

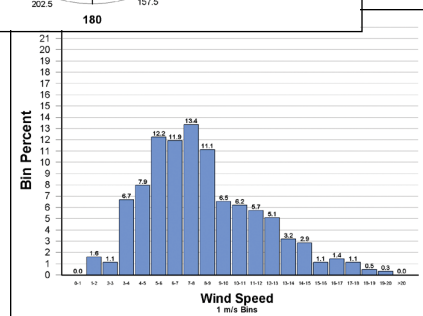
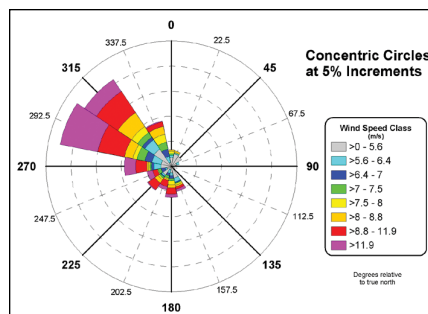
Point Study for Initial Project Assessment

What is a Point Study?

A WindLogics Point Study provides a comprehensive initial look to determine the viability of a specific location for wind energy development. Designed for developers, property owners, and financiers, the analysis delivers detailed, long-term wind speed and energy production prediction for a single specific location at turbine hub height. The results of the study are often used to proceed to development, to direct additional detailed study, or to eliminate a site from further consideration.

What are the advantages?

- **Long-term data analysis** – A Point Study delivers a long-term wind speed based on a complete analysis of 40 years of data. Because wind energy projects have life spans of 20 years or more, a thorough long-term understanding of year-to-year wind variation is essential. Tower data reveal wind speed for a limited collection period—typically just one year (quite possibly an abnormal year).
- **Accurate hub-height wind speed** – A Point Study reports on wind speed at actual turbine hub height. In comparison, met tower data is obtained at lower points and usually extrapolated up to hub height—introducing additional uncertainty.
- **Effects of regional features** – A Point Study takes into account the regional geographic attributes, such as topography, weather patterns, and climate that create and affect wind patterns. A tower can measure the wind at a single geographic point only.
- **Fast turnaround and cost savings** – The Point Study is typically completed in six weeks or less, allowing for rapid decisionmaking. The cost is also substantially less than erecting a tower, collecting data, maintaining equipment, and analyzing results. At the same time, the Point Study is based on years of WindLogics experience and field expertise.



Detailed information on wind speed, direction and frequency at a selected location and hub height.

What comes with a Point Study?

The Point Study report includes a discussion of the site topography, land characteristics, and vegetation that influence the local wind resource and an overview of meteorological characteristics of the project area, with a specific emphasis on seasonal trends and transitional seasons. The report also summarizes the data sources for the analysis and methodologies used to model the wind activity at the project area.

The report results includes a series of summary charts, graphs and tables, plus hourly data for the location and predictive intervals for wind speed and power production over a 40-year period. Point Study customers also receive final results showing the annual average wind speed, along with corresponding annual gross capacity factor and annual gross energy production for a customer-specified turbine.

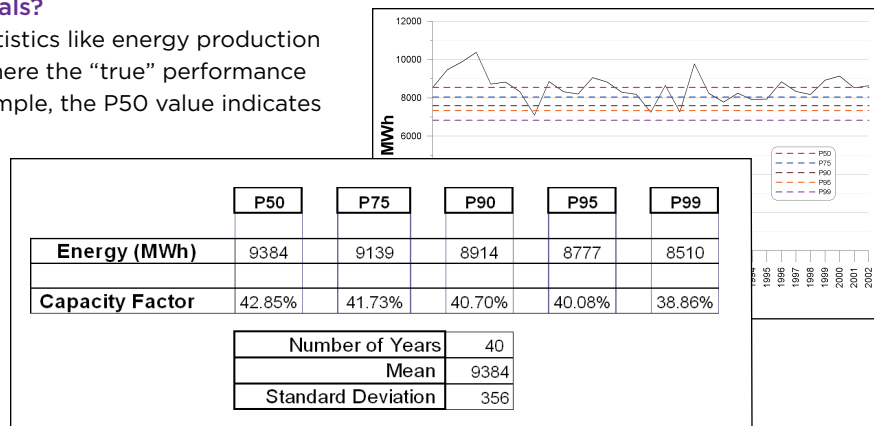
VIEWPOINT POINT STUDY

Point Study Deliverables

- Tables and Graphs of Normalized Daily, Monthly and Annual Wind Patterns**
 Hourly wind speed patterns can be an important part of planning for energy production and negotiating a power purchase agreement. The Point Study report provides the monthly and annual wind speed averages occurring hour to hour (daily), revealing wind variation activity during the daytime and nighttime hours (diurnal variation) over the 40-year normalized study period.
- Speed Bins of Wind Speed Frequencies**
 The Point Study report also divides wind speed into “speed bins” to provide a better picture of wind speed distributions. These bins are groupings of wind speed occurrences that indicate the amount of wind at specific intervals. In addition to graphical depiction, the values can be referenced to industry standard speed tables.
- Power Production and Capacity Factor Statistics**
 Normalized monthly and annual gross energy production and capacity factor (in MWh) are delivered based on your choice of turbine model from our extensive library.
- Hourly Data**
 In addition to the written report, customers also receive a file of normalized hourly wind speed data, plus hourly direction, air density, and temperature data, allowing additional opportunity for analysis.
- Long-Term Statistics**
 Long-term statistics are key considerations in financing wind energy projects. This deliverable includes:
 - Monthly and Annual Average Wind Speed and Gross Energy Production Distributions
 - Annual Wind Speed Averages (showing P50, P75, P90, P95 and P99 prediction intervals)
 - Annual Gross Energy Production (showing P50, P75, P90, P95 and P99 prediction intervals)

What are prediction intervals?

“Prediction intervals” for statistics like energy production provide a range of values where the “true” performance can be expected. In this example, the P50 value indicates the mean energy production over the long-term time horizon. Therefore, on average, the energy production at this location is 9,384 MWh. The P99 value indicates the minimum amount of energy that can be expected one year out of 100 (about 8,510 MWh in this case).



Prediction intervals provide a 40-year picture of expected wind energy production.

Sources of WindLogics Weather Data

Weather data (including wind data) is collected by global wind services from a wide variety of sources including airport towers, commercial aircraft, satellite sensors, weather balloons, and many other sources. WindLogics recognized the value of this information years ago and has archived a quantity of weather data unmatched in the wind energy industry. To study a site, WindLogics uses this exclusive archived weather data, plus data compiled by the National Centers for Environmental Prediction to analyze and derive long-term results.



1021 Bandana Blvd. East, Suite 111 St. Paul, MN 55108 USA
 www.WindLogics.com

651.556.4200 TEL
 651.556.4210 FAX
 sales@windlogics.com