

## MINNKOTA WIND ENERGY CENTERS

*The Minnkota member cooperatives and Northern Municipal Power Agency (NMPA) participants are recognized as leaders in supporting the region's wind resource development. These associated systems built the first two commercial-scale, utility-owned wind turbines in North Dakota history in 2002. The success of those projects helped jump-start significant growth in the adoption of wind energy.*

*Presently, about 459 megawatts of nameplate wind generating capacity is available in the Minnkota/NMPA Joint System. Minnkota has purchase power agreements in place with affiliates of NextEra Energy Resources for energy produced at the Langdon Wind Energy Center, near Langdon, N.D.; Ashtabula Wind Energy Center, near Valley City, N.D.; and Oliver III Wind Energy Center, near Center, N.D. Minnkota owns the two Infinity wind turbines near the towns of Petersburg and Valley City, N.D.*

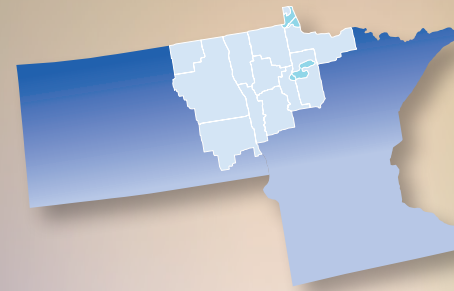
[www.beltramelectric.com](http://www.beltramelectric.com)  
218-444-2540

*This Institution is an equal opportunity provider and employer.*

## INFINITY RENEWABLE ENERGY

The Infinity Program allows member cooperative and municipal consumers to decide how much of the electricity they purchase is generated by renewable resources. While it is not possible to direct where electrons are specifically delivered on the electric grid, it is possible to ensure that the renewable energy purchased is from a resource connected to the Minnkota/NMPA transmission system. The record of that purchase and the proof that it was reserved for a specific consumer is done through a renewable energy credit (REC).

Participating consumers pay for the additional cost to purchase renewable energy and to specifically designate how this energy is credited and used. Contact your local Minnkota member cooperative or NMPA-associated municipal for more information.



### Member-Owner Cooperatives

Beltrami Electric Cooperative  
Cass County Electric Cooperative  
Cavalier Rural Electric Cooperative  
Clearwater-Polk Electric Cooperative  
Nodak Electric Cooperative  
North Star Electric Cooperative  
PKM Electric Cooperative  
Red Lake Electric Cooperative  
Red River Valley Cooperative Power Association  
Roseau Electric Cooperative  
Wild Rice Electric Cooperative



### Northern Municipal Power Agency


123 2nd St. W. • Thief River Falls, MN 56701-1912

Bagley Public Utilities  
Baudette Municipal Utilities  
Fosston Municipal Utilities  
Grafton Municipal Utilities  
Halstad Municipal Utilities  
Hawley Public Utilities  
Park River Municipal Utilities  
Roseau Municipal Utilities  
City of Stephen Utilities  
Thief River Falls Municipal Utilities  
City of Warren Water and Light  
Warroad Municipal Utilities

# WIND POWER



**Beltrami Electric  
Cooperative Inc.**

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## INFINITY Wind Turbines

<b>Location</b>	Valley City and Petersburg, N.D.
<b>Size</b>	Two 900-kW turbines
<b>Estimated annual generation</b>	2.8 million kWh per turbine
<b>Capacity factor</b>	36 percent
<b>Tower height</b>	230 feet
<b>Total weight</b>	130 tons
<b>Tower weight</b>	93 tons
<b>Generator weight</b>	25 tons
<b>Blade weight</b>	4 tons per blade
<b>Blade length</b>	85 feet
<b>Wind speed</b>	Cut-in: 8 mph Cut-out: 56 mph
<b>Project cost</b>	\$1 million per turbine
<b>Start-up date</b>	2002



## LANGDON Wind Energy Center

<b>Location</b>	Nine miles south of Langdon, N.D.
<b>Size</b>	199.5 megawatts (MW) Minnkota portion: 139.5 MW Otter Tail portion: 60 MW
<b>Turbines</b>	133 turbines, 1.5 MW each, manufactured by General Electric
<b>Towers</b>	Approximately 250 feet to center of hub
<b>Blades</b>	Variable pitch – 120 feet long
<b>Output</b>	Cut-in wind speed: 8 mph Maximum output: 35-55 mph Cut-out wind speed: 56 mph
<b>Delivery point</b>	Langdon substation
<b>Transmission</b>	Langdon to Hensel 115-kilovolt (kV) line
<b>Start-up date</b>	December 2007



## ASHTABULA Wind Energy Center

<b>Location</b>	15 miles northeast of Valley City, N.D.
<b>Size</b>	366 megawatts (MW) Minnkota portion: 217.5 MW Otter Tail portion: 97.5 MW Great River Energy portion: 51 MW
<b>Turbines</b>	244 turbines, 1.5 MW each, manufactured by General Electric
<b>Towers</b>	Approximately 250 feet to center of hub
<b>Blades</b>	Variable pitch – 120 feet long
<b>Output</b>	Cut-in wind speed: 8 mph Maximum output: 35-55 mph Cut-out wind speed: 56 mph
<b>Delivery point</b>	Pillsbury substation
<b>Transmission</b>	Pillsbury to Fargo 230-kilovolt (kV) line
<b>Start-up date</b>	2008/2009



## OLIVER III Wind Energy Center

<b>Location</b>	42 miles northwest of Bismarck, N.D.
<b>Size</b>	100 megawatts (MW) Minnkota portion: 100 MW
<b>Turbines</b>	Approximately 48 turbines rated between 1.5 and 2.3 MW each
<b>Towers</b>	Approximately 262 feet to center of hub
<b>Blades</b>	Variable pitch - ___ feet long
<b>Output</b>	Cut-in wind speed: WAITING Maximum output: WAITING Cut-out wind speed: 56 mph
<b>Delivery point</b>	Roughrider substation
<b>Transmission</b>	Center to Mandan 230-kilovolt (kV) line
<b>Start-up date</b>	January 2017

