

**STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL**

**Petition of BNE Energy Inc. for a
Declaratory Ruling for the Location, Construction
and Operation of a 3.2 MW Wind Renewable
Generating Project on New Haven Road in
Prospect, Connecticut (“Wind Prospect”)**

Petition 980

May 2, 2011

PROPOSED FINDINGS OF FACT OF PETITIONER BNE ENERGY INC.

1. BNE, a Connecticut corporation with headquarters in West Hartford, was founded in 2006 for the purpose of constructing and operating commercial wind generation projects in Connecticut and elsewhere. (BNE 1, Vol. 1, p. 2)
2. On November 17, 2010, BNE Energy, Inc. (BNE), pursuant to Connecticut General Statutes (CGS) §16-50k and §§16-50j-40 of the Regulations of Connecticut State Agencies, submitted a petition to the Connecticut Siting Council (Council) for a declaratory ruling that no Certificate of Environmental Compatibility and Public Need is required for the construction, maintenance, and operation (Petition) of a 3.2 megawatt (MW) Wind Renewable Generating facility in Prospect, Connecticut (“Wind Prospect.”) (BNE 1, Vo. 1, p. 1)
3. Pursuant to CGS §16-50k(a), the project is eligible to be approved by a declaratory ruling since it is a grid-side distributed resources facility under 65 MW that is in compliance with air and water quality standards of the Connecticut Department of Environmental Protection (DEP). (BNE 1, Vol. 1, p. 1)
4. Pursuant to CGS § 16a-35k, Connecticut state energy policy includes the goal to “develop and utilize renewable energy resources, such as solar and wind energy, to the maximum extent possible.” (BNE 1, Vol. 1, p. 1)
5. Wind Prospect will further the State’s energy policy by developing renewable energy resources. (BNE 1, Vol. 1, p. 1) Additionally, the Project will not have a substantial adverse environmental effect as a result of its construction (NEED CITE)
6. The State of Connecticut has implemented renewable portfolio standards (RPS) that required 14 percent of electric generation within the state be produced by renewable resources by 2010. By 2020, RPS requirements increase to 27 percent, 20 percent of which must be from Class I renewable energy sources, which include wind. (BNE 1, Vol. 1, p. 3)
7. The parties in this proceeding are the Petitioner (BNE), the Town of Prospect (the “Town”), Save Prospect Corp. (SPC), FairwindCT, Inc., John and Cheryl Lamontagne, Thomas and Eileen Satkunas, and the Connecticut Water Company (CWC). Intervenors to the proceeding include Eric Bibler and The Connecticut Light and Power Company (CL&P). SPC, FairwindCT, Inc. and Eric Bibler were grouped for the purpose of these proceedings. CWC withdrew its party status on

- March 30, 2011. (Transcript 1, 02/23/11, 6:40 p.m. [Tr. 1], p. 7; Transcript 2, 02/24/11, 2:35 p.m. [Tr. 2], pp. 4-5, 10; record)
8. On November 17, 2010, BNE provided notice of the filing to all adjacent landowners via certified mail, return receipt requested. BNE received return receipts for all abutting property owners except for one, which is U.S. Cap, Inc. BNE sent a second notice to this property owner via first class mail. (BNE 1, Vol. 1, Tab D; BNE 2, R. 12)
 9. Pursuant to § 16-5j-21 and 16-5j-40 of the Regulations of Connecticut State Agencies, the Council, after giving due notice thereof, held a public hearing on February 23, 2011 beginning at 6:30 p.m. and on February 24, 2011, beginning at 3:00 p.m. and continuing at 6:30 p.m. at the Long River Middle School Gymnasium, 38 Columbia Avenue, Prospect, Connecticut. (Tr. 1, p. 3; Tr. 2, p. 3; Tr. 3, p. 3)
 10. Public hearings were continued on March 3, March 15 and March 31, 2011 at the office of the Connecticut Siting Council, 10 Franklin Square, New Britain, Connecticut. (Transcript 4, March 3, 2011, 11:11 a.m. [Tr. 4], p. 3; Transcript 5, March 15, 2011, 12:10 p.m. [Tr. 5], p. 3; Transcript 6, March 31, 2011, 11:20 a.m. [Tr. 6], p. 3)
 11. The Council and its staff inspected the proposed site and surrounding area on February 23, 2011. (record)
 12. BNE published notice of the petition filing in the Republican American on October 31, 2010 (BNE 1, Vol. 1, pg. 32, Tab D)
 13. The Council published a legal notice announcing the date, time and place for this hearing in the Waterbury Republican-American on January 26, 2011 and in the Citizen's News on January 28, 2011. (record)
 14. BNE installed a sign at the edge of the host property that presented information regarding the petition and the Council hearing with date if approved. (record)
 15. Pursuant to CGS § 16-50j (h), on January 21, 2011, and April 1, 2011, the Council requested written comments regarding the proposed facility from the following state agencies: DEP, Department of Public Health (DPH), Council on Environmental Quality (CEQ), Department of Public Utility Control (DPUC), Office of Policy and Management (OPM), Department of Economic and Community Development (DECD), Department of Agriculture (DOAg) and the Department of Transportation (DOT). (Record)
 16. The DPH Drinking Water Section provided comments on January 5, 2011. The DPH comments noted that the proposed project is located within the public water supply watershed of Long Hill Reservoir, which is an active source of drinking water for the Connecticut Water Company Naugatuck Central System. The

