



RHODE ISLAND  
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

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Ms. Luly Massaro  
Commission Clerk  
Rhode Island Public Utilities Commission  
89 Jefferson Boulevard  
Warwick, Rhode Island 02888

July 20, 2010

Re: Docket No. 4185

Dear Luly:

On behalf of the Rhode Island Department of Environmental Management and in response to Rhode Island Gen. Laws Section 39-26.1-7 (Senate Bill 2819 Sub A as amended and House Bill 8083 Sub A as amended) and the procedural schedule of July 9, 2010, enclosed please find an original and 12 copies of the Department's Advisory Opinion.

Sincerely

Mary E. Kay  
Acting Executive Counsel

cc: Service List (w/enclosure)

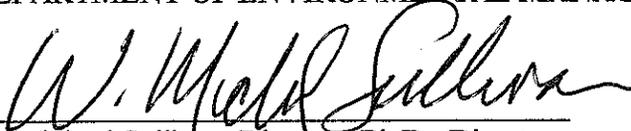
**STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS  
PUBLIC UTILITIES COMMISSION**

IN RE: REVIEW OF AMENDED POWER :  
PURCHASE AGREEMENT BETWEEN :  
NARRAGANSETT ELECTRIC COMPANY : DOCKET NO. 4185  
D/B/A NATIONAL GRID AND DEEPWATER :  
WIND BLOCK ISLAND, LLC PURSUANT TO :  
R.I. GEN. LAWS § 39-26.1-7 :

**RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT  
ADVISORY OPINION  
REVIEW OF POWER PURCHASE AGREEMENT BETWEEN NARRAGANSETT  
ELECTRIC COMPANY AND DEEPWATER WIND BLOCK ISLAND, LLC  
PURSUANT TO R.I. GEN. LAWS § 39-26.1-7**

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

July 20, 2010



W. Michael Sullivan, Director, Ph.D., Director  
235 Promenade Street  
Providence, Rhode Island 02908

**Department of Environmental Management Advisory Opinion on Environmental Issues  
Public Utilities Commission – Docket Number 4185**

The Department of Environmental Management (“DEM”) hereby submits this advisory opinion pursuant to Section 39-26.1-7 (c) (iv) of the Rhode Island General Laws, as amended, to the Rhode Island Public Utilities Commission (“RIPUC”) concerning the Amended Power Purchase Agreement (“PPA”) between Narragansett Electric Company d/b/a National Grid and Deepwater Wind Block Island, LLC. The project proposed in the PPA will provide environmental benefits, including but not limited to the reduction of carbon emissions. The PPA submitted to the RIPUC is for a demonstration project of a proposed larger off-shore wind farm.

DEM’s comments will be focused on what potential benefits this demonstration project will have on air quality from termination of generating activities at Block Island Power Company (“BIPCO”). At this time, the DEM does not have any site specific information on the placement of wind turbines off the coast of Block Island. DEM recognizes that placement of wind turbine generators off the coast of Block Island will have impacts on the marine environment. At this time other potential environmental impacts are being evaluated in the Rhode Island Coastal Resources Management Council’s Ocean Special Area Management Plan (“SAMP”).<sup>1</sup> DEM and other stakeholders including municipal, state and federal agencies, and environmental organizations have been involved in the SAMP process providing input into draft chapters on potential environmental impacts including chapters on Ecology<sup>2</sup>, Commercial and Recreational Fisheries<sup>3</sup>, and Recreation and Tourism<sup>4</sup>

**AIR QUALITY ISSUES**

At the present time, electricity demand for Block Island is provided by electrical generating units owned by BIPCO. The electrical generating units are powered by engines that burn diesel fuel. According to information provided to the DEM Office of Air Resources (“OAR”) from the Division of Public Utilities and Carriers, BIPCO generates, on average, 10,816,826 kW-hrs of electricity per year<sup>5</sup>.

According to the PUC filing, the Deepwater Wind project has a rated output of 21.6 MW and a capacity factor of 40%. Based on these factors, this facility will be capable of producing 75,686,400 kW-hrs of electricity per year when operating under these performance expectations. The energy produced from the wind turbine units and the installation of the transmission line to the mainland should allow the existing BIPCO diesel-fired electric generating facility to be closed. The termination of this facility will result in the elimination of the emission of a number of air pollutants. Information concerning the existing air pollution emissions rates from the BIPCO facility is included in Appendix A. As set forth in Appendix A, the following pollutants will be eliminated: particulate matter, oxides of nitrogen, carbon monoxide, sulfur dioxide, volatile organic compounds, carbon dioxide and ammonia. It should be noted that the first five substances are pollutants that are regulated by the United States Environmental Protection Agency (“EPA”) and four of the pollutants are regulated by National Ambient Air Quality Standards, set to protect public health and the environment. Carbon dioxide has been linked to climate change and is being regulated because of that impact.

