

Blue Sky Green Field Wind Energy Center

We Energies' First Utility-Scale Wind Farm

The Towns of Calumet and Marshfield, WI

Photography by Christine Coates, Editor, Wind Today

If you look closely at the blades of the wind turbines operating at the Blue Sky Green Field Energy Center in Wisconsin, you might see that one of those 264 blades is decorated with community members' signatures.

"In December 2007, during our construction phase, we held a community event so our neighbors could see some of the blades and rotors up close before they were erected," says Tanya Holler Muench, special projects coordinator, We Energies.

We Energies, Milwaukee, WI (414-221-2345), is the trade name of the Wisconsin Electric Power Co. and Wisconsin Gas LLC, the principal utility subsidiaries of Wisconsin Energy Corporation.

We Energies owns the 145 megawatt (MW) wind farm.

During the community event, says Holler Muench, guests signed a wind turbine blade which was later put into production on one of the wind farm's 88 Vestas V82 1.65 MW turbines.

Blue Sky Green Field Energy Center

The Blue Sky Green Field energy center is located near the towns of

Calumet and Marshfield in northeast Fond du Lac County, in east central Wisconsin.

We Energies leases 6,500 acres of property from 51 landowners for the wind farm. The site includes 50 miles of collector system cabling and 20 miles of access roads.

Individual landowners receive a fixed lease payment each year as well as benefits received by their communities. According to Barry McNulty, manager of media relations and special projects at We Energies, the towns of Marshfield and Calumet each receive annual payments of approximately \$120,000 per town plus another \$300,000 or more every year for the county.

"Our relationship with the community is important to We Energies," says Holler Muench.

In order to facilitate open communications, the wind farm hosts open houses. "We try to open up the wind farm twice each year so people can see the operation for themselves and get a better understanding of what we do here," says Holler Muench.

Mark Noah, manager-renewable

Facility Highlights

Location: Near the towns of Calumet and Marshfield in northeast Fond du Lac County, WI

Size: 88 wind turbines

Developer: We Energies

Owner: We Energies

Project capacity: 145 MW

Power contract: We Energies

Project cost: Approximately \$300 million

Connector & Transmission System: American Transmission Company

Utility: We Energies

Commercial operation: May 19, 2008

Turbine Features

Turbines: Vestas V82, 1.65 MW

Tower: 262 ft.

Blade length: 134 ft.

Operational RPMs: 14.4

Cut in wind speed: 8 mph

Rated wind speed: 30 mph

Cut out wind speed: 54 mph

Key Personnel:

Manager-Renewable Resources: Mark Noah

Project Manager: Andy Hesselbach

Director-Construction: Dan Pobloskie

Manager of Alternative Energy Strategy: Richard O'Conor



We Energies built the Blue Sky Green Field energy center's substation adjacent to ATC's substation.

resources for We Energies, manages the wind farm. Noah says more than 1,000 people attended an event at Blue Sky Green Field last September.

"We didn't know how many guests to expect since it was a cold, rainy Saturday," says Noah. "We were surprised at the number of people who lined up more than 200 ft. waiting their turn for a tour."

Holler Muench says We Energies' commitment to open communications with the community has proven beneficial to the project.

"We've come into this community and are operating on their property," says Holler Muench. "It's important that we operate as partners with the people who live here."

During the permitting and construction process, says Holler Muench, We Energies representatives met with landowners, held community meetings, and maintained a project hotline.

Noah says that hiring technicians from the local community further aids in community relations. "The technicians who live around here know the issues that are being discussed and can help us better anticipate any concerns that might come up," says Noah.

The wind farm employs 13-15 people for operations and maintenance. At the peak of construction, says Noah, about 450 workers were employed by the project.

We Energies has a multi-year O&M contract with Vestas which has hired mostly local residents.

"Vestas' technicians have done a great job with O&M services," says Noah. "I'm especially impressed with the amount of training the company provides their employees," he states.

Development

We Energies first entered the wind

energy market in June 1999 when the company erected two Vestas V47 wind turbines by the side of Highway 41 near Byron, WI.

"The Byron turbines were We Energies' initial foray into the wind energy field," says Holler Muench. She explains that in their 10 years of operation the two wind turbines have demonstrated good numbers related to their capacity factor and electricity production.

The positive experience with those turbines led the company to consider acquiring wind farms to increase its ownership of renewable energy.

"We decided to invest in wind energy in response to the state Renewable Portfolio Standard (RPS), as well as to meet our customers' demand for renewable energy," says Noah.

An electric and gas utility, We Energies serves customers in Wisconsin and the Michigan Upper Peninsula.

Currently, We Energies' supply portfolio includes approximately 3% from renewable energy.

