

Utilizing an Energy Harvest Grant provided by the PA Department of Environmental Protection, Mercer County Conservation District installed a Bergey 10 kW wind turbine at Munnell Run Farm on October 19, 2006. The Bergey wind turbine (pictured below) is a grid-connected system that provides electrical service to an educational facility, a century-old bank barn, and a rural life museum at Munnell Run Farm. Please contact us for continued updates on the performance of our small scale wind generation facility.



**Bergey BWC Excel-S 10 kW
Wind Turbine at Munnell Run Farm**



**Munnell Run Farm Foundation, Inc.
753 Greenville Road
Mercer, PA 16137**

**Phone: (724) 662-2242
Fax: (724) 662-3905**

Website: <http://munnellrunfarm.org>

This publication was made possible with the support of Munnell Run Farm Foundation, a 501c(3) non-profit organization.

Small Wind Energy: A Step by Step Guide to Implementing Small Scale Wind Projects



Small wind energy production is defined as a wind turbine that is capable of producing 100 kilowatts or less. These systems are sized to provide electricity to homes, farms, and small businesses. Small wind systems generally cost between \$3,000 to \$5,000 per kilowatt for a grid-connected installation. In spite of significant initial investment, these systems can help landowners reduce or altogether avoid utility costs.

Getting Started:

- **Evaluate Current Energy Costs**

Consider your average annual energy consumption and the average price per kilowatt-hour paid.



Most electric companies will provide you with an annual summary of your consumption and billing costs upon request. If you are paying in excess of \$150 per month, this technology may help offset your costs.

- **Determine The Average Wind For Your Area**

The U.S. Department of Energy measures wind on a scale from 1 to 7. Each class on the scale represents an average annual wind speed. As a general rule, a wind class of 2 or greater is recommended for small wind generation applications. You can



obtain a map of the wind resources of your location by visiting the following website: <http://www.pawindmap.org> and click the "EVALUATE" link.

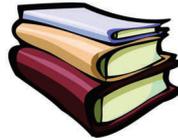
- **Assess Your Site**

A minimum of 1 acre is recommended by most installers and the American Wind Energy Association for small wind generation. Also consider clearance for physical wind barriers such as buildings, trees, or distinct changes in topography within 300 feet of your proposed location.



The lowest swept point of a wind turbine should be at least 30 feet above these barriers to avoid air turbulence. As a general rule, tower heights of at least 80 feet are recommended.

- **Investigate Local Zoning Ordinances**



Wind turbines are like other structures and require building permits. In some areas zoning laws may limit the height and placement of structures on your property. Ask your local municipal officials about applicable zoning laws that may affect your project. Under some circumstances a special permit may be required to erect these structures or special conditions may need to be met to obtain a building permit. If your local municipality prohibits towers of this type, then you must apply for a variance or petition them to revise their ordinance.



- **Examine Your Utility's Policy For Small Wind Generation Facilities**

If you are considering connecting the wind turbine to your current electrical service, you should contact your utility provider to discuss their rules governing "interconnection." Most companies have an existing Interconnection Agreement for these facilities; however, most require structural and electrical engineering drawings and site inspections prior to the equipment going online.

- **Research Small Wind Turbine Manufacturers**

Today there are numerous manufacturers of small wind turbines. You should shop around for different equipment to suit your objectives. Consider the performance and price of the equipment relative to your average wind speed. Below is a list of manufacturers that you may investigate further on the Internet. These manufacturers are certified or qualified by recognized agencies as meeting established standards and recommended business practices. Their contact information can be found by a Google search or accessing the American Wind Energy Association's website at <http://www.awea.org>, clicking "Small Wind" then "Equipment Providers." Some of these manufacturers have qualified professional installers in Pennsylvania.

Manufacturers

Abundant Renewable Energy
Bergey Windpower Co.
Entegrity Wind Systems
Energy Maintenance Service
Lorax Energy
Northern Power Systems
Solar Wind Works
Southwest Windpower Co.
Wind Turbine Industries Corp.



- **Install/Connect**

Obtain qualified professional installation assistance once you have selected a wind turbine that fits your needs. Seek professionals with

proven installation experience and manufacturers' certifications to complete your project. If your system is grid-connected you will need to ensure that your interconnection agreement is finalized and all equipment and electrical service inspections are performed prior to use.