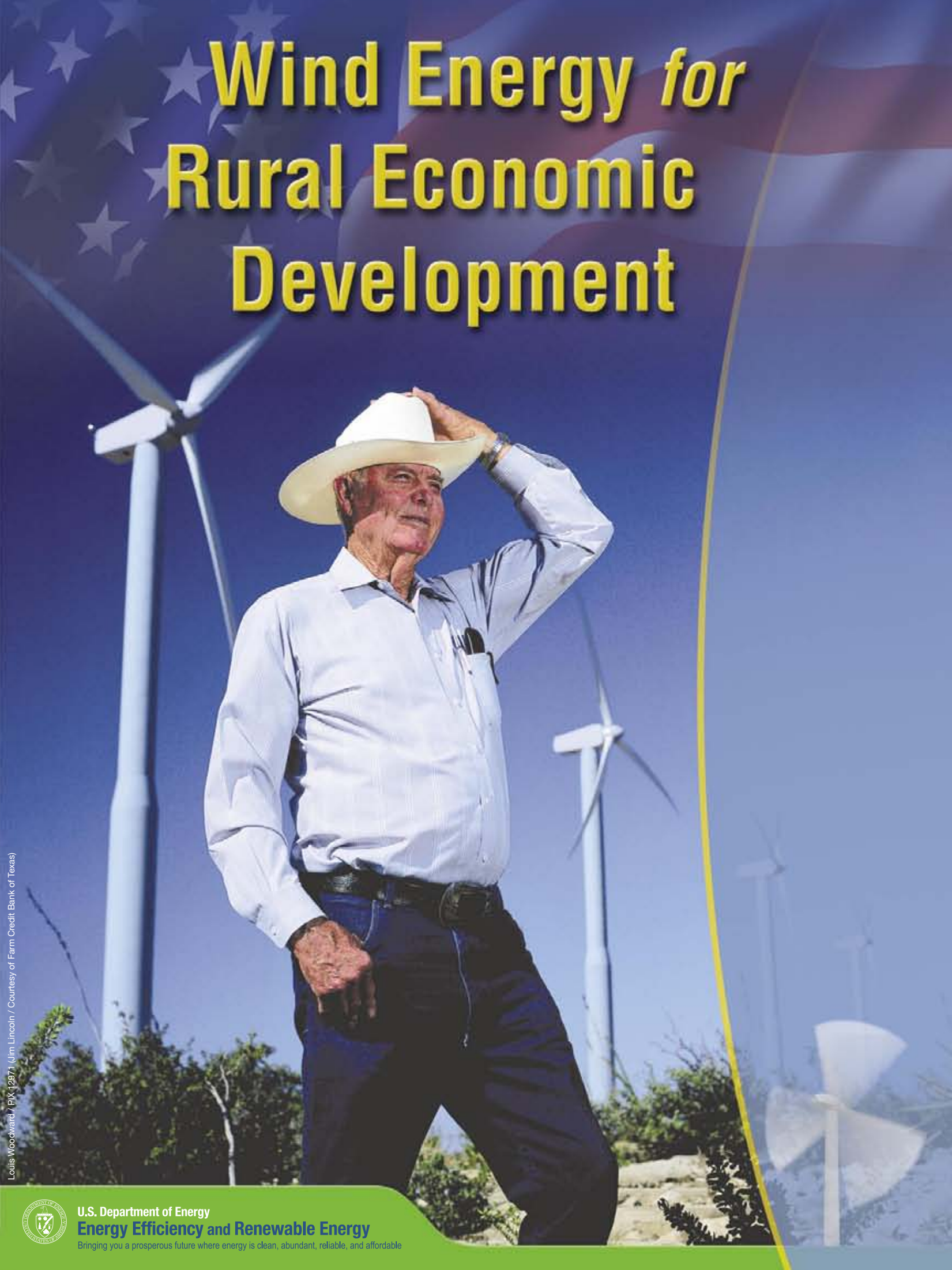
Wind Energy *for* Rural Economic Development



Louis Woodward / PIX 12971 (Jim Lincoln / Courtesy of Farm Credit Bank of Texas)

U.S. Department of Energy
Energy Efficiency and Renewable Energy
Bringing you a prosperous future where energy is clean, abundant, reliable, and affordable

Warren Gretz, NREL / PIX04082

Daniel McGuire / PIX12476

Dan McGuire, Lincoln, Nebraska – Director of the American Corn Growers Foundation and American Corn Growers Association Wealth from the Wind program

"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 and the American Corn Growers Association 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."