<sup>1</sup> <http://seagrant.gso.uri.edu/oceansamp/samp.html>

<sup>2</sup> [http://seagrant.gso.uri.edu/oceansamp/pdf/samp/samp\\_200\\_Ecology\\_6.28.10\\_Clean.pdf](http://seagrant.gso.uri.edu/oceansamp/pdf/samp/samp_200_Ecology_6.28.10_Clean.pdf)

<sup>3</sup> [http://seagrant.gso.uri.edu/oceansamp/pdf/samp/samp\\_500\\_fisheries\\_7.12.10.pdf](http://seagrant.gso.uri.edu/oceansamp/pdf/samp/samp_500_fisheries_7.12.10.pdf)

<sup>4</sup> [http://seagrant.gso.uri.edu/oceansamp/pdf/samp/samp\\_600\\_recreation\\_1.13.10.pdf](http://seagrant.gso.uri.edu/oceansamp/pdf/samp/samp_600_recreation_1.13.10.pdf)

<sup>5</sup> Average annual sales based on filings with the Division of Public Utilities and Carriers (2005-2009)

The wind turbine demonstration project will provide the following major environmental benefits:

- **Diesel Particulate Emissions** (3.4 tons/year eliminated) - The US Environmental Protection Agency determined that inhalation of diesel emissions is likely to cause cancer and causes respiratory irritation, the aggravation of allergy and asthma symptoms, and long-term lung disease. Children, the elderly and individuals with chronic lung disease, such as asthma, are particularly vulnerable to these effects.<sup>6</sup>
- **Carbon Dioxide** (10,328 tons/year eliminated) Carbon dioxide has been recognized as one of the gasses that contribute to global warming<sup>7</sup>. The Administrator of EPA signed the following two findings regarding greenhouse gases under section 202(a) of the Clean Air Act:

1. Endangerment Finding: the Administrator of EPA found the current and projected concentrations of the six key well-mixed greenhouse gases in the atmosphere threaten the public health and welfare of current and future generations through the increase in average temperature and other climate changes. The six gasses included carbon dioxide (CO<sub>2</sub>) and five others, i.e., methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF<sub>6</sub>)

2. Cause or Contribute Finding: the Administrator of EPA found that the combined emission of well-mixed greenhouse gases threatens public health and welfare. Although this finding was directed to emissions from motor vehicles, the underlying science applies to other sources of greenhouse gasses.

The scientific analysis also confirms that climate change impacts human health in several ways. Findings from a recent EPA study titled Assessment of the Impacts of Global Change on Regional U.S. Air Quality: A Synthesis of Climate Change Impacts on Ground-Level Ozone, for example, suggest that climate change may lead to higher concentrations of ground-level ozone, a harmful pollutant. "Additional impacts of climate change include, but are not limited to:

- increased drought;
- more heavy downpours and flooding;
- more frequent and intense heat waves and wildfires;
- greater sea level rise;
- more intense storms; and
- harm to water resources, agriculture, wildlife and ecosystems."<sup>8</sup>

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<sup>6</sup> EPA's Health Assessment Document for Diesel Engine Exhaust, 2002,  
<http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=29060>

<sup>7</sup> <http://epa.gov/climatechange/endangerment.html>

<sup>8</sup> <http://yosemite.epa.gov/opa/admpress.nsf/0/0ef7df675805295d8525759b00566924>

**ADDITIONAL OFFSETS**

According to the PPA, the power produced by the Deepwater project is larger than the electrical demand of Block Island. The excess power (supporting documentation can be found in Appendix B) could result in the displacement of power production from fossil fuel fired electric generating facilities located on mainland Rhode Island. This additional power would result in the reductions of the following emissions:

<b>Pollutant</b>	<b>Emission Reductions</b>
Carbon Dioxide	32,565 tons/year
Nitrogen Oxides	9.1 tons/year
Sulfur Dioxide	18.5 tons/year

**FINDINGS**

The environmental benefits of this project should be evaluated as the first installment of the larger environmental benefit that will accrue from the project when it is finalized. As a demonstration project it would serve as a platform to study and to fine tune the placement of off-shore wind turbine generators.

