

## Appendix C. NOAA Data Site Wind Performance Summary Fact Sheets

### Cover Sheet

As part of the Massachusetts Technology Collaborative (MTC) Offshore Wind Collaborative Pilot Research Program, we have collected and analyzed available windspeed information from the National Oceanic & Atmospheric Administration (NOAA) National Data Buoy Center (NDBC) (<http://www.ndbc.noaa.gov>). This information was then used to analyze the potential economic and environmental performance of northeast offshore wind energy resources.

There were seventeen data sites analyzed for this project (see map and table below). They represent a subset of the historical NOAA stations, and were chosen based on the number of years of data available. The table below lists station names, ID numbers, locations, and other reference information. It also displays average windspeeds and associated capacity factors for the data sites. The next page gives a detailed description of the content of the individual site fact sheets created for this project.

Locations of the 17 NOAA stations selected for analysis



Source: [www.ndbc.noaa.gov/Maps/northeast\\_hist.shtml](http://www.ndbc.noaa.gov/Maps/northeast_hist.shtml)

Station Name	Station ID	Location, Latitude Longitude	Distance From Shore, nautical miles (miles)	Location, Direction from Shore Point	Anem. Height, m	Water Depth, m	Ave. Windspeed @ 75m, m/s	Ave. Capacity Factor, %
Logan <sup>1</sup>	14739	42.37 N 71.03 W	0 nm (0 mi)	Logan Airport, Boston, MA	8	-	6.46	25.5
Portland	44007	43.53 N 70.14 W	10 nm (12 mi)	SE of Portland, ME	5	20	7.16	34.9
Isle of Shoals	IOSN3	42.97 N 70.62 W	8 nm (9 mi)	SE of Portsmouth, NH	32	-	7.58	38.2
Boston	44013	42.35 N 70.69 W	20 nm (23 mi)	East of Boston, MA	5	60	7.60	37.9
Jonesport	44027	44.27 N 67.31 W	20 nm (23 mi)	SE of Jonesport, ME	5	180	7.88	40.3
Georges Bank	44011	41.11 N 66.62 W	170 nm (196 mi)	East of Hyannis, MA	5	90	8.03	41.1
Delaware Bay	44009	38.46 N 74.70 W	30 nm (35 mi)	SE of Cape May, NJ	5	30	8.15	42.7
Long Island	44025	40.25 N 73.17 W	30 nm (35 mi)	South of Islip, NY	5	40	8.26	43.7
Nantucket	44008	40.50 N 69.43 W	50 nm (58 mi)	SE of Nantucket, MA	5	60	8.34	43.7
Gulf of Maine	44005	43.18 N 69.18 W	80 nm (92 mi)	East of Portsmouth, NH	5	20	8.36	44.3
Ambrose Light	ALSN6	40.46 N 73.83 W	20 nm (23 mi)	SE of Ambrose Light, NY	29	-	8.38	44.9
SE Cape Cod	44018	41.26 N 69.29 W	30 nm (35 mi)	East of Nantucket, MA	5	70	8.39	43.6
Buzzard's Bay	BUZM3	41.40 N 71.03 W	30 nm (35 mi)	SW of Buzzard's Bay, MA	25	-	8.40	45.1
Matinicus Rock	MISM1	43.78 N 68.86 W	4 nm (5 mi)	SE of Matinicus Island, ME	33	-	8.47	45.0
Montauk Point	44017	40.70 N 72.00 W	20 nm (23 mi)	SW of Montauk Point, NY	5	50	8.61	46.4
Mt. Desert Rock	MDRM1	43.97 N 68.13 W	20 nm (23 mi)	SE of Mt. Desert Island, ME	32	-	8.63	46.3
Hotel	44004	38.47 N 70.56 W	200 nm (230 mi)	East of Cape May, NJ	5	3,120	8.98	49.5

Source: NOAA NDBC and NCDC<sup>1</sup> Station Pages

<sup>1</sup> Logan Airport data come from the NOAA National Climatic Data Center (NCDC) (<http://www.ncdc.noaa.gov>).

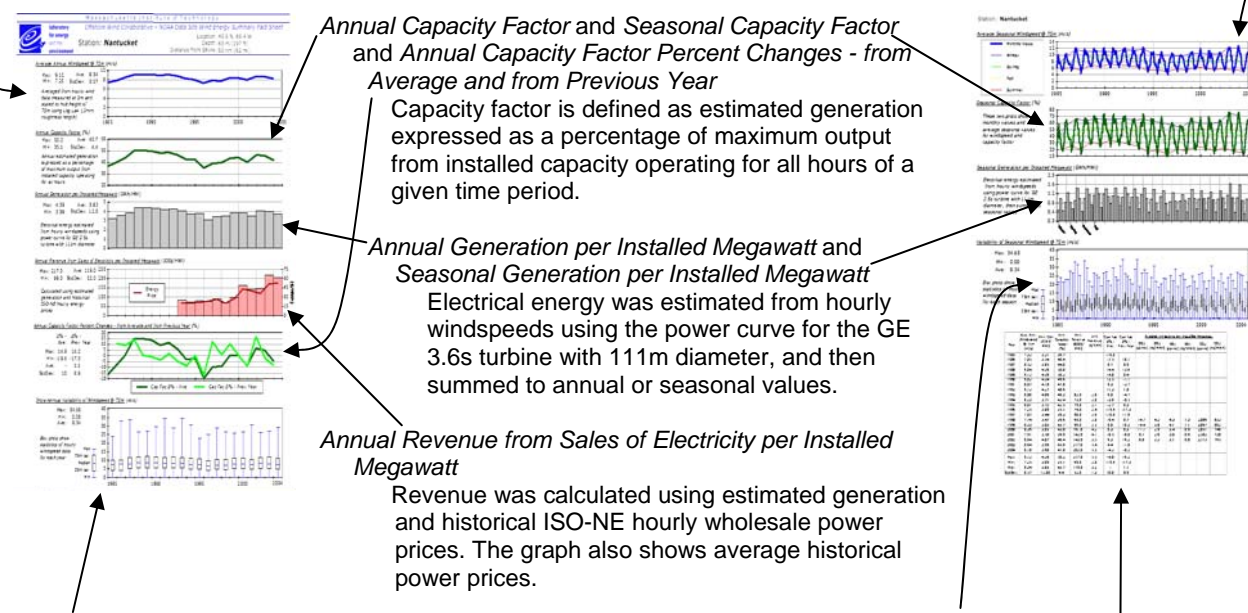
The research team analyzed historical NOAA windspeed data to calculate windspeeds at wind turbine hub height for each individual data site, and to estimate potential generation, revenue, and avoided emissions from locating wind turbines in similar environments. These calculations are based on historical *hourly* values of NOAA windspeeds, New England Independent System Operator (ISO-NE) wholesale power prices, and Environmental Protection Agency (EPA) emission rates for fossil generators. After finishing the analysis, we created fact sheets to display key results and to address the potential economic and environmental performance of the wind resource at the data sites.

*As the individual fact sheets show, inter-annual and intra-annual variability in windspeeds and power generation is quite large. These variations in the wind resource must be taken into account when assessing the performance of prospective wind farms.*

Below is a description of the various sections of the individual data site fact sheets.

**Average Annual Windspeed @ 75m and Average Seasonal Windspeed @ 75m**

Windspeeds were averaged from hourly wind data measured at anemometer height and scaled to 75m hub height using the Log Law (with .2mm roughness length). Anemometer heights at the data sites vary from 5 to 33 meters. Hub height was chosen as representative of likely U.S. offshore configurations. Log Law (and .2mm roughness length) was chosen as the best conservative estimate of the wind scaling relationship.



**Intra-Annual Variability of Windspeed @ 75m and Variability of Seasonal Windspeed @ 75m**  
The box plots show statistics of hourly windspeed data for each year and season.

The table at the bottom of the fact sheets shows annual values for the main parameters, plus unit revenue, as well as avoided emissions per installed MW. Avoided emissions were calculated from estimated generation and hourly marginal emissions rates, which were derived from EPA Acid Rain / Ozone Transport Commission (OTC) Program Hourly Emissions Data.

These fourteen facts sheets<sup>2</sup> show selected results for individual data sites. For more information, and for comparisons across sites, please refer to the main Report and the previous Appendices. The following Fact Sheets appear in alphabetical order.

These fact sheets, as well as the main Report and Appendices, are available via <http://fee.mit.edu/>.

<sup>2</sup> The three data sites Jonesport, SE Cape Cod, and Montauk Point are excluded from these calculations as they only have several years of data,



Station: *Ambrose Light, NY*

Location: 40.5 N, 73.8 W

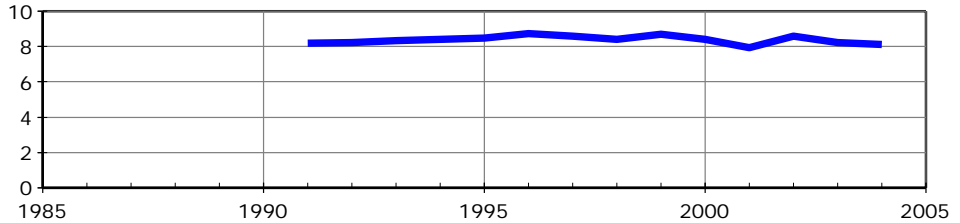
Depth: 0 m (0 ft)

Distance from Shore: 20 nm (23 mi)

Average Annual Windspeed @ 75m (m/s)

Max: 8.72 Ave: 8.38  
Min: 7.93 StdDev: 0.23

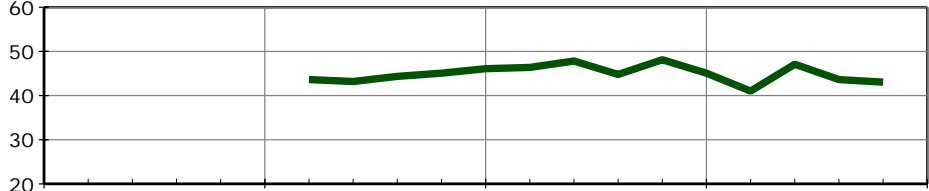
Averaged from hourly wind data measured at 29m and scaled to hub height of 75m using Log Law (.2mm roughness length)



Annual Capacity Factor (%)

Max: 48.1 Ave: 44.9  
Min: 41.0 StdDev: 2.0

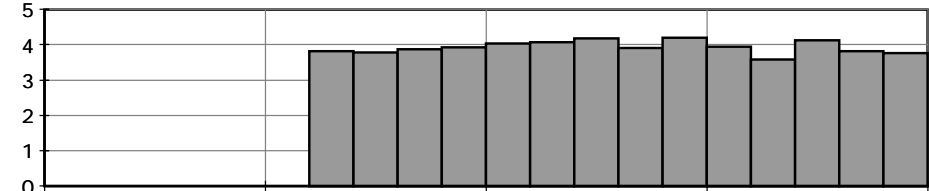
Annual estimated generation expressed as a percentage of maximum output from installed capacity operating for all hours in a given period



Annual Generation per Installed Megawatt (GWh/MW)

Max: 4.21 Ave: 3.94  
Min: 3.59 StdDev: 5.00

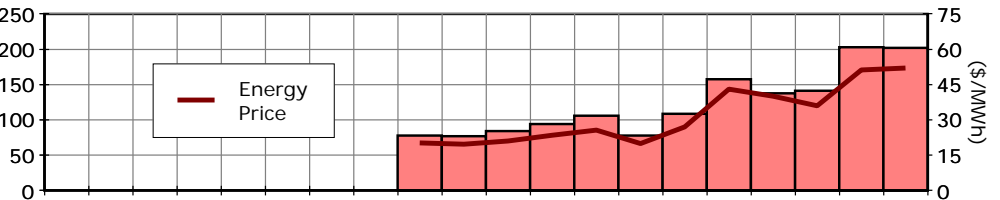
Electrical energy estimated from hourly windspeeds using power curve for GE 3.6s turbine with 111m diameter



Annual Revenue from Sales of Electricity per Installed Megawatt (000\$/MW)

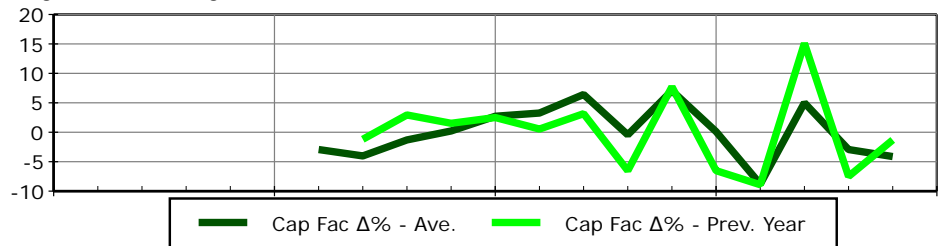
Max: 203.0 Ave: 123.0  
Min: 77.0 StdDev: 46.0

Calculated using estimated generation and historical ISO-NE hourly energy prices



Annual Capacity Factor Percent Changes - from Average and from Previous Year (%)

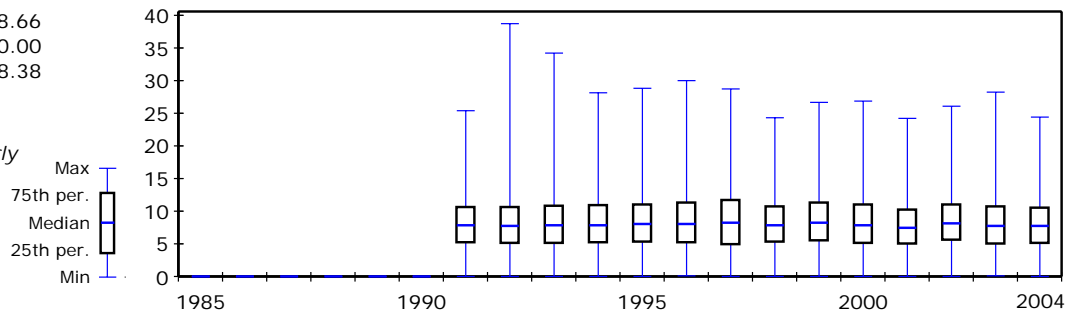
$\Delta\%$  -  $\Delta\%$  -  
Ave. Prev. Year  
Max: 7.1 15.1  
Min: -8.8 -8.9  
Ave: - 0.1  
StdDev: 4.5 6.7



Intra-Annual Variability of Windspeed @ 75m (m/s)

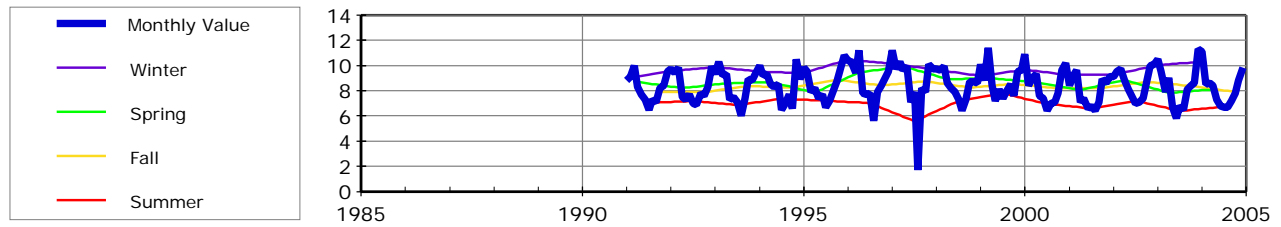
Max: 38.66  
Min: 0.00  
Ave: 8.38

Box plots show statistics of hourly windspeed data for each year



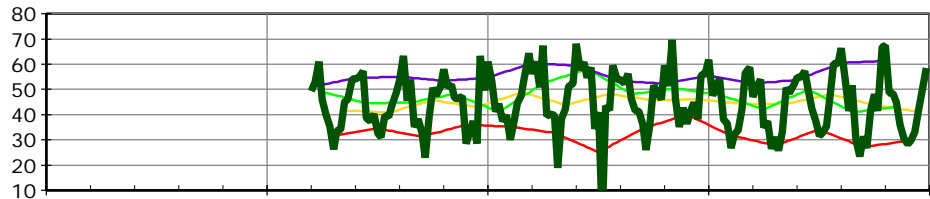
Station: Ambrose Light, NY

Average Seasonal Windspeed @ 75m (m/s)



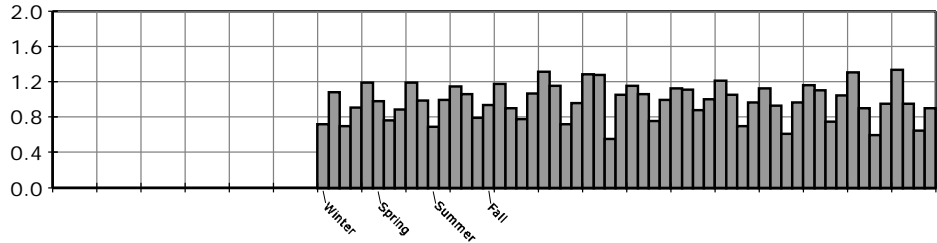
Seasonal Capacity Factor (%)

These two plots show monthly values and average seasonal values for windspeed and capacity factor



Seasonal Generation per Installed Megawatt (GWh/MW)

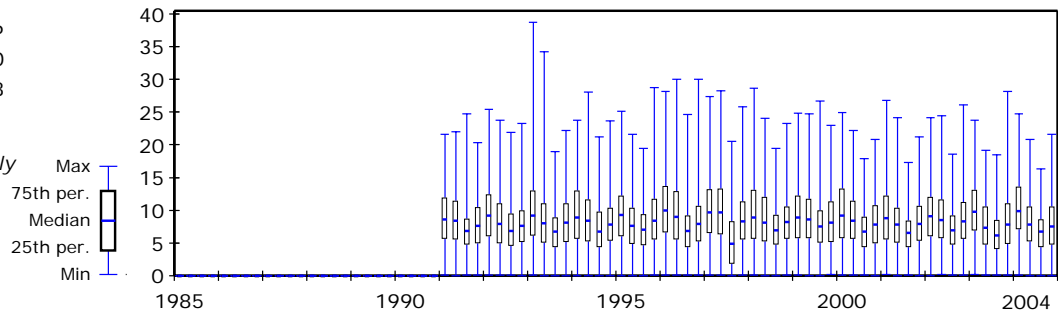
Electrical energy estimated from hourly windspeeds using power curve for GE 3.6s turbine with 111m diameter, then summed to seasonal values



Variability of Seasonal Windspeed @ 75m (m/s)

Max: 38.66  
Min: 0.00  
Ave: 8.38

Box plots show statistics of hourly windspeed data for each season



Year	Ave. Ann. Windspeed @ 75m (m/s)	Ann. Gen (GWh/MWi)	Ann. Capacity Factor (%)	Ann. Revenue (000\$/MWi)	Unit Revenue (¢/kWh)	Cap Fac Δ% - Ave.	Cap Fac Δ% - Prev. Year	Avoided Emissions per Installed Megawatt					
								SO2 (tonne)	SO2 (kg/MWh)	NOx (tonne)	NOx (kg/MWh)	CO2 (tonne)	CO2 (kg/MWh)
1985													
1986													
1987													
1988													
1989													
1990													
1991	8.19	3.82	43.6			-2.9							
1992	8.24	3.79	43.1			-4.0	-1.2						
1993	8.35	3.88	44.3	78.0	2.0	-1.3	2.9						
1994	8.40	3.94	45.0	77.0	2.0	0.2	1.5						
1995	8.48	4.04	46.1	85.0	2.1	2.7	2.5						
1996	8.72	4.07	46.4	95.0	2.3	3.2	0.5						
1997	8.60	4.19	47.8	106.0	2.5	6.4	3.1						
1998	8.40	3.91	44.7	78.0	2.0	-0.5	-6.5	16.7	4.3	4.9	1.3	3,267	835
1999	8.70	4.21	48.1	109.0	2.6	7.1	7.7	15.8	3.7	4.5	1.1	3,366	799
2000	8.41	3.95	45.0	158.0	4.0	0.1	-6.5	11.3	2.9	3.5	0.9	2,941	749
2001	7.93	3.59	41.0	138.0	3.9	-8.8	-8.9	9.2	2.6	3.0	0.8	2,652	739
2002	8.58	4.13	47.1	142.0	3.4	5.0	15.1	8.9	2.2	3.1	0.8	3,167	767
2003	8.24	3.82	43.6	203.0	5.3	-2.9	-7.5						
2004	8.13	3.78	43.0	202.0	5.3	-4.2	-1.3						
Max:	8.72	4.21	48.1	203.0	5.3	7.1	15.1						
Min:	7.93	3.59	41.0	77.0	2.0	-8.8	-8.9						
Ave:	8.38	3.94	44.9	123.0	3.1	-	0.1						
StdDev:	0.23	5.00	2.0	46.0	1.3	4.5	6.7						



Station: *Boston*

Location: 42.4 N, 70.7 W

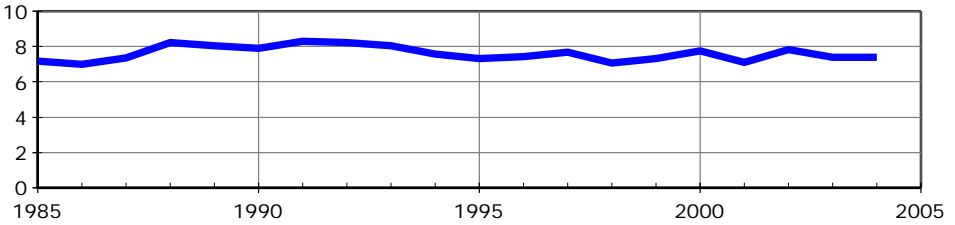
Depth: 60 m (197 ft)

Distance from Shore: 20 nm (23 mi)

Average Annual Windspeed @ 75m (m/s)

Max: 8.29 Ave: 7.60  
Min: 7.00 StdDev: 0.41

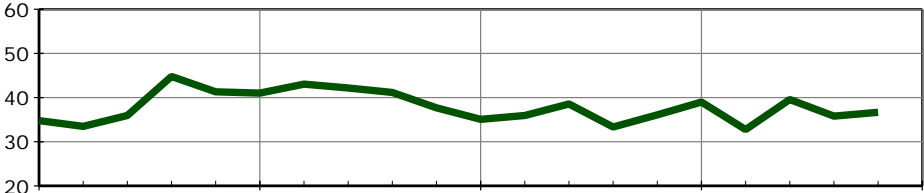
Averaged from hourly wind data measured at 5m and scaled to hub height of 75m using Log Law (.2mm roughness length)



Annual Capacity Factor (%)

Max: 44.8 Ave: 37.9  
Min: 32.7 StdDev: 3.5

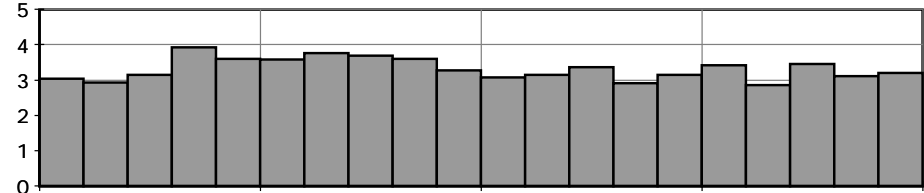
Annual estimated generation expressed as a percentage of maximum output from installed capacity operating for all hours in a given period