- proposed project would also be within 45 feet of a wetlands tributary leading to that water supply. DPH recommended the following.
- a. Erosion and sediment controls should be used and maintained as necessary.
 - b. A responsible party should be named for maintenance, inspection, repair, replacement and incorporation of new e & s controls.
 - c. Construction machinery should be serviced outside of the watershed.
 - d. Vehicles and machinery should be refueled on an impervious pad with secondary fuel containment controls.
 - e. A fuel spill remediation kit should be kept on-site.
 - f. The Connecticut Water Company should be notified prior to commencement of the proposed project construction.
 - g. The Connecticut Water Company should be granted permission to periodically inspect the project to ensure that drinking water is not being affected. (DPH comments dated January 5, 2011)
17. On January 20, 2011, DOT submitted comments including a concern that access to the proposed project would require an encroachment permit if it were to extend from Route 69. (DOT comments dated January 20, 2011)
 18. On March 14, 2011, DEP submitted comments regarding the proposed project. (DEP comments dated March 14, 2011)
 19. The following agencies did not respond with written correspondence: DEQ, DPUC, OMP, DOAg and the DECD. (record)
 20. On October 1, 2008, BNE received local approval from the Prospect Planning and Zoning Commission for the installation of a meteorological (Met) tower to be located on the property. (BNE 1, Vol. 1, p. 5; Tr. 5, p. 30)
 21. On October 1, 2010, BNE submitted an informational filing of the proposed project with the Town of Prospect. (BNE 1, Vol. 1, p. 5)
 22. On October 18, 2010, at the request of the Mayor of Prospect, BNE voluntarily conducted a public informational meeting of the residents of Prospect. (BNE 1, Vol.1, p. 5)

PERMITTING

23. BNE will file with DEP for a General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities. (BNE 1, Vol. 1, p. 30)

24. On November 4, 2009, the Federal Aviation Administration (FAA) issued a determination that the proposed turbines do not exceed obstruction standards and would not be a hazard to air navigation; however, the structures must be marked and/or lighted in accordance with FAA regulations. (BNE 1, Vol. 1, p. 31)
25. BNE would install flashing lights on the nacelle of the turbines, which would be lit at night, and paint the tower white, which would eliminate the requirement of lighting the structures during the day. The proposed flashing lights would light approximately 20 to 30 times per minute. BNE would also notify the FAA within five days after the installation of the blades on the proposed turbine. (BNE 1, Vol. 1, p. 31-32; Tr. 6, pp. 217-218).

PROJECT SITE

26. BNE began searching in Prospect for a site because of Prospect's ground elevation and potential for wind resources. The search was focused on available property with enough acreage to accommodate several turbines, with the ability to interconnect with the electric grid, and with a low residential density in the surrounding area. (BNE 1, Vol. 1, p. 13; BNE 2, R. 5)
27. The proposed site is located on a 67.56 acre parcel at 178 New Haven Road Prospect. The host property boundary would be located approximately 1,760 feet north of the Prospect/Bethany town line and approximately 430 feet east of the New Naugatuck Reservoir (refer to Figure 1). (BNE 1, Vol. 1, pp. 4, 7)
28. BNE obtained an option to purchase the property of the proposed site. (BNE 1, Vol. 1, p. 13)
29. The host parcel is currently undeveloped with the exception of a 160-foot telecommunications tower owned by SBA located on the southeast corner of the parcel. BNE notified the owner of the existing telecommunications tower of the proposed project and SBA had no objection to the project (BNE 1, Vol. 1, p. 7, Vol. 3, Tab J; BNE 2, R. 19).
30. Surrounding land uses include commercial and residential development. (BNE 1, Vol. 1, p. 7)
31. Sprint and the Connecticut Light & Power company have telecommunications towers on abutting properties.
32. CWC owns the adjacent property to the west, which is used for the New Naugatuck Reservoir. Most of the CWC property is Class 1 watershed land with portions of it designated Class II watershed land. (BNE 1, Vol. 1, p. 19)
33. Access to the proposed site would extend from Kluge Road. A portion of the access road currently exists and would be upgraded from that point. (BNE 1, Vol. 1, p. 8)

34. Construction of the proposed project may require some improvements to Kluge Road. BNE would assess the condition of Kluge Road and determine if it is capable of withstanding the weight and size of the equipment that will travel the road to the host property. (Tr. 4, p. 86; Tr. 6, p. 173).
35. Off-site grading would be required between the end of the pavement on Kluge Road and the host property boundary. (BNE 8, R. 82).
36. BNE installed the Met tower on the property on November 3, 2008 to begin collecting wind data. The Met tower measured wind conditions at 131.2 feet (40 meters), 164 feet (50 meters) and 197 feet (60 meters) on the tower. (BNE 1, Vol. 1, p. 13; BNE 2, R. 3) (Height of Met Tower)
37. Data from Met tower was collected for 14.7 months, from November 4, 2008 to January 2, 2010. (BNE 4, Rt. 33)
38. The nighttime (6:00 p.m. to 6:00 a.m.) and daytime (6:00 a.m. to 6:00 p.m.) average wind speeds for each month are shown in the table below.

| Month | Nighttime Average at 100m | Daytime Average at 100m |
|-----------|---------------------------|-------------------------|
| January | 7.07 m/s (15.8 mph) | 7.01 m/s (15.7 mph) |
| February | 8.40 m/s (18.8 mph) | 8.32 m/s (18.6 mph) |
| March | 7.49 m/s (16.8 mph) | 6.83 m/s (15.3 mph) |
| April | 7.24 m/s (16.2 mph) | 7.51 m/s (16.8 mph) |
| May | 6.52 m/s (14.6 mph) | 6.09 m/s (13.6 mph) |
| June | 5.60 m/s (12.5 mph) | 5.07 m/s (11.3 mph) |
| July | 5.99 m/s (13.4 mph) | 5.40 m/s (12.1 mph) |
| August | 6.20 m/s (13.9 mph) | 5.06 m/s (11.3 mph) |
| September | 6.86 m/s (15.3 mph) | 6.07 m/s (13.6 mph) |
| October | 7.37 m/s (16.5 mph) | 6.96 m/s (15.6 mph) |
| November | 7.27 m/s (16.3 mph) | 7.14 m/s (16 mph) |
| December | 8.29 m/s (18.5 mph) | 8.33 m/s (18.6 mph) |

