The Midwest Region

Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota

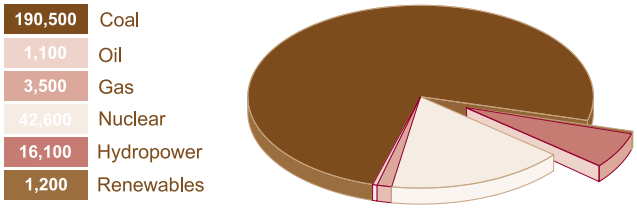
Vast Wind and Biomass Resources

One of the major indigenous energy resources in the Midwest is wind. The entire Midwest region could potentially produce 5.4 trillion kilowatt-hours of wind-generated electricity per year. This is nearly twice the electricity that the entire United States consumes annually. Six of the seven states in the region have more than enough wind energy available to supply all of their electricity. In 1996, for example, North Dakota consumed approximately 8.3 billion kilowatt-hours of electricity. Yet the state has sufficient exploitable wind energy to generate nearly 1,200 billion kilowatt-hours in a year—roughly 150 times as much electricity as the state currently consumes.

The Midwest does not have to rely only on wind for its renewable electricity. The region also has vast areas of fertile land. Much of this land—several million acres—lies fallow or has been set aside. If used to grow dedicated energy crops such as switchgrass, alfalfa, or fast-growing hybrid poplar trees, this land could produce enough biomass each year to generate about 310 billion kilowatt-hours of biomass power, which is nearly one-and-a-half times more electricity than the region currently consumes.

The biomass resource of the Midwest is not limited to land that could be used for energy crops. Crop residues in the Midwest could be used to supply the region with another 80 billion kilowatt-hours of electricity per year. Plus, the region could derive another 6 billion kilowatt-hours a year from its wood waste and municipal solid waste.

Annual Electricity Production (million kilowatt-hours)



Although it has large resources of wind and biomass, the Midwest relies on coal to generate the great majority of its electricity. In 1996, all other energy sources provided 25 percent of the region's electricity.

Coal Dominates

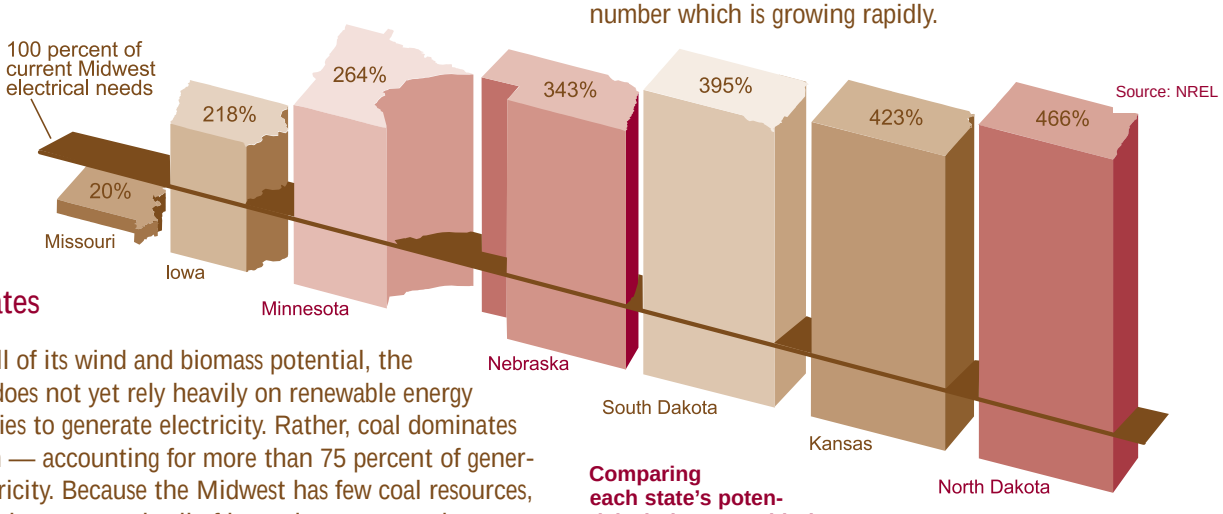
With all of its wind and biomass potential, the Midwest does not yet rely heavily on renewable energy technologies to generate electricity. Rather, coal dominates the region — accounting for more than 75 percent of generated electricity. Because the Midwest has few coal resources, the region imports nearly all of its coal at a cost to the region's economy of more than $1.6 billion.

Primarily because of this reliance on coal, the region's utilities emitted 641 thousand tons of nitrogen oxides and 300 million tons of carbon dioxide in 1995. On average, power plants in the Midwest produce nearly 60 percent more nitrogen oxides and 30 percent more carbon dioxide for each kilowatt-hour of electricity generated than power plants in the rest of the country.