Annual Generation per Installed Megawatt (GWh/MWi)

Max: 3.94 Ave: 3.32  
Min: 2.86 StdDev: 11.0

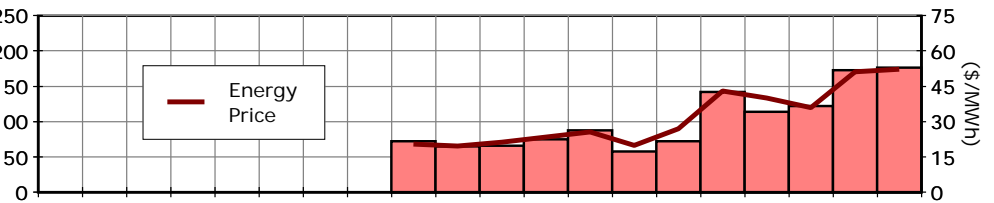
Electrical energy estimated from hourly windspeeds using power curve for GE 3.6s turbine with 111m diameter



Annual Revenue from Sales of Electricity per Installed Megawatt (000\$/MWi)

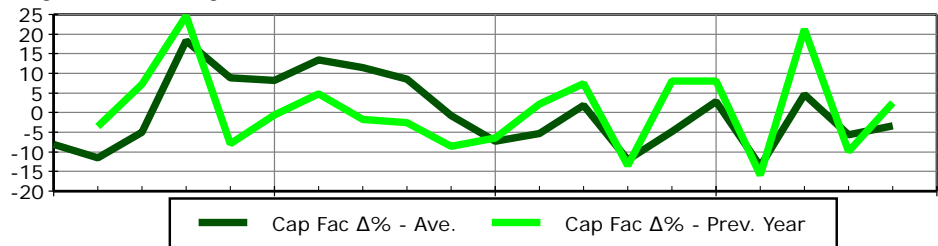
Max: 177.0 Ave: 102.0  
Min: 58.0 StdDev: 43.0

Calculated using estimated generation and historical ISO-NE hourly energy prices



Annual Capacity Factor Percent Changes - from Average and from Previous Year (%)

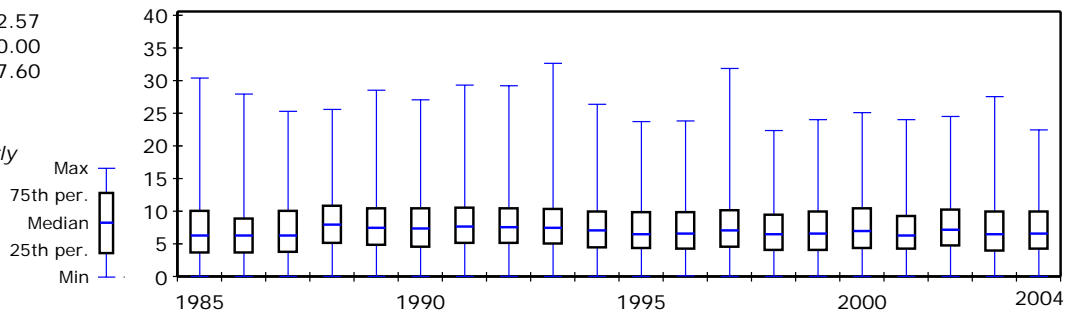
$\Delta\%$  -  $\Delta\%$  -  
Ave. Prev. Year  
Max: 18.3 24.7  
Min: -13.6 -16.0  
Ave: - 0.8  
StdDev: 9.2 10.7



Intra-Annual Variability of Windspeed @ 75m (m/s)

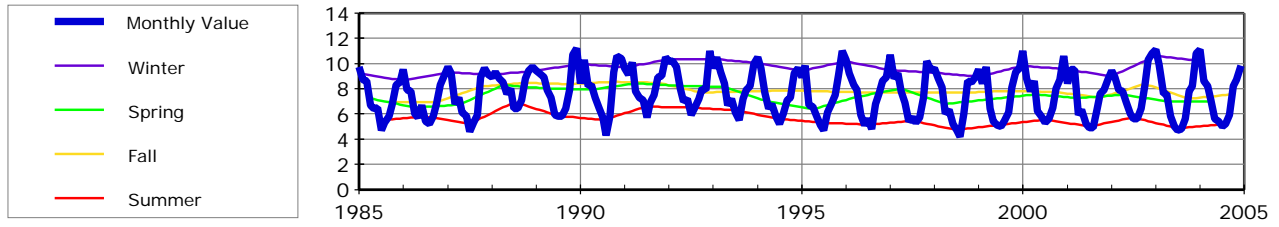
Max: 32.57  
Min: 0.00  
Ave: 7.60

Box plots show statistics of hourly windspeed data for each year



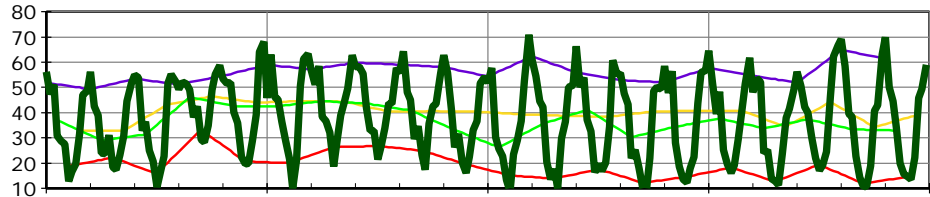
Station: Boston

Average Seasonal Windspeed @ 75m (m/s)



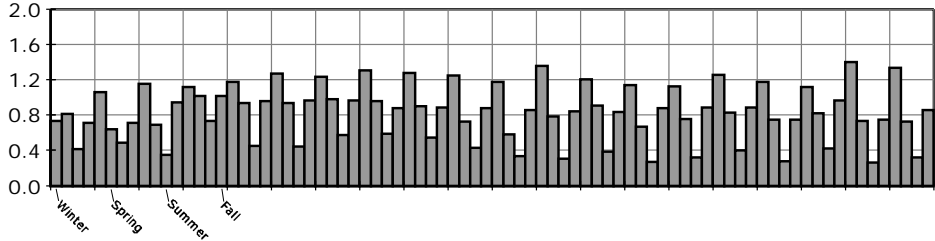
Seasonal Capacity Factor (%)

These two plots show monthly values and average seasonal values for windspeed and capacity factor



Seasonal Generation per Installed Megawatt (GWh/MW)

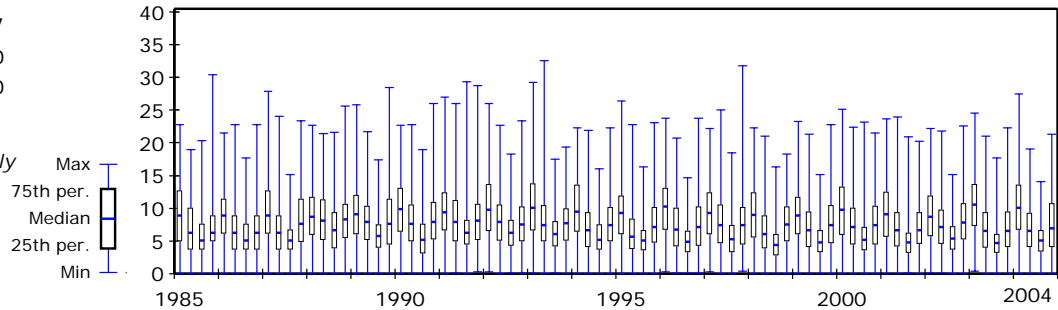
Electrical energy estimated from hourly windspeeds using power curve for GE 3.6s turbine with 111m diameter, then summed to seasonal values



Variability of Seasonal Windspeed @ 75m (m/s)

Max: 32.57  
Min: 0.00  
Ave: 7.60

Box plots show statistics of hourly windspeed data for each season



Year	Ave. Ann. Windspeed @ 75m (m/s)	Ann. Gen (GWh/MW)	Ann. Capacity Factor (%)	Ann. Revenue (000\$/MW)	Unit Revenue (¢/kWh)	Cap Fac Δ% - Ave.	Cap Fac Δ% - Prev. Year	Avoided Emissions per Installed Megawatt					
								SO2 (tonne)	SO2 (kg/MWh)	NOx (tonne)	NOx (kg/MWh)	CO2 (tonne)	CO2 (kg/MWh)
1985	7.16	3.04	34.8			-8.2							
1986	7.00	2.93	33.5			-11.5	-3.6						
1987	7.35	3.15	35.9			-5.1	7.2						
1988	8.23	3.94	44.8			18.3	24.7						
1989	8.03	3.61	41.2			8.8	-8.0						
1990	7.90	3.59	41.0			8.2	-0.6						
1991	8.29	3.76	43.0			13.4	4.8						
1992	8.22	3.70	42.2			11.4	-1.8						
1993	8.04	3.60	41.1	73.0	2.0	8.5	-2.6						
1994	7.57	3.29	37.6	65.0	2.0	-0.8	-8.6						
1995	7.31	3.08	35.1	66.0	2.1	-7.3	-6.5						
1996	7.41	3.15	35.9	75.0	2.4	-5.3	2.2						
1997	7.69	3.38	38.5	88.0	2.6	1.8	7.4						
1998	7.07	2.92	33.3	58.0	2.0	-12.0	-13.5	12.5	4.3	3.7	1.3	2,431	832
1999	7.33	3.15	36.0	73.0	2.3	-4.9	8.0	11.8	3.7	3.4	1.1	2,529	802
2000	7.74	3.42	38.9	142.0	4.2	2.8	8.1	9.7	2.9	3.0	0.9	2,524	743
2001	7.09	2.87	32.7	114.0	4.0	-13.6	-16.0	7.4	2.6	2.4	0.9	2,114	738
2002	7.82	3.47	39.6	122.0	3.5	4.6	21.2	7.6	2.2	2.7	0.8	2,665	768
2003	7.40	3.13	35.7	173.0	5.5	-5.7	-9.9						
2004	7.40	3.21	36.6	177.0	5.5	-3.4	2.5						
Max:	8.29	3.94	44.8	177.0	5.5	18.3	24.7						
Min:	7.00	2.86	32.7	58.0	2.0	-13.6	-16.0						
Ave:	7.60	3.32	37.9	102.0	3.2	-	0.8						
StdDev:	0.41	11.00	3.5	43.0	1.3	9.2	10.7						



Station: *Buzzards Bay*

Location: 41.4 N, 71.0 W

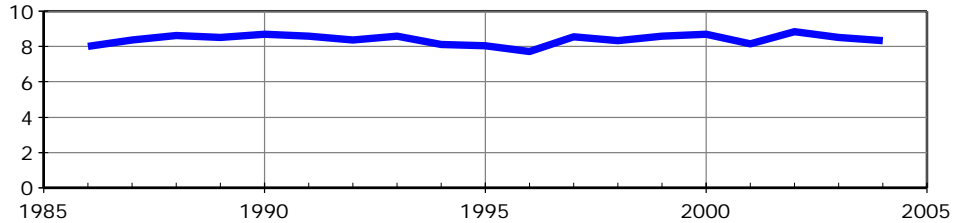
Depth: 0 m (0 ft)

Distance from Shore: 30 nm (35 mi)

Average Annual Windspeed @ 75m (m/s)

Max: 8.83 Ave: 8.40  
Min: 7.73 StdDev: 0.28

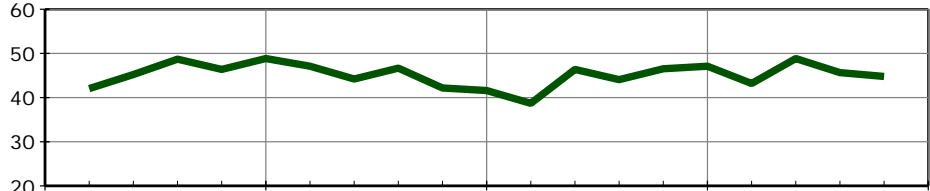
Averaged from hourly wind data measured at 25m and scaled to hub height of 75m using Log Law (.2mm roughness length)



Annual Capacity Factor (%)

Max: 48.8 Ave: 45.1  
Min: 38.6 StdDev: 2.7

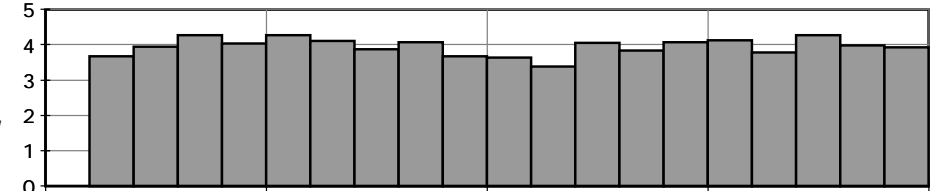
Annual estimated generation expressed as a percentage of maximum output from installed capacity operating for all hours in a given period



Annual Generation per Installed Megawatt (GWh/MWi)

Max: 4.28 Ave: 3.96  
Min: 3.39 StdDev: 7.00

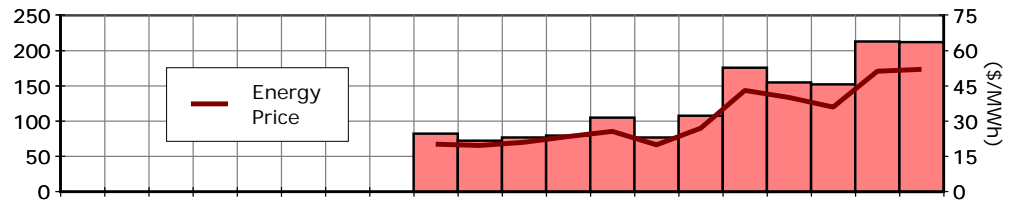
Electrical energy estimated from hourly windspeeds using power curve for GE 3.6s turbine with 111m diameter



Annual Revenue from Sales of Electricity per Installed Megawatt (000\$/MWi)

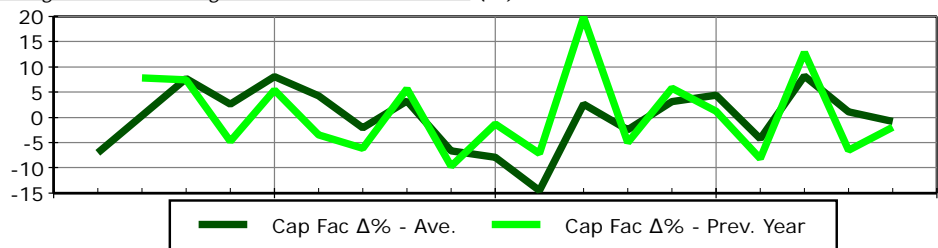
Max: 213.0 Ave: 126.0  
Min: 73.0 StdDev: 53.0

Calculated using estimated generation and historical ISO-NE hourly energy prices



Annual Capacity Factor Percent Changes - from Average and from Previous Year (%)

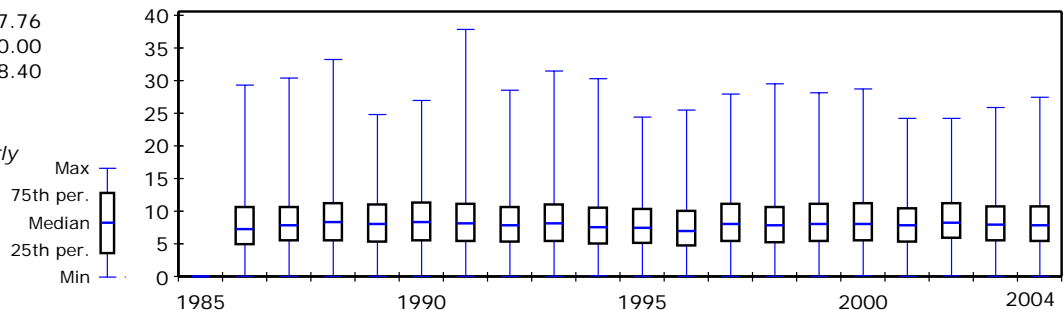
$\Delta\%$  -  $\Delta\%$  -  
Ave. Prev. Year  
Max: 8.2 19.9  
Min: -14.5 -9.7  
Ave: - 0.7  
StdDev: 6.1 8.1



Intra-Annual Variability of Windspeed @ 75m (m/s)

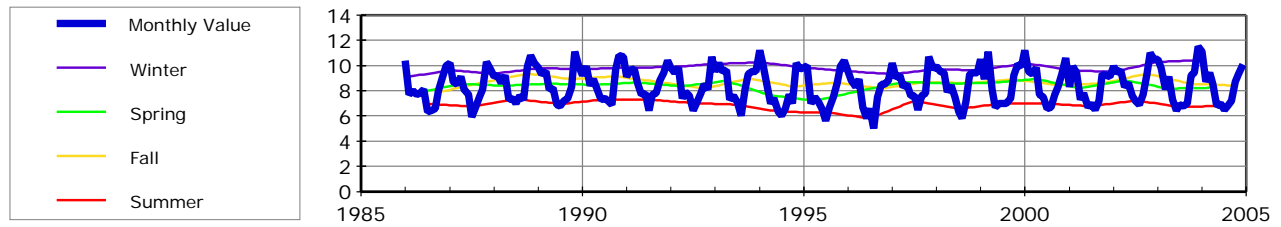
Max: 37.76  
Min: 0.00  
Ave: 8.40

Box plots show statistics of hourly windspeed data for each year



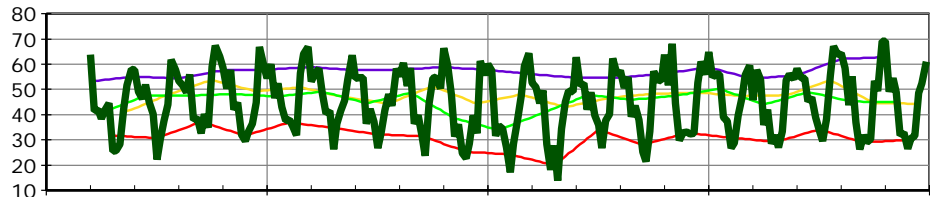
Station: Buzzards Bay

Average Seasonal Windspeed @ 75m (m/s)



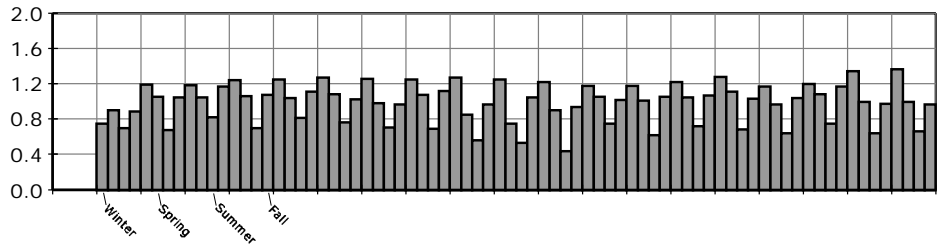
Seasonal Capacity Factor (%)

These two plots show monthly values and average seasonal values for windspeed and capacity factor



Seasonal Generation per Installed Megawatt (GWh/MW)

Electrical energy estimated from hourly windspeeds using power curve for GE 3.6s turbine with 111m diameter, then summed to seasonal values

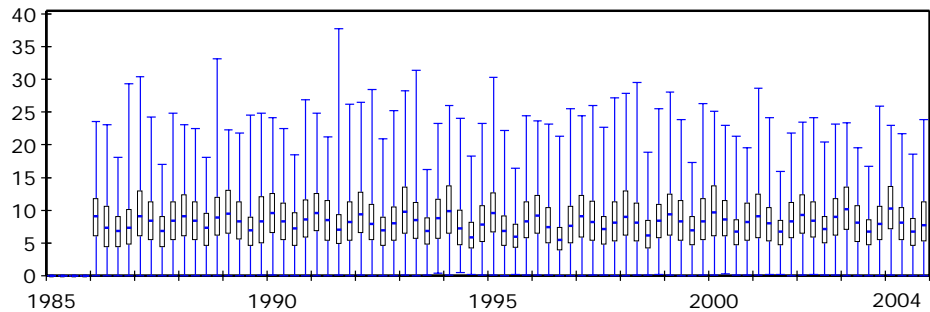


Variability of Seasonal Windspeed @ 75m (m/s)

Max: 37.76  
Min: 0.00  
Ave: 8.40

Box plots show statistics of hourly windspeed data for each season

Max  
75th per.  
Median  
25th per.  
Min



Year	Ave. Ann. Windspeed @ 75m (m/s)	Ann. Gen (GWh/MWi)	Ann. Capacity Factor (%)	Ann. Revenue (000\$/MWi)	Unit Revenue (¢/kWh)	Cap Fac Δ% - Ave.	Cap Fac Δ% - Prev. Year	Avoided Emissions per Installed Megawatt					
								SO2 (tonne)	SO2 (kg/MWh)	NOx (tonne)	NOx (kg/MWh)	CO2 (tonne)	CO2 (kg/MWh)
1985													
1986	8.00	3.68	42.0			-7.0							
1987	8.36	3.96	45.2			0.3	7.8						
1988	8.64	4.27	48.6			7.7	7.4						
1989	8.53	4.05	46.3			2.6	-4.8						
1990	8.70	4.27	48.8			8.1	5.4						
1991	8.58	4.12	47.1			4.3	-3.5						
1992	8.37	3.88	44.2			-2.1	-6.2						
1993	8.58	4.08	46.6	83.0	2.0	3.3	5.6						
1994	8.13	3.69	42.1	73.0	2.0	-6.7	-9.7						
1995	8.04	3.64	41.6	77.0	2.1	-7.9	-1.3						
1996	7.73	3.39	38.6	80.0	2.4	-14.5	-7.1						
1997	8.55	4.06	46.3	105.0	2.6	2.6	19.9						
1998	8.33	3.85	44.0	77.0	2.0	-2.5	-5.0	16.3	4.2	4.8	1.3	3,199	830
1999	8.57	4.07	46.5	108.0	2.7	3.1	5.8	15.2	3.7	4.4	1.1	3,256	799
2000	8.69	4.14	47.1	176.0	4.3	4.4	1.2	11.9	2.9	3.7	0.9	3,075	748
2001	8.15	3.79	43.2	155.0	4.1	-4.2	-8.2	9.7	2.6	3.2	0.8	2,800	739
2002	8.83	4.28	48.8	152.0	3.6	8.2	12.9	9.3	2.2	3.3	0.8	3,281	767
2003	8.51	4.00	45.6	213.0	5.3	1.1	-6.5						
2004	8.34	3.93	44.7	212.0	5.4	-0.8	-1.9						
Max:	8.83	4.28	48.8	213.0	5.4	8.2	19.9						
Min:	7.73	3.39	38.6	73.0	2.0	-14.5	-9.7						
Ave:	8.40	3.96	45.1	126.0	3.2	-	0.7						
StdDev:	0.28	7.00	2.7	53.0	1.3	6.1	8.1						





