

## WIND RESOURCES

Excerpt from:

### **“Evaluation of the Feasibility of Installing a Commercial Scale Wind Energy Facility in Fresh Kills, Staten Island, New York”**

by BQ Energy LLC

#### Wind Resource and Production Estimates

To assess the wind characteristics at the site, BQ Energy obtained the required permits from the Department of Sanitation (NYC DOS) and erected a 60-meter meteorological tower, or mast, atop mound 3/4 on the northwest side of the landfill. AWS Truewind, LLC was retained to collect and evaluate data taken from April 6, 2006 to May 31, 2007.

A data logger was installed at the tower which sent files containing average wind speed, direction, and temperature to AWS Truewind.

The wind shear coefficient was calculated with data from the top two sampling heights. Wind speeds above the mast were determined using the power law equation.

The wind speeds and patterns observed were compared with longer-term records from JFK and Newark Liberty Airports. The consistency between the mast and reference stations suggests that the project will follow a similar pattern over the long term.

The year's mean wind speed was 6.35 m/s at the top of the meteorological mast. The long-term mean wind speed is estimated to be 6.07 m/s. At the standard hub-height for a 2.5 MW wind turbine, 80 meters, the long-term mean wind speed is estimated to be 6.57 m/s or 14.25 mph. These speeds are considered light winds or Wind Power Class 2. Sites with Class 4 winds (7.0 to 7.5 m/s) or higher are generally preferred for large-scale wind farms in rural US locations.

#### **High regional energy prices in New York City will allow wind energy to be competitive in Staten Island.**

The measured wind speeds were significantly greater in winter months as compared with the summer months of July and August.

BQ Energy estimated the annual power production of seven turbine models based on the wind data collected from April 6, 2006 to April 5, 2007. The best performer was the American-built Clipper Liberty 2.5 MW turbine that was estimated to produce 6,116 MWh/year.

The second best performer was the Suzlon S.88 at 4,798 MWh/year.

The table below contains the results of all turbines analyzed.

<b>Manufacturer</b>	<b>Turbine Model</b>	<b>Rotor Blade Diameter (m)</b>	<b>Output (MW)</b>	<b>80 meter Capacity Factor:</b>	<b>80m Annual Production per Turbine (kWh/year)</b>
Clipper	Liberty	99	2.5	0.279	6,116,412
Siemens	B2300	82	2.3	0.226	4,595,539
Gamesa	G83-2.0 MW	83	2.0	0.285	4,476,171
GE	1.5 SL	77	1.5	0.252	3,745,054
Nordex	N80-2500	80	2.5	0.194	4,271,015
Suzlon	S.88	88	2.0	0.274	4,797,701
Vestas	V80-1800 II	80	1.8	0.242	4,241,427

Estimated Annual Power Production using Fresh Kills Wind Data