Generator Air Emission Report for the year in which the REC was purchased (Exh. CLF-2, at 13). CLF contends that with such flexibility provisions, the

DCMM would not limit operation of the Proposed Facility or prevent its dispatch by the ISO-NE grid operator as might be needed to ensure system reliability (CLF Reply Brief at 13).

CLF proposes a modified version of declining cap that would be applicable if in any rolling three-calendar year period before 2031 the Proposed Facility burns ULSD for more than 120 hours on average. If this trigger were breached, the modified cap would be activated for the remainder of the Proposed Facility's operating life (Exh. CLF-2(S) at 3). The declining cap would be adjusted so that there is an equal CO₂ decline each year, until reaching zero by 2051 (id.). CLF maintains that, like the cap it developed for the Initial Reference Case, the modified emission cap would not restrict the ability of the Company to earn significant revenue in the FRM, and would impose at most a net present value cost of 1.9 percent or about \$7.4 million (CLF Reply Brief at 13, citing Exh. CLF-2(S) at 3-4).

With respect to consistency with the GWSA and Kain, CLF argues that the Siting Board may not approve the Proposed Facility in advance of the G.L. c. 21N, § 3(d) regulations mandated by Kain (CLF Reply Brief at 17, citing G.L. c. 21N, § 9; Kain, at 295). CLF contends that, in the absence of those regulations, there is no mechanism by which the Board can establish that "the certain and substantial smokestack emissions from the Proposed Facility are consistent with the GWSA, which requires Massachusetts to actually achieve measurable and permanent reductions to in-state (and other) emissions by 2020 and again by 2050" (CLF Reply Brief at 17-18, citing Kain, at 295). CLF argues that the Company cannot use net reductions in regional GHG emissions to establish compliance with GWSA (CLF Reply Brief at 21-23). CLF further argues that NRG offers no evidence of GWSA compliance between 2030-2050 (CLF Reply Brief at 26).

ii. Company

The Company argues that the Proposed Facility has minimized and mitigated CO₂ emissions impacts consistent with Siting Board requirements and that the Proposed Facility is consistent with the GWSA (Company Reply Brief at 3). NRG contends that its consultant used an appropriate modeling methodology and that the modeling demonstrates that the Proposed Facility would displace higher emitting resources, thereby reducing GHG emissions regardless of whether it operates in the energy market or the FRM (Company Brief at 143, 148). With regard to CLF's criticisms of the Company's dispatch model, NRG contends that even when the

Proposed Facility was modeled using the methodology suggested by CLF, as reflected in the Updated Reference Case and the Canadian/Off-shore Wind Case, the results still show a net reduction in GHG emissions (id.,148).

The Company dismisses CLF's criticisms of its updated modeling. With regard to CLF's assertion that more renewables should have been included, the Company notes that every megawatt of off-shore wind and clean energy reflected in the enacted 2016 energy legislation (H. 4568) is assumed in the model to be actually implemented at the earliest possible time, "even though such an optimistic scenario is unlikely" (id., at 149). The Company dismisses CLF's criticism that the "without the Proposed Facility" modeling scenarios did not include alternative resources, noting the inclusion of imports, solar, wind and other features of a future energy mix (Company Reply Brief at 19). The Company also takes exception to CLF's criticism regarding the treatment of energy storage in the model, contending that energy storage is currently not cost-competitive with the Proposed Facility and that no energy storage unit cleared FCA 10 (Company Brief at 153 n.58, citing Exhs. EFSB-CPC-2; EFSB-A-39).

Noting MassDEP's continuing calculation and publication of a regional method for GHG inventory accounting as an alternative to the Massachusetts method, NRG disputes CLF's assessment that the dispatch model results fail to demonstrate statewide GHG emissions reductions (Company Reply Brief at 20 -23). The Company maintains that MassDEP's primary reliance on the Massachusetts method to develop the Massachusetts GHG inventory does not automatically mean that MassDEP has selected that approach as the method the Commonwealth will use after 2020 to determine if the state meets the GWSA's 2020 emission reduction mandates. The Company maintains that MassDEP is still considering which method it will actually use to determine GWSA compliance after 2020 (Company Reply Brief at 22).

The Company also notes that the GWSA does not require MassDEP to use the Massachusetts method, that the GWSA acknowledges that Massachusetts is part of an integrated regional electric grid, and that this fact must be considered in measuring Massachusetts GHG emissions from the generation of electricity (Company Reply Brief at 22-23). The Company argues that MassDEP's regional method is more closely aligned with the GWSA's definition of

“statewide greenhouse gas emissions” since it accounts for emissions consistent with the regional structure and operation of the New England electric system.⁵⁶

With regard to CLF’s assertion that the Proposed Facility’s response to RR-CLF-9 demonstrates that the Proposed Facility will lead to an increase in the Commonwealth’s statewide GHG emissions in every year through 2029 even if 100 percent of the predicted regional emissions reduction is attributable to the Proposed Facility, the Company maintains that “this smoke stack counting approach is unsupported by the GWSA or plain logic” (Company Reply Brief at 23 n.27, citing CLF Reply Brief at 23-24). NRG contends that CLF simply adds the projected GHG emissions of the Proposed Facility to the inventory of power plants in Massachusetts for the years 2020-2029, but ignores the fact that if the Proposed Facility did not exist, some other generating unit(s) would have to produce the same number of MWh as the Proposed Facility, albeit with higher GHG emissions, to meet Massachusetts’ demand (Company Reply Brief at 23 n.27).

The Company asserts that the Proposed Facility would produce emission benefits, beyond the end of the modeling period in 2030 through 2050 (Company Brief at 150). NRG notes that the Proposed Facility would be a flexible, fast-ramping generator that would help facilitate the electric system’s integration of the expanded renewable generation necessary to meet the GWSA’s 2050 emissions limits. The Company maintains that even with significant renewables penetration, the Proposed Facility will still be dispatched; and when it is dispatched, it will displace higher emitting resources (id.).

The Company argues that it has appropriately minimized and mitigated CO₂ emissions impacts of the Proposed Facility (Company Reply Brief at 3). Contrary to CLF’s assertions, the Company maintains that the Siting Board is not required to impose all available mitigation; instead, the Siting Board evaluates each mitigation option within its statutory framework, balancing environmental impacts, costs, and competing environmental objectives (id., at 5). The Company argues that the CO₂ mitigation measures adopted by the Proposed Facility, such as its highly efficient generation technology, primary use of natural gas, emissions control equipment,

⁵⁶ The Company’s maintains that, since approximately 45 percent of New England’s electricity is consumed in Massachusetts, then 45 percent of the net regional emissions reductions determined by the dispatch modeling would be allocated to Massachusetts electric consumption according to the MassDEP regional method (Company Reply Brief at 23 n.26).

and compliance with regulatory requirements (such as BACT and RGGI) are both consistent with Siting Board precedent and also constitute appropriate air mitigation measures (id., at 6).

NRG contends that CLF's proposed CO₂ mitigation measures, such as using LNG rather than ULSD and imposing a declining emissions cap on the Proposed Facility, have no merit (Company Reply Brief at 9). With regard to using on-site LNG with the Project, the Company maintains that the 400,000 gallons of LNG storage CLF envisions is an inadequate amount of fuel for anything more than unit start-up operations. The three-day supply of fuel afforded by the proposed use of ULSD is the equivalent of 2.82 million gallons of LNG – well beyond what even CLF proposed as being feasible for the site (id.). In addition, to maintain full-load operation on LNG alone, 94 LNG trailers would need to be delivered and unloaded in each 24-hour period (id.). The Company points out that the Town of Sandwich has urged the Siting Board to reject the use of LNG on-site due to safety concerns, and that the Town has not expressed such concerns regarding the storage and use of ULSD. NRG also contends that installing three-day LNG capacity would not be feasible at the Proposed Facility location given both Siting Board requirements and applicable local zoning requirements and local sentiment about LNG (id., at 10).

In regard to CLF's proposed declining cap, the Company argues that it would be unwise from a policy perspective for the Siting Board to impose a declining cap on the Proposed Facility, as it would be “tying the hands of a brand new and very efficient resource, while leaving untied all the other more emitting, less efficient peaking units” (Company Reply Brief at 14). The Company notes that under the economic dispatch used by ISO-NE, the Proposed Facility will only be dispatched ahead of less-efficient units, thereby displacing emissions (Company Brief at 143). If the Proposed Facility is no longer one of the more efficient peaking units, then the Proposed Facility will not be dispatched, and it will not emit, and does not require a declining cap to eventually cease operation (id., at 157-158; Tr. 4., at 708). The Company notes that CLF's proposed declining cap is almost identical to the one CLF proposed in Exelon West Medway. The Company recommends that the Siting Board, once again, should rely on MassDEP regarding whether, and if so how, to impose a declining emissions cap (Company Reply Brief at 14).

In response to CLF's contention that its declining cap will have “a small likely financial impact” that will allow the Proposed Facility to “make a sufficient return on its investment” and

is therefore an “economically viable mitigation measure,” the Company argues that CLF, in effect, asks the Siting Board to ignore its limited statutory scope of reviewing only the direct costs of environmental mitigation (Company Reply Brief at 12, 24). In order to analyze CLF’s claims, the Company points out that the Siting Board would have to review the Proposed Facility’s revenues and profits under a variety of market scenarios and somehow determine if the economic harm to the Proposed Facility resulting from the cap is acceptable (*id.*, at 12).

The Company cites the June 30, 2016 ruling of the Presiding Officer who denied CLF’s motion to compel the Company’s submission of financial data because such data “goes far beyond the type of cost information that the Siting Board considers for mitigation measures” (Company Reply Brief at 12-13, *citing* June 30, 2016 Hearing Officer Ruling). The Hearing Officer Ruling noted that the type of costs the Siting Board reviews are limited to “direct costs of mitigation” such as the cost of increased stack height or the cost of additional noise mitigation. Moreover, the Company contends that G.L. c. 164, § 69J^{1/4} does not require a project proponent to implement any and all potential mitigation so long as the amount spent does not jeopardize the proposed project’s financial health (Company Reply Brief at 24).

The Company argues that it has demonstrated that the Proposed Facility is consistent with the GWSA, referring to its dispatch model analyses and the 2020 CECP Update (Company Reply Brief at 18). The Company disputes CLF’s statutory premise that the Proposed Facility must “comply with the GWSA” (*id.*, *citing* CLF Reply Brief at 21). The Company argues that G.L. c. 164 § 69J^{1/4} requires that a generating facility be “consistent with” the environmental policies of the commonwealth, and that the SJC has interpreted the phrase “consistent with” to require only “general consistency with applicable government regulations” (Company Reply Brief at 18 n.19, *citing* Box Pond Association v. Energy Facilities Siting Bd., 435 Mass. 408, 412 (2001)).

The Company asserts that the Proposed Facility is consistent with the 2020 CECP Update, which anticipates emissions reductions resulting from the ongoing closure of coal-fired electric generating plants and a substitution of natural gas-fired generation (Company Reply Brief at 18, *citing* Exh. CLF-1, Att. 1-15(1), at 14). It further contends that the 2020 CECP Update does not prohibit natural gas as part of the electric generation fleet, even as far off as 2050 (Company Reply Brief at 18). In addition, the Proposed Facility’s quick-start and fast-ramping attributes make the Proposed Facility well suited to support the integration of

intermittent renewable generation, which will be necessary to achieve the GWSA's 2050 mandate (id.).

Finally, the Company rejects CLF's interpretation of G.L. c. 21N, § 9 and Kain by which CLF asserts that Siting Board is barred from approving the Proposed Facility prior to MassDEP promulgating G.L. c. 21N, § 3(d) regulations (Company Reply Brief at 14-15, citing CLF Reply Brief at 17-19). The Company argues that the language in G.L. c. 21N, § 9 simply refers to "compliance with adopted regulations" (Company Reply Brief at 15-16). Given that no such regulations have yet been adopted, there are currently no regulatory provisions under Section 3(d) with which the Proposed Facility must comply (id., at 16). Therefore, the Company concludes, the language of the statute does not preclude either Siting Board approval of the Proposed Facility or its construction (id., at 16 n.17).

d. MassDEP Proposed Air Plan Approval

As noted above, MassDEP issued a Proposed Air Plan Approval for the Proposed Facility on January 5, 2017, after the evidentiary hearings and the briefing period in this proceeding (Exh. EFSB-20). The Proposed Air Plan Approval includes declining CO₂e limits on all sources of GHGs included in the Project, and is designed so that the Project "will not emit GHG emissions that may cause or contribute to a condition of air pollution, or cause damage or threat of damage to the environment, as required by the state Clean Air Act, G.L. c. 111, §§ 142A-142E, MassDEP air regulation, 310 C.M.R. § 7.00, and G.L. c. 21A, §§ 2 and 8" (id., at 3). The Proposed Air Plan Approval requires the Proposed Facility to limit CO₂e emission below the applicable declining annual CO₂e limits, or use over-compliance credits created when the Project's actual annual project-wide emissions are less than the applicable year's CO₂e limit (id.). MassDEP indicated that the declining CO₂e cap is designed to help reduce GHG emissions by 25 percent from 1990 levels and help achieve the 2050 mandate for an 80 percent reduction from 1990 levels, as required by G.L. c. 21N (id.).

The Proposed Air Plan Approval establishes the cap in 2019 at 810,500 tpy, an amount "set initially at a level proposed by the applicant" that is "sufficiently stringent to prevent a condition of air pollution" (Exh. EFSB-20, at 4).⁵⁷ The Proposed Air Plan Approval cap then

⁵⁷ The Proposed Air Plan Approval indicates that that operational limit of Project-wide GHG emissions in any single year is 934,401 tpy (Exh. EFSB-20 at 55, Table 9). This

decreases 2.5 percent annually through 2025, and is reset in 2026 at 622,023 tpy,⁵⁸ decreasing thereafter at 2.5 percent annually through 2050, when it declines to 338,773 tpy (Exh. EFSB-20, at 77, Table 13). The Proposed Air Plan Approval notes that the Project will “likely operate below this initial emission limit” (Exh. EFSB-20, at 4). In anticipation of final regulations proposed by MassDEP as 310 C.M.R. § 7.74, which would place an aggregate declining annual cap on all new and existing Massachusetts generation facilities over 25 MW capacity, the Proposed Air Plan Approval’s indicates that the declining cap in the permit would be superseded by the declining cap regulation once the regulation becomes effective (Exh. EFSB-20, at 4).

The Proposed Air Plan Approval cap would allow the Proposed Facility to earn “Over Compliance Credits” for the number of tons that actual facility-wide CO₂e emissions in a calendar year are less than the cap in effect for that year (Exh. EFSB-20 at 78, Table 13). Over Compliance Credits can be used in future years at the Proposed Facility, if actual CO₂e emissions exceed the CO₂e cap in such year (Exh. EFSB-20, at 78, Table 3). The Siting Board notes that there is no provision indicated for trading of Over-Compliance Credits among generation facilities. Similar to the CLF-proposed DCMM, Over-Compliance Credits are discounted as they accrue in future periods, according to the following schedule:

- Over-Compliance Credits created from 2019-2022: Offset 90%
- Over-Compliance Credits created from 2023-2027: Offset 80%
- Over-Compliance Credits created from 2028-2032: Offset 70%
- Over-Compliance Credits created from 2033-2037: Offset 60%
- Over-Compliance Credits created from 2038-2047: Offset 50%
- No Over-Compliance Credits may be created after 2047

e. MassDEP’s Proposed Massachusetts Electric Generating Unit Declining Cap Regulation

On December 16, 2016, MassDEP issued a set of six proposed regulations for limiting or reducing GHG emissions for several categories of sources in the Commonwealth, including electric generating facilities (Exh. EFSB-7). To reduce GHG emissions from electricity

relates to a capacity factor or 50 percent, assuming a maximum of 720 hours full-load operation on ULSD in any specific 12-month period (id., at 23).

⁵⁸ The Proposed Air Plan Approval does not provide the capacity factor or explain the basis of the proposed reset of the 2026 annual cap to 622,023 tpy.

generating units in the Commonwealth, proposed 310 C.M.R. § 7.74 would establish a mass-based, annually declining limit on GHG emissions from power plants (25 MW and over) (Exhs. EFSB-12; EFSB-20, at 44). The intent of the regulation is to ensure that reductions in electric sector emissions associated with existing and new policies, such as new clean energy supplies, energy efficiency, and the proposed Clean Energy Standard regulation at 310 C.M.R. § 7.75 result in emissions reductions in Massachusetts (Exh. EFSB-7, at 12).⁵⁹

The proposed regulation sets an aggregate CO₂e limit for all affected Massachusetts generators of 9,119,126 metric tons in 2018, declining to 1,823,825 metric tons by 2050 – a reduction of 80 percent over the period (Exh. EFSB-12, at 3-4, Table A). The regulation includes a proposed apportionment of the limit between existing and new facilities (the Proposed Facility would be treated as a new facility) (*id.*, at 3). From 2018 through 2025, new generating facilities would be apportioned an aggregate annual limit of 1.5 million metric tons (“MMT”), while existing facilities would start with an aggregate limit of 7.62 MMT in 2018, declining 2.5 percent of the 2018 limit annually, reaching 6.02 MMT in 2025 (*id.*). Both existing and new facility aggregate caps would be reset somewhat lower in 2026, and then continue declining annually by 2.5 percent of the respective existing or new 2018 limit (*id.*).

The proposed regulation would apportion annual limits through 2025 to existing generators based on a three-year average of power production, and revise such allocations after 2025, on the basis of updated three-year average generation output (Exh. EFSB-12, at 4-5). The regulations would apportion the available limit to new facilities based on their actual energy production in year, and pro-rate such limits, if new facilities exceed the available limit for new facilities in aggregate (*id.*). The proposed regulation would allow generators to accrue Over-Compliance Credits that could be used or transferred to other facilities (new or existing) in current or future periods, without discount for future use (*id.*, at 6-7).

⁵⁹ MassDEP notes that in Kain, the SJC held that RGGI regulations did not comply with Section 3(d) of G.L. c. 21N because the regulations did not ensure “mass-based reductions in carbon dioxide from power plants in the Commonwealth.” Therefore, MassDEP designed 310 C.M.R. § 7.74 to “limit GHG emissions from electric generating facilities within the borders of Massachusetts” (Exh. EFSB-7, at 34 n.31, citing Kain at 297-298).

f. Analysis and Findings

In this section, the Siting Board addresses the following GHG questions for the Project: (1) whether the Project meets applicable GHG regulatory requirements; (2) how the Project affects GHG emissions; (3) whether the GHG emissions for the Proposed Facility comport with the requirement to “minimize the environmental impacts consistent with the minimization of costs associated with the mitigation, control and reduction of the environmental impacts of the proposed generating Facility” under Section 69J¼; and (4) whether the Project is consistent with the GWSA, as a policy of the Commonwealth. As an initial matter, we address the Siting Board’s authority to approve the Proposed Facility. We then address each of the four issues in turn.

i. Siting Board’s Authority

An initial question is whether the Siting Board can approve the Petition in the absence of Section 3(d) regulations mandated by Kain. CLF contends that, in the absence of such regulations, there is no mechanism by which the Board can establish that the future emissions of the Proposed Facility would be consistent with the GWSA and therefore cannot approve the Petition.

The key provision in dispute concerns the meaning of G.L. c. 21N, § 9, which states as follows:

Nothing in this chapter shall affect the authority of the public utility commission or the obligation of an electrical utility to provide customers with safe and reliable electric service. Nothing in this chapter shall preclude, prohibit or restrict the construction of a new facility or the expansion of an existing facility subject to regulation under this chapter, if all applicable requirements are met and the facility is in compliance with regulations adopted pursuant to this chapter.

The Siting Board’s mandate under G.L. c. 164, §§69H, 69J¼ requires the Siting Board to review proposals for generating facilities to ensure that such facilities minimize environmental impacts consistent with the minimization of costs associated with the mitigation, control, and reduction of the environmental impacts of the proposed generating facilities, such that those generating facilities that so minimize environmental impacts are deemed to contribute to a reliable energy supply for the commonwealth with a minimum impact on the environment at the lowest possible cost. The Siting Board sees no prohibition or limitation in either the Kain, Executive Order 569, or G.L. c. 21N, § 9, against the Siting Board fulfilling the obligations

under its statutes to issue a decision in this proceeding in a timely manner. While MassDEP has proposed Electric Generation Cap regulations under Section 3(d) that could ultimately affect the Proposed Facility, such regulations have not yet been adopted, and, therefore, there are currently no such requirements with which the Proposed Facility must comply. In any event, even if Section 3(d) regulations that affect the Proposed Facility are subsequently adopted and enforced by MassDEP, the applicability of such regulations to the Proposed Facility would not be contingent on any action of the Siting Board. Accordingly, for the reasons above, we reject CLF's argument that the Siting Board cannot issue a decision in advance of MassDEP's issuance of Section 3(d) regulations. See Exelon at 61-63.

ii. Compliance with Existing GHG Regulations

As discussed above, a number of existing regulatory programs govern air emissions from the Proposed Facility, including GHG emissions. Primary regulation of the Proposed Facility's GHG emissions will occur pursuant to the Commonwealth's air pollution control laws and regulations, as administered and enforced by MassDEP.⁶⁰ Pursuant to its authority under these provisions, MassDEP has issued the Proposed Air Plan Approval and a Draft PSD Permit for the Proposed Facility, which must be finalized before it can begin operation. As noted above, the Proposed Air Plan Approval, issued on January 5, 2017, includes a declining CO₂e Cap and other GHG-related control provisions applicable to the Proposed Facility.

The Proposed Facility's GHG emissions also are addressed by requirements under MEPA pursuant to its GHG Policy. The Secretary's Final Environmental Impact Report ("FEIR") Certificate on the Proposed Facility, issued August 26, 2016, found that the project adequately and properly complies with MEPA and its implementing regulations (Exh. EFSB-4, at 16).

RGGI, which imposes a regional emissions cap on CO₂ in nine eastern states, also will govern the Proposed Facility's GHG emissions. Pursuant to RGGI, the Proposed Facility will be required to procure emission allowances at auction or on secondary market at prevailing market prices. The Company estimated that it would spend \$1.8 million per year at current allowances prices to procure sufficient allowances to ensure compliance (Exhs. NRG-3, at 6-3, 16-3;

⁶⁰ See G.L. c. 111, §§ 142 A-O; G.L. c. 21C, §§ 4 and 6; G.L. c. 21E, § 6; 310 C.M.R. §§ 7.00, 7.02 (Exh. EFSB-20, at 1).

EFSB-A-21). The Company would also monitor and report CO₂e emissions using methods specified in 40 C.F.R. § 75 (Exh. EFSB-20, at 63).

The Company has represented that it would comply in full with all regulatory requirements applicable to the Proposed Facility, including those pertaining to GHGs. In Condition P, below, the Siting Board also sets forth this requirement as a specified condition of this Decision.⁶¹ Additionally, as set forth in Condition B, below, the Company shall submit to the Siting Board a copy of the Final Air Plan Approval and Final PSD permit for the Proposed Facility, when issued by MassDEP.

iii. Expected GHG Emissions

The record in this proceeding provides a variety of methods and results depicting the emission rates, and levels of CO₂ emissions that Proposed Facility is anticipated to produce that, by design, serve different analytical purposes. CLF asserts that there is inappropriate inconsistency among the Company's emission rate assumptions for the Proposed Facility in the MEPA environmental impact reviews, MassDEP air permitting, and the data inputs used in the dispatch model in this proceeding (CLF Reply Brief at 10 n.34). The Siting Board, however, does not share this view.

Both the MassDEP and MEPA reviews reflect emissions rates for the Proposed Facility under International Standards Organization-defined conditions to facilitate a uniform basis for making comparisons among various technology options. Such a uniform basis is necessary for BACT determinations and compliance with MEPA impact mitigation review requirements. MassDEP's BACT analysis includes additional conservative assumptions in its use of margin factors, noted above to account for turbine degradation over time, and manufacturer guarantees. In contrast, emission rates used for the Proposed Facility and other generating units in the

⁶¹ With respect to future regulatory requirements that may apply to the Facility's GHG emissions, the Siting Board notes two developments, discussed above, that have occurred since the conclusion of hearings in this proceeding. First, MassDEP has proposed regulations (310 C.M.R. § 7.74) that would place a declining annual cap on electric generating units in Massachusetts. Second, MassDEP issued a Proposed Air Plan Approval for the Facility in which it has proposed a facility-specific declining CO₂ cap on the Facility (Exh. EFSB-20). The Proposed Air Plan Approval explicitly states that the Facility will be subject to the new MassDEP regulations when finalized (Exh. EFSB-20).

Company's dispatch model runs are intended to more closely reflect actual operational performance. The dispatch model emission rates are based on the manufacturers' specification data, as compiled by the dispatch model's vendor in a proprietary database. The Company reviewed this data for accuracy, and made any necessary adjustments. We see no deficiency in the Company's heat rate and emission rate assumptions for the Proposed Facility and other units included in the dispatch model, and we find these assumptions appropriate.

Consistent with longstanding Siting Board practice, the Company developed a dispatch modeling analysis to estimate the effect of the Proposed Facility's operation on New England air emissions over a defined forecast period. The Company developed and used the dispatch model in this proceeding for purposes of estimating the Proposed Facility's direct CO₂ emissions, and its overall effect on regional CO₂ emissions from the electric generation sector, through "displacement" analysis. The Company's dispatch model simulates the operation of the Proposed Facility and other regional generating units by ISO-NE according to variable cost and numerous other real-world constraints evident in the New England energy market. Facility proponents have used such models in various forms before the Siting Board for many years to demonstrate emissions – and cost-reduction benefits of proposed generation facilities, and to establish the consistency of such facilities with Siting Board precedent and Commonwealth policies. See Exelon West Medway at 57-60; Footprint Power at 31-32; Berkshire Power Development, Inc., EFSB 95-1 at 61-64 (1996).

During the proceeding, the Company significantly revised both input assumptions and the modeling methodology in response to information requests from CLF and Siting Board staff. Initially, the Company determined the net CO₂ emissions avoided by the Proposed Facility by comparing its direct emissions with a proxy for emissions displaced at marginal fossil units, based on ISO-NE's 2013 monthly marginal emission rates (excluding non-emitting units to better reflect peak conditions). As correctly noted by CLF, this approach suffers from its use of a fixed, historic (2013) measure of marginal unit emission rates to forecast avoided emissions in the region ten years into future, and overlooks the more accurate unit-specific information available within the model.

In its Updated Reference Case and Canadian/Off-shore Wind Case results, the Company addressed this deficiency by running "with" and "without" Proposed Facility scenarios and took the difference between them to determine the incremental effects of the Proposed Facility on

system-wide regional CO₂ emissions. The Company also included the most recent data inputs from the 2016 CELT report regarding projected load data, energy efficiency, solar penetration, and generating unit additions and retirements. The Company also improved the revised model by incorporating significant new clean and renewable energy supplies in the regional mix, mandated for procurement by Massachusetts distribution utilities by the 2016 energy legislation. St. 2016, c. 188.

The Siting Board views the Updated Reference Case and Canadian/Off-Shore Wind Case results as a reasonable representation of how the Proposed Facility would affect electric generating facility emissions throughout New England. The record demonstrates that the dispatch model used by NRG is a well-established analytical tool for the electric sector. With regard to the Updated Reference Case and Canadian/Off-Shore Wind Case, the Siting Board finds that the assumptions and inputs used are reasonable, and the model's results are robust. The results show that the Proposed Facility would avoid net emissions of 142,103 tons over the ten-year simulation period, running at an annual capacity factors of between seven and ten percent. The introduction of the new, mandated clean/renewable energy resources had a significant effect, reducing the CO₂ emissions avoided by the Proposed Facility to 89,487 tons, and decreasing its annual capacity factors to about half of the Updated Reference Case (or about three to five percent). This result is consistent with the fact that renewable resources such as wind and hydro, which have a low (or even zero) marginal cost, push peaking sources such as the Proposed Facility further up the "bid stack" and make them run less often. See Exh. CLF-1, at 30-31, Figures 9 and 10.

With regard to CLF's criticism that the dispatch model analysis is flawed because it only simulated a ten-year period, rather than the expected 40-year design life of the Proposed Facility, the Siting Board notes that it has considered and dismissed such concerns previously. See Footprint Power at 31; Exelon West Medway at 47. As noted by the Company, the degree of uncertainty about modeling assumptions grows as models extend further into the future, and the results of the model become increasingly speculative and unreliable. Moreover, the modeling period addressed by the Company effectively covers the next two legislative milestones established in the GWSA (2020 and 2030) and provides information as to the effect of the Proposed Facility on CO₂ emissions for GWSA purposes, as discussed in Section IV.B.2.f.iv, below. The inclusion of large amounts of legislatively mandated off-shore wind and other clean

energy resources (e.g., large hydroelectric plants) makes the updated dispatch model results significantly more robust – assuming that these mandates will be met as set forth in the legislation.

