



Natural Generation are dedicated to providing the most cost effective and robust renewable energy, tailor-made to suit your projects needs. We passionately believe that by taking responsibility for our environment we are taking responsibility for our own future.

It will come as no surprise to most people who live in the south west that we receive more wind than most of the country. Our exposure to the low pressure systems sweeping in from the Atlantic make Cornwall especially suited to wind turbine installations in the right location.

We are able to quote for a range of services from basic supply and installation of the turbine to full project management, including seeing the project through planning and grid connection agreement if applicable.

Before spending any money, this information sheet should help you ascertain whether a wind turbine is a viable option for you and inform you of some of the preliminary work that needs to be completed before installation.

SITE SUITABILITY

It is important to assess the suitability of your site. We will always carry out a thorough site survey but a charge will be made for this so we recommend you do an initial analysis before commissioning Natural Generation.

The amount of energy that a wind turbine produces is related to two main factors: the swept area of the blades and the average wind speed that the turbine is exposed to. When you double the swept area of a turbine you get twice as much power but when you double the average wind speed you will get back eight times the power from the same machine. As you can see maximising the exposure to as much wind as possible is essential to any installation. The average wind speed for your area can be found at: www.bwea.com/noabl/index.html but this will only give an approximate figure. There are potential inaccuracies due to the actual wind speed at your site being influenced by the local topography and nearby obstructions such as trees and buildings. For the turbine to be effective, it must have access to clean strong wind and therefore be positioned away from obstacles which are south west of its proposed location. Ideally your wind turbine would be situated on the top of a smooth rounded hill with a clear fetch to the prevailing wind but this is not always possible! It should also be bourn in mind that the annual mean wind speed calculated from the DTi's data may be significantly lower in urban areas and higher near the coast. We would recommend a minimum average of 5metres/sec @ 10m above ground level from this data base.

Websites that may help you further in your site assessment include:

www.windpower.org/en/tour/wres/weibull.htm

www.smallwindindustry.org/index.php?id=122

You will need a large working area for the turbine to be delivered and installed (typically on a low loader lorry and loadall). It is essential to have at least double the length of the mast and turbine (ie. a 6kW turbine on a 9m mast requires 23m space) and to bear in mind that the turbine will need to be lowered periodically for servicing.

PLANNING PERMISSION

It is essential to obtain planning permission (subject to the applicable fee and taking at least 6 weeks) for any turbine over 8m tall. Planners are generally very supportive and pro-active towards small wind generation projects but there are several points to be aware of:

- A small turbine will not be allowed near military airfields or radar installations.
- The turbine needs to be at least 50m from your nearest neighbour and ideally 75-100m. It is probably best to discuss your proposals with your neighbours first to make sure they aren't going to object to your application.
- You may have difficulty obtaining planning permission if your site is in a National Park, Area of Outstanding Natural Beauty or Green Belt, although the planning authorities vary considerably in their attitude towards small wind turbines in these areas.
- If you're within 20 miles of a civil airport the airport authority should be contacted in advance of applying for planning permission as they may take a long time to respond.

We can help with your planning application by giving you our planning pack which can then be passed onto your planning authority. We also offer a full planning service. Please contact us for details.

Visit www.planningportal.gov.uk

FUNDING

For grants to be awarded, work must be carried out by BERR accredited installers. Our registered installer number under the Microgeneration Certification Scheme is MCS 1029. Funding is available from the Low Carbon Buildings Programme from whom you can apply for £1000 per kW up to a maximum of £2,500 per household. The grant must be spent within 3 months of being awarded and the property must meet a minimum level of energy efficiency. Natural Generation will provide you with all the information needed to complete the application form.

It should be noted that the turbine also needs to be accredited. Currently only the three Proven models and the 20kW Westwind turbines are accredited products and a grant cannot be claimed on other models.

Websites you might find useful regarding funding include:

www.lowcarbonbuildings.org.uk

www.est.org.uk

ENERGY PRODUCTION

An average household consumes approximately 4,000-5,000 units (kW/h) per year. This can easily be worked out by consulting your current annual electricity bill. At an average wind speed of 5m/s a Proven 2.5kW wind turbine produces 4,200kW/h per

year which should cover the energy needs of an average home, while a 6kW turbine will produce approximately 11,000kWh per year and is recommended for farms and large households. The height of the tower affects energy output; Proven towers are available in a range of heights from 6.5m - 15m while Westwind towers vary from 12m – 18m. Basically the taller the tower, the more efficient the turbine but planners may impose a height restriction depending on your proposed site. Natural Generation are currently looking into the manufacture of taller guyed towers of up to 30m.