Based on the information presented in Appendix A, the approval of the PPA will provide Block Island and the region with measurable environmental benefits. The emissions of diesel particulate will be reduced on Block Island, resulting in a reduction in cancer risk and a reduction in the risk of respiratory disease, especially for sensitive individuals. In addition the project will also provide benefit to regional air pollution by the reduction of pollutants that have been detailed in both Appendix A and Appendix B.

This project would also lead to much larger emission reductions if a larger wind farm is approved. The reduction of air pollution will be considerably greater and these reductions are detailed in Appendix C.

Based on the above facts, the Department has determined that there are substantive environmental benefits concerning this project with respect to reducing air pollution emissions both on Block Island and other fossil-fuel based electrical generating facilities in the region.

**Appendix A - Supporting Calculations BIPCO emissions**

<b>Pollutant</b>	<b>Emissions</b>
<b>Particulate Matter</b>	6872 lbs/year (3.4 tons/yr) <sup>1</sup>
<b>Nitrogen Oxides</b>	40,499 lbs/year (20.2 tons/yr) <sup>1</sup>
<b>Carbon Monoxide</b>	55,041 lbs/year (27.5 tons/yr) <sup>1</sup>
<b>Sulfur Dioxide</b>	6299 lbs/year (3.1 tons/year) <sup>1</sup>
<b>Volatile Organic Compounds</b>	8609 lbs/year (4.3 tons/yr) <sup>1</sup>
<b>Ammonia</b>	13,510 lbs/year (6.8 tons/yr) <sup>1</sup>
<b>Carbon Dioxide</b>	20,655,284 lbs/yr (10,328 tons/yr) <sup>2</sup>

<sup>1</sup>From Air Pollution Inventory filings with the Office of Air Resources  
Average annual emissions for 2005-2009

<sup>2</sup>Calculated from Air Pollution Inventory filings with the Office of Air Resources as follows:  
Average annual fuel usage for 2005-2009: 922,770 gallons/yr  
Carbon dioxide emission factor: 22.384 lbs CO<sub>2</sub>/gallon burned  
922,770 gals/yr x 22.384 lbs/gal = 20,655,284 lbs/yr (10,328 tons/yr)

## Appendix B - Supporting Calculations of Displaced Power

Deepwater Wind production: 21.6 MW @ 40% capacity<sup>1</sup>

$$21.6 \text{ MW} \times 8760 \text{ hrs/year} \times 0.4 \times 1000 \text{ kW/MW} = 75,686,400 \text{ kW-hrs/year}$$

BIPCO Electricity Sales: 10,816,826 kW-hrs/year<sup>2</sup>

Displaced power generation: 64,869,574 kW-hrs/year (64,870 MW-hrs/yr)

2007 Calculated New England Marginal Emission Rates (Annual Averages)<sup>3</sup>

Nitrogen oxides: 0.28 lbs/MWh

Carbon dioxide: 1004 lbs/MWh

Sulfur dioxide: 0.57 lbs/MWh

Nitrogen oxides: 18,164 lbs/year (9.1 tons/yr)

Carbon dioxide: 65,129,480 lbs/year (32,564.7 tons/yr)

Sulfur dioxide: 36,976 lbs/year (18.5 tons/yr)

<sup>1</sup>Public Utilities Commission Report and Order, Docket 4111, page 4.

<sup>2</sup>Average annual sales based on filings with the Division of Public Utilities and Carriers (2005-2009)

<sup>3</sup>Table 1.1, 2007 New England Marginal Emission Rate Analysis, System Planning Department, ISO New England Inc., July 2009

## Appendix C – Displaced Power from Deepwater Wind’s Rhode Island Sound Wind Farm Supporting Calculations

Project capacity: 385 MW

Capacity factor assumed to be 40%

$$385 \text{ MW} \times 8760 \text{ hrs/year} \times 0.4 = 1,349,040 \text{ MW-hrs/year}$$

2007 Calculated New England Marginal Emission Rates (Annual Averages)<sup>1</sup>

Nitrogen oxides: 0.28 lbs/MWh

Carbon dioxide: 1004 lbs/MWh

Sulfur dioxide: 0.57 lbs/MWh

**Nitrogen oxides:** 377,731 lbs/yr (189 tons/yr)

**Carbon dioxide:** 1,354,436,160 lbs/yr (677,218 tons/yr)

**Sulfur dioxide:** 768,953 lbs/yr (384 tons/yr)

Note: The carbon dioxide reduction is approximately 25% of the Regional Greenhouse Gas Initiative (“RGGI”) allowance budget for RI

<sup>1</sup>Table 1.1, 2007 New England Marginal Emission Rate Analysis, System Planning Department, ISO New England Inc., July 2009