(BNE 4, R. 33)

PROJECT PROPOSAL

39. BNE proposes to install two General Electric (GE) 1.6 MW wind turbines and associated equipment; explain access road and explain changes to access road, an ancillary building for storage, office space and an educational area; an access road; and an electrical interconnection at the proposed site (refer to Figure 2). (BNE 1, Vol. 1, p. 7).
40. The hub or tower of each proposed turbine is approximately 328 feet (100 meters) tall. The nacelle is at the top of the hub and contains the operation equipment.

- The proposed rotor blades are 132 feet each with a diameter of 270 feet (82.5 meters) for the three-blade configuration. BNE is requesting approval for 164-foot (50 meter) rotor blades with a 328-foot (100 meter) diameter for this petition to account for possible technological developments in GE turbine design. The total maximum height of the tower and with 100 meter rotor blades would be 492 feet (150 meters). (BNE 1, Vol. 1, pp. 7-8; BNE 6, R. 11)
41. The proposed ancillary building would include restroom facilities and use an on-site well to meet sanitary and drinking needs. An on-site septic system would be required to dispose of wastewater. (BNE 1, Vol. 1, pp. 8-9)
 42. Independent pitch motors are used for each blade to provide adjustment of the blade pitch angle during operation. (BNE 1, Vol. 1, p. 10)
 43. BNE investigated the use of a 262.5-foot (80 meter) hub height tower; however, due to the ground elevation in the area of the proposed turbines, the wind turbulence intensity would be higher, causing more stress on the bottom of the blades versus the top of the blades. (Tr. 4, pp. 88-89)
 44. In response to concerns expressed by parties and intervenors, BNE proposed an alternate location for the northern turbine, approximately 160 feet south-southwest of its original location. This relocation would increase the distance of the turbine to the nearest residence. (BNE 18b, R. 12)
 45. The proposed relocation would also require the slight relocation of the laydown areas, crane pad, turnarounds and the position and slope of the access road (refer to Figure 3). (BNE 18b, R. 12)
 46. The ground elevation at the relocated northern turbine would be 640 feet above mean sea level. (BNE 18b, Tab 1)
 47. GE performed a Mechanical Loads Assessment taking into account wind shear, air density and turbulence intensity. Turbulence intensity at the location of the proposed turbines was found to be too high for the 270-foot (82.5 meter) rotor diameter turbine with a 262-foot (80 meter) hub height. The proposed 270-foot (82.5 meter) turbine with a 328-foot (100 meter) hub height was selected to reduce the turbulence intensity and loading on the turbine when in operation. (BNE 2, R.1)
 48. The proposed 328-foot (100 meter) hub height would result in a higher energy output and capacity factor compared to the 262-foot (80 meter) hub height. (BNE 2, R. 1)
 49. The cut-in wind speed for the 270-foot (82.5 meter) rotor diameter turbine is 7.8 mph (3.5 m/s). (BNE 2, R. 7)
 50. Based on measured wind data, the turbines are expected to spin approximately 7,787 hours over a one-year period, or 88.9 percent of the time (BNE 2, R. 7).

51. Based on measured wind data at the site, the proposed turbines are expected to run at full capacity for approximately 7.52 percent of the time during the year. (BNE 2, R. 8)
52. The annual capacity factor of the proposed turbines at the site is expected to be approximately 30 percent over the course of the year. (BNE 2, R. 7, 8)
53. The proposed wind turbines are designed to have an availability of approximately 98 percent
54. The remaining two percent of time that the turbines may be unavailable is typically due to routine maintenance or needed repairs (Tr. 4, p. 83)
55. Maintenance is generally scheduled every six months and requires turbines to be shut down for approximately one and a half days. Maintenance includes tightening of bolts, changing filters, and topping off lubricants in the nacelle. (Tr. 4, pp. 83-84)
56. The proposed turbines could operate in a maximum extreme gust for a three-second period of approximately 125 miles per hour (mph) and for ten minutes at approximately 89.5 mph, in accordance with International Electrotechnical Commission standards. (BNE 1, Vol. 1, p. 13)
57. BNE worked with GE to find the property location and product for the proposed wind turbines on the Prospect property. (BNE 2, R.1)
58. The proposed placement of the turbines is appropriate because if the proposed wind turbines were placed too close together, there would be potential of wind coming through one turbine and causing turbulence on the second turbine. The turbine would be affected by turbulence would be damaged over time and/or would produce less electricity. (Tr. 6, p. 24)
59. BNE proposes to install an electrical collector yard on the property. Electrical equipment would include a 600-amp, 15-kV class circuit breaker or recloser with a multifunctional relay. (BNE 1, Vol. 1, p. 8)
60. BNE would make the electrical interconnection with CL&P's 13.8-kV distribution system at Kluge Road. (BNE 1, Vol. 1., p. 9)
61. The electrical interconnection of the wind turbines would be subject to an agreement with CL&P to provide power on to the electrical distribution system. (Tr. 6, pp. 215-216)
62. The proposed project would generate approximately 8,410 megawatt-hours (MWh) of Class I renewable energy annually. (BNE 1, Vol. 1, p. 11)

