

*The following is the most up-to date information regarding energy use, generation and potential.*

## Minnesota

### Resources and Consumption

Minnesota has no fossil fuel resources, but the western part of the State has wind energy potential, and cornfields in the south and west provide feedstock for ethanol production. Minnesota's population and total energy consumption place the State in the middle of national rankings. The industrial and transportation sectors lead State energy demand.

### Petroleum

Minnesota has two oil refineries in the Minneapolis-St. Paul area for processing crude oil that comes primarily from Canada. Several pipeline systems bring the crude to Minnesota, including the Lakehead Pipeline System from Canada that passes through northern Minnesota on its way to other markets in the U.S. Midwest. In an effort to keep pace with growing State demand for petroleum products, Minnesota recently completed construction on a new, 300-mile pipeline to carry additional Canadian crude oil to the State's refineries. Plans for two additional oil pipelines, running from northwestern Minnesota to Superior, Wisconsin, were recently approved by the Minnesota Public Utilities Commission.

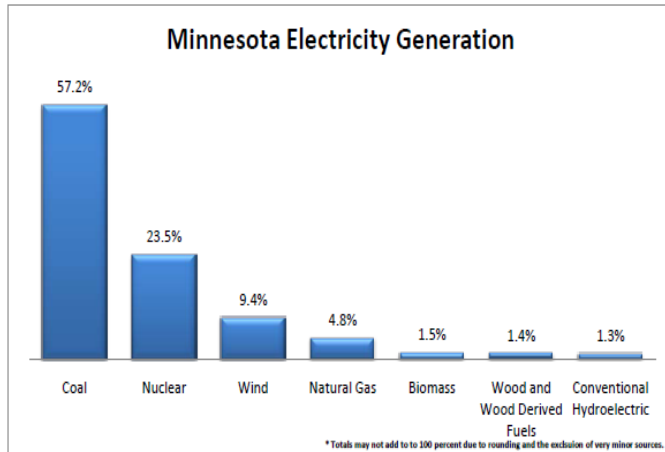
### Ethanol

Since 1992, Minnesota has had a robust program in place to support ethanol production and consumption. Minnesota is one of the few States that require the statewide use of oxygenated motor gasoline blended with 10 percent ethanol. Minnesota also offers incentives to encourage the adoption of E85 — a

## Minnesota Highlights:

- *Minnesota is a leading producer of ethanol with 21 plants capable of producing 1.1 billion gallons annually. Minnesota's ethanol industry generated \$2.5 billion for the economy and 6,854 jobs.*
- *Minnesota is one of the few States that require the statewide use of oxygenated motor gasoline blended with 10 percent ethanol.*
- *Minnesota ranks 7<sup>th</sup> in the US for existing wind power capacity with 1,797 megawatts of wind energy. Another 697 megawatts are under construction.*
- *Over two-thirds of Minnesota households use natural gas as their primary heating fuel during the State's long, cold winters.*
- *Two nuclear power plants near the Twin Cities generate nearly one-fourth of the electricity produced in the State.*





**1. Minnesota Electricity Generation. Minnesota Energy Institute for Energy Research (IER)**

mixture of 85 percent ethanol with 15 percent motor gasoline — throughout the State and now has more E85 refueling stations than any other State. Minnesota is among the Nation’s top producers of ethanol, with 21 corn-based production plants located primarily in the southern part of the State and additional facilities under construction.

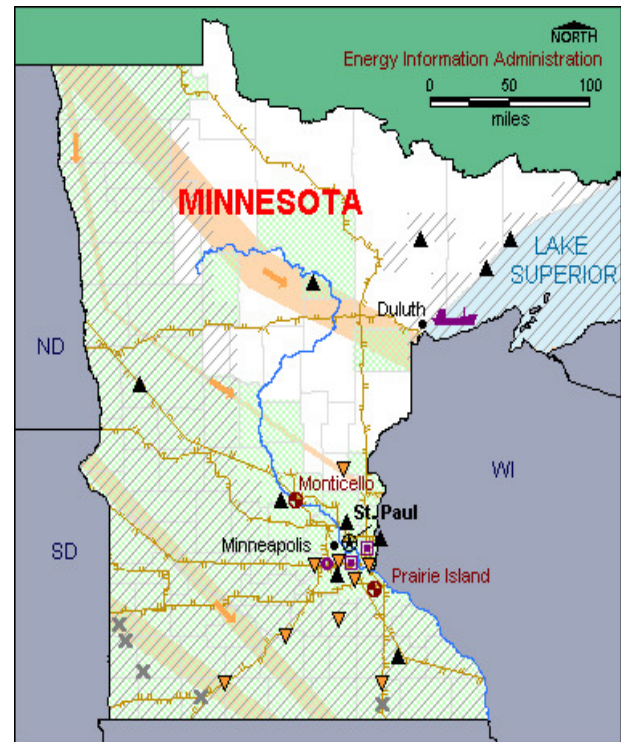
**Natural Gas**

The residential sector is Minnesota’s largest natural gas consumer, accounting for over one-third of State consumption. Over two-thirds of Minnesota households use natural gas as their primary heating fuel during the State’s long, cold winters. Natural gas is mostly supplied by pipelines entering the State from Canada and from North and South Dakota. The State ships over four-fifths of the natural gas it receives to Iowa and Wisconsin, on the way to other markets in the U.S. Midwest.