As reflected in the dispatch model results, the Company’s representation that whenever Proposed Facility operates it displaces a higher-emitting unit is correct. When the Proposed Facility displaces oil units, or other natural gas-fired units, it does so on the basis of energy bid prices, which reflect a combination of the forecasted prices for natural gas and ULSD, and the relative efficiency of the Proposed Facility compared to other units. This outcome also reflects the dispatch model’s representation of the day-ahead energy market, in which generating units can schedule pipeline gas deliveries in advance. As the Company noted, the net effect of these assumptions is that whether competing against other gas- or oil-fired units, the Proposed Facility will run in the model only if it has lower variable costs, and, lower CO₂ emissions.

CLF faults the Company for not presenting a wider variety of future resource scenarios that could have included more renewables, increasing use of energy storage technologies, updated load data, and additions of other unit capacity that might have been built absent the construction and operation of the Proposed Facility. We find CLF’s argument valid with respect to the initial model results, but the Company substantially addressed these concerns by the updated modeling. The Siting Board finds that the changes made to the model input assumptions and methodology more accurately reflect anticipated changes in the electric sector and more accurately quantifies their effect on emissions. While CLF may prefer a future with different resource assumptions, the Siting Board finds the Company’s assumptions reasonable, and based on substantial record evidence.

NRG was not asked to, and did not otherwise produce a dispatch model iteration simulating the effects of the declining CO₂ emissions cap proposed by CLF or any other declining cap. However, the “without the Proposed Facility” scenario it did run effectively constitutes an “emissions cap” of zero – that is, as if the Proposed Facility did not operate at all. The dispatch model runs show that whenever the Proposed Facility would operate, the result would be a reduction of regional CO₂ emissions; we can therefore infer that the more stringent a cap imposed on the Proposed Facility (or, more specifically, the less it runs), the fewer the tons of net regional CO₂ reductions will occur, as modeled. Thus, the Updated Model results lead to

the conclusion that a declining cap that causes the Proposed Facility to run less than it would have otherwise, would increase, not decrease, regional CO₂ emissions.

CLF and the Company disagree sharply about whether the results of the dispatch model runs are valid, and if so, whether they establish “statewide emission reductions” (as defined by the GWSA) or only regional emissions reductions. CLF’s witness conceded that “the final Canadian/Off-shore Wind Case contains the most reasonably accurate representation of . . . the most likely future conditions in New England between 2019 and 2029 for purposes of such analysis” (Exh. CLF-1(S) at 12). However, CLF maintains that this model run results in “an increase each year in Massachusetts’ total emissions,” even if “100% of the predicted regional emissions reduction attributable to the Facility were credited to Massachusetts” (CLF Reply Brief at 24, citing RR-CLF-9; EFSB-A-49).

CLF’s suggested methodology to determine the change in “Massachusetts’ total emissions” attributable to the Proposed Facility is not consistent with either GHG inventory accounting approach used by MassDEP (the Massachusetts method or the regional method).⁶² Under the regional method as delineated by MassDEP, the Massachusetts emissions inventory is determined using Massachusetts’s 45 percent share of total New England load as the determinant of the Massachusetts share of regional CO₂ emissions. Thus, using the MassDEP regional method, a total regional CO₂ emissions reduction of 89,487 tons (relating to operation of the Proposed Facility) would equate to a “statewide” CO₂ emissions reduction of 45 percent of this figure, or approximately 40,269 tons.

CLF cites RR-CLF-9(2) as demonstrating that, with the Proposed Facility, an emissions increase within Massachusetts borders dwarfs the regional emissions reduction, even if the entire reduction were credited to Massachusetts. Specifically, CLF compares the change in emissions of power plants located within Massachusetts to the total regional generation facility emission change (inclusive of the change in Massachusetts’s power plant emissions).

⁶² CLF’s suggested emissions comparison also fails to comport with the GWSA’s definition of “statewide greenhouse gas emissions” for the electric sector (G.L. c. 21N, § 2(a)), as it understates the offsetting statewide emissions reductions associated with the reduced need for imported power, when displaced by the Proposed Facility. The error in CLF’s approach occurs principally as a result of the double counting of the net change in Massachusetts’s CO₂ emissions.

CLF's suggested approach takes some recognition of the statutory definition that "statewide greenhouse gas emissions" for the electric sector are not limited to power plant emissions within the borders of Massachusetts. G.L. c. 21N, § 2(a). However, CLF's methodology is faulty because it double counts the change in Massachusetts's emissions: first (and appropriately) in the calculation of the change in emissions located physically in Massachusetts (a net increase of 525,530 tons) and then again (inappropriately) in looking at offsetting emissions reductions in New England. An appropriate accounting analysis would compare the CO₂ increase of 525,530 tons within the borders of Massachusetts to the more-than-offsetting reduction of 615,017 tons of CO₂ emissions outside of Massachusetts, yielding a net regional reduction of 89,487 tons.

CLF's method fails to recognize the fact that when the increase of emissions at the Proposed Facility is weighed against the displaced emissions at other generating facilities in Massachusetts and elsewhere in New England, the region experiences a net overall reduction of 89,487 tons over the 2019 to 2029 period in the Canadian/Off-Shore Wind Case scenario. As discussed below, this 89,487-ton reduction is arguably also a valid measure of "statewide emission reductions," given GHG calculation methodologies used by MassDEP and the Secretary for evaluation of prospective regulatory, policy, and market changes.

NRG witness Mr. Peaco explained why computing the emissions impact of the Proposed Facility according to MassDEP's Massachusetts method is not susceptible to predictive uses, as CLF seeks to do. First, as Mr. Peaco noted, the Massachusetts method for GHG inventory accounting is used retrospectively, with known, historical data available that is necessary to perform the calculations. In using the Massachusetts method prospectively, Mr. Peaco identified several critical unknown inputs, such as REC transactions across state borders, and the location of new generating capacity, both of which would affect the Massachusetts method calculation significantly. Second, Mr. Peaco noted that, even if it could be calculated prospectively, the Massachusetts method would be an inappropriate basis to evaluate the effects of the Proposed Facility which, as a peaking unit, would affect generation activity throughout the region at the margin (i.e., the most costly units to run in particular hours). He noted that the Massachusetts method is based on imports of power from New England states and adjacent control areas that produce a surplus relative to their loads, and that the method assumes that Massachusetts imports are comprised of the average mix of generation (and emissions) in those states/control areas

rather than the units at the margin that would be, in fact, displaced by the Proposed Facility (Tr. 4, at 760). Thus, he suggested that the Massachusetts method results in a fundamental mismatch, in which marginal generation and emission changes in Massachusetts (due to the Proposed Facility) are compared to decreased imports and emissions, based on the average emissions profile of generation in the exporting states/control areas.

Although the Company acknowledged that MassDEP relies on the Massachusetts method in updating the Commonwealth's GHG emissions inventory, it is also correct that MassDEP continues to describe and calculate GHG emissions inventories pursuant to the regional method in its periodic GHG inventories, and it has not announced which method it will use to evaluate compliance with the 2020 emissions target established by the Secretary. The record in this proceeding also demonstrates that, MassDEP's estimation of GHG impacts regarding its own prospective regulatory and policy decisions closely resembles the methodology reflected in the Company's dispatch model approach. For example, in the MassDEP's Background Document on Proposed New and Amended Regulations (relating to the GWSA), MassDEP evaluated the GHG impacts of prospective actions such as retirements of coal, oil, and nuclear units in Massachusetts (Exh. EFSB-7, at 10, Table 3). In the document, MassDEP notes that the estimated emissions reductions for these anticipated future plant retirements are "net of gas generation increase compensating for Brayton [Point], Salem [Station], Mt. Tom, [and] Pilgrim shutdowns" (Exh. EFSB-7, at 10, Table 3).

Similarly, in the 2020 CECP Update, the Secretary also relies on a marginal unit methodology to gauge the impact of future market, policy, and program changes on GHG emissions for GWSA purposes (Exh. NRG-CLF-1-15(1) at 34-35). For example, in quantifying emissions effects relating to plant shutdowns, renewable portfolio standards, clean energy imports, energy efficiency programs, and electric vehicles, the 2020 CECP Update quantifies the resulting increases or decrease in demands for power and related emissions effects based on "marginal units that ramp generation up and down as needed to meet demand on the electric grid" (Exh. NRG-CLF-1-15(1) at 34). The document notes that these compensating marginal units are assumed to use natural gas as their primary fuel, and that such units would be located both in Massachusetts and elsewhere.⁶³ Again, this type of marginal, predictive analysis is

⁶³ Acknowledging the difference between the CECP's prospective, marginal-unit type analysis, and MassDEP's retrospective accounting methods, the CECP Update notes

similar to the method reflected in the Company's dispatch model analysis of the Proposed Facility.⁶⁴

In view of the above record evidence, the Siting Board finds that the Canadian/Off-shore Wind Case constitutes the most robust and appropriate of the dispatch model results provided by the Company, and that the results are sufficiently reliable for use in this proceeding. Further, the Siting Board views the 89,487 tons of CO₂ reduced over the 2019 to 2029 period as a reasonable measure of expected regional CO₂ emission reductions. In evaluating whether these reductions also constitute "statewide emissions reductions," the Siting Board notes that MassDEP's regional method of GHG inventory accounting, and the marginal accounting methods used by MassDEP and the Secretary to analyze prospective changes affecting the electric sector, all support the Company's contention that this is the case.⁶⁵

With regard to the Company's decision to use the dispatch model in simulations only for the first ten years of the Proposed Facility's operations, rather than its 40-year design life, the Siting Board concurs with the Company's decision. As noted by the Company, modeling beyond the initial ten years requires reliance on increasingly uncertain assumptions regarding the market, regulatory requirements, technology, and other factors that would be speculative and the

"This estimation method does not account for the fact that a portion of the compensating changes in natural gas-fired generation are likely to occur in states other than Massachusetts (Exh. NRG-CLF-1-15(1) at 35). Therefore, the magnitude of the compensating change in natural gas-fired generation in the chart above is likely to be larger than the amount that will ultimately be reflected in MassDEP's GHG inventory" (*id.*).

⁶⁴ The 2020 CECP Update marginal unit methodology, which assumes that Massachusetts plant shutdowns lead to compensating increased generation at marginal, gas-fired units throughout New England, is a nearly identical methodology to the one used in the Company's dispatch model. However, the dispatch model is directed toward addressing a different question: how are marginal generation units in New England affected by the addition of the Proposed Facility to the ISO-NE energy market?

⁶⁵ The Siting Board concludes that the amount of such statewide CO₂ emissions reductions for the 2019 – 2029 period ranges from approximately 40,269 tons (45 percent of the dispatch model's net emissions reductions, pursuant to the MassDEP's regional method) (Tr. 6, at 1008-1009, 1036-1038) to 89,487 tons (100 percent of the regional reductions associated with the Proposed Facility, pursuant to the marginal emissions methodologies used by MassDEP in its GWSA regulations development and by the Secretary in the 2020 CECP Update).

results, therefore, increasingly unreliable. Instead, the Company offered the ten-year study period as one that is sufficient to illustrate the impact of the Proposed Facility.

Even though the model results end in 2029, they provide a reasonable basis to look beyond that time in gauging the general impact of the facility on regional and statewide emissions. As long as energy facilities continue to be dispatched according to variable cost, and the cost of natural gas remains competitive with ULSD (as predicted by the Company through at least 2029) then whenever the Proposed Facility runs, it will displace less-efficient, higher-emitting units somewhere else on the grid, resulting in reduced net CO₂ emissions. To the extent that carbon cost adders (such as RGGI, or new other new regulations) grow in significance over time, the economic incentive to dispatch the Proposed Facility only when it is the lowest emitting resource available at the time will also grow. Accordingly, the Siting Board concludes that, even after 2029, the Proposed Facility will likely continue to provide some measure of CO₂ emission reduction benefits when it operates.

iv. GHG Mitigation Measures

Section 69J¹/₄ requires the Siting Board to determine whether environmental impacts relating to the Proposed Facility, such as its GHG emissions, comport with the requirement to “minimize the environmental impacts consistent with the minimization of costs associated with the mitigation, control and reduction of the environmental impacts of the proposed generating facility.” This requires an examination and balancing of mitigation options and costs under the established provisions of Section 69J¹/₄. Given the inclusion of the Zoning Petition, and pursuant to G.L. c. 30, § 61 and 301 C.M.R. § 11.01(4), the Siting Board must also comply with MEPA review requirements and make Section 61 findings in this proceeding. With regard to requirements in MEPA to evaluate alternatives that avoid, minimize and mitigate environmental impacts to the maximum extent practicable (301 C.M.R. § 11.01), the MEPA GHG Policy is intended to ensure that project proponents and agency reviewers carefully consider the GHG impact of their projects and take all feasible⁶⁶ means and measures to reduce those impacts. Consistent with the MEPA GHG Policy and established Siting Board statutory requirements and

⁶⁶ The word “feasible” is not a defined term in the GWSA, the MEPA GHG Policy, or the MEPA statutes and regulations. See St. 2008, c. 298; Revised MEPA Greenhouse Gas Emissions Policy and Protocol (Revised May 5, 2010); 301 C.M.R. § 11.00.

precedent for mitigating environmental impacts, we evaluate mitigation to reduce GHG emissions below.

The Company asserts that the Proposed Facility has minimized and mitigated CO₂ emissions impacts through its selection of a highly efficient, quick start gas turbine, that will operate predominantly on clean-burning natural gas, with many efficiency measures incorporated throughout the overall Proposed Facility, resulting in a generating facility that would be among the most efficient, and lowest-emitting peaking facilities in New England. CLF contends that the Proposed Facility includes no mitigation to reduce direct CO₂ emissions, and that feasible and cost-effective mitigation is available through use of on-site LNG as a start-up fuel, and the imposition of a declining CO₂ emissions cap for the Proposed Facility.

In carrying out its statutory responsibility to “minimize environmental impacts consistent with the minimization of costs associated with the mitigation, control and reduction of environmental impacts of the proposed generating facility,” the Siting Board assesses the costs and benefits of options for mitigating, controlling, or reducing these impacts, and determines whether mitigation beyond that proposed by the applicant is required to meet this standard of review. Braintree Electric at 97; Nickel Hill at 118. In addition, the Siting Board assesses any tradeoffs that need to be considered among conflicting environmental impacts, particularly where an option for mitigating one type of impact has the effect of increasing another type of impact. Braintree Electric at 97; Nickel Hill at 118.

CLF argues that “a proposed project cannot itself be a mitigation measure under Massachusetts law” and that pursuant to MEPA requirements, a project proponent must first establish a baseline without any mitigation measures (CLF Reply Brief at 9). We note, however, that the Secretary’s FEIR Certificate presents a variety of Project features (some adopted, and others subject to further consideration by the Company) that are described as “mitigation.” Some of these measures are integral to the Project, and have been “baseline” components since the Project was first presented to the Siting Board and MEPA for review.⁶⁷ Therefore, we accept

⁶⁷ For example, one of the listed GHG mitigation measures is “Use of a high-efficiency combustion turbine capable of meeting the project's stated goal of participating in the TMNSR market” (Exh. EFSB-4, at 13). The selected GE 7HA.02 turbine is, in fact, part of the MEPA project baseline.

the Company's contention that features of the Facility's design and operations that enhance its efficiency would help to mitigate GHG emissions.

The Company and CLF debate whether the Proposed Facility's compliance with the RGGI program constitutes a mitigation measure. While the Company is correct that earlier forms of CO₂ mitigation required by the Siting Board prior to the implementation of RGGI (and enactment of the GWSA) were discontinued and replaced by RGGI program requirements, RGGI compliance (like compliance with other regulatory requirements) does not constitute mitigation of GHG impacts. Where regulations require attainment of specific limits, performance standards, or compliance requirements, regulatory compliance would generally not be defined as mitigation.⁶⁸

With regard to the potential use of LNG as a secondary fuel supply, the record shows that while it is technically possible for the Facility to operate on LNG, albeit for very limited periods of time, there could indeed be GHG emissions reduction benefits by doing so. However, CLF determined that only 400,000 gallons (360,000 gallons net) of LNG capacity could be located on the site, providing only nine hours of full-load operation (without refilling), whereas the existing fuel oil storage facilities on site are capable of 72 hours of full-load operation during winter base load dispatch, without refill. Although MassDEP proposes to only allow ULSD use at the Proposed Facility for unscheduled startup periods, and other defined contingencies (and not for economic reasons), the potential need for a secure supply of secondary fuel for extended periods during such contingencies cannot be overlooked. Each day of full-load operation on LNG would require 94 LNG trailer deliveries, presenting significant additional logistical and environmental challenges. Moreover, the Town of Sandwich expressed strong opposition to use of LNG storage at the Proposed Facility, citing concerns about public safety (Sandwich Brief at 2-3).

While CLF has presented evidence suggesting financial benefits for the Project by using LNG rather than ULSD, and related reductions of approximately 400,000 tons CO₂ over the Proposed Facility's life, at the scale proposed by CLF, LNG would simply not provide a robust secondary fuel supply consistent with the Proposed Facility's intended design, market function,

⁶⁸ The Siting Board notes that the RGGI program could be used to create a GHG mitigation measure. For example, if a facility elected to *exceed* RGGI requirements, by acquiring and retiring more RGGI CO₂ emission allowances than necessary to cover its own emissions, that would constitute a form of CO₂ mitigation given the resulting regional and statewide emissions reductions.

and operational needs. Accordingly, for the reasons described, the Siting Board declines to impose the use of LNG storage as a GHG mitigation measure.

The disagreement between the Company and CLF about whether the Siting Board should impose a declining CO₂ emission cap on the Proposed Facility preceded both the issuance of MassDEP's proposed GWSA regulation that would establish a declining CO₂ on the electric generation sector in Massachusetts, and MassDEP's issuance of the Proposed Air Plan Approval including a declining CO₂ cap. In its comments, the Company opposes the Siting Board's imposition of a CO₂ cap, and recommends instead that, as it did in Exelon West Medway, the Siting Board should "rely on MassDEP regarding whether, and if so how, to impose a declining emissions cap." CLF asserts that imposing a declining emissions cap that reaches zero by 2050 would reduce the Proposed Facility's CO₂ emissions by three millions tons between 2019 and 2046, and impose, at most, a net present value cost of about \$7.4 million, or 1.9 percent, making such a cap feasible and cost-effective.

As a preliminary matter, the Siting Board notes that in considering potential mitigation measures, the Siting Board generally imposes only more-stringent – not less stringent – mitigation requirements than those of other jurisdictional regulatory agencies.⁶⁹ MassDEP's Proposed Air Plan Approval, the proposed 310 C.M.R. § 7.74 regulation, and Executive Order 569, evince MassDEP's intention to impose some form of emissions cap on the Proposed Facility and/or the electric generating sector in Massachusetts. If MassDEP does impose a declining cap on the Proposed Facility, the relevant question for the Siting Board is whether it relies solely on MassDEP's regulatory approach, or pursuant to its Section 69J^{1/4} authority, chooses to impose its own declining cap (or other form of mitigation) that is more stringent than MassDEP's mitigation.

In evaluating whether to impose a more stringent emission cap, as proposed by CLF, we begin by noting that the Siting Board's standard of review for considering environmental mitigation makes clear that reducing an environmental impact in one respect, can sometimes result in countervailing environmental impacts that must also be considered. As described

⁶⁹ In contrast, in its review of requests for zoning exemptions under G.L. c 40A, § 3, the Siting Board (through delegated Department authority) often imposes less stringent requirements than local authorities would allow under their zoning ordinances and by-laws.

below, the dispatch modeling performed by the Company provides a clear illustration of such conflicting impacts with regard to a binding CO₂ emissions cap imposed on the Proposed Facility.

Although the Company's dispatch model scenarios did not overtly include a declining cap mechanism, the "with/without" approach, reflected in the Updated Reference Case and the Canadian/Off-Shore Case effectively approximates the effects of an emissions cap of zero for the Proposed Facility during the 2019 – 2029 simulation period. While a cap of zero (i.e., precluding the Proposed Facility's operation) is the most extreme possible representation of a CO₂ cap, it nevertheless provides a valid illustration of the effect of a binding cap – that is, a cap that actually reduces the level of a facility's generation level below what it otherwise would have produced.

The dispatch model results are relevant to consideration of a declining cap as mitigation. As described above, without the Proposed Facility (equivalent to a cap of zero) net emissions within Massachusetts⁷⁰ would be less than with the Proposed Facility. However, without the Proposed Facility, CO₂ emissions increases outside of Massachusetts would more than offset the Massachusetts CO₂ reduction. Thus, the net impact for the New England region (and "statewide greenhouse gas emissions," as defined in the statute) is that, without the Proposed Facility, both regional and statewide emissions would be higher than with the Proposed Facility. Given record evidence showing that whenever the Proposed Facility operates, it displaces higher-emitting units on the grid, any CO₂ cap level that is binding on the Proposed Facility operations would have the same general effect – lower emissions within Massachusetts, but more than offsetting emissions increases elsewhere, resulting in increases in regional and statewide emissions, as defined by the GWSA.⁷¹

⁷⁰ As noted above, for the electric generating sector, GHG "emissions within Massachusetts" is not the same thing as "statewide greenhouse gas emissions" as defined by the GWSA, due to consideration of both in-state emissions and emissions from imports of power.

⁷¹ The GWSA defines the reduction of emissions in Massachusetts with offsetting emissions increases outside of Massachusetts as "leakage." G.L. c. 21N, § 1. The GWSA makes clear that leakage is a threat to attainment of the GWSA's emission reduction objectives, and it directs the Secretary to report on "whether state actions minimize leakage." G.L. c. 21N, § 5. If binding CO₂ caps were imposed consistently throughout

While, the imposition of a cap that is both more stringent than the one included in the Proposed Air Plan Approval, and binding in its effect, would reduce GHG emissions within the Project's fenceline and within the borders of Massachusetts, it would also result in more than offsetting CO₂ emissions increases elsewhere in the region, and therefore, a net increase in both regional and statewide GHG emissions, as defined by the GWSA. This is exactly the type of environmental tradeoff that Siting Board precedent recognizes, and compels the Board to address in its consideration of appropriate mitigation measures.

An additional concern regarding CLF's proposed declining cap is the evidentiary basis upon which CLF asks the Siting Board to make a determination that the cap would reduce emissions at "nominal expense" and "at most a net present value cost of 1.9%" (CLF Reply Brief at 13). In evaluating the financial implications for the Proposed Facility of CLF's proposed declining cap, CLF takes the concept of "mitigation costs" into areas that are inconsistent with Siting Board practice, and at odds with statutory provisions regarding the Siting Board's review of generating facilities enacted during restructuring of the electric sector. The mitigation "costs" that CLF attributes to its declining cap proposal, are, in fact lost profits that result from the combination of reduced revenues (from curtailment of the Proposed Facility's operations) and the reduced expenses of foregone generation output. While these lost profits might fit an economist's definition of "opportunity costs," they are not mitigation costs that have a logical nexus with Section 69J¹/₄, which involve actual expenses to control, reduce, avoid, or minimize environmental impacts. Typical examples of such mitigation costs in past Siting Board reviews include: air pollution emission controls, noise abatement measures, visual mitigation for abutters, and other such physical or operational measures taken to reduce environmental impacts associated with the production of electricity. Siting Board-approved mitigation may sometimes involve limiting operations during particular hours or periods to reduce impacts on sensitive receptors or the environment, but such mitigation is easily distinguished from the CLF's declining cap, which leads, inexorably, to a 2050 end-point of zero CO₂ emissions and, most likely, the forced retirement of the Proposed Facility.⁷²

the New England market, rather than in Massachusetts alone, there would be a reduced risk of leakage.

⁷² As noted by the Company, at such time as the Proposed Facility is no longer efficient relative to other units in the market, and it no longer provides emissions displacement

In asking the Siting Board to consider what it regards as only a small diminution of the Proposed Facility's profitability and financial viability stemming from the declining cap, CLF also implicitly asks the Siting Board to disregard its post-restructuring precedent. Following restructuring, the legislature revised the statutory provisions in Section 69J¼ so that the Siting Board "shall review only the environmental impacts of generating facilities, consistent with the commonwealth's policy of allowing market forces to determine the need for and cost of such facilities."

In EFSB 98-1, the Siting Board considered the implications of the new statutory language on its then-applicable standard of review for generating facilities, and determined that the Siting Board could no longer "continue its review of the economic viability of generating facilities." EFSB 98-1, at 16. In its cap proposal, CLF suggests, in effect, that the Siting Board return to its now-proscribed financial viability standard of the past, albeit for environmental purposes. Whether for environmental mitigation, or for any other reason, the type of financial analysis CLF puts forth to justify its cap proposal is inconsistent with both Section 69J¼ and Siting Board precedent.

For this reason, and those indicated above, the Siting Board declines to impose CLF's proposed CO₂ cap on the Proposed Facility. Instead, the Siting Board will rely on MassDEP regarding whether, and if so how, to impose a declining emissions cap. Any cap more stringent than the one that may ultimately be adopted by MassDEP would not comport with the record in this proceeding and is not appropriately imposed by the Siting Board. Based on the record evidence and findings above, the Siting Board finds that the Proposed Facility comports with the requirement to "minimize the environmental impacts consistent with the minimization of costs associated with the mitigation, control and reduction of the environmental impacts of the proposed generating Facility" under Section 69J¼.

v. Consistency with the GWSA

CLF and the Company disagree sharply about the implications of the GWSA and the determination the Siting Board must make as to the Proposed Facility's consistency with the GWSA. As an initial matter, we note that the Court has interpreted the phrase "consistent with"

benefits, the economics of the ISO-NE markets would avoid dispatch of the Facility leading to the Facility's likely retirement.

to require only “general consistency with applicable government regulations.” Box Pond Association v. Energy Facilities Siting Bd., 435 Mass. 408, 412 (2001). The GWSA establishes broad GHG reduction objectives for the entire Commonwealth and places the responsibility of developing regulations and programs to achieve these reductions primarily on the Secretary and MassDEP. The GWSA lacks specific guidance as to limits that should be placed on specific generating facilities. As noted above, MassDEP has included GHG requirements in the Draft Air Permits for the Proposed Facility, and has proposed Section 3(d) rules to comply with the Kain decision and Executive Order 569.

MassDEP has proposed Electric Generation Cap regulations under Section 3(d) that could ultimately affect the Proposed Facility, such regulations have not yet been adopted, and, therefore, there are currently no such regulatory requirements with which the Proposed Facility must comply. Even in the absence of Section 3(d) regulations (or other regulations that MassDEP might adopt to meet GWSA requirements), CLF’s argument that the Siting Board does not have any mechanism by which it can determine that the Proposed Facility is consistent with the GWSA is misplaced. Although MassDEP’s proposed regulations for the electric sector (310 C.M.R. § 7.74 and 310 C.M.R. § 7.75) are still not yet finalized, they nevertheless provide an indication of MassDEP’s policy intentions regarding how the Commonwealth might achieve the 2020 target (25 percent below 1990 emissions levels) and, eventually, the 2050 target (80 percent below 1990 levels). In the Clean Energy Standard regulation (310 C.M.R. § 7.75), MassDEP is proposing a significant increase in the amount of large hydro-electric and other clean energy resources which, along with growth in the RPS, would increase retail supplier portfolios to 80 percent clean and/or renewable resources by 2050.⁷³ Operation of the Proposed Facility is consistent with the vision articulated in the proposed Clean Energy Standard, by providing quick-start, and fast-ramping capability to help support the integration of significant quantities of intermittent renewable generation, which will be necessary to meet the GWSA 2050 target.

⁷³ In both of its GHG inventory accounting methods (the Massachusetts method and the regional method) MassDEP accounts for the net procurement of RECs by Massachusetts retail suppliers in the Massachusetts GHG inventory; MassDEP proposes to accord similar GHG inventory treatment to the proposed Clean Energy Standard regulation, and the “Clean Energy Certificates” that would be used to measure its compliance. Thus, significant reductions in measured Massachusetts GHG Inventory levels for the electric sector would result from the RPS and the proposed Clean Energy Standard – independent of the proposed declining cap regulation in 310 C.M.R. § 7.74.

The 2020 CECP Update anticipates a 2020 emissions reduction of 2.7 million metric tons of CO₂ annually resulting from the expected closure of coal-fired electric generating plants and substitution of natural gas-fired generation. The 2020 CECP Update does not specify whether the greater use of natural gas would occur through an increased number of gas-fired plants or greater use of existing plants. In addition, the 2020 CECP Update does not prohibit natural gas as part of the electric generation fleet, even as far off in the future as 2050.

To meet the GWSA's 2050 limit, there must be a significant increase in the amount of renewable resources, including wind energy, solar generation, and hydroelectric power. The electric system would need, therefore, to support the integration of increased intermittent renewable generation. The Proposed Facility, as a responsive quick-start unit, is well suited for this function during the transition from natural gas-fired generation to renewables anticipated by the 2020 CECP Update.