Larry Widdel, Minot, North Dakota – Farmer who leases his land to Basin Electric Power Cooperative and now enjoys revenue from two 1.5-megawatt (MW) turbines

"Who would have guessed that the air above our land might be worth money someday?"

Larry Widdel / PIX12550

Basin Electric Co. / PIX12152

Craig Cox / PIX11929

John Stulp / PIX13298

John Stulp, Lamar, Colorado – Commissioner for Prowers County, home to the 162-MW Colorado Green Wind Farm

"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."

Mike Newton, Highmore, South Dakota – Mayor of Highmore, a town that is now home to the 40-MW South Dakota Wind Energy Center

"I had heard some rumblings that wind energy was coming to South Dakota. I asked, 'Isn't there any way we can harness this energy and make it work around here?' And the rest, as they say, is history."

Mike Newton / PIX12934

©2003 GE Wind Energy / PIX12928

(Jim Yost / PIX10365)

Wind Energy for Rural Economic Development

It's tough to make a living on the family farm. In recent years, net farm income decreased as dry conditions in much of the country reduced the forecasted yields of corn, soybeans, and wheat. Lower commodity prices combined with higher fertilizer and natural gas prices forced farmers and ranchers to pursue income from off-farm sources—as much as 94% of their total income in 2003, according to the U.S. Department of Agriculture. High unemployment rates also affected rural families forced to work off the farm. Bankers foreclosed on farm loans in record numbers—for example, Colorado's foreclosure rate on farm loans was 30% in 2002. As young people move to the city to pursue an alternative way to make a living, the traditional rural American way of life is disappearing.

But there is a bright spot on the rural economic development horizon: wind energy. The wind industry contributes to the economies of 46 states, and the outlook for regional economic growth from wind energy is positive. Wind energy projects provide new jobs, a new source of revenue for farmers and ranchers, and an increased local tax base for rural communities. And wind energy is homegrown energy that helps secure our energy future during uncertain times while reducing pollution and conserving our precious water resources.

In fact, achieving the goals of the U.S. Department of Energy's Wind Powering America program during the next 20 years will create $60 billion in capital investment in rural America, provide $1.2 billion in new income for farmers and rural landowners, and create 80,000 new jobs. Wind energy is the fastest-growing energy source in the world, and your rural community may be able to reap the benefits.

Jobs

Wind energy projects create new jobs in rural communities in manufacturing, transportation, and project construction.

New projects in the Great Plains prompted Denmark's LM Glasfiber to open a rotor blade manufacturing plant in North Dakota. Wind turbine tower and component manufacturing plants have created new jobs in several states, including Washington, North Dakota, Nebraska, and Wisconsin.

Local labor is often used for project construction, like building roads and erecting turbines. Once the projects are complete, jobs are created in the operation and maintenance of the projects. The wind power plant in Lake Benton, Minnesota, is now the second largest employer in town. Construction on Iowa's major wind farms provided 200 six-month construction jobs and 40 permanent operations and maintenance jobs at an average wage of $16 per hour.

Wind energy projects create permanent operations and maintenance (O&M) jobs. (©2003 GE Wind Energy / PIX12933)

Wind energy projects generate more new jobs than conventional fossil fuel projects. According to a study by the New York State Energy Research and Development Authority, wind energy produces 27% more jobs per kilowatt-hour than coal plants and 66% more jobs than natural gas plants.

Prowers County Economy Reaps Rewards from Colorado Green Wind Farm

The economy turned around for the depressed rural communities in Prowers County when construction began on the Colorado Green Wind Farm in 2003. At the height of construction, subcontractors employed nearly 400 workers, providing a boost to local businesses. Local companies that provided services also benefited.

