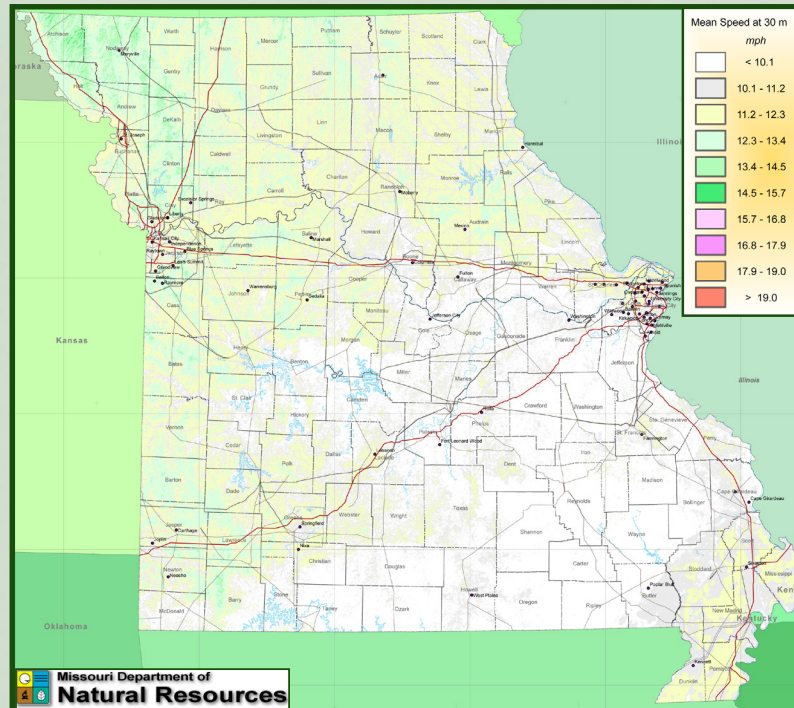


Wind power classification in Missouri



◀ The mean wind speed, measured at 30 meters, is shown here.

The economic feasibility of purchasing a wind turbine involves many factors such as wind speed in your location, wind turbine performance, size of wind turbine, future maintenance costs and the member's retail electricity costs.

Wind maps are available from the Missouri Department of Natural Resources at www.dnr.mo.gov/energy/renewables/wind-energy.htm#maps.

Net metering small wind turbines (100 kW and less) with Missouri cooperatives

The process of connecting a small wind turbine (100 kW or less) to the electric utility grid is called interconnection. The Missouri law “Net-Metering and Easy Connection Act” (Revised Statutes 386.890) specifies rules for interconnecting and providing credits for excess generation supplied to the grid. Your cooperative has an Interconnection Application/Net Metering Agreement based on this Act, which also addresses safety and power quality concerns and insurance recommendations. In order to Net Meter, the flow of electricity has to be measured in both directions, to and from the member, thus special metering may have to be installed.

Under the Act, your cooperative will net your monthly use against your monthly excess generation delivered to the grid, measured during each billing cycle. If your monthly use is greater than your monthly excess generation, you will pay the difference based on your cooperative's retail rate. If the excess generation delivered to the grid is greater than your use, you will receive a credit (equal to the monthly excess generation times the cooperative's avoided cost) on the next billing cycle.

For Missouri electric cooperatives, the credit is based on the average monthly avoided cost of Associated Electric Cooperative, Inc. (AECI), your

cooperative's wholesale power provider. Avoided cost is what it would cost AECI to generate power or purchase power from another utility. Under the Act, the credits have to be used within 12 months or they expire without compensation.

For safety reasons, the Act states small wind turbine must meet applicable codes for distributed generation developed by NEC (National Electric Code), NESC (National Electric Safety Code), UL (Underwriters Laboratory) and IEEE (Institute of Electrical and Electronic Engineers). One of which ensures that there is a form of protection that automatically disables the small wind turbine and interrupts the flow of electricity back onto the grid in the event that service to the member is interrupted. Your cooperative may also require you to provide a visible, accessible and lockable disconnect device on your small wind turbine to ensure it cannot back feed onto the grid during emergency conditions. The Act also requires installation be certified by a qualified professional electrician or engineer.

