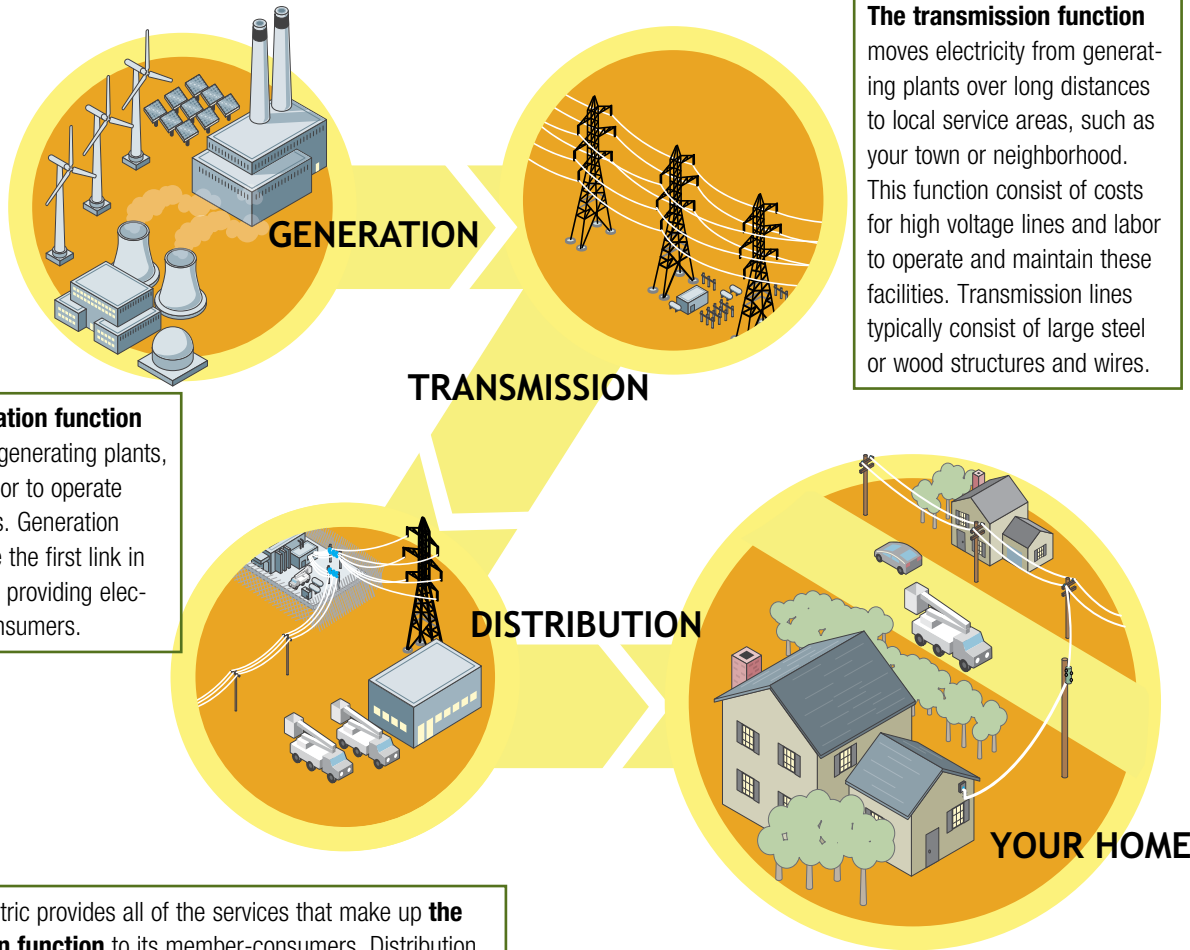


# How the Generation, Transmission and Distribution System Works

**The cost to create and deliver electricity** is composed of three general functions; generation, transmission and distribution.

Dakota Electric purchases generation and transmission services from Great River Energy and provides distribution services directly to our members.



**The generation function** consists of generating plants, fuel and labor to operate these plants. Generation facilities are the first link in the chain in providing electricity to consumers.

**The transmission function** moves electricity from generating plants over long distances to local service areas, such as your town or neighborhood. This function consist of costs for high voltage lines and labor to operate and maintain these facilities. Transmission lines typically consist of large steel or wood structures and wires.

Dakota Electric provides all of the services that make up **the distribution function** to its member-consumers. Distribution is the final link in the chain built to deliver electricity to your home or business. Dakota Electric's distribution plant includes substations, poles, wires, transformers and meters. These facilities convert and deliver high voltage power from the transmission system into voltage that is usable for homes and businesses. Service and labor expenses incurred by Dakota Electric include the operation and maintenance of facilities, as well as billing and member services.