- ***Herling Construction*** built 25 miles of roads and excavated 108 turbine foundations.
- ***Mortensen*** employed 87 people to pour 35,000 yards of concrete.
- ***Gate City Steel*** employed as many as 14 people to install 45,000 pounds of rebar in each foundation.
- ***Christensen*** employed 46 people at the height of construction to install 20 miles of underground cable and build the substation.
- ***Wilson Construction*** employed 25 people to install more than 50 miles of buried cable and 44 miles of poles and cables to the new substation.
- ***Ridge Crane*** devoted two cranes to the project for three months.
- ***All-Rite Paving & Redi-Mix, Inc.*** supplied concrete for 32 miles of poles and for the substation.
- ***Country Acres Motel and RV Park***, which provided housing for construction workers, was booked solid for months.
- ***Wallace Gas and Oil*** provided up to two truckloads per day of fuel and lubricants for the vehicles and heavy equipment on the site.
- The ***Hay Stack Steak House*** experienced a 30% increase in business.
- Movie rentals at the local ***Movie Gallery*** increased 20%.*

**Craig Cox, Colorado Coalition for New Energy Technologies*

The People Want Wind Energy

The Municipal Energy Agency of Nebraska (MEAN) owns and purchases the power from this new 10.5-MW project near Kimball. (Tennessee Valley Infrastructure Group Inc. / PIX12088)

On a summer day in Nebraska in 2003, 109 people participated in an 8-hour special survey that yielded startling results. More than 60% of the survey participants traveled more than 100 miles to voice their opinions on electricity-generating options to the Nebraska Public Power District (NPPD).

The special survey, known as Deliberative Polling ™, revealed participants' feelings about continuing, decreasing, or expanding the NPPD's commitment to renewable resources after reading, discussing, and asking questions of experts. The survey revealed that an overwhelming 96% of the participants thought that the NPPD should move forward with a 200-MW wind project and the costs should be included in the base rate.

Wind Power Brings Relief to Rural Texas

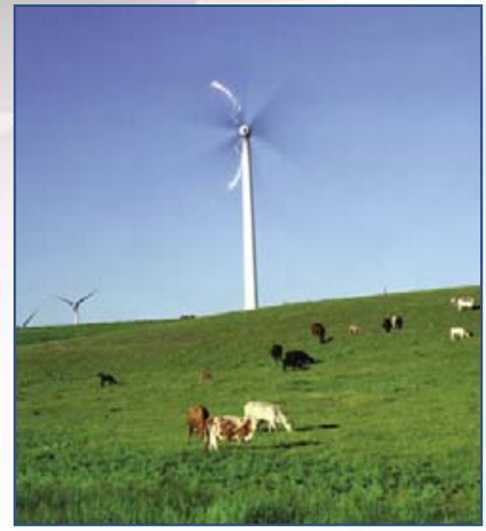
After the Texas legislature passed a Renewable Portfolio Standard (RPS), utilities and wind companies invested $1 billion in 2001 to build 912 MW of new wind power projects. The results? "The completed plants created 2,500 quality jobs with a payroll of $75 million, will deliver $13.3 million in tax revenue for schools and counties and pay landowners $2.5 million in royalty income in 2002 alone. The multiplier effect of this new investment activity will stimulate another 2,900 indirect jobs in Texas. Wind power is bringing relief to rural Texas and creating jobs state-wide."*

**SEED Coalition and Public Citizen's Texas office*

Landowner Revenues

Wind energy offers rural landowners a new cash crop. Although leasing arrangements vary widely, royalties are typically around $2,000 per year for a 750-kilowatt wind turbine or 2% to 3% of the project's gross revenues. Given typical wind turbine spacing requirements, a 250-acre farm could increase annual farm income by $14,000 per year, or more than $55 per acre. In a good year, that same plot of land might yield $90 worth of corn, $40 worth of wheat, and $5 worth of beef.

Wind turbines have a minimal effect on farming and ranching operations. The turbines have a small footprint, so crops can be grown and livestock can be grazed right up to the base of the turbine. As Leroy Ratzlaff, a third-generation landowner and farmer in Hyde County, South Dakota, said, "It's almost like renting out my farm and still having it. And the cows don't seem to mind a bit."



