

# WIND POWERING AMERICA



**Strengthening rural economies**



**Powering our communities and businesses**



**Securing a clean energy future**



**U.S. Department of Energy**

**Energy Efficiency and Renewable Energy**

Bringing you a prosperous future where energy is clean, abundant, reliable, and affordable





Herziger, Lloyd - General Electric Company/PX1 1952



Tom Maves/PX1 4826

## Wind Powering Our Communities and Businesses

Wind turbines convert the kinetic energy in the wind into mechanical power that turns a generator that produces electricity to power homes, schools, businesses, and communities.

A typical wind turbine generates electricity 65% to 90% of the time, depending on the pattern of the wind speeds at its location.

Wind energy is one of the fastest growing new energy sources in the United States, second only to natural gas.

Wind is economically competitive with other energy resources and helps stabilize our nation's energy portfolios.

Areas with good wind resources have the potential to supply up to 20% of the electricity used in the United States.

*"In my 44 years in the municipal utility business, no utility project has ever generated more customer support and interest than our wind turbine project."*

**Nick Scholer, former manager  
of Algona Municipal Utilities,  
Algona, Iowa.**



U.S. wind farms will generate 48 billion kilowatt-hours of electricity in 2008. That's enough to power 4.5 million homes.

The generating capacity installed in 2007 alone represented a capital investment of almost \$9 billion and generated more than 10,000 new jobs. If wind energy were to provide 20% of the nation's electricity by 2030, the wind industry would have a total economic impact in excess of \$1 trillion and would support nearly 500,000 jobs.

\$500,000 – \$1,000,000 in new annual property tax payments are generated for every 100 MW of installed wind energy capacity.

Wind energy is the lowest cost option for meeting the renewable portfolio standards in 25 states.

*"Converting the wind into a much-needed commodity while providing good jobs, the Colorado Green Wind Farm is a boost to our local economy and tax base."*

**John Stulp, Commissioner  
of Agriculture, Colorado**



John Stulp/PX13298

## Strengthening Rural Economies

Rural landowners receive \$2,000 to \$4,000 per turbine per year in land-lease payments.

If wind were to produce 20% of the nation's electricity, annual land-lease payments to rural landowners would top \$600 million and the industry would generate additional local tax revenues of more than \$1.5 billion annually by 2030.

Only 3% to 5% of the land within the boundaries of a wind farm is needed for the generators and their service roads. The rest remains available for farming and ranching.

*"Higher production costs combined with low commodity prices paid to farmers spells economic trouble for rural America. That's why the American Corn Growers Foundation (ACGF) and the American Corn Growers Association (ACGA) promote wind energy. It's why we developed the Wealth from the Wind Program. We support wind farming as both an alternative income stream for farmers and landowners and an economic development opportunity for rural communities."*

**Dan McGuire, Director of ACGF and ACGA Wealth from the Wind Program. Lincoln, Nebraska**

*"We are very happy with our decision to become the first school in the State of Illinois to produce electricity by the use of a wind turbine. This past year we were able see gross savings of \$100,000 with the turbine, which we had predicted before construction. Not only is it good for our district's checkbook, it is the wise and prudent decision with our environment."*

**Terry Gutshall  
School Superintendent, Bureau Valley Unit  
School District #340, Manlius, Illinois**



Wind energy can help our schools save money while providing the education our next generation needs to become the professionals required for a rapidly growing industry.

New Providence Community School District in Eldora Iowa installed a 750-kW wind turbine at the high school in 2002. During the first three months of 2003, the turbine saved the district \$25,170 and generated \$2,698 in extra income.

The Bureau Valley High School in Northern Illinois installed a 660-kW wind turbine in 2005 to offset their energy use. In the first 7 months of operation, the turbine produced 646,397 kWh of energy and the school estimates it will save \$100,000 per year – enough to pay for two teachers. The school district considers the turbine to be a great way to earn some money, teach students about renewable energy, and help the environment.



Jenny Hager Photography/PXI 4913

Bureau Valley High School/PXI 13996

PXI



## Securing a Clean Energy Future

One of the greatest benefits of wind energy is the role it can play in stabilizing the cost of power generated by natural gas and coal and preserving these strategic energy resources for higher value uses than simply generating electricity. The most popular fuel for new power plants is natural gas. Future natural gas supplies are expected to come from liquefied natural gas (LNG). The largest sources for future LNG supplies are in Russia, Iran, and Qatar. By increasing electricity production from domestic resources like wind, we reduce our dependence on foreign supplies.

If 20% of the nation's electricity were produced by wind energy, it could displace approximately 50% of electricity generated from natural gas and 18% of that generated from coal.