**Component Costs by Category**

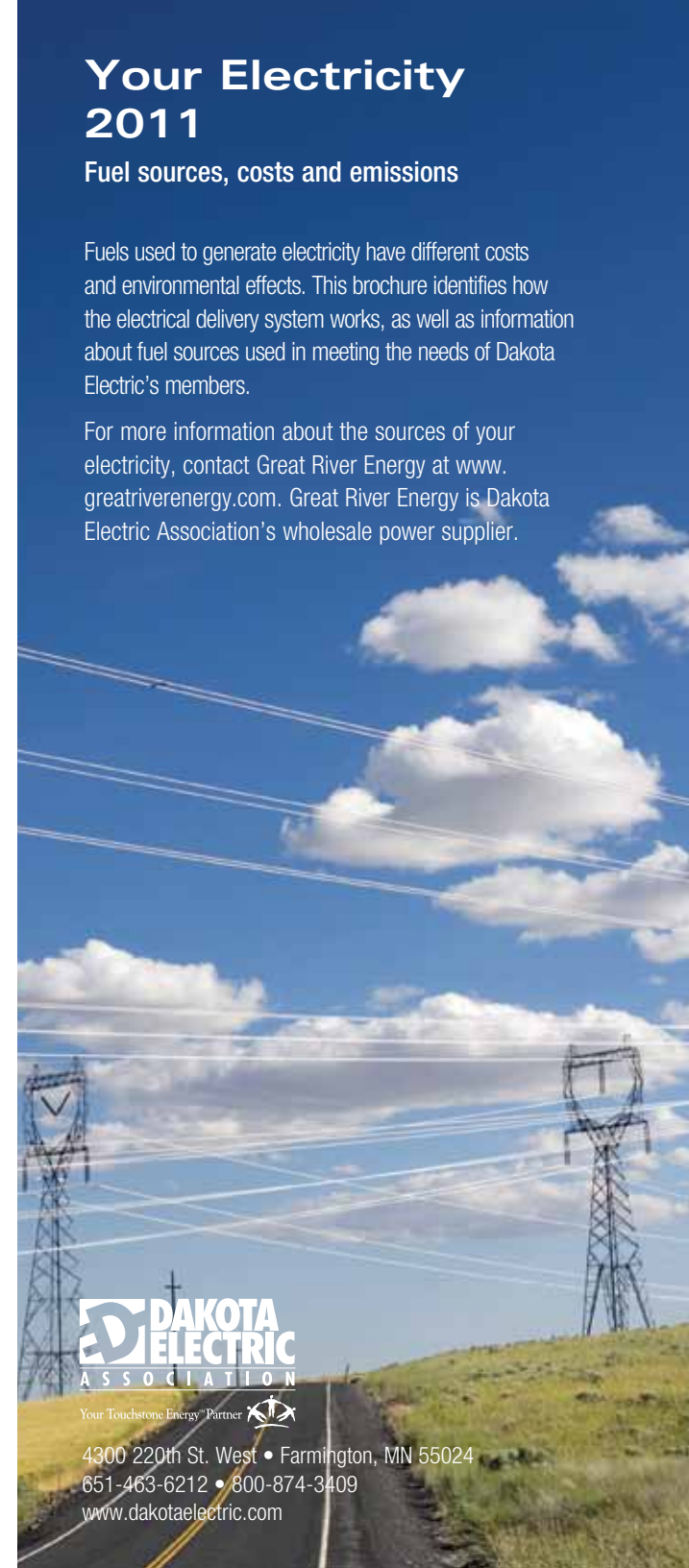
	Residential	Small General	General
Generation	57%	58%	76%
Transmission	10%	11%	9%
Distribution	33%	31%	15%
Total	100%	100%	100%

## Your Electricity 2011

### Fuel sources, costs and emissions

Fuels used to generate electricity have different costs and environmental effects. This brochure identifies how the electrical delivery system works, as well as information about fuel sources used in meeting the needs of Dakota Electric's members.

For more information about the sources of your electricity, contact Great River Energy at [www.greatriverenergy.com](http://www.greatriverenergy.com). Great River Energy is Dakota Electric Association's wholesale power supplier.