Wind turbines have a small footprint, so crops can be grown and livestock can be grazed right up to the base of the turbine. (Warren Gretz, NREL / PIX06332)

Increased Local Tax Base

Property tax payments from utility-scale wind projects provide much-needed revenue to rural communities for building new schools, roads, bridges, and other community infrastructure. Property tax payments of 1% of the assessed value of a wind project equal approximately $10,000 per megawatt for rural communities each year.

Because wind projects are more capital intensive than conventional power plants, property taxes for wind projects are often two to three times higher per unit of energy than conventional plants. Thanks to wind energy, Pecos County, Texas, added $4.6 million to its property tax revenue in 2002 alone. Here are some more examples of communities reaping the benefits of property tax revenue from wind energy projects:

- Lincoln County, Minnesota: $471,822 in 2003 (155 MW)
- Kewaunee County, Wisconsin: $200,000/year in property taxes, or 50% of the county's budget (20 MW)
- Carbon County, Wyoming: $480,000/year (85 MW)
- Iowa: $2.5 million/year (320 MW)
- Stateline project on the Oregon/ Washington border: $1.2 million/year (300 MW)
- Prowers County, Colorado: $2 million (162 MW).

The Texas General Land Office granted permission for Texas' first commercial wind energy farm to be built on state lands in the Delaware Mountains in West Texas. This project has added more than half a million dollars to the Permanent School Fund for use in Texas schools. (Southwestern Public Service Co. / PIX03615)

Minwind I and II: Innovative Farmer-Owned Projects Are the Wave of the Future

In 2000, a group of farmers in Luverne, Minnesota, were looking for an investment that would provide a source of income for farmers and would benefit the local community. The farmers formed two limited liability companies as a vehicle to pursue farmer-owned commercial wind turbines (the farmers chose LLCs because they allowed them to maximize their ability to take advantage of tax credits and other incentives).

Sixty-six investors purchased all available shares in 12 days. The companies had enough working capital to purchase four NEG Micon 950-kilowatt turbines (two at Minwind I and two at Minwind II). They decided that 85% of the shares must be owned by farmers; the rest are available for local townspeople.

After negotiations, the farmers signed a 15-year contract with Alliant Energy to purchase the electricity. There is so much local interest in the project that more Minwinds are planned. For more information, visit www.windustry.com.

Wind Energy vs. Conventional Energy

Wind energy is "homegrown" energy that produces no air or water emissions. It also makes the homeland more secure by reducing our dependence on foreign energy sources. Local wind energy can also ensure that dollars earmarked for conventional energy remain in the community. In 2001, a study conducted by the Nebraska Wind Energy Task Force found that while Nebraska spent $113 million on imported coal in 1998, the state's ten windiest counties experienced a median income 21% lower and a poverty rate 4% higher than the state average (based on 1995 data). The task force concluded that a commitment to developing wind power in Nebraska could help counteract these trends in rural areas. By contributing to utility-grade power generation, wind power can extend non-renewable energy sources, helping to secure our energy future, stabilize energy costs, and reduce our dependence on foreign energy. For these reasons, rural utilities are looking for ways to diversify their energy portfolios and partner in utility-grade wind power generation (See "The People Want Wind Energy," facing page).

Diversifying energy portfolios with wind energy also makes good economic sense. In 1979, wind energy cost 40 cents per kilowatt-hour. In 2004, the cost per kilowatt-hour dropped to between 3 and 4.5 cents per kilowatt-hour, making wind energy a competitive contender for electricity generation. In fact, when the Colorado Public Service Commission issued a ruling in 2001 on the 162-MW wind project in Lamar, Colorado, the commission determined that wind energy provided the lowest cost of any generation resource submitted to a solicitation bid by Xcel Energy. The commission also determined that unlike the other generation resources considered, the Lamar project avoided a future risk of increased fuel prices.

Wind energy provides yet another advantage over conventional fuels: conservation of our precious water resources. Conventional power plants use large amounts of water to generate power from fossil fuels; wind turbines do not. That makes wind energy a good choice for drought-stricken communities in rural America.

Warren Gretz / PIX04082

Corn Growers Support Wind Energy

In April of 2003, the American Corn Growers Foundation commissioned a nationwide, random, and scientific survey of 500+ corn farmers in the 14 states representing nearly 90% of the nation's corn production. The poll found that 93.3% of the nation's corn producers support wind energy; 88.8% want farmers, industry, and public institutions to promote wind power as an alternative energy source; and 87.5% want utility companies to accept electricity from wind turbines in their power mix.

