



2010 Capitol Hill Ocean Week

**“Challenges of the Offshore Frontier;
Wind Power”**

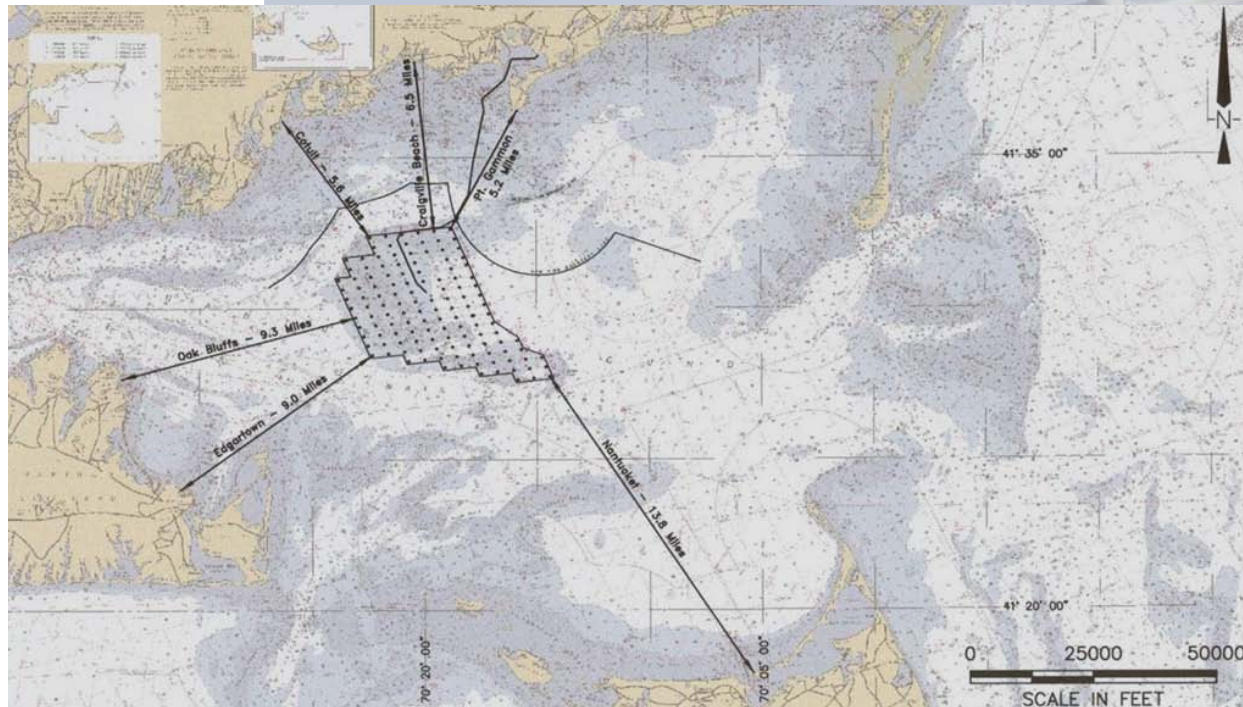
**Dennis Duffy
June 9, 2010**

Cape Wind Park Proposal

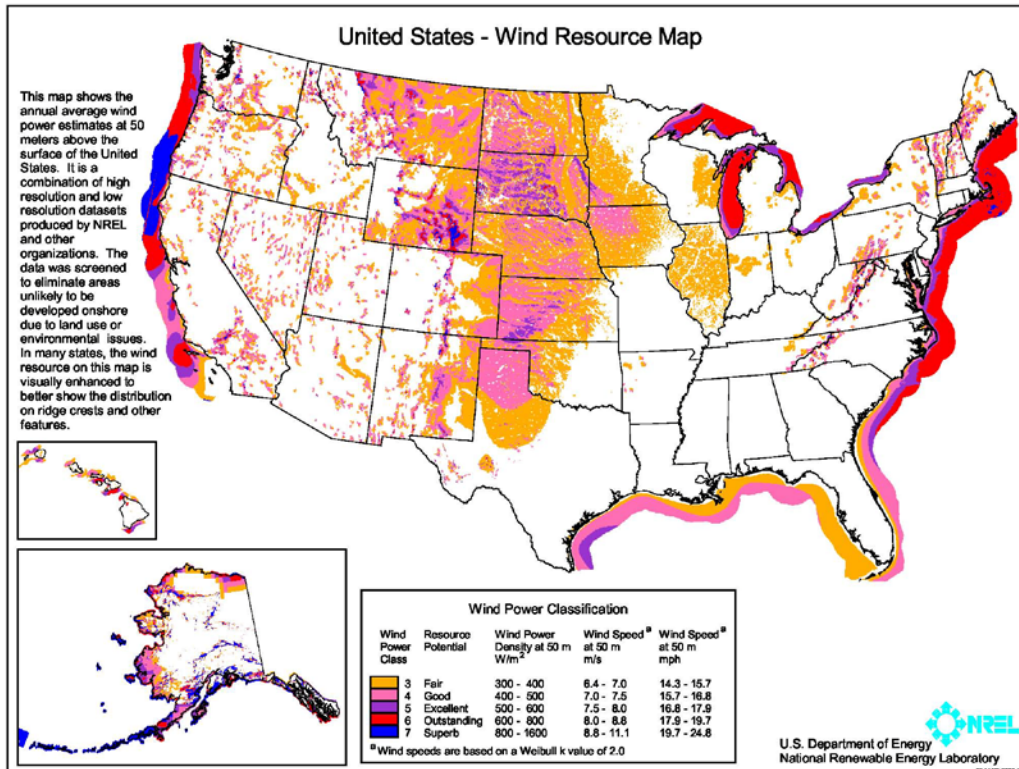
- 130 WTGs (3.6MW)
- Electric Service Platform
- Two 115 kv circuits to shore – two cables each
- 468 MW Generating Capacity
- On Average, 75% entire electrical requirements of the Cape & Islands.
- On-peak and high capacity factor production.

