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**Use at Will** – September 2009

**HARNESSING THE WIND'S ENERGY**

*- Small wind turbines provide an attainable way to generate renewable energy -*

For more than a thousand years we have been harnessing the power of wind to sail boats, pump water and grind grain. As time passed, new uses for wind power evolved and today it is used to generate clean renewable power for homes, businesses, farms and schools. And demand for this clean power is growing as Focus on Energy co-funded small wind turbine installations are expected to more than double in 2009 compared to 2008.

**What are small wind turbines?**

Wind turbines have become an important technology in the search for a renewable way to generate electricity. And as this technology improves, a growing number Wisconsin residents and businesses are investing their time and resources into this industry. In many of these cases small wind turbines make the most sense.

A small wind turbine has a rated capacity of 100 kilowatts (kW) or less. These systems work when wind passing over the turbine creates a rotary motion that turns an electric generator and creates electricity. The electricity output of a wind turbine depends on its size and the wind's speed through the rotor. As wind speed increases, the energy produced increases exponentially. For example, a 10 percent increase in average annual wind speed from 10 miles per hour to 11 miles per hour can result in a 33 percent increase in total electricity production.

“A 10 kW wind turbine can generate about 10,000 to 16,000 kilowatt-hours (kWh) annually, a bit more than the amount of electricity a typical household uses,” said Rich Hasselman, small wind technical lead for Focus on Energy, Wisconsin's statewide resource for energy efficiency and renewable energy.

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### **What are the benefits of small wind turbines?**

There are many benefits to using wind energy as a source of electricity, including:

- The cost of electricity generated from wind power is stable over time and isn't subject to swings in fuel prices because wind is free.
- Wind energy is clean, non-polluting and non-depletable. It does not produce smog, acid rain or greenhouse gases.
- A small wind turbine can help make a home or business energy independent.
- Wind turbines support the electric utility infrastructure by providing power exactly where it is needed.
- Building a wind turbine is a way to show your commitment to the community and the environment. By using wind power, you can demonstrate that renewable energy is a viable solution for a clean energy future.

### **What considerations should prospective owners of small wind turbines know about?**

While there are many benefits to owning a small wind turbine, wind power is not the best option for every situation or the lowest-cost source. There are a number of considerations to take into account including:

- Not all locations are suitable for a wind turbine. The quantity and quality of the wind resource at a site should be carefully evaluated by a wind assessor — including wind speed, terrain and proximity of buildings, trees and other obstacles. A rule of thumb is that small wind turbines should be installed to operate 30 feet above the trees and buildings located within 500 feet of the turbine, including the area's tree line. This means that most towers for Wisconsin are typically in the 80- to 120-foot range, or taller.
- In general, a taller tower will provide better access to a more productive wind resource. If an acceptable tower height that provides access to adequate wind resources cannot be installed, Focus on Energy recommends considering a different type of renewable energy, such as a solar electric system.
- Prior to installing any renewable energy system it's important to ensure your home or business is as energy efficient as possible. For every dollar you spend on energy efficiency, you can save three dollars on the cost of your renewable energy system.
- Like any mechanical system, small wind turbines require annual inspections and maintenance to function reliably. In some cases manufacturers may recommend a more frequent service interval. Focus on Energy recommends following manufacturer service and maintenance schedules, with inspections occurring at least once each year. Most installers will offer a service contract option as a part of the installation bid.

### **How can I implement a small wind turbine?**

The first step to implementing a small wind turbine is to learn about wind turbines to determine if it's the right energy solution for you. Getting a site assessment is the next step. These assessments provide site-specific information to evaluate site characteristics, the wind resource, and production estimates for turbines that can help meet your energy goals. During the site assessment, a renewable energy site assessor will evaluate the location and answer any questions about wind power and the different systems available. Following the site assessment, the assessor will provide a written report with feedback and suggestions on using wind power as well as next steps.

In addition to technical expertise, Focus on Energy offers financial assistance on small wind turbine projects; however, to receive financial assistance from Focus on Energy the project must first have an independent site assessment by a certified wind site assessor. And to help defray the initial cost, Focus offers 50 percent off site assessment fees for residences. For non-residential site assessments, Focus offers 100 percent reimbursement if a turbine is installed.

More financial assistance includes a Cash-Back Reward up to \$35,000, or a maximum of 25 percent of the project's cost (up to 35 percent for governments and nonprofits), on eligible projects involving wind turbines with a rated capacity of up to 20 kW. Eligible projects involving wind turbines with a rated capacity between 20 kW and 100 kW can receive an implementation grant up to \$100,000, or a maximum of 35 percent of the project's cost. In general, wind turbines on taller towers will produce more electricity and receive higher incentives. In addition to the Focus on Energy financial incentives, the federal government is also offering a 30 percent tax credit to help defray the costs of installing a wind turbine. Visit [focusonenergy.com/incentives](http://focusonenergy.com/incentives) for more information on Focus on Energy and federal incentives.

“Bottom line, installing small wind turbines can be a productive way to offset energy costs, while making a commitment to the community and the environment,” continued Hasselman. “And to help people make the step from idea to reality, Focus on Energy offers a network of experts across the state, as well as a variety of programs to help anyone plan, finance and install renewable energy systems.”

To learn more about small wind turbines, and if implementing renewable energy is the right decision for you, visit Focus on Energy's Web site [focusonenergy.com](http://focusonenergy.com) or call their Information Center at (800) 762-7077.

**About Focus on Energy**

Focus on Energy works with eligible Wisconsin residents and businesses to install cost effective energy efficiency and renewable energy projects. Focus information, resources and financial incentives help to implement projects that otherwise would not be completed, or to complete projects sooner than scheduled. Its efforts help Wisconsin residents and businesses manage rising energy costs, promote in-state economic development, protect our environment and control the state's growing demand for electricity and natural gas. For more information, call (800) 762-7077 or visit [focusonenergy.com](http://focusonenergy.com).

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