

Fact Sheet - Wind Power

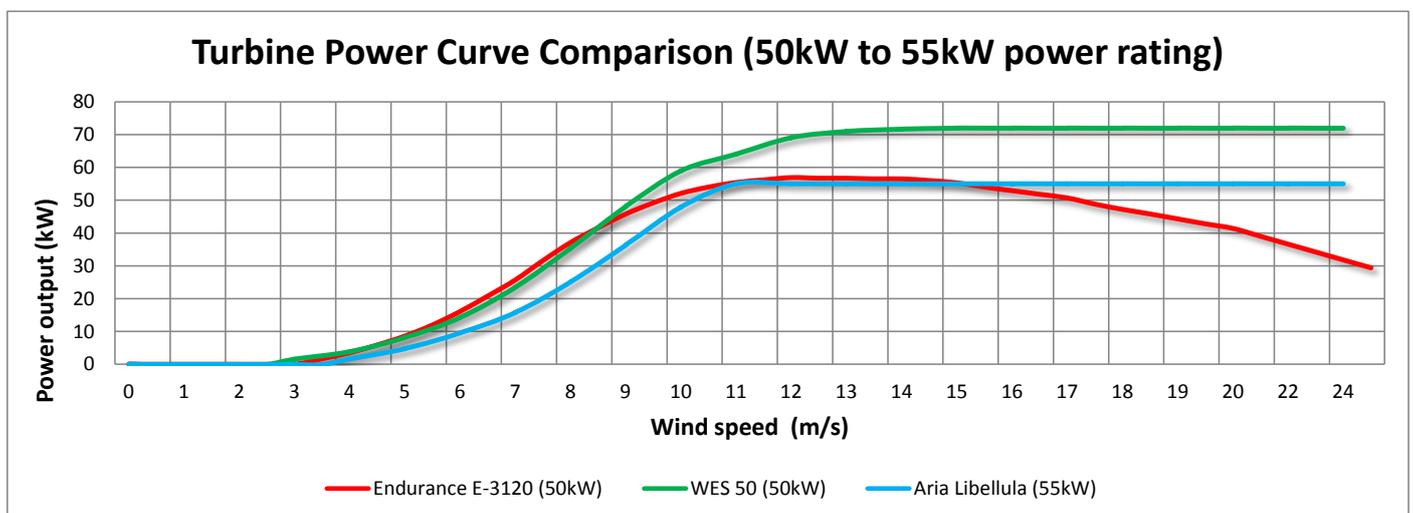
The UK is the windiest country in Europe, exposed to prevailing winds from the Atlantic Ocean and has the greatest potential for wind power. Because the UK is now a net importer of oil and gas, wind offers key benefits in terms of secure energy supplies. As such this technology is supported by the Government through subsidies such as the Feed-In Tariffs (FITs), Renewable Obligation Certificates (ROCs) and in 2017 Contracts for Difference (CfD).



Wind power is variable by its very nature and wind turbines generate differing amounts of power depending on the wind speed being experienced. Over the course of an entire year, a turbine might generate approximately 30% of its theoretical maximum output; a figure known as the capacity factor. For example a 50kW wind turbine with a 30% capacity factor would generate approximately 130,000kWh annually, currently resulting in approximately £23,000 of FIT payments annually.

Significantly, a small difference in the wind speed makes a big difference to the power output of a wind turbine. Wind speeds increase with height, giving taller turbines an advantage. The power output of the turbine is also related to the length of the blades and therefore the swept area. The longer the blades and the larger the area, the greater the amount of power the turbine can produce from the wind. The size of the turbine that can be installed is generally governed by planning restrictions and the local capacity of the grid network to take the additional load.

The graph below illustrates the differing power outputs produced by three turbines, all of which are officially rated at 50kW to 55kW. It demonstrates that turbines of the same power rating perform differently at the same wind speeds and that some turbines have a higher output (nominal power) than their rated power. As such it is critical to have a good understanding of both wind speeds and individual turbine performance when selecting a turbine.



Q: How do I find out if my site has sufficient wind resource?

A: The Department of Energy & Climate Change holds a UK Wind Speed Database (NOABL) which will provide the average wind speed in your area for free. This data should only be used as an initial indicator of site suitability. The actual wind speed at a site will be influenced by the local topography and any nearby obstructions that cause turbulence (which reduces energy yields and turbine life) such as trees, buildings, etc. A more accurate way of assessing wind speeds is to purchase historic windspeed data or to install an anemometer to measure the wind speed directly over the course of a year or more. A site with an average wind speed of 6 metres per second is generally sufficient enough to make installing a wind turbine worthwhile.

Q: Do I need planning permission for a wind turbine?

A: Wind energy installations require planning permission and you should always consult your local planning department early in the feasibility process. Relevant factors include environmental impacts, site access, noise, visual effects, radar interference, among others.

Q: How do the FIT and ROC subsidies work and will they be cut?

A: The Feed-In Tariffs (FIT) are available as financial support for wind turbine projects up to 5MW installed capacity over a 20 year term. The tariff is paid for each kWh of electricity generated, with different rate bands applying for varying sizes of turbine. A minimum degression factor of 3.5% is due to be applied to tariff rates from April 2014. However, the actual degression applied may be as high as 20% because it is dependent on technology deployment levels. It is therefore vital to commission projects as soon as possible in order to secure the best possible FIT rate.

Renewable Obligation Certificates (ROCs) provide support for wind turbine projects of any capacity. Support is guaranteed for a 20 year term, but ROCs are to be replaced by Contracts for Difference (CfD) in 2017 when entry to the ROC scheme closes. Support will therefore end in 2037. ROCs are tradable on the open market and therefore their value is variable with the current price at the time of writing (July 2014) being approximately £41/MWh. Different bandings apply for different technologies, but onshore wind current receives 0.9 ROCs/MWh.

Contracts for Difference (CfD) is a 15 year contract which will pay developers the difference between the 'reference price' (an index which estimates the market price for electricity) and the 'strike price' (a fixed price per MWh of electrical output). Draft strike prices were published in June 2013 and it is currently proposed that onshore wind will initially receive £100/MWh.

Q: What is the 'swept area' of a wind turbine?

A: The swept area is the area through which the rotor blades of a wind turbine spin, as seen when directly facing the centre of the rotor blades. The power output of a wind turbine is directly related to the swept area of its blades; the larger the diameter of its blades, the more power it is capable of extracting from the wind. The relationship between wind speed and energy output is not linear; as wind speed increases the power output increases by a cube factor and therefore if wind speed doubles you get eight times the amount of electricity generated.

Q: What is the lifespan of a wind turbine?

A: A wind turbine's life expectancy is approximately 20 to 25 years. The expected life time of a refurbished wind turbine is approximately another 15 years. However, even after this period, the existing turbine tower and foundation can potentially be reused.

Q: How do I get funding?

A: For the initial feasibility assessment CARES funding is available to farmers from the Energy Savings Trust. To qualify, support for a scheme must be provided by the local community. Up to £150,000 can be secured from the CARES fund to secure planning and grid connection. Once planning and grid connection are achieved most banks and funding providers will release funds for a wind project subject to certain criteria being met. There is currently only one provider offering non-recourse funding which is Triodos. Non-recourse funding is a loan where the lending bank is only entitled to repayment from the profits of the project the loan is funding, and not from other assets of the borrower.