SAFETY

63. The proposed turbines can be controlled from an interface within the nacelle, from a control box at the bottom of the tower, and/or remotely using a Supervisory Control and Data Acquisition System with local lockout capacity. (BNE 1, Vol. 1, p. 10)
64. The proposed turbines would have automatic fire extinguishers and fire alarms and additional, had held fire extinguishers. (BNE 6, R. 45)
65. Emergency stop buttons would be located within the tower base and within the nacelle to stop the turbine in the event of an emergency. (BNE 1, Vol. 1, p. 10)

ICE

66. Ice can form under appropriate weather conditions that typically include temperatures in the range of 28° F to 36° F, and a relative humidity greater than 97 percent. Glaze ice is of most concern with wind turbines and can be formed through accumulations of freezing rain or drizzle. (BNE 14, R. 44; Tr. 2, pp. 65-66)
67. Ice throw and ice fall determinations were based on climate data obtained from on-site measurements from one winter season. Based on the collected climate data, the estimated amount of icing at the site is a total of 192 hours per year. (BNE 9h; BNE 14, R. 49; Tr. 2, p. 67; Tr. 4, pp. 207-208)
68. Ice can accumulate on stationary turbines and can fall off during melting conditions. The worst-case ice drop distance, assuming a 1.1 pound ice fragment, is approximately 226 feet from the base of the turbine. The typical drop range (90 percent of occurrences) of 1.1 pound and 2.2 pound ice fragments from a 328-foot rotor diameter is 131 feet from the base of the turbine. (BNE 9h)
69. The typical range (90 percent of occurrences) of a 1.1-pound ice fragment being thrown from a turbine with a 328-foot rotor diameter is 0 to 475 feet. Land-owners/properties within the typical range of the turbines include the site property, CWC and 15 Kluge Road. (BNE 1, Vol. 1, Tab D, Tab F; BNE 9h; BNE 14, R. 43)
70. The exceptional range (10 percent of occurrences) of a 1.1-pound ice fragment being thrown from a turbine with a 328-foot rotor diameter is 476 to 820 feet. Land-owners/properties within the exceptional range of the turbines are the same as above. (BNE 1 Vol. 1, Tab D, Tab F; BNE 9h; BNE 14, R. 43)
71. The typical range (90 percent of occurrences) for a 2.2-pound ice fragment being thrown from a turbine with a 328-foot rotor diameter is 9 to 508 feet. Land-owners/properties within the typical range of the turbines includes the site property, Naugatuck Water Company, 15 Kluge Road, 18 Kluge Road (CL&P),

- 214 New Haven Road (U.S Cap Inc., 200 New Haven Road (Demagistris), 190 New Haven Road, (Visockis), and 184 New Haven Road (McCormack). (BNE 1 Vol 1. Tab D, Tab F; BNE 9h; BNE 14, R. 43)
72. The closest residence to the turbines, 200 New Haven Road, is approximately 823 feet east of the northern turbine, within the 2.2-pound ice fragment exceptional range (328-foot rotor diameter). The probability of a 2.2-pound ice fragment striking a 10.7 square foot section of the residence is once in every 8,391 years, assuming ice mitigation methods are not employed. (BNE 9h; BNE 14, R. 41)
 73. A residence at 190 New Haven Road, is approximately 885 feet east of the northern turbine. The probability of a 2.2-pound ice fragment striking a 10.7 square foot section of the residence is greater than once in 10,000 years, assuming ice mitigation methods are not employed. (BNE 9h; BNE 14, R. 41)
 74. If a 270-foot (82.5 meter) rotor diameter was used at the site, the probability of a 2.2-pound ice fragment striking a 10.7 square foot section of the closest residence (823 feet east of northern turbine) is once in every 82,639 years, assuming ice mitigation methods are not employed. (BNE 14, R. 41)
 75. The probability of a 2.2-pound ice fragment being thrown beyond 837 feet is nil. (BNE 14, R. 41)
 76. GE has developed recommended setback distances related to ice throws. All proposed turbine locations, using the alternate location for the northern turbine, meet or exceed GE's recommended setback distances. (BNE 9h; BNE 14, R. 46; Tr. 6, pp. 40, 260-261).
 77. Remote and internal monitoring of the turbines can detect icing events, or other problems, through changes in turbine electrical output when compared to wind speed. Ice formation can affect the aerodynamics of the turbine with accumulating ice slowing the blades down. Sensors would detect lower power outputs when compared to wind speed and would automatically shut down the turbine. The shut down would protect the turbine from mechanical damage as well as act as a safety measure during icing events (BNE 14, R. 47; Tr. 2, pp. 78-79)
 78. Internal monitoring can also detect icing events through an increase in rotor vibration caused by blade ice formation, leading to a shut down of the turbine (BNE 2, R. 9; BNE 14, R. 47)
 79. The turbine would be monitored continuously by GE during operation. During known or predicted icing events, BNE would dispatch personnel to the site to monitor the turbines for icing. (BNE 2, R. 9; BNE 14, R. 47, Tr. 2, pp. 74-75)
 80. Once shut down BNE would have personnel on-site to assess ice accumulation and operating conditions (BNE 14, R. 47)

81. Restarting and operation of a turbine with ice on the blades is the most dangerous scenario for ice throws. To prevent ice throws upon re-start, BNE would have on-site personnel inspect and ensure ice has melted and fallen from the blades prior to re-start. (BNE 14, R. 47, R. 48; Tr. 2, pp. 69-71, 73; Tr. 6, pp. 267-268).
82. During severe icing events, BNE would curtail or completely shut down the turbines prior to the icing event to prevent ice throws. The turbines could be manually positioned away from favorable ice-forming wind conditions during turbine operation to reduce the amount of icing on the blades during the ice event. (BNE 14, R. 47)
83. GE offers an option Winter Ice Operation mode that would allow the turbine to spin at slower speeds during icing events to keep the turbines operational and thus produce electricity. BNE is studying whether local weather conditions would warrant inclusion of this option. The mode can be added on after construction is completed. (BNE 2 R. 9; Tr. 2; pp.86-89)
84. BNE has committed to employing the aforementioned shut down procedures and a specific re-start procedure, completely eliminating any potential risk due to ice. (BNE 9h, Ex. 14).