As we have noted above, the efficient profile of the Proposed Facility leads to both regional and statewide GHG reductions, as shown in the results of the Company's dispatch modeling from 2019 to 2029. Also as noted above, the use of economic dispatch by ISO-NE ensures that when the Proposed Facility operates, it will be one of the more efficient units to be dispatched, and is likely to displace higher emitting resources. This mechanism provides an assurance that, even after 2029, whenever the Proposed Facility produces power, it will be producing lower emissions than what otherwise would have been the case, continuing to provide regional and statewide emissions reductions through such operation.

Finally, the Siting Board disagrees with CLF's argument that the Board is precluded by its own statutes and precedent from finding GWSA consistency based on, among other factors, beneficial environmental or economic impacts⁷⁴ that the Proposed Facility might effect regionally on the grid. We note that G.L. c. 164, § 69J¼ specifically authorizes the Siting Board to consider local and regional land use impacts, and local and regional cumulative health impacts relating to generating facilities under review. Moreover, for decades, the Siting Board has

⁷⁴ Although the Company's primary objective in performing dispatch modeling was to determine statewide and regional GHG displacement impacts, the dispatch model results also indicate that the Proposed Facility would result in lower wholesale regional energy market prices. This result is consistent with ISO-NE's economic dispatch of generation units in its day-ahead energy market (CONFIDENTIAL Exhs. EFSB-A-44(S)-69; EFSB-A-44(S)-84).

evaluated system-wide environmental impacts for proposed generating facilities in a similar manner to that performed by the Company in its dispatch modeling. The Siting Board has consistently based its findings, in part, on such results.

Accordingly, based on the record evidence and findings above, the Siting Board finds that the Proposed Facility is consistent with the GWSA.

3. Conclusion on Air Impacts

Accordingly, the Siting Board finds that, with implementation of the stack-height condition, above, the air quality impacts of the proposed Project would be minimized.

C. Land Use

1. Company Proposal

The Proposed Facility would occupy an approximately twelve-acre site (the Facility Site) located in the northeast quadrant of the 52-acre Freezer Road Site (Exh. NRG-1, at 1-1, 4-101). NRG stated that the majority of the Freezer Road Site has been developed in conjunction with the Existing Facility, which, as described in Section I.A, above, consists of two steam-electric generating units, several aboveground storage tanks, and other appurtenant facilities (*id.* at 1-5; RR-EFSB-15(S)(1) at 1-1). The Existing Facility connects to the regional transmission system via the Eversource Switchyard located south of the Freezer Road Site (Exh. NRG-1, at 4-101; RR-EFSB-15(S)(1) at 1-1). NRG stated that it would require an approximately 120-foot-wide utility easement from Eversource and the Massachusetts Department of Transportation (“MassDOT”) to connect the Proposed Facility to this switchyard (Exhs. NRG-1, at 1-2; EFSB-G-17(1); EFSB-G-35). Natural gas is supplied to the Existing Facility through an existing interconnection with the AGT system located at the west end of the Freezer Road Site (Exh. NRG-1, at 1-15, fig. 1.1-2). Because all of the new gas interconnection work associated with the Proposed Facility would be within the Freezer Road Site, no new land rights would be required to connect the Project to the existing AGT system (*id.* at 1-2, 1-15). According to the Company, the entire Freezer Road Site is zoned “Industrial Limited” and the Proposed Facility is an allowed use (*id.* at 1-5 to 1-6, 4-103).

NRG stated that the Facility Site itself is currently occupied by an earthen- and concrete-slab, two ammonia storage tanks, aluminum-sided warehouses, several temporary

trailers, and hard-packed open areas used for parking (Exh. NRG-1, at 1-5). NRG would remove the warehouses and trailers to enable construction of the Project (id.). Approximately half of the ground cover in the unoccupied portions of the Facility Site is gravel; sparse plant communities, consisting primarily of herbaceous vegetation, are present within the remainder of the area (id. at 4-101; RR-EFSB-15(S)(1) Att. 5.H-1, at 2). NRG reported that no state-listed or federally listed rare plant or animal species inhabit the Facility Site, and no exemplary natural communities are present on the Facility Site or in the vicinity (Exh. NRG-1, at 4-63).

Land uses adjacent to the Facility Site include recreational, commercial/industrial, and residential uses (Exh. NRG-1, at 4-101 to 4-102). A U.S. Army Corps of Engineers (“USACE”) recreational walkway, frequented by pedestrians, cyclists, and recreational fishermen, runs along the Cape Cod Canal, immediately north of the Freezer Road Site (id. at 4-101). Further north, across the Cape Cod Canal, is the Scusset Beach State Reservation, which includes recreational beach and campground amenities (id. at 4-101 to 4-102). The Town of Sandwich Marina, a Canal Marine Fisheries building, and parking for the USACE walkway are the dominant land uses adjacent to the Freezer Road Site to the east (id. at 4-102). Further east is a more densely developed residential area off of Town Neck Road, approximately a quarter of a mile away from the Facility Site (id. at 4-102; Exh. EFSB-NO-6). To the south is an active railroad ROW, used by the Cape Cod Scenic Railroad and a small number of freight trains (Exh. NRG-1, at 4-102). To the west is a wooded area in Bourne (id.).

The closest residential abutter is located adjacent to the railroad tracks on Freezer Road at a distance of 141 feet from the Facility Site boundary (id.; Exh. EFSB-NO-6). Two additional residences are located on Briarwood Avenue/Tupper Road, approximately 550 feet south of the Proposed Facility (Exhs. NRG-1, at 4-102; EFSB-NO-6). In total, NRG indicated that there are 108 residences, 30 commercial buildings, and three sensitive receptors located within one-half mile of the proposed Facility Site (Exh. EFSB-LU-1).

The Town of Sandwich has designated the Existing Facility a historic site (RR-EFSB-15(S)(1) at 2-1). NRG stated that although the proposed Project would be constructed adjacent to the Existing Facility, it would not alter any designated historic structures or features (id.). Furthermore, NRG stated that the Proposed Facility is consistent with the policies of the Town of Sandwich regarding historic preservation and community character, as reflected in the Local Comprehensive Plan, and that the Project design is consistent with the

objectives of the Old King's Highway Regional Historic District Act of the Commonwealth, St. 1973, c. 470 (id. at 5-83; Exh. NRG-1, at 4-107). Finally, NRG submitted a Project Notification Form to the Massachusetts Historical Commission ("MHC") in 2015, and the Company reported that the MHC had no comments regarding the Project (RR-EFSB-15(S)(1) at 2-1).

2. Analysis and Findings

The record shows that the Proposed Facility is consistent with the existing and longstanding utility-related uses of the Freezer Road Site, which is zoned for industrial use. The twelve-acre Facility Site consists of previously disturbed areas, including aluminum-sided warehouses, temporary trailers, and temporary parking. NRG would remove the warehouses and trailers as part of the Project. The record indicates that no rare species or exemplary natural communities are present on the Facility Site.

The Existing Facility has been designated as a historic site by the Town of Sandwich. The record shows that the Project would not alter any of the historic structures or features, and that the Project has been designed to be consistent with the Town of Sandwich's Local Comprehensive Plan and the objectives of the Old King's Highway Regional Historic District Act.

The Facility Site is surrounded by a variety of uses, including a USACE public access walkway, residential homes, commercial businesses, and forested land. From a land use perspective, the Proposed Facility is compatible with land use of the Freezer Road Site and its surroundings. Mitigation for visual, noise, traffic, and public safety impacts with the potential to affect adjacent uses are addressed in Sections IV.E through H.

The Siting Board finds that the land use impacts of the proposed Project would be minimized.

D. Wetland and Water Resources

In this section, the Siting Board addresses water-related impacts of the Proposed Facility including water supply systems, surface and groundwater resources, wastewater and stormwater discharges, and wetland and waterway impacts, as well as the potential for seawater flooding of the Proposed Facility.

1. Company Proposal

- a. Project Water Demand

NRG calculated the Proposed Facility's water use based on factors such as representative ambient temperatures and humidity, and projected operating hours on ULSD and natural gas (Exh. NRG-1, at fig. 4.4-3). The Proposed Facility would use simple-cycle combustion turbine technology, which the Company characterized as having inherently low water demand (id. at 4-37). Water would be used for NO_x emissions control during ULSD use, for evaporative inlet cooling in warm weather, and for turbine washing and general process use (id.; Exh. NRG-3, at 2-4). The majority of water use at the Proposed Facility would be associated with NO_x control (Tr. 2, at 325; RR-EFSB-14). The Company projected that, at the proposed air permit limit, the Proposed Facility would use an average of up to 0.078 million gallons per day ("MGD") on an annual basis (Tr. 1, at 10-11; Tr. 2, at 324). This is a reduction from the Company's originally proposed 0.125 MGD, which was based on 1,440 hours of ULSD use (Exh. NRG-1, at 4-40; Tr. 1, at 10-11). The Company indicated that the maximum daily use would be 0.69 MGD (Exh. NRG-1, at fig. 4.4-3).⁷⁵

- b. Available Water Supply

There are four active production wells on the Freezer Road Site (Exh. NRG-1, at 4-40). The Company would supply process water to the Proposed Facility with two of those wells, identified as Well No. 2 and Well No. 3 (id.). These are the same wells that are used by the Existing Facility for service and make-up water (id.). Potable water would continue to be supplied by the Sandwich Water District (id.).

Well No. 2 was installed in 1966 and has a well screen at approximately 96 to 117 feet below the ground surface in native material (Exh. NRG-1, at 4-40). Well No. 3 was installed in 1974 and has a well screen at approximately 90 to 110 feet below the ground surface in packed gravel (id.). The Company stated that the Canal Generating Station registration under the Massachusetts Water Management Act ("WMA"), issued in 1990, allows for an average groundwater withdrawal volume of 0.45 MGD for the two wells (164.25 million gallons per year) (id. at 4-41). The Company stated that Well No. 3 has a potential yield of approximately 3

⁷⁵ Staff calculated maximum daily water use (in MGD) based on the Company's reported maximum daily use in gallons per minute, and extending it over 24-hours.

MGD, considerably in excess of the capability of the pump in the well (Tr. 2, at 313). The Company further stated that while the two wells are physically capable of pumping more than the 0.45 MGD registration limit, the registration was based on historical use between 1981 and 1985 (Exhs. NRG-1, at 4-41 to 4-42; EFSB-W-7). According to the Company, monthly and yearly withdrawal rates from the wells were consistently at or close to the registration limits until 2009, when operation of the Existing Facility was reduced (Exh. NRG-1, at 4-41).

The Company stated that no impacts to sensitive resources from pumping of these on-site wells were documented during operations between 1966 and 2009 (*id.* at 4-41). NRG also stated that during the past five years, due to the reduced operation of the Existing Facility from historical baseload levels, the average daily withdrawals from Wells No. 2 and No. 3 have been between 0.11 and 0.26 MGD (*id.* at 4-42). NRG stated that using this highest withdrawal rate of 0.26 MGD, and adding an originally proposed additional 0.125 MGD needed for the Proposed Facility, a total average demand of 0.38 MGD would accrue for both the Proposed and Existing Facilities (*id.*). The Company asserted that, based on previous pumping tests and current water demand, the current on-site water supply system should be able to supply the water needs of the Project while remaining below the allowed WMA water withdrawal volume limit (*id.*). The Company asserted that because the Proposed Facility would not increase water demand above the MWA limit, no further mitigation is required (Exh. EFSB-W-7).⁷⁶

The Sandwich Water District supplies potable water to the Existing Facility and to the surrounding residential dwellings and commercial establishments (Exh. NRG-1, at 4-42). The Company stated that there are no known private groundwater supply wells located within half a mile of the Facility Site (*id.*). According to NRG, the South Sagamore wellfield, which is

⁷⁶ The Company stated that the local aquifer, the Sagamore Lens, has a thickness of up to 250 feet within the nearby Joint Base Cape Cod, from which groundwater flows radially including northward towards the Freezer Road Site (Exh. NRG-1, at 4-39). The Company stated the maps of the MassDEP Sustainable Water Management Initiative indicate that there are no stressed watersheds near the Freezer Road Site (Exh. EFSB-W-7). A relatively high hydraulic gradient pushes water from the upgradient aquifer towards the ocean (Exhs. NRG-3, at fig. 4.3-1; EFSB-W-1). The Company added that the Sagamore Lens aquifer from which the Existing Facility withdraws water is one of the most abundant supplies in Massachusetts (Exh. EFSB-W-7).

not in use due to contamination,⁷⁷ is located to the west of the Facility Site but the Interim Wellhead Protection Area for the wellfield does not extend to the Facility Site (Exhs. EFSB-W-10; EFSB-W-10(1); Tr. 2, at 344-345). The Project includes a new 360,000-gallon tank to store water for process use and fire suppression, and a new 1,000,000-gallon demineralized water tank (Exh. NRG-1, at 1-10 to 1-13, fig. 1.1-3).

NRG maintains that it has minimized environmental impacts of the Project on water supplies (Company Brief at 64).

c. Wastewater Discharge

NRG indicated that the total process wastewater discharge of the Proposed Facility would be low – no more than 0.0144 MGD (Exh. NRG-1, at 4-43, fig 4.4-3; RR-EFSB-37(1)).⁷⁸ According to the Company, all liquid wastewater streams that cannot be recycled on-site, such as turbine wash water and turbine startup drains, would be collected in a new underground tank for off-site treatment (Exh. NRG-1, at fig. 1.1-3, 4-43). The Project includes both a new 20,000-gallon wastewater holding tank and a new 4,000-gallon CTG wash water holding tank (id. at 1-1).

The Company stated that it would use existing sanitary facilities located in the existing training building (id. at 4-43). No additional sanitary facilities are planned for the Proposed Facility; operational staff would use sinks and toilets in the Existing Facility, which discharge less than 1,000 gallons per day to septic tanks and a leach field designed for higher quantities (id.; Exh. EFSB-W-9).⁷⁹

The Company contends that it has minimized any wastewater impacts of the Project (Company Brief at 70).

⁷⁷ NRG indicated that an upgradient auto demolition yard was the source of the South Sagamore wellfield contamination (Tr. 2, at 344-346).

⁷⁸ Staff calculated maximum daily wastewater discharge (in MGD) based on the Company's reported maximum daily use in gallons per minute, extending it over 24 hours.

⁷⁹ The Existing Facility discharges non-contact cooling water into the Cape Cod Canal through a submerged diffuser (Exh. NRG-1, at 4-43).

d. Stormwater Management

NRG stated that the existing drainage system within the Freezer Road Site has three catchments and associated discharge locations: the cooling water discharge flume, which discharges into the Cape Cod Canal through existing National Pollutant Discharge Elimination System (“NPDES”) Outfall 001; a culvert discharge to a drainage ditch adjacent to Rickeys Road, near the railroad; and a culvert discharge to a wetland system south of Rickeys Road (Exh. NRG-3, at 9-1).

Before commencing construction, NRG would prepare an erosion and sediment control plan intended to meet USEPA, MassDEP, Cape Cod Commission (“CCC”), and Town of Sandwich requirements and guidelines (id. at 9-2). NRG indicated that it would also prepare a construction-phase Storm Water Pollution Prevention Plan (“SWPPP”) prior to construction (Exh. NRG-1, at 4-43, 4-47). The plan would describe installation of perimeter sediment controls, installation of a stabilized construction exit to minimize tracking of sediment onto public ways, inlet protection around existing catch basins, and inspection requirements (id. at 4-44, 4-47). In addition, the SWPPP would describe soil stockpile protection, dust control measures, the intended inventory of sediment control supplies, and contractor training (id. at 4-45, 4-47).

With respect to operational stormwater management, NRG stated that the Proposed Facility would continue to use all three existing discharge points (Exh. NRG-3, at 9-4). The Company asserted that the quality of stormwater runoff from the Facility Site would be greatly improved compared to existing conditions through the introduction of structural and non-structural Best Management Practices (“BMPs”) that include deep sump catch basins, vegetated water quality swales, vegetated strips and infiltration basins with sediment forebays, and leaching catch basins (id.). The Company stated that the design emphasizes infiltration and pretreatment pollutant removal efficiencies through the introduction of vegetation (id.).

NRG stated that the proposed Project would be consistent with the MassDEP stormwater management standards (id. at 9-4 to 9-7). The Company would ensure conformance by: (1) not proposing any new direct point discharges that would release untreated stormwater or that would cause erosion; (2) making sure that post-development peak discharge rates would not exceed pre-development discharge rates; (3) complying with total post-construction suspended solids removal requirements; and (4) designing the Project so that potentially affected critical areas

(including areas that grow shellfish) are protected (*id.* at 9-5). The Company stated that the Project would not have an unacceptable effect on wetlands, water supplies, groundwater, flood control, erosion and sedimentation control, water pollution, fisheries, shellfish, or wildlife habitat, in conformance with the Town of Sandwich Stormwater Management Bylaw (Exh. NRG-1, at 4-48).

NRG anticipates that, based on its wastewater discharges to groundwater and land-use parameters, the Company would meet a CCC guideline by limiting discharges to no more than five parts per million of nitrate as nitrogen (*id.* at 4-49). On the basis of this expectation, and by conforming to other water quality standards, the Company asserted that the Proposed Facility conforms with Coastal Zone Management water quality policies (*id.*). The Company noted that the Facility Site is not located within a Wellhead Protection Area (*id.* at 4-52).

In addition, the Company argues that its stormwater management plan will minimize any impacts from the Proposed Facility's stormwater discharges (Company Brief at 70).

e. Wetlands and Waterways Impacts

NRG stated that the rip-rap slope along the edge of the Cape Cod Canal, above the mean high water elevation, is classified as Coastal Bank as defined by the Massachusetts Wetlands Protection Act ("WPA") (Exh. NRG-1, at 4-52 to 4-53). The Company stated that while the gas feed line for the Project would be within 100 feet of the Coastal Bank, the Coastal Bank is outside the Facility Site itself and would not be impacted by the Project (*id.* at 4-53; Tr. 2, at 339).

NRG identified small portions of three jurisdictional wetlands located within the Freezer Road Site, all of which are associated with drainage ditches (Exhs. NRG-1, at 4-52 to 4-53; NRG-6, at 1-16). According to the Company, its Project design avoids impacts to these wetland resource areas and their associated buffer areas (Exh. NRG-1, at 4-63).⁸⁰

⁸⁰ With respect to wetland-dwelling federally listed, proposed, or candidate species potentially present at the Facility Site, NRG stated that coastal beach species such as piping plover, roseate tern, red knot, and northeastern beach tiger beetle would not be found on the Facility Site due to habitat preference; that northern red-bellied cooter, a turtle that inhabits inland ponds and rivers, also would not be found on the Facility Site; and that sandplain gerardia was not observed on Facility Site inspections (Exh. NRG-1, at 4-60).

The electric lines interconnecting to the existing switchyard south of the Proposed Facility would traverse a wetland outside of the Freezer Road Site, requiring some trimming of taller vegetation (*id.* at 4-53, 4-56, 4-61; Exh. NRG-6, at 1-3; Tr. 2, at 342-343). The Company stated that it identified several individual taller trees in this area and was able to design the transmission line alignment to avoid most of these trees (Tr. 2, at 347). Also, one pole would be located within the buffer zone of the wetland (Exh. NRG-6, at 1-3). NRG stated that a 100-foot buffer zone is neither defined as a resource area nor does it include performance standards under the WPA, but it is considered a resource pursuant to Chapter 7 of the Town of Sandwich General Bylaws (Exh. EFSB-G-36). Therefore, the Company stated that the placement of the poles within this buffer zone would require a Notice of Intent application filing with the Sandwich Conservation Commission (*id.*). The Company stated that it is consulting with the Sandwich Conservation Commission with respect to establishing an understory scrub-shrub wetland community in this area, to be composed of native shrub species (Exh. NRG-1, at 4-63).

Finally, the Facility Site includes Land Subject to Coastal Storm Flowage (“LSCSF”) – that is, land subject to any inundation caused by coastal storms up to and including that caused by a 100-year storm, surge of record, or storm of record (*id.* at 4-53). The Company stated that Massachusetts wetlands regulations do not specify performance standards for LSCSF (*id.*). Flowage from coastal storms is discussed at greater length in the context of sea level rise in the next subsection.

NRG stated that the Project’s ULSD line is located within the footprint of an existing dock and bridge structure, both of which are licensed pursuant to waterways regulations, and consistent with uses previously authorized in Chapter 91 licensing (*id.*). The Company will file a request for a “Minor Modification” of the existing Chapter 91 license with the Waterways Program of MassDEP (Exh. EFSB-W-12).

The Company argues that the Proposed Facility would have no permanent impacts on wetlands, and temporary impacts would be adequately mitigated (Company Brief at 67).

f. Coastal Flooding and Sea Level Rise

NRG described its evaluation of potential effects of sea level rise as having three parts: first, the Company identified the “baseline” elevation that would protect the Proposed Facility from coastal flooding as it exists today; second, the Company projected future sea level rise at

the Facility Site; and third, the Company determined how projected future sea level rise would affect flooding-related impacts at the Facility Site, as described below (RR-EFSB-18; Company Brief at 71-74). The Company ultimately selected a design elevation for foundations of 16 feet relative to the North American Vertical Datum of 1988 (“NAVD 88”), the current reference point for elevation (Exh. NRG-1, at 5-12; Tr. 1, at 18, 66, 82; Company Brief at 73).

To select a design elevation for the Facility Site that would currently be protective against potential coastal flooding, the Company consulted coastal flood information provided by the Federal Emergency Management Administration (“FEMA”) (Exh. NRG-1, at 5-10 to 5-11). The entire 12-acre Facility Site is mapped by FEMA as subject to a 100-year storm flood, and is considered LSCSF under wetlands regulations, as noted above (Exh. NRG-1, at 4-53). The Company referenced FEMA’s Flood Insurance Rate Map (“FIRM”) (FIRM number 25001C0319J, effective July 16, 2014) as indicating that the mapped 100-year storm flood level is 14 feet above mean sea level (“amsl”) for most of the Facility Site, and 15 feet amsl with moderate wave action at the rip-rap slope of the Cape Cod Canal (*id.* at 4-55 to 4-56).⁸¹ The Company also provided a more-precise 100-year storm flood level (including wave set-up and wave run-up) elevation of 13.7 feet NAVD 88 for the Facility Site, as interpreted by the Company from FEMA’s Barnstable County Flood Insurance Study, which is labeled as being effective July 16, 2014, based on the figure for Transect 004 crossing Scusset Beach (RR-EFSB-18 n.7; *see* Exh. CLF-1-48(1) at 76; NRG-3, fig. 10-1).⁸² Using the same information, the Company also estimated that the 500-year storm water elevation at the Facility

⁸¹ NRG’s lead witness on sea level rise indicated that the Company means to reference elevations to NAVD 88 when it states an elevation as amsl (Tr. 1, at 21).

⁸² FEMA’s Barnstable County, Massachusetts, Flood Insurance Study indicates a one-percent chance each year of the water level reaching 13.7 feet NAVD 88, on Barnstable County Transect 004, including a stillwater elevation of 9.5 feet and wave set-up and wave run-up (Exh. EFSB-1). Transect 004 cuts across Scusset Beach near the north bank of the Cape Cod Canal, whereas Transect 005 is on the south side of the Canal (the same side as the Facility Site) (Exh. NRG-3, at fig. 10-1). Transect 005 has predicted a 100-year storm total water level elevation equivalent to that on Transect 004 (Exh. CLF-1-48(1) at 76). Relative to the interior of the Facility Site, flood scenario mapping shows an area of moderate wave action extending to the edge of the Cape Cod Canal, which the Company described as due to a 1.5-foot wave height from residual wind-driven waves at the mouth of the Cape Cod Canal (Exhs. EFSB-W-4; EFSB-W-4(2)).

Site, including wave set-up and wave run-up, would be 14.7 feet NAVD 88 (RR-EFSB-17). The Company reported that, going back to 1920, the highest actual water level recorded at Boston was 9.7 feet NAVD 88 in the Blizzard of 1978, during which the water level reached 8.35 feet NAVD 88 at the Sandwich Marina, adjacent to the Facility Site (*id.*; Exhs. EFSB-W-3; CLF-2-10; RR-EFSB-19).⁸³ The Company selected the 100-year storm flood level provided by FEMA for Transect 004, 13.7 feet NAVD 88, as its baseline elevation (RR-EFSB-18 n.7; Company Brief at 73).

NRG provided a variety of explanations of how it selected the figure for estimated sea level rise it used to establish its design elevation of 16 feet NAVD 88.⁸⁴ In its final set of responses in the proceeding and in its brief, however, it stated that it calculated its design elevation by considering two figures obtained with a calculation tool⁸⁵ available from the

⁸³ A 1963 report of the Massachusetts Water Resources Commission lists tidal heights for earlier dates, each described as a height above mean low water (“MLW”) (but the date or dates that MLW was established were not listed) (Exh. CLF-5, at 47-48). For instance, in the Portland gale of November 1898, the Boston tide reached 14.4 feet above MLW (Exh. CLF-5, at 47-48). Additional northeasters in 1851 and 1909 raised Boston’s tide to 14.9 feet, and a storm in February 1722 caused a high tide in Boston of 15.4 feet above MLW (Exh. CLF-5, at 47-48). The Siting Board notes that these values compare to a 1978 flood of about 15.2 feet above MLW, assuming that MLW in 1978 was about minus 5.5 feet NAVD 88 (9.7’ NAVD 88 + 5.5’ conversion factor). The Company stated that tidal records are not available for as long a time period at Sandwich, compared to Boston Harbor (Tr. 1, at 13-14; RR-EFSB-1). However, the Company did note that the mean tidal range (*i.e.*, the difference between mean high tide and mean low tide) at the east end of the Cape Cod Canal is 8.7 feet, which is lower than the 9.5-foot mean tidal range at Boston (Exh. NRG-1, at 5-12).

⁸⁴ At different times during the proceeding, NRG indicated that it chose an estimate of sea level rise by 2060 of: 1.87 feet of sea level rise, as the USACE high estimate (Exh. CLF-1-45; Tr. 1, at 96); two feet of sea level rise, as an intermediate figure between a NOAA intermediate high projection of 1.89 feet and an identified USACE high estimate of 2.28 feet (Exh. NRG-1, at 5-12; NRG-3, at 10-4); 2.15 feet, half-way between USACE and NOAA high estimates (RR-EFSB-18); and 2.3 feet of sea level rise, approximating a USACE high estimate of 2.28 feet (Exh. EFSB-G-23; RR-EFSB-2; RR-CLF-6). Each of these formulas was used by the Company to justify its design elevation of 16 feet NAVD 88. Also, during oral testimony, the lead NRG sea level witness did not recollect whether he had provided the 16-foot figure to Project engineers or vice versa (Tr. 1, at 133).

