

What are Wind Turbines?

Wind turbines are essentially aerofoils linked to a generator/turbine which produces electricity when sufficient wind is present to power the turbine. The power generated can be used immediately, stored in batteries or sold into the grid.

How does it work?

The turbine will have a given power output. For micro-generators this will be typically around 2.5 to 6 kW which in turn may generate around 4,000 to 15,000kWh of electricity. In a 4-bed roomed family house where electricity isn't used for heating the amount of electricity used can be around 4 - 6,000kWh. Clearly production of power and use of power, including peak usage can vary significantly. Small wind turbines have often been used to generate electricity for charging batteries to run small electrical applications, often in remote locations where it is expensive or not physically possible to connect to a mains power supply. Here the output of the wind turbine is directly connected to the existing mains electricity supply. A grid-connected wind turbine can work well where electricity consumption is high. The turbine can replace "grid" electricity and generate additional income in the form of ROCs or feed-in tariffs. The value of avoided electricity purchases is generally higher than the value that can be obtained from exporting power to the grid.

Where will it work?

Turbines can be mounted on roofs or on masts. The location of the turbine and the availability of clear air flows will significantly affect the performance, and presently roof mounted wind turbines are likely to be ineffective and in some cases can cause vibration and even damage to a building.



Some turbines perform better at low wind speeds and in turbulent air conditions. Whilst the UK reportedly is the windiest country in Europe, there is considerable variation with the greatest winds in the north of Scotland. Generally the wind speeds in England are lower and actual performance of the turbine will be significantly lower than its quoted rating. Average wind speeds need to be greater than 6m/s for wind turbines to be at all effective.

Regulations

Planning permission will normally be required for domestic installations, and Listed Building Consent and or Conservation Area Consent would also be required if applicable.

Income/Savings

The savings achievable from turbines are directly related to the size of the turbine installed. There are many turbines marketed that are unlikely to generate sufficient power to make investment viable. Actual average wind speed is all important and monitoring wind speed for a period of time prior to investment is highly advisable.

Feed-in Tariffs (FITs)

In November 2008, the Energy Bill received Royal Assent. Included was the introduction a financial incentive to homes, businesses and communities to install small-scale renewable energy systems by providing a payment for the power (and heat) they generated.

The introduction of FITs from 1st April 2010 provides a support structure that in the main will be considerably more attractive than ROCs. In essence there are two potential payments, one for power generation (see table below) and then an optional guaranteed export tariff i.e. a guaranteed payment for electricity transferred into the Grid proposed to be 3p/kWh. Alternatively generators can sell into the open market. Tariffs are to be paid for 20 years.

| Table of generation tariffs for first year of FITs (2010-11) Technology | Scale | Proposed initial tariff (p/kWh) |
|--|------------|---------------------------------|
| Wind | ≤ 1.5kW | 34.5 |
| Wind | >1.5–15kW | 26.7 |
| Wind | 15–100kW | 24.1 |
| Wind | >100–500kW | 18.8 |

The scheme creates a significant shift in the cost/benefit of smaller scale schemes with additional income now being generated from green power generation.

Capital Costs

A 2.5kW Larger mast mounted systems cost between £11,000 and £19,000, including installation. A larger 10kW unit may cost on the region of £30,000.

The useful life of wind turbine installation will vary depending on the quality of the turbine installed. A well maintained turbine should last over 20 years.

Grants

Grants for domestic and community installations are currently available through the Low Carbons Building Programme but these will be withdrawn at 31 March 2010. Larger units in rural locations have been eligible for grant under the RDPE. It is not clear presently whether RDPE grants will be similarly withdrawn.



Partners

We are pleased to be working with a number of partners in respect of Wind Turbines. We are therefore able with our partners able to offer a complete package including feasibility assessment, planning, installation and commissioning of Wind Turbines.



Scoping **Feasibility** **Project Management** **Planning**
Environmental Compliance **Design** **Funding** **Delivery**

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