

In-Depth

Small Wind Turbines

Dig deeper into themes and topics encountered at
Cascade Meadow

Function

The Cascade Meadow center and site feature several renewable energy systems. In partnership with Rochester Public Utilities (RPU), these renewable systems support one of our major goals - to demonstrate a range of market-ready renewable energy technologies. The wind turbines were purchased, installed and are maintained by RPU.

Renewable energy systems are generally considered appealing because they allow us to generate electricity without burning fossil fuels or emitting greenhouse gases into the atmosphere. However, in addition to these widely accepted positive impacts, each renewable energy system comes with its own challenges and barriers, each of which must be addressed when considering making the move to renewable energy. This sheet provides details for the wind turbines installed at Cascade Meadow and answers some of the typical questions that arise when considering the purchase of a wind turbine.



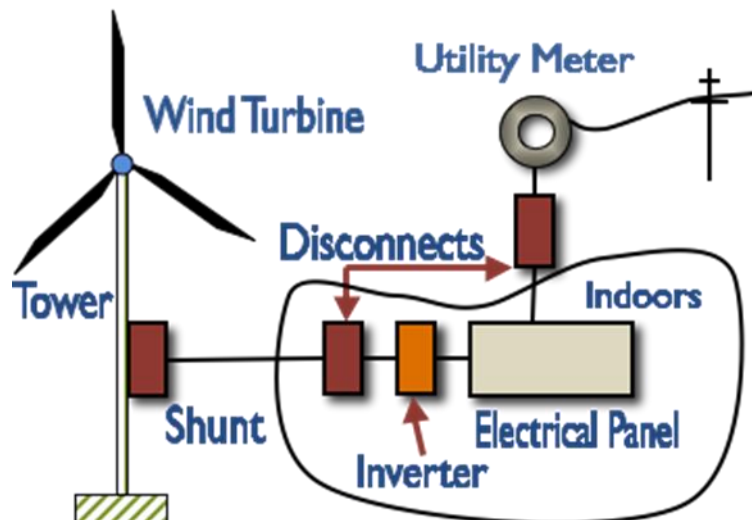
BanksPhotos.com

Our Wind Turbines

Cascade Meadow features two wind turbines. The first is a large horizontal axis turbine, mounted on a 100-foot monopole. The second is a smaller vertical axis turbine mounted on a 23-foot monopole. See the chart below for more detailed information.

	Manufacturer and model	Power rating (Watts)	Estimated annual energy production (kilowatt hours)	Inverters	Turbine Mounting
Horizontal Axis Wind Turbine (HAWT)	Bergey® BWC Excel 10kW	10,000 W	15,000-18,000 kWh	Gridtek® 10kW	Monopole
Vertical Axis Wind Turbine (VAWT)	Urban Green Energy® EddyGT 1kW	1,000 W	750 kWh	Power-One® 3kW	Monopole

What are the Typical Components of a Small Wind System?



Will Wind Power Work for You? Conduct a Feasibility Study

Wind power is exciting for people for many different reasons. Your motivation for a wind power project will impact your selection of equipment, your installation and operation, and the overall economics of your project. Small wind turbines won't work for everyone or every site. The process of deciding if wind is right for you is called a feasibility study. Read the details below to learn more about the process. For sites where small wind presents too many challenges, consider purchasing wind power from your power utility, become an advocate for large-scale wind projects or look into another renewable energy system, such as solar photo-voltaic or solar-thermal.

- 1) Explore your motivation: Why do you want a wind system? Are there simpler or less-expensive ways to reach your energy goals?
- 2) Know your wind resource: Does your site have enough wind to support a small wind turbine? Are there other practical or physical limitations at your site (tall structures or trees, inappropriate geology)?
- 3) Zoning/permitting: What local zoning or permitting rules including setback rules and ordinances affect your site?
- 4) Net metering: Will you tie your system to the grid? If so, what is the payment rate structure your utility will use to buy back extra power your system produces?
- 5) Choosing a turbine, tower and other equipment: Based on the above four items, research the available turbines and other equipment that meet your needs. Learn the differences between your choices for towers and the other required equipment.
- 6) Choosing an installer: Contact others in your area that have used renewable installers and learn as much as you can. See more on this below.
- 7) Working with your utility: Know the applicable laws that affect you and your utility. Keep in mind that your utility has its own interests to consider.
- 8) Insurance: While often overlooked, consider protecting your investment with insurance.
- 9) Operations and maintenance: Determine equipment needed for maintenance, and consider your options for climbing or tilting-down the tower for maintenance.

A Word on Energy Efficiency/Conservation

Before you try to decide on the size of your renewable system, work to reduce your overall requirements by replacing lighting and appliances with energy-efficient models. According to the founder of *Home Power* magazine Richard Perez, every dollar spent on energy efficiency saves three dollars in renewable energy system costs. What he means is that if you try to size your wind turbine for your current needs, you'll spend a lot more than if you reduce your needs through efficiency upgrades and then pick your turbine. Check out the Pyramid of Conservation for more information at www.mnpower.com/powerofonehome.

Additional Resources

Small wind incentives and rebates:

- For Rochester Public Utilities customers: RPU does not have a small wind incentive program at this time.
- For a comprehensive and up-to-date list of federal, state and local incentives and rebates, head to www.dsireusa.org.

Finding a qualified local vendor, consultant, and installer:

The Minnesota Office of Energy Security maintains a list of certified renewable energy installers. Download the most recent list on the Office of Energy Security website at www.energy.mn.gov > Renewables > Publications Directory > "Hiring a Renewable Energy Contractor." This document also provides a list of key questions to ask a renewable energy contractor.

For more information on the items above, see the following resources:

www.cleanenergyresourceteams.org/technology/wind/home
www.windustry.org/your-wind-project/home-and-farm-scale-wind/home-and-farm-scale-wind
<http://www.renewwisconsin.org/wind/windtoolbox.htm>