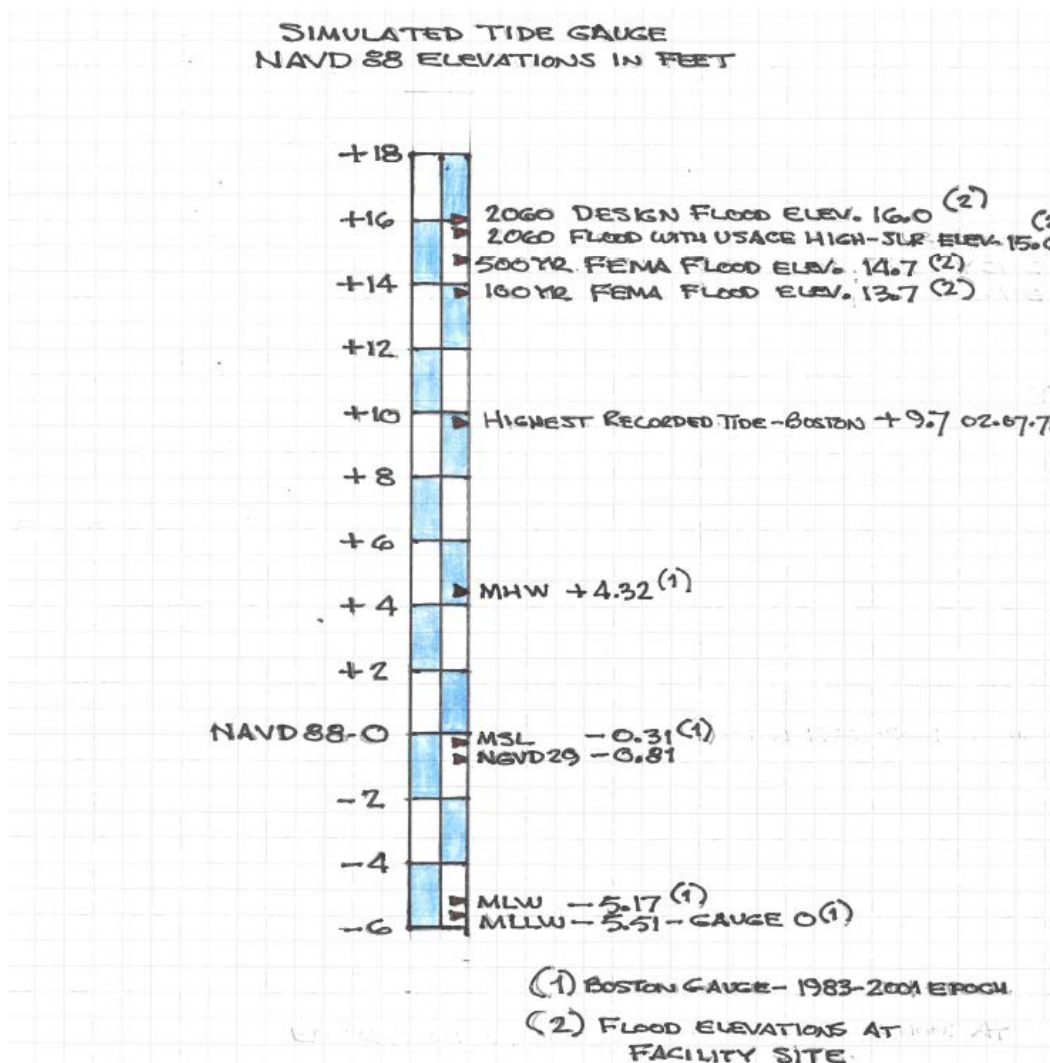
⁸⁵ NRG stated that the USACE estimating tool estimates the expected future sea level at a particular tide station location (selected by the user of the tool) and using a particular start

USACE – (1) the “high” estimate provided by the USACE itself, 1.87 feet, and (2) the “high” estimate of 2.43 feet provided by the National Oceanic and Atmospheric Administration (“NOAA”) – and then taking the arithmetic average of the two figures (RR-EFSB-18; Company Brief at 72-73). The Company explained that the USACE tool calculates sea level rise for specified locations and for specified future dates (RR-EFSB-18; Company Brief at 73). According to the Company, it chose 2016 as the start date to use in the USACE tool and 2060, 44 years in the future, as the end date,⁸⁶ and also selected Boston as best representing tides at the Facility Site (Tr. 1, at 19; RR-EFSB-18; Company Brief at 72, citing Exh. EFSB-W-16). NRG points out that the USACE recommends considering a low-, a medium-, and a high- scenario (Company Brief at 72, citing Exh. CLF-3(S), app. D). However, in what it describes as a conservative measure, the Company considered only the two highest sea level rise projections provided by the tool, the USACE “high” estimate of 1.87 feet and NOAA “high” estimate of 2.43 feet sea level rise over the current baseline (Exh. CLF-1-45-1; RR-EFSB-18; Company Brief at 72). NRG averaged these two values, yielding a 2.15 feet projected rise, and added that figure to the 13.7-foot NAVD 88 100-year storm flood level projection to get 15.85 feet NAVD 88 as the elevation of the future (2060) 100-year storm flood (RR-EFSB-18). The Company stated that it then rounded 15.85 feet to 16 feet NAVD 88 as its design elevation (RR-EFSB-18; Company Brief at 73). Selected water levels are shown in Figure 1, below, as drawn by the Company.

date and a particular end date (both entered by the user of the tool) (RR-EFSB-18). The USACE tool was available on-line (at the time of the proceeding) at <http://www.corpsclimate.us/ccaceslcurves.cfm> (id.).

⁸⁶ The Company indicated that it considers 40 years as the design life of the Proposed Facility (Exh. NRG-1, at 5-12; Tr. 1, at 169).

Figure 1. Tidal Ranges, Flood Ranges, and Design Flood Elevation



Source: RR-EFSB-19.

NRG proposes to raise the grade level from approximately ten feet to provide an elevation for the base slab/tops of foundations of 16 feet NAVD 88 in an area of the Facility Site that includes all Proposed Facility components required to produce electricity and deliver it to the grid (Exhs. NRG-6, at 5-1; EFSB-G-21; EFSB-W-15; Tr. 1, at 86; RR-CLF-5). The Company estimated that this work would cost \$2.3 million (RR-CLF-2). According to the Company, roadways would remain at an elevation of approximately 11 feet NAVD 88 (Exh. EFSB-G-21). The Company stated that compensatory flood storage is not required because the Facility Site is in a coastal location and drains to the ocean and therefore would not affect any adjacent properties (Exh. NRG-1, at 4-53; Tr. 1, at 78-80).

The Company concluded that its plan to raise the base elevation of the Facility Site so that the tops of equipment foundations will be 16 feet NAVD 88 will protect against damage from storms and sea level rise for the design life of the Proposed Facility (Exh. NRG-1, at 5-12; Company Brief at 73-74).

In response to CLF's contention (see below) that the Company should build at or above 17.5 feet NAVD 88, the Company described CLF's 17.5-foot flood level as improbable (Exh. EFSB-W-15). NRG stated that it chose to follow the lead of the USACE, which NRG described as possibly the largest civil engineering organization in the world (Tr. 1, at 57-60). The Company maintained that, with a slab foundation elevation of 16 feet and supporting structures holding all of the generating equipment above its foundations, the lowest parts of the essential Project equipment would be located between 18 feet and 19 feet (id. at 62-66; RR-CLF-5).⁸⁷ Furthermore, the Company indicated that at any point in the next ten to 40 years, the Company will be able to look again at sea level trends, re-evaluate the potential for flooding and, if warranted, install adaptable flood mitigation such as deployable flood protection structures (Exh. EFSB-W-15; Tr. 1, at 70-75).⁸⁸ The structures would be acquired well in advance but deployed shortly in advance of a particular storm (i.e., in lieu of sandbags) (Tr. 1, at 70-71). Currently available products identified by the Company as fitting this description include Aquafence (modular, reusable panels) and Tigerdam and Eco-Dam (inflatable tubes) (RR-CLF-3).⁸⁹

⁸⁷ Addressing one of CLF's specific criticisms, NRG stated that its geotechnical analyses would ascertain the size of piles needed to prevent Proposed Facility subsidence, and indicated that it would employ piles sufficient to the purpose (Tr. 1, at 92-93).

⁸⁸ NRG stated that MassPort and the Federal Reserve Bank in Boston have installed deployable flood protection structures in an area that has ground elevations of approximately ten to twelve feet (Tr. 1, at 70). NRG suggested that in the storm the Proposed Facility is designed to survive, the streets next to South Station in Boston would be six feet under water (id. at 70-71).

⁸⁹ NRG noted that it clearly has a financial motivation to avoid having its equipment flooded; The Company stated that, with a major investment in the Canal Generating Facilities, the Company would do what it could to prevent flooding (Tr. 1, at 77).

2. Positions of the Parties

a. Applicable Standard

The parties present different standards of review as being applicable to the Siting Board's obligations regarding sea level rise. CLF argues that any finding by the Board must include a "finding that all feasible measures have been taken to avoid or minimize" the "reasonably foreseeable climate change impacts, including additional greenhouse gas emissions" relating to the Proposed Facility as well as reasonably foreseeable climate change "effects, such as predicted sea level rise" (CLF Brief at 4, citing G.L. c. 30, § 61). CLF contends that the Board should deny approval to the Petition, because it "fails to include *all feasible measures* to avoid the reasonably foreseeable effects of predicted sea level rise" (CLF Brief at 5; CLF Reply Brief at 1; emphasis supplied).

The Company, however, asserts that CLF is misstating the standard of review for addressing sea level rise under the GWSA as incorporated into G.L. c. 30, § 61 ("Section 61") (Company Reply Brief at 27). NRG argues that the statute in question has two applicable and distinct requirements. According to the Company, the first of these is that the Siting Board must use "all *practicable* means and measures to *minimize* damage to the environment" (Company Reply Brief at 27, citing G.L. c. 30, § 61, ¶ 1; emphasis supplied). This first requirement was part of the text of Section 61 before the GWSA amended that statute (Company Reply Brief at 27, 28). The Company notes that Section 61 explicitly defines the term "damage to the environment" and that this definition does not include sea level rise (Company Brief at 27 n.31).⁹⁰

The Company maintains that the second requirement under Section 61 is that the Siting Board, when issuing an administrative approval, "shall *also consider reasonably foreseeable*

⁹⁰ "Damage to the environment" is defined in the third paragraph of G.L. c. 30, § 61 as follows: "As used in this section and section sixty-two, 'damage to the environment' shall mean any destruction, damage or impairment, actual or probable, to any of the natural resources of the commonwealth and shall include but not be limited to air pollution, water pollution, improper sewage disposal, pesticide pollution, excessive noise, improper operation of dumping grounds, reduction of groundwater levels, impairment of water quality, increases in flooding or storm water flows, impairment and eutrophication of rivers, streams, flood plains, lakes, ponds, or other surface or subsurface water resources; destruction of seashores, dunes, marine resources, underwater archaeological resources, wetlands, open spaces, natural areas, parks, or historic districts or sites. Damage to the environment shall not be construed to include any insignificant damage to or impairment of such resources."

climate change impacts, including additional greenhouse gas emissions, and *effects, such as predicted sea level rise*” (Company Reply Brief at 27, 28, citing G.L. c. 30, § 61 ¶ 2; emphasis supplied). This requirement was inserted into Section 61 by the GWSA (Company Reply Brief at 28 n.32; see also, St. 2008, c. 298, § 7).

The Company argues that Section 61 does not address “damage to the environment” and “predicted sea level rise” together and, therefore, there is nothing to suggest that predicted sea level rise should be added to the definition of “damage to the environment” (Company Reply Brief at 28). Consequently, with respect to predicted sea level rise, the Company argues, the Siting Board’s obligation is only to consider it in issuing approvals (id.). Finally, the Company notes that under the Siting Board’s statute, G.L. c. 164, §69J¼, the Siting Board is obligated to review the effects of predicted sea level rise to determine whether they have been minimized consistent with the minimization of costs associated with the mitigation, control, and reduction of the environmental impacts of the proposed generating facility (id. at 29).

b. Estimates of Sea Level Rise

i. Conservation Law Foundation

CLF argues that the Petition fails to include all feasible measures to avoid the reasonably foreseeable effects of predicted sea level rise (CLF Brief at 5; CLF Reply Brief at 1). CLF argues that the Petition should be denied for failure to account for reasonably foreseeable sea level rise and the impacts sea level rise will have on the coastal site proposed for the Proposed Facility (CLF Brief at 5-6). CLF also argues that approval should include conditions requiring the Company “to adequately prepare for expected sea level rise sufficient to protect the Proposed Facility from flood- and storm-related damage throughout its planned operational life,” specifically arguing that the minimum Facility Site elevation should be at least 17.5 feet NAVD 88 (id. at 6; CLF Reply Brief at 2).

In supplemental testimony, CLF asserted that the Company was not justified in using a 13.7-foot flood elevation from specific transects (i.e., such as Transect 004) when the Proposed Facility is not on the transect; and argued for use of the 14-foot base flood level shown on the FEMA map, applicable to an area inclusive of the Facility Site (Exh. CLF-3(S) at 10). In addition, CLF witness Dr. Carling Hay asserted that NRG seriously underestimated the potential risk of future flooding on the site given scientific consensus regarding sea level rise in

southeastern New England induced by global warming (Exh. CLF-3, at 2, 3). According to CLF, NRG failed to include “state-of-the-art probabilistic modeling” of sea level in the future and suggested that a sea level rise allowance of at least 3.5 feet is required to meet a 100-year storm standard for site flooding by 2060, and it advocated for placement of important Proposed Facility components at least 17.5 feet NAVD 88 (*id.* at 3, 6 to 9). Rejecting the NOAA and USACE projections, CLF selected a figure for regional sea level rise characterized as having a 0.1 percent chance of occurring for a “business as usual” carbon emission scenario, based largely on a 2016 report provided to the Climate Ready Boston initiative in which Dr. Hay participated (Exhs. CLF-3, at 2 to 13; CLF-3(S) at 5).⁹¹

CLF further suggested that even this approach may be insufficiently conservative because of potential increased storm intensity in the future; changes to the coastline shape due to sea level rise; and local subsidence from compaction of sediment under the Proposed Facility caused by withdrawal of groundwater or gravel moving or being crushed by the weight of buildings (Exh. CLF-3, at 12; Tr. 7, at 1069-1071, 1149). Finally, CLF referenced a wave height of 15 feet reported from Sandwich during a 1954 hurricane as a factor to be considered in evaluating FEMA’s 14-foot base flood elevation (Exh. CLF-3, at 13).⁹²

CLF asserted that an estimate of sea level rise to be added to a current flood level estimate (*i.e.*, sea level rise from the present time to 2060) must be expressed relative to a datum (*i.e.*, NAVD 88), rather than as an estimated change in height (Exh. CLF-3(S) at 2, 3; Tr. 7, at 1109).⁹³ CLF additionally suggested that shorelines and local topography might change in the future with sea level rise, such that the Facility Site would become more exposed to wave action (*i.e.*, from Cape Cod Bay) (Exh. CLF-3(S) at 6). CLF pointed to an absence of clear logical justification by the Company for selecting a sea-level-rise estimate halfway between NOAA’s

⁹¹ According to CLF’s information, the most likely range of sea level rise at Boston is 0.7 to 1.5 feet by 2050 and 1.5 to 3.1 feet by 2070 (Exh. CLF-3, at 10).

⁹² CLF indicated that it does not have information about how the 15-foot wave was measured, or what the number represents (Tr. 7, at 1084-1087; RR-EFSB-39).

⁹³ Specifically, CLF stated that “[the] sea level rise that Fobert & Sellars now suggest the Facility site will experience by [2060] is not a NAVD 88-referenced elevation but, instead, a “relative-to-2016” number that cannot properly be added onto the 13.7 feet NAVD88 elevation as [NRG] has done” (Exh. CLF-3(S) at 3).

high estimate and the USACE's high estimate (Exh. CLF-3(S) at 3).⁹⁴ CLF opined that the Company should prepare for potentially greater sea level rise that may occur after 2060 because the Company had indicated that it would continue to operate the plant after 2060 as long as it is economically favorable to do so (id. at 7). However, CLF also indicated that it could not balance cost against risk for the Company and suggested that once the Company had evaluated the implications of a range of sea level rise possibilities, the Company should pick a number based on the Company's risk tolerance – depending on Company needs at the location (Tr. 7, at 1148-1149; Tr. 8, at 1174-1175).

ii. Company

The Company argues that it has properly identified potential flooding impacts related to sea level rise (Company Brief at 71). The Company asserts that it correctly established current flood elevation at the Facility Site as 13.7 feet NAVD 88 using a FEMA Barnstable County Flood Insurance Study (id.). The Company also asserts that it correctly projected sea level rise at the Facility Site by using a USACE calculation tool (id.; Company Reply Brief at 33). According to the Company, it chose appropriate inputs to the calculator – the tide station location, and start and end dates for operation (Company Brief at 71-72). Then the Company considered the two highest sea level rise projections, and calculated an average of these high estimates to identify projected relative sea level rise in the vicinity of the Facility Site (id. at 72-73). The Company maintained that it considered the current flood level elevation and projected sea level rise to arrive at a design elevation of 16 feet NAVD 88, which the Company states will be sufficient such that projected sea level rise will not adversely affect the Facility Site (id. at 73). The Company concludes that it has minimized flood impacts by deciding to raise the grade of the Facility Site to 16 feet NAVD 88 for areas containing equipment essential for operation of the Proposed Facility (id. at 73-74).

Regarding CLF's projection of sea level rise, the Company asserts that CLF presents an extreme and highly improbable projection of sea level rise and advocates an equally extreme and

⁹⁴ Specifically, CLF stated that “[n]owhere in their testimony have [NRG sea level witnesses] Fobert or Sellars indicated how or why they assume that specific point between the USACE High and the NOAA High scenarios can, or should properly, be relied on for determining 2060 sea level rise at the Facility site” (Exh. CLF-3(S) at 3).

unreasonable set of responses (Company Reply Brief at 26). In addition, the Company maintains that its prediction methodology is consistent with industry standards (*id.* at 30). NRG notes that, in CLF's model, the most likely sea level rise is 1.5 feet and the probability of a sea level rise of at least 3.71 feet is 0.001 percent (*id.* at 26). Regarding CLF's methodology for predicting sea level rise, NRG argues that Dr. Hay could not identify any power plant projects that had used the method she endorsed for project design purposes (*id.* at 31, *citing* EFSB-CLF-15). Disagreeing with CLF's assertion, the Company argues that estimated relative sea level change is an estimate of the increment that the water will rise and is not meant to be tied to a datum; explained another way, the Company states that it added the *height* of projected sea level rise to a storm surge *elevation* (Tr. 1, at 108; Company Brief at 73; Company Reply Brief at 34-38).

Referencing G.L. c. 164, § 69J¼, the Company also argues that, as required by the Siting Board statute, it has demonstrated that it has minimized the environmental impacts related to sea level rise consistent with the minimization of costs associated with mitigation, control, and reduction of the environmental impacts of the proposed generating facility, as required by the Siting Board statute (Company Brief at 70-71).

3. Analysis and Findings

The record shows that the Project would use an average of up to 0.078 MGD on an annual basis and up to 0.69 MGD in a single day. The record shows that there is sufficient fresh water available at the Facility Site to meet the needs of the Project, both in terms of the large volumes of groundwater that flow north from the aquifer under Joint Base Cape Cod towards Cape Cod Bay, and in terms of the permitted volumes and capacities of the NRG wells. The maximum annual average water use, even combined with current usage by the Existing Facility, would be below the wells' registration for 0.45 MGD withdrawal on an annual basis. The Siting Board concludes that impacts of Project groundwater withdrawals would be minimal.

The record shows that the Project would only marginally increase wastewater discharge from the Canal Generating Facilities. The Proposed Facility includes a 20,000-gallon wastewater holding tank and a 4,000-gallon CTG wash water holding tank for collecting turbine wash water and turbine startup drains for off-site treatment. No additional sanitary facilities are proposed for the Proposed Facility. The Siting Board concludes that the impacts of Project wastewater discharges would be minimal.

The record indicates that, for stormwater management, the Project would continue to use all three existing discharge points that are currently being used by the Existing Facility, and the Company did not propose any new point discharges. The record also shows that quality of stormwater runoff from the Facility Site would be improved compared to existing conditions through the introduction of structural and non-structural BMPs that include deep sump catch basins, vegetated water quality swales, vegetated infiltration basins with sediment forebays, and leaching catch basins. For construction phase stormwater management, prior to commencement of construction, the Company would develop a detailed erosion and sediment control plan and SWPPP that meet the current USEPA, MassDEP, CCC, and Sandwich requirements and guidelines. The Siting Board finds that with the implementation of these measures, the Project's stormwater impacts would be minimized.

The record shows that the Project would avoid adverse impacts to three drainage swales located within the Facility Site. Further, the Company has designed the interconnecting transmission line to minimize the necessity of cutting trees in a nearby wetland. Finally, the record shows that the Project's ULSD pipeline would be located within the footprint of existing dock and bridge structures licensed pursuant to waterways regulations. The Siting Board finds that the Project's wetlands impacts would be minimal.

With respect to coastal flooding and sea level rise, we first address the extent of the Siting Board's obligations regarding sea level rise under applicable statutes. The relevant statute, G.L. c. 30, § 61, distinguishes between "damage to the environment," which requires an agency (including the Siting Board in this case) to use all practicable means and measures to minimize, and "reasonably foreseeable climate change impacts . . . and effects such as predicted sea level rise," which an agency must consider when granting an approval. In this proceeding, the Siting Board has an obligation to "consider reasonably foreseeable climate change impacts . . . and effects such as predicted sea level rise" in issuing an approval. In addition, under G.L. c. 164, §69J1/4, the Siting Board is obligated to review the effects of predicted sea level rise to determine whether they have been minimized consistent with the minimization of costs associated with the mitigation, control, and reduction of the environmental impacts of the proposed generating facility.

With regard to sea level rise, the record shows that the Company used the FEMA Barnstable County Flood Insurance Study for Transect 004 to identify the 100-year storm flood

(including wave set-up and wave run-up) elevation of 13.7 feet NAVD 88 for the Facility Site. Using a sea level estimation tool provided by the USACE, the Company provided inputs such as location of the Facility Site and FEMA base flood elevation levels, and produced low, intermediate, and high relative sea level change estimates. Based on the output of the tool, the Company selected a value of 2.15 feet of sea level rise, which is the arithmetic average of the USACE “high” projection (1.89 feet) and the NOAA “high” projection (2.43 feet) for year 2060; the Company then added this value of 2.15 feet to the Transect 004 FEMA flood level prediction for a 100-year storm (13.7 feet NAVD 88), to obtain a result of 15.85 feet NAVD 88. The Company then rounded this value up to 16 feet NAVD 88, which it selected as its design elevation for the Proposed Facility.

The record shows that the Company followed the general approach proffered by the USACE, which involves selecting a statistically rare storm tide, and then selecting a target design date and a qualitative degree of conservatism with respect to predicting sea level rise over the design life of the Proposed Facility. Using this approach, NRG simply added a selected sea level rise estimate for the Boston area together with an estimate of storm tide levels at the Facility Site (adjusted by FEMA to account for wave action). The Company explained its choice of 16 feet NAVD 88 for electricity production components foundation levels in several formulations, but the general approach followed the USACE model.

CLF promoted an alternative method that it argues better considered additional factors it anticipates, such as regional differences in sea level rise, worsening storm intensity, and soil subsidence. According to CLF’s alternative method, the Company should incorporate the highest estimate of sea level rise and build its Proposed Facility at 17.5 feet NAVD 88. The Company counters that CLF’s estimate is highly improbable, and states that the additional 1.5 feet will cost \$1.6 million.

The Siting Board notes that USACE is a recognized expert and a respected institution that has access to current research in support of its sea level estimating tool, designed to calculate region-specific changes in sea level. The Siting Board finds that the Company’s reliance on USACE’s general methodology for predicting sea level rise is reasonable and appropriate. In addition, the Company included several conservative assumptions in its decision to choose a design height of 16 feet NAVD 88.

First, selecting the FEMA base flood elevation from Transect 004 in Sandwich, whether interpreted as 13.7 feet or 14 feet NAVD 88, is likely conservative because accounting for an additional four feet of wave (wave set-up plus wave run-up) action appears to overstate actual circumstances at the Facility Site in a 100-year storm. Historical information indicates that the actual highest flood level over the past century was recorded at 9.7 feet NAVD 88 in Boston. Second, the Company chose a figure using the highest two sea level rise estimates produced by the USACE estimating tool. While CLF referenced a report of a 15-foot wave in Sandwich in a 1954 hurricane, the record does not show what this figure represents. Given this uncertainty, the Siting Board cannot rely on this information in its understanding of flood levels relevant to the Facility Site.

The parties disagree with whether sea level rise should be expressed as a relative height or an elevation. We agree that sea level rise should be expressed as a change in height, to be added to a current elevation such as a NAVD 88 flood level. Ultimately, the decision to build at 16 feet NAVD 88 is to a large extent one of commercial judgment.

However, if the Company's estimates of sea level rise turn out to be less than conservative, the Project also has an additional one to two feet of freeboard between the tops of slab foundations and the bottoms of the generating equipment. In addition, the Company has the option of installing, at a later date, adaptable flood mitigation that can be deployed on a temporary basis for storm events. Accordingly, the Company appears to have taken a conservative approach to maintaining Project reliability and therefore grid reliability into the future, and has options for supplementary action in the future based on actual measured conditions and deployable storm surge mitigation technology.

The Siting Board concludes that the Company's approach to evaluation of coastal flooding is reasonable and relies on authoritative sources and methods. While CLF's proposed site elevation would obviously avoid flooding in an even more extreme scenario than the type of scenario evaluated by the Company, the record does not support the case for making the additional investment at this time to mitigate a low-probability risk. The Company has identified supplemental mitigation measures should circumstances change adversely. The Siting Board finds that, with the proposed base elevation of the Proposed Facility, the Company has minimized the potential effects of coastal flooding and it has mitigated the effect of predicted sea level rise on the Proposed Facility.

Accordingly, the Siting Board finds that the water-related environmental impacts of the proposed Project would be minimized.

E. Visual Impacts

1. Company Proposal

NRG developed a visual impact assessment of the Project, based on a characterization of existing conditions. NRG noted that the Existing Facility has been a major visual element in its area of Sandwich since the mid-1970s (Exh. NRG-1, at 4-69). The Company characterized the adjacent area, including the Cape Cod Canal, the Sandwich Marina, and Scusset Beach State Reservation, as having a strong recreational visual identity (id.). The area along Route 6A is a mixture of single family homes, retail establishments, and historic landmarks (id.). Further east, there is a single-family residential neighborhood with a residential ocean community visual character (id.).

NRG stated that the Existing Facility contains numerous visual elements easily identifiable as electrical generation and transmission facilities including: (1) the 498-foot stack; (2) 210-foot-tall power block buildings; (3) transmission towers (some atop the power block); and (4) transmission lines (Exh. NRG-1, at 4-69). The existing stack has lighting in accordance with requirements of the Federal Aviation Administration (“FAA”) (id. at 4-70). NRG indicated that the Existing Facility is in full view of nearby locations that lack visual obstructions, such as the bike trail on the north side of the Cape Cod Canal, located within the Scusset Beach State Reservation (id. at 4-69). The Company stated that views from the Sandwich Marina and the Cape Cod Canal Visitors Center, located east of the Facility Site, are partially obstructed by trees; and forested areas tend to block views from residences located to the south and west, though the 498-foot existing stack is visible from various vantage points (id.).

NRG performed visual simulations by superimposing a modeled image of the Proposed Facility onto a digital photograph of the Facility Site from multiple surrounding vantage points (Exh. NRG-1, at 4-70 to 4-72). The visual simulations indicate that the Proposed Facility would be visible in the foreground of the Existing Facility from adjacent points to the east such as the parking area for the Sandwich Marina, the Cape Cod Canal Visitors Center, and the east end of the public walkway along the Cape Cod Canal (id. at 4-71, fig. 4.6-3, fig 4.6-4, fig. 4.6-5). From Town Neck to the east and from Stop and Shop Plaza to the south, only the highest parts of the

Proposed Facility would be visible, but they would blend in against adjacent higher elements (id. at 4-71, fig. 4.6-6, fig 4.6-7). From Scusset Beach parking, the Proposed Facility would be visible to a greater extent, which the Company characterized as a “co-dominant or even subordinate visual change,” considering the views of existing industrial components (id. at 4-72, fig. 4-6.10). In contrast, from the Scusset Beach Road Pier and from the Sagamore Bridge, both to the west, the new stack would be almost imperceptible given its location relative the existing facilities (id. at 4-72, fig. 4.6-9, fig 4.6-11).

NRG therefore concluded that the Proposed Facility would be most visible from the north and east, particularly along waterfront locations along the Cape Cod Canal (Exh. NRG-1, at 4-72). Current views from all directions from which elements of the Proposed Facility would be visible are already dominated by the Existing Facility (id.). According to the Company, the incremental visual impact may not be noticed by casual observers, especially with intervening terrain and vegetation (id.). The Company stated that existing trees provide generous screening of the Proposed Facility from many areas, and that such vegetative screening is more effective close to an observer than near the stack (Tr. 2, at 295-296). However, from other areas, such as Town Neck, views of the existing stack are fairly striking (id. at 298). The Company does not propose local mitigation of views for the Proposed Facility because views of the new structures are both similar in character and minor in scope, relative to views of the Existing Facility, which have existed for decades (id. at 302).⁹⁵

When asked about the visual implication of a taller stack, such as a 235-foot or 250-foot stack, NRG performed additional modeling of visibility. From the west, a 250-foot stack would also be visible from a stretch of the Cape Cod Canal and a few other scattered locations, from which a 220-foot stack would not be visible, while from the east, the taller stack would be visible from essentially the same locations as the 220-foot stack (Exh. EFSB-A-34(1); RR-EFSB-25). The Company maintained that from the Sagamore Bridge, a 220-foot stack would be largely obscured by structures on top of the main power block, while the top of a 235-foot would be slightly visible and a 250-foot stack would be more visible (Tr. 3, at 534).

⁹⁵ In consideration of an eventuality in which the stack and power block of the Existing Facility are later demolished, NRG provided a viewshed analysis and a visual simulation showing that the Proposed Facility would then be more visually dominant in the area, with multiple structures (including the stack) higher than surrounding features such as existing oil tanks (Exhs. EFSB-V-1; EFSB-V-1(1); EFSB-V-1(2)).

