



## WERC Brings Prairie Woods Closer To Their Goal



Thanks to major support from Kandiyohi County and Kandiyohi Power Cooperative, Prairie Woods ELC was able to hire WERC to plan, purchase and install a wind turbine.

Now, when the wind blows it spins a 30-foot rotor blade on a 20 kilowatt Jacobs wind turbine, situated on a 120-foot tower at Prairie Woods.

The turbine is expected to produce approximately 60% of the annual electrical power needs for Prairie Woods.

The grid-connected system will send surplus power out to Kandiyohi Power Cooperative customers when the turbine is producing more power than is being consumed at Prairie Woods. The wind turbine is a major step toward the goal of 100% renewable energy use at Prairie Woods within the next five years. The turbine is a centerpiece for their efforts to educate visitors about renewable energy options. The turbine was commissioned during 2007 Fall Open House.

Prairie Woods ELC also acquired a 1.95 kW Solar Photo-Voltaic (PV) system on their roof, also designed and installed by WERC. This new solar electric installation is another step closer to their goal. (Picture at right of newly installed solar array.)



### What is Prairie Woods ELC?

Prairie Woods is a nonprofit environmental learning center, committed to providing outstanding environmental education and outdoor experiences to people of all ages. Deeply rooted in our Kandiyohi County community, Prairie Woods reaches out to provide services for communities across Minnesota and the upper Midwest.

Project:  
Subject:

**Prairie Woods ELC, Spicer, MN**  
Emission Reduction from Wind vs. Coal

<b>Wind Turbine Description:</b>	Jacobs 31-20
Rated Turbine Capacity:	20 kW
Predicted Power Output:	25,000 kW-Hr/Yr
Predicted Power Output:	2,083 kW-Hr/Month
Predicted Power Output:	85,300,000 Btu/Yr
Coal Heat Content:	12,300 Btu/Lb
Energy Conversion Efficiency (estimate):	33%
Equivalent Coal Usage:	10.51 Tons/Yr
Coal Sulfur Content:	3 % by wt.
Electrostatic Precipitator Control Efficiency:	95%

Pollutant	Emission Factor <sup>1</sup> (lb/ton)	Emission Reduction (tons/yr)
Particulate Matter (controlled by ESP)	66.0	0.0173
Particulate Matter less than 10 microns (controlled by ESP)	13.2	0.0035
Carbon Monoxide	5.0	0.0263
Hydrogen Chloride	1.2	0.0063
Hydrogen Fluoride	0.15	0.0008
Total Nonmethane Organic Compounds	0.05	0.0003
Sulfur Dioxide	114.0	0.5989
Nitrogen Oxides	8.8	0.0462
<b>Carbon Dioxide</b>	<b>4810</b>	<b>25.2706</b>
Antimony	0.000018	0.000000
Arsenic	0.00041	0.000002
Beryllium	0.000021	0.000000
Cadmium	0.000051	0.000000
Chromium	0.00026	0.000001
Chromium (VI)	0.00008	0.000000
Cobalt	0.00010	0.000001
Lead	0.00042	0.000002
Magnesium	0.01100	0.000058
Manganese	0.00049	0.000003
<b>Mercury</b>	<b>0.00008</b>	<b>0.000000</b>
Nickel	0.00028	0.000001
Selenium	0.00130	0.000007
<b>Total Emissions</b>		<b>25.9702</b>

<sup>1</sup> Emission factors taken from USEPA, Compilation of Air Pollutant Emission Factors for Bituminous and Subbituminous Coal Combustion, AP-42, Section 1.1