**Coal, Electricity, and Renewables**

Coal-fired power plants typically account for roughly three-fifths of Minnesota’s electricity generation. Minnesota receives most of its coal supply by rail from Montana and Wyoming. Two nuclear plants near the Twin Cities typically account for nearly one-fourth of the State’s electricity production. Recent legislation permits

the Prairie Island Plant to store additional nuclear waste onsite, extending the plant’s operation through 2014. After receiving approval from the U.S. Nuclear Regulatory Commission for license renewal in 2006, the smaller Monticello nuclear plant is now licensed through September 2030.



Major Electric Power Plants (>=100 MW)		Renewable Energy Potential
▲ Coal	○ Geothermal	■ Biomass (>= 50 tons/sq km/yr)
◆ Hydroelectric	◇ Nuclear	■ Geothermal (>= 80 milliwatts/m2)
▼ Natural Gas	● Petroleum	■ Solar (>= 6.0 kWh/m2/day)
◆ Petroleum	☼ Solar	■ Wind (>= 3 Power Class)
◆ Oil Import Site	✕ Wind	
◆ Oil Seaport	☼ Wood	
— Electricity Transmission Line (>= 345 kV)	◆ Other Renewable	
■ Natural Gas Flow (1 mile band width = 100 million cubic feet/day)		
■ Oil and Gas Active Leases		

**2. U.S. Energy Information Administration State Energy Profile**

References: Institute of Energy Research; Energy Information Association and the Renewable Energy Policy Network for the 21<sup>st</sup> Century, Renewables 2010: Global Status Report and Agricultural Marketing Services Division, Minnesota Department of Agriculture, July 2010



Minnesota has numerous wind farms, particularly in the southwest, and is a major producer of wind power. Wind contributes nearly 7 percent of Minnesota's electricity production.

The State generates electricity from other renewable sources, as well, including hydroelectric dams, municipal solid waste, landfill gas, and wood waste, which together contribute minimally to the State's total electricity production.

In February 2007, Minnesota adopted a renewable portfolio standard that requires one-fourth of Minnesota's power to come from renewable sources by 2025. The mandate also requires Xcel Energy, the provider of about one-half of the State's electricity, to have one-third of its total power come from renewable sources by 2020.

### World

The year 2009 was unprecedented in the history of renewable energy. As other economic sectors declined around the world, existing renewable capacity continued to grow at rates close to those in previous years, including grid-connected solar PV (53 percent), wind power (32 percent), solar hot water heating (21 percent), geothermal power (4 percent), and hydropower (3 percent). Annual production of ethanol and biodiesel increased 10 percent and 9 percent, respectively.

For the second year in a row, in both the United States and Europe, more renewable power capacity was added than conventional power capacity (coal, gas, nuclear). Renewables accounted for 60 percent of newly installed power capacity in Europe in 2009, and nearly 20 percent of annual power production.

## Global Highlights:

- *Solar PV additions reached a record high of 7 GW. Germany was the top market, with 3.8 GW added, or more than half the global market. Other large markets were Italy, Japan, the United States, Czech Republic, and Belgium. Spain, the world leader in 2008, saw installations plunge to a low level in 2009 after a policy cap was exceeded.*
- *Many countries saw record biomass use. Notable was Sweden, where biomass accounted for a larger share of energy supply than oil for the first time.*
- *Biofuels production contributed the energy equivalent of 5 percent of world gasoline output.*
- *Almost all renewable energy industries experienced manufacturing growth in 2009.*
- *Nearly 11 GW of solar PV was produced, a 50-percent increase over 2008.*
- *Wind power received more than 60 percent of utility-scale renewables investment in 2009 (excluding small projects), due mostly to rapid expansion in China.*
- *Wind power additions reached a record high of 38 GW. China was the top market, with 13.8 GW added, representing more than one-third of the world market—up from just a 2 percent market share in 2004. The United States was second, with 10 GW added. The share of wind power generation in several countries reached record highs, including 6.5 percent in Germany and 14 percent in Spain.*