

Small-scale wind turbines

A good option, in the right place

Mounted on the roof of a building or on a small mast, micro wind turbines can provide useful amounts of electricity, particularly in rural or 'off-grid' settings.

Domestic wind turbines generally range from between 1kW to 6kW and will be either building mounted or free-standing depending on their size. There are two main designs of turbine, vertical axis and horizontal axis.

Horizontal axis turbines are the more common design. They have turbine blades that look like an aeroplane propeller. The towers that support this design need to have strong foundations in order to prevent the turbine from blowing over and on domestic systems they will often have guy wires to provide additional support.

Vertical axis turbines have the main rotor shaft running down vertically which allows them to have the gearbox located at the base of the turbine. The turbine does not have to directly face the wind in order to rotate and is considered by manufacturers to be more suited to areas where the wind is turbulent.



Average wind speed is a key factor to consider for any wind turbine installation and the recommended annual average wind speed for a location is 5 metres per second (11 mph). There are a number of factors that can affect wind speed such as nearby buildings, trees and the height of the turbine from the ground. An ideal location will have no significant obstructions such as tall buildings that are likely to either reduce wind speed or create a turbulent airflow.

Check the wind speed where you live before you buy a wind turbine. Built-up areas are mostly not suitable sites



A 6kW turbine in a windy site, unobstructed by trees or tall buildings

Photos: left, reproduced with permission from Kingspan Environmental Ltd. far left, arenamontanus

Turbines sited in urban areas are unlikely to perform well and locations such as the bottom of rural valleys are also probably unsuitable. There are a number of online wind speed calculators you can use to find out if you live in an area that is suitably windy, including:

Department of Energy and Climate Change
www.decc.gov.uk/en/windspeed/default.aspx

Energy Saving Trust
www.energysavingtrust.org.uk/windspeedtool

However, before making any significant investment in a wind turbine it is recommended that you invest in an anemometer to measure the average wind speed at your proposed location. To get the most accurate picture, you should run the anemometer for a minimum of three months, and ideally over the course of a year.

Cost

The cost of installing a wind turbine does vary depending on factors such as the size and type of system.

- A roof mounted 1kW system costs around £2,000
- A 2.5kW pole-mounted system costs around £15,000
- A 6kW pole-mounted system costs around £30,000

A well made and well maintained wind turbine will last between 20 to 25 years, but regular maintenance checks should be carried out to ensure that the system is running efficiently. The turbine inverter (which converts the DC current produced by the turbine into AC current that most

household appliances use) will need replacing at some stage and off-grid systems will probably need new batteries every 6 to 10 years.

Savings

Wind turbines will not only provide you with free electricity, but will earn you money through the feed-in tariff which is a payment that the owners of small-scale renewable energy installations receive for both generating and selling their electricity*. For more on this, see our leaflet 'Feed-in tariffs' at www.cse.org.uk/advice-leaflets.

The following table will give you an idea of the savings you may make with a 6kW turbine, sited in an appropriate location and assuming that the system is eligible for the feed-in tariffs:

Feed-in tariff: (generation)	£2,800
Feed-in tariff (export)	£160
Savings on electricity bill	£260
Total income and savings	£3,220

[These calculations are based on a generation tariff of 28p/kWh and an export tariff of 3.2p/kWh assuming that 75% is exported. Fuel bill savings assume an electricity unit cost of 14.39p/kWh. Figures from Energy Saving Trust.

Note that the tariffs are reviewed periodically by the government and may be reduced, and are also index-linked which means that they will increase or decrease with inflation. The most up-to-date figures can be found on-line at www.ofgem.gov.uk/fits.]

Planning obligations

Due to permitted development rights it is now possible in some cases to have domestic wind turbines installed without the need for planning permission as long as specific limits and conditions are met. In some cases planning permission will be required and it is recommended in all cases to first approach the local planning authority to determine regulations for the area.



* To be eligible for the feed-in tariff both the system and installer must be certified under the Microgeneration Certification Scheme (www.microgenerationcertification.org).

Installers who are members of the REAL Assurance scheme will have also agreed to adhere to the REAL consumer code (www.realassurance.org.uk).

Tips for lower energy bills

Happy paying more for your electricity and gas than you need to? Course not. So here's how you can cut your bills:

Give your clothes a day in the sun and give your tumble drier a break. Clothes dried in the fresh air feel great, and there are drying days in winter, too.



Catch 'em young. Encourage your children to switch off electric toys and lights that they're not using. They'll soon get the hang of saving energy.

Be a friend to your freezer. Defrost it regularly to help it run more efficiently.

Buying a new washing machine, TV or dishwasher? Look out for the Energy Saving Trust logo.



Don't over-fill the kettle (but do make sure you cover the metal element at the base).



Dodge the draught! Fit draught-excluders to your front door, letter box and key hole, and draw your curtains at dusk to keep the heat in.

Turn your heating down by 1 degree. You'll hardly notice the change in temperature, but it'll make a big difference to your heating bill.

Sleep tight. Make sure all the lights are turned off when you go to bed. If you want to light a child's room or a landing, use a low-wattage night light.



The Centre for Sustainable Energy's Home Energy Team offers free advice on domestic energy use to householders in Bristol and Somerset (including the unitary authorities of North Somerset and Bath & North East Somerset).

Call us free on 0800 082 2234, email home.energy@cse.org.uk or follow us on twitter @cse_homeenergy

More energy advice leaflets at www.cse.org.uk/advice-leaflets



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We are a national charity that helps people change the way they think and act on energy