Station: Delaware Bay

Location: 38.5 N, 74.7 W

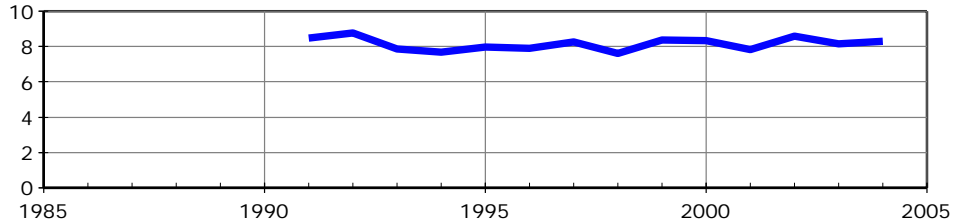
Depth: 30 m (98 ft)

Distance from Shore: 30 nm (35 mi)

Average Annual Windspeed @ 75m (m/s)

Max: 8.75 Ave: 8.15  
Min: 7.61 StdDev: 0.35

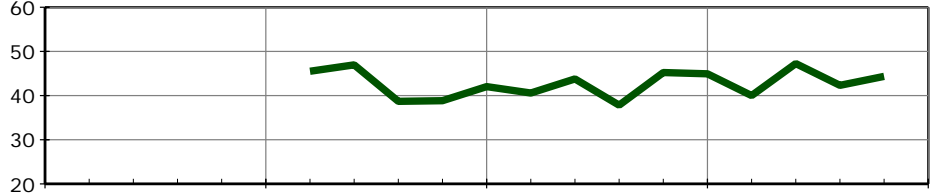
Averaged from hourly wind data measured at 5m and scaled to hub height of 75m using Log Law (.2mm roughness length)



Annual Capacity Factor (%)

Max: 47.2 Ave: 42.7  
Min: 37.8 StdDev: 3.2

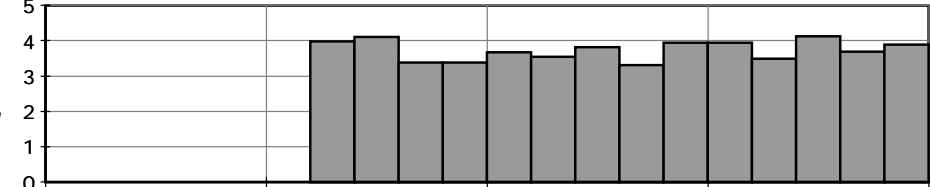
Annual estimated generation expressed as a percentage of maximum output from installed capacity operating for all hours in a given period



Annual Generation per Installed Megawatt (GWh/MWi)

Max: 4.14 Ave: 3.74  
Min: 3.31 StdDev: 8.00

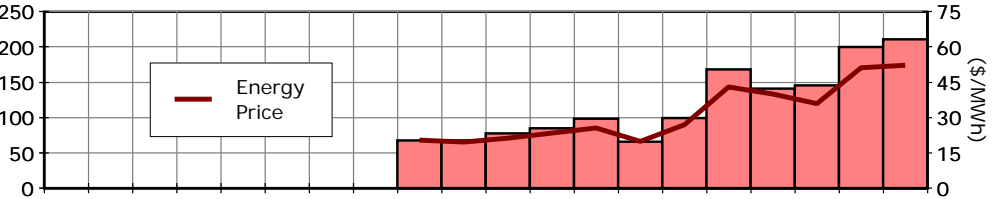
Electrical energy estimated from hourly windspeeds using power curve for GE 3.6s turbine with 111m diameter



Annual Revenue from Sales of Electricity per Installed Megawatt (000\$/MWi)

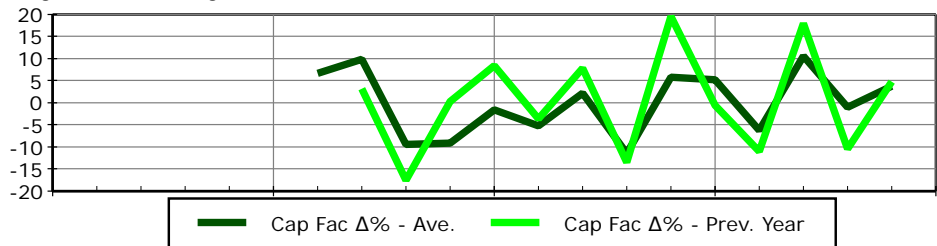
Max: 211.0 Ave: 119.0  
Min: 66.0 StdDev: 52.0

Calculated using estimated generation and historical ISO-NE hourly energy prices



Annual Capacity Factor Percent Changes - from Average and from Previous Year (%)

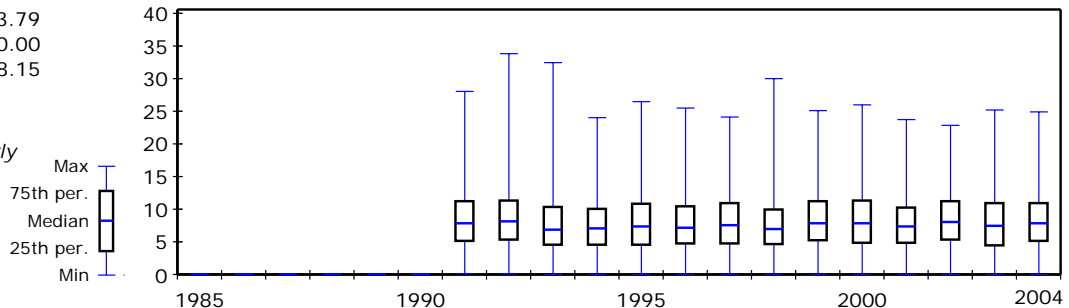
$\Delta\%$ - Ave.	$\Delta\%$ - Prev. Year
Max: 10.6	19.6
Min: -11.5	-17.5
Ave: -	0.4
StdDev: 7.4	11.6



Intra-Annual Variability of Windspeed @ 75m (m/s)

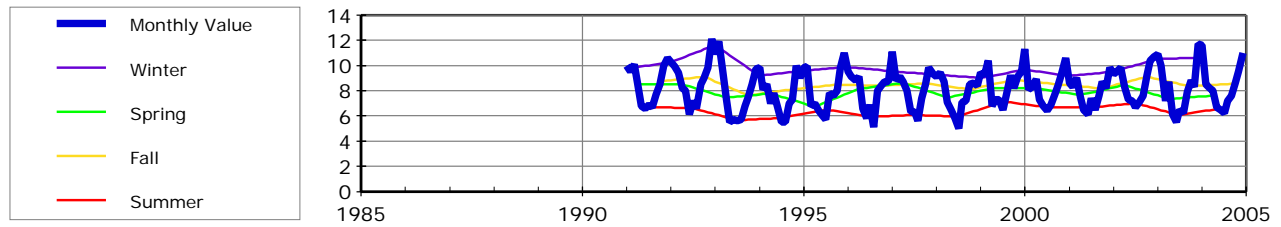
Max: 33.79  
Min: 0.00  
Ave: 8.15

Box plots show statistics of hourly windspeed data for each year



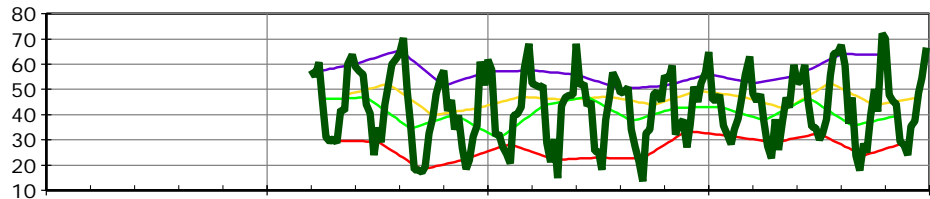
Station: Delaware Bay

Average Seasonal Windspeed @ 75m (m/s)



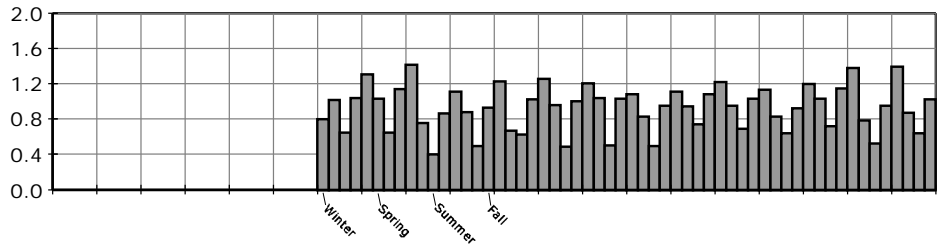
Seasonal Capacity Factor (%)

These two plots show monthly values and average seasonal values for windspeed and capacity factor



Seasonal Generation per Installed Megawatt (GWh/MW)

Electrical energy estimated from hourly windspeeds using power curve for GE 3.6s turbine with 111m diameter, then summed to seasonal values

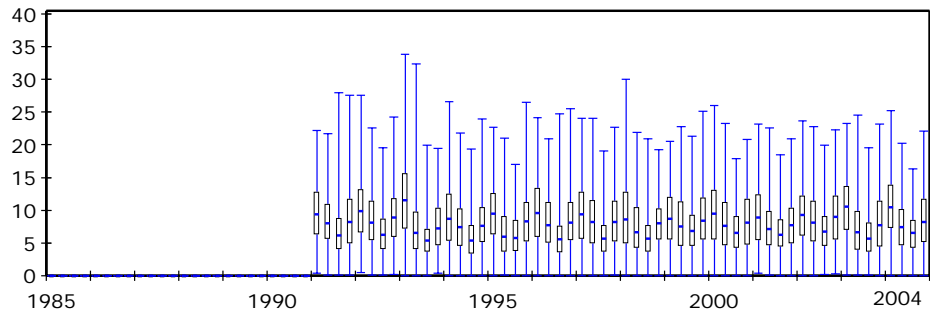


Variability of Seasonal Windspeed @ 75m (m/s)

Max: 33.79  
Min: 0.00  
Ave: 8.15

Box plots show statistics of hourly windspeed data for each season

Max  
75th per.  
Median  
25th per.  
Min



Year	Ave. Ann. Windspeed @ 75m (m/s)	Ann. Gen (GWh/MWi)	Ann. Capacity Factor (%)	Ann. Revenue (000\$/MWi)	Unit Revenue (¢/kWh)	Cap Fac Δ% - Ave.	Cap Fac Δ% - Prev. Year	Avoided Emissions per Installed Megawatt					
								SO2 (tonne)	SO2 (kg/MWh)	NOx (tonne)	NOx (kg/MWh)	CO2 (tonne)	CO2 (kg/MWh)
1985													
1986													
1987													
1988													
1989													
1990													
1991	8.48	3.99	45.5			6.6							
1992	8.75	4.12	46.9			9.9	3.1						
1993	7.85	3.39	38.7	68.0	2.0	-9.4	-17.5						
1994	7.67	3.40	38.8	68.0	2.0	-9.2	0.2						
1995	7.97	3.68	42.0	78.0	2.1	-1.6	8.4						
1996	7.88	3.56	40.5	85.0	2.4	-5.2	-3.7						
1997	8.25	3.83	43.7	99.0	2.6	2.2	7.8						
1998	7.61	3.31	37.8	66.0	2.0	-11.5	-13.5	14.2	4.3	4.1	1.3	2,756	832
1999	8.38	3.96	45.2	100.0	2.5	5.8	19.6	14.7	3.7	4.2	1.1	3,150	796
2000	8.35	3.95	44.9	169.0	4.3	5.2	-0.6	11.2	2.9	3.5	0.9	2,924	745
2001	7.84	3.51	40.0	141.0	4.0	-6.3	-11.0	9.0	2.6	3.0	0.8	2,582	737
2002	8.59	4.14	47.2	146.0	3.5	10.6	18.0	8.9	2.2	3.2	0.8	3,166	765
2003	8.14	3.70	42.3	200.0	5.4	-1.0	-10.5						
2004	8.29	3.89	44.3	211.0	5.4	3.7	4.7						
Max:	8.75	4.14	47.2	211.0	5.4	10.6	19.6						
Min:	7.61	3.31	37.8	66.0	2.0	-11.5	-17.5						
Ave:	8.15	3.74	42.7	119.0	3.2	-	0.4						
StdDev:	0.35	8.00	3.2	52.0	1.3	7.4	11.6						



Station: *Georges Bank*

Location: 41.1 N, 66.6 W

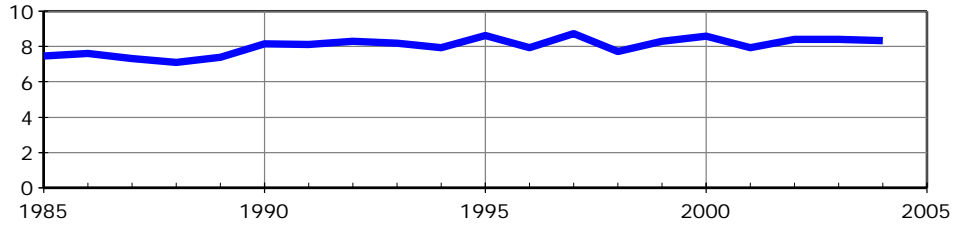
Depth: 90 m (295 ft)

Distance from Shore: 170 nm (196 mi)

Average Annual Windspeed @ 75m (m/s)

Max: 8.72 Ave: 8.03  
Min: 7.09 StdDev: 0.47

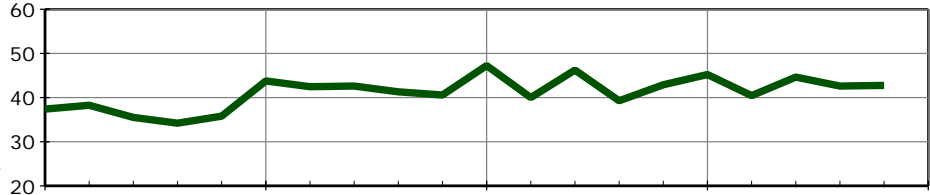
Averaged from hourly wind data measured at 5m and scaled to hub height of 75m using Log Law (.2mm roughness length)



Annual Capacity Factor (%)

Max: 47.2 Ave: 41.1  
Min: 34.2 StdDev: 3.6

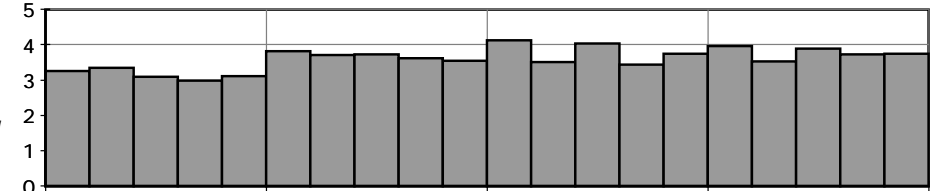
Annual estimated generation expressed as a percentage of maximum output from installed capacity operating for all hours in a given period



Annual Generation per Installed Megawatt (GWh/MW)

Max: 4.14 Ave: 3.60  
Min: 3.00 StdDev: 11.0

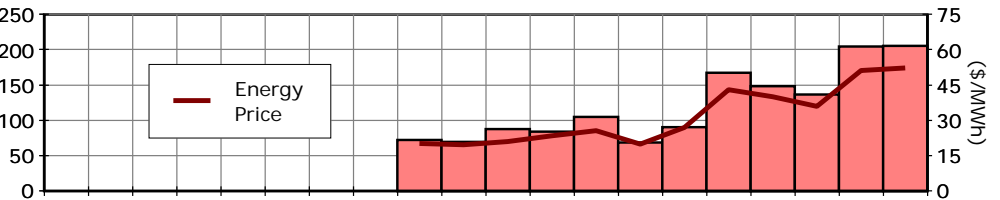
Electrical energy estimated from hourly windspeeds using power curve for GE 3.6s turbine with 111m diameter



Annual Revenue from Sales of Electricity per Installed Megawatt (000\$/MW)

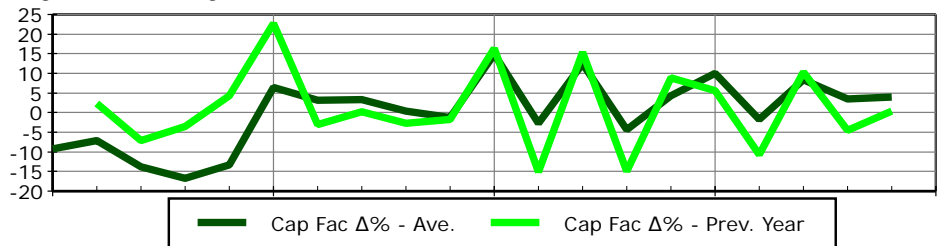
Max: 206.0 Ave: 120.0  
Min: 69.0 StdDev: 51.0

Calculated using estimated generation and historical ISO-NE hourly energy prices



Annual Capacity Factor Percent Changes - from Average and from Previous Year (%)

$\Delta\%$  -  $\Delta\%$  -  
Ave. Prev. Year  
Max: 14.8 22.7  
Min: -16.8 -15.2  
Ave: - 1.2  
StdDev: 8.8 10.3

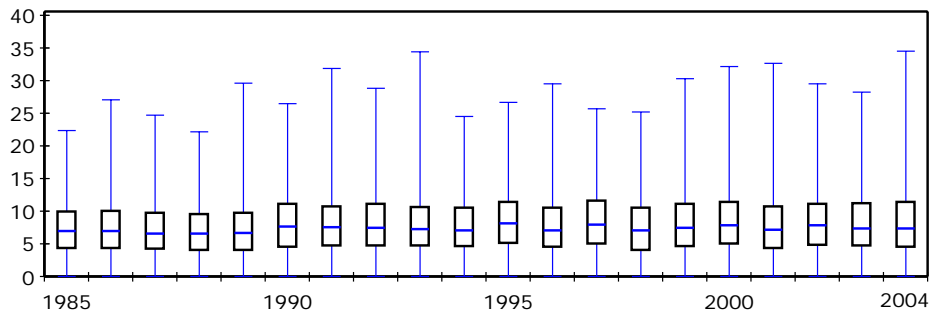


Intra-Annual Variability of Windspeed @ 75m (m/s)

Max: 34.47  
Min: 0.00  
Ave: 8.03

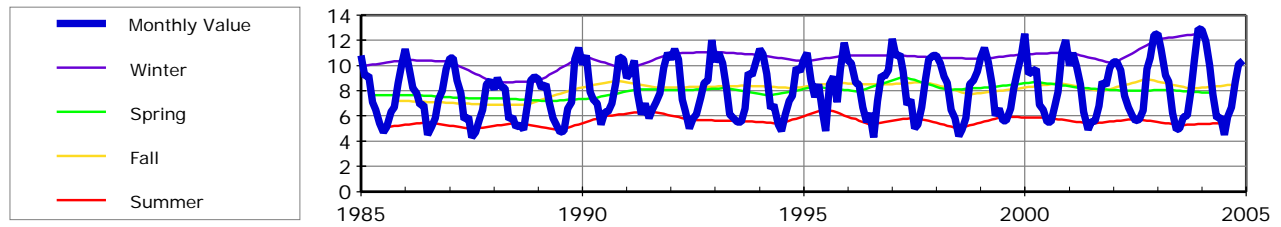
Box plots show statistics of hourly windspeed data for each year

Max  
75th per.  
Median  
25th per.  
Min



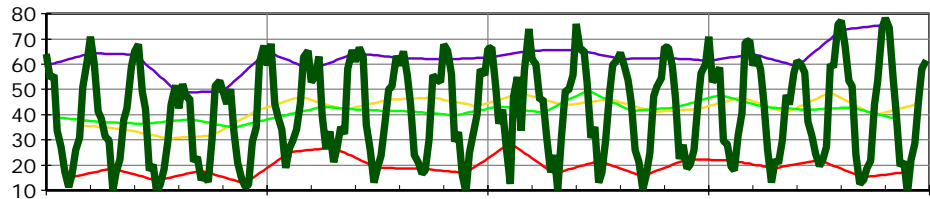
Station: Georges Bank

Average Seasonal Windspeed @ 75m (m/s)



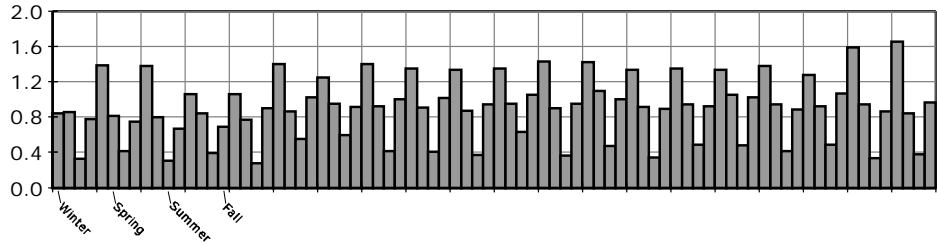
Seasonal Capacity Factor (%)

These two plots show monthly values and average seasonal values for windspeed and capacity factor



Seasonal Generation per Installed Megawatt (GWh/MW)

Electrical energy estimated from hourly windspeeds using power curve for GE 3.6s turbine with 111m diameter, then summed to seasonal values

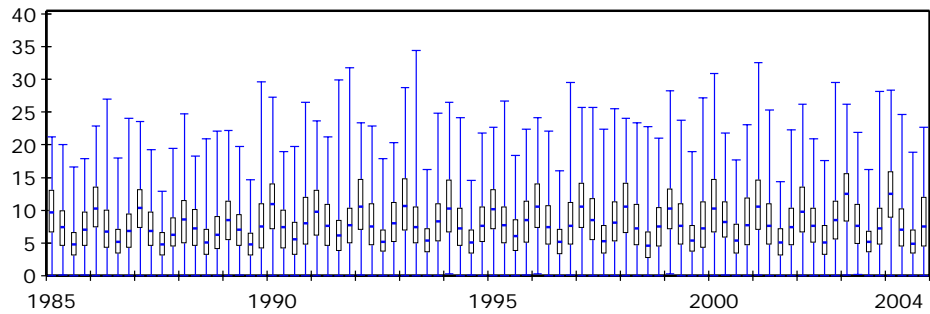


Variability of Seasonal Windspeed @ 75m (m/s)

