



# E<sup>3</sup>A: Small Wind Energy Applications for the Home, Farm or Ranch

## Steps in the Small Wind Series

Understand Small Wind

Electricity Consumption and Installation Options

Assessing Your Wind Resource

Estimating Energy Production

Selecting Turbine Model and Tower Height

Economic Considerations and Incentives

Siting and Permitting

Operation and Maintenance

Living with Small Wind

Wind for Pumping Water

### Small wind energy checklist

This series explores the applications and benefits of small wind systems and is meant to help you understand their benefits and limitations before you invest in a system.



Photo courtesy of DOI NREL  
Credit: Doug Nelson

### Is small wind energy right for me?

The following questions may help you decide if small wind will work for you.

**1. Are you willing to learn about small wind?** Great strides are being made, but small wind is still a buyer-beware market. Educate yourself about small wind systems, or hire a qualified installer or consultant to guide you through the process.

Yes  No  Uncertain

**2. Have you considered your energy consumption and the price of electricity?** Measures for energy conservation and efficiency are the best place to start. Knowing your current electricity usage and the cost of electricity is crucial to making an informed decision about a small wind system. Renewable energy systems are more cost-effective in markets with high electricity prices where conservation and efficiency measures have been implemented.

Yes  No  Uncertain

**3. Do you have a good wind resource?** Wind speed is an important factor in determining whether your wind resource is adequate for a small wind system. Average wind speeds below 6 mph are generally insufficient. Consider installing a small wind system if the average wind speed at your site is over 10 mph. Learn more about how to assess your site's average wind speed later in this module.

Yes  No  Uncertain

**4. Are you comfortable with some uncertainty in power production?** Wind speeds fluctuate, and system size, type and site characteristics will cause variations in energy output. If you want consistent power generation, a wind system may not be right for you.

Yes  No  Uncertain

**5. Are you willing to invest in a tall tower?** Wind speed increases the higher you are off the ground, so a tall tower allows your wind turbine to produce more electricity. The taller the tower, the greater the cost, so a tower can end up costing more than a turbine. Tower height will vary by location, cost and the turbine selected. Tower heights typically range from 45 to 120 feet. A tower height of 30 feet may be viable in some locations, but that is the exception.

Yes  No  Uncertain

**6. Can you finance a small wind system?** A system that would offset most of an average grid-connected home's electricity use, which is 10,000 kWh per year, costs about \$50,000 before incentives. Some homeowners reduce total investment in a wind system by offsetting only a portion of their total energy use. This reduces system cost but extends the payback period. Some installers or manufacturers offer financing, and incentives can offset 45 percent or more of

your total system cost. Many incentives come in the form of tax credits or reimbursements issued after installation, so you may have to finance the full cost of the system upfront.

*Note: Off-grid wind systems are typically smaller and therefore less expensive than grid-connected systems. However, other system components, such as batteries, add to the overall cost of an off-grid project.*

Yes                       No                       Uncertain

**7. Do you have enough available space?** You should have at least one acre of available land around the site where you would like to site your turbine. Zoning laws or ordinances may require a half acre to more than five acres of space based on the size of wind system.

Yes                       No                       Uncertain

**8. Does your area allow wind turbines?** Some areas do not allow wind turbines or have special permitting requirements for small wind turbines. Zoning restrictions may limit structure height, noise, tower placement and tower type. Consult your electrical utility to determine if wind generators are allowed and what utility company rules you must follow to remain connected to your electrical utility.

Yes                       No                       Uncertain

**9. Are you willing to maintain the system?** Small wind turbines require annual maintenance. Maintenance activities vary from system to system, but all require the same basic maintenance. You need to climb the tower, use a bucket truck or take the system down — if you have a tilt-up tower — each year to inspect and repair the turbine. If you are unwilling to maintain your system or hire someone to perform maintenance work, a wind system may not be for you.

Yes                       No                       Uncertain

**10. Do you know what wind looks like when installed?** Visit an installed wind turbine to learn how it sounds and how a turbine and tower look when installed. Talk to your neighbors about any concerns or objections they may have to your proposed system.

Yes                       No                       Uncertain

### Consider your answers

- If you answered “yes” to most of these questions, you may be a good candidate for a small wind system.
- If you answered “no” to questions 3, 6 or 7, you are probably not a good candidate for small wind.
- If you answered “no” to questions 1, 2, 4, 5, 8, 9 or 10, you may wish to do more research before investing in a system. The other guides in this module can help you learn more about small wind systems.
- If you’re uncertain about most of these questions, do more research before deciding if a wind system is right for you.

Original work created by Montana State University Extension and the University of Wyoming.  
Adapted with permission by University of Missouri Extension.