

WIND POWER

What is wind energy?

Wind represents a vast source of energy and has been used for hundreds of years in Britain to grind corn and pump water. It can now be used to make electricity and, for onshore installations, it is one of the cheapest sources. As the UK is the windiest place in Europe, wind power is one of the most promising renewable energy technologies and already provides enough electricity to power more than 2 million homes.

What is a wind turbine?

Wind turbines range from small units of around 30 watts, used to charge batteries for caravans and boats, to giant structures of 7.5 Megawatts, with rotor diameters of more than 100 metres extracting enough energy to run 5000 homes. A turbine, basically, is a set of blades designed to rotate as the wind blows past them. The shaft to which the blades are attached is coupled to an electrical generator. The more wind that passes the blades, the more energy can be extracted, so we have a situation where doubling the length of the blade increases the "swept area" by a factor of four. The bigger the turbine, the more economic generation of power there is.

Why are wind turbines sited on the tops of hills?

As the wind blows towards a hill it has to rise up the hill to get over it, in doing this the moving lower air joins with the air above it and so more air must pass over the top. The only way that more air can pass over the top of the hill is for its speed to increase.

Every time you double the wind speed, the energy increases eight times. This is why we choose high wind speed regions to site wind turbines. Some of the best places in the U.K. are the north west of Scotland, north and south west Wales and Cornwall together with smaller areas of the East Coast. Other areas such as the Pennines and the North York moors are also good for strong winds.

A 2009 study by the Energy Savings Trust found that small rooftop turbines in urban areas perform very poorly. This was mostly due to lower wind speeds in urban areas.

What happens when the wind doesn't blow?

If the wind isn't blowing, wind turbines do not produce energy. In fact most wind turbine have a "cut-in" wind speed of around 4 m/s (approx 9 mph). This is why wind energy is known as an "intermittent" energy source and as such it needs to feed into either a storage system, such as a battery (for small scale applications), or into the electricity network – the national grid - where it can be combined with electricity from other sources.

Can I run my house on wind power?

According to Ofgem the average UK house uses 3300 Kilowatt hours of electricity per year. A well-sited 2 kilowatt wind generator could provide you this. Because of the intermittent nature of the wind energy a storage system would be required if you were off-grid.

What are the environmental aspects of wind turbines?

Wind turbines occupy very little ground space and so can co-exist with livestock or even cereal crops. With larger installations, the only permanent use of the land is the concrete turbine foundations, service road and the transformer building.

Renewable Energy Information sheet



For good wind speeds, the turbines need to be sited on high exposed land. However, as technology has developed and system costs have reduced it has become more feasible to locate wind turbines in less windy sites. The turbines, like other conventional infrastructures and power generation plant, such as power transmission lines and power stations, can be visually intrusive. There is therefore a delicate balance to be struck between the change in the landscape and wind power's environmental benefits. Noise from modern turbines is less than from many other everyday activities. Careful design, siting and operation have ensured that the noise is no longer a nuisance. Electromagnetic interference with television reception is not usually a problem and any remedial action is simple and cheap. Offshore wind farms, although more expensive to install, are less visually intrusive.

Energy payback

Energy payback is the energy required to manufacture, install, run and decommission a technology. A wind turbine can expect to pay back all this energy in a matter of months. This makes wind turbines, which usually have a 20 year lifespan, a very good technology for helping reduce carbon emissions.

Are there many wind turbines in the UK?

There are many wind turbines around the country, from single turbines to large wind farms, and the UK's growth in wind energy continues. The UK has the biggest offshore wind farm in the world – Walney Wind Farm off the coast of Cumbria. This allows us to generate more power from off shore wind than the rest of the world put together.

How much does it cost?

Typical domestic-scale systems (below 15kW) cost £2,500 - £5,000 per kilowatt installed.

Are there any grants or incentives available to help with the costs?

As of April 2010, feed in tariffs have been introduced in the UK - making it not only environmentally friendly, but also economically profitable, to have microgeneration systems installed in ones home or workplace. Feed in tariffs pay a guaranteed premium rate for the energy you. To ensure that you can gain the full advantage of being part of the feed in tariff scheme please ensure that your system is installed by an MCS registered fitter. For details of these schemes, download the **Financial Incentives information sheet** from our website. For information about the feed in tariff and accredited installers within the Yorkshire and Humber area visit www.yhmp.org

Trade association

RenewableUK (formally BWEA) is the trade and professional body for the UK wind industry. Members of **RenewableUK** range from the largest international corporations to members of the public. A full membership directory can be found at www.renewableuk.com

A variety of low carbon energy calculators, which can help you calculate everything from your carbon footprint to the windpower and solar potentials of your home or workplace can be found at <http://www.energysavingtrust.org.uk/>. These are free and easy to use.

The ATC promotes energy efficiency – it is cheaper to save energy than produce it.