

# Wind Turbine Purchasing Tips

## Up to 1 kW: Battery-Charging, Off-Grid Applications

Small wind turbines for personal use are increasingly accessible through major retail outlets. Buying and installing even a “mini” wind turbine is a long-term commitment with long-term benefits. If you want to pursue the environmental and economic advantages of generating your own electricity with wind, you may want to know:

### What benefits can I expect?

The smallest (< 1 kW) wind turbines have a variety of applications, providing off-grid power for pumps and irrigation systems, telecommunications, navigation equipment, area lighting, and small remote sites and seasonal loads. The equipment usually costs \$2,800-\$3,000 per kW, but installation costs increase the total by more than double, typically to \$5,000-7,000/kW for this size. Note that prices based on manufacturers’ rated power do not necessarily provide comparable resulting costs for energy production at a given wind speed. The benefits depend on how windy your site is, how much you would otherwise pay for electricity, and what value you place on having a clean, independent, fuel-free source of electricity.

### Is my site suitable for a wind turbine?

Small turbines require a minimum wind speed of 15 km/hr (4 m/s) just to operate; wind maps ([www.windatlas.ca](http://www.windatlas.ca)) can give you an idea of whether your area gets enough wind on an annual basis. However the average wind speed is not always the best indicator of a site’s suitability due to seasonal advantages, particularly for off-grid applications. Even the smallest wind turbines must be elevated well above nearby structures to capture the wind and minimize air turbulence. Check with your local permitting agency about setbacks and height restrictions. In most cases it is not a good idea to mount a small wind turbine on your dwelling or other rooftop.

### Which turbine is best for me?

First, you will need to know your annual electricity consumption (in kWh). Matching turbine output to your needs is generally a function of the available wind resource and the length of the rotor blades. You will also need “balance of system” (BOS) components (batteries and inverter, cables, switches, circuit breakers, meters, etc.) that are not necessarily supplied by the turbine manufacturer. Buy certified equipment from a reputable authorized dealer, and look for a manufacturer with documented minimum 5-year warranty service and a turbine with a solid performance record.

### How can I get my installation approved?

As with erecting any structure on your property, you will need to obtain a building permit and pass building and electrical code inspections. You are required to notify Transport Canada, but air traffic safety compliance should not present a problem. You should also let your neighbours know about your plans early on, to answer any questions and avoid opposition later on.

### Who can help me install my turbine?

Unless you are installing a very small turbine or are very experienced and knowledgeable about the technology, you should seek professional assistance with installing your turbine. CanWEA’s website lists small wind dealers and installers. Obtaining quotes from a minimum of three installers. Be sure to ask for – and CHECK – installer references!

### How can I keep my system running well?

A wind turbine needs regular service just like a car, but it is mounted on a tall tower. It must be operated safely, and requires regular attention and care to work properly. Even if you install a tilt-down tower, you will need to be trained in tower safety and have special equipment or hire a professional to perform routine maintenance. Ask your dealer about maintenance contracts.

### Where can I learn more?

CanWEA’s Small Wind Purchase Guide provides additional safety recommendations and can help you make informed decisions. CanWEA also maintains up-to-date information (including manufacturer contact information and authorized dealer/installer listings) and other planning tools on its website: [www.smallwindenergy.ca](http://www.smallwindenergy.ca)

**For more information, contact [info@canwea.ca](mailto:info@canwea.ca) or call 613-234-8716 or 1-800-922-6932**

#### *Remember:*

*Saving a kilowatt-hour is almost always cheaper than producing one! Taking steps to reduce your energy use first will save you money and likely reduce the size of the wind turbine you require.*



# Wind Turbine Purchasing Tips

## 1-10 kW: Residential Scale Applications

The rapidly growing residential market for wind energy systems offers important opportunities for reducing air pollution and producing clean power. Buying and installing a wind turbine is a long-term commitment with long-term benefits. To pursue the environmental and economic advantages of generating your own electricity with wind, first consider:

### What benefits can I expect?

Residential-scale (1-10 kW) wind turbines range in price from \$3,000 - \$4,000 per kW, but installation costs usually double the total to \$6,000 - \$8,000 per kW for this size. Note that prices based on manufacturers' rated power do not necessarily provide comparable resulting costs for energy production at a given wind speed. The benefit depends on how windy your site is, how much you pay for electricity (from the utility or other sources), and what value you place on having a clean, independent, fuel-free electricity supply. Wind is a variable resource, but interconnecting with the local utility grid provides back-up and allows owners to "net meter" their production against on-site use.

### Is my site suitable for a wind turbine?

Wind maps ([www.windatlas.ca](http://www.windatlas.ca)) can give you an idea of whether your area gets enough wind; annual average wind speeds of at least 18 km/hr (5 m/s) are generally required for grid-connected applications. However, the average wind speed is not always the best indicator of a site's suitability due to seasonal advantages and application considerations. Wind turbines must be elevated well above nearby structures to capture the wind and minimize air turbulence. Check with your local permitting agency about setbacks and height restrictions; while it may be possible to obtain a variance, zoning requirements may limit your ability to site a turbine on your property.

