A national laboratory of the U.S. Department of Energy
Office of Energy Efficiency & Renewable Energy

National Renewable Energy Laboratory

Innovation for Our Energy Future

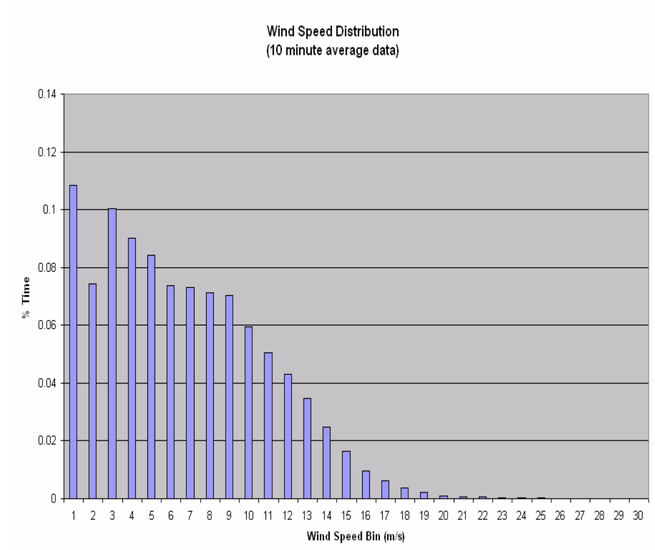
REGIONAL FIELD VERIFICATION PROJECT – OPERATIONAL RESULTS FROM FOUR SMALL WIND TURBINES

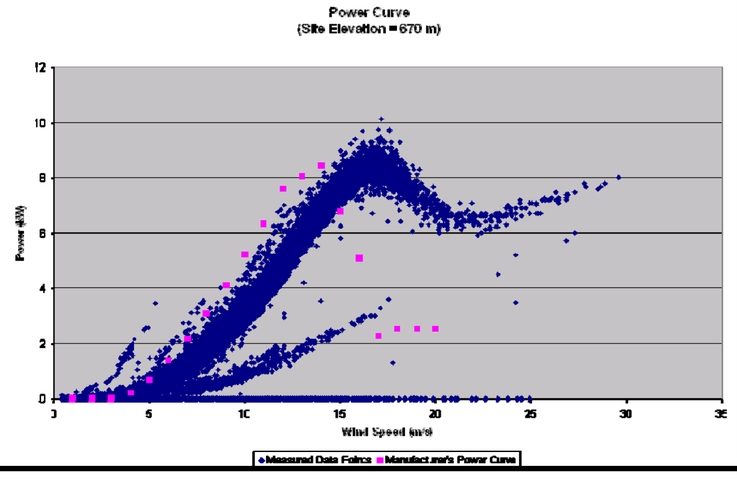
Karin Sinclair, National Renewable Energy Laboratory
Jessica Raker, Northwest Sustainable Energy for Economic Development

Bergey 10-kW Excel-S wind turbines, each equipped with the same blades, were installed at sites in the Pacific Northwest as part of Northwest Sustainable Energy for Economic Development's Our Wind Cooperative. Each installation was instrumented with data acquisition systems to collect a minimum of two years of operating data. The four turbines highlighted in this poster were installed between 2003 and 2004. Wind speed predictions were taken from available wind resource maps for Montana and Washington and modeled at hub height. Measured wind speeds were measured at anemometer height (6m below hub height) and adjusted to hub height. At all sites, the annual average data recovery was 80% or better. Manufacturer power curves and performance have been adjusted for the elevation at each site. Deviations from predicted performance may be due to equipment, operator, or the environment.

Site Location: Goldendale, Washington
Data for: Jan2004 – Dec2005

Tower type/height: 24m standard guyed.
Commission date October 31, 2003.
Host site: Ed Kennell.





