



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

## Steps in the Small Wind Series

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Wind for Pumping Water

### Living with small wind

This guide addresses considerations and questions about living with a small wind turbine.

#### Insurance

For grid-connected systems, your utility will probably require liability insurance though. The amount of required coverage varies. If your turbine is financed or if your home is off the grid, your lender may also require liability coverage for personal injury and damage to property from the turbine. A blade detaching from the rotor hub and damaging a neighbor's roof would be an example of property damage. Personal injury coverage includes people being hurt while working on the generator and those working on utility lines during an outage. Industry proponents point out that there are few examples of people being hurt or liability claims related to small wind systems. Budget for the insurance cost for the life of the system.

Insurance for the turbine itself should also be included in your budget for the life of the system. Turbine insurance helps cover replacement costs in an unexpected event, such as extreme winds, lightning strikes or wildfires. Coverage usually also addresses theft, vandalism, fire caused by internal malfunctions, flooding and acts of God. Including the turbine on your homeowners insurance is the easiest and least expensive means of insuring the turbine. The turbine would be considered an appurtenant structure if it is on the same property as your home, which is the same coverage used for a shop, disconnected garage or barn. Coverage costs can be inexpensive, but discuss with your insurance agent the costs and types of coverage if the turbine is not on the same property as your home.

#### Lightning

A properly sited wind turbine is generally the tallest structure on your property. Lightning strikes occur on small wind systems, but lightning protection equipment is standard for small wind turbines. Many electrical system components have protective features built into them at the manufacturing facility, and proper installation includes electrical grounding. Guywires should have grounding rods or a concrete anchor at each point where the cable comes in contact with the soil. Towers should have grounding rods connect to each tower leg. Grid-connected systems have additional protections in place from the utility side of the inverter, including grounding, lightning and voltage surge arrestors. None of these protections will prevent lightning strikes, but they will mitigate the damage lightning causes to your small wind system. These measures also demonstrate to the insurance company and manufacturer that you have taken prudent steps to protect your system.

#### Icing and ice shedding

Ice can affect a small wind system in two ways. The first is when weather conditions allow ice to form on system components but there is no wind to keep the turbine in motion. The turbine may freeze, but ice typically does not cause damage. You can thaw the turbine, but system owners usually wait for the ice to melt.

The second issue is ice shedding. When ice builds on rotor blades, it affects the aerodynamics of the blade. In large, utility-scale equipment, the blades can build enough momentum to "throw" ice off the blade. Small wind systems turn more slowly when iced. While it is rare for ice throwing to occur with small wind turbines, some zoning

ordinances prohibit ice being thrown over property lines or onto public rights of way. Discuss icing and ice shedding with the turbine manufacturer or installer to learn about your turbine's performance in ice situations.

## Birds and bats

As mentioned in the *Siting and Permitting* guide, there are no comprehensive studies on avian impacts with small wind systems. Use common sense and do not site a wind turbine in or near a sensitive area.

## Shadow flicker and noise

Shadow flicker occurs when the intermittent shadow of the rotating blades passes over an object, such as a house. Shadow flicker is a growing concern in utility-scale wind but is rarely discussed in small wind. Siting restrictions in some local ordinances ensure turbines do not cause shadow flicker on neighboring properties. Consider the possibility of shadow flicker on your own home and site the turbine accordingly.

Additionally, unusual noises might indicate a problem with your turbine. Issues with bushings, yaw or unbalanced blades change the sound a turbine creates. Sensitivity to changes in sound may help you catch problems before they get out of hand.

## Wind easement

In some situations, small wind turbine owners seek to protect the wind resource on their property by ensuring undisturbed flow of wind across neighboring properties. Check local ordinances to determine if a wind easement is allowed in your location. There are several considerations in developing an easement with your neighbors.

The agreement must be in writing, recorded and filed according to requirements for other easements on real property. Check with your county clerk and recorder's office for those requirements. The agreement must include:

- A legal description of property benefited and property burdened by the easement

- Dimensions of horizontal space across and vertical space above the burdened property that must remain unobstructed
- Types of restrictions — vegetation, structures, wind turbines or other objects — that would impair the wind resource
- Terms or conditions for changing the easement

Your neighbors are not obligated to enter into an easement agreement with you and may expect compensation from you for the burden you are placing on their property. Legal counsel is encouraged if you intend to pursue this type of agreement.

## Property tax implications

Your property taxes may be affected by the installation of a small wind system. Tax codes change, and the actual effect on your property taxes varies according to your situation. Contact the Missouri Department of Revenue to understand your property tax implications. There are presently many property tax exemptions in place for renewable energy systems, but some of those exemptions expire over a set number of years. Determine whether any exemptions offered will expire during the life expectancy of your system.

## References

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