2. Positions of the Parties

Sandwich notes that the proposed stack height of 220 feet meets all ambient air quality criteria, including NAAQS, the toxic exposure levels for air toxics, as well as the PSD Increments, and would at this height cost less and have less visual impact than higher stacks (Sandwich Brief at 3). Sandwich argues that an increase to a 235-foot or 250-foot stack height would have no significant or material increase in compliance with these standards, and believes that the current proposal provides adequate health protection (id.). Therefore, Sandwich is not in support of an increased stack height at the Proposed Facility beyond the 220-foot stack height proposed by NRG (id.).

3. Analysis and Findings

The Company proposes to construct the Proposed Facility on a parcel with a large existing generation plant with a tall, visually intrusive stack. The record shows that the Proposed Facility would be generally consistent with the industrial appearance of the Freezer Road Site. The new stack at either 220 feet or 235 feet would be less than half the height of the existing stack, and would not be noticeable from most vantage points from which the Existing Facility can be seen. As discussed in Section IV.B, above, the Siting Board found that a stack height of 235 feet would provide an appropriate balance among conflicting environmental concerns (including visual impacts) and between environmental impact and cost.

In several prior generating facility decisions, the Siting Board has required proponents to mitigate visibility of the facility and the associated stack(s) by providing selective tree plantings and other requested reasonable mitigation in all residential areas within varying distances of up to one mile of the proposed location of the stack(s). Exelon West Medway at 91-92; Footprint Power at 58-59; Montgomery Energy at 374-375. Because the Existing Facility has existed for decades and because the Proposed Facility would add a relatively small incremental visual impact, visual screening at residential and commercial properties is not warranted in this case. Further, due to the large dimensions of the Existing Facility, including the existing stack, landscaping around the Proposed or Existing Facilities would provide little or no visual screening.

Notwithstanding the generally industrial appearance of the location, the Siting Board directs the Company to maintain the good appearance of the Canal Generating Facilities, including the new stack, for the life of the Project. The Siting Board finds that, with implementation of this condition, the visual impacts of the Project, including a 235-foot tall stack, would be minimized.

F. Noise

This section addresses Project operational and construction noise impacts, and mitigation of those impacts.

1. Company Proposal

a. Operational Noise

NRG's operational noise analysis for the Project involved characterizing the background ambient sound levels of the Facility Site, identifying Proposed Facility sound sources, modeling Proposed Facility sound dispersion, and assessing Proposed Facility impacts in the context of existing sound levels including the Proposed Facility's compliance with MassDEP noise policy⁹⁶ (Exhs. NRG-1, at 4-75 to 4-82; NRG-3, at 7-1 to 7-7).

i. Background Ambient Sound Levels

As discussed in Section IV.B, above, land use surrounding the Facility Site is largely mixed-use, and the closest sensitive receptors are residences to the southeast on Freezer Road and to the south on Briarwood Avenue/Tupper Road (Exhs. NRG-1, at 4-75; NRG-3, at 7-3;

⁹⁶ The Company stated that MassDEP prohibits emission of noise that: (1) results in an increase in the broadband sound pressure level of more than ten A-weighted decibels ("dBA") above the ambient sound level; and/or (2) results in a "pure-tone" condition (Exhs. NRG-1, at 4-73; NRG-3, at 7-1). MassDEP uses an L₉₀ sound level to represent an ambient background sound (Exhs. NRG-1, at 4-73; NRG-3, at 7-1). The L₉₀ sound level is the sound level exceeded during 90 percent of a measurement period (Exhs. NRG-1, at 4-73; NRG-3, at 7-1). MassDEP defines a "pure-tone" condition as a condition that occurs when any octave band sound pressure level exceeds both of the two adjacent octave band sound pressure levels by three decibels or more (Exhs. NRG-1, at 4-73; NRG-3, at 7-1). The Company stated that MassDEP's noise policy is applicable at the property line and at the nearest noise-sensitive areas (e.g., residences) (Exhs. NRG-1, at 4-73; NRG-3, at 7-1).

EFSB-G-1(S2)(1) at 7-3). In order to characterize background ambient sound levels, the Company identified seven short-term monitoring locations around the Facility Site, which include residential dwellings, commercial buildings, and public areas (Exhs. NRG-1, at 4-75; EFSB-G-1(S2)(1) at 7-3).⁹⁷

According to the Company, the short-term monitoring locations are representative of receptors that would be most sensitive to noise from the Proposed Facility (Exhs. NRG-1, at 4-75; NRG-3, at 7-3). Background sound levels at all of the short-term monitoring locations were measured on December 14 and 15, 2014; sound levels at locations ST-1, ST-2, ST-3, and ST-7 were measured at fifteen-minute intervals during the day (11:00 a.m. to 3:30 p.m.) and night (11:00 p.m. to 2:00 a.m.), and continuous 24-hours sound levels were measured at locations ST-4, ST-5, and ST-6 (Exh. EFSB-G-1(S2)(1) at 7-3).⁹⁸ NRG asserted that the duration of the measurements was sufficient to document the residual L_{90} levels that occur when short-term intrusive sound sources are absent (Exh. EFSB-NO-2). The short-term monitoring locations are described below:

- Location ST-1: One Freezer Road, Sandwich, representing a residence approximately 141 feet away from the Facility Site;
- Location ST-2: 55 Tupper Road, Sandwich, representing two residences approximately 553 feet from the Facility Site;
- Location ST-3: 14 Gallo Road, Sandwich, representing the Sandwich Marina, located approximately 1,293 feet away from the Facility Site;
- Location ST-4: 11 Tupper Road, Sandwich, representing a residence approximately 2,486 feet from the Facility Site;

⁹⁷ The Company stated that as part of the ambient sound measurement program, it identified two long term monitoring locations within the Project boundary to document both the diurnal variation within the study area as well as any differences between weekday/weekend types of periods (Exh. NRG-1, at 4-75; Tr. 2, at 212). The Company stated that the long-term monitoring data consisted of continuous data collection performed between June 11 and 30, 2015 (Exh. EFSB-NO-2)

⁹⁸ The Company reported that most of the short-term monitoring locations are similar to locations that were used during environmental sound surveys performed in the area from 1998 through 2001 in connection with a previous Siting Board case (EFSB 98-9, Southern Energy Canal LLC) (Exh. EFSB-NO-26; Tr. 2, at 211; Company Brief at 23).

- Location ST-5: Canal service road walkway representing a pedestrian walkway near the Scusset Beach State Reservation approximately 2,244 feet from Facility Site;
- Location ST-6: 14 Town Neck Road, Sandwich, representing a residence 1,425 feet from the Facility Site; and
- Location ST-7: Canal service road walkway, representing the USACE recreational walkway approximately 590 feet from the Facility Site.

(Exhs. NRG-1, at 4-75; EFSB-NO-6; EFSB-G-1(S2)(1) at 7-3).

NRG stated that ambient sound level measurements at the identified monitoring locations were taken when the Existing Facility (Units 1 and 2) was not operating (Exhs. NRG-1, at 4-80; NRG-3, at 7-7). Noise monitoring staff identified numerous sound sources in the area surrounding the Project, including roadway traffic; nearby industrial operations including trucking, rail traffic, marina activity, and marine vessel movements; auxiliary equipment housed in the nearby communications tower; and aircraft (Exhs. NRG-1, at 4-74; EFSB-NO-6). According to NRG, background ambient nighttime L_{90} sound levels ranged from 33 to 41 dBA (Exhs. NRG-1, at 4-75, 4-80; EFSB-NO-4). NRG noted that background L_{90} levels were found to be five to ten dBA higher during the daytime hours than the nighttime minimum (Exhs. NRG-1, at 4-80; NRG-3, at 7-7).

ii. Proposed Facility Noise Sources

The Company modeled Proposed Facility noise impacts by identifying the sound level of facility components with a set of noise control options applied, and the dispersion of sound from those sources (Exh. NRG-1, at 4-76 to 4-79). The Company identified the following as the Proposed Facility's primary sources of noise: the GE 7HA.02 CTG and related equipment, air pollution control equipment, the exhaust stack, the natural gas pre-heater and compressor, the evaporative inlet air cooling system, the tempering air fan system, the generator step-up transformer, blowers, pumps, and ventilation fans (Exh. NRG-3, at 7-4; Tr. 2, at 212 to 214). The Company noted that the Existing Facility's noise sources include similar components (*i.e.*, fans and transformers) and a hopper vibrator system (Exh. NRG-EJK-1). NRG used Cadna/A software as well as ISO 9613 Part 1 and Part 2 noise propagation standards to calculate propagation and attenuation of sound energy with distance, surface and building reflection, and shielding effects of barriers, buildings, and ground topography (Exhs. NRG-1, at 4-76; NRG-3, at 7-4).

iii. Proposed Noise Control

The Company considered two noise control options: its proposed set of noise control measures on both the Existing and Proposed Facilities; and a potential “high attenuation” option.

NRG’s proposed noise mitigation measures for the Proposed Facility included: increased casing thickness for the SCR and acoustic shrouding that will envelop the exhaust gas diffuser and the transition duct from the CTG exhaust to the SCR casing; additional exhaust silencing; enclosures around the CTG, lube oil skid, and generator; a noise barrier near the tempering air fans; acoustically treated walls for the fuel gas compressor enclosure; and turbine inlets equipped with an 8-foot silencer with an acoustically lined weather hood (Exhs. NRG-1, at 4-82; NRG-3, at 7-8; EFSB-NO-31). Proposed mitigation measures for the Existing Facility included: (1) an acoustical lagging that consists of an impervious membrane spaced away from the surface, or a partial (absorptive) enclosure for Units 1 and 2 hopper vibrator systems; (2) refurbishment of lined inlet and noise baffling system for Unit 2 forced draft fans; and (3) noise barrier walls for Units 1 and 2 service and main transformers (Exhs. NRG-3, at 7-8 to 7-10; EFSB-NO-21; EFSB-NO-28).⁹⁹ In total, the Company’s proposed noise mitigation measures would cost approximately \$13 million (Exhs. NRG-1, at 4-82; NRG-3, at 1-12, 7-10; EFSB-NO-31; NRG-EJK-1 at 3).

NRG stated that with the implementation of its proposed mitigation measures, the operation of the Proposed Facility alone would increase nighttime background sound levels by one to seven dBA at the nearest residences and marina area (Exhs. EFSB-NO-8; EFSB-NO-9). The highest sound level increases would be at residences on Freezer Road (ST-1) and Briarwood Avenue/Tupper Road (ST-2), with increases of six dBA and seven dBA, respectively (Exhs. NRG-3, at 7-7; EFSB-NO-9). Evaluating operational noise from the Existing Facility and the Proposed Facility combined, nighttime background sound levels are expected to increase by five to ten dBA at all receptor locations (Exh. EFSB-G-1(S2)(1) at 7-8; RR-EFSB-7). The Company stated that the Proposed Facility would not result in any pure tone conditions

⁹⁹ NRG stated that it revised its proposed mitigation for the Existing Facility based on updated sound modeling it performed using dispatch information (Exh. NRG-EJK-1, at 3). The Company stated that updated modeling showed the Existing Facility (Units 1 and 2) transformers are significant sound contributors at receptor locations along the Canal walkway (id.).

(Exhs. NRG-1, at 4-80; NRG-3, at 7-7). NRG asserted that, with the implementation of the proposed noise control, the Canal Generating Facilities would comply with MassDEP requirements at all receptor locations and at the property line (Exh. EFSB-NO-32; Company Brief at 87-88). A summary of measured background sound levels and modeled Proposed Facility and cumulative noise levels, with the proposed noise controls is shown in Table 6 below.

Table 6. Predicted Nighttime Noise Levels (dBA)

| Receptor | Ambient (L ₉₀) | Proposed Facility | | | Proposed Facility + Existing Facility (Cumulative) | |
|--------------------------------|----------------------------|-------------------|------------------------------------|------------------------|--|------------------------|
| | | Contribution | Total Modeled (Facility + Ambient) | Increase above Ambient | Total Modeled | Increase above Ambient |
| ST-1 1 Freezer Road | 41 | 45.5 | 46.8 | 5.8 | 49.7 | 8.7 |
| ST-2 55 Tupper Road | 40 | 45.5 | 46.6 | 6.6 | 50.0 | 10.0 |
| ST-3 (Marina) 14 Gallo Road | 40 | 40.3 | 43.2 | 3.2 | 45.4 | 5.4 |
| ST-4 11 Tupper Road | 36 | 34.6 | 38.4 | 2.4 | 42.6 | 6.6 |
| ST-5 Canal Service Walkway | 33 | 29.9 | 34.7 | 1.7 | 42.0 | 9.0 |
| ST-6 14 Town Neck Road | 34 | 37.6 | 39.2 | 5.2 | 41.9 | 7.9 |
| ST-7 Canal Service Walkway | 39 | 34.5 | 40.3 | 1.3 | 49.0 | 10.0 |

Sources: Exhs. NRG-3, at 7-7; EFSB-NO-9; EFSB-G-1(S2)(1) at 7-8; RR-EFSB-7.

NRG argues that its noise level projections are conservative because simultaneous operation of the Existing Facility and the Proposed Facility during nighttime hours would be very infrequent (Tr. 2, at 239-241; Company Brief at 98-99). Simultaneous operation, particularly at night, would be infrequent because: (1) the Proposed Facility is a peaking plant with ten-minute start capability and would rarely be needed at night, and would not need to run overnight to be available for the next day; and (2) the Existing Units operate relatively infrequently (Tr. 2, at 239-241; Company Brief at 98-99). NRG reported that the Existing

Facility (Units 1 and 2) operated simultaneously between 11:00 p.m. and 6:00 a.m. for a total of 1.5 hours in 2016 (Exh. EFSB-NO-34). The Company maintains that simultaneous operation of the Proposed Facility with the Existing Units would likely occur only in the event of a significant electric system contingency (Tr. 2, at 239-241). The Company stated that even with the conservative assumption of simultaneous operation, the Proposed Facility and the Existing Facility would meet MassDEP noise regulations (Company Brief at 97).

To assess the potential for further noise mitigation, NRG evaluated the addition of noise mitigation elements beyond its proposed package. NRG characterized this option as a “high attenuation” option that would envelop the CTG, the entire SCR system and, the exhaust diffuser in a single 115-foot-long building, and would add silencers to the cooling fans (Exhs. NRG-1, at 4-82; EFSB-NO-31).¹⁰⁰ NRG stated that compared to the proposed package, the high attenuation option would reduce the Proposed Facility’s noise contribution by three dBA at some receptors, but as little as one dBA in the more densely populated area near Town Neck Road (Exhs. NRG-1, at 4-82; NRG-3, at 7-10). The Company estimated that the high attenuation option would cost an additional \$7 million (Exhs. NRG-1, at 4-82; NRG-3, at 7-10; EFSB-NO-31).

NRG argued that because a three dBA increase is generally considered to be a barely perceptible change in sound levels, the high attenuation option would not provide a noticeable reduction in community sound levels, but would cost an additional \$7 million (Exh. NRG-1, at 4-82; Company Brief at 95-96). The Company asserted that with its proposed noise control package, the Canal Generating Facilities would fully comply with MassDEP requirements at all receptor locations and at the property line, and the proposed package represents a reasonable balance between the cost and benefit of noise control measures (Exhs. NRG-3, at 7-10; EFSB-NO-32). NRG stated that it obtained sound level guarantees from GE for the 7HA.02 package and that it would obtain noise limit guarantees from its EPC contractor for all other equipment not provided by GE (Exh. EFSB-NO-10; Tr. 2, at 218-221).

In the HCA negotiated between NRG and the Town of Sandwich, the Company agreed to the following noise-related provisions: (1) to limit nighttime noise levels such that the combined

¹⁰⁰ The Company stated that the preliminary measures, the proposed control option, and the high attenuation option were part of the Company’s Best Available Noise Control Technology analysis (Exhs. NRG-1, at 4-82; EFSB-NO-18).

operation of the Proposed Facility and the Existing Facility would comply with all applicable laws, including, but not limited to, the MassDEP noise policy and the Town's Bylaws Section 3.55 (Noise); (2) to use commercially reasonable efforts through final design and construction of the Proposed Facility to shield and insulate abutting properties from increases in noise and visual impacts; and (3) to perform noise testing as required by its operating permits and to promptly forward the results of any required testing directly to the designated representative of the Town of Sandwich (Exh. EFSB-G-34(S1)(1) at 9).

The Company stated that, prior to commercial operation, it would take near-field measurements of sound levels from major sound sources and at the Freezer Road Site property line to demonstrate compliance with the noise impact analysis results, and with applicable noise policies and Sandwich Bylaws (Exhs. NRG-3, at 7-11; EFSB-G-1(S2)(1) at 7-11; EFSB-20, at 43). The near-field measurements will enable isolation of sound contributions from the Project and the existing Units 1 and 2, without interference from variable non-Project-related sources (Exh. EFSB-20, at 43).

b. Construction Noise

NRG stated that construction of the Proposed Facility would result in a temporary increase in sound levels near the Facility Site (Exh. NRG-1, at 4-81). Noise impacts from Facility construction would be caused by site clearing, excavation, foundation work, steel erection, and finishing work (Exh. NRG-1, at 4-81).¹⁰¹ The Company noted that no blasting or pile driving would be performed on the Facility Site (id.). According to NRG, noise levels resulting from construction activities vary greatly depending on the operations being performed, the type of equipment, the equipment model, and the overall condition of the equipment (id.). Estimated construction sound levels at the nearest residential locations would range from 44 to 66 dBA (id.; Exh. EFSB-NO-35).¹⁰²

¹⁰¹ The Company stated that, during peak construction periods, approximately 150 workers would be traveling to and from the Facility Site (Tr. 2, at 249 to 251). NRG stated that 150 vehicles would be a small fraction of the existing traffic approaching the Facility Site and would therefore not be a significant source of additional noise (Tr. 2, at 249 to 251).

¹⁰² The Company's sound level estimates are based on USEPA (1971) published data on the average sound levels (L_{eq}) for typical construction, measured at 50 feet from the sound source (Exh. NRG-1, at 4-81).

NRG stated that the Project construction period including testing would be approximately eighteen months, with typical work days from 7.00 a.m. to 5:30 p.m. Monday through Friday (Exh. EFSB-NO-23; Tr. 2, at 249-250, 399). According to the Company, activities that may require working outside the specified days and hours would include schedule recovery; placement of major foundations; heavy haul and oversized equipment delivery; and setting of heavy equipment (Exhs. EFSB-NO-17; EFSB-NO-23). The Company noted that it would notify the Town of Sandwich of all construction activities that generate significant noise that would be performed outside of daytime hours and would request approval from Sandwich (Exh. EFSB-NO-17).¹⁰³

NRG proposed the following mitigation measures to minimize construction noise: limiting construction activities that produce significant noise to daytime hours as listed in the Sandwich Zoning Bylaw;¹⁰⁴ ensuring construction equipment is well-maintained and in good working order; equipping vehicles with internal combustion engines with mufflers; using quieter-type adjustable backup alarms for vehicles; using portable noise barriers and enclosures for localized high noise activities; locating noisy equipment away from sensitive areas; and developing a noise-complaint hotline (Exhs. NRG-1, at 4-81 to 4-82; EFSB-NO-17).

As part of the HCA negotiated between NRG and Sandwich, the Company agreed to prepare and provide Sandwich with a construction management program schedule on a monthly basis (Exh. EFSB-G-34(S1)(1) at 9).

2. Analysis and Findings

In reviewing noise impacts associated with a generating facility, the Siting Board is required to “minimize the environmental impacts of the proposed facility consistent with the

¹⁰³ In the HCA, the Company agreed to limit activities related to construction of the Proposed Facility that generate significant noise levels to between 7:00 a.m. and 8:00 p.m., except as otherwise approved by Sandwich, and in accordance with Town Bylaws Section 3.55 (Exh. EFSB-G-34(S1)(1) at 9; Tr. 2, at 268). The HCA also specifies that, “to the greatest degree possible, all of NRG’s activities related to construction of the Facility (regardless of noise level) shall be within these time periods” (Exh. EFSB-G-34(S1)(1) at 9).

¹⁰⁴ The Town of Sandwich Zoning Bylaw (Section 3420 Noise) limits construction to between 7:00 a.m. and 7:00 p.m.; no numerical decibel limits (no limits on days of the week) apply to construction activity (Exhs. EFSB-20, at 42; NRG-2(1) at 25).

minimization of costs associated with the mitigation, control, and reduction of the environmental impacts.” While a project’s compliance with the applicable MassDEP noise policy requirements, and noise-related municipal ordinances and bylaws is a critical focus of the Siting Board’s review of generating facilities, the Siting Board also must examine whether further mitigation may be warranted to fulfill our statutory requirements and precedent. Compliance with other agencies’ standards does not necessarily establish that a proposed facility’s environmental impacts would be minimized. Where supported by the record in past generating facility cases, the Siting Board has required (or otherwise approved) facility noise mitigation measures that limit residential L_{90} increases to between five and eight dBA. Footprint Power at 28; PVEC at 28; Montgomery Energy at 55-56.

The Siting Board notes that the Company proposed substantial and comprehensive noise mitigation measures for the Proposed Facility. The Company obtained manufacturer noise limit guarantees from GE and stated it would also obtain noise limit guarantees from its EPC contractor for equipment not provided by GE. In addition, the Company proposed noise mitigation measures for the Existing Facility (Units 1 and 2).

The record shows that at all of the nearest residences and sensitive receptors to the Facility Site, the Company’s proposed mitigation would limit noise increases from operation of the Proposed Facility to no more than seven dBA during the quietest nighttime hours – a level the Siting Board has found appropriate in a number of prior cases. The record also indicates that with the proposed mitigation measures for the Proposed Facility and the Existing Facility, the noise increase from operation of the Canal Generating Facilities at the nearest residences and sensitive receptors would be limited to five to ten dBA above background during the quietest nighttime hours. Notably, simultaneous operation of the Proposed Facility and the Existing Facility is likely to be very infrequent, thereby limiting the potential for such combined noise impacts. Based on our review, further mitigation measures identified and considered by the Company (the “high attenuation” option), which would cost an additional \$7 million and produce only a one to three dBA reduction would not yield a cost-effective reduction in noise levels. Accordingly, the Siting Board finds these measures are not warranted.

The record shows that the Company would require its major equipment vendors and EPC contractor to test noise levels of the Proposed Facility near-field and at the property line before commercial operation to demonstrate compliance with the projected noise impact levels. With

regard to this commitment, the Siting Board directs the Company to consult with MassDEP and Sandwich to develop an operational noise monitoring protocol, which shall consist of an ongoing periodic noise monitoring program and reporting schedule chosen in consultation with MassDEP and Sandwich. The reporting procedure in the protocol should provide for submission of all periodic monitoring results to Sandwich, and submission of relevant results to any persons whose property is affected by noise increases from the Project of three dBA or more. The Company shall submit a copy of the noise monitoring protocol to the Siting Board prior to the commencement of commercial operation. The Company shall submit copies of the monitoring results when provided to Sandwich or affected persons in accordance with the noise monitoring protocol. During only the first year of the Proposed Facility's operation, the Company shall expand the noise compliance monitoring to include the nearest residential receptors (ST-1 and ST-2), and shall provide to the Board a copy of a report of its compliance monitoring along with an explanation of whether the Canal Generating Facilities are operating in a manner consistent with pre-construction noise impact studies, and any other relevant regulatory requirements.

While the record shows that NRG has stated that its typical construction workday would be 7:00 a.m. to 5:30 p.m., Monday through Friday, the Company and the Town of Sandwich have agreed in the HCA to much more permissive construction hours: between 7:00 a.m. and 8:00 p.m., except as otherwise approved by Sandwich, and in accordance with Town Bylaws Section 3.55. The HCA also specifies that, "to the greatest degree possible, all of NRG's activities related to construction of the Facility (regardless of noise level) shall be within these time periods." While the Town of Sandwich is entitled to deference in negotiating HCA provisions that it believes are necessary to protect its residents, the Siting Board is concerned that HCA would allow unlimited construction activity needed for the facility thirteen hours a day, seven days a week. Such construction hours conflict quite dramatically with the "typical work week" representations made by the Company during the proceeding, and clearly pose the potential to disturb area residents many hours a week, for an extended period of time.

Accordingly, the Siting Board will allow construction work at the Proposed Facility to occur as described by the Company, Monday through Friday from 7:00 a.m. to 5:30 p.m. Should the Company need to extend construction work beyond those hours and days, the Siting Board directs the Company to seek written permission (for individual days or longer periods) from the Town of Sandwich before the commencement of such work, and to provide the Siting Board

with a copy of such permission. If the Company and Town officials are not able to agree on whether such extended construction hours should occur, the Company may request prior approval from the Siting Board and shall provide Sandwich with a copy of any such request.

As set forth in the HCA, the Company also agreed to prepare a construction management plan for Sandwich. The Siting Board directs the Company, consistent with the HCA, to establish prior to commencement of construction a construction noise testing protocol in Sandwich in consultation with MassDEP and Sandwich's designated representative. This protocol shall make clear how the Company intends to respond to complaints about noise from Project construction, and commit the Company to using its best efforts to resolving any complaints promptly.

In addition, it is important that the Company establish an outreach plan to communicate with area residents. Consequently, the Siting Board directs the Company, in consultation with Sandwich, to develop an outreach plan for Project construction, to be made available to the public prior to construction and no later than 90 days after the date of this Decision. This outreach plan should, at a minimum set forth procedures for providing prior notification to affected residents of: (1) the scheduled start, duration, and intended hours of construction; (2) any construction the Company intends to conduct outside of the hours detailed above (as approved in writing by Sandwich or the Siting Board); and (3) complaint and response procedures including contact information, the availability of web-based project information, a dedicated project hotline for complaints, and protocols for notifying all potentially affected residents of upcoming construction.

Accordingly, the Siting Board finds that, with the implementation of the above conditions, the noise impacts of the proposed Project, along with the Existing Facility, would be minimized.

G. Traffic

1. Company Proposal

The Company submitted a traffic study that evaluated: (1) existing traffic conditions on roadways and intersections surrounding the Freezer Road Site; (2) traffic impacts under peak construction conditions; (3) traffic impacts of Proposed Facility operations; and (4) the Company's proposed traffic impact mitigation measures (Exh. NRG-1, at 4-88 to 4-97).

The Company evaluated the existing and future functioning of the following three intersections in the immediate vicinity of the Facility Site, using a level of service (“LOS”)¹⁰⁵ analysis: (1) Old King’s Highway (Route 6A), Tupper Road, and Route 130 east of the Facility Site; (2) Tupper Road and Freezer Road directly south of the Facility Site; and (3) Old King’s Highway (Route 6A) and Tupper Road west of the site (id. at 4-91 to 4-96). The Company stated that these three intersections would be used by construction workers to travel to and from the Facility Site (id. at 4-88).

a. Construction Traffic

NRG stated that the traffic study based its analysis on the potential impact of construction worker arrival between 6:00 a.m. and 7:00 a.m. in the morning, and departure between 4:00 p.m. and 5:00 p.m. in the afternoon (Exh. NRG-1, at 4-88).¹⁰⁶ The Company stated that proposed peak construction worker departure hours coincide with the non-Project peak traffic conditions at the intersections analyzed (id. at 4-94). In addition, the traffic impact analysis conservatively assumed that construction workers would arrive in their own vehicles (one worker per vehicle), and that delivery trucks would arrive and depart the Facility Site during morning and evening peak hours (id.).

NRG stated that peak period for construction activity would occur from June 2018 to July 2018, with approximately 150 workers traveling to and from the Facility Site daily (id.; Exh. EFSB-T-2). For thirteen months, fewer than 100 workers would be on site, while for approximately eight months (March 2018 to October 2018), the number of workers would range

¹⁰⁵ LOS is a measure of operational conditions within a traffic stream generally in terms of speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience (Exh. NRG-1, at 4-88). LOS is a term describing the quality of traffic flow on a roadway facility at a particular point in time; operating levels of service are reported on a scale of A to F, with “A” representing the best operating conditions and “F” representing the worst (id. at 4-91).

¹⁰⁶ The Company noted that afternoon shift end times for construction workers are expected to vary based on the phase of the Project work being done and that a departure between 4:00 p.m. and 5:00 p.m. was modeled to provide a conservative analysis (Exh. NRG-1, at 4-88).

from approximately 100 to 150 (Exh. NRG-1, at 4-94). The Company estimated that the peak level of construction activity in the summer of 2018 would generate 161 inbound and nine outbound trips during the morning peak hours and nine inbound and 161 outbound trips during the afternoon peak hours (id.).

The Company assumed that 70 percent of the Project-generated construction traffic would arrive and depart to and from the west along Route 6A, and that 30 percent would arrive and depart to and from the south via Route 6A and Route 130 (id. at 4-95). Access for construction personnel would be through a dedicated construction entrance off Freezer Road (id. at 1-7; Tr. 2, at 376). The Company has 173 parking spaces on-site, which the Company noted is in excess of what is needed for construction workers (Exh. EFSB-T-3; Company Brief at 105).

