

## Small-scale wind power

The Cotswolds Conservation Board is the body responsible for co-ordinating the management of the Cotswolds Area of Outstanding Natural Beauty (AONB).

The Board believes that there is considerable scope for the generation of renewable energy by householders and businesses in the AONB without harming the beauty of the landscape or traditional buildings.

This leaflet is one of a series providing information about a number of renewable energy technologies which are suitable for the Cotswold landscape.\* Consideration should be given to using more than one such technology in an integrated way to maximise the potential for renewable energy generation at a particular site or building.

The Board encourages everyone to reduce energy use by making their home or office energy efficient, particularly when planning for new buildings or conversions of existing buildings.



Domestic wind turbine

\* The other leaflets in the series cover solar photovoltaics, solar water heating, biomass, heat pumps, and micro-hydropower.

### SMALL-SCALE WIND POWER

#### Key points

- Generates electricity directly from the momentum of moving air
- No greenhouse gases are produced when in operation
- No air pollutants are produced when in operation
- Noise can be an issue
- Visual impact is a significant issue
- Good for running domestic electricity appliances and off-grid equipment
- Electricity produced but not required can be sold back to The National Grid
- Electricity may not be produced when needed, i.e. in high winds

#### How does it work?

Wind power uses the momentum of moving air to turn a turbine which is used to generate electricity. The important factors in the generation of power from a turbine are: the speed of the air flow and the swept area of the blade. The greater the swept area the more power a turbine will generate, subject to a maximum speed. The electricity generated can be used in a building connected to the turbine or stored in batteries. Any surplus energy generated can be exported and sold to The National Grid as long as a property is connected.

A wind power system consists of a propeller mounted on a structure, usually a free standing tower. Siting near trees increases the effect of turbulence.



Community building with small turbine

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### How much electricity can be generated?

The output of a turbine will depend upon the location, turbine design and the size of the propeller. Small turbines for domestic use mounted on a building with a propeller diameter of 2m can have an output of 1.5 kW. This would produce approximately 25% of a Cotswold household's average demand for electricity. Small free standing turbines, mounted on a pole 9 to 15m in height and with a turbine diameter of 5.5m, can produce 6kW.

### Is wind power generation suitable for the Cotswolds AONB?



Large turbines are likely to have harmful impact on the landscape particularly when combined into windfarms

Wind turbines can fulfil an important role in the generation of renewable electricity. However, due to the function of wind turbines they are usually positioned in exposed locations and can have a visual impact over a wide area that can be unacceptably harmful. When turbines are grouped in numbers to create 'wind farms' their harmful impact on the landscape is likely to be greater.

Due to the need of the turbine to have clear air flow for greatest efficiency, such turbines have to be in exposed locations, where visual impact is greatest. It is therefore difficult to achieve satisfactory screening by, for example placing a turbine amongst trees of equivalent height. There is a danger that the widespread installation of domestic turbines on houses will produce visual clutter and intrusion in locations with a concentration of traditional buildings.

The largest potential for wind generation in the Cotswolds therefore lies with single or paired turbines of a size suitable for generating the power requirements of a community, industrial, commercial or agricultural building. There is an increasing availability of vertical turbines for such use.

Planning permission and listed building consent from your local planning authority may be required.



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