Unstable fuel prices put U.S. manufacturers, consumers, and the economy at risk. Wind energy is not subject to unstable fuel prices and the cost of electricity produced by a wind turbine remains the same during its 20 years of production.

Wind energy increases security and stability by diversifying the national electricity portfolio.

*"From our winter pasture near the Wyoming border, we used to be able to see all the way to Denver. Now all we see is air pollution. We believe it's time to begin using pollution-free energy in the West. That's why our winter range now boasts a wind farm."*

Keith and Myrna Roman  
landowners/ranchers in  
Weld County, Colorado



Keith Roman/PX09055

Forty thousand tons of coal or 131,000 barrels of oil would be needed to generate the same amount of electricity as a single 1.5-MW wind turbine generates over 20 years.

Wind power generates no emissions and causes no pollution. A single 1-MW wind turbine displaces 2,000 tons of carbon dioxide (CO<sub>2</sub>) each year (equivalent to planting 1 square mile of forest), based on the current average U.S. utility fuel mix. Supplying 20% of the nation's electricity from wind could reduce electric sector CO<sub>2</sub> emissions by 25% and could reduce cumulative emissions through 2030 by 7,600 million metric tons.

Displacing large amounts of fossil-fueled power generation with wind energy also reduces water consumption. Supplying 20% of our electricity with wind energy could save 4 trillion gallons of water from 2007 through 2030.

Of all types of electricity generation, wind is one of the least harmful to birds and other wildlife.

A modern wind turbine 300 meters (about 300 yards) away is no noisier than the reading room of a library and quieter than the sound of the blowing wind.