NOISE

85. The DEP developed noise control regulations to establish community noise exposure criteria, Regs. Conn. State Agencies §22a-69-1, et. seq. (Council Administrative Notice Item 42).
86. The regulations establish three types of land classifications based on the actual use of the parcel. The three categories are Class A, generally residential; Class B, generally commercial; and Class C, generally industrial. (Council Administrative Notice Item 42)
87. Land use classification for noise control purposes is not based on zoning (Council Administrative Notice #42 at 22a-69-2.1).
88. The site is already developed with a telecommunications tower, a Class C Land use category (state classification). (Council Administrative Notice Item 42; BNE1, Vol. 2, Tab F; BNE 14, R. 39)
89. Land classification is based on actual use. Given that the actual use of the property for telecommunications towers and wind turbines is an industrial use; the property is categorized as Class C, generally industrial. (Council Administrative Notice #42 at 22a-69-2.1; March 15, 2011 TR at 119).
90. The DEP noise criteria from a Zone C emitter to a Zone A use is 61 dBA during the daytime (7:00 a.m. to 10:00 p.m.) and 51 dBA during the nighttime (10:00 p.m. to 7:00 a.m.). (Council Administrative Notice Item 42)

91. Noise modeling indicates the noise levels from the turbine hub locations would be 45 to 45 dBA at the nearest residences (Zone A use) during the daytime and nighttime, at a wind speed of 20.1 miles per hour.
92. Contrary to the assertions by other parties and intervenors to this proceeding, the Project complies with DEP noise control regulations. (Council Administrative Notice Item 42; BNE 1, Vol. 3, Tab M)
93. Infrasound, sound below 20 Hz, will not be generated by the project. (March 31, 2011 TR at 230)
94. There are no Connecticut regulations or requirements which address infrasound.
95. Low frequency sound will not be generated by the project. (March 31, 2011 TR at 230)
96. Background noise levels are irrelevant to a determination of compliance with DEP noise control regulations. (Council Administrative Notice Item 42)
97. The alternate location of the northern turbine is slightly farther from the nearest receptor thereby having a slightly beneficial effect on noise levels. (Tr. 6, p. 141)
98. BNE would be willing to conduct a two-year post-construction noise study focusing on noise levels at the property boundary near the adjacent residences (BNE 24)
99. Operation of the site would not generate low frequency noise that is subject to regulation since the turbine would not produce individual octave bands that are higher than other octave bands. (Tr. 6, pp. 228-230)
100. Walls, vegetation or other short barriers would not be effective in reducing sound levels at nearby receptors. (Tr. 6, pp. 150-151, 233-234)
101. The fact that the Project complies with DEP noise criteria is underscored by the fact that the DEP has provided a comment letter regarding the proposed Project and did not mention any issue with noise. (DEP Letter dated March 14, 2011)

AIR QUALITY

102. Water quality standards have been developed by the DEP to protect surface and groundwater resources in Connecticut. (Council Administrative Notice 40)
103. The proposed project would comply with DEP air quality standards. The project would produce no air emissions during operation. (BNE 14, R. 36)
104. The Project will actually result in a net benefit to air quality in the State of Connecticut by producing approximately 8,410 megawatt hours (MWh) per year of clean, renewable energy which will reduce CO2 emissions by approximately 4,222 tons per year. (BNE 9i)

105. The DEP acknowledged that the Project will have no air emissions and will actually result in emissions reductions. (DEP comment letter dated March 14, 2011)

WATER QUALITY

106. The Project will satisfy DEP's groundwater standards and guidelines and will result in no impact to groundwater on the Property and in the vicinity thereof. (BNE 14, 18c, 21)
107. The Property itself is located on a glacial drumlin comprised of glacial till with till soil ranging from a depth of zero to fifty feet or deeper. (BNE 21)
108. The Project abuts property owned by the Connecticut Water Company (CWC), which hosts CWC's watershed land from which CWC supplies potable water to CWC customers in 55 towns. As was demonstrated in this proceeding, BNE has made a concerted effort to work with CWC and incorporate its comments and requested changes and additional measures in order to satisfy any concerns that CWC may have regarding impact to drinking water by the Project. In order to do so, BNE submitted plan revisions requested by CWC on both the original location of the northern turbine and the revised location of the northern turbine (BNE 3 and 18a)
109. CWC submitted a letter indicating that BNE's proposed measures will provide adequate protection to the water resources at the site and that there will be no adverse impact to the water supply. (CWC correspondence dated March 29, 2011)
110. The DPH Public Health Drinking Water Section and the DEP have both submitted comments in this proceeding which make it clear that neither agency has concerns about the Project's potential impact to groundwater (DPH correspondence dated Jan. 5, 2011; DEP correspondence dated March 14, 2011)
111. The excavation for the turbine foundations requires a depth of less than ten feet, no bedrock is anticipated to be encountered and therefore no blasting will be required for the installation of the foundations for the proposed turbines. (BNE 21)
112. The fact that the Property is adjacent to the U.S. Cap and Jacket property, located at 214 New Haven Road in Prospect, is irrelevant in terms of groundwater because the "plume" associated with the contamination at the U.S. Cap and Jacket property is moving in an opposite direction away from the BNE Property and no blasting will be utilized for development of the Project. Therefore there is no possibility that the Project would disturb contamination at the U.S. Cap and Jacket property. (BNE 18c and 21; March 3, 2011 TR at 48, 123-125, 133)
113. The DEP agreed that groundwater flows from the U.S. Cap and Jacket property would not be likely to migrate in the direction of the Property and noted that the