### Which turbine is best for me?

First, you will need to know your annual electricity consumption (in kWh). Matching turbine output to your needs is generally a function of the available wind resource and the length of the blades ("rotor-swept area"). You will also need "balance of system" (BOS) components (batteries and inverter, cables, switches, circuit breakers, meters, etc.) that may not be supplied by the turbine manufacturer. Buy certified equipment from a reputable authorized dealer, and look for a manufacturer with documented minimum 5-year warranty service and a turbine with a solid performance record.

### How can I get my installation approved?

As with erecting any large structure on your property, you will need to obtain a building permit and pass building and electrical code inspections. If you seek to interconnect your turbine to the electric grid, you will need to notify your utility and meet their interconnection requirements. In addition, you will need to notify Transport Canada. You should also let your neighbours know about your plans early on, to answer any questions and avoid opposition later on.

*Putting a turbine on too short a tower is like putting a solar panel in the shade.*

### Who can help me install my turbine?

Unless you are very experienced and knowledgeable about the technology, seek professional assistance with installing your turbine. CanWEA's website lists small wind dealers and installers. Obtain quotes from at least three installers; be sure to ask for – and CHECK – their references!

### How can I keep my system running well?

Like a car, a wind turbine must be operated safely, and requires regular attention and care to work properly. Even if you install a tilt-down tower, you will need to be trained in tower safety and have special equipment or hire a professional to perform routine maintenance. Ask your dealer about maintenance contracts.

### Where can I learn more?

CanWEA's Small Wind Purchase Guide provides additional safety recommendations and can help you make informed decisions. Also see [www.smallwindenergy.ca](http://www.smallwindenergy.ca) for up-to-date information (including cost and manufacturer and dealer listings) and other planning tools.

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# Wind Turbine Purchasing Tips

## 10-300 kW: Farm, Small Business and Institutional Applications

Small wind turbines demonstrate a commitment to clean power and can contribute significantly to reducing electricity costs and demands. Buying and installing a wind turbine is a long-term commitment with long-term benefits. To pursue the environmental and economic advantages of generating your own electricity with wind, first consider:

### What benefits can I expect?

Wind turbines for farm, small business and institutional applications (10-300 kW) typically range in price from \$2,000-\$2,500 per kilowatt (kW), but installation costs increase the total by nearly double, to \$3,000-4,000/kW for this size. Note that prices based on manufacturers' rated power do not necessarily provide comparable resulting costs for energy production at a given wind speed. The benefit depends on how windy your site is, how much you pay for electricity (from the utility or other sources), and what value you place on clean, independent, fuel-free electricity. Wind is a variable resource, so if you aren't able to interconnect with the local utility grid, you may want battery storage, a biodiesel generator, or a hybrid solar or micro hydro system.

### Is my site appropriate for a wind turbine?

An average annual wind speed of 22 km/hr (6 m/s) is considered a moderate wind resource, but the average wind speed is not always the best indicator of a site's suitability due to seasonal advantages. Wind maps ([www.windatlas.ca](http://www.windatlas.ca)) can give you an idea of whether your area gets enough wind, but a 10% change in wind speed can result in as much as a 30% change in available power, so it's a good idea to monitor wind speeds at the height and location of the site that seems most promising. Wind turbines must be elevated well above nearby structures to capture the wind and minimize air turbulence. Check with your local permitting agency about setbacks and height restrictions; while it may be possible to obtain a variance, zoning requirements may limit your ability to site a turbine on your property.

### Which turbine is best for me?

First, you will need to know your annual electricity consumption (in kWh). Matching turbine output to your needs is generally a function of the available wind resource and the length of the rotor blades ("rotor-swept area"). You will also need "balance of system" (BOS) components (batteries and inverter, cables, switches, circuit breakers, meters, etc.) that may not be supplied by the turbine manufacturer. Buy certified equipment from a reputable authorized dealer, and look for a manufacturer with documented minimum 5-year warranty service and a turbine with a solid performance record.

*Are you willing to "check the oil" and keep up the wind turbine's maintenance as required? If not, don't install one!*

### How can I get my installation approved?

As with any large project, you will need to obtain a building permit and pass building and electrical code inspections. You will need to notify your utility and meet their interconnection requirements. In addition, you will need to notify Transport Canada. You should also let neighbouring property owners know about your plans early on, to answer any questions and avoid opposition later on.

### Who can help me install my turbine?

Seek professional assistance with installing your turbine. CanWEA's website lists small wind dealers and installers. Seek quotes from at least three installers; be sure to check their references!

### How can I keep my system running well?

Like a car, a wind turbine must be operated safely, and requires regular attention and care to work properly. Even if you install a tilt-down tower, you will need to be trained in tower safety and have special equipment or hire a professional to perform routine maintenance. Ask your dealer about maintenance contracts.

### Where can I learn more?

CanWEA's Small Wind Purchase Guide provides additional safety recommendations and can help you make informed decisions. See also [www.smallwindenergy.ca](http://www.smallwindenergy.ca) for up-to-date information (including cost and manufacturer and dealer listings) and other planning tools.

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