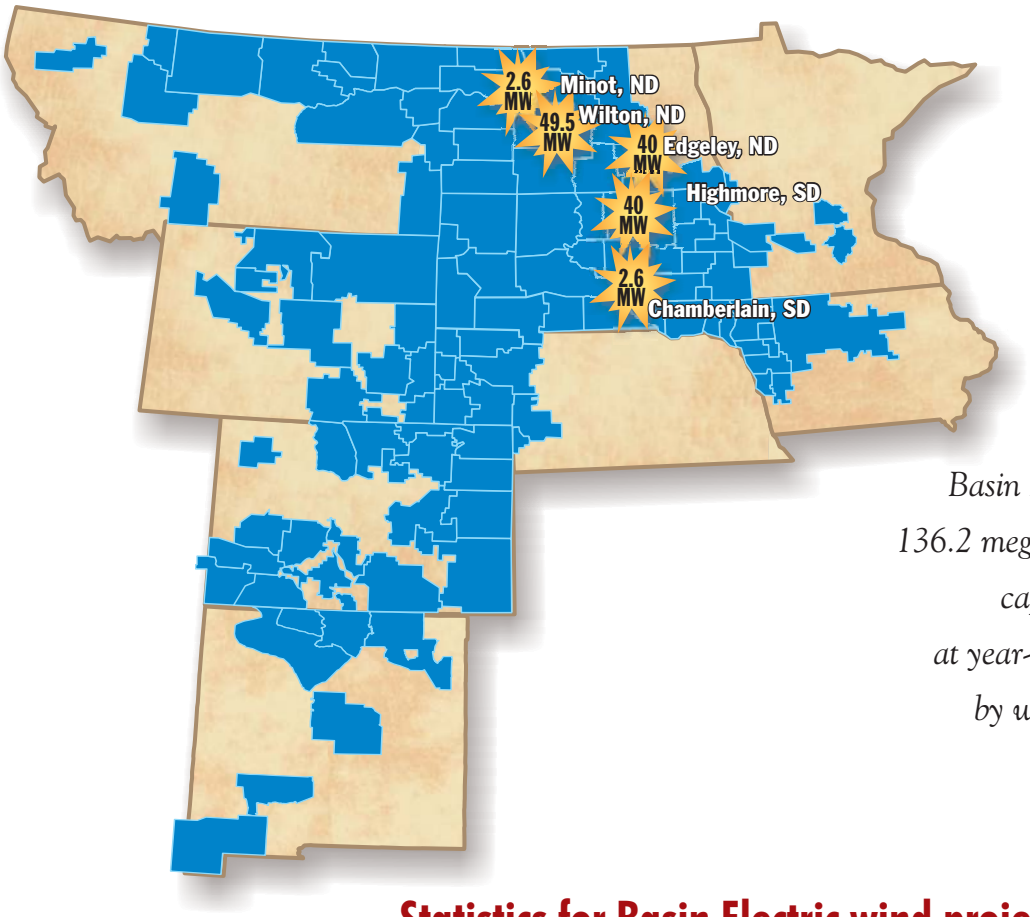
BASIN ELECTRIC

Wind Energy



One of the region's largest wind energy portfolios

Basin Electric will have more than 136.2 megawatts of electric generating capacity produced by the wind at year-end. The power is produced by wind turbines at five separate locations in the Dakotas.

Statistics for Basin Electric wind projects

MINOT & CHAMBERLAIN

TOTAL GENERATING CAPACITY:
Each site has two turbines with a generating capacity of 1.3 megawatts.

PROJECT COST:
$2.9 million each site

WIND TURBINES BY:
Nordex N60/1300, Hamburg, Germany

TOWERS:
200 ft. tall - Manufactured by DMI, West Fargo, ND.

BLADES: 100 ft. long and weigh 5.5 tons. Manufactured by LM Glasfiber, Grand Forks, ND.

AVERAGE ANNUAL WIND SPEED AT THE SITES:
18 mph

GENERATOR CUT-IN/CUT-OUT SPEED:
6-8 mph (minimum wind speed required to produce electricity); cut-out speed: 50-55 mph.

FPL EDGELEY/KULM & HIGHMORE

PROJECT OWNER/OPERATOR:
FPL Energy, Juno Beach, FL. Basin Electric purchases 100% of the electricity produced.

TOTAL GENERATING CAPACITY:
Each site has 27 turbines producing a total of 40 megawatts. Each turbine has a generating capacity of 1.5 megawatts.

PROJECT COST: Approximately $40 million each site

WIND TURBINES BY: General Electric

TOWERS: 213 ft. tall - Edgeley/Kulm Site - Manufactured by DMI, West Fargo, ND.

BLADES: 110 ft. long and weigh 7 tons. Manufactured by LM Glasfiber, Grand Forks, ND.

AVERAGE ANNUAL WIND SPEED AT THE SITE:
Approximately 19-20 mph

GENERATOR CUT-IN/CUT-OUT SPEED:
Approximately 7-8 mph (minimum wind speed required to produce electricity); cut-out speed: about 56 mph.

FPL WILTON

PROJECT OWNER/OPERATOR:
FPL Energy, Juno Beach, FL. Basin Electric purchases 100% of the electricity produced.

TOTAL GENERATING CAPACITY:
33 turbines producing 49.5 megawatts. Each turbine has a generating capacity of 1.5 megawatts.