Site Locus

- Outside of Shipping Lanes
- Outside of Flight Paths













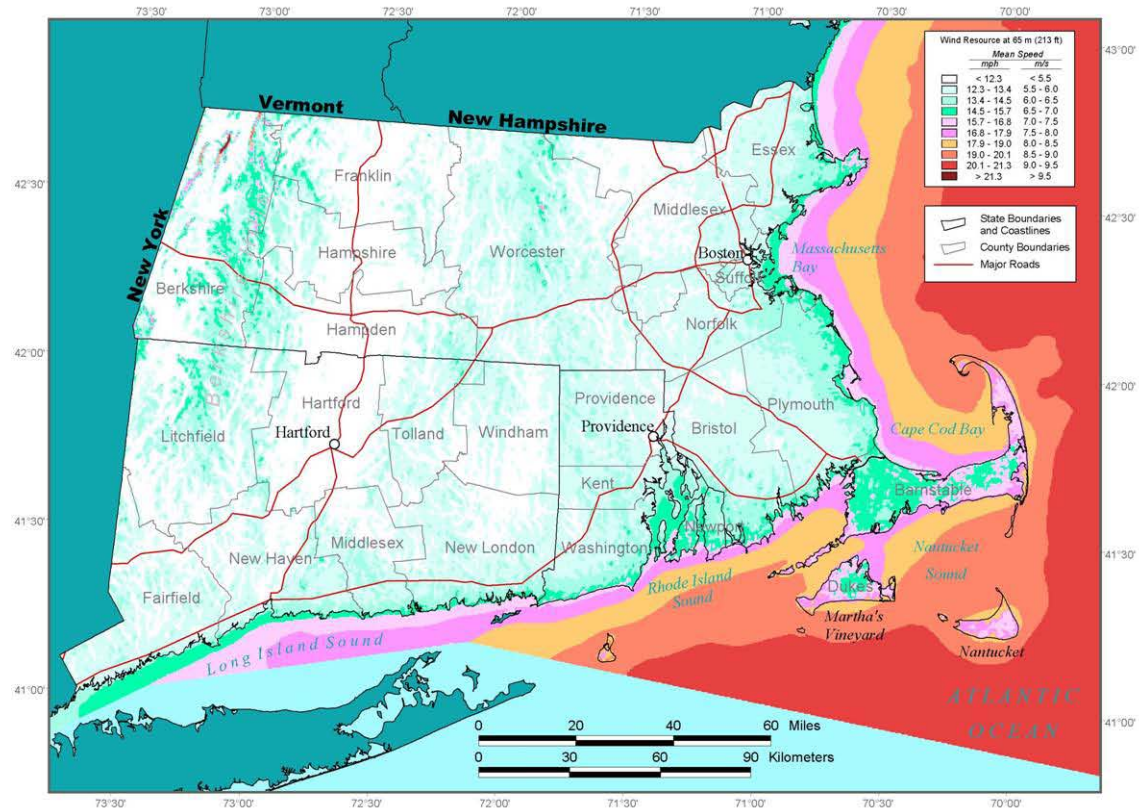
United States Wind Resource Map



Locating Commercial Grade Wind: Offshore

Wind Resource at 65 m (213 ft)

