

Discover renewable energy

Using the wind's energy to power your home

Microwind turbines

The wind is a great source of natural energy and one that we have plenty of in the UK. But did you know that today's technology could help you make more of our gusty climate – by using wind power to create electricity in your home?

Despite having access to around 40 per cent of Europe's total wind power, less than 1 per cent of the electricity we use comes from wind farms. In other words, this renewable form of energy is there for the taking.

And with a single **microwind turbine**, you can generate electricity to help power your home, reduce your energy bills and cut down harmful carbon dioxide (CO₂) emissions too.

Could a microwind turbine work for your home?

Before looking in detail at the microwind turbines you could use for your home, it's worth making sure your house is suitable. And that means asking yourself the following questions:

- Do you get a decent amount of wind around your home? Wind speed – which affects the amount of energy produced – increases with height, so the ideal siting for a turbine is a building on a smooth-top hill with lots of exposure to the wind. This location should ideally be free from excessive turbulence and obstructions like large trees, houses or other buildings.
- Does your home have a suitable place where a microwind turbine can be mounted? The smallest wind turbines available can be fitted to your roof (roof-mounted), or larger, free-standing wind turbines can be installed on a mast near your house.

For guidance on the above, call your nearest Energy Saving Trust advice centre for free on **0800 512 012**.

Renewable energy is worth your effort

Renewable energy technologies like microwind turbines are a way for you to save money over the long term and to help prevent climate change. They can work alongside – and help you use less – energy generated from fossil fuels such as gas, oil and coal. And unlike fossil fuels they produce little or no carbon dioxide (CO₂): the harmful gas that's one of the biggest causes of climate change.



energy saving trust®





How do microwind turbines work?

It's simple. Wind blowing over the turbine blades causes them to rotate. The rotating turbine, in turn, produces electricity, which can either feed into – and complement – your mains supply or power your appliances on its own.

Most household wind turbines generate direct current (DC) electricity; an **inverter** turns this into alternating current (AC) electricity – the sort that's used in the home. Another important part of a wind energy system is the **controller**, which stops too much electricity being supplied to buildings and appliances.

Wind turbines vary in both size and the amount of power they can produce. A small turbine, capable of making a few hundred watts of electricity when the wind is blowing well, could be used to charge batteries for a small boat or a caravan; even smaller ones can simply provide low-voltage lighting. At the other end of the scale, large, 3mW (megawatt) turbines are the sort you'd find on a wind farm, grouped together to supply electricity to the national grid.

Choosing your microwind turbine

Household wind turbines can vary in size, but are typically rated at 1 to 6 kilowatts (kW). The rated power of a system is the amount of energy it can produce at a given point in time, under ideal wind conditions. The amount of electricity generated by a microwind turbine over a year will depend on a number of things, including wind speeds, location and nearby landscape, as well as the size of the system.

As a rule of thumb, a 2.5kW would be able to generate almost the same amount of electricity that a typical household consumes in a year. However a back-up supply will be required, as some of the electricity you generate will be exported to the grid.

Could wind be your only source of electricity...?

Those living in remote and suitably windy areas off the electricity grid can use a stand-alone microwind turbine system, also known as an '**off-grid**' system.

Off-grid systems use the electricity produced by the turbine to charge up banks of batteries. Your system controls will make sure that these are never under or over-charged; when they're fully charged, it will divert surplus power to another useful source of power, like a room or water heater.

In less windy times, a diesel generator can provide much-needed back-up. When wind speeds are low, the generator will kick in: working at full pelt for short periods of time to keep the batteries charged. Alternatively, you could use another form of renewable energy to top up your electricity supply – like solar PV panels or hydroelectricity.



...or work with your mains supply?

Of course, microwind turbines can also be used in tandem with a traditional mains supply of electricity, which itself will provide an automatic top-up when wind speeds are low. If your home remains connected to the national grid, the inverter will turn DC electricity into an AC supply of grid-standard quality.

And if your turbine is creating more power than you need, the controller will send any excess electricity straight back to the grid. Many electricity suppliers will buy this back from you, so it's a good idea to compare the tariffs on offer.



