

The Farmer as Wind Developer

A third opportunity for a farmer or group of farmers is to become a wind developer who produces power to sell to others. Electric companies increasingly buy their power from independent power producers rather than generating it themselves. They are also increasingly offering “green” or environmentally friendly power products and may be looking for suppliers of wind power. In addition, a number of states and the federal government provide incentives for wind power development.

Becoming a wind power developer has some important challenges, however. Purchasing one or more large wind turbines can be a substantial investment for even a large farm operation. And smaller wind farms may have to compete with larger, multiple-turbine wind farms, which

often have lower production costs due to economies of scale in manufacturing and installation. While green markets may create a place for niche products, the market for green power is still young and profit margins are small.

Farmers willing to take the risk could become wind investors as well. In Europe, cooperative ownership of one or more large turbines is common. Pooling resources with other farmers can be an attractive option for reducing risk and lowering costs. In Denmark, the law allows wind turbine co-ops to get a preferential rate from local utilities. But in the US, rates for independent power producers are low — generally not enough to justify a wind co-op. However, farmers may be able to team up with a rural electric co-op to finance a project and sell the wind power to its customers.

Typical Expenses for a Wind Turbine:

The economics of owning a turbine depend on many factors, including wind speeds, the size and cost of the wind turbine, interest rates, taxes, and electricity prices. One key issue is how much of the power the farm uses and how much is sold back to the utility. A study by the Izaak Walton League found that a wind turbine investment pays for itself most quickly when most or all of the power is used on the farm, since the farmer is saving power at the retail price, rather than selling it at a wholesale price.

With smaller wind turbines, most farm operations can use all of the power. But the cost per unit of electricity generated from smaller turbines is higher than that from larger turbines, so the payback period is longer. Since a well-maintained wind turbine can last 30 years, it can be a profitable investment. Like any other long-term investment, a thorough engineering and financial analysis is important before making the investment.

For more information —

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National Wind Technology Center
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303-384-6979 www.nwtc.nrel.gov

American Wind Energy Association
122 C Street, NW, Suite 380
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202-383-2504 www.awea.org

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

Windustry
2105 First Avenue
S. Minneapolis, MN 55404
612-377-2407 www.windustry.org

To find out more about renewable energy and agriculture, visit the UCS web page at www.ucusa.org/energy. Or write: Energy Program, Union of Concerned Scientists, Two Brattle Square, Cambridge, MA 02238. Or call: 617-547-5552.



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FACT SHEET

Farming the Wind: Wind Power and Agriculture

"I didn't really expect them to come all the way out here in northern Iowa to start a wind farm. But this is really great. Now we grow corn on the ground and generate power in the air — all on the same piece of property."

Delbert Watson, farmer near Clear Lake, Iowa, quoted in the *Christian Science Monitor*

The first heyday of wind power in America was from 1870 to 1930, when thousands of farmers used the wind to pump water and generate power. The second heyday is just beginning. The wind industry is expanding rapidly all over the world, with annual growth of more than 25% in the 1990s. In the US alone, over a billion dollars-worth of wind turbines came on line between June 1998 and June 1999—enough to power 350,000 homes.

The Department of Energy's "Wind Powering America" initiative has set a goal of producing 5% of the nation's electricity from wind by 2020. DOE projects to achieve this goal will add \$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 during the next 20 years.



Farmers can plant crops right to the base of the wind turbines.

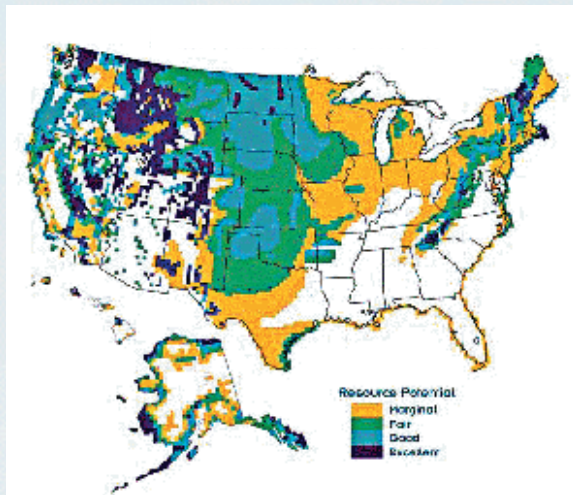
Photo: Warren Gretz, National Renewable Energy Lab

Until recently, wind power was concentrated in California. Now it can be found in 22 states. Farming regions in Minnesota and Iowa have emerged as major growth areas, followed by Texas, Wyoming, Colorado, and Wisconsin. Wind power is growing partly as a result of technology improvements and cost reductions and partly in response to state and federal laws and incentives.