Todd Spink/PX14960

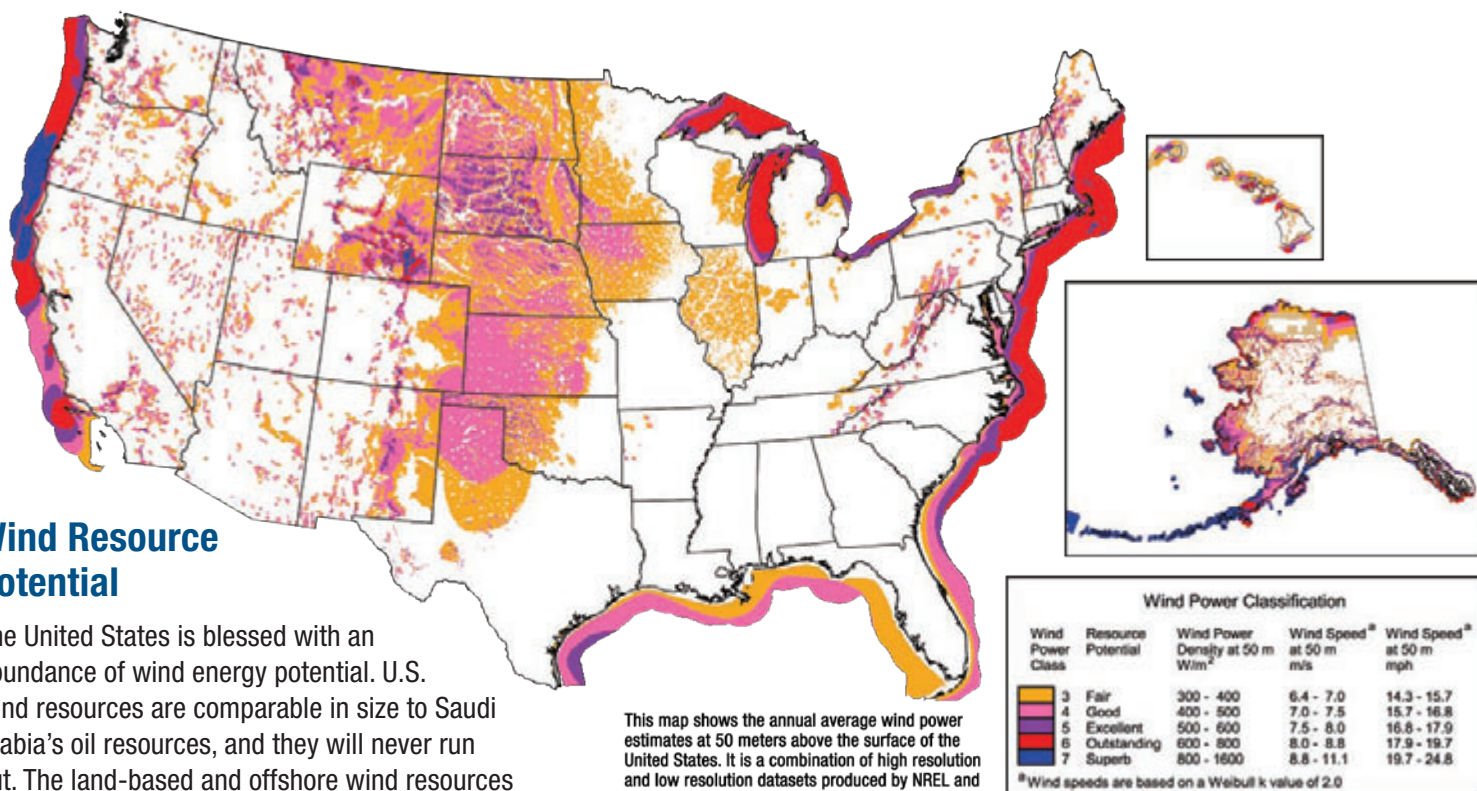
Warren Grez, NREL/PX00280





## Wind Resource Potential

The United States is blessed with an abundance of wind energy potential. U.S. wind resources are comparable in size to Saudi Arabia's oil resources, and they will never run out. The land-based and offshore wind resources have been estimated to be sufficient to supply the electrical energy needs of the entire country several times over. The nation's best wind resources are located at higher elevations and offshore.

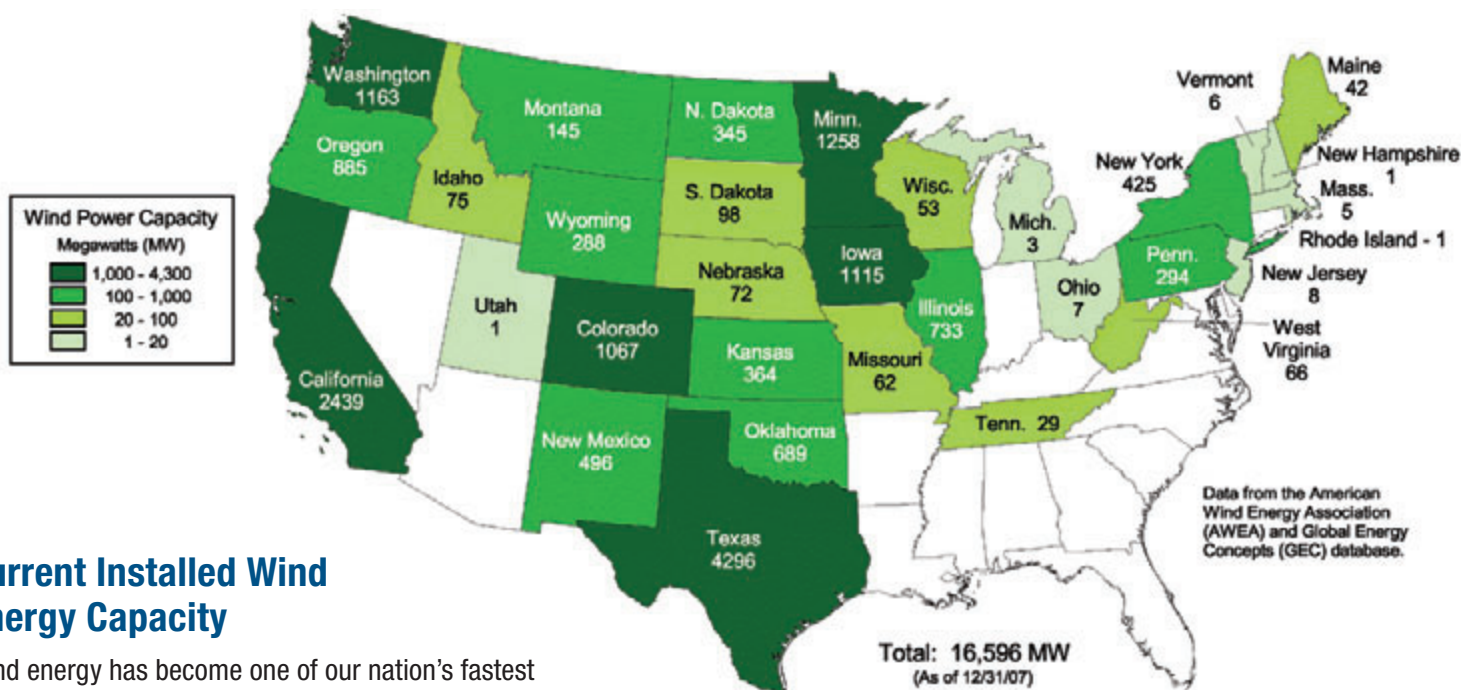


This map shows the annual average wind power estimates at 50 meters above the surface of the United States. It is a combination of high resolution and low resolution datasets produced by NREL and other organizations. The data was screened to eliminate areas unlikely to be developed onshore due to land use or environmental issues. In many states, the wind resource on this map is visually enhanced to better show the distribution on ridge



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Data from the American Wind Energy Association (AWEA) and Global Energy Concepts (GEC) database.