You can learn more about the Net-Metering and Easy Connection Act and find other resources from the Missouri Department of Natural Resources at www.dnr.mo.gov/energy/renewables/wind-energy.htm. Contact your cooperative for additional details.

Plugging into the power of a *Residential wind energy system*



Photo by Derek Jensen



Farmers' Electric Cooperative

Your Touchstone Energy® Cooperative



Safety. Member-Owner. Delivery of Power.

201 Business Highway 36 • Chillicothe, MO 64601 • (660) 646-4281 • fec-co.com

An overview of residential wind power generation



Wind generation example Boone Electric Cooperative – Harrisburg, Mo.

Information about the turbine:
Rated output: 1.8 kilowatts
Maximum output: 2.4 kW
Installation & equipment cost: \$15,000
Rotor elevation: 35 feet

Wind generation measured in kilowatt-hours (kWh)

	Total turbine output	Generation out to grid ¹	Household use ²
June ‘11	28	0	2680
July ‘11	27	1	3078
Aug. ‘11	13	0	4237
Sept. ‘11	28	1	3366
Oct. ‘11	25	1	1901
Nov. ‘11	79	9	2226
Dec. ‘11	55	3	3672
Jan. ‘12	89	5	4470
Feb. ‘12	47	2	4201
March ‘12	107	13	2563
April ‘12	40	2	2173
May ‘12	37	2	1988

¹Since electricity must be consumed at the time it is produced, if the turbine is producing more energy than the household is consuming at any given time, the excess generated goes “out to the grid.”

²Amount consumed by the household in the given billing period minus kWh generated by the turbine and consumed by the household.

Why are residential wind turbines getting more attention?

As we hear more about alternative energy sources and large “wind farms,” cooperative members are considering the practicality of installing a residential wind turbine on their property. A small wind energy system can provide some long-term savings on electricity as well as some environmental benefits by generating with renewable energy.

There are incentives available to encourage the use of renewable energy technologies. The Emergency Economic Stabilization Act of 2008 (P.L. 110-343) extended consumer tax incentives for using renewable energy technologies through 2016. Homeowners may qualify for a tax credit up to \$4,000 when installing a small wind energy system. To learn more go to www.energy.gov/taxbreaks.htm.

Should you decide to install a wind energy system, contact your local electric cooperative in the initial planning stages. Your cooperative will work with you and the wind turbine manufacturers to establish an “energy budget” to determine if a particular wind turbine and tower will produce the proper amount of electricity to meet your needs.

Your cooperative also can provide the necessary forms and assist with connecting your wind turbine to the electric distribution system of power lines, “the grid.” In addition, they will work with you to help you be more energy efficient. Reducing your energy consumption through energy-efficiency measures or conservation efforts will maximize your investment.

System requirements affect potential savings

The least expensive, and most common, small wind energy systems are grid connected systems interconnected behind the retail meter. If the turbine generates more electricity than you use, you will receive a credit on your bill in accordance with Missouri’s “Net-Metering and Easy Connection Act.” (See back page for more information.) If your monthly use is greater than your monthly excess generation, you will pay the difference based on your cooperative’s retail rate.

The basic elements for an individual wind energy system are consistent winds and adequate acreage. Installation costs for a 1- to 10-kilowatt grid-connected system are \$15,000 to \$50,000. The cost typically includes the tower and turbine, wiring, meters, electrical and AC/DC conversion equipment (inverter), labor costs for site preparation and installation.

The length of the payback period (the time before the savings resulting from the system equal the cost of the system itself) depends on the system, the wind resource in the area, electricity costs and how efficiently the electricity generated by the system is used. To shorten the payback period on the investment, the U.S. DOE suggests a property owner be paying at least 10 cents per kilowatt-hour (kWh) for electricity.

Stand-alone wind systems

If you are building in a remote location, the cost of running power lines to your property may be high. In this case, generating your own electricity with a stand-alone wind system could be an option.

Stand-alone wind systems are completely independent of and not connected to the electric utility grid. During low wind periods, the system uses storage batteries and supplemental power sources such as solar cells or fuel-burning generators to meet the home’s electricity needs. Storage batteries and supplemental power sources greatly increase the cost of generation with a residential wind system.

