

Project:  
Subject:

**John Persell, Bemidji, MN**  
Emission Reduction from Wind vs. Coal

**Wind Turbine Description:** Jacobs 31-20  
 Rated Turbine Capacity: 20 kW  
 Predicted Power Output: 10,000 kW-Hr/Yr  
 Predicted Power Output: 833 kW-Hr/Month  
 Predicted Power Output: 34,120,000 Btu/Yr  
 Coal Heat Content: 12,300 Btu/Lb  
 Energy Conversion Efficiency (estimate): 33%  
 Equivalent Coal Usage: 4.20 Tons/Yr  
 Coal Sulfur Content: 3 % by wt.  
 Electrostatic Precipitator Control Efficiency: 95%

<b>Pollutant</b>	<b>Emission Factor<sup>1</sup> (lb/ton)</b>	<b>Emission Reduction (tons/yr)</b>
Particulate Matter (controlled by ESP)	66.0	<b>0.0069</b>
Particulate Matter less than 10 microns (controlled by ESP)	13.2	<b>0.0014</b>
Carbon Monoxide	5.0	<b>0.0105</b>
Hydrogen Chloride	1.2	<b>0.0025</b>
Hydrogen Fluoride	0.15	<b>0.0003</b>
Total Nonmethane Organic Compounds	0.05	<b>0.0001</b>
Sulfur Dioxide	114.0	<b>0.2396</b>
Nitrogen Oxides	8.8	<b>0.0185</b>
<b>Carbon Dioxide</b>	<b>4810</b>	<b>10.1082</b>
Antimony	0.000018	<b>0.000000</b>
Arsenic	0.00041	<b>0.000001</b>
Beryllium	0.000021	<b>0.000000</b>
Cadmium	0.000051	<b>0.000000</b>
Chromium	0.00026	<b>0.000001</b>
Chromium (VI)	0.00008	<b>0.000000</b>
Cobalt	0.00010	<b>0.000000</b>
Lead	0.00042	<b>0.000001</b>
Magnesium	0.01100	<b>0.000023</b>
Manganese	0.00049	<b>0.000001</b>
<b>Mercury</b>	<b>0.00008</b>	<b>0.000000</b>
Nickel	0.00028	<b>0.000001</b>
Selenium	0.00130	<b>0.000003</b>
<b>Total Emissions</b>		<b>10.3881</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