- degree of contamination at the U.S. Cap and Jacket property is not significant. DEP correspondence dated March 14, 2011)
114. The CWC submitted comments in this proceeding and did not indicate any concern regarding the U.S. Cap and Jacket property. (CWC correspondence dated March 29, 2011)
 115. The Project will not have a negative impact on surface water quality on the Property or in the vicinity of the Property and will not directly discharge into surface waters of the state. (March 31, 2011 TR at 278; BNE 9c, 9f, 14, 18b, 22)
 116. The development of the Project, utilizing the alternative location for the northern turbine, will result in only 7.71 acres of temporary disturbance and just over one acre of permanent disturbance from the entire parcel of 67.5 acres. The development of this Project will result in far less impact than the development of the Property for residential purposes. (BNE 25; March 31, 2011 TR at 278-79)
 117. The Project is a renewable facility under 65 MW and as such is governed by the Council's Petition for Declaratory Ruling Energy Facility guide. The guide does not require any engineered plans be filed with a petition for declaratory ruling for such a facility. (Council's Petition for Declaratory Ruling Energy Facility guide, updated April 2010)
 118. BNE submitted preliminary drawings for review during this locational approval portion of this proceeding and demonstrated that, to the extent possible at this stage of these proceeding, those plans will result in no direct impacts to wetlands or surface waters of the State and comply with the *2004 Connecticut Stormwater Quality Manual* and the *2002 Connecticut Guidelines for Soil Erosion and Sediment Control*.
 119. Assuming that two turbines are approved on the Site, BNE will then move into the development and management (D&M) portion of this proceeding when it would submit preliminary construction drawings. Assuming those D&M preliminary drawings are approved, BNE would then be required to submit 100% completed construction drawings—incorporating any requested modifications of the preliminary construction drawings—prior to the commencement of construction. (March 31, 2011 TR at 163, 278; BNE 9c, 9f, 18b, 22)
 120. The DEP's 2002 soil erosion and sedimentation guidelines and 2004 stormwater quality manual are not requirements or regulations, but are just that – guidelines. Both guidance documents state that they are intended only to provide information and reference but are not intended to substitute professional judgment. (Council Administrative Notice #9 and #40)

VISIBILITY

121. Using the 100-meter blade length, the areas where the proposed turbine hubs could be visible above the tree canopy year-round (during both “leaf-on” and “leaf-off” conditions) comprise approximately 160 acres within (or less than 0.05% of) the 5-mile Study Area. At its apex, the blade(s) may be visible above the tree canopy from approximately 347 acres (less than 1 percent of the 5-mile Study Area). (BNE 9b)
122. Using 82.5-meter blade length, year-round visibility of the blades above the tree canopy drops from approximately 347 acres to approximately 313 acres. (BNE 18c)
123. The majority of potential year-round views of the turbine hub would occur on the project site, the adjacent New Naugatuck Reservoir, and New Haven Road. (BNE 9b)
124. Using the 100-meter blades, approximately 50 residential properties within one mile of the Property may have at least partial views of the Project’s turbine(s) hub(s) during “leaf-on” conditions. An additional 58 residential properties within one mile could have views of the blade(s) at its apex above the trees. (BNE 9b)
125. Using the 100-meter blades, approximately 1,164 acres (representing approximately 2% of the Study Area) have the potential to offer some views of the turbine hubs through the trees during “leaf-off” conditions. (BNE 9b)
126. Most of the potential seasonal visibility occurs on and within approximately one mile of the project site. Using the 100-meter blades, approximately 248 residential properties within one mile of the Project site could have at least partial views of the turbine(s) hub(s) through the intervening trees during “leaf-off” conditions. (BNE 9b)
127. Use of the 82.5-meter blade length slightly reduces areas of predicted blade visibility. (BNE 18c)
128. The project would have no effect on historical or cultural resources. (BNE 9b, R. 10)

SHADOW FLICKER

129. Shadow flicker is the alternating changes in light intensity in a shadow cast upon an area. The change in light intensity is caused by the sun casting a shadow of each of the rotating blades over an area. (BNE 2a)
130. Shadow flicker can be cast through an unobstructed window of a home under certain circumstances where the room would experience repetitive changes in

