



Wisconsin Public Service's generating system

February 2019



WIND

Forward Wind Park



Location:

Forward Wind Park is located on more than 4,000 acres of land in Dodge and Fond du Lac counties.

Type of plant:

Wind turbine

Initial cost:

\$178 million total purchase price

WPS owns 44.6 percent, Wisconsin Power & Light owns 42.6 percent and Madison Gas and Electric owns 12.8 percent

Units:

Eighty-five 1.6 megawatt GE turbines

One 1.85 megawatt turbine

Year in service:

2008

Forward Wind Park

Net generating capacity:

137.85 MW total

Turbine manufacturer:

General Electric

Turbine design:

GE 1.6-MW wind turbine generator, a pitch-regulated, upwind turbine with active yaw and three-blade rotor

Total weight:

Tower and turbine: 193.37 tons

Rotor design:

Three blades constructed of fiberglass-reinforced epoxy that each consist of two airfoil shells bonded to a supporting beam

Rotor diameter:

77 meters (252.62 feet)

Rotor speed:

11-20 rpm at variable blade pitch

Generator:

Induction-slip ring-rotor, IM B3 Design

Generator nominal voltage:

575 (60 Hz)

Integrated lightning protection:

Surge arrestors and grounding system

Control system:

Each wind turbine generator is controlled by either a Bachman or ESS wind turbine generator PC controller as the master device.

Tower dimensions:

Hub height:	262 feet
Weight:	138 tons
Base diameter:	14.9 feet
Rated power output:	1.6 or 1.85 MW

Cut-in wind speed:

8.9 mph

Cut-out wind speed:

55.9 mph

Extreme gust wind speed:

62.6 mph (67.1 mph on 1.85 MW wind turbine generator)

Rated wind speed:

26.8 mph