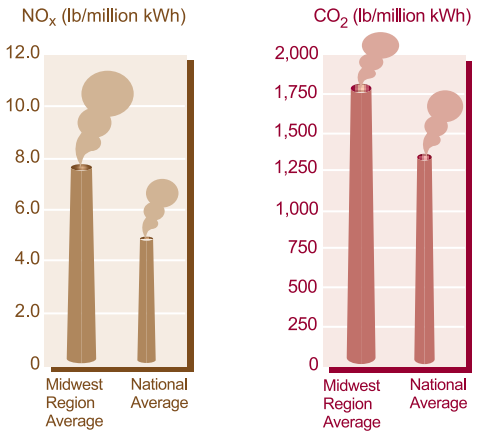
The fact that the region has a poorly diversified supply base for its electrical needs argues strongly for the Midwest to exploit its indigenous renewable resources, especially its enormous wind energy potential.

Growing in the Midwest: Renewable Power

Renewable energy already has a small presence in the Midwest. Biomass power plants, using timber residues, municipal solid waste, and landfill methane as their energy sources, total more than 1,000 megawatts of capacity. In addition, there are more than 500 megawatts of wind — a number which is growing rapidly.



Comparing each state's potential wind power with the Midwest's current electrical needs, it's obvious that the region has excellent wind resources. Even when much of the land is excluded and conservative estimates of viable wind resources are used, the region still has the potential to be a net exporter of wind power.



In 1995, power plants in the Midwest produced 31 percent more carbon dioxide and 59 percent more nitrogen oxides for each kilowatt-hour of electricity generated than power plants in the rest of the country.

Wind plants are now being built throughout the Midwest. In Nevada, Iowa, a recently installed 250-kilowatt turbine provides power to the town's sewage treatment plant. At the Sibley Wind Plant in Iowa, 1.2 megawatts are now operating, with another 10.5 megawatts being planned. Based on its experience with an 80-kilowatt wind turbine, Waverly Light and Power has completed a 3.5-megawatt wind project and is discussing installation of a large wind plant in cooperation with neighboring utilities. Three very large wind projects in Iowa include 42 megawatts in Cerro Gordo, and two projects, 75 megawatts and 112 megawatts, in Buena Vista County near Storm Lake. In all, Iowa has seven projects totaling 252 megawatts under construction, with intended completion dates before the middle of 1999.

Northern States Power, Minnesota's largest utility, plans to build or purchase at least 425 megawatts of wind capacity by the year 2000, and as much as 825 megawatts by the year 2012. In the first phase of the plan, 25 megawatts of wind power were installed in a facility in Southwest Minnesota (Buffalo Ridge) which became operational in 1994. Two additional project phases totalling 210 megawatts came on line in late 1998 and early 1999. The electricity from these projects will cost Northern States Power roughly 3 cents per kilowatt-hour, averaged over the 30-year power purchase agreement. This price includes the net impact of the federal production tax credit, which amounts to 1.5 cents per kilowatt-hour for the first 10 years, plus a state property tax levy. It's the lowest price yet for a wind power plant.

Northern States Power has awarded contracts for 125 megawatts of biomass power capacity to three companies. The biomass power plants will use hybrid poplar trees, alfalfa, and clean waste wood as feedstocks.

Altogether, more than 500 megawatts of renewable capacity is in the planning stages for the Midwest. This is the first step for the region toward harvesting its abundant bounty of renewable energy.

Minnesota Legislature Encourages Renewables in the Midwest

Most of the renewable power capacity planned in the Midwest is being developed because of actions taken by state legislatures and utility regulators, particularly in Minnesota. For instance, Northern States Power's (NSP) decision to install renewable generation capacity stems from an agreement between the utility and the Minnesota legislature that permits the utility to store spent nuclear fuel at its Prairie Island Nuclear Plant in exchange for the utility building or purchasing renewable generation technology.

Minnesota has also passed sweeping legislation that will encourage the use of renewable energy throughout the state. In 1995, the legislature passed a bill to further spur the development of wind energy by providing loans and financial incentives for family farms and agricultural cooperatives to develop wind energy. The law provides a 10-year state tax credit of 1.5 cents per kilowatt-hour, to a statewide total of as much as 100 megawatts of capacity. This state tax credit is in addition to a similar federal tax incentive.

The Minnesota legislature requires the state's public utility commission to consider renewable energy projects as their first choice for new power projects. The legislation also requires NSP to contribute as much as $8.5 million by 2003 to a renewable energy account.

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