PROJECT COST: Approximately $50 million

WIND TURBINES BY: General Electric

TOWERS: 262 ft. tall - Manufactured mainly by DMI, West Fargo, ND.

BLADES: 120 ft. long and weigh 7.5 tons. Manufactured by LM Glasfiber, Grand Forks, ND.

AVERAGE ANNUAL WIND SPEED AT THE SITE: N/A

GENERATOR CUT-IN/CUT-OUT SPEED:
Approximately 7-8 mph (minimum wind speed required to produce electricity); cut-out speed: about 55 mph

WIND ENERGY GLOSSARY

Anemometer: An instrument used to measure the velocity, or speed, of the wind.

Availability Factor: The percentage of time that a wind turbine is able to operate and is not out of commission because of maintenance or repairs.

Capacity Factor: A measure of the productivity of a wind turbine, calculated by the amount of power that a wind turbine produces over a set time period, divided by the amount of power that would have been produced if the turbine hade been running at full capacity during that same time interval. Most wind turbines operate at a capacity factor of 25% to 35%.

Cut-In Speed: The wind speed at which the turbine blades begin to rotate and produce electricity, typically around 8 to 10 miles per hour.

Cut-Out Speed: The wind speed at which the turbine automatically stops the blades from turning and rotates out of the wind to avoid damage to the turbine. (Usually around 55 to 60 miles per hour)

Distributed Generation: The concept of using smaller, more dispersed generation facilities to produce power, rather than larger, centrally located power plants.

Grid: Also termed transmission system, the network of power lines and associated equipment required to deliver electricity from generators to consumers.

Hub: The central part of the wind turbine, which supports the turbine blades on the outside and connects the low-speed rotor shaft inside the nacelle.

kWh (kilowatt-hour): A unit of energy that measures the amount of power produced or used over a 1-hour time interval. A 100-watt light bulb operating for 10 hours would use 1 kWh of energy (100 watts x 10 hr = 1000 Wh = 1 kWh).

Nacelle (pronounced na-sell): The structure at the top of the wind turbine tower just behind (or, in some cases, in front of) the wind turbine blades that houses the key components of the wind turbine, including the rotor shaft, gearbox, and generator.

PTC (production tax credit): The result of the Energy Policy Act of 1992, a tax credit that applies to wholesale electrical generators of wind energy facilities based upon the amount of energy generated in a year. As it exists today, the PTC for generators of wind energy is $0.015 per kWh of electrical production for the first 10 year of wind power plant operation.

RPS (renewable portfolio standard): A policy set by federal or state govern-ments that a percentage of the electricity supplied by electricity generators be derived from a renewable source.

Rated Wind Speed: The wind speed at which the turbine is producing its nameplate-rated power production (i.e., a 750-kW wind turbine would be out-putting 750 kW of power). This rated wind speed varies by model of wind turbine, but is usually about 30 to 35 miles per hour.

Rotor: Comprises the spinning parts of a wind turbine, including the turbine blades and the hub.

Tower: The base structure that supports and elevates a wind turbine rotor and nacelle. Modern turbines are typically constructed using a tubular steel tower. Older wind turbines and windmills used the lattice-type tower, which consists of a crisscrossed network of steel or wood members.

Transmission System: Also termed grid, the network of power lines and associated equipment required to deliver electricity from electrical generators to consumers.

Turbines (Down Wind): Blades face in the direction the wind is blowing while operating.

Utility-Scale Wind Turbine: The size of turbine typically utilized by wind energy developers to produce large amounts of electricity, currently ranging in size from 750 kW to 1.5 MW.

WPA (Wind Powering America): A U.S. Department of Energy initiative designed to promote the use of wind energy across the country, with the goal of quadrupling U.S. wind capacity by 2010, thereby generating enough energy to supply 3 million households annually. Under the WPA program, by 2020, 5% of the nation's electricity needs will be supplied by wind energy.

W (watt), kW (kilowatt), MW (megawatt): The base unit of power, a watt, is a measure of the rate at which work is being done (746 W = 1 horsepower). A kilowatt and megawatt are common terms used to describe the amount of power that can be generated by a wind turbine.

1 kW = 1000 W

1 MW = 1000 kW = 1,000,000 W

Wind-Monitoring System: Also termed met tower (short for meteorological tower) a group of instru-ments (including anemometers and wind vanes) that collectively measure various meteorological parameters such as wind speed, wind direction, and temperature at various heights above the ground. Wind-monitoring stations are used to collect and store data over a period of time. Those data are then used to evaluate the wind resource at that location.

Wind Power Class: A system designed to rate the quality of the wind resource in an area, based on the average annual wind speed. The scale ranges from 1 to 7, with 1 being the poorest wind energy resources and 7 representing exceptional wind energy resources.

Wind Power Density: A way to define the amount of wind power contained in a given area for use by a wind turbine, measured in watts per square meter.

Wind Resource: The wind energy available for use based on historical wind data, topographic features, and other parameters.

Wind Rose: A circular plot used to define certain characteristics about wind speed and direction observed at a monitoring location. The wind rose plot is a circle divided into 8, 12, or 16 "pie wedges" that represent different directions, such as on a compass. The wind rose typically depicts three sets of data: 1) the percentage of time that the wind blows from a certain direction, 2) how much the wind from a certain direction affects the average wind speed at the location, and 3) how much the wind from a certain direction contributes to the energy content of the wind at a given location.