Max: 34.43  
Min: 0.00  
Ave: 8.03

Box plots show statistics of hourly windspeed data for each season

Max  
75th per.  
Median  
25th per.  
Min



Year	Ave. Ann. Windspeed @ 75m (m/s)	Ann. Gen (GWh/MW)	Ann. Capacity Factor (%)	Ann. Revenue (000\$/MW)	Unit Revenue (¢/kWh)	Cap Fac Δ% - Ave.	Cap Fac Δ% - Prev. Year	Avoided Emissions per Installed Megawatt					
								SO2 (tonne)	SO2 (kg/MWh)	NOx (tonne)	NOx (kg/MWh)	CO2 (tonne)	CO2 (kg/MWh)
1985	7.47	3.27	37.3			-9.2							
1986	7.61	3.35	38.2			-7.1	2.3						
1987	7.30	3.10	35.4			-13.8	-7.2						
1988	7.09	3.00	34.2			-16.8	-3.5						
1989	7.40	3.12	35.7			-13.3	4.3						
1990	8.14	3.83	43.7			6.4	22.7						
1991	8.13	3.71	42.4			3.1	-3.1						
1992	8.31	3.73	42.5			3.3	0.2						
1993	8.17	3.62	41.3	73.0	2.0	0.4	-2.8						
1994	7.92	3.55	40.6	70.0	2.0	-1.3	-1.7						
1995	8.63	4.14	47.2	88.0	2.1	14.8	16.4						
1996	7.94	3.52	40.0	84.0	2.4	-2.7	-15.2						
1997	8.72	4.05	46.2	105.0	2.6	12.4	15.4						
1998	7.72	3.44	39.3	69.0	2.0	-4.4	-14.9	14.8	4.3	4.3	1.3	2,875	835
1999	8.31	3.75	42.8	91.0	2.4	4.2	8.9	14.2	3.8	4.1	1.1	3,020	805
2000	8.60	3.97	45.2	168.0	4.2	10.0	5.6	11.4	2.9	3.6	0.9	2,954	748
2001	7.94	3.54	40.4	149.0	4.2	-1.8	-10.7	9.2	2.6	3.1	0.9	2,614	739
2002	8.41	3.90	44.6	137.0	3.5	8.4	10.3	8.5	2.2	3.0	0.8	2,993	767
2003	8.41	3.73	42.6	205.0	5.5	3.5	-4.5						
2004	8.35	3.75	42.7	206.0	5.5	3.9	0.4						
Max:	8.72	4.14	47.2	206.0	5.5	14.8	22.7						
Min:	7.09	3.00	34.2	69.0	2.0	-16.8	-15.2						
Ave:	8.03	3.60	41.1	120.0	3.2	-	1.2						
StdDev:	0.47	11.00	3.6	51.0	1.3	8.8	10.3						



Station: *Gulf of Maine*

Location: 43.2 N, 69.2 W

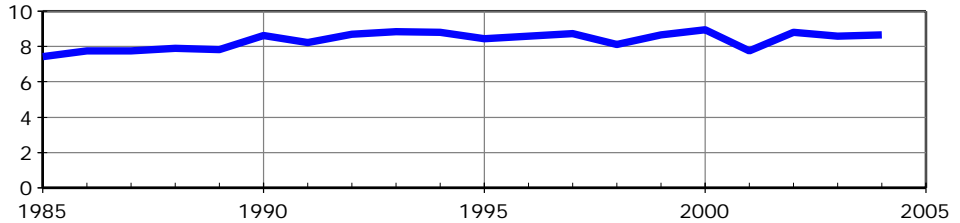
Depth: 20 m (66 ft)

Distance from Shore: 170 nm (196 mi)

Average Annual Windspeed @ 75m (m/s)

Max: 8.95 Ave: 8.36  
Min: 7.41 StdDev: 0.47

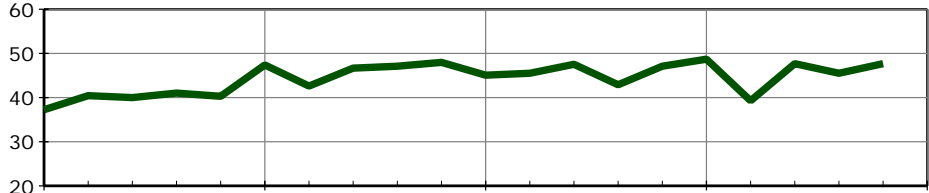
Averaged from hourly wind data measured at 5m and scaled to hub height of 75m using Log Law (.2mm roughness length)



Annual Capacity Factor (%)

Max: 48.7 Ave: 44.3  
Min: 37.2 StdDev: 3.6

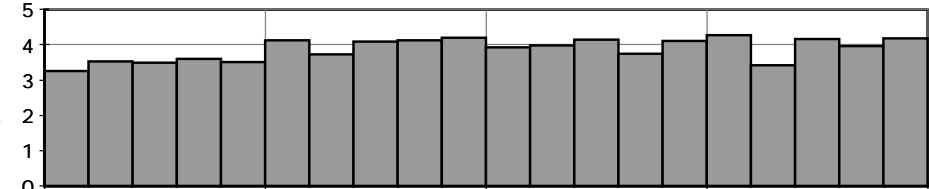
Annual estimated generation expressed as a percentage of maximum output from installed capacity operating for all hours in a given period



Annual Generation per Installed Megawatt (GWh/MWi)

Max: 4.28 Ave: 3.89  
Min: 3.26 StdDev: 10.0

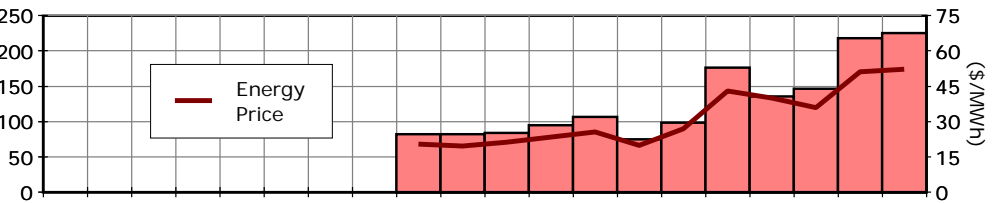
Electrical energy estimated from hourly windspeeds using power curve for GE 3.6s turbine with 111m diameter



Annual Revenue from Sales of Electricity per Installed Megawatt (000\$/MWi)

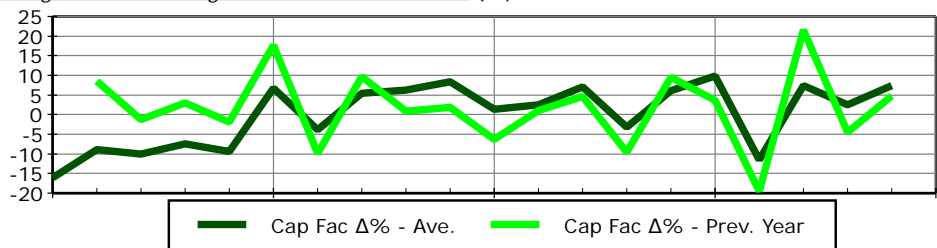
Max: 226.0 Ave: 128.0  
Min: 75.0 StdDev: 54.0

Calculated using estimated generation and historical ISO-NE hourly energy prices



Annual Capacity Factor Percent Changes - from Average and from Previous Year (%)

$\Delta\%$	$\Delta\%$
Ave.	Prev. Year
Max: 9.8	21.5
Min: -16.1	-19.5
Ave: -	1.7
StdDev: 8.1	9.7

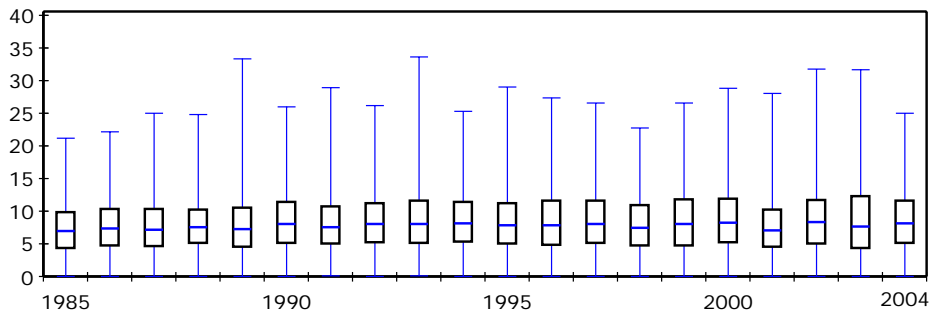


Intra-Annual Variability of Windspeed @ 75m (m/s)

Max: 33.64  
Min: 0.00  
Ave: 8.36

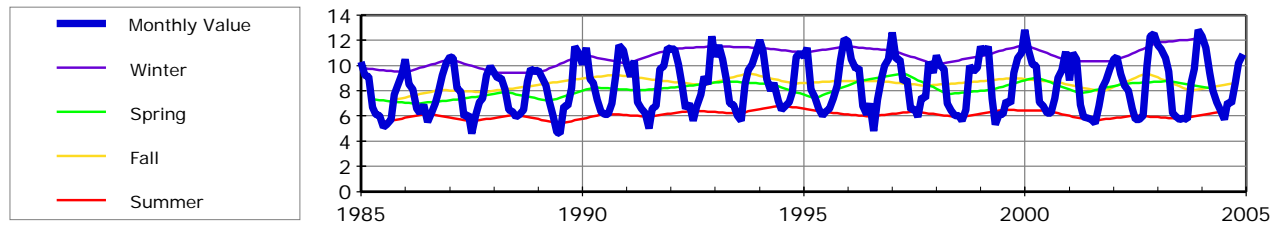
Box plots show statistics of hourly windspeed data for each year

Max  
75th per.  
Median  
25th per.  
Min



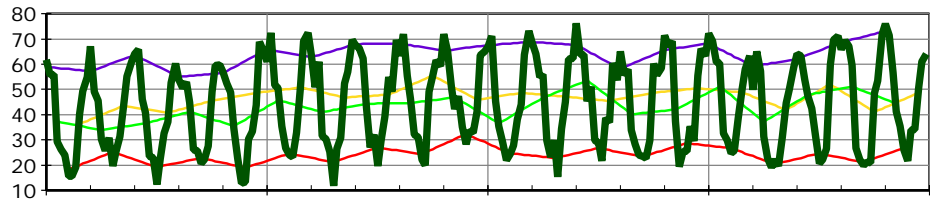
Station: Gulf of Maine

Average Seasonal Windspeed @ 75m (m/s)



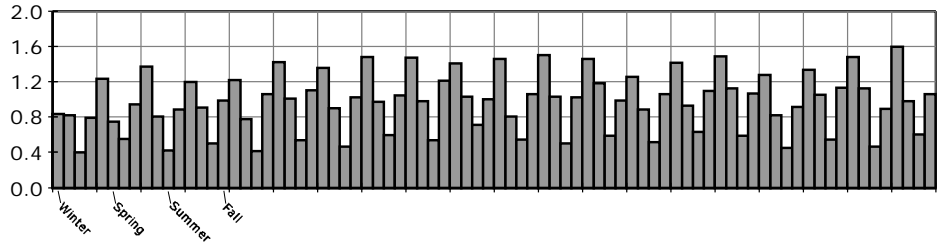
Seasonal Capacity Factor (%)

These two plots show monthly values and average seasonal values for windspeed and capacity factor



Seasonal Generation per Installed Megawatt (GWh/MW)

Electrical energy estimated from hourly windspeeds using power curve for GE 3.6s turbine with 111m diameter, then summed to seasonal values

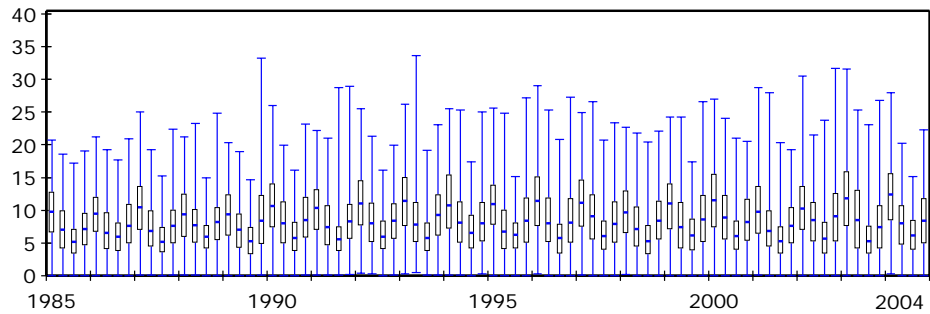


Variability of Seasonal Windspeed @ 75m (m/s)

Max: 33.64  
Min: 0.00  
Ave: 8.36

Box plots show statistics of hourly windspeed data for each season

Max  
75th per.  
Median  
25th per.  
Min



Year	Ave. Ann. Windspeed @ 75m (m/s)	Ann. Gen (GWh/MW)	Ann. Capacity Factor (%)	Ann. Revenue (000\$/MW)	Unit Revenue (¢/kWh)	Cap Fac Δ% - Ave.	Cap Fac Δ% - Prev. Year	Avoided Emissions per Installed Megawatt					
								SO2 (tonne)	SO2 (kg/MWh)	NOx (tonne)	NOx (kg/MWh)	CO2 (tonne)	CO2 (kg/MWh)
1985	7.41	3.26	37.2			-16.1							
1986	7.74	3.54	40.4			-8.9	8.5						
1987	7.77	3.49	39.9			-10.1	-1.2						
1988	7.90	3.60	41.0			-7.5	2.9						
1989	7.82	3.52	40.2			-9.4	-2.0						
1990	8.63	4.14	47.3			6.7	17.7						
1991	8.24	3.73	42.6			-3.9	-9.9						
1992	8.69	4.10	46.7			5.4	9.7						
1993	8.83	4.13	47.1	83.0	2.0	6.3	0.9						
1994	8.82	4.20	48.0	83.0	2.0	8.3	1.8						
1995	8.43	3.94	45.0	84.0	2.1	1.4	-6.3						
1996	8.60	3.99	45.4	95.0	2.4	2.4	1.0						
1997	8.72	4.16	47.5	107.0	2.6	7.1	4.6						
1998	8.11	3.76	42.9	75.0	2.0	-3.2	-9.6	16.0	4.3	4.7	1.3	3,126	832
1999	8.66	4.12	47.0	99.0	2.4	6.0	9.5	15.5	3.8	4.4	1.1	3,299	801
2000	8.95	4.28	48.7	177.0	4.1	9.8	3.6	12.2	2.9	3.8	0.9	3,175	746
2001	7.76	3.43	39.2	136.0	4.0	-11.6	-19.5	8.8	2.6	2.9	0.9	2,533	738
2002	8.79	4.17	47.6	147.0	3.5	7.4	21.5	9.1	2.2	3.2	0.8	3,206	769
2003	8.59	3.98	45.4	218.0	5.5	2.5	-4.6						
2004	8.67	4.18	47.6	226.0	5.4	7.4	4.8						
Max:	8.95	4.28	48.7	226.0	5.5	9.8	21.5						
Min:	7.41	3.26	37.2	75.0	2.0	-16.1	-19.5						
Ave:	8.36	3.89	44.3	128.0	3.2	-	1.7						
StdDev:	0.47	10.00	3.6	54.0	1.3	8.1	9.7						



Station: *Hotel*

Location: 38.5 N, 70.6 W

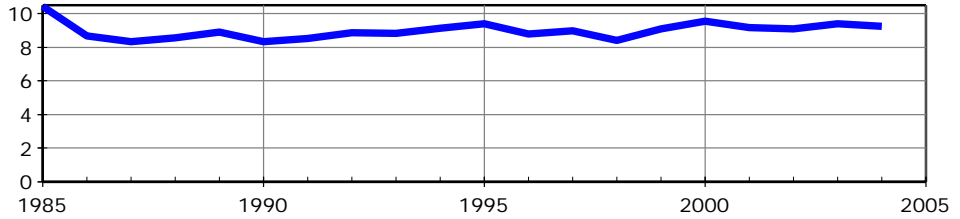
Depth: 3,120 m (10,234 ft)

Distance from Shore: 200 nm (230 mi)

Average Annual Windspeed @ 75m (m/s)

Max: 10.44 Ave: 8.98  
Min: 8.32 StdDev: 0.50

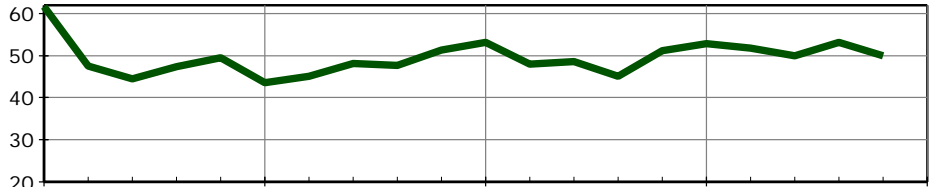
Averaged from hourly wind data measured at 5m and scaled to hub height of 75m using Log Law (.2mm roughness length)



Annual Capacity Factor (%)

Max: 61.7 Ave: 49.5  
Min: 43.6 StdDev: 4.1

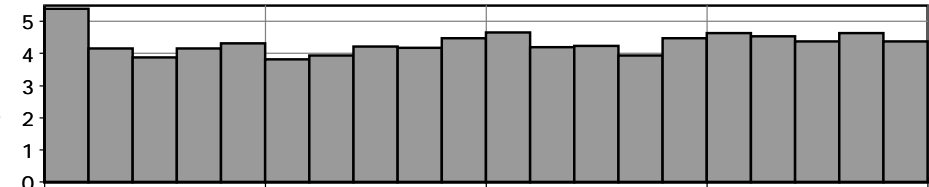
Annual estimated generation expressed as a percentage of maximum output from installed capacity operating for all hours in a given period



Annual Generation per Installed Megawatt (GWh/MWi)

Max: 5.40 Ave: 4.34  
Min: 3.82 StdDev: 0.36

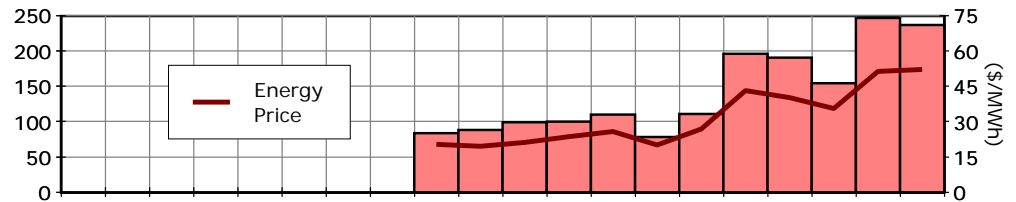
Electrical energy estimated from hourly windspeeds using power curve for GE 3.6s turbine with 111m diameter



Annual Revenue from Sales of Electricity per Installed Megawatt (000\$/MWi)

Max: 247.0 Ave: 142.0  
Min: 79.0 StdDev: 61.0

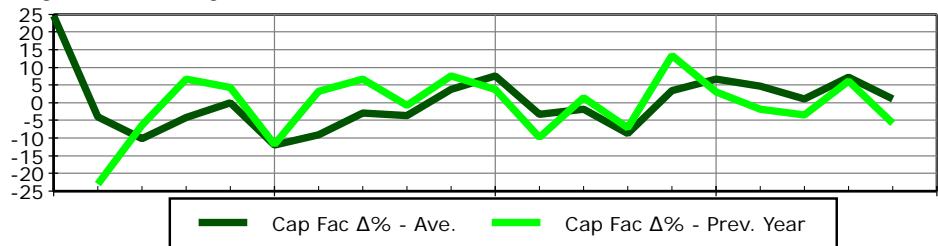
Calculated using estimated generation and historical ISO-NE hourly energy prices



Annual Capacity Factor Percent Changes - from Average and from Previous Year (%)

$\Delta\%$  -  $\Delta\%$  -  
Ave. Prev. Year

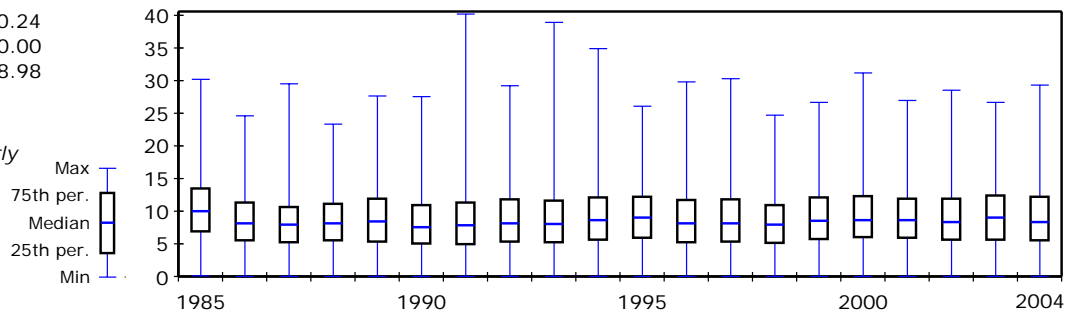
Max: 24.6 13.4  
Min: -11.9 -23.0  
Ave: - -0.7  
StdDev: 8.2 8.6



Intra-Annual Variability of Windspeed @ 75m (m/s)

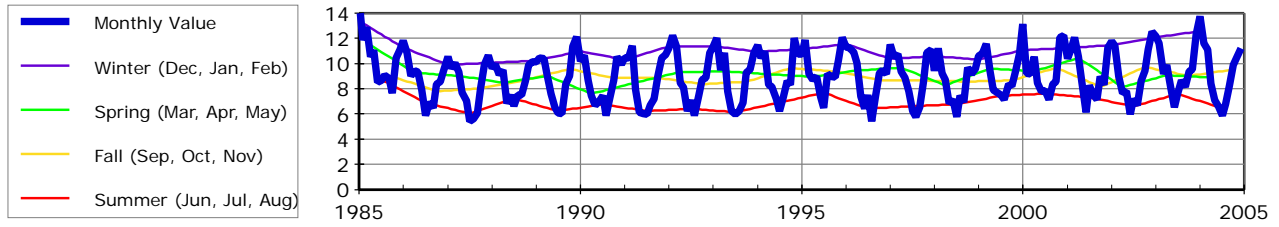
Max: 40.24  
Min: 0.00  
Ave: 8.98

Box plots show statistics of hourly windspeed data for each year



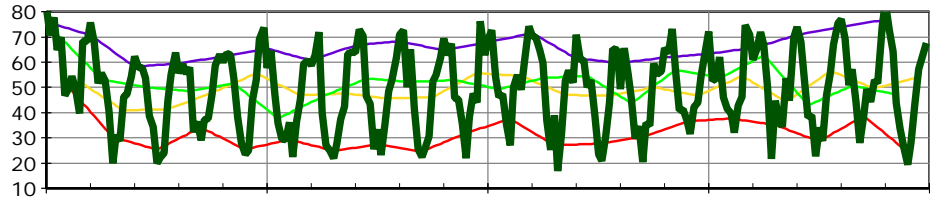
Station: Hotel

Average Seasonal Windspeed @ 75m (m/s)



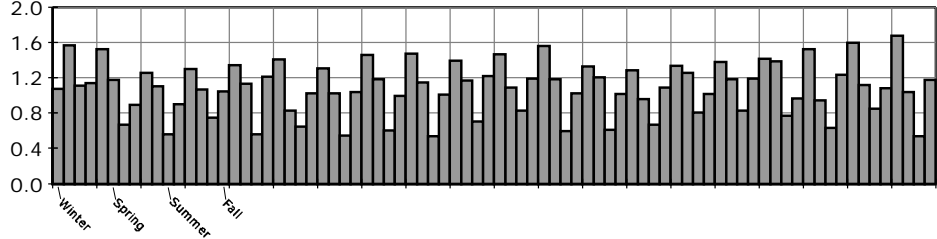
Seasonal Capacity Factor (%)