	Mean Speed	
	mph	m/s
	< 12.3	< 5.5
	12.3 - 13.4	5.5 - 6.0
	13.4 - 14.5	6.0 - 6.5
	14.5 - 15.7	6.5 - 7.0
	15.7 - 16.8	7.0 - 7.5
	16.8 - 17.9	7.5 - 8.0
	17.9 - 19.0	8.0 - 8.5
	19.0 - 20.1	8.5 - 9.0
	20.1 - 21.3	9.0 - 9.5
	> 21.3	> 9.5



Projection: Universal Transverse Mercator, Zone 19. Map Scale: 1:830,000. 1 inch = 13 miles.
 Spatial Resolution of Wind Resource Data: 400 m (1312 ft)

This wind resource map was created by TrueWind Solutions using the MesoMap System. Funding for the project was provided by Connecticut Clean Energy Fund, Massachusetts Renewable Energy Trust, and Northeast Utilities Service Co. Although the map is believed to present an accurate overall picture of the wind resource, estimates for any particular location should be confirmed by measurement. The map has been validated using available meteorological data. However it is subject to change pending further review.



Critical Differentials in Evaluating Wind Resources

- All MW of installed wind capacity are NOT of equal system value;
- Average and peak capacity factors and daily and seasonal production curves vary widely by location;
- These variations will result in widely differing impacts on the production cost model, both in the energy and capacity markets;
- The following existing information shows relative benefits of offshore wind resources to the production cost models.

Comparison of Onshore and Offshore Wind Capacity Factors within NYISO (4 to 1 ratio on peak)

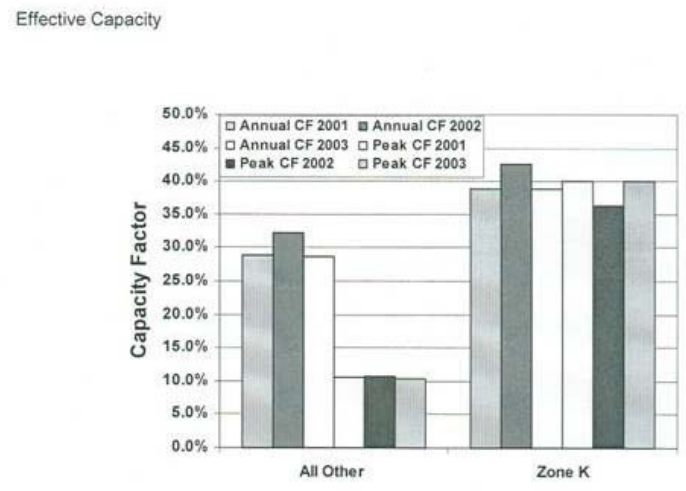


Figure 7.21 Average Hourly Wind Speeds for 2002

Source, "The Effect of Integrating Wind Power On Transmission System Planning, Reliability and Operations," prepared by GE Energy Consulting for NYSERA in 2005.

Note: "Zone K is offshore; "All other" is onshore.

Comparison of Daily Onshore and Offshore Wind Production within NYISO

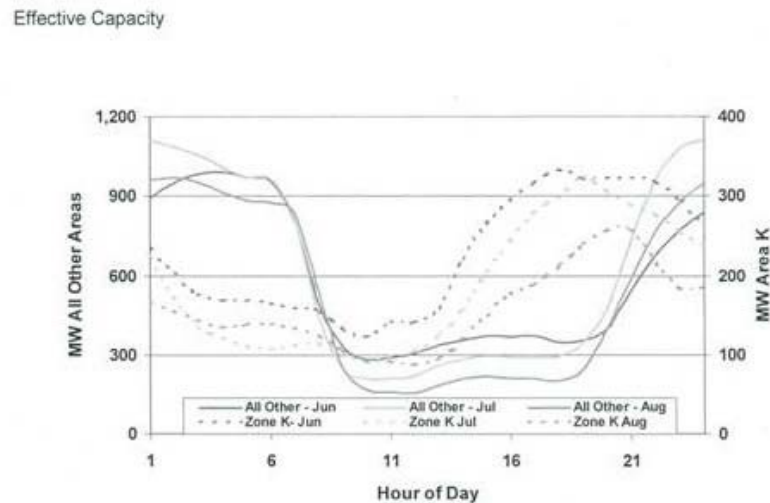


Figure 7.23 NYISO Wind Capacity Factors

Source, "The Effect of Integrating Wind Power On Transmission System Planning, Reliability and Operations," prepared by GE Energy Consulting for NYSERDA in 2005.

Note: "Zone K is offshore; "All other" is onshore.