SELLING SURPLUS ELECTRICITY

Where your property is connected to the grid you will then use energy produced by your turbine first, but on still days or when your consumption exceeds output you will still draw the deficit from the grid. But in reverse, on windy days the surplus power your turbine produces will be exported to the grid and sold back to your supplier. The rate your energy provider pays for your excess power will vary but it is generally less than the rates you are paying them! We recommend you contact several energy suppliers to get the best price for your power - EDF and npower seem to be the most competitive at the moment. It is far more cost effective if you are currently connected to the grid to stay connected. Unfortunately, despite the turbine, if you are connected to the national grid you will still be disconnected when a power cut occurs.

ELECTRICITY STORAGE

A battery stand alone system makes you completely energy self-sufficient. It consists of a large battery bank as well as the turbine and therefore will increase the cost of the project significantly. Batteries will need to be replaced approximately every 10 years. If you are currently off-grid a battery system may be a good option for you as grid connection can cost tens of thousands of pounds.

ROCs

In addition to your energy savings, once your turbine has been installed, you will also be credited with Renewable Obligation Certificates (ROCs) which are in effect a bonus for generating renewable energy. One ROC will be awarded for each 1000kWhs you generate whether it is used by you or sold to the national grid. For a typical site this should be valued at £300-£400 a year. ROCs can be sold through Tradelink Solutions (<http://www.tradelinksolutions.com/>).

INSTALLATION

Initially concrete foundations need to be laid for the tower and a trench needs to be dug for the cable connecting the turbine to the electrical distribution board. Natural Generation can do this but we are also happy to supply detailed instructions for your local building contractor.

The turbine and tower will be delivered by truck with crane attached or will require a JCB or tractor for lifting. It is then fixed onto the foundations and the turbine assembled and erected. We supply and install all the electrical components that connect your turbine to the national grid or to your battery bank. Natural Generation will then commission the system and your turbine will start generating power.

AFTERSALES

Our quotation will include a 3 month service to ensure that the turbine is operating correctly. After this, servicing intervals will be set according to the type of turbine – each year for Proven turbines and the 20kW Westwind, less frequently for the other Westwind models. If annual maintenance is required then this should be carried out by an approved installer to comply with the warranty. Maintenance is a relatively simple operation and could be carried out by yourselves assuming you are fairly mechanically minded. Your turbine has a life expectancy of 25 years.

THE WIND TURBINES

Natural Generation are distributors for the internationally renowned Proven and Westwind wind turbines and also Marlec wind generators for smaller off grid applications.

During very high winds Marlec and Westwind turbines turn out of the wind to reduce their surface area preventing damage to the machine. Proven turbines feature a patented reinforced rubber hinge and a spring which helps to hold the blade in position whilst in operation. As the wind gets stronger it pushes the blade back and allows the turbine to protect itself by reducing the surface area exposed to the wind. As the wind dies down the blades open out again.

Marlec Rutland FM910-3

Recommended for average small scale battery charging applications

Annual energy output 110 - 240 kWh

Rated power 80W @ 10m/s

POA

Marlec Rutland FM1803

Recommended for small scale battery charging applications

Annual energy output equivalent to 380 – 1,000 kWh

Rated power 340W @ 10m/s

POA

Westwind 3kW

Recommended for small/average household applications

Annual energy output 2,800 – 6,000 kWh

Grid connected installed cost approx. £14,000

Westwind 5.5kW

Recommended for average household applications

Annual energy output 4,300 – 12,000 kWh

Grid connected installed cost between £20,000

Westwind 10kW

Recommended for farms and large household applications

Annual energy output 8,000 – 20,000 kWh

Grid connected installed cost between £30,000

Westwind 20kW*

Recommended for commercial, farms and large or joint household applications

Annual energy output 16,000 – 40,000 kWh

Grid connected installed cost approx. £57,000

Proven 2.5kW*

Recommended for average household applications

Annual energy output 2,500 – 5,000 kWh

Grid connected installed cost approx. £11,500

Proven 6kW*

Recommended for farms and large household applications

Annual energy output 6,000 – 12,000 kWh

Grid connected installed cost approx. £21,000

Proven 15kW*

Recommended for commercial, farms and large or joint household applications

Annual energy output 15,000 – 30,000 kWh

Grid connected installed cost approx. £44,000

*These products are accredited under the Low Carbon Building Programme and should therefore allow the purchaser to apply for a grant.

Output range is quoted to cover typical average annual wind speeds.
Lighter wind sites with typical 4.5 m/s will produce lower end of range.
Higher wind sites eg. 6.5 m/s average will produce upper end of range.

For domestic installations VAT will be charged at 5% on all prices quoted unless the turbine is part of a new build project where VAT is exempt. VAT will be charged at the standard rate on commercial installations.

*For more specific project advice or to arrange a site visit,
we would be delighted to hear from you either by phone on 01872 554144
or by email on info@naturalgen.co.uk*

**Microgeneration Approved Installers
Certification no. MCS 1029**