While many people will benefit indirectly from the clean air and economic growth brought about by wind power development, farmers can benefit directly. Wind power can provide an important economic boost to farmers. Large wind turbines use only about a quarter acre of land, including access roads, so farmers can continue to plant crops and graze livestock right up to the base of the turbines.

Wind Resource Potential

Source: National Renewable Energy Lab



The Wind Resource

In theory, the wind could produce as much as six times current US electricity use. Some of the best wind resources in the country are on farmland, especially in the Plains states. However, the wind resource varies greatly from one location to another. Many states have been measuring the wind and collecting data that farmers could find useful for determining the wind potential on their land.

The market potential for wind also depends on the cost. The cost of producing wind power has fallen by as much as 90% since 1980. By 2010, electricity from new wind power projects will be cheaper than electricity from new conventional power plants, according to DOE.

How the Wind Can Help Farmers

Farmers and ranchers are in a unique position to benefit from the growth in the wind industry. To tap this market, farmers can lease land to wind developers, use the wind to generate power for their farms, or become wind power producers themselves.

Working with Wind Developers

One of the easiest and most attractive ways for farmers to benefit from wind

power is to allow developers to install large wind turbines on their land. The royalties are typically around \$2,000 per year for each turbine. These payments can provide a stable supplement to a farmer's income, helping to counteract swings in commodity prices.

Wind developers may offer landowners a fixed annual lease payment, a single up-front payment, a share of revenues from a wind project, or some combination of these. Although fixed payments may be lower than a share of revenues, they offer less risk to the landowner. Up-front payments may be attractive too, but if the property is sold within the time frame of the contract, it could complicate the sale. A new landowner who doesn't receive any income from the wind turbines may want to pay a lower price for the property. Also, up-front payments are often structured so that the developer receives a perpetual lease to the wind resource rights on the property. This can be a disadvantage, as the value of wind power is expected to increase over time. Basing the lease on a share of revenues is likely to be the best option for capturing future increases in the value of wind power.

Successful Wind Farming

The number of farmers and ranchers benefiting from wind power is growing. Here are some examples:

I think it's one of the greatest things that ever happened. It's good for my pocketbook. It's good for the environment. And wind is replenishable; we're not digging it out of a hole in the ground.

Chuck Goodman, retired farmer near Alta, Iowa, as quoted in Successful Farming. Goodman has three turbines owned by Enron Wind Corp., producing power for the utility MidAmerican Energy. The turbines take up about 1.3 acres of land, including an access road. Goodman gets \$750 per year per turbine, plus 2% of the revenue, for a total income of about \$6,000 per year.

Wind is homegrown energy that we can harvest right alongside our corn or soybeans or other crops. We can use the energy in our local communities or we can export it to other markets. We need to look carefully at wind energy as a source of economic growth for our region.

David Benson, Farmer & County Commissioner, Nobles County, Minnesota

From our winter pasture near the Wyoming border, we used to be able 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 & Myrna Roman, ranchers in Weld County, Colorado.

[The wind turbines] are clean and they are noiseless. We just love them. Everybody around here likes them as far as I know. I hope in the future that more people get them. The wind's free and it's here.

Donald and Irene Decker, farmers in Pennsylvania, quoted in Environmental News Network, June 21, 2000. The Deckers have four 200-foot-tall wind turbines installed on their family farm.

Owning a Turbine

Farmers and ranchers can generate their own power from the wind, just as their predecessors did in the 1930s and 1940s. Small wind generators, ranging from 400 watts to 40 kilowatts or more, can meet the needs of an entire farm or can be targeted to specific applications. In Texas and the West, for example, many ranchers use wind generators to pump water for cattle. Electric wind generators are much more efficient and reliable than the old water-pumping fan-bladed windmills. They may also be cheaper than extending power lines and are more convenient and cheaper than diesel generators.

"Net metering" enables farmers to get the most out of their wind turbines. When a turbine produces more power than the farm needs at that moment, the extra power flows back into the electricity system for others to use, turning the electric meter backwards. When the turbine produces less than the farm is using, the meter spins forward, as normal. At the end of the month or year, the farmer pays for the net consumption, or the electric company pays for the net production. Net metering rules and laws are in place in 30 states. Electricity providers in other states may also be willing to accommodate net metering.

Costs and payback of typical wind turbines

	Capital or Up-front cost	Annual energy production	Payback using all farm power needs
10 kW	\$30,000–32,000	20,000–28,000 kWh	18–27 years
225 kW	\$301,000–315,000	639,000–852,000 kWh	6–8 years
500 kW	\$504,000–535,000	1.1–1.5 million kWh	6–8 years

Assumes a retail electricity cost of 6 cents per kilowatt-hour and a wholesale electricity cost of 2 cents per kilowatt-hour paid by the utility. Wind turbines have a typical operating life of 30 years.

Source: Izaak Walton League of America, Landowner's Guide to Wind Energy in the Upper Midwest, 1995.