PJM On-shore Wind at 13% On-Peak CF



Calculation of Wind Class Average Capacity Factor

Individual Unit-Year Capacity Factors 2005 - 2007

0.124	0.156	0.161	0.112	0.116	0.124
0.116	0.138	0.145	0.126	0.140	0.169
0.164	0.052	0.135	0.113	0.086	0.155

Average 0.130

Min 0.052

Max 0.169

Std Dev 0.029 (22.3% of Average)

Source: PJM Determination of Wind Class Average Capacity Factory Planning Committee
February 22, 2008

Offshore Example: Cape Wind at 76% CF During NEPOOL's Top 10 Historical Peaks

Table 1. Comparison of Cape Wind Scientific Data Tower Wind Speed Data and ISO-NE Top Ten Electric Demand Days

Rank	Date	Time	ISO-NE total NE Demand, MW	Wind Speed Meters per Second	Cape Wind Production, MW
1	8/2/06	2PM	28,127 MW	10.80	339 MW
2	8/1/06	5PM	27,467 MW	10.11	293 MW
3	7/18/06	3PM	27,332 MW	10.78	344 MW
4	8/3/06	2PM	27,122 MW	8.89	201 MW
5	7/27/05	3PM	26,885 MW	12.90	420 MW
6	7/19/05	3PM	26,736 MW	9.37	235 MW
7	7/17/06	5PM	26,727 MW	9.96	281 MW
8	6/27/07	3PM	26,264 MW	12.5	419 MW
9	8/5/05	3PM	25,983 MW	11.84	407 MW
10	7/26/05	5PM	25,555 MW	9.89	276 MW

Cape Wind's average production during the hour of peak electric demand of the Top Ten Demand Days would have been 321 megawatts, 76% of Cape Wind's total production potential, had the offshore wind farm been in operation.

Completed Six Years of Environmental Study

- Surface and Subsurface Geological Conditions
- Wind, Tide and Wave Conditions
- Sediment Transport Patterns
- Benthic Infauna and Shellfish Resources
- Essential Fish Habitat Assessment
- Commercial and Recreational Fisheries
- Marine Mammals and Threatened & Endangered Species

Completed Six Years of Environmental Study - continued

- Avian Autecology and Risk Assessment
- Visual Impact Assessments
- Navigational Transit and Vessel Type Assessment
- Marine Archaeological/Cultural Resources
- Aviation Flight Patterns and Conditions
- Shoreline Landfall Conditions Assessments
- Historical and Tribal Resources Consultation

Key Adjudicatory Findings of the EFSB on behalf of Massachusetts

- **Need:** There is a need for capacity provided by this wind farm beginning in 2007 for reliability purposes” (EFSB 02-2 at 152); “There will be a need for the renewable resources produced by the wind farm to meet regional RPS requirements in 2006” (Id. at 156);
- **Air Quality:** “Overall, the Siting Board finds that the air quality benefits of the wind farm are significant, and important for Massachusetts and New England” (Id. at 189);
- **Reliability:** “The variability or the unpredictability of the energy generated by the wind farm is unlikely to adversely affect the reliability of the electric system” (Id.);
- **Cost Savings:** “The record shows that the wind farm will tend to reduce market clearing prices for electricity because it typically will be bid into that market at its marginal operating costs, which are close to zero, and displace power plants with higher marginal costs. The savings resulting from this displacement would accrue to electric customers, and are estimated to be \$25 million per year for New England customers....” (Id. at 162.)

Federal Permitting Status

- NEPA process complete, lead by MMS, with 17 participating agencies.
- MMS released favorable FEIS in January 2009
- MMS Approval ROD issued in April 2010
- FAA Determination of No Aviation Hazard in May 2010
- Favorable USCG Navigation Report in 2009

Notable Supporters

- Maritime Trades Council
- Woods Hole Research Center
- Massachusetts Audubon Society
- Natural Resources Defense Council
- Union of Concerned Scientists
- Conservation Law Foundation
- Environmental League of Massachusetts
- Massachusetts Governor Deval Patrick
- 87% of Massachusetts Voters

Favorable Comments

- **U.S. Interior Secretary Ken Salazar**: “After careful consideration of all the concerns expressed during the lengthy review and consultation process and through analyses of the many factors involved, I find that the public benefits weigh in favor of approving the Cape Wind project at the Horseshoe Shoal location. With this decision we are beginning a new direction in our Nation’s energy future, ushering in America’s first offshore wind energy facility and opening a new chapter in the history of this region.”
- **NRDC**: “[Cape Wind] is, to our knowledge, the largest single source of supply-side reductions in CO₂ currently proposed in the United States and perhaps the world.”
- **USDOE Asst. Secretary Garmon**: “As the first shallow water offshore project under review in the United States, utility-scale projects like Cape Wind are important to our national interest and a crucial first step to building a domestic, globally competitive wind industry.”



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