Wind Speed (m/s)

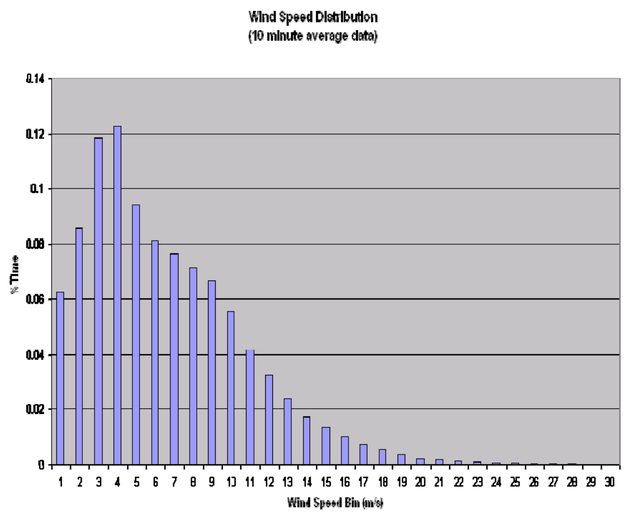
Predicted: 5.9
Measured: 5.8

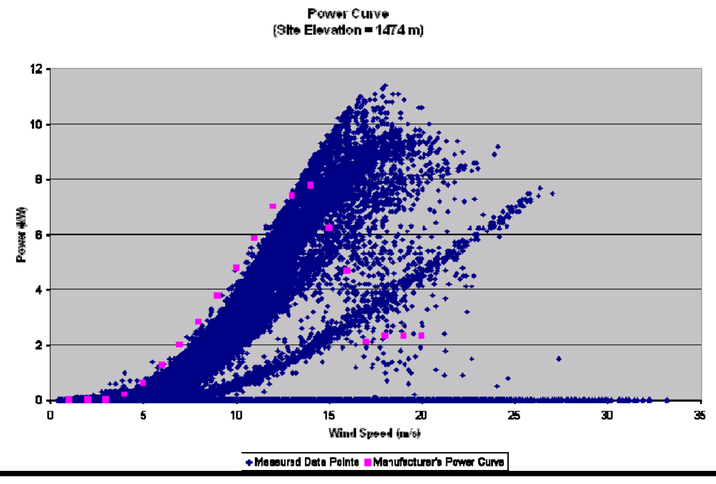
Performance Data (kWh/y)

- Based on predicted wind speed: 18,485
- Based on measured wind speed: 17,473
- Actual measured performance: 12,577

Site Location: Browning, Montana
Data for: Feb2004 – Feb2006

Tower type/height: 18m standard guyed.
Commission date February 20, 2004.
Host site: Doug Nelson.





Wind Speed (m/s)

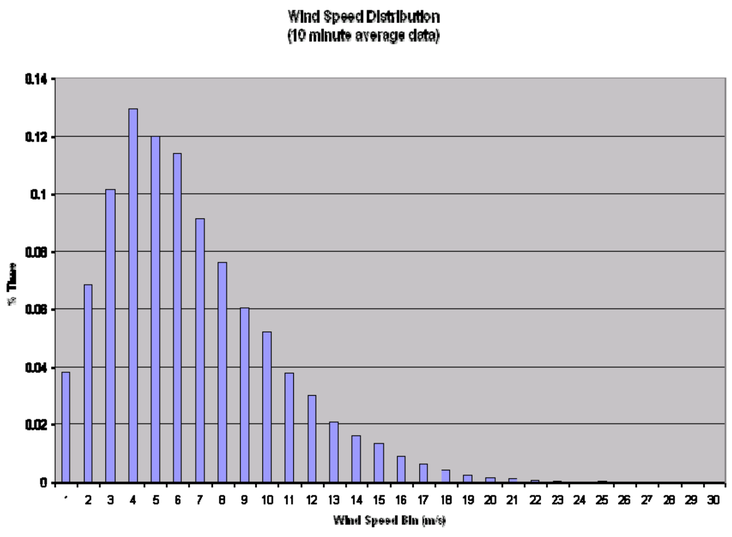
Predicted: 5.7
Measured: 5.6

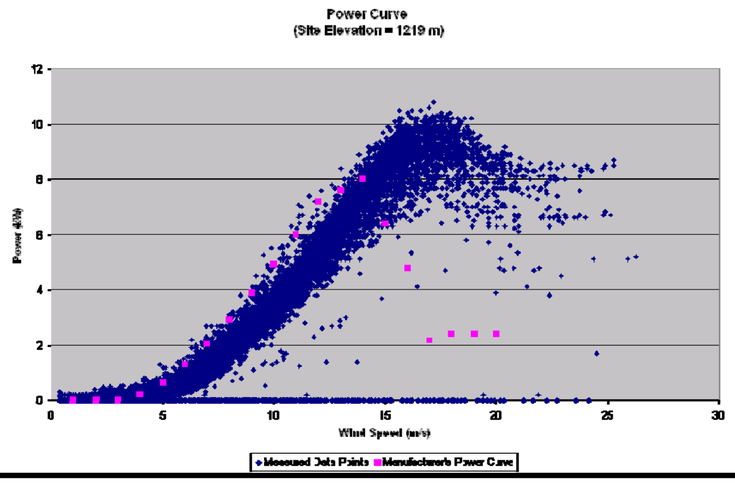
Performance Data (kWh/y)

