

# In-Depth: Small Wind Turbines

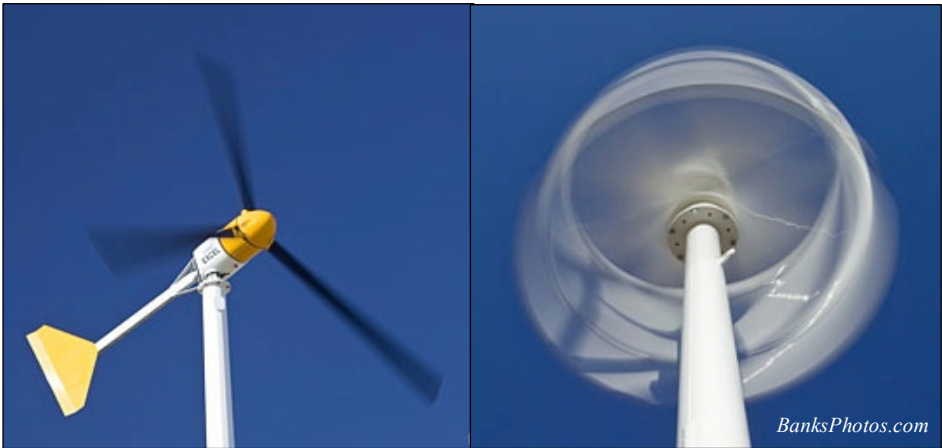
## Function

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. Of course, in addition to these widely-accepted positive impacts, each renewable energy system comes with its own challenges and obstacles, each of which must be addressed when a person considers making the move to renewable energy. This sheet provides details about the wind turbines installed at Cascade Meadow and answers some of the typical questions that arise for those considering the purchase of a wind turbine.

## Address efficiency first!

Before you decide on the size of your renewable system, reduce your overall requirements by replacing lighting and appliances with energy-efficient models. According to Richard Perez, founder of *Home Power* magazine, every dollar spent on energy efficiency saves three dollars in renewable energy system costs. 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 before you pick your turbine. Go to [www.mnpower.com/powerofonehome](http://www.mnpower.com/powerofonehome) for more information.

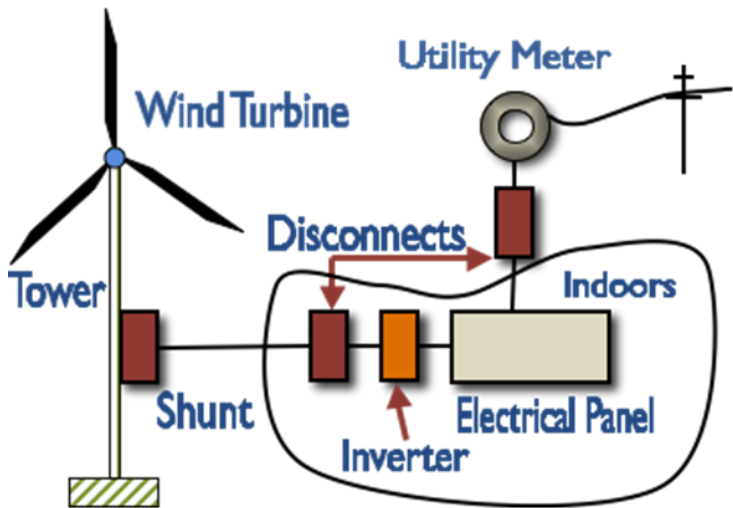


## Our wind turbines

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 the details.

	Manufacturer and model	Power rating (Watts)	Estimated annual energy production (kiloWatt hrs)	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 parts of a small wind system?





## Will wind power work for you? Conduct a feasibility study.

People are excited about wind power for many different reasons. Your motivation for undertaking 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. For sites where a small wind system 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. Research zoning/permitting: What local zoning or permitting rules, including setback rules and ordinances, affect your site?
4. Consider 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. Choose 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. Choose 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. Work 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. Insure your investment: This detail is often overlooked; consider protecting your investment with insurance.
9. Know the maintenance and operation costs: Be aware what equipment you'll need for maintenance, and consider your options for climbing or tilting-down the tower for upkeep.

## Additional resources

- To learn more about wind energy projects:
  - Visit [www.cleanenergyresourceteams.org/technology/wind/home](http://www.cleanenergyresourceteams.org/technology/wind/home).
  - Visit [www.windustry.org/your-wind-project/home-and-farm-scale-wind/home-and-farm-scale-wind](http://www.windustry.org/your-wind-project/home-and-farm-scale-wind/home-and-farm-scale-wind).
  - Visit [www.renewwisconsin.org/wind/windtoolbox.htm](http://www.renewwisconsin.org/wind/windtoolbox.htm).
- For a comprehensive and up-to-date list of federal, state, and local incentives and rebates, head to [www.dsireusa.org](http://www.dsireusa.org).
  - Note: For Rochester Public Utilities customers, RPU does not have a small wind incentive program at this time.
- To find a qualified local vendor, consultant, and installers:
  - Visit [www.thecleanenergybuilder.com](http://www.thecleanenergybuilder.com).
  - To see a list of key questions to ask a renewable energy contractor, visit [mn.gov/commerce/energy/images/Hiring-Renewable-Energy-Installer.pdf](http://mn.gov/commerce/energy/images/Hiring-Renewable-Energy-Installer.pdf).

### Learn More

Cascade Meadow's website provides lots of additional information about various sustainability technologies. Visit [www.cascademeadow.org](http://www.cascademeadow.org) for more details, and watch the website's Events page to learn about upcoming workshops and events that can help answer your sustainability questions.

demonstrate • educate • participate

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[www.cascademeadow.org](http://www.cascademeadow.org)