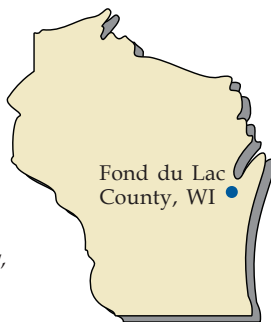
According to Noah, wind energy is the least expensive of the company's renewable energy options for new, large-scale production. The utility also purchases renewables from other generating companies.

Customer demand. Noah says the utility's *Energy for Tomorrow* renewable energy program allows customers to pay a premium to assure that a percentage of their electricity is generated by renewable sources.

In March 2009, an average 750 kilowatt per hour customer would be expected to pay \$2.57 extra for 25% renewable energy. Customers who want 100% of their electricity to come from renewables would pay an additional \$10.28.

As of March 2009, says McNulty, 19,624 We Energies customers subscribe to this program.

The Blue Sky Green Field energy center is located near the towns of Calumet and Marshfield in northeast Fond Du Lac County, WI.



The wind farm is comprised of 88 wind turbines standing on 6,500 acres of land.



Renewable Portfolio Standard.

Wisconsin's RPS was established in 2003 by Senate Bill 459. The legislation requires utilities to produce 10% of all their electricity from renewable energy sources by 2015.

In 2002, We Energies issued a Request for Proposals (RFP) for wind energy and in 2003 signed two 80 MW Power Purchase Agreements (PPA) with Navitas Energy, Minneapolis, MN, the original developer of this project.

In June 2005, We Energies purchased engineering, leases, and some permits for development of the Blue Sky Green Field energy center from Navitas.

Since the developer already had land leases and agreements with the towns in place, We Energies was able to start their part of the permitting process in 2006 and received approval by January 2007. Construction began in June 2007.

Construction

According to Noah, the Blue Sky Green Field energy center cost approximately \$300 million.

Alliant Energy's RMT WindConnect, Madison, WI (608-831-4444), was the Balance of Plant (BOP) contractor.

Boldt Construction, Appleton, WI (920-739-6321), put in the turbine foundations and installed the turbines. Noah says the foundations required 324 yards of concrete weighing 650 tons plus another 10 tons of rebar and steel.

Hooper Corporation, Madison, WI (608-249-0451), installed the underground collector system at the wind farm.

Hooper Corp's Director of Business Development Steve Lindley says the contractor installed approximately 50 miles of medium voltage underground power cable between the 88 wind turbines using 156,941 linear feet of 1/0 and 4/0 cable, 81,004 feet of 750 MCM, and 17,141 feet of 1000 MCM cable.


Pipe and wire were buried approximately four feet below ground to avoid interrupting cropland as much as possible. Several thousand feet of directional boring was done in areas where trenching was prohibited.

Fiber optic lines were installed to

link the turbines—eight separate circuits—to the SCADA system.

Baumhardt Sand & Gravel, Eden, WI (920-477-2511), provided aggregate products and services.

According to Noah, geotextile fabric was installed as a base for

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the stone so it won't sink into the soil.

The access roads also required drainage culverts to make sure water moves through fields as it did prior to the wind farm's construction.

"We want to make sure the farmer's fields experience no undue impact because of our wind turbines," says Noah.

Michels Wind Energy, Brownsville, WI (920-583-3132), provided electrical services.

Waukesha Electric Systems, Waukesha, WI (800-835-2732), manufactured and installed the main substation transformer.

The power produced at the Blue Sky Green Field energy center is connected to the grid via lines owned and operated by the American Transmission Company, Waukesha, WI (ATC/262-506-6700).

"The siting here was very fortuitous in that ATC's 345 kilovolt (kV) transmission lines already ran through the middle of the project," says Noah.

He says ATC put in their substation, We Energies installed the wind farm's substation adjacent to that, and no overhead line work was required.

"The only real challenges we experienced in construction of this wind farm are related to logistics and the weather," says Noah.

Logistics. According to Noah, in 2007 component shipments were required to be delivered to the wind farm laydown yard at night. At 6:00 a.m. the next morning, workers could re-load the components and transport them to their respective sites.

"Since then, we've worked out a better plan for the timing of deliveries," says Noah.

Weather. Weather conditions interrupted construction briefly due to an unexpected thaw during the first week of January 2008.

The second week of the year, the area had 50° temperatures and thunderstorms with 1½ inches of rain, says Noah. That shut down construction for about a week before the ground froze again.

Noah explains that construction had been scheduled through the winter months so cranes—including two Manitowac 16000 cranes—could move

across the land without damaging the fields. This reduced the amount of remedial soil reclamation required to return the properties back to their original condition.

In spite of the short delay, the wind farm was completed by May 19, 2008, less than a year after the start of construction, concludes Noah.

Christine Coates, editor

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