

Charting a New Path for Minnesota's Electricity Generation and Use



Minnesota's energy future is at a crossroads

One path leads to increased dependency on fossil fuels—threatening our economy and fueling global warming. The other leads to a new, smarter energy future for Minnesota. Investing in clean energy alternatives—like solar and wind power—can create and protect jobs in Minnesota, save families and businesses money, and make America more energy independent. Clean energy is also the most effective solution to the threat of global warming. We can start making progress right away using proven technology, and then draw on American innovation to take us the rest of the way with new technologies.

How does Minnesota generate electricity today?

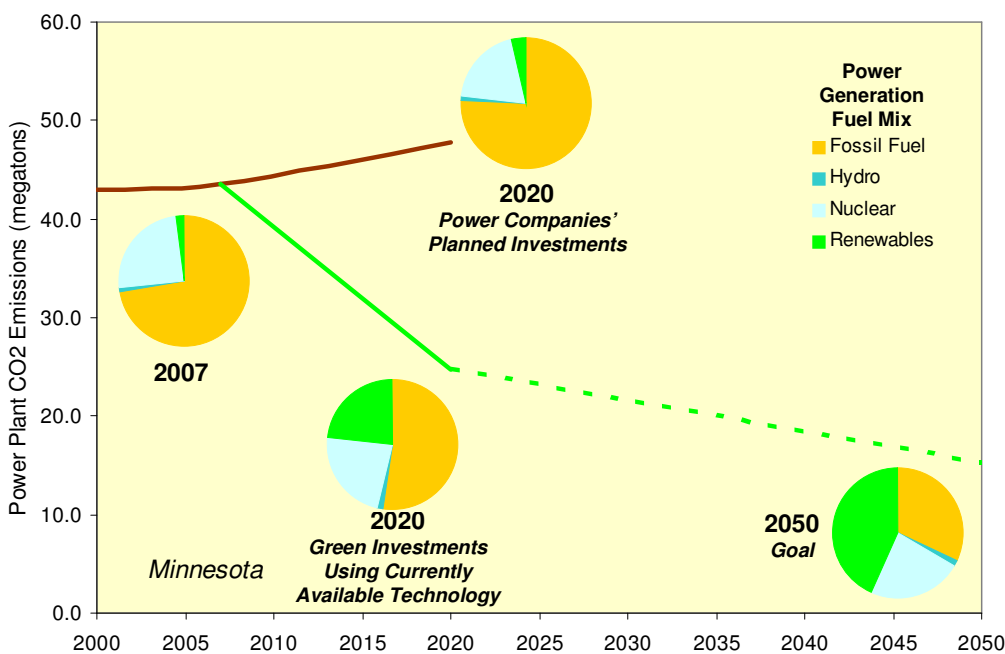
In 2007, electric power generated in Minnesota primarily came from coal (63.8 percent), gas (5.4 percent), and nuclear (24.5 percent). Most utilities intend to continue relying heavily on fossil fuels in the coming decade. Minnesota power companies plan to increase the energy generation from gas by 159.8 percent. Only about 2.0 percent of electricity generated in Minnesota is expected to come from renewable sources like wind, solar, geothermal, and biomass under current plans.

Minnesota has a choice to invest in a cleaner energy future

Minnesota can achieve a new energy future by making better investments as utilities replace increasingly aged infrastructure and expand capacity. An important first step is for Minnesota to generate at least 25 percent of electricity from renewable sources by 2020, a goal readily achievable with today's technology. Continuing to convert 15 percent of the state's energy portfolio to renewable energy sources each decade could yield an energy profile of at least 65 percent renewables by 2050.

Minnesota can also benefit from improved energy efficiency. Technologies are available that could reduce demand nationally by 20 to 30 percent over the next decade. Innovations in energy efficiency should allow us to keep demand constant after 2020, even as the population grows.

Today, Minnesota is ranked 8th in the nation for energy efficiency, largely because the state's utilities are already spending \$56 million annually to improve energy efficiency.