- Based on predicted wind speed: 15,959
- Based on measured wind speed: 15,679
- Actual measured performance: 8,424

Site Location: Stanford, Montana
Data for: Jan2004 – Dec2005

Tower type/height: 30m standard guyed.
Commission date October 8, 2003.
Host site: Jess Alger.





Wind Speed (m/s)

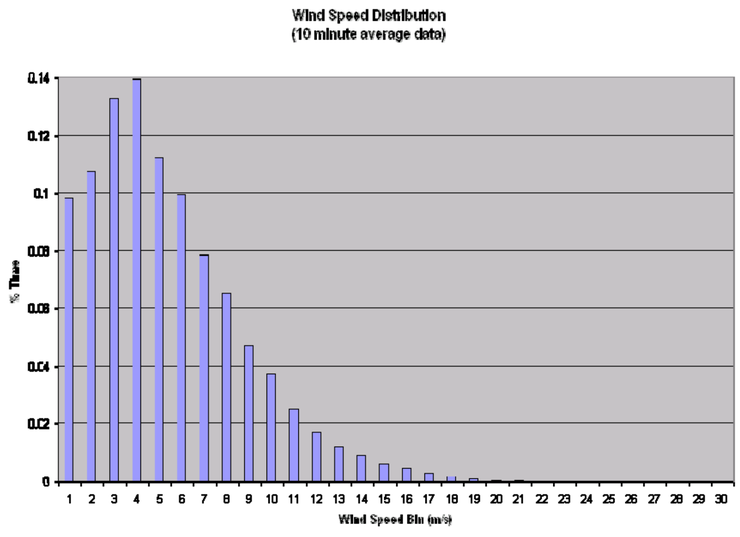
Predicted: 6.1
Measured: 5.8

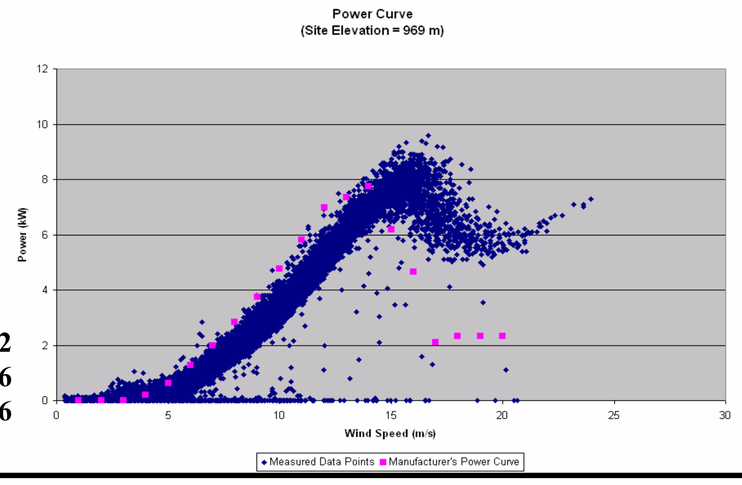
Performance Data (kWh/y)

- Based on predicted wind speed: 18,034
- Based on measured wind speed: 15,969
- Actual measured performance: 11,389

Site Location: Liberty County, Montana
Data for: Feb2004 – Feb2006

Tower type/height: 24m tilt-up.
Commission date: February 24, 2004.
Host site: Liberty County.





Wind Speed (m/s)

Predicted: 5.7
Measured: 4.6

Performance Data (kWh/y)

- Based on predicted wind speed: 16,242
- Based on measured wind speed: 9,786
- Actual measured performance: 7,926

The information contained in this poster is subject to a government license · WINDPOWER 2006 · Pittsburgh, PA · June 4-7, 2006 · NREL/PO-500-39831