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28-JAN-2008 1.1.27

## Current Installed Wind Energy Capacity

Wind energy has become one of our nation's fastest growing electricity generation sources, growing from 1,800 MW of capacity in 1996 to more than 16,000 MW in 2007. Although that's enough to power about 4.5 million U.S. homes, it only accounts for about 1% of the national electricity supply. To provide 20% of the nation's electricity supply, U.S. wind capacity would have to increase to more than 300,000 MW.

## Resources

U.S. Department of Energy  
Wind Energy Program  
Forrestal Building  
1000 Independence Ave., S.W.  
Washington, D.C. 20585  
(202) 586-5348  
[www.windpoweringamerica.gov](http://www.windpoweringamerica.gov)

National Renewable Energy Laboratory  
National Wind Technology Center  
1617 Cole Boulevard  
Golden, Colorado 80401  
(303) 384-6979  
[www.nrel.gov/wind](http://www.nrel.gov/wind)

American Wind Energy Association  
122 C Street, N.W., Suite 380  
Washington, D.C. 20001  
phone (202) 383-2500  
fax (202) 383-2505  
[www.awea.org](http://www.awea.org)

National Wind Coordinating Collaborative  
c/o RESOLVE  
1255 23rd Street NW, Suite 275  
Washington, DC 20037  
phone (888) 764-WIND (202) 965-6398  
fax (202) 338-1264  
[www.nationalwind.org/contact.htm](http://www.nationalwind.org/contact.htm)

### A Strong Energy Portfolio for a Strong America

Energy efficiency and clean, renewable energy will mean a stronger economy, a cleaner environment, and greater energy independence for America. Working with a wide array of state, community, industry, and university partners, the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy invests in a diverse portfolio of energy technologies.

For more information contact:  
EERE Information Center  
1-877-EERE-INF (1-877-337-3463)  
[www.eere.energy.gov](http://www.eere.energy.gov)

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## Wind Powering America

The goal of the U.S. Department of Energy Wind Powering America (WPA) effort is to rapidly accelerate the market penetration of wind technology to secure the substantial energy, economic, environmental, and national security benefits for America. In 1999, only four states boasted more than 100 MW of installed wind capacity. By the end of 2007, 16 states had more than 100 MW of wind capacity. WPA's goal is to have 100 MW of wind capacity in 30 states by 2010.

To encourage the growth of wind energy, WPA works with national, regional, and state partners to communicate the opportunities and benefits of wind energy to communities and industry stakeholders. Although WPA's emphasis is on states and their rural agricultural sectors, which stand to reap significant economic benefits from wind energy development, it also provides technical assistance, education, and outreach to Native American communities, schools, public power entities, and government officials.

### State Wind Working Groups

WPA supports 30 state wind working groups by providing group members with timely information on the current state of wind technology, economics, wind resources, economic development impacts, and policy options/issues. Group members include landowners and agricultural sector representatives, utilities and regulators, colleges and universities, advocacy groups, and state and local officials.

### Regional Wind Energy Institutes

Wind Powering America is working to increase the adoption of wind energy in targeted regions through the formation of Regional Wind Energy Institutes (RWEIs). RWEI's will provide state wind outreach teams with the tools to effectively communicate the impacts of increasing wind capacities to the state's stakeholder groups. These tools include current information about the rapidly evolving market; wind's benefits, issues, and experiences; policy developments and options; economic impacts and strategies for increasing the use of wind; and regional wind energy activities. The information will be provided by WPA topical experts, wind industry experts, regional and state advocacy networks, and state policy and market leaders.

### Wind for Schools

WPA's Wind for Schools project is an education and outreach effort to engage universities and rural schools and communities in wind energy education through the installation of a small wind turbines.

### Wind Power for Native Americans

To support the development of Native American wind resources, WPA provides a wide range of technical assistance and outreach activities to more than 30 tribes in 13 states. To help tribes understand their wind resource and potential development options, WPA administers a Native American Anemometer Loan Program. WPA also provides wind energy training for Native Americans through the DOE-supported Wind Energy Applications and Training Symposium (WEATS).

For more information about Wind Powering America, visit  
[www.eere.energy.gov/windandhydro/windpoweringamerica/](http://www.eere.energy.gov/windandhydro/windpoweringamerica/)