Wind Energy Helps Mitigate Natural Gas Prices

Natural gas accounts for 80% to 90% of the cost of producing anhydrous ammonia for nitrogen fertilizers. When natural gas prices increase, farmers and ranchers are forced to pay higher utility bills and higher production costs.

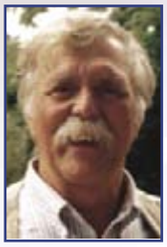
According to the U.S. Energy Information Administration, natural gas prices today are in the range of $5 to $6 per MMBtu. According to Ed DeMeo, president of Renewable Energy Consulting Services, gas industry analysts expect prices to be high for a number of years because the demand for gas continues to rise and new production is not keeping pace. At these prices, the fuel-cost component alone for a kilowatt-hour generated in most gas plants exceeds the total cost of a kilowatt-hour generated by a modern wind plant.

"A utility with both gas and wind plants can use wind energy when it's available, back off on the gas plant during those periods, and then ramp up the gas plant to maintain total system output when the wind dies down," DeMeo said. "The savings in gas resulting from the wind plant operation can more than cover the total wind plant costs, and the gas plant can maintain system reliability when the wind is fluctuating or not blowing. Total-system operating costs are reduced, total-system environmental emissions are reduced, and system reliability is maintained. Sounds good to me!"

Wind power has the potential to displace substantial amounts of natural gas consumption, thus reducing upward pressure on natural gas demand and prices.

The Colorado Green Wind Farm won a solicitation bid to Excel Energy, proving that wind energy can provide the most economical energy generation. (Craig Cox / PIX13052)

Minnesotans Export Crop of the Future to Cities



(Dave Benson / PIX12479)

Dave Benson

"There's no question in our minds that we need to move toward renewable energy, and wind energy development is significant for any community. This is one of the few bright spots in a rural landscape," said Dave Benson, farmer and county commissioner of Nobles County, Minnesota.

Wind energy generated in rural areas can be connected to the regional utility grid system and transmitted to other areas. Rural leaders in Benson's region are planning a new transmission line along I-90 that will bring wind energy to the Twin Cities. The region currently generates about 360 MW, but the rural communities can only use 50-60 MW.

"We need a line to export this new crop," Benson said. "And we're educating the community to be partners in owning the means of production. Our hope is that the local communities benefit."

Rural communities in Nobles County, Minnesota, plan to sell their excess wind energy. (Corey Babcock / PIX10629)

How Can I Bring Wind Energy to My Community?

- Learn more about the wind resource in your community. Access the latest state wind resource maps at www.eere.energy.gov/windpoweringamerica/wind_resources.html.
- Learn more about Section 9006 of the 2002 U.S. Farm Bill and the Value-Added Producer Grant Program, which provide grants and loans for farmers and ranchers who install renewable energy projects. Visit www.usda.gov/farmbill for more information.
- Determine the feasibility of a wind energy project in your community by accessing Wind Energy Finance (WEF), a free online cost of energy calculator that provides a quick, detailed economic evaluation of potential utility-scale wind energy projects. Visit www.eere.energy.gov/windpoweringamerica and click on Wind Energy Finance Calculator.
- Learn about the economic benefits of wind energy projects to your community by accessing the Job and Economic Development Impact (JEDI) model, a free online easy-to-use tool that provides an approximation of the economic impacts to the local county and state that can be generated from wind project development, during the construction phase and throughout the 20- to 30-year life of the project. Visit www.eere.energy.gov/windpoweringamerica for more information.
- Consider investing in a small wind turbine to help supply electricity for your farm or ranch operation. Visit the Wind Powering America Web site at www.windpoweringamerica.gov for more information on choosing the correct turbine size, assessing your wind resource, choosing the best site for your turbine, and connecting your turbine to the utility grid. Many states offer incentives; access the online DSIRE database at www.dsireusa.org to determine which incentives may apply to your installation.