- brightness. Shadow flicker can also occur outside where the alternating shadows would appear on the ground (BNE 2a)
131. The frequency of a shadow flicker is determined by rotor blade speed and the number of blades on the rotor. The frequency is measured in Herz (Hz), with 1 Hz being equivalent to one flicker per second. (BNE 2a)
 132. The proposed turbines, with 270-foot rotor diameter, would rotate at a speed at 9.75 to 16.18 revolutions per minute which corresponds to 29.2 to 48.5 shadows per minute or 0.49 to 0.81 Hz. (BNE 2a; Tr. 6, P. 268)
 133. There are no Federal or State of Connecticut standards for shadow flicker. (BNE 2a;)
 134. A probable case shadow flicker model was generated with accounts for vegetation and weather conditions not favorable for generating shadows such as lack of sun or absence of wind. Additionally, the probably case model was operated in a conservative “greenhouse mode” which accounts for line of sight shadows affecting a residential dwelling from all sides of the dwelling. This mode is conservative in that the windows of many houses do not face the sun directly during all shadow flicker occurrences. Additionally, varying widths of the blade were not factored into the model. Shadow flicker is more pronounced when the shadow is cast from closer to the hub than from the blade tips. (BNE 2a; BNE 18c; Tr. 2, 90-93; Tr. 4, pp. 141-147; Tr. 6, pp. 118-120)
 135. It is possible that shadow flicker could occur in areas considered obscured by vegetation when leaves are off the trees, especially when shadows are cast through the thin tops of the tree canopy. (Tr. 4, pp. 156-158)
 136. The probable case model, when applied to the original proposed locations using a 270-foot rotor diameter, indicates shadow flicker would occur generally east of the site, usually two hours before sunset during specific calendar dates. Shadow flicker would occur to a limited area west of the site for up to two hours after sunrise. (BNE 2a; BNE 5; Tr. 2, pp. 94-95; Tr. 4, pp. 168-189)
 137. The probable case model indicates 74 residential dwellings would experience some shadow flicker ranging from three to 31 minutes per day during certain times of the year. Two residential dwellings would experience 32 to 34 hours of shadow flicker per year. Twelve residential dwellings would experience between 10 and 23 hours of shadow flicker per year (refer to figure 4), (BNE 5)
 138. The probable case model also indicates approximately five off-site properties would experience over 40 hours of exterior shadow flicker per year and an additional six properties would experience 30 to 40 hours per year of exterior shadow flicker (not including the New Naugatuck Reservoir). (BNE 5; Tr. 6, pp. 268-270)

139. If the probable case model were applied to the site with the alternative northern turbine location, and using a 328-foot rotor diameter (100 meter diameter blades), 93 residential dwellings are predicted to have some shadow flicker occurrence, totaling a maximum of nearly 33 minutes annually. Four receptor locations on Route 69 (New Haven Road) could slightly exceed 30 hours annually, including two residential structures located at 177 New Haven Road, one residential structure at 213 New Haven Road, and the commercial office building located at 207 New Haven Road. (BNE 18c)
140. When employing 82.5-meter blade diameters, a total of 77 receptors are predicted to have some shadow flicker occurrences. Annual durations of shadow flicker range from an approximate low of 14 minutes per year up to nearly 25 minutes. No receptor locations are predicted to exceed 30 hours annually. (BNE 18c)
141. Utilizing the alternative location for the northern turbine reduces the total number of receptors from 860 to 840. (BNE 18c)
142. Shadow flicker can be mitigated by eliminating shadows cast upon the receptor through the installation of window blinds or the strategic planting or landscaping on the receptor property. Turbines could also be shut down when shadow flicker is most prevalent. (Tr. 2, pp. 96-99; Tr. 4, pp. 169-170; Tr. 6, pp. 124-125)

SITE DISTURBANCE

143. Construction of the proposed project would disturb approximately 8.4-acres, including the clearing of approximately 5 acres of woodland. Approximately 0.6-acres of disturbance would occur within 100 feet of the wetland areas (BNE 1, Vol. 2, Tab F)
144. Disturbed areas would include the proposed turbines, a blade assembly and laydown area, a temporary stockpile area, a crane assembly area, a tower section laydown area, and a crane pad. (BNE 1, Vol. 2, Tab F)
145. The proposed temporary access road would result in approximately 1.74 acres of graveled surface. (Tr. 4, p. 115)
146. Approximately 5.74 acres of vegetation would have to be cleared for the proposed project if the northern turbine relocation were approved. The total area to be disturbed would be approximately 9.79 acres and the area within 100 feet of wetlands would be approximately 1.1 acres (BNE 18b, Tab 1)
147. Development of the project with the alternative northern turbine location, and a using 20-foot wide construction access road, would disturb approximately 8.8-acres, including the clearing of 4.4-acres of woodland. Approximately 0.43-acres of disturbance would occur within 100 feet of wetland areas. (BNE 22, Attachment 1; BNE 25)

148. After construction, approximately 7.7-acres of the disturbed areas would be restored by recontouring the areas using soil from the stockpiles and planting a native herbaceous seed mixture to create meadow areas. (BNE 9f, R. 6, BNE 25)

WILDLIFE

149. The BNE site property is generally located on the west side of a forested hill and includes the following habitat types: second growth hardwood forest, forested wetlands and hillside seeps, and a nine-acre hilltop meadow (refer to Figure 6), (BNE 1, Tab I, p. 2)
150. The site does not have high wildlife value due to the absence of a diversity of nut and seed bearing vegetation in the forest and the abundance of Japanese barberry in the forest understory. Japanese barberry is an invasive species offering minimal food supply to native fauna (BNE 1, Tab I, p. 15)
151. Construction of the project would cause relocation of some wildlife to adjacent areas and cause some mortality of slower moving species. Once construction is completed, some species sensitive to disturbance would return and some would occupy re-vegetated areas. Generally, long-term impacts to wildlife would be minimal. (BNE 1, Tab I, pp. 15-16)
152. The site lacks water features that would attract many amphibian species. Common species that may occur at the site include American toad, redback salamander, wood frog, and spring peeper. (BNE 1, Tab I, pp. 10-11, BNE 1, Tab M, p. 11)
153. Reptile species could include common snakes and the eastern box turtle, a state species of special concern. Although box turtles were not identified on site, and the site's ground elevation is not within the box turtles' favored habitat range, BNE would undertake protection measures to prevent impacts to this species, including work area isolation, contractor education and reporting to the DEP. (BNE 1, Tab I, pp. 10-12; BNE 24)
154. Mammal species most likely to be found at the site include white-tailed deer, red fox, raccoon, opossum, skunk, woodchuck, coyote, rabbits, various rodents, mink, fisher, and bats. (BNE 1, Tab I, pp. 8-10, 13-14; BNE 9h)
155. A bat survey performed from June 25 to November 1, 2010 identified six species of bats utilizing the site. Three of these species, the eastern red bat, hoary bat, and silver-haired bat, are listed as state species of special concern. (BNE 9e, pp. 16, 20)
156. Tree dwelling bats would be attracted to the forest and forested wetland areas of the site. This type of habitat is common to the region and not specific to the Project site. Tree roosting bats in this area are solitary and do not aggregate in large numbers; however, the presence of forested wetlands and forest edge habitat