These two plots show monthly values and average seasonal values for windspeed and capacity factor



Seasonal Generation per Installed Megawatt (GWh/MW)

Electrical energy estimated from hourly windspeeds using power curve for GE 3.6s turbine with 111m diameter, then summed to seasonal values

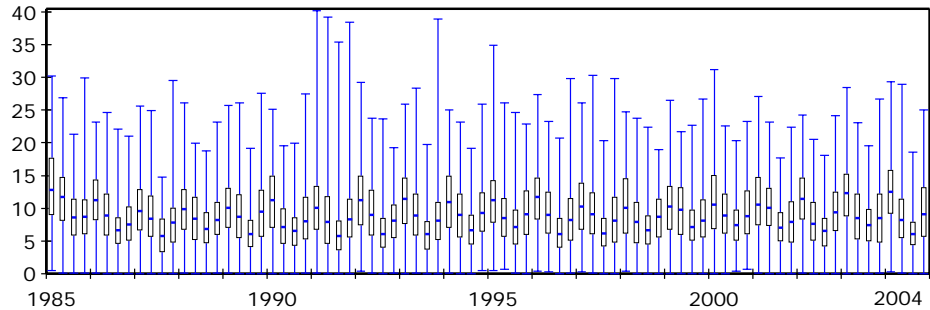


Variability of Seasonal Windspeed @ 75m (m/s)

Max: 40.24  
Min: 0.00  
Ave: 8.98

Box plots show statistics of hourly windspeed data for each season

Max  
75th per.  
Median  
25th per.  
Min



Year	Ave. Ann. Windspeed @ 75m (m/s)	Ann. Gen (GWh/MWi)	Ann. Capacity Factor (%)	Ann. Revenue (000\$/MWi)	Unit Revenue (¢/kWh)	Cap Fac Δ% - Ave.	Cap Fac Δ% - Prev. Year	Avoided Emissions per Installed Megawatt					
								SO2 (tonne)	SO2 (kg/MWh)	NOx (tonne)	NOx (kg/MWh)	CO2 (tonne)	CO2 (kg/MWh)
1985	10.44	5.40	61.7			24.6							
1986	8.66	4.16	47.5			-4.0	-23.0						
1987	8.32	3.89	44.5			-10.2	-6.4						
1988	8.55	4.17	47.4			-4.2	6.7						
1989	8.91	4.33	49.5			-0.1	4.3						
1990	8.34	3.82	43.6			-11.9	-11.8						
1991	8.52	3.95	45.1			-9.0	3.3						
1992	8.86	4.22	48.1			-2.9	6.7						
1993	8.84	4.18	47.7	84.0	2.0	-3.7	-0.8						
1994	9.13	4.50	51.3	88.5	2.0	3.7	7.6						
1995	9.38	4.66	53.2	99.6	2.1	7.5	3.7						
1996	8.77	4.21	47.9	100.0	2.4	-3.2	-9.9						
1997	8.97	4.26	48.6	109.9	2.6	-1.8	1.4						
1998	8.40	3.95	45.1	78.7	2.0	-8.8	-7.1	16.7	4.2	4.9	1.2	3,293	833
1999	9.09	4.48	51.2	111.4	2.5	3.4	13.4	16.9	3.8	4.8	1.1	3,593	801
2000	9.54	4.64	52.8	196.8	4.2	6.7	3.1	13.3	2.9	4.1	0.9	3,446	747
2001	9.18	4.54	51.8	191.1	4.2	4.7	-1.8	11.8	2.6	3.9	0.8	3,346	737
2002	9.08	4.38	50.0	154.8	3.5	1.0	-3.5	9.5	2.2	3.4	0.8	3,353	765
2003	9.41	4.65	53.1	247.3	5.3	7.2	6.1						
2004	9.24	4.39	50.0	236.8	5.4	1.0	-5.8						
Max:	10.44	5.40	61.7	247.0	5.4	24.6	13.4						
Min:	8.32	3.82	43.6	79.0	2.0	-11.9	-23.0						
Ave:	8.98	4.34	49.5	142.0	3.2	-	-0.7						
StdDev:	0.50	0.36	4.1	61.0	1.3	8.2	8.6						





Station: *Isle of Shoals, NH*

Location: 43.0 N, 70.6 W

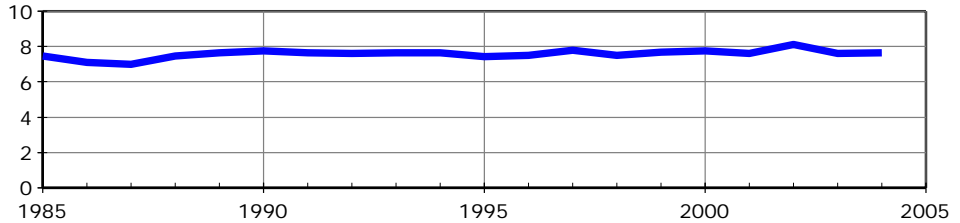
Depth: 0 m (0 ft)

Distance from Shore: 8 nm (9 mi)

Average Annual Windspeed @ 75m (m/s)

Max: 8.12 Ave: 7.58  
Min: 7.00 StdDev: 0.24

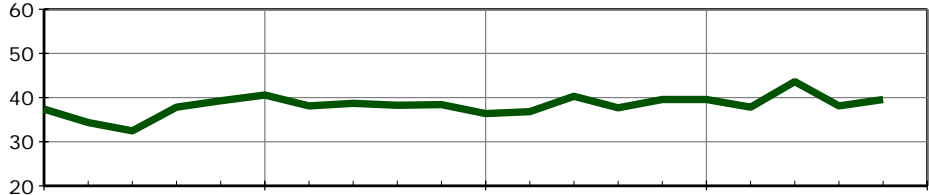
Averaged from hourly wind data measured at 32m and scaled to hub height of 75m using Log Law (.2mm roughness length)



Annual Capacity Factor (%)

Max: 43.6 Ave: 38.2  
Min: 32.4 StdDev: 2.3

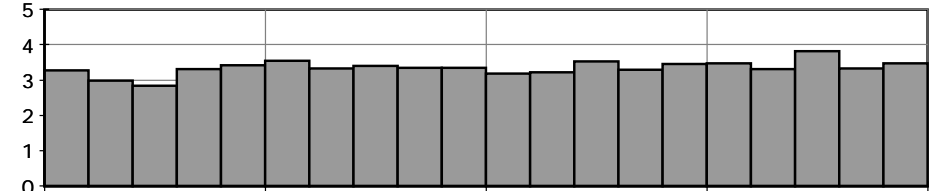
Annual estimated generation expressed as a percentage of maximum output from installed capacity operating for all hours in a given period



Annual Generation per Installed Megawatt (GWh/MWi)

Max: 3.82 Ave: 3.35  
Min: 2.84 StdDev: 0.70

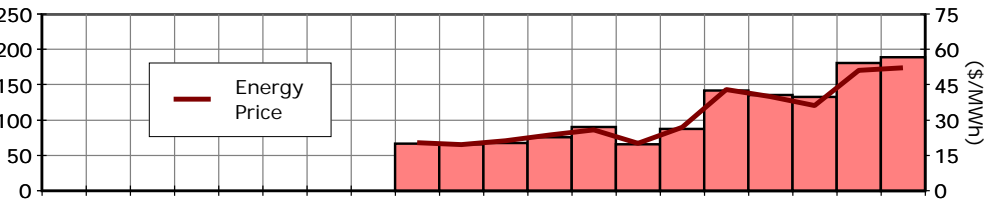
Electrical energy estimated from hourly windspeeds using power curve for GE 3.6s turbine with 111m diameter



Annual Revenue from Sales of Electricity per Installed Megawatt (000\$/MWi)

Max: 189.0 Ave: 109.0  
Min: 66.0 StdDev: 46.0

Calculated using estimated generation and historical ISO-NE hourly energy prices



Annual Capacity Factor Percent Changes - from Average and from Previous Year (%)

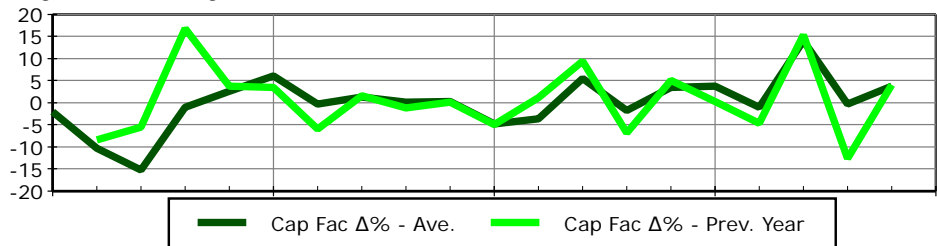
$\Delta\%$  -  $\Delta\%$  -  
Ave. Prev. Year

Max: 14.1 16.8

Min: -15.3 -12.6

Ave: - 0.6

StdDev: 6.1 7.7

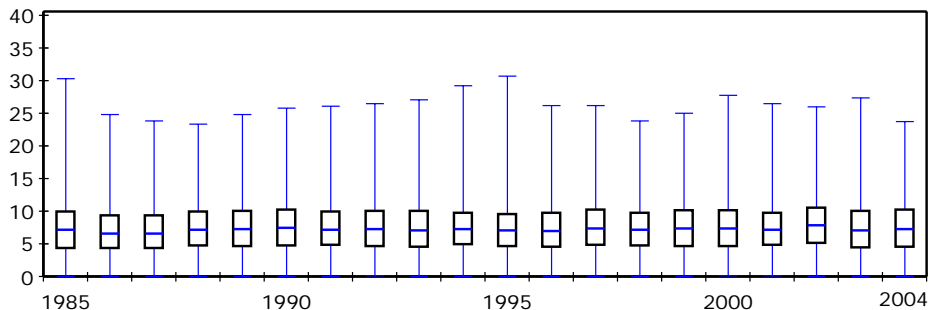


Intra-Annual Variability of Windspeed @ 75m (m/s)

Max: 30.72  
Min: 0.00  
Ave: 7.58

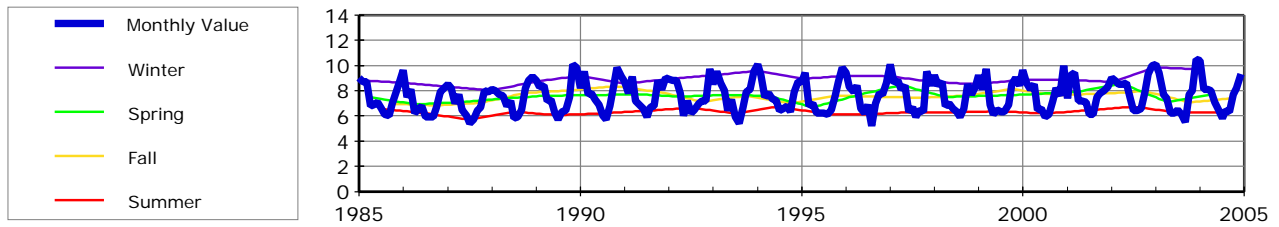
Box plots show statistics of hourly windspeed data for each year

Max  
75th per.  
Median  
25th per.  
Min



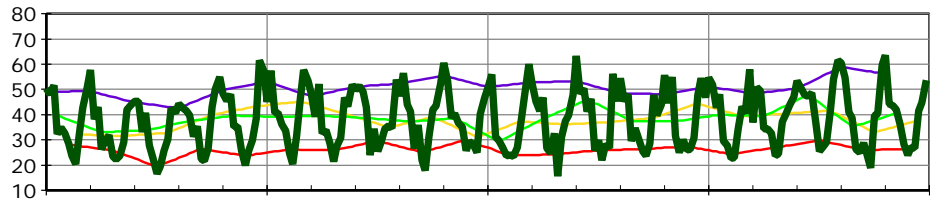
Station: Isle of Shoals, NH

Average Seasonal Windspeed @ 75m (m/s)



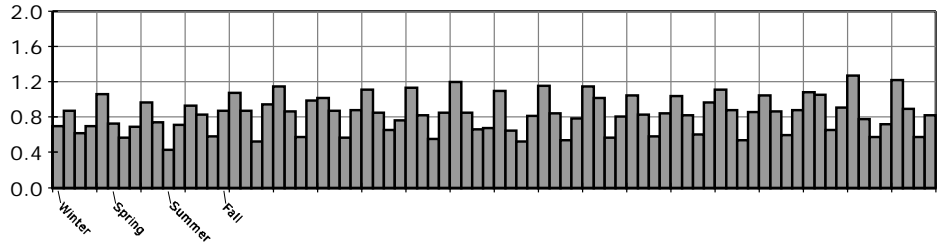
Seasonal Capacity Factor (%)

These two plots show monthly values and average seasonal values for windspeed and capacity factor



Seasonal Generation per Installed Megawatt (GWh/MW)

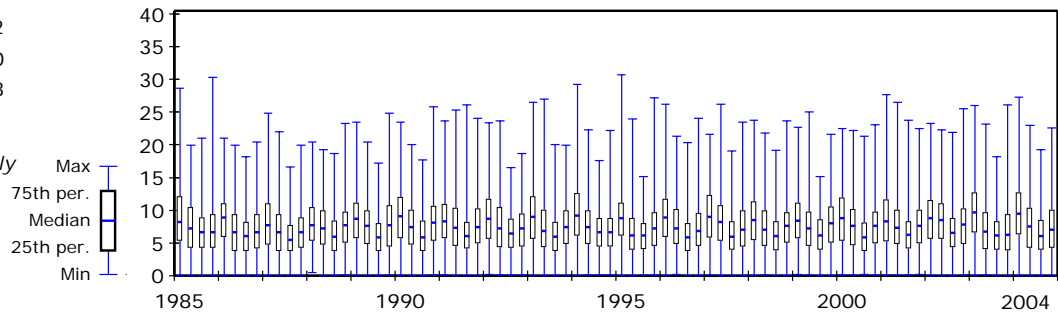
Electrical energy estimated from hourly windspeeds using power curve for GE 3.6s turbine with 111m diameter, then summed to seasonal values



Variability of Seasonal Windspeed @ 75m (m/s)

Max: 30.72  
Min: 0.00  
Ave: 7.58

Box plots show statistics of hourly windspeed data for each season



Year	Ave. Ann. Windspeed @ 75m (m/s)	Ann. Gen (GWh/MW)	Ann. Capacity Factor (%)	Ann. Revenue (000\$/MW)	Unit Revenue (¢/kWh)	Cap Fac Δ% - Ave.	Cap Fac Δ% - Prev. Year	Avoided Emissions per Installed Megawatt						
								SO2 (tonne)	SO2 (kg/MWh)	NOx (tonne)	NOx (kg/MWh)	CO2 (tonne)	CO2 (kg/MWh)	
1985	7.45	3.28	37.4			-2.1								
1986	7.10	3.00	34.3			-10.3	-8.4							
1987	7.00	2.84	32.4			-15.3	-5.5							
1988	7.48	3.32	37.8			-1.1	16.8							
1989	7.66	3.43	39.2			2.6	3.7							
1990	7.77	3.55	40.5			6.1	3.4							
1991	7.64	3.34	38.1			-0.3	-6.0							
1992	7.61	3.40	38.7			1.3	1.6							
1993	7.63	3.35	38.2	67.0	2.0	0.1	-1.2							
1994	7.66	3.35	38.3	66.0	2.0	0.2	0.1							
1995	7.42	3.19	36.4	68.0	2.1	-4.8	-5.0							
1996	7.50	3.23	36.8	76.0	2.4	-3.6	1.2							
1997	7.80	3.53	40.3	91.0	2.6	5.5	9.4							
1998	7.51	3.29	37.6	66.0	2.0	-1.7	-6.8	14.0	4.2	4.1	1.3	2,737	832	
1999	7.67	3.46	39.5	88.0	2.5	3.4	5.1	12.8	3.7	3.7	1.1	2,770	801	
2000	7.74	3.48	39.6	142.0	4.1	3.7	0.3	10.0	2.9	3.1	0.9	2,585	748	
2001	7.59	3.31	37.8	136.0	4.1	-1.1	-4.6	8.4	2.5	2.8	0.8	2,447	739	
2002	8.12	3.82	43.6	133.0	3.5	14.1	15.3	8.3	2.2	2.9	0.8	2,932	768	
2003	7.61	3.34	38.1	181.0	5.4	-0.3	-12.6							
2004	7.66	3.48	39.6	189.0	5.4	3.7	4.0							
Max:	8.12	3.82	43.6	189.0	5.4	14.1	16.8							
Min:	7.00	2.84	32.4	66.0	2.0	-15.3	-12.6							
Ave:	7.58	3.35	38.2	109.0	3.2	-	0.6							
StdDev:	0.24	7.00	2.3	46.0	1.3	6.1	7.7							



Station: Logan

Location: 42.4 N, 71.0 W

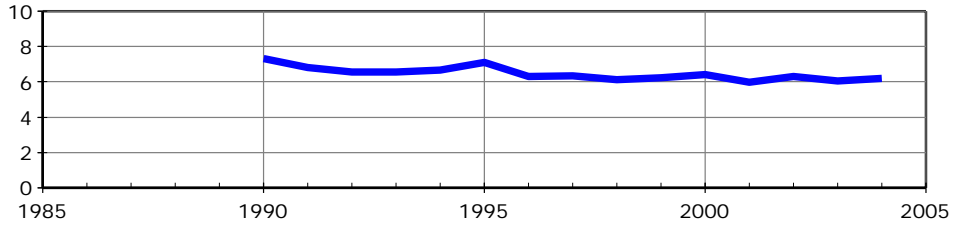
Depth: 0 m (0 ft)

Distance from Shore: 0 nm (0 mi)

Average Annual Windspeed @ 75m (m/s)

Max: 7.30 Ave: 6.46  
Min: 5.99 StdDev: 0.38

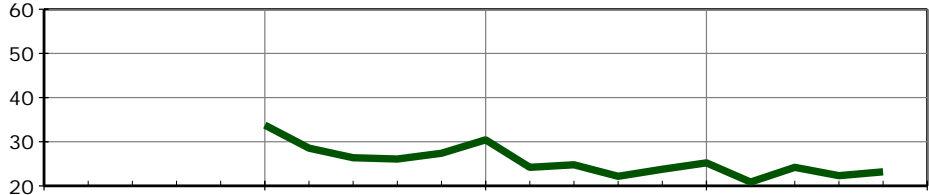
Averaged from hourly wind data measured at 8m and scaled to hub height of 75m using Log Law (.2mm roughness length)



Annual Capacity Factor (%)

Max: 33.8 Ave: 25.5  
Min: 20.8 StdDev: 3.4

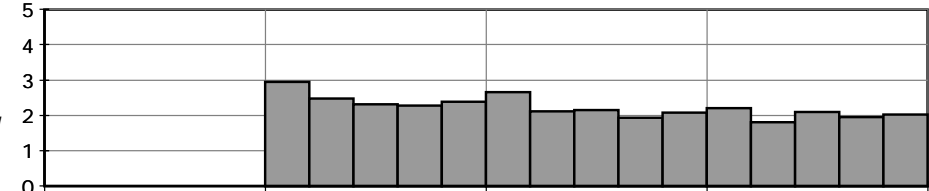
Annual estimated generation expressed as a percentage of maximum output from installed capacity operating for all hours in a given period



Annual Generation per Installed Megawatt (GWh/MWi)

Max: 2.96 Ave: 2.24  
Min: 1.82 StdDev: 16.0

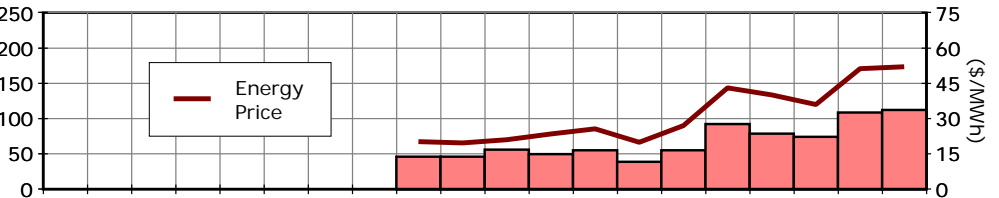
Electrical energy estimated from hourly windspeeds using power curve for GE 3.6s turbine with 111m diameter



Annual Revenue from Sales of Electricity per Installed Megawatt (000\$/MWi)

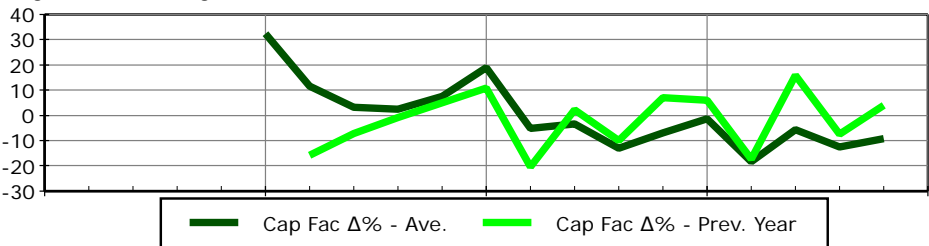
Max: 113.0 Ave: 68.0  
Min: 39.0 StdDev: 25.0

Calculated using estimated generation and historical ISO-NE hourly energy prices



Annual Capacity Factor Percent Changes - from Average and from Previous Year (%)

$\Delta\%$  -  $\Delta\%$  -  
Ave. Prev. Year  
Max: 32.3 15.9  
Min: -18.5 -20.4  
Ave: - -2.1  
StdDev: 13.3 11.2

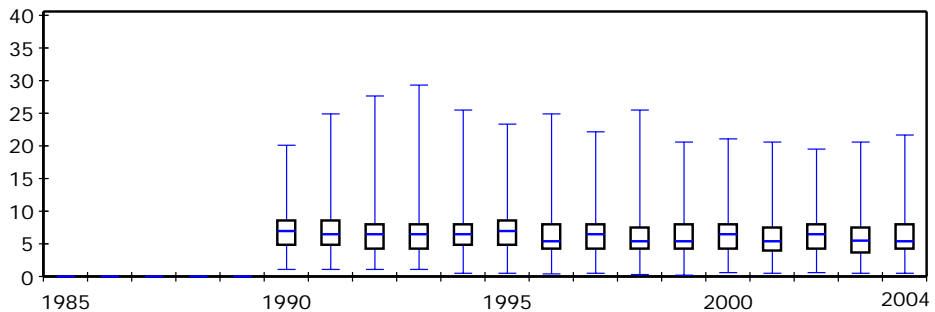


Intra-Annual Variability of Windspeed @ 75m (m/s)

