

Project:  
Subject:

**Boys n Berries Farm, Brainerd, MN**  
Emission Reduction from Wind vs. Coal

<b>Wind Turbine Description:</b>	Jacobs 31-20
Rated Turbine Capacity:	20 kW
Predicted Power Output:	12,000 kW-Hr/Yr
Predicted Power Output:	1,000 kW-Hr/Month
Predicted Power Output:	40,944,000 Btu/Yr
Coal Heat Content:	12,300 Btu/Lb
Energy Conversion Efficiency (estimate):	33%
Equivalent Coal Usage:	5.04 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>0.0083</b>
Particulate Matter less than 10 microns (controlled by ESP)	13.2	<b>0.0017</b>
Carbon Monoxide	5.0	<b>0.0126</b>
Hydrogen Chloride	1.2	<b>0.0030</b>
Hydrogen Fluoride	0.15	<b>0.0004</b>
Total Nonmethane Organic Compounds	0.05	<b>0.0001</b>
Sulfur Dioxide	114.0	<b>0.2875</b>
Nitrogen Oxides	8.8	<b>0.0222</b>
<b>Carbon Dioxide</b>	<b>4810</b>	<b>12.1299</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>0.000028</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>12.4657</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