

## Back to Basics: Wind-Site Assessments

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*What to expect from a wind-site-assessment report.*

In the September/October issue, I described the best tools for estimating the wind resource for a small wind turbine and discussed the need to have a trained wind-site assessor evaluate your potential wind site. This column will lay out the items that should be covered in a thorough wind-site assessment.

### Initial Contact

On first contact, determine the site assessor's qualifications and any ties he or she might have to small-turbine manufacturers, however loose those ties may be. For example, many practitioners (but certainly not all) were trained at a workshop sponsored by a manufacturer. Such trainings vary considerably in quality. Some adequately cover the all-important topics of wind turbine towers and siting, while others focus far more on simply closing the sale. Training from or association with a manufacturer is not a fatal flaw, but it is good to know if there will be any potential bias. For instance, if the assessor represents a company that offers one tower size for all sites and applications, look elsewhere, as all you are likely to come away with is an intense sales pitch.

The first piece of information that the assessor will require is your annual electricity usage. She will likely ask you about your major appliances and try to identify energy-efficiency strategies that make sense in your situation. Keep in mind that it is always cheaper to use energy more efficiently (with compact fluorescent lighting and high-efficiency appliances) than it is to install renewable energy equipment to offset electricity consumed by wasteful appliances. The rule of thumb is that every dollar spent on efficiency saves three dollars in generating capacity.

Make sure that you settle on a price for the site-assessment service, which should include a written report to be delivered on some reasonable date.

### The Site Visit

When the assessor visits, he will want to walk around your premises. He is simply getting a lay of the land and looking for current and potential future obstacles that will affect the performance of the wind turbine by restricting wind flow. The assessor will also want to know your preferred location for the turbine and tower, as well as the location of the building where the controls and inverter for the system will be housed. The assessor will determine the heights of tallest obstacles on the property, usually trees, and their distance from the proposed tower site. These numbers will be used to determine the minimum acceptable tower height for the location and help in estimating the average annual wind speed for the site.

A good assessor will take pictures of the site in eight or more directions, for two reasons. The first is simply to refresh his or her memory when reviewing your site infor-

mation. The second reason is to include these pictures in the wind-site-assessment report. It is not unusual for a wind-site-assessment report to be reviewed by the permitting or zoning authority, the local utility, financing or granting institutions including banks, the state public benefits program or the U.S. Department of Agriculture (USDA). Photographs will help them understand what you plan to do.

### The Final Report

The assessor's formal report should include —

- The minimum acceptable tower height for the site based on terrain and ground clutter. This should take into account the height that the surrounding trees will attain in the 20- to 30-year life of the wind system.
- The wind rose for the site, detailing the seasonal prevailing wind directions and any patterns. This is useful for siting the tower upwind of obstacles to minimize ground drag and turbulence.
- Aerial photographs of the property showing all structures, infrastructure and trees within a 500-foot radius of the tower location.
- Topographic maps of the area with a 1 to 3 mile radius that conveys a sense of the lay of the land.
- The conservatively estimated wind resource at the site at the minimum tower height specified, as well as an explanation about how the average annual wind speed for the site was arrived at.
- A list of several wind turbine models that will, ideally, offset the electrical consumption of the owners. The suggested turbines may include systems that are larger than required to account for future growth in consumption, or smaller than currently required if there are opportunities for efficiency savings.
- The estimated annual energy output of the suggested turbines, at this location, at the specified tower height and estimated wind speed. In the end, this is really the purpose of a wind-site assessment — to estimate how much electricity this investment will generate that offsets utility-supplied energy. An explanation of how the annual energy outputs were arrived at should also be included.

In addition, some public benefits programs, as well as the USDA, may require additional information for their grants — specifically, any historical disruptions or environmental ramifications of the project.

Based on the above, the assessor will make recommendations to the customer to optimize the wind resource at the site with a small wind system.

Finally, the assessment will need to specify how the customer should proceed. The customer's first tasks should be contacting the local utility for the interconnection requirements and an application and the local zoning authority for the building permit. **57**