Max: 29.27  
Min: 0.17  
Ave: 6.46

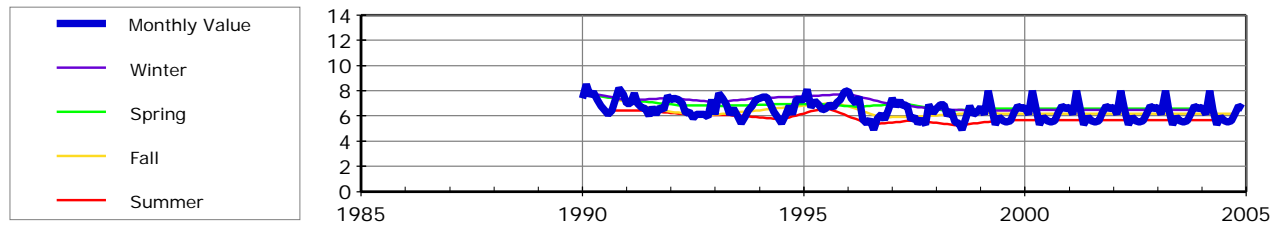
Box plots show statistics of hourly windspeed data for each year

Max  
75th per.  
Median  
25th per.  
Min



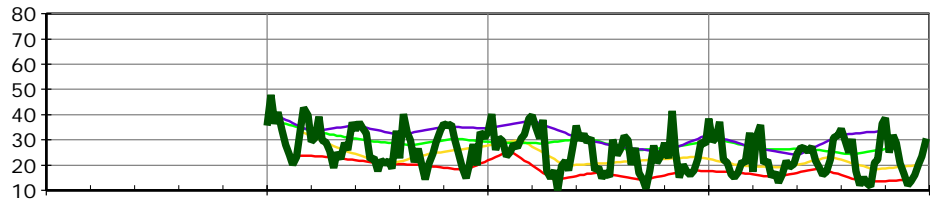
Station: Logan

Average Seasonal Windspeed @ 75m (m/s)



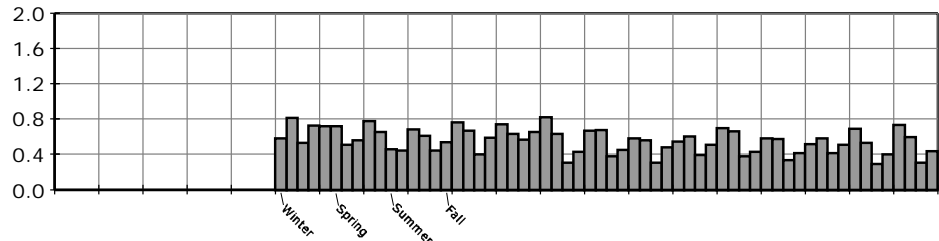
Seasonal Capacity Factor (%)

These two plots show monthly values and average seasonal values for windspeed and capacity factor



Seasonal Generation per Installed Megawatt (GWh/MW)

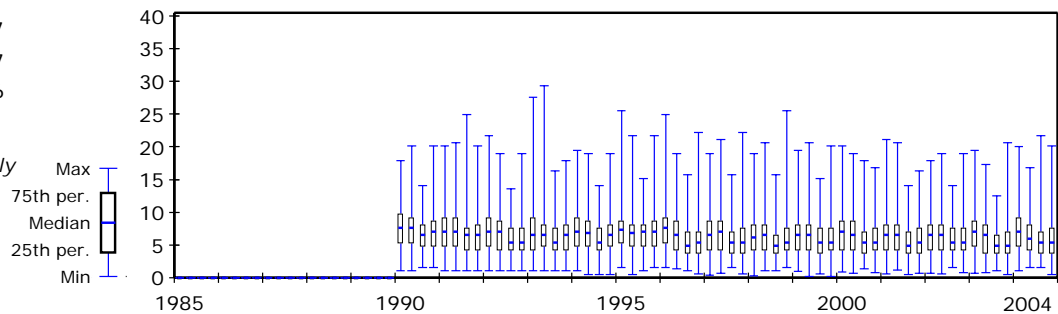
Electrical energy estimated from hourly windspeeds using power curve for GE 3.6s turbine with 111m diameter, then summed to seasonal values



Variability of Seasonal Windspeed @ 75m (m/s)

Max: 29.27  
Min: 0.17  
Ave: 6.46

Box plots show statistics of hourly windspeed data for each season



Year	Ave. Ann. Windspeed @ 75m (m/s)	Ann. Gen (GWh/MWi)	Ann. Capacity Factor (%)	Ann. Revenue (000\$/MWi)	Unit Revenue (¢/kWh)	Cap Fac Δ% - Ave.	Cap Fac Δ% - Prev. Year	Avoided Emissions per Installed Megawatt					
								SO2 (tonne)	SO2 (kg/MWh)	NOx (tonne)	NOx (kg/MWh)	CO2 (tonne)	CO2 (kg/MWh)
1985													
1986													
1987													
1988													
1989													
1990	7.30	2.96	33.8			32.3							
1991	6.80	2.49	28.5			11.5	-15.8						
1992	6.57	2.32	26.4			3.3	-7.3						
1993	6.56	2.29	26.1	47.0	2.0	2.4	-0.9						
1994	6.68	2.40	27.4	47.0	2.0	7.4	4.9						
1995	7.09	2.66	30.4	57.0	2.2	18.9	10.7						
1996	6.29	2.12	24.2	50.0	2.4	-5.3	-20.4						
1997	6.35	2.16	24.7	56.0	2.6	-3.3	2.1						
1998	6.11	1.94	22.2	39.0	2.0	-13.1	-10.1	8.2	4.2	2.4	1.3	1,612	829
1999	6.24	2.08	23.8	56.0	2.7	-6.9	7.1	7.7	3.7	2.2	1.1	1,658	797
2000	6.40	2.21	25.2	93.0	4.2	-1.3	6.1	6.4	2.9	2.0	0.9	1,651	752
2001	5.99	1.82	20.8	79.0	4.3	-18.5	-17.4	4.6	2.5	1.5	0.8	1,337	733
2002	6.32	2.11	24.1	75.0	3.6	-5.6	15.9	4.5	2.1	1.6	0.8	1,613	764
2003	6.04	1.96	22.3	109.0	5.6	-12.6	-7.4						
2004	6.19	2.04	23.2	113.0	5.5	-9.2	3.9						
Max:	7.30	2.96	33.8	113.0	5.6	32.3	15.9						
Min:	5.99	1.82	20.8	39.0	2.0	-18.5	-20.4						
Ave:	6.46	2.24	25.5	68.0	3.3	-	-2.1						
StdDev:	0.38	16.00	3.4	25.0	1.4	13.3	11.2						



Station: Long Island

Location: 40.3 N, 73.2 W

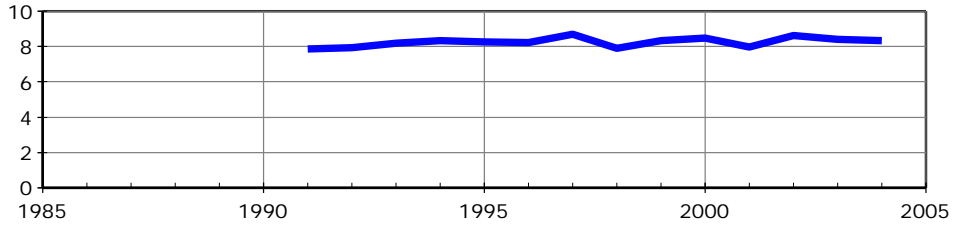
Depth: 40 m (131 ft)

Distance from Shore: 30 nm (35 mi)

Average Annual Windspeed @ 75m (m/s)

Max: 8.71 Ave: 8.26  
Min: 7.86 StdDev: 0.27

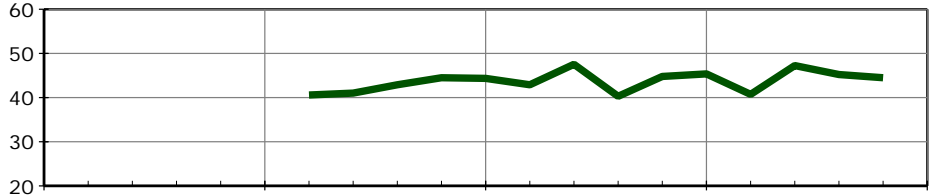
Averaged from hourly wind data measured at 5m and scaled to hub height of 75m using Log Law (.2mm roughness length)



Annual Capacity Factor (%)

Max: 47.5 Ave: 43.7  
Min: 40.3 StdDev: 2.4

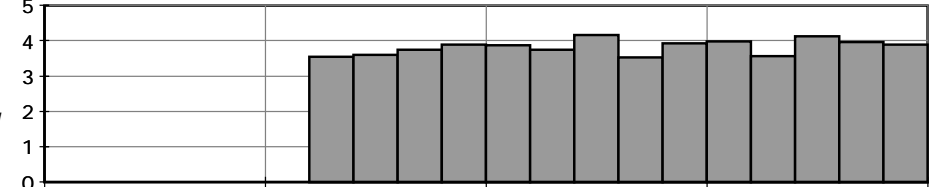
Annual estimated generation expressed as a percentage of maximum output from installed capacity operating for all hours in a given period



Annual Generation per Installed Megawatt (GWh/MW)

Max: 4.16 Ave: 3.83  
Min: 3.53 StdDev: 6.00

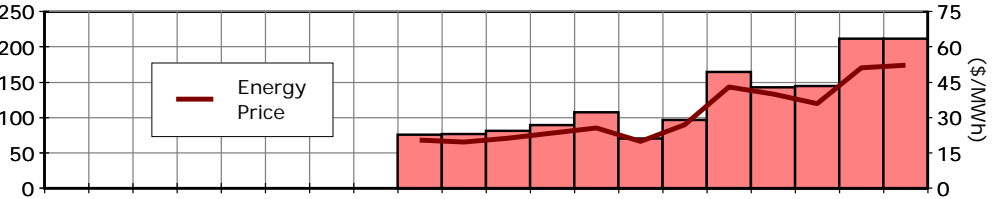
Electrical energy estimated from hourly windspeeds using power curve for GE 3.6s turbine with 111m diameter



Annual Revenue from Sales of Electricity per Installed Megawatt (000\$/MW)

Max: 212.0 Ave: 123.0  
Min: 71.0 StdDev: 51.0

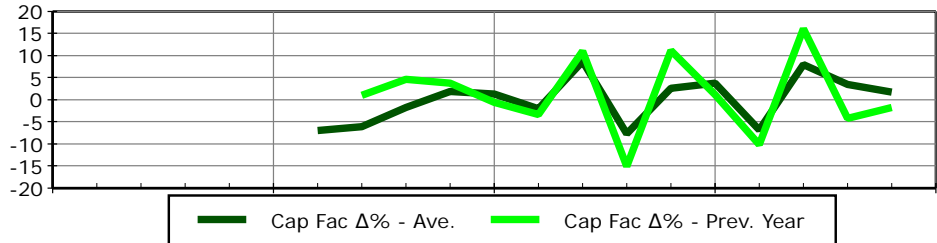
Calculated using estimated generation and historical ISO-NE hourly energy prices



Annual Capacity Factor Percent Changes - from Average and from Previous Year (%)

$\Delta\%$  -  $\Delta\%$  -  
Ave. Prev. Year

Max: 8.7 16.0  
Min: -7.7 -15.1  
Ave: - 1.0  
StdDev: 5.4 8.6

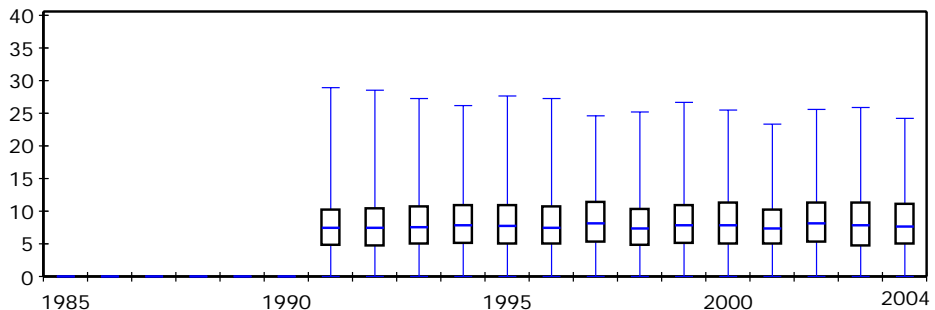


Intra-Annual Variability of Windspeed @ 75m (m/s)

Max: 28.90  
Min: 0.00  
Ave: 8.26

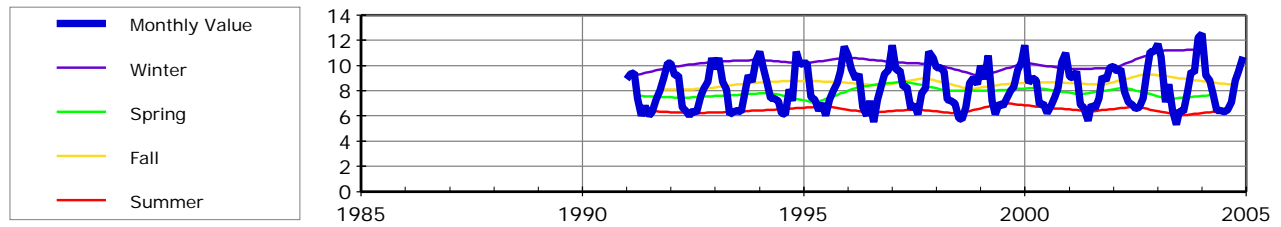
Box plots show statistics of hourly windspeed data for each year

Max  
75th per.  
Median  
25th per.  
Min



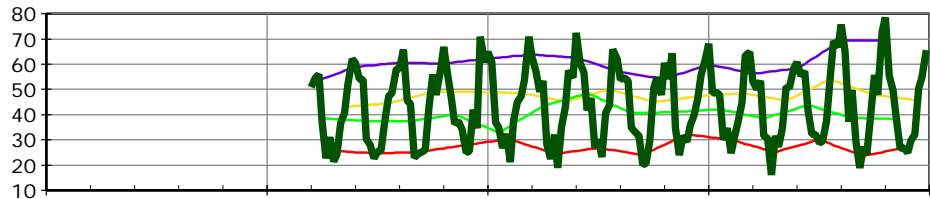
Station: Long Island

Average Seasonal Windspeed @ 75m (m/s)



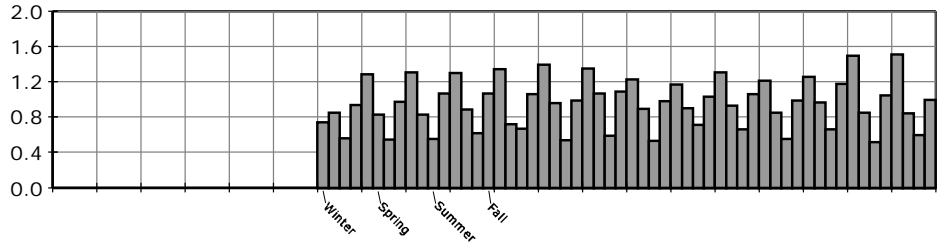
Seasonal Capacity Factor (%)

These two plots show monthly values and average seasonal values for windspeed and capacity factor



Seasonal Generation per Installed Megawatt (GWh/MW)

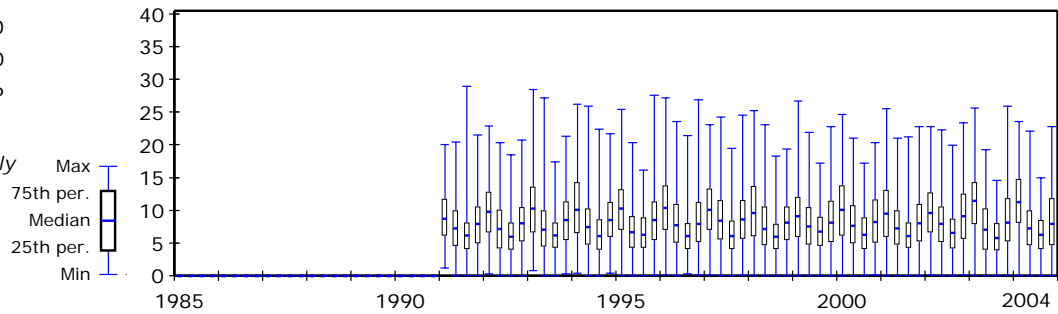
Electrical energy estimated from hourly windspeeds using power curve for GE 3.6s turbine with 111m diameter, then summed to seasonal values



Variability of Seasonal Windspeed @ 75m (m/s)

Max: 28.90  
Min: 0.00  
Ave: 8.26

Box plots show statistics of hourly windspeed data for each season



Year	Ave. Ann. Windspeed @ 75m (m/s)	Ann. Gen (GWh/MWi)	Ann. Capacity Factor (%)	Ann. Revenue (000\$/MWi)	Unit Revenue (¢/kWh)	Cap Fac Δ% - Ave.	Cap Fac Δ% - Prev. Year	Avoided Emissions per Installed Megawatt					
								SO2 (tonne)	SO2 (kg/MWh)	NOx (tonne)	NOx (kg/MWh)	CO2 (tonne)	CO2 (kg/MWh)
1985													
1986													
1987													
1988													
1989													
1990													
1991	7.86	3.56	40.6			-7.0	1.0						
1992	7.95	3.60	41.0			-6.1	4.6						
1993	8.18	3.76	42.9	76.0	2.0	-1.8	3.7						
1994	8.35	3.90	44.5	77.0	2.0	1.9	11.0						
1995	8.27	3.88	44.3	82.0	2.1	1.3	-0.6						
1996	8.22	3.76	42.8	90.0	2.4	-2.0	-3.3						
1997	8.71	4.16	47.5	108.0	2.6	8.7	11.0						
1998	7.90	3.53	40.3	71.0	2.0	-7.7	-15.1	15.1	4.3	4.4	1.3	2,943	833
1999	8.35	3.93	44.8	97.0	2.5	2.6	11.2	14.7	3.7	4.2	1.1	3,139	799
2000	8.49	3.98	45.3	165.0	4.2	3.7	1.1	11.3	2.9	3.5	0.9	2,943	744
2001	7.96	3.57	40.7	143.0	4.0	-6.9	-10.2	9.2	2.6	3.0	0.9	2,629	738
2002	8.62	4.13	47.2	145.0	3.5	8.0	16.0	9.0	2.2	3.2	0.8	3,170	767
2003	8.42	3.96	45.2	212.0	5.4	3.5	-4.2						
2004	8.33	3.90	44.4	212.0	5.4	1.7	-1.7						
Max:	8.71	4.16	47.5	212.0	5.4	8.7	16.0						
Min:	7.86	3.53	40.3	71.0	2.0	-7.7	-15.1						
Ave:	8.26	3.83	43.7	123.0	3.2	-	1.0						
StdDev:	0.27	6.00	2.4	51.0	1.3	5.4	8.6						



Station: *Matinicus Rock, ME*

Location: 43.8 N, 68.9 W

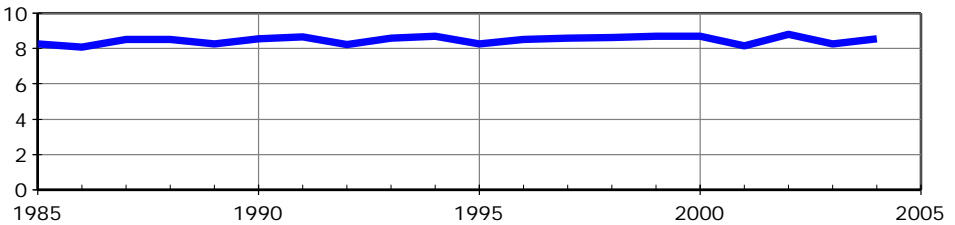
Depth: 0 m (0 ft)

Distance from Shore: 4 nm (5 mi)

Average Annual Windspeed @ 75m (m/s)

Max: 8.79 Ave: 8.47  
Min: 8.07 StdDev: 0.21

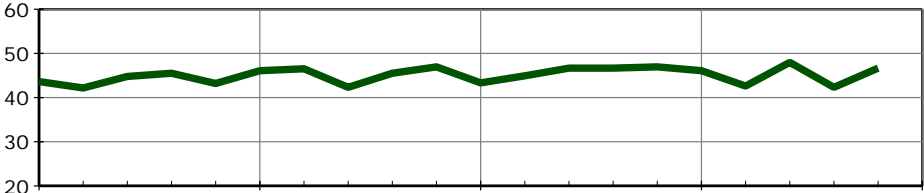
Averaged from hourly wind data measured at 33m and scaled to hub height of 75m using Log Law (.2mm roughness length)



Annual Capacity Factor (%)

Max: 48.0 Ave: 45.0  
Min: 42.2 StdDev: 1.9

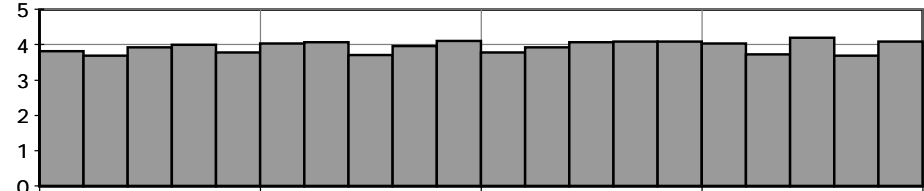
Annual estimated generation expressed as a percentage of maximum output from installed capacity operating for all hours in a given period



Annual Generation per Installed Megawatt (GWh/MWi)

Max: 4.20 Ave: 3.95  
Min: 3.70 StdDev: 4.00

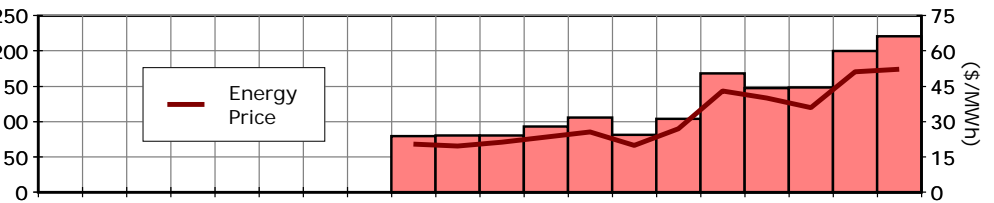
Electrical energy estimated from hourly windspeeds using power curve for GE 3.6s turbine with 111m diameter



Annual Revenue from Sales of Electricity per Installed Megawatt (000\$/MWi)

Max: 221.0 Ave: 126.0  
Min: 80.0 StdDev: 50.0

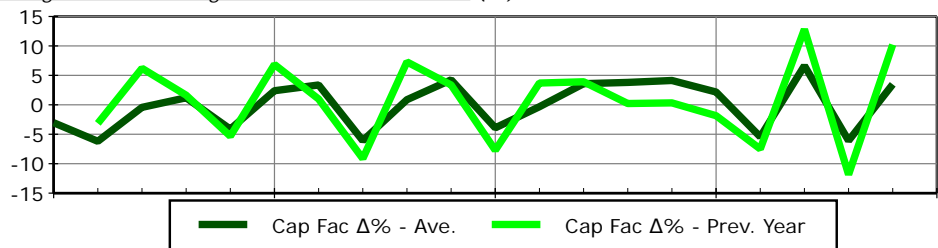
Calculated using estimated generation and historical ISO-NE hourly energy prices



Annual Capacity Factor Percent Changes - from Average and from Previous Year (%)