Wind energy is part of rural America's past and future. (NMPP Energy / PIX11062)

Although integrating wind energy into the energy portfolio mix may sound like a futuristic concept, harnessing the power of the wind is hardly a new idea. Small turbines on individual farms and ranches were commonplace before the advent of rural electrification. Wind projects in rural America may be a return to the past that could help preserve rural communities and the family farm. Making a living on the family farm has never been easy, but harnessing wind energy as the cash crop of the future is a viable way to ease the financial burdens of farmers, ranchers, and rural communities and preserve the rural way of life.

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

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WIND POWERING AMERICA

In 1999, the U.S. Department of Energy launched Wind Powering America (WPA), a program to increase the use of wind energy in the United States over the next two decades. WPA's goals are to:

- Increase the number of states with 100 MW of wind capacity to 30 by 2010
- Support the American Wind Energy Association's goal of 100,000 MW of wind power by 2020.

Resources

U.S. Department of Energy
Wind Energy Program
Forrestal Building
1000 Independence Avenue, SW
Washington, DC 20585
(202) 586-5318
www.eere.energy.gov/windpoweringamerica

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

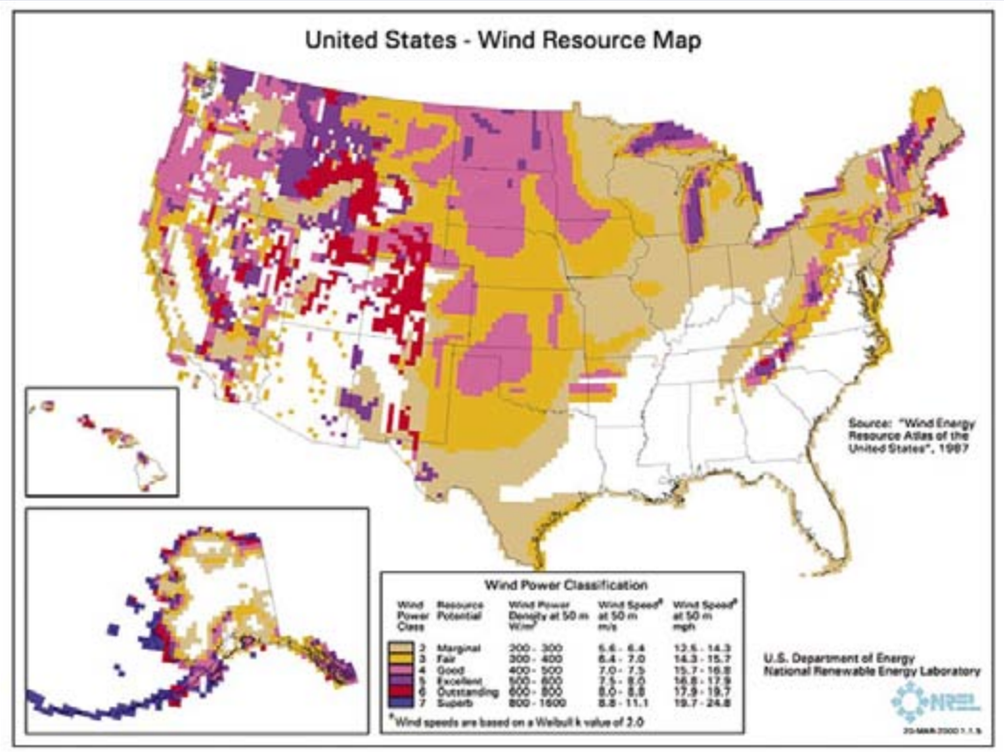
American Wind Energy Association
122 C Street NW, Suite 380
Washington, DC 20001
(202) 383-2500
www.awea.org

American Corn Growers Foundation
Wealth from the Wind Program
1730 M Street NW, Suite 911
Washington, DC 20036
(202) 835-0023
www.acgf.org

Windustry
2105 First Avenue, South
Minneapolis, MN 55404
(800) 946-3640
www.windustry.com

Utility Wind Interest Group
P.O. Box 2671
Springfield, VA 22152
(703) 644-5492
www.uwig.org

National Wind Coordinating Committee
1255 23rd Street NW, Suite 275
Washington, DC 20037
(888) 764-WIND
www.nationalwind.org



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WIND POWERING AMERICA

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.

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