- on the site, and the proximity of the New Naugatuck Reservoir to the site, are all favorable in supporting bat populations. (DEP comments of March 14, 2011; BNE 9e, p. 18; SPC 5d; R. 66, R. 67)
157. Most bat activity recorded at the site was in the meadow area, mostly likely because it offers more food for a majority of the identified bat species when compared to the forested areas. (BNE 9e, pp. 18-19)
 158. Most recorded bat fatalities at wind turbine sites are of migratory tree roosting species generally during post breeding and migratory periods. The most affected species (75% of reported fatalities) are the eastern red, hoary, and silver-haired bats. (BNE 9e, p. 21; Tr. 6, pp. 201-202)
 159. The expected mortality of bats at the site are expected to be low to moderate. Most bat fatalities would occur in August and September, usually during low wind speed nights. (DEP comments of March 14, 2011; BNE 9e; SPC 5d, R. 61, R. 64; Tr. 6, pp. 202, 206)
 160. BNE has volunteered to perform additional bat monitoring for the period of May to November 2011 and would conduct a two-year post-construction bat monitoring study. (BNE 24)
 161. The site is utilized by various birds as nesting and foraging habitat. Forty-three bird species were identified on-site during a limited study in summer of 2010, all of which were regionally common species such as the eastern towhee and the American robin and are not specific to the site. (DEP comments of March 14, 2011; BNE 1, Tab M. pp. 6-12, BNE 8, R. 56; SPC 5a, R. 49, R. 50, R.56, R. 57)
 162. BNE is performing a migratory bird study from March to April 2011 to address concerns regarding the initial study that did not include migratory periods. Data from this study would be submitted to the DEP upon completion. (BNE 24)
 163. No state listed or federal listed species of concern were identified at the site during the survey. (DEP comments of March 14, 2011; BNE 1, Tab M, pp. 12-13; BNE 8, R. 59)
 164. The Project would not have a significant negative impact on birds of regional conservation concern. (DEP comments of March 14, 2011)

WETLANDS

165. Four separate wetland areas were identified on the site, all of which are similar in their soil, hydrology, and vegetative characteristics. All four are forested wetlands that, contain hillside seepage areas where seasonal high groundwater supports wetland vegetation. Intermittent watercourses are within most of the wetland areas. (BNE 1, Vol. III, Tab I, BNE 9c, R. 4)
166. All of the wetlands drain in a westerly direction towards the New Naugatuck Reservoir. (BNE 9c, R. 4)
167. Development of the original turbine configuration or the alternative configuration would have not direct impact on wetlands. (BNE 22)
168. No vernal pools were identified on the site property. (BNE 9c, R. 5)
169. The southernmost wetland is identified as Wetland 1. This wetland is the most productive than the other on-side wetlands. (BNE 1, Vol. II, Tab F)
170. The nearest wetland to the southern development area, (turbine and associated blade laydown area) is Wetland 1, approximately 120 feet to the west. (BNE 1, Vol. II, Tab F)
171. BNE consulted with the CWC regarding the site development plans to further protect the on-site wetlands from potential impacts from erosion and sedimentation. The plans were revised several times to address CWC's concerns, most of which regarded the protection of Wetland 3. (BNE 9c; BNE 15, R. 1, R. 2; Tr. 6, pp. 140-141, 154-155, 158-161)
172. The northern turbine relocation site plan revision of March 28, 2011 re-oriented the clearing and blade laydown areas to the east of the turbine, creating a 35-foot buffer between the construction areas. (BNE 1, Vol. II, Tab F; BNE 9c, R. 7; BNE 22, Attachment 1)
173. Other protections for Wetland 3 include the use of a wildlife/conservation seed mix on disturbed soils, and the use of erosion control blankets on exposed areas (BNE 9c)
174. BNE would retain third-party inspector to conduct inspections of the established soil and erosion control measures. BNE would also allow CWC representatives to visit the site to inspect soil and erosion control measures. (BNE 14, R. 36; BNE 15, R. 5)
175. The CWC commented on the March 28, 2011 site plan, stating that the preliminary plan would adequately protect the on-site wetlands and requesting additional items to be incorporated into the final design of the site. BNE has agreed to address these items in the final design. (BNE 7, R. 7; BNE 22; BNE 26; Tr. 6, pp 162-164, 180, 185, 278)

176. In order to provide additional protections to the on-site wetlands, BNE has agreed to establish a conservation easement to a distance of 50 feet from the delineated edge of the two northernmost wetlands (Wetlands 2 and 4) and the southernmost wetland (Wetland 1). BNE has agreed to establish an easement around Wetland 3 to a distance sufficient for BNE to perform necessary construction, operations and maintenance of the northern turbine. (BNE 26; Tr. 6, pp. 223-226)

Respectfully Submitted,

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Certification

This is to certify that a copy of the foregoing has been mailed this date to all parties and intervenors of record.

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