$\Delta\%$  -  $\Delta\%$  -  
Ave. Prev. Year

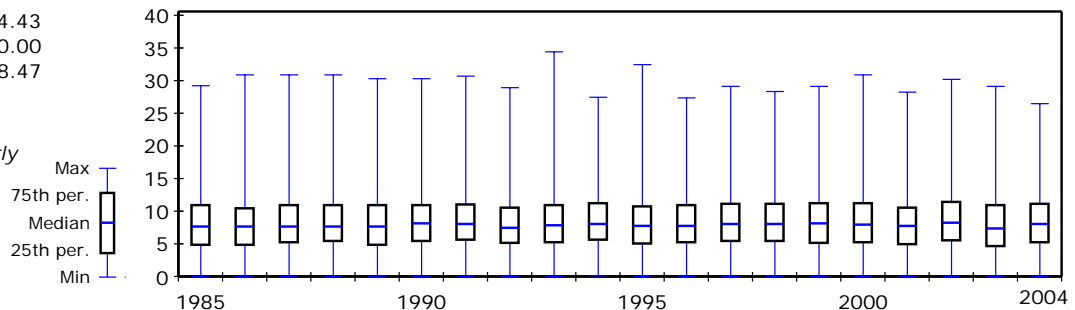
Max: 6.6 12.8  
Min: -6.2 -11.9  
Ave: - 0.6  
StdDev: 4.1 6.8



Intra-Annual Variability of Windspeed @ 75m (m/s)

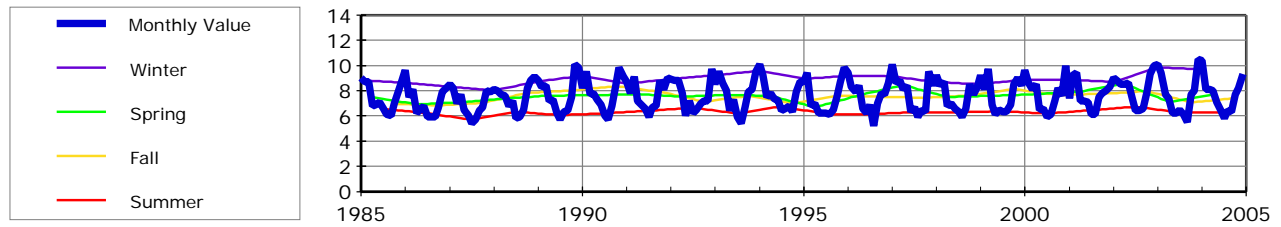
Max: 34.43  
Min: 0.00  
Ave: 8.47

Box plots show statistics of hourly windspeed data for each year



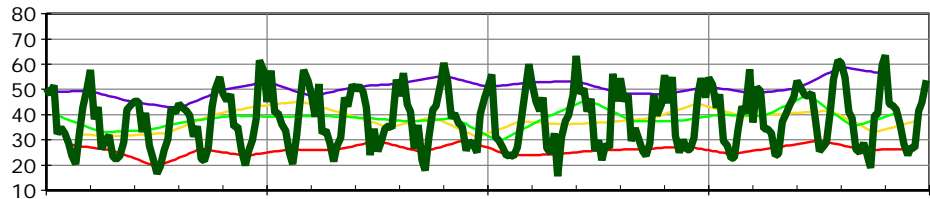
Station: Matinicus Rock, ME

Average Seasonal Windspeed @ 75m (m/s)



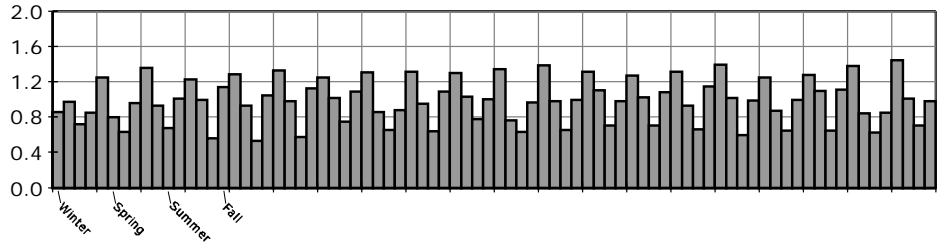
Seasonal Capacity Factor (%)

These two plots show monthly values and average seasonal values for windspeed and capacity factor



Seasonal Generation per Installed Megawatt (GWh/MW)

Electrical energy estimated from hourly windspeeds using power curve for GE 3.6s turbine with 111m diameter, then summed to seasonal values

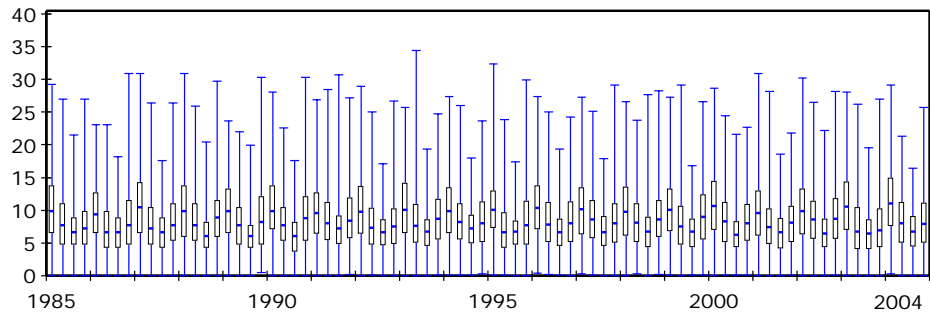


Variability of Seasonal Windspeed @ 75m (m/s)

Max: 34.43  
Min: 0.00  
Ave: 8.47

Box plots show statistics of hourly windspeed data for each season

Max  
75th per.  
Median  
25th per.  
Min



Year	Ave. Ann. Windspeed @ 75m (m/s)	Ann. Gen (GWh/MW)	Ann. Capacity Factor (%)	Ann. Revenue (000\$/MW)	Unit Revenue (¢/kWh)	Cap Fac Δ% - Ave.	Cap Fac Δ% - Prev. Year	Avoided Emissions per Installed Megawatt					
								SO2 (tonne)	SO2 (kg/MWh)	NOx (tonne)	NOx (kg/MWh)	CO2 (tonne)	CO2 (kg/MWh)
1985	8.26	3.82	43.6			-3.1							
1986	8.07	3.70	42.2			-6.2	-3.2						
1987	8.50	3.93	44.8			-0.4	6.2						
1988	8.52	4.00	45.5			1.2	1.6						
1989	8.26	3.78	43.1			-4.2	-5.3						
1990	8.54	4.04	46.1			2.4	6.8						
1991	8.67	4.07	46.5			3.3	1.0						
1992	8.21	3.71	42.3			-6.1	-9.1						
1993	8.58	3.97	45.4	80.0	2.0	0.8	7.3						
1994	8.68	4.11	46.9	81.0	2.0	4.2	3.4						
1995	8.26	3.79	43.3	81.0	2.1	-3.9	-7.7						
1996	8.53	3.94	44.9	93.0	2.4	-0.3	3.7						
1997	8.59	4.08	46.6	106.0	2.6	3.6	3.9						
1998	8.64	4.09	46.7	82.0	2.0	3.8	0.2	17.4	4.2	5.1	1.3	3,403	831
1999	8.69	4.11	46.9	104.0	2.5	4.1	0.3	15.3	3.7	4.4	1.1	3,286	800
2000	8.70	4.04	46.0	169.0	4.2	2.2	-1.9	11.6	2.9	3.6	0.9	2,998	746
2001	8.15	3.73	42.6	148.0	4.0	-5.5	-7.5	9.6	2.6	3.2	0.9	2,753	739
2002	8.79	4.20	48.0	149.0	3.5	6.6	12.8	9.2	2.2	3.2	0.8	3,226	767
2003	8.27	3.70	42.3	200.0	5.4	-6.1	-11.9						
2004	8.55	4.09	46.6	221.0	5.4	3.5	10.2						
Max:	8.79	4.20	48.0	221.0	5.4	6.6	12.8						
Min:	8.07	3.70	42.2	80.0	2.0	-6.2	-11.9						
Ave:	8.47	3.95	45.0	126.0	3.2	-	0.6						
StdDev:	0.21	4.00	1.9	50.0	1.3	4.1	6.8						





Station: Mt. Desert Rock, ME

Location: 44.0 N, 68.1 W

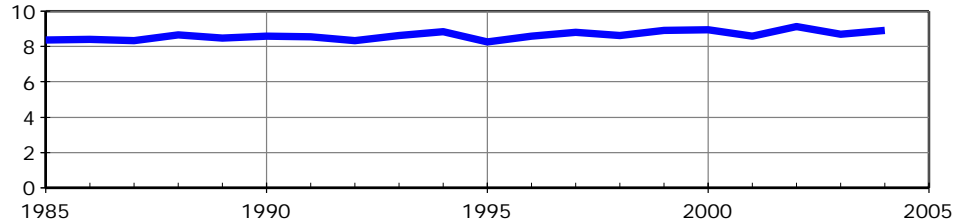
Depth: 0 m (0 ft)

Distance from Shore: 20 nm (23 mi)

Average Annual Windspeed @ 75m (m/s)

Max: 9.12 Ave: 8.63  
Min: 8.25 StdDev: 0.23

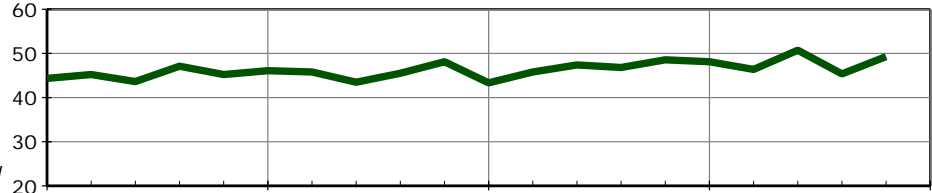
Averaged from hourly wind data measured at 32m and scaled to hub height of 75m using Log Law (.2mm roughness length)



Annual Capacity Factor (%)

Max: 50.7 Ave: 46.3  
Min: 43.3 StdDev: 2.0

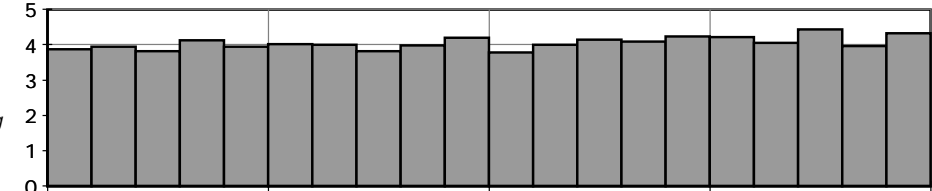
Annual estimated generation expressed as a percentage of maximum output from installed capacity operating for all hours in a given period



Annual Generation per Installed Megawatt (GWh/MWi)

Max: 4.44 Ave: 4.06  
Min: 3.80 StdDev: 5.00

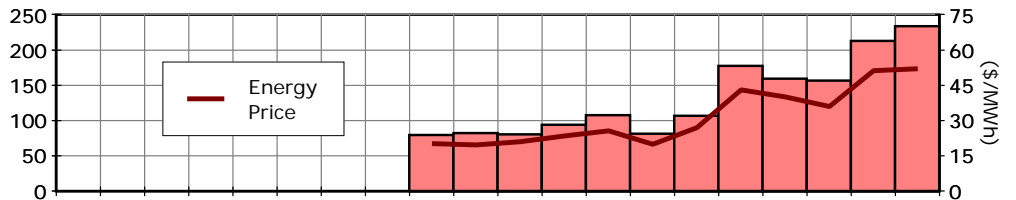
Electrical energy estimated from hourly windspeeds using power curve for GE 3.6s turbine with 111m diameter



Annual Revenue from Sales of Electricity per Installed Megawatt (000\$/MWi)

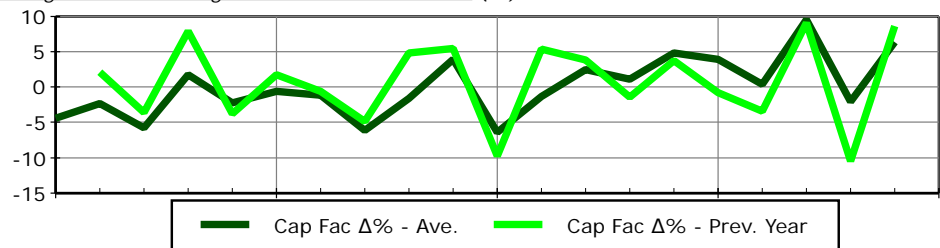
Max: 234.0 Ave: 131.0  
Min: 80.0 StdDev: 55.0

Calculated using estimated generation and historical ISO-NE hourly energy prices



Annual Capacity Factor Percent Changes - from Average and from Previous Year (%)

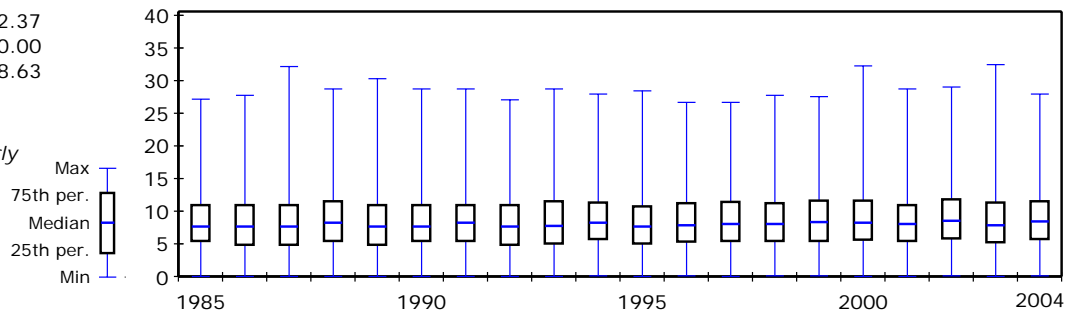
$\Delta\%$  -  $\Delta\%$  -  
Ave. Prev. Year  
Max: 9.5 9.1  
Min: -6.4 -10.5  
Ave: - 0.7  
StdDev: 4.3 5.8



Intra-Annual Variability of Windspeed @ 75m (m/s)

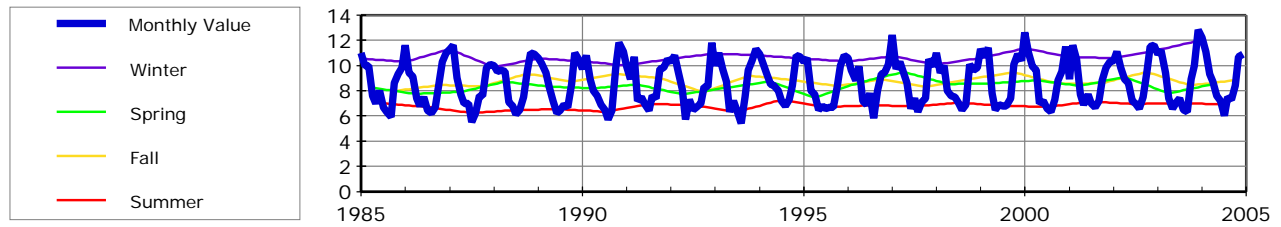
Max: 32.37  
Min: 0.00  
Ave: 8.63

Box plots show statistics of hourly windspeed data for each year



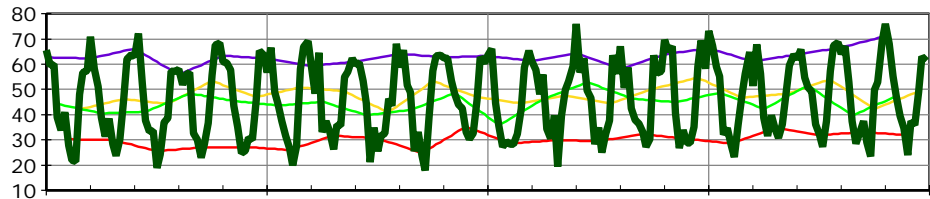
Station: Mt. Desert Rock, ME

Average Seasonal Windspeed @ 75m (m/s)



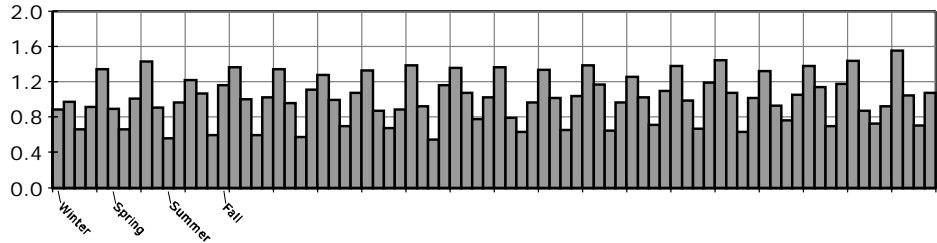
Seasonal Capacity Factor (%)

These two plots show monthly values and average seasonal values for windspeed and capacity factor



Seasonal Generation per Installed Megawatt (GWh/MW)

Electrical energy estimated from hourly windspeeds using power curve for GE 3.6s turbine with 111m diameter, then summed to seasonal values

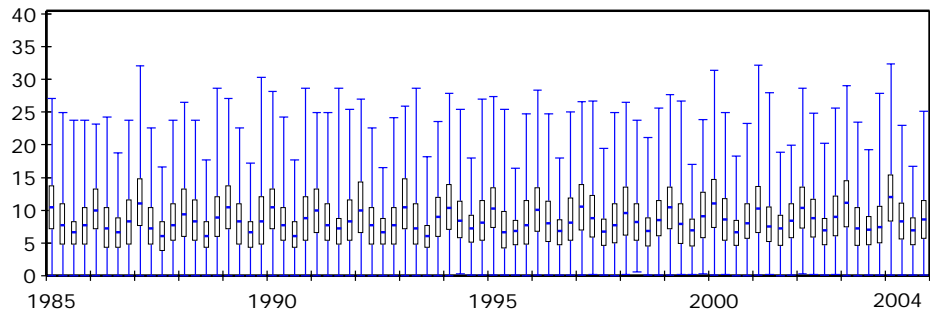


Variability of Seasonal Windspeed @ 75m (m/s)

Max: 32.37  
Min: 0.00  
Ave: 8.63

Box plots show statistics of hourly windspeed data for each season

Max  
75th per.  
Median  
25th per.  
Min



Year	Ave. Ann. Windspeed @ 75m (m/s)	Ann. Gen (GWh/MW)	Ann. Capacity Factor (%)	Ann. Revenue (000\$/MW)	Unit Revenue (¢/kWh)	Cap Fac Δ% - Ave.	Cap Fac Δ% - Prev. Year	Avoided Emissions per Installed Megawatt					
								SO2 (tonne)	SO2 (kg/MWh)	NOx (tonne)	NOx (kg/MWh)	CO2 (tonne)	CO2 (kg/MWh)
1985	8.36	3.88	44.3			-4.4							
1986	8.39	3.96	45.2			-2.3	2.1						
1987	8.33	3.82	43.6			-5.8	-3.6						
1988	8.65	4.13	47.0			1.7	7.9						
1989	8.49	3.96	45.2			-2.2	-3.8						
1990	8.58	4.03	46.0			-0.6	1.7						
1991	8.55	4.01	45.7			-1.2	-0.6						
1992	8.34	3.82	43.5			-6.1	-4.9						
1993	8.61	3.99	45.5	80.0	2.0	-1.6	4.8						
1994	8.85	4.21	48.1	83.0	2.0	3.9	5.5						
1995	8.25	3.80	43.3	81.0	2.1	-6.4	-9.8						
1996	8.60	4.01	45.7	95.0	2.4	-1.3	5.4						
1997	8.80	4.15	47.4	108.0	2.6	2.5	3.8						
1998	8.63	4.10	46.8	82.0	2.0	1.1	-1.4	17.4	4.2	5.1	1.3	3,405	831
1999	8.90	4.25	48.5	107.0	2.5	4.8	3.7	16.0	3.8	4.6	1.1	3,406	802
2000	8.95	4.22	48.1	178.0	4.2	3.9	-0.8	12.2	2.9	3.8	0.9	3,134	746
2001	8.57	4.07	46.4	160.0	3.9	0.4	-3.4	10.4	2.6	3.5	0.9	3,007	739
2002	9.12	4.44	50.7	157.0	3.5	9.5	9.1	9.6	2.2	3.4	0.8	3,402	767
2003	8.70	3.97	45.3	213.0	5.4	-2.1	-10.5						
2004	8.90	4.32	49.2	234.0	5.4	6.4	8.6						
Max:	9.12	4.44	50.7	234.0	5.4	9.5	9.1						
Min:	8.25	3.80	43.3	80.0	2.0	-6.4	-10.5						
Ave:	8.63	4.06	46.3	131.0	3.2	-	0.7						
StdDev:	0.23	5.00	2.0	55.0	1.3	4.3	5.8						



Station: Nantucket

Location: 40.5 N, 69.4 W

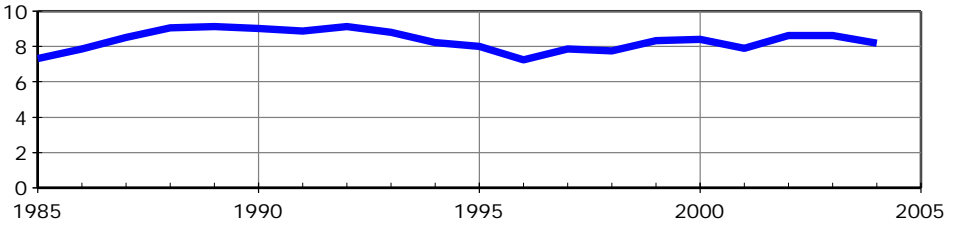
Depth: 60 m (197 ft)

Distance from Shore: 50 nm (58 mi)

Average Annual Windspeed @ 75m (m/s)

Max: 9.12 Ave: 8.34  
Min: 7.25 StdDev: 0.57

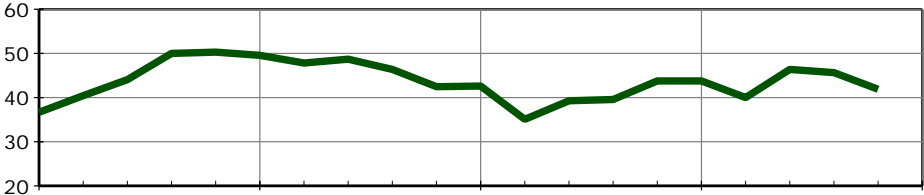
Averaged from hourly wind data measured at 5m and scaled to hub height of 75m using Log Law (.2mm roughness length)



Annual Capacity Factor (%)

Max: 50.2 Ave: 43.7  
Min: 35.1 StdDev: 4.4

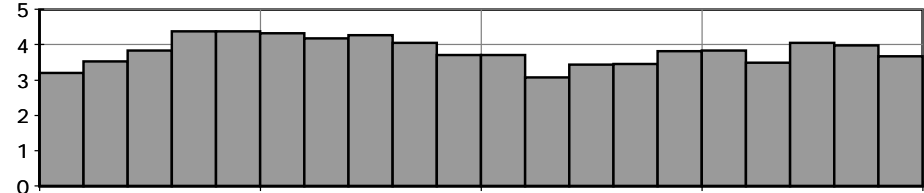
Annual estimated generation expressed as a percentage of maximum output from installed capacity operating for all hours in a given period