Always ask an expert to help

Choosing and installing the right microwind turbine for your home is a complex process – so always get an accredited installer to help from the word go.

To get the specialist support that you need – any other advice you're after – speak to your nearest Energy Saving Trust advice centre who can put you in touch with accredited installers. Call freephone 0800 512 012 and we'll be happy to help.

How much will a microwind turbine cost?

The cost of installing a wind energy system depends very much on the size and type of system you choose.

A small, roof-mounted system can cost from £1,500, whereas installing a 2.5kW system will cost you between £11,000 and £12,500 – covering all equipment, masts, battery storage (if required) and installation. Meanwhile, the total cost of a larger 6kW system could range from £18,000 to £25,000.

Turbines have a 'life' of up to 20 years, but will need a service check every few years to make sure they're continuing to work efficiently. Their blades might also need replacing at some point during this time – as will batteries for off-grid systems, which usually last from six to 10 years.



How much will you save?

The electricity generated at any one time by a wind turbine is highly dependent on the speed and direction of the wind. The windspeed itself is dependent on a number of factors, such as location within the UK, height of the turbine above ground level and nearby obstructions. Ideally, you should undertake a professional assessment of the local windspeed for a full year at the exact location where you plan to install a turbine before proceeding. In practice, this may be difficult, expensive and time consuming to undertake. Therefore we recommend that, if you are considering a domestic building mounted installation and electricity generation is your main motivation, then you only consider a wind turbine under the following circumstances:

- The local annual average windspeed is 6 m/s or more. An approximate figure for your location can be checked on the DTI website <http://www.dti.gov.uk/energy/sources/renewables/renewables-explained/wind-energy/page27326.html>.
- There are no significant nearby obstacles such as buildings, trees or hills that are likely to reduce the windspeed or increase turbulence

If you are in any doubt, please consult a suitably qualified professional.

Free-standing wind turbines:

Assuming that you use 40 per cent of wind-produced electricity in your home, and sell 60 per cent back to the grid, an average 2.5kW wind energy system could save you **£150 - £250 year** in electricity bills. Plus, you could be cutting your home's CO₂ emissions by **one to two tonnes a year**.

Know your wind speeds

If you're unsure how much wind blows around your home visit the DTI's webpage mentioned above. Or, for around £120, you could buy an **anemometer**, set it on top of your own monitoring mast – and record the exact wind speeds above your home.

To find out more, talk to your nearest Energy Saving Trust advice centre on freephone **0800 512 012**.



How the Energy Saving Trust can help

The Energy Saving Trust is one of the UK's leading organisations set up to address the damaging effects of climate change. We aim to cut emissions of carbon dioxide (CO₂) – the main greenhouse gas causing climate change – by promoting the sustainable and efficient use of energy. And we want to make it easy for everyone to take action to save energy and help prevent climate change – by offering free, impartial advice.

So, if you're interested in using renewable energy in your home, call your nearest Energy Saving Trust advice centre on **freephone 0800 512 012**.

Our advisors will give you one-to-one advice on what's practical for your home, explain any technical or planning issues and put you in touch with a local, accredited installer. We can even tell you about grants and offers available to help with your planned home-energy improvements.

And remember: there are lots of other simple ways to save energy in your everyday life, many of which won't cost you a penny. Again, we're here to help on **0800 512 012**, with more free tips online at **www.energysavingtrust.org.uk**.

Get planning permission

Given that wind turbines can be both seen and heard quite easily, it's important that you get permission to install one from your local authority – especially if you live in a conservation area or listed building.

It's always best to check this out in advance as getting planning permission after the event can be difficult and expensive.

You should also make sure that the site of your installation is structurally sound to make sure that it doesn't cause any damage.

Find out even more online

Energy Saving Trust – **www.energysavingtrust.org.uk**

Renewable Energy Association – **www.r-e-a.net**

REAL Assurance Scheme – **www.realassurance.org.uk/**

British Wind Energy Association (trade association of the UK wind energy industry) – **www.bwea.com**



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