About the chart: 2000, 2007 and 2020 Power Companies' Planned Investments from CARMA 1.0 (www.CARMA.org). The 2020 Green Investments projection assumes that, using currently available technology, Minnesota makes (1) improvements in efficiency to reduce overall demand by 25 percent and (2) shifts away from fossil fuels so that 25 percent of power generation is from renewable energy sources. The 2050 Goal assumes (1) hydro and nuclear are unchanged, (2) continued efficiency improvements keep total demand flat, and (3) renewable energy replaces at least 65 percent of power generation formerly done through fossil fuel burning. Note that the projection of future CO₂ emissions from fossil fuels assumes no investment in carbon capture and storage.

Making a Difference in Minnesota

With abundant renewable resources, Minnesota has risen to the top as one of the nation's largest providers of wind energy. Minnesota ranks fourth in wind production after California, Texas and Iowa. There are still plenty of new opportunities for wind power in the state. A Department of Public Service study shows that the Lake Benton "Buffalo Ridge" area, known as the "Original Wind Power Capital of the Midwest," could produce enough energy to power Minnesota for over a year.

Minnesota is also home to the largest green energy design builder in the United States. Fagen, Inc. is one of the leading firms constructing wind farms and ethanol plants. The company provides around 1,500 jobs in research, engineering, and construction in Minnesota and across the country.

Sources:

<http://www.fageninc.com/index.html>

<http://lakebenton.govoffice.com/index.asp?Type=NONE&SEC=%7BB62CE668-CE41-4427-BBCF-D3D873A5A3C9%7D>

<http://www.awea.org/projects/projects.aspx?s=Minnesota>



Making a dent in global warming pollution

Simply by shifting to renewable energy sources and improving energy efficiency over the next decade or so, Minnesota can reduce its future carbon dioxide (CO₂) emissions from electricity generation by 48 percent compared to the business-as-usual path that utilities are following now.

Given that 35 percent of Minnesota's CO₂ emissions come from electricity generation, diversifying and updating our power sources is critical for cutting the state's total global warming pollution.

Increasing Minnesota's energy and economic security

Investing in renewable energy sources will reduce Minnesota's dependence on fossil fuels and at the same time create new green collar jobs. A new energy future in Minnesota could include:

Expanded solar power. Minnesota has enough solar resources to produce 4,000 to 5,000 Whr per square meter using photovoltaic systems and 3,500 to 4,500 Whr per square meter using concentrating solar power systems. This means that devoting just 1 square mile in Minnesota to solar power can provide enough electricity for about

1,100 households each year.

Expanded wind power. Minnesota is currently ranked 4th for wind power, with 1,366 MW of existing electricity generation capacity and 250 MW under construction. The American Wind Energy Association ranks Minnesota 9th in terms of its future wind potential, with 75,000 MW of potential capacity.

Biomass power. Minnesota has 21.2 million dry tons of biomass available each year that could be used to generate about 4,200 MW of electricity.

New jobs. Committing to a 30 percent growth in solar energy use in the United States will bring 587 jobs and \$474 million investment to Minnesota.

A stronger economy. Minnesota could realize as many as 3,064 jobs manufacturing wind turbines and \$1.02 billion investment in the wind industry alone if 50,000 MW of new wind energy is created on a national level.

How does Minnesota use electricity?

Minnesota's energy is used to power:

- homes (33 percent),
- businesses (33 percent), and
- industry (34 percent).

Per capita residential electricity use is 4,250 kilowatt hours per year, near the national average.

References and Additional Reading:

American Council for an Energy-Efficiency Economy, www.aceee.org.

American Wind Energy Association, www.awea.org.

Bioenergy Feedstock Information Network, bioenergy.ornl.gov

CARMA (Carbon Monitoring for Action), www.CARMA.org.

Database of State Incentives for Renewables and Efficiency, www.dsireusa.org.

Department of Energy, Energy Efficiency and Renewable Energy, apps1.eere.energy.gov/states/alternatives/electricity.cfm.

Energy Information Administration, State Energy Data System, www.eia.doe.gov/emeu/states/_seds_updates.html.

Environmental Protection Agency, Energy CO₂ emissions by state, www.epa.gov/climatechange/emissions/state_energyco2inv.html.

Geothermal Energy Association, www.geo-energy.org.

McKinsey Global Institute, 2007: *Wasted Energy: How the U.S. Can Reach its Energy Productivity Potential*.

Political Economy Research Institute, www.peri.umass.edu.

Renewable Energy Policy Project, www.repp.org.

For more information, visit www.nwf.org/globalwarming.