Comparison of existing traffic conditions to projected peak construction traffic conditions in 2018 indicated that two changes in LOS are expected: (1) during the morning peak hour, the Freezer Road approach to Tupper Road would drop from a LOS A to B, and (2) during the afternoon peak hour, the Freezer Road approach to Tupper Road would drop from a LOS B to D (Exh. NRG-1, at 4-95 to 4-96). The Company stated that a reduction of LOS B to D at the unsignalized intersection of Tupper Road and Freezer Road could mean an average delay of 25 seconds per vehicle, which NRG considered to be acceptable (Tr. 2, at 380; Company Brief at 107). The Company asserted that these changes in LOS are minor and are partially attributed to a three percent increase in regional traffic that the Company expects by 2018 (Exh. NRG-1, at 4-95).¹⁰⁷ The Company reports that at the intersection of Freezer Road and Tupper Road, in a direction that workers would be turning in, the morning and afternoon peak construction would be LOS A, representing an adequate capacity at the intersection, and limiting the potential for queuing at the entrance of the Freezer Road Site (Tr. 2, at 377).

NRG stated that in order to alleviate construction traffic impacts, it would work with the Town of Sandwich to develop a traffic management plan (“TMP”) that includes a traffic monitoring program (Exh. EFSB-T-9).¹⁰⁸ The traffic monitoring program would include field

¹⁰⁷ The Company noted that in the afternoon peak hour, vehicles turning left from Route 130 onto Route 6A experience a LOS of F (i.e., an average per vehicle delay of over 50 seconds) currently and in 2018 (Exh. NRG-1, at 4-88, 4-91 to 4-92).

¹⁰⁸ NRG stated that Route 6A in Sandwich is under MassDOT jurisdiction and therefore, if a police detail for traffic control purposes becomes necessary during the Project

observations that would record vehicle queuing during the morning and afternoon peak hours over a two-day period at all the study intersections (id.). Should significant queuing occur, the Company would modify worker shift times during the afternoon peak hour to mitigate traffic impacts (id.; Exh. NRG-1, at 4-88). In addition, as part of the TMP, the Company would hire a traffic control officer if there are significant delays (Tr. 2, at 380-381). The Company stated that it would encourage car-pooling for construction workers, and would coordinate with vendors to shift deliveries to off-peak hours (Exh. NRG-1, at 4-94).

As part of the HCA negotiated between NRG and Sandwich, the Company agreed that all construction and operations-related heavy truck traffic shall only access the Facility Site via Tupper Road to Freezer Road, unless otherwise identified in the TMP which shall be subject to the approval of the Sandwich Chief of Police (Exh. EFSB-G-34(S1)(1) at 10). The Company also agreed that during construction, any material deviations from the TMP would be submitted for approval to the Sandwich Chief of Police and Sandwich Harbormaster (id.).

Furthermore, NRG agreed in the HCA to repair, following construction of the Project (but in no event later than six months following completion of the Project), any material damage to any street or streets near the Facility Site and/or in NRG's construction routes in Sandwich caused by the construction of the Project (id.). The Company agreed to complete the repair in accordance with commonly accepted standards of road construction and conditions (id.).

b. Operational Traffic

NRG indicated that as discussed in Section I.A, above, natural gas would be supplied to the Proposed Facility from a new on-site connection to the existing on-site interconnection with AGT, and ULSD would be transported to the Proposed Facility by barge, the same delivery practice used for the Existing Facility (Exh. NRG-1, at 1-15).¹⁰⁹ For the operation of both the Proposed Facility and Existing Facility, deliveries of aqueous ammonia would be made by rail

construction phase at the intersection of Route 6A and Tupper Road, NRG would contact the Massachusetts State Police to arrange for a police detail (RR-EFSB-16).

¹⁰⁹ In the HCA, the Company agreed that barge deliveries would enter the Freezer Road Site from the Canal bulkhead east of the Sandwich Marina and would be performed at night to reduce traffic interference (Exh. EFSB-G-34(S1)(1) at 10). Large equipment modules would also be delivered by barge to the extent possible (id.).

(id. at 4-85; Exh. EFSB-T-1). According to the Company, the typical aqueous ammonia delivery would be two rail cars per month on average and no more than once per week (Exh. EFSB-T-1).

Deliveries via vehicles/trucks for both the operation of the Proposed Facility and Existing Facility are generally made Monday through Friday between the hours of 7:00 a.m. and 3:30 p.m. (id.). For general supplies, the Company indicated that between three to five vehicles per day would make deliveries to the Canal Generating Facilities (id.).¹¹⁰ The Company asserted that the operation of the Proposed Facility is expected to result in negligible changes in traffic relating to Canal Generating Facilities staff and truck traffic for routine deliverables (Exh. NRG-1, at 4-96). In order to minimize traffic impacts during peak commuting hours, the Company would schedule deliveries during off-peak hours (Exh. NRG-1, at 4-96).

As part of the HCA, the Company agreed that the TMP that would be developed with the Sandwich Police Chief would address deliveries by barge and shall be subject to the approval of the Sandwich Harbormaster (Exh. EFSB-G-34(S1)(1) at 10). In addition, NRG agreed to coordinate with the Sandwich Chief of Police, the Sandwich Director of Public Works and the Sandwich Harbormaster, as appropriate, in advance of any transportation of oversized and/or overweight loads in connection with construction or operation of the Proposed Facility (id.).

2. Analysis and Findings

The record shows that comparison of peak construction period traffic conditions to existing conditions indicated that the morning and afternoon peak traffic LOS would worsen for vehicles approaching Tupper Road from Freezer Road. The Company asserts that the expected changes in LOS during the peak construction period are acceptable. However, backups from Freezer Road turning onto Tupper Road may worsen and traffic from Route 130 onto Route 6A may be further delayed by workforce vehicles approaching the intersection from the west, especially in the summer of 2018.

The record shows that there are enough parking spaces available for construction workers. Traffic modeling shows that workforce traffic would not generally be forced to queue at the intersection of Freezer Road and Tupper Road, due to intersection capacity. However, as

¹¹⁰ The Company stated that the delivery of other chemicals required for the Proposed Facility would be made via trucks with expected average delivery frequency of one to two times per year (Exh. EFSB-T-1).

noted above, traffic at the intersection of Route 130/Route 6A/Tupper Road may worsen. Generally, to alleviate potential traffic impacts, the Company would develop a traffic management plan with the Town of Sandwich that includes a traffic field monitoring program. The Company would alter construction workers' shift schedules to avoid peak traffic hours if necessary as a mitigation measure. The Company commits to arranging a traffic control officer as part of the traffic management plan. The Siting Board supports NRG's field monitoring program for vehicle traffic and directs the Company to work collaboratively with the Town of Sandwich, MassDOT, and the Town of Bourne in coordinating construction and operational traffic. Nonetheless, the Siting Board directs the Company to utilize a traffic control detail or personnel at the intersection of Route 130/Route 6A/Tupper Road during the predicted arrival and departure hours when the Company anticipates 150 or more vehicles arriving on-site. In addition, the Siting Board directs the Company to provide the Board with a report on the findings of the field monitoring program and any changes that would be made to the proposed construction hours during peak Project construction periods as a result of this program.

The record shows that the operation of the Proposed Facility is expected to result in negligible changes in Canal Generating Facilities staff, and truck traffic for routine deliveries, as ULSD would be supplied by barge and aqueous ammonia by rail. In addition, to minimize any potential traffic impacts during peak commuting hours, the Company commits to scheduling truck deliveries during off-peak hours.

As set forth in the HCA, the Company's traffic management plan would address deliveries by barge and would be subject to the approval of Sandwich's Harbormaster. Furthermore, NRG would repair, following construction of the Project (but in no event later than six months following completion of the Project), any material damage to any street or streets near the Freezer Road Site and/or in NRG's construction routes in Sandwich caused by the construction of the Project. Within 60 days of completing road repairs, the Siting Board directs the Company to provide the Siting Board with verified records of all road repairs made by or on behalf of the Company in Sandwich. The Siting Board also directs the Company to submit the TMP to the Siting Board prior to the start of construction.

The Siting Board finds that, with the implementation of the above conditions, the traffic impacts of the proposed Project would be minimized.

H. Hazardous Waste, Solid Waste, and Safety

The following section addresses hazardous and solid waste from the Project's construction and operation, as well as the safety impacts of the proposed Project.

1. Company Proposal

a. Hazardous Waste

Maintenance activities at the Proposed Facility would create hazardous waste including waste oils, spent aerosol cans, waste cleaning solvents, and waste paint (Exh. NRG-1, at 4-68). The Company reported that the Existing Facility is classified as a Large Quantity Generator of waste oil and a Small Quantity Generator of non-oil hazardous waste under MassDEP's hazardous waste regulations, 310 C.M.R. § 30 (*id.* at 4-67). NRG stated that construction of the Project is not expected to trigger any changes to these classifications (*id.* at 4-68). In accordance with the MassDEP regulations, the Company would be responsible for conducting weekly hazardous waste area inspections and for emergency preparation, and would be subject to accumulation limits for waste-oil and non-waste-oil containers (Exh. EFSB-HW-7).

Regarding past hazardous waste contamination, NRG stated that releases of oil and other hazardous substances have occurred at the Freezer Road Site in the past (Exh. NRG-1, at 4-66). NRG identified 19 release tracking numbers under the Massachusetts Contingency Plan ("MCP") associated with the Freezer Road Site, all but two of which had been closed (*id.* at 4-66 to 4-67). NRG stated that there are no activity and use limitations on the Freezer Road Site, and that neither of the two open MCP sites is associated with the Facility Site (*id.* at 4-67). Therefore, NRG concluded that no existing hazardous waste contamination that would affect construction or operation of the Project is believed to be present on the Facility Site (*id.*).

b. Chemical/Oil Storage and Handling

i. Aqueous Ammonia

The SCR system for NO_x control at the Proposed Facility would use 19 percent aqueous ammonia (Exh. NRG-1, at 4-34, 4-85). The Company would use two existing aboveground 60,000-gallon welded-steel ammonia storage tanks (which currently serve the Existing Facility) to store the aqueous ammonia (*id.* at 4-85 to 4-86). NRG stated that each of these storage tanks is located within a secondary containment structure with 110 percent tank capacity, and contains

a level gauge that would alert plant staff if the tank level were to fall at an abnormal rate (id. at 4-86). The open interior of the secondary containment structure contains plastic spheres that would float on the surface of any spilled or leaked aqueous ammonia, reducing the exposed surface area and airborne ammonia concentrations (id.). The existing ammonia storage tanks are not currently enclosed; however, as part of the Project the Company would construct an enclosure around the two tanks and their associated containment structures (id. at 4-35, 4-86).

According to the Company, the existing tanks were pressure tested by the manufacturer prior to their use in 2006, and are subject to multiple ongoing inspections, including an annual tank inspection by an American Petroleum Institute-qualified (“API”) inspector and daily visual inspections performed by plant staff (Exh. EFSB-S-5). Additionally, NRG stated that all aboveground tanks with a capacity of more than 10,000 gallons, except water tanks, require a renewed Use Permit from the Massachusetts Department of Fire Services every five years (Exh. NRG-1, at 4-84, 4-86). In this case, an annually renewed storage tank permit may also be required by the Sandwich Fire Department (id. at 4-86; Exh. EFSB-S-5).

Regarding the potential for accidental releases from the ammonia storage tanks, the Company indicated that it used the USEPA’s Risk Management Program Guidance for Offsite Consequence Analysis to calculate the maximum predicted one-hour concentration of ammonia in the unlikely event of a complete failure of one of the storage tanks (Exh. NRG-1, at 4-35).^{111,112} According to the Company, all modeled concentrations at or beyond the fenceline of the Freezer Road Site would be below the American Industrial Hygiene Association’s Level 1 Emergency Response Planning Guideline (“ERPG-1”) (id. at 4-36).¹¹³ NRG calculated that

¹¹¹ The Company stated that the release rate calculation assumed the release of an entire 60,000-gallon storage tank at an outdoor temperature of 93.4 degrees Fahrenheit (Exh. NRG-1, at 4-35)

¹¹² NRG proposes to construct a 25-foot-tall enclosure around the two existing ammonia storage tanks as part of the Project (Exh. NRG-1, at 4-35 to 4-36). In the event of a tank failure, the enclosure would be ventilated to atmosphere through a roof vent (id. at 4-35). In its dispersion model, NRG modeled the roof vent as a volumetric source of ammonia with a release rate of 23.7 pounds per hour (id. at 4-36).

¹¹³ ERPG-1 (25 ppm or 17,414.1 $\mu\text{g}/\text{m}^3$) is defined as “the maximum airborne concentration below which nearly all individuals could be exposed to for up to 1 hour without experiencing other than mild, transient adverse health effects or without perceiving a clearly defined objectionable odor” (Exh. NRG-1, at 4-36).

airborne ammonia concentrations would be $4,275.5 \mu\text{g}/\text{m}^3$ at or beyond the Proposed Facility fence line, corresponding to 24.6 percent of the ERPG-1 maximum concentration (id. at 4-37).

NRG stated that aqueous ammonia would be delivered to the Proposed Facility by rail, consistent with current practices at the Existing Facility (Exh. NRG-1, at 4-85). The Proposed Facility includes a berm around the ammonia unloading area; any fluid released during unloading would be collected in an enclosed containment system located beneath the tank building (id.). Delivery trailers would be equipped with fast-action shut-off valves and the pump system would be equipped with an automatic shut-off (id.).

ii. ULSD

NRG stated that, as part of the Project, two of the several existing No. 6 fuel oil tanks located on the Freezer Road Site (one storage tank and one day tank) would be refurbished and converted to store ULSD (Exh. NRG-1, at 1-15). These tanks have a capacity of 5.7 million gallons and 1.8 million gallons respectively, and are both equipped with secondary containment designed to accommodate at least 110 percent of each tank's volume (id.; Exh. EFSB-S-6).

According to the Company, ULSD for the Proposed Facility would be delivered by barge, using the same delivery practices currently used for the Existing Facility (Exh. NRG-1, at 1-15). A new unloading pipe would be constructed parallel to the existing refueling pipes for this purpose (id.). NRG stated that ULSD would be transferred from the storage tank to the day tank and then to the combustion turbine via a new approximately 4,000-foot pipeline (id.). According to the Company, any release of oil to water or land during unloading or during transport to the Facility would need to be reported by the oil transportation and delivery company to the U.S. Coast Guard's National Response Center (RR-EFSB-31). Such a report would also trigger reporting to the MassDEP and the USEPA (id.). Any spills impacting the Cape Cod Canal would also need to be reported to the USACE Cape Cod Canal Field Office (id.).

NRG stated that it maintains a Spill Prevention, Control, and Countermeasure Plan ("SPCC Plan"), and a Facility Response Plan ("FRP") for the Existing Facility, and that these plans would be updated as necessary to reflect the addition of the Proposed Facility (Exh. EFSB-S-9). The Company indicated that the purpose of the SPCC Plan is to prevent oil spills from occurring, and to facilitate a safe, efficient, and timely response in the event of a spill

or leak (Exh. EFSB-S-9(1) at 1-1). The primary purpose of the FRP is to describe the resources and procedures to respond to an oil spill and other related emergencies (Exh. EFSB-S-9(2) at xvi). The FRP includes facility-wide emergency planning, discharge modeling and spill drill requirements (Exh. NRG-1, at 4-88).

iii. Other Chemicals

NRG stated that it would use a number of other chemicals in conjunction with the operation and maintenance of the Proposed Facility, including petroleum products, compressed gases, acids and caustics, paints, and other solvents (Exh. NRG-1, at 4-86 to 4-87). According to the Company, these materials would be received and handled in accordance with a written control procedure and stored in specially-designated areas (id. at 4-87). Additionally, the Company would segregate and mark materials as required under applicable regulatory standards (id.).

NRG stated that 3,500 gallons of mineral insulating oil would be used in electrical transformers associated with the Project (id.). NRG indicated that these transformers would be located above concrete secondary containment areas with capacities of at least 110 percent of the transformer's volume, and that all mineral oil would be PCB-free (Exhs. NRG-1, at 1-11; EFSB-S-1; RR-EFSB-33).

c. Solid Waste

The Company reported that it would minimize the generation of solid waste during construction by implementing best management practices including re-use, recycling, and salvaging of waste materials (Exhs. NRG-1, at 4-67; EFSB-HW-2). NRG stated that the Existing Facility actively recycles paper, cardboard and metals and is looking to expand its recycling program to include plastic (Exh. EFSB-HW-2). The Proposed Facility would be integrated into the existing solid waste recycling program of the Canal Generating Facility (id.).

d. Safety

The Company stated that to ensure safety during construction, it would implement the following measures in conjunction with its construction contractor: (1) developing a health and safety plan; (2) providing an on-site safety professional from the construction contractor and the

Company during active phases of construction; and (3) following all appropriate U.S. Occupational Safety and Health Administration (“OSHA”) regulations (Exhs. NRG-1, at 4-85; EFSB-S-10; EFSB-S-11). The health and safety plan would include descriptions of anticipated hazards, mandated safety measures, safety training requirements, incident report procedures, and emergency procedures (Exh. EFSB-S-10). NRG reported that the Freezer Road Site is gated and that the Existing Facility is guarded by security personnel 24 hours a day (id.; Exh. EFSB-S-2). During construction a contractor parking area would be designated, and this area would be segregated from the Existing Facility by a combination of signage and barriers (Exh. EFSB-S-10).

Regarding public access areas along the Cape Cod Canal, NRG stated that no public health or safety hazards would exist for the majority of Project construction (Exh. EFSB-S-2). According to the Company, there would be a brief period during the construction of the new ULSD unloading line where an open trench across the adjacent USACE path would be required (id.). NRG stated that this trench would be guarded by construction personnel during the day, and covered with road plates at night (Exh. EFSB-S-13). One side of the path would be kept open to provide emergency vehicle and public access (id.). The Company would work with the USACE on proper protection and detour routes to further protect public safety (Exh. EFSB-S-2).

NRG stated that it would implement a comprehensive maintenance program to ensure safe and reliable operation of the Proposed Facility (Exh. NRG-1, at 4-85). Additionally, it would operate a fully integrated control system to ensure the CTG, electric generator, water treatment, and electrical systems are run within safe operating limits (id.). The Company described measures to ensure adequate fire and operational safety including: the selection of appropriate building materials; inclusion of automatic shutdown systems; installation of sprinkler systems, dry chemical fire suppression systems, and emergency lighting; and provision of adequate access for emergency response and egress for employees (Exh. EFSB-S-12).

The Proposed Facility would be equipped with one ULSD-fired and one electric-powered fire pump, and each individual fire pump would be sufficient to meet the entire needs of the fire suppression system (Exh. NRG-1, at 1-11). As noted in Sections I.A.2 and IV.C.X, above, NRG would construct a new 360,000-gallon aboveground service and fire water storage tank for the

Proposed Facility (id. at 1-10).¹¹⁴ According to the Company, the portion of this tank dedicated to fire protection would be sufficient to allow simultaneous supply to the Proposed Facility's largest fire extinguishing system and a 500-gallon-per-minute hose stream for a two-hour period (id.). Additionally, the Company stated that prior to commercial operation, NRG would provide orientation tours and an overview of planned emergency response procedures at the Proposed Facility to Sandwich fire personnel and other emergency responders (Exhs. NRG-1, at 4-85; EFSB-S-11).

2. Analysis and Findings

The record indicates that the Company intends to dispose of all hazardous waste according to MassDEP's hazardous waste regulations. Additionally, no existing hazardous waste contamination is anticipated to affect construction or operation of the Project.

The Company proposes to store aqueous ammonia on-site in two existing 60,000-gallon tanks. These tanks are equipped with secondary containment capable of accommodating 110 percent of the each tank's contents. The Company will enclose the existing ammonia tanks in a new building. NRG stated that in the case of an accidental release of an entire ammonia storage tank, ammonia concentrations in the air at the Proposed Facility fenceline would be below the level that would cause transient health effects for most people.

The record shows that the Facility would contain a 5.7 million gallon ULSD aboveground storage tank and a 1.8-million gallon ULSD aboveground day tank, each of which would be surrounded by a secondary containment structure with a capacity of at least 110 percent of the tank volume. The Company would also construct secondary containment systems around other oil-containing equipment, including electrical transformers. NRG provided the SPCC Plan and the FRP for the Existing Facility, and stated that these plans would be updated as necessary to reflect the addition of the proposed Project. The Siting Board directs the Company to submit to the Siting Board the updated SPCC Plan, including the FRP, prior to the commencement of

¹¹⁴ NRG stated that the Project and the Existing Facility would each have independent fire-suppression systems due to their locations within the Freezer Road Site (Exh. EFSB-G-24). However, in the event of an oil storage fire, the Existing Facility firefighting system would be used (Exh. EFSB-G-25). The Company also indicated that water from the Cape Cod Canal would be available for use by fire trucks during such an event (id.).

construction. Both the aqueous ammonia and ULSD tanks require a renewed Use Permit from the Massachusetts Department of Fire Services every five years. Additionally, the ammonia storage tanks would be subject to multiple ongoing inspections, including annual API inspections, and daily staff inspections. An annually renewed Use Permit from the Town of Sandwich may also be required.

With these actions, the Siting Board finds that hazardous waste and chemical/oil storage impacts of the Proposed Facility would be minimized.

The Company stated that it would minimize construction and operational waste through measures such as reuse, recycling, and salvaging of construction materials. The Siting Board finds that the measures the Company outlined would minimize the solid waste impacts of the Proposed Facility.

The record shows that NRG would have programs in place to address safety during both Proposed Facility construction and operation. The Company would provide adequate access for emergency response and egress for employees, and would provide orientation tours and an overview of planned emergency response procedures to Sandwich fire personnel and other emergency responders prior to commercial operation of the Proposed Facility. The record also indicates that the Company would store and handle oil and other chemicals in accordance with applicable regulatory standards. To facilitate accurate and effective emergency response planning procedures, the Siting Board directs the Company to develop an Emergency Response Plan for the Proposed Facility in consultation with the Town of Sandwich. The Siting Board finds that, with the implementation of the safety measures proposed by the Company, and the conditions above, the proposed Project adequately addresses identified safety considerations.

Accordingly, the Siting Board finds that, with the implementation of the above conditions, the hazardous waste, solid waste, and chemical/oil storage impacts of the proposed Project would be minimized, and the Project would adequately address identified safety considerations.

I. Cumulative Health Impacts

This section describes the cumulative health impacts of the Proposed Facility. See G.L. c. 164, §69J¼. The Siting Board considers the term “cumulative health impacts” to encompass the range of effects that a proposed facility could have on human health due to

exposure to substances emitted during construction and operation of the proposed facility, as well as physical phenomena such as noise and magnetic fields. Exelon West Medway at 120; Footprint Power at 94. The Siting Board considers these effects in the context of existing baseline health conditions and existing background conditions and, when appropriate, likely changes in the contributions of other major emissions sources. Exelon West Medway at 120; Footprint Power at 94; Sithe Mystic Development, LLC, EFSB 98-8, at 79-80 (1999) (“Sithe Mystic”).

1. Baseline Health Conditions

NRG provided a summary of asthma prevalence and cancer incidence study findings for the Sandwich area, as available from the Massachusetts Department of Public Health (“MADPH”) (Exh. NRG-1, app. H, at 30-34).

For asthma prevalence among schoolchildren over five years (2007-2008 to 2011-2012), school asthma prevalence was 7.8 percent to 9.0 percent, lower than the statewide average in each of those years – the period for which the Company was able to obtain data from the MADPH Environmental Public Health Tracking Program (id., app. H, at 32). The Company stated that adult asthma data from 2012 show an asthma prevalence rate for the Southeast Region of the state, encompassing Sandwich, of 14.6 percent, similar to the central, metro-west, and northeast regions (id., app. H, at 33-34). A different survey, covering 2003-2008, showed an adult asthma prevalence rate of 9.1 percent for an area including the Cape and Islands, compared to a statewide average of 9.8 percent (id., app. H, at 34). The Company also reported that the hospitalization rate for asthma among Sandwich residents was 61.4 per 100,000 for calendar year 2009, compared to an age-adjusted statewide average of 160.2 per 100,000 (id.).

Sandwich cancer rates in 2006-2010 were not statistically significantly different from statewide averages for most cancer sites, but were statistically above statewide rates for leukemia, prostate cancer, melanoma, and total cancer among males and for melanoma among females (Exh. NRG-1, app. H, at 31). The Company interpreted the community health data to mean that the Sandwich area has asthma and cancer rates that are similar to statewide averages (id., app. H, at 37).

2. Air

The Company's human health risk assessment evaluated whether air emissions from the Proposed Facility and the Existing Facility combined contribute to significant health risks (including risks of diseases for which baseline health is characterized above for the community) among potentially affected populations (Exh. NRG-1, at 4-108, app. H, at 36, ES-1).

a. Criteria Pollutants

NRG used the NAAQS for SO₂, particulate matter, NO₂, and carbon monoxide as relevant criteria to evaluate potential health impacts of its potential air emissions of criteria pollutants (Exh. NRG-1, app. H, at 2, 8-12). As noted by the Company, the USEPA selected the NAAQS to be protective of members of the general population, including potentially susceptible individuals (*id.*, app. H, at 8). The Company's modeling of the dispersion of Proposed Facility emissions shows that maximum Proposed Facility impacts are a fraction of background concentrations at NRG's air monitoring station in Shawme-Crowell State Forest (*id.*, app. H, at 9). As further discussed in Section IV.B.1. above, adding those background concentrations and dispersion from the Existing Facility to the Company's dispersion modeling of Proposed Facility emissions indicated that cumulative air concentrations would remain below the applicable NAAQS (*id.*).

The record shows that the NAAQS are set to be broadly protective of health including any sensitive populations, and that the Proposed Facility would meet the NAAQS. As described in Section IV.B.1 above, ground-level impacts of Proposed Facility emissions of particulate matter could be further reduced by increasing the stack height, and the Siting Board has directed the Company to construct a stack 235 feet tall. Further increases in height would also reduce ground-level impacts, but visual impacts would increase. Accordingly, the Siting Board finds that the health impacts of criteria pollutants would be minimized.

b. Non-criteria Pollutants (Air Toxics)

NRG calculated a toxicological hazard index and a cancer risk level for a hypothetical resident breathing air throughout the year at the point of highest airborne concentrations modeled from stack emissions, for a period of 30 years (Exh. NRG-1, app. H, at 14-15). The Company stated that such a calculation is conservative relative to real exposures to air toxics – that is, toxic

air pollutants other than the criteria pollutants (id.). For this modeled resident, NRG calculated a hazard index¹¹⁵ of 0.01 for all air toxics, combined, which is well below the established 1.0 hazard threshold; therefore, the Company concluded that non-cancer health effects would not be anticipated (id. at 21). For the same off-site residential exposure, the Company calculated a cancer risk of 8×10^{-8} , which is below the USEPA de minimis level (id.).

The record shows that health risks from non-criteria pollutants would be minimal. In each of the risk calculations, the preponderance of the risk is from background sources, rather than emissions modeled from the Proposed Facility. Accordingly, the Siting Board finds that the health impacts of non-criteria pollutants would be minimized.

3. Noise

As discussed in Section IV.F, above, the Company has proposed to implement noise mitigation at the Canal Generating Facilities sufficient to keep operational noise levels to 50 dBA at residential locations, representing increases of ten dBA or less (Exhs. NRG-3, at 7-7; EFSB-NO-9). As discussed in Section IV.F, noise during construction may be louder, but would be temporary. The Company indicated that the Project is consistent with the Commonwealth's noise policy and that, while the noise policy does not establish health effects thresholds, the policy has been established to avoid nuisance and to be protective of health with a margin of safety (Exh. EFSB-H-4). The record does not indicate that noise produced by the Project either due to construction or operation would present health concerns.

In Section IV.F, the Siting Board found that, with implementation of the Company's proposed noise mitigation measures and conditions imposed by the Siting Board, noise impacts of construction and operation of the Proposed Facility would be minimized, consistent with minimizing cost. Accordingly, the Siting Board finds that the health effects, if any, of noise from the proposed Project would be minimized.

¹¹⁵ A hazard index is used to assess non-cancer risks. Adverse health impacts are not anticipated when a hazard index is less than 1.0, and may not necessarily occur when a hazard index exceeds 1.0 due to safety margins built into the calculation (Exh. NRG-1, app. H, at 21).

4. Handling and Disposing of Hazardous Materials

In Section IV.H, above, the Siting Board reviewed the Company's plans for storage and handling of hazardous materials, including 19 percent aqueous ammonia and limited amounts of industrial chemicals for maintenance and operation of the Proposed Facility. Section IV.H also outlines the Company's plans for minimizing and responding to accidental releases of oil and other hazardous materials. The record shows that the Company would establish plans for minimizing and responding to accidental releases. The Siting Board finds that, with implementation of the conditions set forth in Section IV.H, above, the health impacts related to the handling and disposal of hazardous materials, including ammonia, would be minimized.

