

SMALL SCALE WIND TURBINES

SCOTLAND



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Why Consider Microgeneration?

Energy use in the home accounts for 24% of the UK's total emissions of carbon dioxide, a major contributor to climate change. Meanwhile, industry accounts for 32%, transport for 24%, and the public sector for 12%. Increasing energy efficiency and the use of alternative energy sources with reduced emissions, is essential to achieving the Government's target to reduce carbon emissions by 60% by 2050.

The Government are encouraging householders, businesses and the public sector to do their bit to tackle climate change by reducing the amount of energy they consume and to consider installing microrenewable technologies, such as small scale wind turbines or solar panels.

Should I Install a Small Wind Turbine?

Small scale wind turbines have become more widely available over the past few years and with government grant schemes available many people are looking to them as a good solution to reduce their carbon dioxide emissions. However, before deciding whether to purchase a turbine, there are a number of important factors to consider, which will enable you to judge whether it is the right technology for you.

What's Available?

Small scale wind turbines vary in size according to how much electricity they generate, ranging from 100 watts to 6 kilowatts, whilst larger turbines of up to 50 kilowatts are available for bigger community projects or businesses. The average house would need a system of 1-6 kilowatts depending on the location and size of the property, whilst a public building such as a community hall would require around 5-6 kilowatts. Meanwhile, smaller systems of 600 watts would be suitable for charging batteries for caravans or boats.

There are two types of small scale wind turbines available – mast mounted and roof mounted. Although mast mounted systems are generally more cost effective, they may not be appropriate for many properties. However, smaller roof mounted systems are capable of generating a reasonable proportion of energy requirements given the right conditions.

Most small wind turbines generate direct current electricity (DC) and require an inverter to convert it to alternating current electricity (AC). They can either use a battery to store the energy generated or be connected to the national grid, which means any excess electricity can be sold to the national grid. Grid connection is generally a better option for larger systems where energy consumption is high (since

a larger and more expensive battery would be required) or where a lot of excess energy will be generated.

Wind Speed

Before considering installing a small scale wind turbine, it is important to assess whether the wind speed level in your area is high enough, since this will determine how much power can be generated from the turbine. Wind speed increases with height so it is generally better to position a turbine on a tall mast. However, this is not always possible and, where it is, may be visually intrusive to neighbours or be judged out of character with the local area.

It is recommended that small scale turbines should only be used in areas where the average annual wind speed is 6 metres per second or more. You should also bear in mind any obstacles nearby such as buildings, trees or pylons. These are likely to increase turbulence and therefore reduce the wind speed experienced by the turbine if they are close enough, thus reducing the amount of electricity generated.

You can check the potential wind speed yourself by setting up a monitoring mast and using an anemometer, which can be purchased for around £120 from a number of retailers. In doing this assessment, it is important to measure the wind speed at the position of the turbine as wind speed varies considerably with height.

Alternatively, the Department for Business Enterprise and Regulatory Reform (BERR) have a windspeed database where you can check the average windspeed in your area at various levels above ground level. However, this may not account for local variations caused by nearby structures or topography so should only be used as a rough guide.

The database is available at:

<http://www.berr.gov.uk/energy/sources/renewables/renewables-explained/wind-energy/page27708.html>

Potential Impacts

Impacts from noise, vibration and flicker have all been attributed to small scale wind turbines. The potential extent of any or all of these impacts will depend on the location, but they all need to be carefully considered before a turbine is installed. For example, the noise impact will depend on background noise, noise from the wind itself and the proximity of neighbours, as well as the noise generated by the turbine itself. Noise generated by a turbine will increase with wind speed and can be as loud as a passing car or rain if it is particularly windy, although the impact is lessened against the noise from the wind itself.

Meanwhile, vibration will be dependent on the structure of the building on which the generator is mounted and how well it is installed, and flicker on the position of the generator in relation to neighbours (and inhabitants of the property).

Planning Permission and Building Regulations

Before proceeding, you should contact your local authority regarding planning permission for installing a turbine. In Scotland, the National Planning Policy Guideline (NPPG) 6: Renewable Energy Developments provides further information.

Building Control approval is required on two counts for the installation of a turbine upon a building. Firstly, an assessment of whether the building structure is strong enough to support the weight of the turbine and the force of the wind upon the turbine. Secondly, an assessment of the electrical connection between the turbine and the electrical supply to the house (and possibly the national grid, as appropriate) needs to be carried out.

What to Consider Before Installing a Wind Turbine

- Find out whether the average wind speed in your area is 6m/s or more and assess whether there are obstructions nearby that might reduce the wind speed and cause turbulence.
- Work out what size turbine would be appropriate for your property and whether there is a suitable place to install it.
- Check with your local authority whether planning or building control approval are likely to be given.
- Consider your neighbours – noise and vibration may be produced, particularly if there are nearby obstructions, which could affect people living nearby. There may also be visual impacts.
- Look into how much a turbine would cost to install and maintain, the grants available to you, and whether you are likely to produce more or less of your electricity requirements.

How Much Will it Cost?

Wind turbines vary in price according to their size – smaller systems will cost around £1500, while larger systems can cost as much as £20,000. Savings made from installing a turbine will also vary according to the size, as well as where it is positioned, how much electricity is used, and electricity prices. Turbines can last up to 20 years although regular service checks should be made to ensure they are working efficiently. When using a battery storage system, it may be necessary to replace the battery after 6-10 years.

Government Funding

The Government provide funding for small scale renewable technologies throughout the UK through the Low Carbon Buildings Programme, which is managed by the Energy Saving Trust. Grants towards installing small scale wind turbines are available for householders, community organisations, schools, the public and not-for-profit sector, and private businesses. In order to qualify for funding applicants must first carry out a number of energy efficiency measures.

In Scotland grants are available for householders and community organisations under the Scottish Community Householder Renewables Initiative (SCHRI), which is also managed by the Energy Saving Trust.

Further Information

Low Carbon Buildings Programme

www.lowcarbonbuildings.org.uk

Tel: 0800 915 0990

Scottish Community Householder Renewables Initiative

www.est.org.uk/schri

Tel: 0800 138 8858

Energy Saving Trust

Advice for householders, community organisations, local authorities and housing associations

www.est.org.uk

Tel: 0800 512012

(householders)

Tel: 08701 261 444

(community organisations)

Tel: 0870 241 2089

(local authorities and housing associations)

The Carbon Trust in Scotland

www.carbontrust.co.uk

Email:

scotlandoffice@carbontrust.co.uk

Tel: 01355 581810

British Wind Energy Association

www.bwea.com

Tel: 020 7689 1960

Email: info@bwea.com

Institute of Acoustics

www.ioa.org.uk

Tel: 01727 848195

Email: ioa@ioa.org.uk



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- Noise Pollution - Scotland

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