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## Wind power in agriculture – small, medium and large scale

### Background

With 75 per cent of UK land area in the agricultural sector, the NFU believes that its members are well-placed to capture renewable natural energy flows, while maintaining our traditional role in food production as well as the delivery of other environmental and land management services. It is the NFU's aspiration that every farmer and grower should have the opportunity to become a net exporter of low-carbon energy. Government policy on cutting greenhouse gas emissions, and the challenging new national targets for renewable energy supply, are creating substantial business opportunities for the farm sector. Premium prices for small-scale renewable electricity generation through a new 'Feed-in Tariff' or 'Clean Energy Cashback' from April 2010 are expected to make on-farm power production an attractive investment.

### Wind turbines and farming

Wind power (or wind energy) is one of many land-based renewable energy resources available to agriculture, for self-supply and for export of energy services to others – alongside a wide range of bioenergy technologies (biogas, energy crops, etc.), solar power and heating, small hydropower, ground source heat, etc. The NFU remains technology-neutral with respect to choosing renewable energy options – we strongly support those that are commercially available and economic under today's market conditions and policy framework. Growers and processors of food have a long history of harnessing the wind – from the first English mill around 1200 to a 19th-century peak of about 10,000 windmills across Britain. Not every farmer or land manager has welcomed the return of wind power in recent years. A wind farm on your own land, earning income for your business, may be judged a good thing; one which you can see on your neighbour's land, but which earns you nothing, may be considered an eyesore! But, love them or hate them, modern wind turbines are set to become a familiar part of the 21st-century landscape, making a significant contribution to energy security and national renewable energy targets.

Opportunities for wind power development in agriculture may be considered at a number of scales:

- large commercial wind farms
- single turbines or small 'windclusters'
- small wind energy systems

### Large wind farms

Much of the experience in the agricultural sector to date has been with relatively large commercial developers of large-scale wind farm projects, in which the farmer plays a relatively passive role as landlord. However, the NFU would like to see more farmers and growers assuming risk and becoming project developers in their own right, in order to better realise the value of the wind potential on their land. A landowner following this strategy would need to obtain the required technical and professional advice, assume the risk of obtaining planning consent, and then either sell the project as a more valuable 'going concern' or develop a joint venture to actually implement the wind farm.

At present NFU's preferred legal partners (some of whom specialise in this area and advertise in British Farmer and Grower magazine) tend to provide only help with negotiating wind farm option agreements and leases on behalf of the landowner. Commonly an option agreement, for which the landowner receives a modest payment plus legal expenses, allows a prospective developer a limited time period (say 24-60 months) in which to work on the landowner's site and progress the project to the point of planning consent. A lease agreement covers the likely lifetime of the development, including fixed payments, rents and eventual decommissioning/reinstatement of the site. Payments and rents are usually negotiated with reference to precedents, prevailing market rates, etc. An indication of the typical annual rent is roughly £4000-5000 per megawatt (MW) of installed capacity, but this is usually paid as a fraction of gross income from electricity sales rather than as a fixed amount. There may be an opportunity for the landowner to acquire an equity stake in the project, assuming more risk but probably receiving a great income as a result. However, this is likely to be a small share since the total project capital cost will be in the range £5-50 million for a windfarm of 5 to 50 MW capacity, based upon individual turbines of 1-3 MW each.

### Single wind turbines or 'clusters'

A more affordable scale of development for the farmer-entrepreneur may be a single medium-to-large scale turbine (225 kW to 2 MW), or a 'wind cluster' of up to three turbines, costing between about £100,000 and £5 million in total. Some refurbished older models of turbines are available to serve this market, although loan finance may be harder to obtain for second-hand machines than for new equipment. Such a project may be suitable for a smaller site with good wind speeds that has been overlooked by mainstream commercial wind developers as too difficult or expensive.

### Small wind energy systems

These include building-mounted or pole-mounted micro-turbines with outputs ranging from a few hundred watts to about 1.5 kilowatts, a wide range of small turbine configurations up to about 15 kW, and small-to-medium single turbines up to about 100 kW. Small wind systems are more closely matched to on-site electricity demand, or the energy needs of a single remote farm building. However, they are still usually connected to the mains electricity grid, in order to allow both the import and export of electricity when production exceeds or falls short of local needs. Both the equipment and installation costs are higher than for larger machines – more like £3000-5000 per kW – but the premium prices paid under the Feed-in Tariff from April 2010 are expected to make many smaller projects economically viable.

### Where to begin

In line with NFU energy advice elsewhere, you are strongly recommended to conduct a comprehensive energy efficiency audit to better manage your on-site costs before investing in renewable energy production. Seek professional advice for all the following steps. Start by collecting detailed monthly energy data for your farm (you may need to look at sub-metering for different parts of the business), identify where you can make simple improvements to equipment or behaviour to save energy, and then look at more substantial upgrades to older equipment. Next, an 'options appraisal' of the many renewable energy technologies should determine which of them best suits your business. Lastly, think about scale – if you are considering wind power, do you want to power a remote farm building, replace the electricity supply to the entire farm, or generate power to sell to the grid?

Get a rough estimate of your windspeed from the Government's database (go to [decc.gov.uk](http://decc.gov.uk) and search for "windspeed" – or [energysavingtrust.org.uk](http://energysavingtrust.org.uk) and search for "wind"). If your location looks promising, you may benefit from more accurate data over a period of a few months for different sites on your land (sites only several hundred metres apart can have very different wind speeds). Low-cost

wind monitoring anemometers are increasingly available – but good-quality anemometer data is needed to estimate the likely performance of a turbine.

### **Sensitive approach to developing a wind project**

The NFU recommends that members considering wind farms (or even single turbines of any scale) should first consult extensively with neighbouring farmers and the community as a whole; then hold early meetings with local planners, and finally 'go public' through village meetings and exhibitions. In exceptional cases it may be more prudent not to proceed with a project, but often setting up a community development fund using a small portion of the income (e.g. linked to energy efficiency improvements for neighbouring householders, farmers or community buildings) can go a long way towards alleviating concerns that the development has been foisted on the area by 'outsiders'. As the examples below demonstrate, offering shares in your project to members of the local community may be a good way of galvanising support and advancing the project quickly.

### **Grant funding and renewable tariffs**

Although some capital grant funding may be available for renewable energy equipment, the total amount of public grant support is limited and subject to competitive bidding. Revenue-based support such as the Renewables Obligation and the Renewable Feed-in Tariff offer a more substantial and assured long-term source of income. You should check carefully that any grant funding (especially from central government sources) does not exclude your project from receiving revenue-based support – NFU's understanding is that this is unlikely to be a problem for small projects (under 50 kW) receiving capital grant support from local or regional schemes.

### **Examples of farmer-led wind power developments:**

Llraithddu Windfarm - a large-scale project (67 MW) developed under local ownership in Powys, Wales:

<http://www.lraithdduwindfarm.co.uk/indexa.html>

Windpower Wales - a locally-owned developer of a 40 MW project in Denbighshire, in which more than 50 farmers, local individuals and businesses have already become shareholders:

<http://www.windpower-wales.com/home.php?lang=en>

### **Further information**

Through its reciprocal exchange of membership with the Renewable Energy Association (REA), the NFU already participates in joint communications, lobbying and publicity activities - and we have also established a good working relationship with the British Wind Energy Association (BWEA).

<http://www.bwea.com/you/agric.html>

<http://www.bwea.com/small/>

<http://www.r-e-a.net/power/wind-power>