5. Magnetic Fields

The proposed 345 kV transmission line extending from the Proposed Facility to the nearby Eversource Switchyard is in an area with land use controlled by NRG, Eversource, and MassDOT (RR-EFSB-20). For the closest private properties, NRG modeled the maximum magnetic field from the transmission line at 2.0 milligauss ("mG") at the property lines and 1.25 mG at the structures on the private properties (*id.*). Sandwich holds a road easement for a dead-end road on Eversource property, on which the maximum modeled magnetic field would be 48 mG; the road could be used to reach future homes but only if Eversource sold land for such houses (*id.*; Tr. 3, at 427).

Operation of the Proposed Facility would affect magnetic fields along transmission lines extending from the mainland onto Cape Cod, but would have no effect along transmission lines extending from Sandwich further down-Cape (Tr. 3, at 432-433). According to the Company, Proposed Facility operation would typically reduce currents on the lines extending onto Cape Cod by displacing power from off-Cape; only rarely would the Company expect power generated at the Canal Generating Facilities to exceed power consumption on the Cape and Islands and therefore be exported off-Cape (*id.* at 433-435).

The record shows that the Proposed Facility would rarely increase power flows on any regional transmission lines. The record in this case shows, furthermore, that the proposed Project would not create a significant increase in magnetic field levels at off-site locations frequented by the public. The Siting Board has found that although some epidemiological studies have suggested a statistical correlation between exposure to magnetic fields and

childhood leukemia, there is no evidence of a causal relationship between magnetic field exposure and human health. Footprint Power at 99; PVEC at 42; Sithe Mystic at 88-89.

The Siting Board finds that health effects of the proposed Project related to magnetic fields would be minimized.

6. Conclusion on Cumulative Health Impacts

The Company provided its evaluation of Project cumulative health impacts. Regarding air pollutants, the record shows that the NAAQS are set to be broadly protective of health and that the Proposed Facility would meet the NAAQS so health impacts of criteria pollutants would be minimized. The record also shows that health impacts of air toxics would be minimal. Additionally, the record shows that noise impacts would be minimized; the health impacts related to the handling and disposal of hazardous materials, including ammonia, would be minimized; and that the Proposed Facility would not create significant increases in magnetic fields in locations frequently used by the public. Consequently, the Siting Board finds that the Project would not exacerbate health problems in the communities surrounding the Project. Accordingly, the Siting Board finds that cumulative health impacts of the proposed Project would be minimized.

J. Conclusions on Environmental Impacts

Based on the information in Sections IV.B through I, above, the Siting Board finds that the Company's description of the proposed Project and its environmental impacts is substantially accurate and complete.

In Section IV.B, the Siting Board found that, with the implementation of a condition requiring an increase in the stack height of the Proposed Facility from 220 feet to 235 feet, the air quality impacts of the proposed Project would be minimized.

In Section IV.C, the Siting Board found the land use impacts of the proposed Project would be minimized.

In Section IV.D, the Siting Board found the water-related impacts of the proposed Project would be minimized.

In Section IV.E, the Siting Board found that, with the implementation of a condition requiring the Company to maintain the good appearance of the Canal Generating Facilities, including the new stack, the visual impacts of the proposed Project would be minimized.

In Section IV.F, the Siting Board found that, with the implementation of: (1) a condition governing allowable work hours; (2) conditions requiring the Company to consult with MassDEP and Sandwich to develop an operational noise monitoring protocol and a construction noise monitoring protocol; and (3) a condition requiring the development of an outreach plan for Project construction, the noise impacts of the proposed Project would be minimized.

In Section IV.G, the Siting Board found that, with the implementation of: (1) a condition requiring the Company to work collaboratively with the Town of Sandwich, MassDOT, and the Town of Bourne in coordinating construction and operational traffic; (2) a condition requiring the Company to utilize a traffic control detail or personnel at the intersection of Route 130/Route 6A/Tupper Road during the predicted arrival and departure hours when the Company anticipates 150 or more vehicles arriving on-site; (3) a condition requiring the Company to report on its construction traffic monitoring program and any changes to construction hours resulting from this program; (4) a condition requiring the Company to report on all road repairs made in Sandwich within 60 days of completing road work; and (5) a condition requiring the Company submit a copy of its Traffic Management Plan to the Siting Board prior to the start of construction, the traffic impacts of the Project would be minimized.

In Section IV.H, the Siting Board found that, with the implementation of conditions requiring the Company to (1) develop an Emergency Response Plan for the Proposed Facility, and (2) submit updated Spill Prevention, Control and Countermeasure Plan and Facility Response Plan for the Proposed Facility, the hazardous waste, solid waste, and chemical/oil storage impacts of the proposed Project would be minimized, and the Project would adequately address identified safety considerations.

In Section IV.I, the Siting Board found that the cumulative health impacts of the proposed Project would be minimized.

Accordingly, the Siting Board finds that, with the Company's compliance with: (1) all applicable legal requirements, including statutory, regulatory, and environmental permitting requirements; (2) all measures the Company has stated in this proceeding that it will use to avoid, minimize, and mitigate environmental impacts; and (3) all conditions to this Decision, the

Company's plans for the construction of the proposed Project would minimize the environmental impacts of the Project consistent with the minimization of costs associated with the mitigation, control, and reduction of the environmental impacts of the Project. In addition, the Siting Board finds that the proposed Project would achieve an appropriate balance among conflicting environmental concerns as well as between environmental impacts and costs.

V. CONSISTENCY WITH THE POLICIES OF THE COMMONWEALTH

A. Standard of Review

G.L. c. 164, § 69J¼ requires the Siting Board to determine whether the plans for construction of a proposed generating are consistent with current health and environmental protection policies of the Commonwealth and with such energy policies of the Commonwealth as are adopted by the Commonwealth for the specific purpose of guiding the decisions of the Siting Board. The health and environmental protection policies applicable to the review of a generating facility vary considerably depending on the unique features of the site and technology proposed. In this section, the Siting Board summarizes the health, environmental protection and energy policies of the Commonwealth that are applicable to the proposed Project and discusses the extent to which the proposed Project complies with these policies.¹¹⁶

B. The Global Warming Solutions Act

As discussed in Section IV.B.2 above, the GWSA establishes a comprehensive framework for the reduction of GHG emissions in Massachusetts. The 2020 CECP and the 2020 CECP Update, developed pursuant to the GWSA, require the reduction of GHG emissions to 25 percent below 1990 levels by 2020 and to 80 percent below 1990 levels by 2050. While MassDEP has proposed electric generation regulations under G.L. c. 21N, § 3(d), such regulations have not yet been adopted. Therefore, there are currently no regulatory requirements with which the Proposed Facility must comply.

¹¹⁶ The energy policies embodied by the Legislature in the Siting statute, G.L. c. 164, §§ 69G- 69S, and particularly §§ 69H-69J¼, are the foundation for the Siting Board's overall review of the Company's Petition in this proceeding, and are reflected in the Board's analyses and findings, and Final Decision, in this matter.

The evidence in this proceeding indicates that construction and operation of the Proposed Facility is consistent with the GHG emission goals set forth in the 2020 CECP and the 2020 CECP Update. In Section IV.B.2 above, the efficient profile of the Proposed Facility would lead to both regional and statewide emissions reductions, as shown in the results of the Company's dispatch modeling from 2019 to 2029. Furthermore, ISO-NE's use of economic dispatch would ensure that when the Proposed Facility operates, it would be likely to displace higher emitting resources. Consequently, whenever the Proposed Facility produces power, even after 2029, it would be doing so while producing lower emissions than would have otherwise been the case. Additionally, MassDEP has issued a Proposed Air Plan Approval for the Proposed Facility. Citing GWSA Section 3(d) and Executive Order 569, the Proposed Air Plan Approval imposes an annual declining cap on the Proposed Facility's allowable CO₂ emissions, and it requires the Proposed Facility's compliance with applicable provisions of the Section 3(d) regulations once they are issued by MassDEP.

Accordingly, we find that construction and operation of the Proposed Facility would be consistent with the GWSA.

C. Consistency with Other Policies of the Commonwealth

In Sections I.A.1 and I.A.2 above, the Siting Board reviewed the process by which the Company sited and designed the Proposed Facility, and the overall environmental and health impacts of the Proposed Facility as sited and designed. As part of this review, the Siting Board identified a number of Commonwealth policies applicable to the design, construction, and operation of the Proposed Facility. These policies, except for the policies associated with the Global Warming Solutions Act, which are discussed immediately above, and the Company's compliance therewith, are summarized below.

As discussed in Section IV.B above, MassDEP, in conjunction with the USEPA, extensively regulates emissions of criteria and non-criteria air pollutants from new sources such as the Proposed Facility. The Company has demonstrated that operation of its Proposed Facility, with the conditions imposed, would be consistent with all applicable MassDEP and USEPA standards.

As discussed in Section IV.D above, MassDEP, in conjunction with the USEPA, extensively regulates various environmental issues related to water, as well as construction in

wetlands and waterway areas. The Company has demonstrated that construction and operation of the Proposed Facility, with the conditions imposed, would be consistent with applicable MassDEP and USEPA standards. Furthermore, in Section IV.D we also analyzed the Project in relation to likely sea level rise and found that, with the proposed base elevation of the Proposed Facility, the Company has minimized the potential for coastal flooding and that it has mitigated the effect of predicted sea level rise.

As discussed in Section IV.F above, the Company has addressed construction and operational noise. With the conditions imposed in that section, the construction and operation of the Project would be consistent with the policies of the Commonwealth regarding noise impacts.

D. Conclusions on Consistency with the Policies of the Commonwealth

Accordingly, for the reasons set forth above, the Siting Board finds that plans for construction and operation of the proposed Project are consistent with current health and environmental protection policies of the Commonwealth and with such energy policies of the Commonwealth as have been adopted for the specific purpose of guiding the decisions of the Siting Board.

VI. REQUEST FOR INDIVIDUAL ZONING EXEMPTIONS PURSUANT TO G.L. C. 40A, § 3

The Company requests certain individual exemptions, or in the alternative, a comprehensive exemption, from the Zoning Bylaw of the Town of Sandwich (“Zoning Bylaw”) (Exh. NRG-2, at 1).¹¹⁷

A. Standard of Review

G. L. c. 40A, § 3, provides, in relevant part, that:

Land or structures used, or to be used by a public service corporation may be exempted in particular respects from the operation of a zoning ordinance or by-law if, upon petition of the corporation, the [Department] shall, after notice

¹¹⁷ Individual zoning exemptions excuse the Company from compliance with only those specific provisions of the zoning bylaw that are identified in the petition. A comprehensive zoning exemption excuses the Company from compliance with the entire zoning bylaw.

given pursuant to section eleven and public hearing in the town or city, determine the exemptions required and find that the present or proposed use of the land or structure is reasonably necessary for the convenience or welfare of the public.

Thus, a petitioner seeking exemption from a local zoning by-law under G.L. c. 40A, § 3, must meet three statutory-based criteria. First, the petitioner must qualify as a public service corporation. Second, the petitioner must demonstrate that its present or proposed use of the land or structure is reasonably necessary for the convenience or welfare of the public. Finally, the petitioner must establish that it requires exemption from the zoning ordinance or by-law. Exelon West Medway at 134; New England Power Company d/b/a National Grid, D.P.U. 15-44/15-45, at 4-5 (2016) (“MVRP”); Save the Bay, Inc. v. Department of Public Utilities, 366 Mass. 667 (1975) (“Save the Bay”).

Additionally, the Siting Board favors the resolution of local issues on a local level whenever possible, to reduce concern regarding any intrusion on home rule. The Siting Board believes that the most effective approach for doing so is for a petitioner to consult with local officials regarding its project before seeking zoning exemptions pursuant to G.L. c. 40A, § 3. Exelon West Medway at 134; New England Power Company d/b/a National Grid, EFSB 13-2/D.P.U. 13-151/152, at 97 (2014) (“Salem Cables”); Russell Biomass LLC/Western Massachusetts Electric Company, EFSB 07-4/D.P.U. 07-35/36, at 61-62 (2009) (“Russell Biomass/WMECo”). Thus, the Siting Board encourages petitioners to consult with local officials, and in some circumstances, to apply for local zoning permits, prior to seeking zoning exemptions under G.L. c. 40A, § 3. Exelon West Medway at 134; Salem Cables at 97; Russell Biomass/WMECo at 62.¹¹⁸

¹¹⁸ G.L. c. 40A, §3, authorizes the Department, not the Siting Board, to grant zoning exemptions. On December 16, 2015, the Chair of the Department referred the Company’s zoning exemption petition to the Siting Board for review and decision pursuant to G.L. c. 25, § 4 (Exh. NRG-TEA-1, at 3). In accordance with G.L. c. 164, § 69H, the Siting Board applies Department and Siting Board standards “in a consistent manner.” Thus, the Department and the Siting Board implement G.L. c. 40A, §3, using consistent standards of review. Consequently, the standard of review, and this Decision, cites to both Siting Board Decisions and Department Orders interpreting G.L. c. 40A, §3.

B. Public Service Corporation

1. Standard of Review

In determining whether a petitioner qualifies as a “public service corporation” (“PSC”) for the purposes of G.L. c. 40A, § 3, the Massachusetts Supreme Judicial Court has stated:

among the pertinent considerations are whether the corporation is organized pursuant to an appropriate franchise from the State to provide for a necessity or convenience to the general public which could not be furnished through the ordinary channels of private business; whether the corporation is subject to the requisite degree of governmental control and regulation; and the nature of the public benefit to be derived from the service provided.

Save the Bay, 366 Mass. at 680; Exelon West Medway at 135; NSTAR Electric Company d/b/a Eversource Energy, D.P.U. 15 02 (2015) (“Eversource Hopkinton”) at 4-5; see also Berkshire Power Development, Inc., D.P.U. 96-104, at 26-36 (1997) (“Berkshire Power”).¹¹⁹

2. Analysis and Findings

Pursuant to Department and Siting Board precedent, any corporation that owns generating assets in Massachusetts and makes those assets available to serve the New England market is a public service corporation. Exelon West Medway at 136; USGen New England, Inc., D.T.E. 03-83, at 15 n.9 (2004); Russell Biomass LLC, D.T.E./D.P.U. 06-60, at 15 (2008) (“Russell Biomass 2008”).

¹¹⁹ The Department interprets this list not as a test, but rather, as guidance to ensure that the intent of G.L. c. 40A, § 3, will be realized: *i.e.*, that a present or proposed use of land or structure that is determined by the Department to be “reasonably necessary for the convenience or welfare of the public” not be foreclosed due to local opposition. Berkshire Power at 30; Save the Bay, 366 Mass. at 685-686; Town of Truro v. Department of Public Utilities, 365 Mass. 407, at 410 (1974) (“Town of Truro”); Exelon West Medway at 135 n. 117; MVRP at 5-6. The Department has interpreted the “pertinent considerations” as a “flexible set of criteria which allow the Department to respond to changes in the environment in which the industries it regulates operate and still provide for the public welfare.” Berkshire Power at 30; MVRP at 6; see also Dispatch Communications of New England d/b/a Nextel Communications, Inc., D.P.U./D.T.E. 95-59B/95-80/95-112/96-113, at 6 (1998). The Department has determined that it is not necessary for a petitioner to demonstrate the existence of “an appropriate franchise” in order to establish PSC status. Berkshire Power at 31; MVRP at 6; Eversource Hopkinton at 4-5.

NRG's affiliate, NRG Canal LLC, owns and operates the Canal Generating Facility that has been operating on the Freezer Road Site for many years (Exhs. NRG-1, at 1-2; NRG-2, at 14). NRG and its parent company, NRG Energy, Inc., are in the business of acquiring, owning, and operating electric generation facilities, including facilities in Massachusetts, that serve the needs of the Commonwealth and of the New England region (Exh. NRG-2, at 14). The Facility's bid in FCA 10 was accepted and, consequently, the Facility has a capacity supply obligation commencing on June 1, 2019 (Exh. NRG-TEA-1, at 3). The Facility will be used to meet capacity shortages identified by ISO-NE in the SEMA/RI region beginning in June 2019 (Exh. NRG-2, at 15).

Accordingly, we find that NRG meets the criteria for public service corporation status as developed and applied by the Department and the Siting Board under G.L. c. 40A, §3.

C. Public Convenience and Welfare

1. Standard of Review

In determining whether the present or proposed use is reasonably necessary for the public convenience or welfare, the Department must balance the interests of the general public against the local interest. Save the Bay at 680; Town of Truro at 407. Specifically, the Department is empowered and required to undertake "a broad and balanced consideration of all aspects of the general public interest and welfare and not merely [make an] examination of the local and individual interests which might be affected." New York Central Railroad v. Department of Public Utilities, 347 Mass. 586, 592 (1964) ("NY Central Railroad"). When reviewing a petition for a zoning exemption under G.L. c. 40A, § 3, the Department is empowered and required to consider the public effects of the requested exemption in Massachusetts as a whole and upon the territory served by the applicant. Save the Bay at 685; NY Central Railroad at 592.

Therefore, when making a determination as to whether a petitioner's present or proposed use is reasonably necessary for the public convenience or welfare, the Department examines: (1) the need for, or public benefits of, the present or proposed use; (2) the present or proposed use and any alternatives or alternative sites identified;¹²⁰ and (3) the environmental impacts or

¹²⁰

With respect to the particular site chosen by a petitioner, G.L. c. 40A, § 3, does not require the petitioner to demonstrate that its primary site is the best possible alternative, nor does the statute require the Department to consider and reject every possible alternative site presented. Rather, the availability of alternative sites, the efforts

any other impacts of the present or proposed use. The Department then balances the interests of the general public against the local interest and determines whether the present or proposed use of the land or structures is reasonably necessary for the convenience or welfare of the public. Boston Gas, D.T.E. 00-24, at 2-6; Massachusetts Electric Company, D.T.E. 07-77, at 5-6 (2002); Tennessee Gas Pipeline Company, D.T.E. 01-57, at 5-6 (2002); Tennessee Gas Company, D.T.E. 98-33, at 4-5 (1998).

2. Analysis and Findings

The Siting Board reviewed the Company's site selection process in Section II, and determined that its description of the site selection process used is accurate. With respect to energy and reliability benefits, the Siting Board found, in Section III above, that construction of this Facility, including the GE 7HA.02 simple-cycle combustion turbine generator, contributes on balance to a reliable, low-cost, diverse regional energy supply with minimal environmental impacts. Finally, regarding Project environmental impacts, in Section IV the Siting Board reviewed the environmental impacts of the Project and the Siting Board found that the environmental impacts of the Project would be minimized with the implementation of certain mitigation measures and conditions.

Based on the foregoing, the Siting Board finds that the general public interest in constructing the Project outweighs adverse local impacts identified in Section IV above. Accordingly, the Siting Board finds that the Project is reasonably necessary for the convenience or welfare of the public.

D. Individual Exemptions Sought

1. Standard of Review

In determining whether an exemption from a particular provision of a zoning by-law is "required" for purposes of G.L. c. 40A, § 3, the Department determines whether the exemption is necessary to allow construction or operation of the petitioner's project. Exelon West Medway

necessary to secure them, and the relative advantages and disadvantages of those sites are matters of fact bearing solely upon the main issue of whether the primary site is reasonably necessary for the convenience or welfare of the public. Martarano v. Department of Public Utilities, 401 Mass. 257, 265 (1987); NY Central Railroad at 591.

at 138; MVRP at 7; Tennessee Gas Company, D.P.U. 92-261, at 20-21 (1993). The Petitioner bears the burden to identify the individual zoning provisions applicable to the Project and then to establish on the record that exemption from each of those provisions is required:

The Company is both in a better position to identify its needs, and has the responsibility to fully plead its own case . . . The Department fully expects that, henceforth, all public service corporations seeking exemptions under [G.L.] c. 40A, § 3 will identify fully and in a timely manner all exemptions that are necessary for the corporation to proceed with its proposed activities, so that the Department is provided ample opportunity to investigate the need for the required exemptions.

New York Cellular Geographic Service Area, Inc., D.P.U. 94-44, at 18 (1995); MVRP at 7-8; Eversource Hopkinton at 6.

2. Exemptions Sought

The Company is seeking eleven individual exemptions from the Town of Sandwich Zoning Bylaw (Exh. NRG-2, at 3).¹²¹ Applications for several of the local permits cannot be entertained by the Town until the CCC has completed its review, which can be a lengthy procedure (RR-EFSB-35). For several of the requested exemptions, the Company notes that it is unclear whether the special permit or variance is required for the Facility (Company Brief at 170 n.65). In addition, the Company notes that appeals from the grant of a permit or a variance could delay construction of the Project (id. at 76, 167).¹²² For this reason and others (see Table 7, below), NRG asserts that each exemption is required in order for the Company to construct the Facility in a timely manner and thereby fulfill its capacity supply obligations (id. at 166; RR-EFSB-35).

¹²¹ In Section VII, below, the Siting Board addresses the Company's request for a comprehensive zoning exemption.

¹²² The Company places significant emphasis on the potential for a "crippling delay in the event of appeals" (Company Brief at 76). All grants of variances and all grants of special permits are subject to appeal. G.L. c. 40A, § 17; G.L. c. 185, § 3A; see also, Skawski v. Greenfield Investors Property Development LLC, 473 Mass. 580 (2016) (only the Land Court and the Superior Court may adjudicate certain appeals). Consequently, the possibility of delay caused by appeal is a reason for granting each of the individual exemptions sought in the Zoning Petition.

Table 7, below, summarizes the provisions of the Zoning Bylaw from which the Company seeks exemptions, the relief available from the Town, and the Company’s argument as to why the Project cannot comply with the identified zoning provision (in addition to the arguments set forth immediately above) and, therefore, an exemption from the provision is required (see Company Brief at 168-175). The Project would be located within the Industrial zoning district (“IND”) (Exh. NRG-2, at 9). The Town Sandwich supports the Company’s zoning exemption request (id. at 11 and Att. A; Exh. EFSB-Z-4(1)).

**Table 7. Requested Individual Exemptions from Sandwich Zoning Bylaw:
Summary of the Company’s Position**

| Section of the Zoning Bylaw | Available Relief | Why Exemption is Required: Company’s Position |
|--|-------------------------|--|
| Section 2420 Change, Extension or Alteration (Pre-existing non-conforming use) | Special Permit | Construction of the Project may be considered to be the extension of a pre-existing non-conforming use: <u>i.e.</u> , the Canal Generating Facility. Project involves electric power generation, and electrical power generation is allowed in the industrial zoning district only upon the grant of a special permit pursuant to section 1380: Special Permit Issued for Protection of Drinking Water Resources. |
| Section 2540(b) Multiple Principal Buildings on the Same Lot | Special Permit | This section allows multiple principal buildings on the same lot only upon the issuance of a special permit by the Zoning Board of Appeals. Term “principal building” is undefined; Company cannot say with certainty whether both the Facility and the existing Canal Generating Facility would constitute multiple principal buildings. Likely that the permitting authorities would consider both structures to be principal buildings. |
| Section 2600 Intensity of Use Schedule (height limitation) | Variance | This section restricts maximum height to 45 feet. Proposed Facility would include a much taller stack and other components that would also exceed this limit ¹²³ , and a variance would most likely be required in order to obtain site plan approval and a building permit. By statute, a variance may only be granted by the Zoning Board of Appeals if it makes certain findings with respect to the conditions of the land; however the stack height is not related to land conditions, but rather is built to conform to state and federal air quality standards. Highly unlikely that the ZBA would grant a variance. |

¹²³ The “other components” and their heights are: the SCR/CO catalyst (113 feet); the power unit (86 feet); the demineralized water tank (56 feet); and the transmission pole (137.6 feet) (Exh. NRG-2, Att. B).

| Section of the Zoning Bylaw | Available Relief | Why Exemption is Required: Company's Position |
|--|-----------------------------|--|
| Section 3100 Parking Requirements | Special Permit | Section 3100 <u>et seq.</u> address parking requirements in general, and section 3120 contains a list entitled: "Table of Requirements." It is not clear which category set forth in this table would be appropriate for the Proposed Facility. If the Proposed Facility is not placed in any particular category, then it falls within "Others individually determined," a category that contains no text. Therefore, it is very hard to ascertain how many parking spaces the Town would require the Proposed Facility to create pursuant to this section of the Zoning Bylaw. |
| Section 3420 Environmental Controls (Noise) | Variance/ Special Permit | This section requires that no noise be "perceptible" more than 400 feet from the boundary of the lot. The term "perceptible" is not defined (<i>i.e.</i> , there is no decibel limit) and is, therefore, subjective. Construction of the Facility may generate noise that violates this section. |
| Section 3430 Environmental Controls (Dust) | Variance/ Special Permit | This section requires that cinders, dust, fumes, gases, radiation, and trash be "effectively" disposed of or confined out of sight. Bylaw does not give any definition or guidance to interpret "effectively" and is, therefore, subjective. Company represents that during operations the Proposed Facility would store waste appropriately and that any emissions of fumes, gases, and cinders would comply with the emission limits in the Proposed Facilities' Comprehensive Air Plan Approval issued by MassDEP. But Company cannot be sure whether this will be sufficient because the bylaw relies upon subjective criteria (RR-EFSB-35; Company Brief at 173). |
| Section 3450 Environmental Controls (Airborne Particulate Matter) | Variance/ Special Permit | This section would require that: (1) total airborne particulate matter on the Facility Site not exceed 30 grams per hour per acre; and (2) there is no measurable transmission of particulate matter from the ground at the boundary of the premises. NRG will take measures to minimize dust during construction; it is not yet possible to know whether the concentration of particulate matter at all points within the Facility Site will meet the requirement established by this section. Due to the sensitivity of modern monitoring equipment, the Company cannot determine whether the Proposed Facility operations could meet the "no measurable transmission" standard. |
| Section 3470 Lighting Standards | Variance/ Special Permit | This section prohibits lighting that, among other things: outlines any part of a structure; casts direct light or glare onto any neighboring residential property; interferes with the safe vision of vehicle operators; or is mounted higher than 20 feet above ground. The lighting plan for the Project has not been finalized. Lighting that is more than 20 feet above ground may be required for the stack in order to obtain FAA approval. Not |

| Section of the Zoning Bylaw | Available Relief | Why Exemption is Required: Company's Position |
|--|------------------|--|
| | | possible to know whether the Project will comply with this section. |
| Section 3510 Landscaping And Screening Requirements | Special Permit | This section requires that at least 30 percent of the lot area must be "retained in a vegetated condition." The Company has not finalized a landscaping plan. Not possible to know whether the Project will comply with this section. |
| Section 4340 (Excavation or Fill Within a Flood Plain) | Special Permit | This section prohibits the issuance of any building permit for a building located in the flood plain if any land to be excavated or filled pursuant to said the construction is below base flood elevation. Fill may be required in order to make modifications to the substation. |
| Modification of Special Permit 99-27 | Special Permit | The construction of the Project will require a new enclosure for the ammonia storage tanks. Special Permit 99-27, as amended, authorized the existing ammonia storage tanks for the Canal Generating Facility. May be necessary to obtain a modification of this special permit. |

Sources: Exhs. NRG-2, at 9-11, and exhibit 1, at 26; EFSB-Z-1 through EFSB-Z-6; RR-EFSB-13; Company Brief at 168-170.

3. Analysis and Findings

In order to construct the Project, NRG argues that it would need to obtain the following: (1) special permits to exempt the Project from Zoning Bylaw section 2420 (change or alteration of a pre-existing, non-conforming use), section 2540(b) (multiple principal buildings on the same lot), section 3100 (parking requirements), section 3510 (landscaping and screening), and section 4340 (excavation or fill within a flood plain); (2) a variance from section 2600 (imposing a height limitation on structures in order to build the emissions stack); (3) four separate variances or special permits from the environmental controls portions of the Zoning Bylaw: section 3420 (noise); section 3430 (dust); section 3450 (airborne particulate matter); and section 3470 (lighting standards);¹²⁴ and (4) a modification of Special Permit 99-27 in order to create a new

¹²⁴ Due to the continued operation of the Canal Generating Facility, the Company has two options in seeking the requested exemptions from the zoning provisions in the 3400 sections (Environmental Controls). If the Project is deemed to be part of the existing Canal Generating Facility, then NRG could seek a special permit to extend the nonconforming use or structure pursuant to zoning Section 2420. In the alternative, if the Project is deemed to stand alone, then the Company could seek a variance from any of

enclosure for ammonia storage tanks.. Based on the information provided and on our own review of the Zoning Bylaw and other relevant documents, the Siting Board finds that construction of the Project would require the Company to obtain the individual exemptions that it seeks.

