

# Sheet: 9

## Wind Turbines



Wind farms are now a common sight around the UK. They work when wind forces the blades around, driving the turbine that generates electricity. The stronger the wind, the more energy produced.

Domestic wind power generally isn't suitable if you live in a built up area, but if your house is in an exposed or isolated location, it could be a suitable renewable energy option. As with solar power, wind energy can cut your carbon emissions – a typical domestic wind turbine could save you almost two tonnes of carbon dioxide a year. And just like sunshine, wind is free, so once you've paid for the initial installation, you'll save money on your electricity bills.

### How it works

Wind turbines use large blades to catch wind. When the wind blows, the blades rotate causing direct current (DC) electricity to be generated. This is then converted into alternating current (AC) using an inverter to power the appliances in your home.

There are two types of domestic-sized wind turbines:

**Pole-mounted:** These are free standing and are erected in a suitably exposed position, capable of generating about 5-6kW.

**Building-mounted:** These systems are smaller, often about 1-2 kW in size, and can be installed on the roof of a home. Bladeless wind generators, which technically aren't turbines, are a new type of technology that's gaining attention. These work by a phenomenon called 'vortex shedding'. They rely on harnessing the 'wobbly-ness' of the structure to create electricity via an alternator.

Very few domestic sites are suitable for traditional turbines. Suitability should be determined by a year-long survey of wind speeds and directions.

### Costs and savings

The cost of a wind turbine system varies depending on the size and mounting method. Building-mounted systems are less expensive, but also produce less electricity.

A 6kW pole-mounted wind turbine can cost between £23,000 and £34,000 to install.

Wind turbines need routine maintenance checks every 2-3 years, which cost about £100-200, depending on the type and size of the system.

Wind turbines can last up to 20 years, but the inverter may need replacing before then. Expect to pay £1,000-2,000 for an inverter.

Financial incentives, such as the Smart Export Guarantee tariffs, could help offset the initial cost of the system.

### Key considerations

Wind speed. Choose a location that sees the most wind and one without obstructions.

Height. Determine how high you can erect the turbine, since the higher it is, the more efficient it will be.

Permission. In some cases, you may not need planning permission, but in those instances, you will need to meet strict criteria.

### Costs

The cost of a system will depend on the size and the mounting method. Building-mounted turbines cost less to install than pole-mounted ones, but they tend to be smaller and less efficient.

For equipment and installation, a 6kW pole-mounted system costs around £31,000.

### Savings

A well-sited 6kW turbine can generate around 9,000kWh a year, which could save you around £610 a year on your electricity bills\*. The renewable energy generated could also save around 1.9 tonnes of carbon dioxide a year.

*\*Savings and SEG payments assume household occupants are out all day until 4pm. Savings will vary depending on household occupancy pattern.*

### Financial support

You may be able to claim [Smart Export Guarantee \(SEG\) payments](#) for any surplus electricity you export to the grid. The Smart Export Guarantee replaced the previous Feed-in Tariff, which closed to new applications at the end of March 2019.

A well-sited 6kW pole mounted turbine could typically earn about £365 per year in SEG payments.

### Maintenance

Maintenance checks are necessary every few years, and will generally cost around £100 to £200 per year depending on turbine size.

A well-maintained turbine should last more than 20 years, but you may need to replace the inverter at some stage during this time, at a cost of £1,000 to £2,000 for a large system.

For [off grid systems](#), batteries will also need replacing, typically every six to 10 years.

The cost of replacing batteries varies depending on the design and scale of the system.

Any backup generator will also have its own fuel and maintenance costs.

### Further Advice

<https://energysavingtrust.org.uk/energy-at-home/generating-renewable-electricity/>