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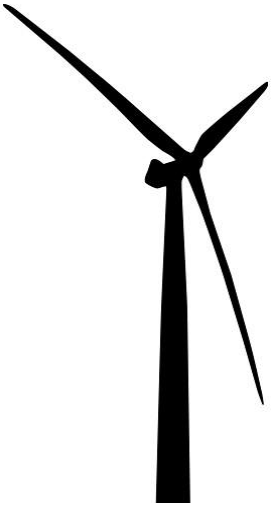
SURREY'S LOW CARBON COMMUNITY

Wind Turbines



What is renewable wind technology and how does it work?

Wind turbines harness energy from the wind and convert it into electricity. Wind passes over the blades and causes them to rotate. The blade rotor axle then passes through an electricity generator. This electrical output passes through a number of systems to ensure that it is in phase with the mains electrical supply before it enters the home. Wind turbines tend to generate maximum power during winter which coincides with maximum household electricity demands. Electricity yield is however very variable on a day-to-day basis.

What different systems/sizes are available?

There are two types of wind turbine:

- Mast mounted - which are free standing and located near the building(s) that will be using the electricity
- Roof mounted - which can be installed on house roofs and other buildings

Wind turbines can vary in size and power output from a few hundred watts to two or three megawatts. They are therefore a versatile technology with usage ranging from very small turbines supplying energy for battery charging systems (e.g. homes), to turbines on wind farms supplying electricity to the grid.

Is my house suitable and what should I consider before installation?

- Wind speed increases with height so it's best to have the turbine high on a mast or tower
- A turbine will be most productive if the local annual average wind speed is 6 m/s or more. The BERR wind speed database[1] or the Carbon Trust Wind Yield Estimation Tool[2] will allow you to find out the wind speed in your area.
- It is advisable to get a local appraisal of the impact of trees and buildings on wind speed and turbulence[3]

[1] http://www.berr.gov.uk/energy/sources/renewables/explained/wind/windspeed-database/page27326.html
[2] http://www.carbontrust.co.uk/windpowerestimator/

- Turbines should be kept as far away as possible from 'wind spoiling' features such as trees or adjacent buildings.
- Roof mounted turbines should ideally be installed on the side of a building facing the prevailing wind
- Urban areas are usually not suited to wind turbines because of turbulence caused by surrounding obstacles
- A structural engineer should be consulted to ensure that the structure of the building is suitable for the load of the turbine and any vibration
- Wind turbines that are roof mounted do cause vibration noises and those that are mast mounted are also audible in terms of the blades cutting through the air.
- Turbines should be located so that they can be easily accessed for maintenance. An installer should advice on typical maintenance that is required.
- To install a grid-connected system, the local Distribution Network Operator (DNO) will need to be notified if the system output exceeds 16A per phase[4]

Is planning permission required?

Planning permission is, at present, required for the installation of a turbine and Woking Borough Council Planning Department should be contacted for advice.

Benefits

- Wind power is a clean, renewable source of energy which produces no carbon dioxide emissions or waste products
- Small scale wind power is particularly suitable for remote off grid locations where conventional methods of supply are expensive or impractical.

Cost & cost saving

Roof mounted systems cost from £1,500. Larger mast mounted systems in the region of 2.5kW to 6kW would cost £11,000 - £19,000 (installed). These costs are inclusive of the

[3] Contact NOABL (Department of Trade and Industry resource used by most wind turbine suppliers when estimating site potential) www.bwea.com/noabl for more information
[4] To find out which company the local DNO is, visit the British Photovoltaic Association website www.pv-uk.org.uk

turbine, mast, inverters, battery storage (if required) and installation. Costs always vary however depending on location and the size and type of system.

Wind turbines can have a life of up to 25 years but should undergo a service check every few years to ensure they are continuing to work efficiently. For a system powering batteries, typical battery life is around 6-10 years, depending on the type. As a result, batteries may have to be replaced at some point in the system's life.

The amount of energy and carbon that roof top micro wind turbines save depends on several things including size, location, wind speed, nearby buildings and the local landscape. At the moment there is not enough data from existing wind turbine installations to provide a figure of how much energy and carbon could typically be saved.

If you would like further information on wind turbines or like a recommended installer; please contact the Woking Energy Advice Centre on 0800 783 2503