How Are Coal-Fired Plants Doing?

Statewide, coal-fired power plants in Minnesota generate 42 percent of all sulfur dioxide pollution, 26 percent of all carbon dioxide pollution, 10 percent of all mercury pollution and 7 percent of all nitrogen oxides pollution. All other generation sources contribute a small amount of pollution.

How Minnesota Power is Doing

Compared to MPCA Regional Average Emissions

<table>
<thead>
<tr>
<th>Lower Emissions</th>
<th>Regional Average 100%</th>
<th>Higher Emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon Dioxide</td>
<td>437,204 tons</td>
<td></td>
</tr>
<tr>
<td>Nitrogen Oxides</td>
<td>280 tons</td>
<td></td>
</tr>
<tr>
<td>Sulfur Dioxide</td>
<td>189 tons</td>
<td></td>
</tr>
<tr>
<td>Particulate Matter</td>
<td>25 tons</td>
<td></td>
</tr>
<tr>
<td>Mercury</td>
<td>3.18 lbs</td>
<td></td>
</tr>
</tbody>
</table>

What You Can Do

You can participate in Minnesota Power’s energy conservation programs. To learn more visit mnpower.com/powerofone or call 218-355-2843.

Where You Can Learn More

The Minnesota Public Utilities Commission requires electric utilities to provide customers with information on the costs, reliability and air emissions related to the fuels used to generate electricity.

Contact Minnesota Power at 218.722.2625 or 800.228.4966, or visit www.mnpower.com

Contact the Minnesota Pollution Control Agency at www.pca.state.mn.us, or call 651.296.6300 or 800.657.3864 for additional information about air emissions.

Contact the Department of Commerce at www.mn.gov/commerce, or call 651.539.1886 or 800.657.3710 for more ideas on saving energy.

2020
Components of an Electric System

**Generation**
Utilities produce electricity at power plants by burning fuels (such as coal, natural gas, oil, and biomass fuels like wood) and by operating hydroelectric and wind facilities. Utilities also purchase electricity from other utilities or power suppliers.

**Transmission**
High-voltage electricity travels from power plants along transmission lines to distribution substations and directly to industrial customers.

**Distribution**
At distribution substations, the voltage is reduced and low-voltage electricity is delivered to customers. The amount of electricity is metered to measure customer usage levels.

Renewable Choices
With our Renewable Source, Community Solar Garden and Solar Sense programs, you can choose how much of the energy you purchase comes from renewable sources and directly influence the amount of renewable energy on the power grid.

To learn more about our renewable energy programs, visit mnpower.com/RenewableChoices

Electric Service Costs
Minnesota Power charges customers for the costs of providing electric service, including investments in power plants, transmission and distribution lines, and operating and maintaining Minnesota Power's electric system.

The 2019 Component Cost table shows average percentages of monthly service costs related to the generation, transmission and distribution of electricity for four major customer categories: Residential, Commercial, Industrial and Lighting.

The average percentages are calculated by dividing Minnesota Power’s total cost to provide electric service among the generation, transmission and distribution components.

Air Emissions by Fuel Type
For the year ending December 31, 2019
(measured in pounds per MWh)

<table>
<thead>
<tr>
<th>Fuel Type</th>
<th>Carbon Dioxide</th>
<th>Nitrogen Dioxide</th>
<th>Sulfur Dioxide</th>
<th>Particulate Matter</th>
<th>Mercury</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchases</td>
<td>1,212</td>
<td>0.846</td>
<td>1.146</td>
<td>0.081</td>
<td>0.000000587</td>
</tr>
<tr>
<td>Coal</td>
<td>2,054</td>
<td>1.233</td>
<td>0.361</td>
<td>0.106</td>
<td>0.000000623</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>1,343</td>
<td>2.079</td>
<td>0.012</td>
<td>0.000</td>
<td>0.0000000000</td>
</tr>
<tr>
<td>Biomass</td>
<td>3,576</td>
<td>5.489</td>
<td>1.381</td>
<td>0.505</td>
<td>0.000002082</td>
</tr>
</tbody>
</table>

Wind and solar power produce none of these air emissions. Large hydro power may alter ecosystems and cultural resources depending upon the location and design of the facility. Nuclear energy does not produce these air emissions but does produce both high- and low-level nuclear waste.

How Air Emissions Affect the Environment
Carbon dioxide is the principal greenhouse gas linked to global warming. Nitrogen oxides and sulfur dioxide contribute to acid rain; nitrogen oxides also contribute to smog.

Particulate matter (sometimes called soot) contributes to asthma attacks and other respiratory illnesses.

Mercury accumulates in some fish to levels exceeding current health department guidelines. The Minnesota Pollution Control Agency is responsible for ensuring that emissions from utilities meet air quality standards for nitrogen oxides, sulfur oxide and smog.