Annual Generation per Installed Megawatt (GWh/MWi)

Max: 4.39 Ave: 3.83  
Min: 3.09 StdDev: 0.38

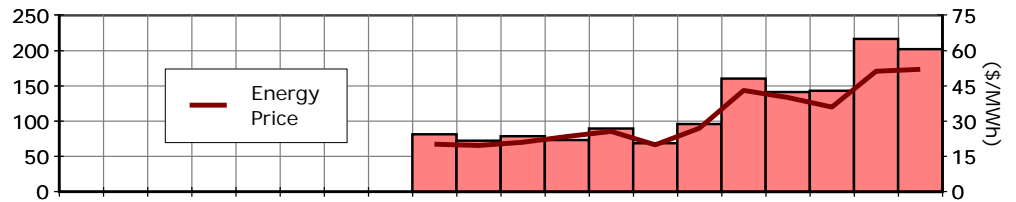
Electrical energy estimated from hourly windspeeds using power curve for GE 3.6s turbine with 111m diameter



Annual Revenue from Sales of Electricity per Installed Megawatt (000\$/MWi)

Max: 217.0 Ave: 119.0  
Min: 69.0 StdDev: 52.0

Calculated using estimated generation and historical ISO-NE hourly energy prices

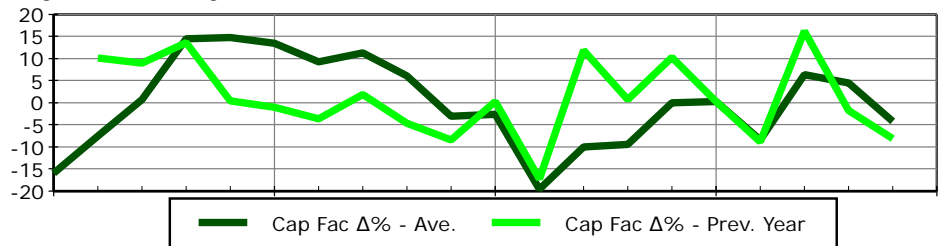


Annual Capacity Factor Percent Changes - from Average and from Previous Year (%)

$\Delta\%$  -  $\Delta\%$  -  
Ave. Prev. Year

Max: 14.8 16.2  
Min: -19.6 -17.3

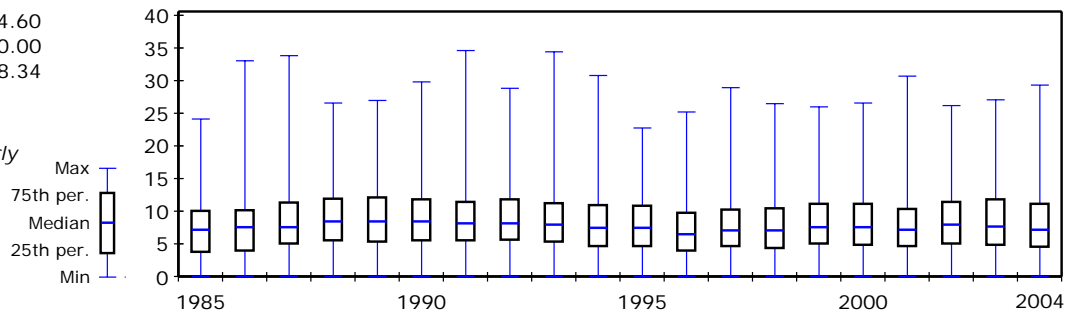
Ave: - 1.1  
StdDev: 10 8.9



Intra-Annual Variability of Windspeed @ 75m (m/s)

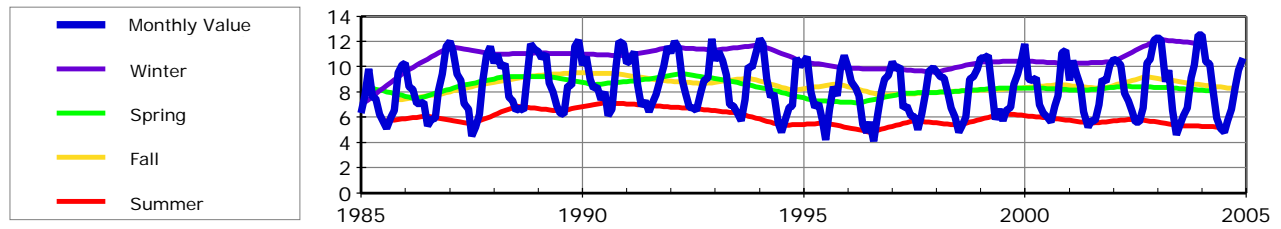
Max: 34.60  
Min: 0.00  
Ave: 8.34

Box plots show statistics of hourly windspeed data for each year



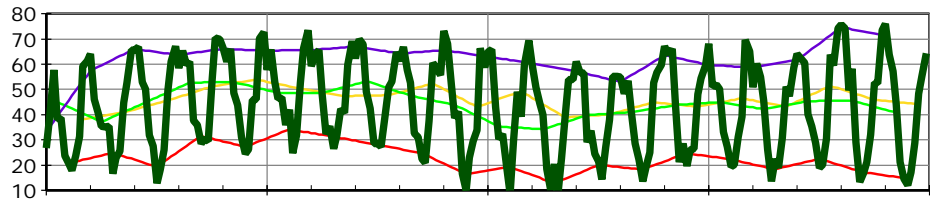
Station: Nantucket

Average Seasonal Windspeed @ 75m (m/s)



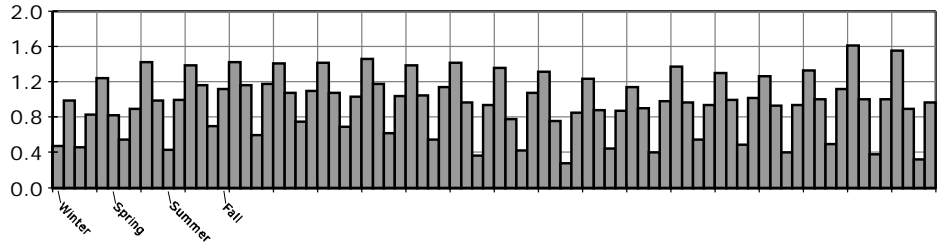
Seasonal Capacity Factor (%)

These two plots show monthly values and average seasonal values for windspeed and capacity factor



Seasonal Generation per Installed Megawatt (GWh/MW)

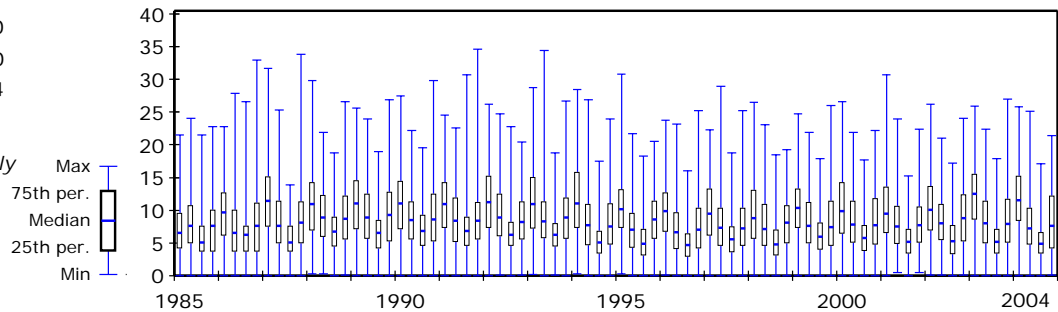
Electrical energy estimated from hourly windspeeds using power curve for GE 3.6s turbine with 111m diameter, then summed to seasonal values



Variability of Seasonal Windspeed @ 75m (m/s)

Max: 34.60  
Min: 0.00  
Ave: 8.34

Box plots show statistics of hourly windspeed data for each season



Year	Ave. Ann. Windspeed @ 75m (m/s)	Ann. Gen (GWh/MWi)	Ann. Capacity Factor (%)	Ann. Revenue (000\$/MWi)	Unit Revenue (¢/kWh)	Cap Fac Δ% - Ave.	Cap Fac Δ% - Prev. Year	Avoided Emissions per Installed Megawatt					
								SO2 (tonne)	SO2 (kg/MWh)	NOx (tonne)	NOx (kg/MWh)	CO2 (tonne)	CO2 (kg/MWh)
1985	7.32	3.21	36.7			-16.0							
1986	7.85	3.54	40.4			-7.5	10.1						
1987	8.52	3.85	44.0			0.7	8.9						
1988	9.04	4.39	50.0			14.4	13.6						
1989	9.12	4.39	50.2			14.8	0.4						
1990	9.02	4.34	49.6			13.5	-1.1						
1991	8.87	4.18	47.8			9.3	-3.7						
1992	9.12	4.27	48.6			11.3	1.8						
1993	8.80	4.06	46.3	82.0	2.0	6.0	-4.7						
1994	8.23	3.71	42.4	73.0	2.0	-3.0	-8.5						
1995	8.01	3.72	42.5	79.0	2.1	-2.7	0.3						
1996	7.25	3.09	35.1	74.0	2.4	-19.6	-17.3						
1997	7.87	3.44	39.3	90.0	2.6	-10.0	11.9						
1998	7.74	3.47	39.6	69.0	2.0	-9.4	0.7	14.7	4.2	4.3	1.3	2,886	832
1999	8.33	3.83	43.7	96.0	2.5	0.0	10.3	14.4	3.8	4.1	1.1	3,067	802
2000	8.39	3.85	43.8	161.0	4.2	0.3	0.3	11.1	2.9	3.4	0.9	2,851	746
2001	7.91	3.50	39.9	142.0	4.1	-8.5	-8.8	9.1	2.6	3.0	0.9	2,582	738
2002	8.64	4.07	46.4	143.0	3.5	6.3	16.2	8.8	2.2	3.1	0.8	3,113	765
2003	8.64	3.99	45.6	217.0	5.4	4.4	-1.8						
2004	8.18	3.68	41.8	202.0	5.5	-4.2	-8.2						
Max:	9.12	4.39	50.2	217.0	5.5	14.8	16.2						
Min:	7.25	3.09	35.1	69.0	2.0	-19.6	-17.3						
Ave:	8.34	3.83	43.7	119.0	3.2	-	1.1						
StdDev:	0.57	0.38	4.4	52.0	1.3	10.0	8.9						



Station: *Portland*

Location: 43.5 N, 70.1 W

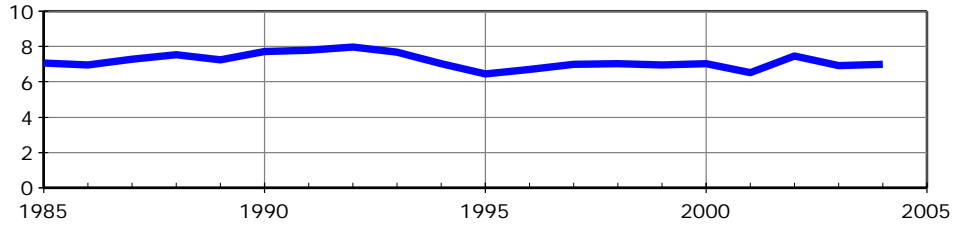
Depth: 20 m (66 ft)

Distance from Shore: 10 nm (12 mi)

Average Annual Windspeed @ 75m (m/s)

Max: 7.97 Ave: 7.16  
Min: 6.45 StdDev: 0.41

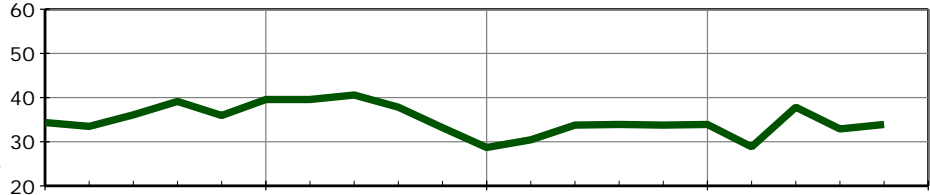
Averaged from hourly wind data measured at 5m and scaled to hub height of 75m using Log Law (.2mm roughness length)



Annual Capacity Factor (%)

Max: 40.6 Ave: 34.9  
Min: 28.6 StdDev: 3.5

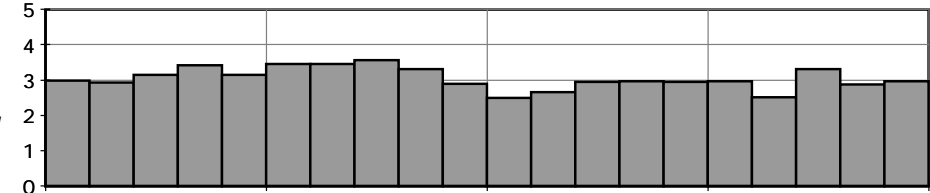
Annual estimated generation expressed as a percentage of maximum output from installed capacity operating for all hours in a given period



Annual Generation per Installed Megawatt (GWh/MWi)

Max: 3.57 Ave: 3.06  
Min: 2.50 StdDev: 12.0

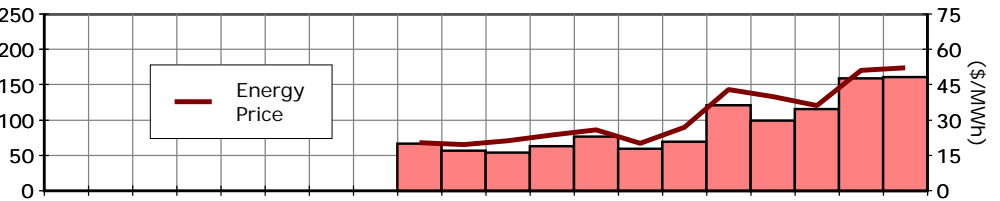
Electrical energy estimated from hourly windspeeds using power curve for GE 3.6s turbine with 111m diameter



Annual Revenue from Sales of Electricity per Installed Megawatt (000\$/MWi)

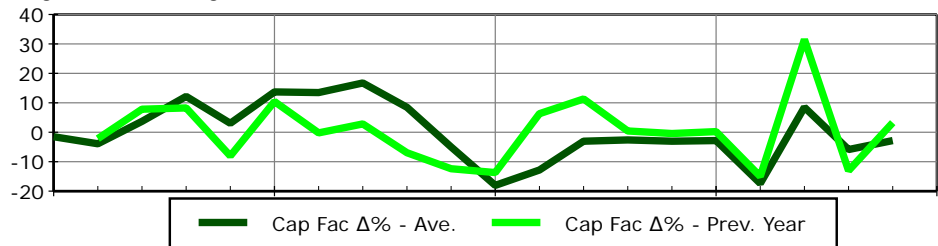
Max: 161.0 Ave: 92.0  
Min: 54.0 StdDev: 39.0

Calculated using estimated generation and historical ISO-NE hourly energy prices



Annual Capacity Factor Percent Changes - from Average and from Previous Year (%)

$\Delta\%$  -  $\Delta\%$  -  
Ave. Prev. Year  
Max: 16.6 31.4  
Min: -18.1 -15.0  
Ave: - 0.5  
StdDev: 9.9 11.2

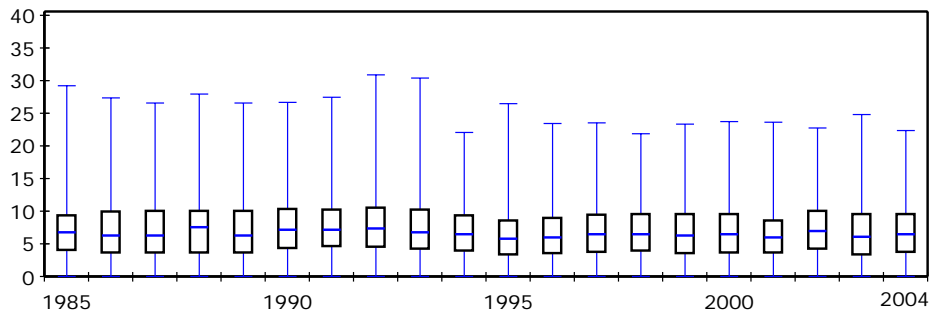


Intra-Annual Variability of Windspeed @ 75m (m/s)

Max: 30.93  
Min: 0.00  
Ave: 7.16

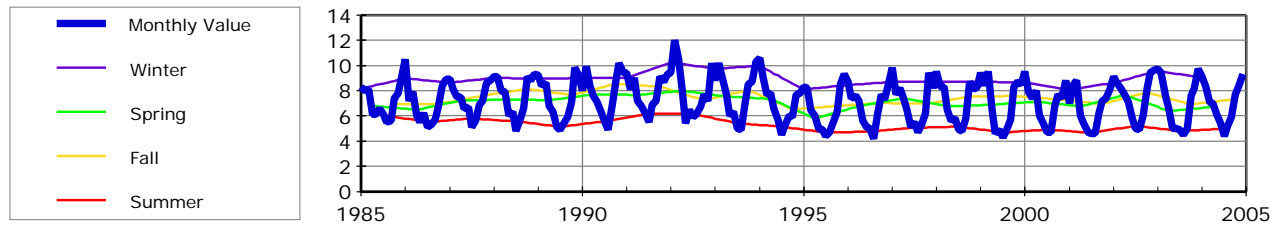
Box plots show statistics of hourly windspeed data for each year

Max  
75th per.  
Median  
25th per.  
Min



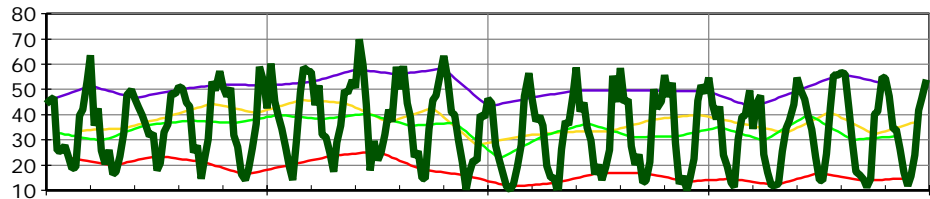
Station: Portland

Average Seasonal Windspeed @ 75m (m/s)



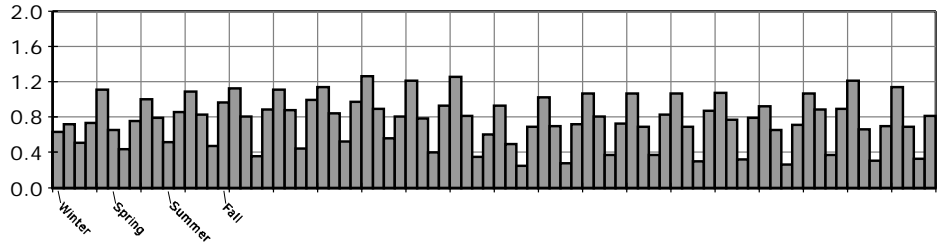
Seasonal Capacity Factor (%)

These two plots show monthly values and average seasonal values for windspeed and capacity factor



Seasonal Generation per Installed Megawatt (GWh/MW)

Electrical energy estimated from hourly windspeeds using power curve for GE 3.6s turbine with 111m diameter, then summed to seasonal values

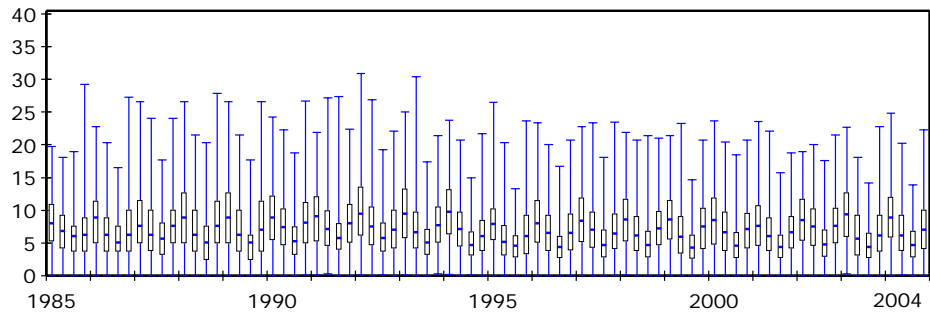


Variability of Seasonal Windspeed @ 75m (m/s)

Max: 30.93  
Min: 0.00  
Ave: 7.16

Box plots show statistics of hourly windspeed data for each season

Max  
75th per.  
Median  
25th per.  
Min



Year	Ave. Ann. Windspeed @ 75m (m/s)	Ann. Gen (GWh/MWi)	Ann. Capacity Factor (%)	Ann. Revenue (000\$/MWi)	Unit Revenue (¢/kWh)	Cap Fac Δ% - Ave.	Cap Fac Δ% - Prev. Year	Avoided Emissions per Installed Megawatt					
								SO2 (tonne)	SO2 (kg/MWh)	NOx (tonne)	NOx (kg/MWh)	CO2 (tonne)	CO2 (kg/MWh)
1985	7.06	3.00	34.3			-1.6	-3.9						
1986	6.96	2.93	33.5			3.6	7.9						
1987	7.29	3.16	36.1			12.1	8.2						
1988	7.54	3.43	39.1			3.1	-8.1						
1989	7.23	3.15	35.9			13.6	10.3						
1990	7.70	3.47	39.6			13.4	-0.2						
1991	7.79	3.46	39.5			16.6	2.8						
1992	7.97	3.57	40.6			8.5	-6.9						
1993	7.67	3.31	37.8	67.0	2.0	-5.0	-12.4						
1994	7.03	2.90	33.1	57.0	2.0	-18.1	-13.8						
1995	6.45	2.50	28.6	54.0	2.1	-12.9	6.3						
1996	6.69	2.67	30.4	63.0	2.4	-3.1	11.3						
1997	6.99	2.96	33.8	77.0	2.6	-2.7	0.3	12.6	4.2	3.7	1.3	2,471	832
1998	7.04	2.97	33.9	60.0	2.0	-3.1	-0.4	8.5	2.9	2.6	0.9	2,200	745
1999	6.97	2.96	33.8	70.0	2.4	-17.5	-15.0	6.4	2.6	2.1	0.9	1,861	738
2000	7.02	2.97	33.9	121.0	4.1	8.4	31.4	7.2	2.2	2.6	0.8	2,535	766
2001	6.53	2.52	28.8	100.0	4.0	-5.8	-13.1						
2002	7.45	3.31	37.8	116.0	3.5	-2.8	3.2						
2003	6.91	2.88	32.8	159.0	5.5								
2004	6.98	2.98	33.9	161.0	5.4								
Max:	7.97	3.57	40.6	161.0	5.5	16.6	31.4						
Min:	6.45	2.50	28.6	54.0	2.0	-18.1	-15.0						
Ave:	7.16	3.06	34.9	92.0	3.2	-	0.5						
StdDev:	0.41	12.00	3.5	39.0	1.3	9.9	11.2						