Safety Note

In general, state courts have held that the generation and transmission of electricity is a hazardous activity. Those involved in such activity are obligated to use the highest degree of care to protect the safety of the public.

If you generate or transmit electricity and fail to use appropriate care, and this results in personal injury or property damage, you could be held liable for the resulting harm and monetary loss. You may wish to consider purchasing liability insurance to protect you against this risk.

Will it help the environment to install a wind turbine?

Yes. Generating electricity using your own wind energy system supplements the amount of electricity generated from other sources. You can further lessen your own environmental impact by reducing your energy consumption through energy-efficiency measures or conservation efforts.

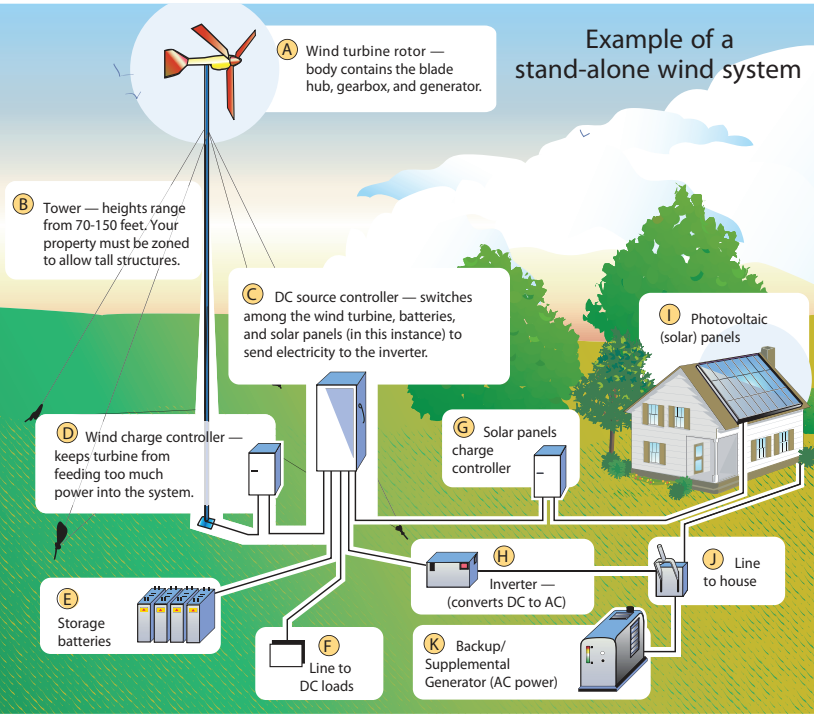
Go to www.TakeControlAndSave.coop to learn more about energy-efficiency.

Information Sources

American Wind Energy Association (AWEA)
(202) 383-2500 ~ www.awea.org/smallwind

U.S. Department of Energy (DOE) Energy Efficiency and Renewable Energy (EERE) Wind & Hydropower Technologies Program
www.windpoweringamerica.gov/small_wind.asp

Green Power Network, Net Metering Policy
www.eere.energy.gov/greenpower/markets/netmetering.shtml



Terms to know

Kilowatt (kW) -
The basic unit of electrical power, equal to 1,000 watts or 1.341 horsepower. A residential wind system is rated by the amount of kilowatts it can produce.

Kilowatt-hour (kWh) -
A unit of electrical energy equivalent to one kilowatt of power used for one hour. For example, a 100-watt light bulb burning for 10 hours uses one kWh.
(100W X 10 hours = 1,000 Watt hours = 1 kWh)
Consumers are billed by the number of kWh registered by their electric meter. The average household uses 800-1,300 kWh per month.

Public Utility Regulatory Policies Act (PURPA) 18CFR part 292 -
A 1978 federal law, section 210 requires electric utilities to purchase electricity produced from certain efficient power producers (often using renewable energy or natural gas).

Avoided cost -
The Federal Energy Regulatory Commission (FERC) established the concept of “avoided cost” as the basis for utility power purchase rates. Avoided cost is the rate it costs the utility to generate power itself, or to purchase it from another provider.

Net metering -
In Missouri, excess generated electricity above the member’s monthly use is credited on the next monthly bill by their utility company at the avoided cost.