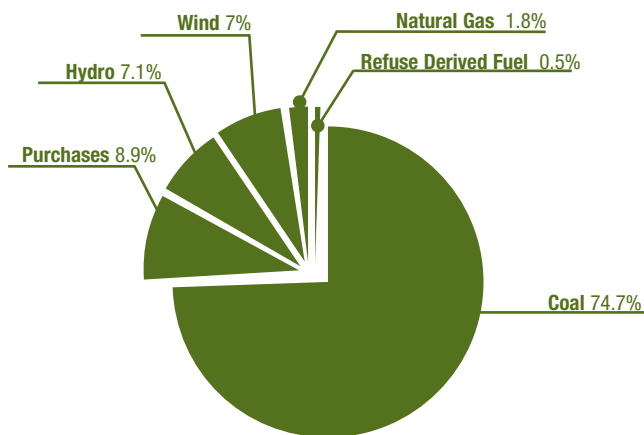


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## Energy Sources

How are your electricity needs met by Dakota Electric Association? This pie chart shows the primary fuel sources used to produce your electricity in 2010.



## Energy Conservation

Annual member participation in Dakota Electric Association's energy conservation programs reduced the need to produce roughly 135,000,000 kilowatt-hours of electricity in 2010, a 6.7 percent savings. These annual savings resulted from both new and ongoing member participation in conservation programs. By not producing this electricity, the following approximate amounts of air emissions were avoided:

<b>Carbon Dioxide (CO<sub>2</sub>)</b>	<b>256,080,916 lbs.</b>
<b>Sulfur Dioxide (SO<sub>2</sub>)</b>	<b>535,306 lbs.</b>
<b>Nitrogen Oxides (NO<sub>x</sub>)</b>	<b>259,773 lbs.</b>
<b>Particulate Matter (PM)</b>	<b>38,663 lbs.</b>
<b>Mercury (Hg)</b>	<b>8.73 lbs.</b>

## Save Energy

For ideas on saving energy, contact the Minnesota Department of Commerce at [www.energy.mn.gov](http://www.energy.mn.gov) or call 651-296-5175 or 1-800-657-3710.

## Air Emissions by Fuel Type

The following table shows the average emissions for each primary fuel source used in producing your electricity in 2010. All data is reported in units of pounds per 1,000 kilowatt-hours of electricity.

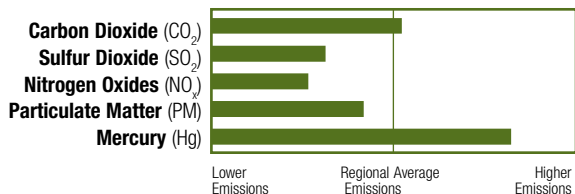
Fuel Source	Carbon Dioxide	Sulfur Dioxide	Nitrogen Oxides	Particulate Matter	Mercury
Natural Gas	1,614	0.0014	1.21	0.09	0.000000
Coal	2,267	4.6	2.1	0.34	0.000081
Refuse Derived Fuel	2,291	0.55	5.7	0.23	0.000064
Purchases	1,824	5.9	3.6	0.34	0.000039

Purchases come from various fuel sources (nuclear, coal, natural gas, etc.) from throughout the region. Although nuclear energy is part of the region's generating sources, Dakota Electric Association and Great River Energy do not directly purchase nuclear-based electricity for sale to members.

Nuclear energy does not produce these air emissions, but it does produce both high- and low-level nuclear waste.

Wind and solar power generation do not produce any of these air emissions. However, large hydropower may alter ecosystems and cultural resources depending on the location and design of the facility.

The following chart compares the average emissions associated with the power plants producing your electricity with the emissions associated with regional power plants. Regional emissions averages are developed by the Minnesota Pollution Control Agency.



## How Do Air Emissions Affect The Environment?

**Carbon dioxide** is the principal greenhouse gas linked to global warming.

**Sulfur dioxide** and **nitrogen oxides** 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 sulfur dioxide, nitrogen oxides and smog.

## Where Are Air Emissions Generated?

Statewide, coal-fired power plants in Minnesota generate: 35 percent of all carbon dioxide pollution, 50 percent of all sulfur dioxide pollution, 16 percent of all nitrogen oxides pollution and 43 percent of all mercury pollution.

All other generation sources contribute a small amount of pollution.

Pollution is emitted from many places, such as industrial and commercial sources, cars, trucks and home heating.

For more information about air emissions contact the Minnesota Pollution Control Agency at [www.pca.state.mn.us/programs/electricity.html](http://www.pca.state.mn.us/programs/electricity.html) or call 651-296-6300 or 1-800-657-3864.

## Renewable Wind Energy

Dakota Electric offers the option of supporting renewable energy through our Wellspring Renewable Wind Energy® program.

Wellspring costs an additional \$0.40 per month for each 100 kilowatt-hour block you purchase. You determine how many blocks to purchase. The price is subject to change.

For more information on Wellspring Renewable Wind Energy or energy-saving programs, contact Dakota Electric at [www.dakotaelectric.com](http://www.dakotaelectric.com) or call 651-463-6243 or 1-800-874-3409.