With respect to the first group of exemptions sought (sections 2320, 2540(b), 3100, 3510, and 4340), we find the Company's arguments convincing. Specifically, with respect to the Proposed Facility, there is a significant uncertainty regarding whether it would constitute a pre-existing non-conforming use; whether it would constitute multiple buildings on the same lot; what, if any, parking requirements would be applicable; whether a portion of the lot would be required to be retained in a vegetated condition; and whether it could be constructed in the flood plain. We find that the Company would need to obtain some or all of these special permits in order to construct the Proposed Facility. But it is unlikely that the Company could obtain the special permits it needs. See G.L. c. 40A, § 9 ("Special permits may be issued only for uses which are in harmony with the general purpose and intent of the [zoning] ordinance or by-law). Therefore, we find that exemptions from sections 2320, 2540(b), 3100, 3510, and 4340 are necessary in order for the Company to construct the Proposed Facility.

Next, we address the request for a variance from section 2600 which imposes a height limitation on structures in order to build the emissions stack. The relevant zoning ordinance limits building height to 45 feet, but the stack alone would be over 200 feet high. Consequently, NRG would need to obtain a variance in order to construct the stack. Variances are granted based upon the conditions of the land, a criteria that is inapplicable to the stack height. Therefore, the stack cannot be built unless NRG obtains a variance, and it is unlikely to do so. Furthermore, variances are a "disfavored" form of relief. Cornell v. Board of Appeals of Dracut, 453 Mass. 888, 895 (2009). For this reason, variances are to be "sparingly granted." Lussier v. Zoning Board of Appeals of Peabody, 447 Mass. 531, 534 (2006). Additionally, the Siting Board notes that the grant of a variance may be appealed. See G.L. c. 40A, § 17, see also, 28 Mass. Prac. Series, Real Estate Law, § 23.24 (4th ed.) ("it is not surprising that few variances stand up when challenged in court"). Consequently, the Company's pursuit of variances could, at a minimum, result in significant Project delay; at worst it would prevent the Project's

the provisions of Section 3400 with which the Project cannot comply pursuant to zoning Section 1321.

construction. Consequently, it is necessary for the Siting Board to grant the Company a variance from section 2600 in order for the Company to build the Proposed Facility.

The third group of requested exemptions involves environmental control portions of the Zoning Bylaws: section 3420 (noise); section 3430 (dust); section 3450 (airborne particulate matter); and section 3470 (lighting standards). The Company would need to obtain either special permits or variances from these bylaws in order to construct the Proposed Facility. The difficulty in obtaining variances and special permits has been noted above. The Siting Board accepts the Company's arguments that these sections contain vague and subjective criteria as well as criteria that relate to unknowable (at this time) situations: whether certain noise will be perceptible (Section 3420); whether waste will be effectively out of sight (Section 3430); what will be the concentration of particulate matter at all points within the Facility Site during construction (Section 3450), and whether lighting that is more than 20 feet above ground will be required by the FAA (Section 3470). Consequently, we find that it is necessary for the Siting Board to grant exemptions from these sections in order for NRG to construct the Proposed Facility.

Finally, we address the requested modification of Special Permit 99-27 in order to create a new enclosure for ammonia storage tanks. The existing special permit authorizes only the creation of the existing ammonia storage tanks. But it would be necessary for the Company to construct a new enclosure in order to complete the Proposed Facility. Due to the difficulty in obtaining special permits, it is unlikely that the Company could obtain permission for this construction. Therefore, it is necessary for the Siting Board to grant an exemption to this by-law requirement.

In several orders and decisions, the Department and the Siting Board have excluded zoning exemptions related to environmental control over the ongoing operation of a facility ("Environmental Zoning Provisions") from the grant of zoning exemptions. Western Massachusetts Electric Company, EFSB 08-2/D.P.U. 08-105/08-106 (2010) ("GSRP"); NSTAR Electric Company, D.P.U. 15-85, at 42 (2016) ("Woburn Substation"); New England Power Company, D.P.U. 14-128/14-129, at 45, 46 (2015) ("Cabot Taps"); New England Power Company, EFSB 12-1/D.P.U. 12-46/12-47, at 88, 89 (2014) ("IRP"). In other orders, however, the Department has granted zoning exemptions without such an exclusion for Environmental

Zoning Provisions. New England Power Company, D.P.U. 09-136/09-137, at 48, 49 (2011); Princeton Municipal Light Department, D.T.E./D.P.U. 06-11 at 37-39 (2007).

The rationale for modifying zoning exemptions to exclude Environmental Zoning Provisions was most concisely articulated in Cabot Taps. “Although the Department grants requests for zoning exemptions to facilitate construction and avoid unnecessary delay or adverse zoning outcomes, the Department also believes that once such facilities are operational they should comply with local zoning requirements relating to the environmental aspects of the ongoing operation of the proposed Project.” Cabot Taps at 46. The other cases mentioned above – GSRP, Woburn Substation, and IRP – follow the same rationale. GSRP at 137, Woburn Substation at 42, IRP at 88.

The present case, however, differs from GSRP, Woburn Substation, Cabot Taps, and IRP in at least two important respects: NRG and Sandwich have entered into both a Host Community Agreement (“HCA”) as well as a PILOT agreement (Payment in Lieu of Taxes) (Exhs. EFSB-G-34(S)(1); EFSB-G-34(S1)(2)). The HCA addresses the Company’s responsibility with respect to environmental issues during the Facility’s operation (Exh. EFSB-G-34(S)(1)). Such environmental issues include air quality (§ 9), the supply of water to the Facility (§ 10), noise and visual impacts (§ 11), establishment of a traffic management plan (§ 12), and health and safety (§ 13) (*id.*). In return, the Town has promised to cooperate with NRG and to “facilitate the review of all local permits and approvals... necessary to accomplish the Project” (Exh. EFSB G-34(S)(1) §§ 1, 6).

The PILOT agreement provides for NRG to pay the Town of \$54,210,557 over 21 years (Exh. EFSB G-34(S1)(2) at 3-5). NRG’s duty to pay this sum is expressly conditioned upon “NRG’s election to construct the New Facility” (*id.* at 8). Furthermore, in order to decide to construct the Proposed Facility, “NRG must have received a building permit from the Town for the New Facility” (*id.* at 8). Therefore the Town has indicated a general willingness to grant necessary building permits necessary for the Proposed Facility to be constructed.

Our review of the HCA and the PILOT lead us to conclude that the Town of Sandwich has adequately protected the interests of its residents – including environmental interests related to the ongoing operation of the Facility – in a manner that is independent of its Zoning Bylaw. In this instance, where the interests of the residents are so protected, the Siting Board does not see a need to exclude any of the zoning bylaws from the exemptions granted.

Specifically, the Siting Board grants exemptions from the following by-law provisions that would require a variance: section 2600 (height); section 3420 (noise); section 3430 (dust); section 3450 (airborne particulate matter); and section 3470 (lighting standards). We note that some sections in the 3400 group of the Zoning Bylaw may require either a variance or a special permit. We have already granted the Company an exemption from obtaining a variance with respect to these provisions. In order to avoid any misunderstanding, we hereby also grant the Company an exemption from obtaining a special permit with respect to these same provisions.

Furthermore, the Siting Board finds that exemptions from the identified provisions of the Zoning Bylaw that would require the Company to obtain a special permit to construct and operate the Project are required within the meaning of G.L. c. 40A, § 3. Specifically, exemptions are granted from the following provisions: section 2420 (change, extension, or alteration of non-conforming structures and uses); section 2540(b) (multiple principal buildings on the same lot); section 3100 (parking requirements); 3510 (landscaping and screening); and section 4340 (excavation or fill within a flood plain). Furthermore, the Siting Board grants the Company an exemption from the modification of Special Permit 99-27, which addresses ammonia tanks. In making these decisions we rely on a number of factors; the specific facts justifying each exemption, as explained above; the Town's assent to the grant of the exemptions; the difficulty in obtaining variances; the difficulty in obtaining special permits; and the potential for delay in the event that any grant of a variance or special permit is appealed. Finally, for reasons explained above, we conclude that the grant of each exemption is necessary.

E. Consultation with the Municipality

Between March 2015 and May 2016, the Company held more than 40 meetings with local officials and members of the public (Exh. EFSB-G-5). Furthermore, on October 19, 2016, the Company and the Town of Sandwich entered into two significant contracts. The first agreement is a Host Community Agreement ("HCA"), which the Town of Sandwich represents will "help to protect the environmental and financial interests of" Sandwich residents (Exh. EFSB-G-34(S1)(1)); Sandwich Brief at 1-2). The second contract was a Payment in Lieu of Taxes ("PILOT") agreement, which provides for payment of \$54,210,557 over 21 years

(Exh. EFSB-G-34(S1)(2) at 3-5).¹²⁵ Sandwich supports the Company's zoning exemption request (Exhs. NRG-2; EFSB-Z-4(1)).

The Company stated it has developed a plan to keep residents, abutters, businesses, and Sandwich officials updated regarding construction (Exh. EFSB-G-6). Pursuant to this plan, the Company has already established "routine communication networks" with local officials including the police department, the fire department, and those responsible for traffic management (*id.*). In addition, the Company stated it would keep residents informed of developments through email, postal service mail, a website, and social media (*id.*).

Based on the foregoing, the Siting Board finds that the Company has made a good faith effort to consult with municipal authorities regarding its proposal to seek zoning relief for construction and operation of the proposed Project pursuant to G.L. c. 40A, § 3.

F. Conclusion on Request for Individual Zoning Exemptions

The Siting Board found above that: (1) the Company is a public service corporation; (2) the proposed use is reasonably necessary for the public convenience or welfare; and (3) the specifically named zoning exemptions are required for construction of the Project, within the meaning of G.L. c. 40A, § 3. Additionally, the Siting Board found that the Company engaged in good faith consultation with the Town of Sandwich.

Accordingly, the Siting Board grants the Company's request for the individual zoning exemptions described above, subject to the conditions in this Decision.

VII. REQUEST FOR A COMPREHENSIVE ZONING EXEMPTIONS PURSUANT TO G.L. C. 40A, § 3

A. Standard of Review

The Company has requested a comprehensive zoning exemption from the Town of Sandwich Zoning Bylaws. The Siting Board grants such requests on a case-by-case basis where the applicant demonstrates that issuance of a comprehensive exemption could avoid substantial public harm by serving to prevent a delay in the construction and operation of the proposed use. Salem Cables at 99; New England Power Company, EFSB 10-1/ D.P.U. 10-107/ 10-108 (2012)

¹²⁵ This figure includes payments made pursuant to the Community Preservation Act and payments to the Sandwich Water District (Exh. EFSB-G-34(S1)(2) at 3-5).

(“Hampden County”) at 93; Western Massachusetts Electric Company EFSB 08-2 /D.P.U. 08-105/08-106 (2010) (“GSRP”) at 135; Princeton Municipal Light Department, D.T.E./D.P.U. 06-11 (2007) (“Princeton”).

In order to make a determination regarding substantial public harm, the Department and the Siting Board have articulated relevant factors, including, but not limited to, whether: (1) the project is time sensitive; (2) the project involves multiple municipalities that could have conflicting zoning provisions that might hinder the uniform development of a large project spanning these communities; (3) the proponent of the project has actively engaged the communities and responsible officials to discuss the applicability of local zoning provisions to the project and any local concerns; and (4) the affected communities do not oppose the issuance of the comprehensive exemption. Hampden County at 89; GSRP at 136-137.

B. Positions of the Parties

The Company argues that the Siting Board should grant a comprehensive zoning exemption because under these circumstances it would be difficult or impossible for the Company to comply with the zoning provisions and also commence construction of the Project on time (Company Brief at 166-175).

First of all, the Company asserts that the vagueness and subjectivity of the criteria for satisfying certain of the Zoning By-Law provisions make it difficult for the Company to determine which of the zoning provisions would apply to the Proposed Facility, and therefore whether the Company could comply (id. at 166). As noted above in the section on individual zoning provision exemptions, the Company argues that sections 3420 and 3430 are particularly subjective, and that the vagueness and subjectivity of the zoning provisions makes it difficult to be certain that the Company has requested all of the individual exemptions it might need (id.).

Furthermore, the Company asserts that the approvals necessary to build this Project are especially burdensome because the Project must be reviewed by both the Siting Board and the CCC (Company Brief at 166-167; see also Exh. NRG-2, at 4, 5, 39, 51-52). The CCC will undertake an adjudicatory process regarding the Project, at the end of which it will issue a Development of Regional Impact (“DRI”) (Exh. NRG-2, at 4, 5). Sandwich may not begin the local permitting process until after the CCC issues the DRI, and consequently, the CCC process adds significant time to the overall permitting process (id. at 5).

The Company argues that the time required for the CCC to take action on the DRI Application, plus the ensuing zoning application process, and any appeal from the grant of a variance or special permit could take years (Company Brief at 167; Exh. EFSB-Z-2). The Company argues that the delay inherent in this procedure presents a significant problem (Exh. NRG-2, at 2). According to the Company, the Project is obligated to commence operations in June 2019, and therefore the Company must begin construction during the summer of 2017 (*id.*). The Company maintains that there is a distinct possibility that the Company's applications for zoning relief may either be denied, or be approved and then appealed (*id.* at 5; RR-EFSB-35). If either of these events comes to pass, then the Company might be unable to commence construction as scheduled (Exh. NRG-2, at 5).

Sandwich explicitly supports the grant of a comprehensive zoning exemption for the Proposed Facility (Sandwich Brief at 3).

C. Analysis and Findings

The grant of a comprehensive exemption is based on the specifics of each case. Compared to the grant of individual zoning exemptions, which are tailored to meet the construction requirements of a particular project, the grant of a comprehensive exemption serves to nullify a municipality's zoning code in its entirety with respect to the project under review. Thus, compared to the grant of individual zoning exemptions, a comprehensive zoning exemption constitutes a broader incursion upon municipal home rule authority. In the absence of a showing that substantial public harm may be avoided by granting a comprehensive exemption, the granting of such extraordinary relief is not justified. New England Power Company, D.P.U. 15-44/15-45, at 64 (2016) ("Tewksbury, Andover, Dracut"); NSTAR Electric Company, D.P.U. 13-126/13-127, at 34-35 (2014) ("Electric Avenue") at 37; Princeton at 37.

The Siting Board more often grants comprehensive zoning exemptions for transmission lines instead of generation facilities.¹²⁶ Transmission lines often traverse multiple municipalities

¹²⁶ Braintree Electric Light Department, EFSB 07-1/D.T.E./D.P.U. 07-5 (2008) ("BELD"), like the present case, involved a petition to construct an energy generating facility pursuant to G.L. c. 164, § 69J¼. In that case, the petitioner originally requested a comprehensive zoning exemption. But the petitioner withdrew this request before the Final Decision issued. BELD at 3 n.2. Consequently, the Siting Board's decision in BELD is not relevant to the issue of whether to grant a comprehensive zoning exemption.

and are therefore subject to different zoning requirements. The reasons for granting a comprehensive zoning exemption often include reliability concerns and assent of the affected municipality. See, e.g., Cabot Taps at 46; Salem Cables at 100; IRP at 88. Those factors apply in this case.

As shown in Section I.A.2 above, the Company has demonstrated that ISO has identified a need to increase capacity in the ISO-NE region. In order to meet the projected shortfall, the Facility is obligated to begin commercial operation in June 2019, and therefore the Company states it must begin construction during the summer 2017. It is likely, however, that construction will not begin on time unless the Siting Board grants the Company a comprehensive exemption from the Sandwich Zoning Bylaw, triggering reliability concerns. Furthermore, Sandwich supports the grant of such relief. Therefore, the Siting Board finds that the Company has established that the grant of a comprehensive zoning exemption will avoid substantial public harm.¹²⁷

Accordingly, the Siting Board grants the Company's request for a comprehensive exemption from the Sandwich Zoning Bylaw, subject to the conditions in this Decision.

VIII. SECTION 61 FINDINGS

The MEPA provides that “[a]ny determination made by an agency of the commonwealth shall include a finding describing the environmental impact, if any, of the Project and a finding that all feasible measures have been taken to avoid or minimize said impact.” G.L. c. 30, § 61. Pursuant to 301 C.M.R. § 11.01(4), Section 61 findings are necessary when an Environmental Impact Report (“EIR”) is submitted to the Secretary and Section 61 findings should be based on such EIR. Where an EIR is not required, Section 61 findings are not necessary.

301 C.M.R. § 11.01(4).

On July 31, 2015, the Company submitted an Expanded Environmental Notification Form (“EENF”) to MEPA (Exh. NRG-6, at 1). The Secretary issued a certificate on the EENF on September 18, 2015 (“EENF Certificate”) that outlined the issues to be addressed in the Draft Environmental Impact Report (“DEIR”) (). In the EENF Certificate, the Secretary stated that the

¹²⁷ The Siting Board notes that the analysis regarding granting exemptions from environmental controls outlined in the individual zoning exemption section applies equally to comprehensive zoning exemptions. See Section VI.

Project is subject to a mandatory EIR for a variety of reasons (Exh. NRG-3, Appendix A at 4). Therefore a finding under G.L. c. 30, § 61 is necessary for the Company's Zoning Petition.¹²⁸ On March 23, 2016, the Company submitted a DEIR (Exh. NRG-3); and on May 4, 2016, the Secretary issued a certificate on the DEIR (Exh. NRG-4). The Company submitted its FEIR on July 5, 2016 (Exh. NRG-6). The Secretary issued the Certificate on August 26, 2016, determining that the FEIR adequately and properly complies with MEPA and its implementing regulations (Exh. EFSB-4, at 1).

The Siting Board recognizes the Commonwealth's policies relating to GHG emission, including G.L. c. 30, § 61, and MEPA's GHG Policy.¹²⁹ The Secretary's Certificate on the EENF found that the Project is subject to review under the GHG Policy, which requires the identification of GHG emissions associated with the Project and adoption of all feasible measures to avoid, minimize and mitigate these increases (Exh. NRG-3, Appendix A, at 11). In Section IV.B.2 above, the Siting Board conducted an analysis on the Project's proposed GHG emissions and compliance with the GWSA, and found that the Project is consistent with the GWSA. In Section IV above, the Siting Board conducted a comprehensive analysis of the environmental impacts of the Project, and found that the Company's plans for the construction of the Project would minimize the environmental impacts of the Project consistent with the minimization of costs associated with the mitigation, control, and reduction of the environmental impacts of the Project. Based upon the record in this case – including the DEIR, the FEIR, the FEIR Certificate, and the Siting Board's findings regarding environmental impacts of the Project – implementation of the required mitigation measures, and compliance with all applicable federal, state, regional and local laws and regulations, the Siting Board finds that it has carefully

¹²⁸ The Siting Board generally is not required to make a G.L. c. 30, § 61 finding in a G.L. c. 164, § 69J¼ proceeding, as the Siting Board is exempt by statute from MEPA requirements. G.L. c. 164, § 69I. However, the Board must comply with MEPA in this case because this proceeding includes a zoning exemption request. Accordingly, the Siting Board in this proceeding has conducted the review and made the Section 61 findings required by MEPA.

¹²⁹ The amendment of G.L. c. 30, § 61, by the GWSA is discussed above in Section IV.D. As stated there, section 7 of the GWSA, amended G.L. c. 30, § 61, requires that in issuing approvals, agencies should “consider the reasonably foreseeable climate change impacts, including additional greenhouse gas emissions, and effects, such as predicted sea level rise.” St. 2008, C.298 § 7.

considered the GHG impacts of the Proposed Facility, taken all feasible means and measures to reduce GHG emissions, and ensured that the MEPA GHG Policy and general MEPA requirements relating to GHG emissions have been fulfilled.

IX. DECISION

The Siting Board's enabling statute directs the Siting Board to implement the energy policies contained in G.L. c. 164, §§ 69H-69Q to provide a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost. G.L. c. 164, § 69H. Section 69J¼ requires that, in its consideration of a proposed generating facility, the Siting Board review, inter alia, the site selection process, the environmental impacts of the proposed Project, and the consistency of the plans for construction and operation of the proposed Project with policies of the Commonwealth.

In Section II, above, the Siting Board found that NRG provided an accurate description of its site selection process and that the Company's site selection process contributes to minimizing the environmental impacts of the proposed Project.

In Section III, above, the Siting Board found that the Company's technology selection on balance contributes to a reliable, low-cost, diverse regional energy supply with minimal environmental impacts.

In Section IV, above, the Siting Board found that with the Company's compliance with: (1) all applicable legal requirements, including statutory, regulatory, and environmental permitting requirements; (2) all measures the Company has stated in this proceeding that it will use to avoid, minimize, and mitigate environmental impacts; and (3) all conditions to this Decision, the Company's plans for the construction of the Proposed Facility would minimize the environmental impacts of the proposed Project consistent with the minimization of costs associated with the mitigation, control, and reduction of the environmental impacts of the proposed Project.

In Section V, above, the Siting Board found that the plans for the construction of the proposed Project are consistent with current health and environmental protection policies of the Commonwealth, and with such energy policies of the Commonwealth as have been adopted by the Commonwealth for the specific purpose of guiding the decisions of the Siting Board.

In addition, in Section VI, the Siting Board found that: (1) the Company is a public service corporation; (2) the proposed use is reasonably necessary for the public convenience or welfare; and (3) the specifically named zoning exemptions are required for construction of the Project, within the meaning of G.L. c. 40A, § 3. The Siting Board also found that the Company engaged in good faith consultation with the Town of Sandwich. In Section VII, the Siting Board found that the Company has established that the grant of a comprehensive zoning exemption will avoid substantial public harm.

Accordingly, the Siting Board finds that, upon compliance with the conditions set forth above and listed below, the construction and operation of the proposed Project will contribute to a reliable energy supply for the Commonwealth with a minimum impact on the environment at the lowest possible cost.

Accordingly, the Siting Board [approves] the Petition of NRG Canal 3 Development LLC to construct a 350 megawatt simple-cycle, dual-fuel peaking electric generating facility and NRG's ancillary facilities on a portion of the 52-acre site of the existing Canal Generating Station in Sandwich, Massachusetts, and [approves] NRG's Petition for certain specific exemptions from the Town of Sandwich Zoning Bylaw, as well as a comprehensive exemption from said Bylaw, subject to the conditions below.

- A. The Siting Board directs the Company to increase the proposed stack height to 235 feet.
- B. The Siting Board directs the Company to submit a copy of the final Air Plan Approval and final PSD Permit for the Proposed Facility when issued by MassDEP, for Siting Board Review.
- C. The Siting Board directs the Company to limit operation of the Facility on ULSD consistent with MassDEP's requirements specified in the Proposed Air Plan Approval, or as otherwise included in the final Air Plan Approval, when issued.
- D. The Siting Board directs the Company to maintain the good appearance of the Canal Generating Facilities, including the new stack, for the life of the Project.
- E. The Siting Board directs the Company to consult with MassDEP and Sandwich to develop an operational noise monitoring protocol, which shall consist of an ongoing periodic noise monitoring program and reporting schedule chosen in consultation with MassDEP and Sandwich. The reporting procedure in the protocol should provide for submission of all periodic monitoring results to Sandwich, and

- submission of relevant results to any persons whose property is affected by noise increases from the Project of three dBA or more. The Company shall submit a copy of the noise monitoring protocol to the Siting Board prior to the commencement of commercial operation. The Company shall submit to the Board copies of the monitoring results when provided to Sandwich or affected persons in accordance with the noise monitoring protocol. During only the first year of the Proposed Facility's operation, the Company shall expand the noise compliance monitoring to include the nearest residential receptors (ST-1 and ST-2), and shall provide to the Board a copy of a report of its compliance monitoring along with an explanation of whether the Canal Generating Facilities are operating in a manner consistent with pre-construction noise impact studies, and any other relevant regulatory requirements.
- F. The Siting Board directs the Company to perform construction work at the Proposed Facility Monday through Friday, 7:00 a.m. to 5:30 p.m. Should the Company need to extend construction work beyond those hours and days, the Siting Board directs the Company to seek written permission (for individual days or longer periods) from the Town of Sandwich before the commencement of such work, and to provide the Siting Board with a copy of such permission. If the Company and town officials are not able to agree on whether such extended construction hours should occur, the Company may request prior approval from the Siting Board and shall provide Sandwich with a copy of any such request.
- G. The Siting Board directs the Company, consistent with the HCA, to establish prior to commencement of construction a construction noise testing protocol in Sandwich in consultation with MassDEP and Sandwich's designated representative. This protocol shall make clear how the Company intends to respond to complaints about noise from Project construction, and commit the Company to using its best efforts to resolving any complaints promptly.
- H. The Siting Board directs the Company, in consultation with Sandwich, to develop an outreach plan for Project construction, to be made available to the public prior to construction and no later than 90 days after the date of this Decision. This outreach plan should, at a minimum set forth procedures for providing prior notification to affected residents of: (1) the scheduled start, duration, and intended hours of construction; (2) any construction the Company intends to conduct outside of the hours detailed above (as approved in writing by Sandwich or the Siting Board); and (3) complaint and response procedures including contact information, the availability of web-based project information, a dedicated project hotline for complaints, and protocols for notifying all potentially affected residents of upcoming construction.
- I. The Siting Board directs the Company to work collaboratively with the Town of Sandwich, MassDOT, and the Town of Bourne in coordinating construction and operational traffic.

- J. The Siting Board directs the Company to utilize a traffic control detail or personnel at the intersection of Route 130/Route 6A/Tupper Road during the predicted arrival and departure hours when the Company anticipates 150 or more vehicles arriving on-site.
- K. The Siting Board directs the Company to provide the Board with a report on the findings of the traffic monitoring program and any changes that would be made to the proposed construction hours during peak Project construction periods as a result of this program.
- L. The Siting Board directs the Company to provide the Board with verified records of all road repairs made by or on behalf of the Company in Sandwich within 60 days of completing road repairs.
- M. The Siting Board directs the Company to submit the Traffic Management Plan to the Siting Board prior to the start of construction.
- N. The Siting Board directs the Company to develop an Emergency Response Plan for the Proposed Facility in consultation with the Town of Sandwich in order to facilitate accurate and effective emergency response planning procedures.
- O. The Siting Board directs the Company to submit to the Siting Board the updated SPCC Plan, including the FRP, prior to the commencement of construction.
- P. The Siting Board directs the Company and its contractors and subcontractors to comply with all applicable federal, state, and local laws, regulations, and ordinances from which the Company has not received an exemption.
- Q. The Siting Board directs the Company, within 90 days of Project completion, to submit a report to the Siting Board documenting compliance with all conditions contained in this Decision, noting any outstanding conditions yet to be satisfied, and the expected date and status of such resolution.

Because issues addressed in this Decision relative to this facility are subject to change over time, construction of the project must be commenced within three years of the date of the Decision.

In addition, the Siting Board notes that the findings in this Decision are based upon the record in this case. Project proponents have an absolute obligation to construct and operate the Proposed Facility in conformance with all aspects of the proposal as presented to the Siting Board. Therefore, the Siting Board requires NRG and its successors in interest, to notify the Siting Board of any changes other than minor variations to the Project so that the Siting Board may decide whether to inquire further into a particular issue. NRG and its successors in interest

are obligated to provide the Siting Board with sufficient information on changes to the proposed Project to enable the Siting Board to make these determinations.

The Secretary of the Department shall transmit a copy of this Decision and the Section 61 findings herein to the Executive Office of Energy and Environmental Affairs and the Company shall serve a copy of this Decision on the Town of Sandwich Board of Selectmen, the Town of Sandwich Planning Board, and the Town of Sandwich Zoning Board of Appeals within five days of its issuance. The Company shall certify to the Secretary of the Department within ten business days of issuance that such service has been made.



Robert J. Shea
Presiding Officer

Dated this 20th day of June 2017

[Approved] By the Energy Facilities Siting Board at its meeting on June 30, 2017, by the members present and voting. Voting for the Tentative Decision as amended:

[List members voting to Approve]

[If applicable] Voting Against the Tentative Decision as amended: [list any members].

[If applicable] Abstaining [List any member who has abstained from voting.]

Ned Bartlett, Chairman
Energy Facilities Siting Board

Dated this June ____ 2017

Appeal as to matters of law from any final decision, order or ruling of the Siting Board may be taken to the Supreme Judicial Court by an aggrieved party in interest by the filing of a written petition praying that the order of the Siting Board be modified or set aside in whole or in part. Such petition for appeal shall be filed with the Siting Board within twenty days after the date of service of the decision, order or ruling of the Siting Board, or within such further time as the Siting Board may allow upon request filed prior to the expiration of the twenty days after the date of service of said decision, order or ruling. Within ten days after such petition has been filed, the appealing party shall enter the appeal in the Supreme Judicial Court sitting in Suffolk County by filing a copy thereof with the clerk of said court. Massachusetts General Laws, Chapter 164, Sec. 69P; Chapter 25, Sec. 5.