Wind power: environmental and safety issues

Wind Energy Fact Sheet 4

As with all sectors of society, the wind energy industry has a duty to act responsibly, both towards the health and safety of individuals and in minimising the impact of wind turbines on the environment. This Fact Sheet addresses some of the major issues and public perceptions.

Wind developers are required to consider all environmental aspects of wind energy projects as most wind farms (and all large wind farms) are required to produce an Environmental Impact Assessment, which covers all the issues as part of the application for planning permission. The Environmental Impact Statements produced as a result of these Assessments are available to the public. See Fact Sheet 12 for more information on the project development process for wind farms.

Are wind turbines visually intrusive?

Wind turbines are tall structures that are built in open spaces. Often wind farms are quite conspicuous and can be seen from some distance. A particular wind farm may appear intrusive to some people, but not to others, and it is common for people to think that some wind farms are more visually acceptable than others. People's opinions are based on their individual values and judgements, and are influenced by issues such as:

- the value a person places on the preservation of the proposed site, its surrounding area and its social and historic context
- the value a person places on the clean production of electricity and reduction in pollution
- the person's familiarity with the technology and the alternatives
- the person's interest in, and awareness of, energy supply and demand.

A person's opinion is based on balancing these issues for each wind farm. There is no single right answer.

It is the responsibility of the land planning process to balance all the relevant issues and views on a project-by-project basis. There is Government guidance on planning for wind farms, which, for England and Wales, is contained in *Planning Policy Guidance Note 22, Renewable Energy* and, for Scotland, in *National Planning Policy Guideline 6 (NPPG6): Renewable Energy Developments*.

Some organisations also publish guidance and background information to assist with planning issues for wind projects. The British Wind Energy Association (BWEA) has published some Best Practice Guidelines and some other countryside organisations, including the Countryside

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Agency, Countryside Council for Wales and Scottish Natural Heritage, have published useful information on the subject (see Web sites under References).

Developers and planners increasingly need to consider the cumulative effects of wind schemes. As increasing numbers of turbines are installed, more attention needs to be paid to their combined effects. Many of these cumulative effects can be considered in the same way as for individual schemes, but some issues become more relevant as more turbines are installed such as their potential effect on birds.

Can the look of wind farms be improved?

Some wind turbine manufacturers have employed industrial designers to help improve the look of their machines. This has led to a trend towards tubular towers instead of lattice towers and more slender and refined nacelle shapes.

Landscape architects are often consulted on the layout of wind farms. They aim to ensure that the farms seem coherent and do not appear cluttered in the landscape. They consider the effect of the turbines against the skyline and from important viewpoints or beauty spots (see for example ETSU reports W/13/00354/034/REP, and W/13/00395/REP, available from the Renewable Energy Enquiries Bureau – see below). The colour of a wind turbine can also affect how noticeable it is (see ETSU W/14/00533/REP).

How noisy are wind turbines?

Noise from wind turbines is less than from many other everyday country activities. Two types of noise are generated by a wind turbine: aerodynamic (from the blades) and mechanical (from the rotating machinery). Aerodynamic noise has been likened to the swishing sound caused by branches of trees during a brisk wind. Mechanical noise can be minimised using well-proven engineering practices.

Because of the nature of sites required for wind farms, wind turbines will often be located in areas of low background noise where the added noise contribution from the wind turbines may be detectable. Even in these circumstances, it is likely that the wind turbine noise will only be detectable for limited periods during low wind speeds; at higher wind speeds the ambient noise level due to wind noise from trees and buildings may increase sufficiently to mask the turbine noise. Careful design, siting and operation should ensure that wind turbine noise is not a nuisance. Noise considerations, however, often limit the number or layout of turbines on a particular site.

Wind farm developers often use planning tools to estimate the noise output from their wind farms. Using these tools they can ensure that the levels at the nearest residences, for example, are within acceptable levels.

There is accepted guidance on measuring and predicting noise levels from wind farms in the Noise Working Group publication "*The Assessment and Rating of Noise from Wind Turbines*" (ETSU-R-97). This working group involved a range of noise experts, wind farm developers and environmental health officers. The recommendations, agreed by the Working Group, are frequently used by local authorities to set acceptable noise levels.

How do wind turbines affect wildlife?

Generally, at wind farms wildlife lives in harmony with the wind turbines. This is apparent at existing wind farms where livestock graze right up to the base of the turbines.

Evidence to date suggests that there is minimal risk to birds from the operation of properly sited wind turbines. There are just a few cases where birds have been injured through collision with wind turbines. These should be considered in the context of the number of bird deaths caused by collision with radio masts, electricity pylons, aircraft, vehicles etc. Monitoring studies at operational wind farms in the UK indicate that, in general, birds live in harmony with wind turbines (see ETSU reports W/13/00300/REP/2D, W/13/00394/REP, W/13/00426/REP/3) .

The developers and planners of wind energy take the issue of bird impacts seriously. Development has generally been excluded from EU bird protection areas and similar designated areas.

Are turbines safe?

There are two situations where wind turbines could cause damage to a member of the general public. These are:

- Turbines shedding a part of a blade or, in exceptional circumstances, a whole blade, due to lightning strikes or mechanical failure.
- Ice, which has formed on a turbine blade, being 'shed' when the turbine starts up.

There have been a few cases, worldwide, of such occurrences. These incidents have usually occurred in bad weather when few people are around and in Europe there are no known cases where injury has resulted.

Wind turbines are like most other engineering products such as cars or aircraft; they are designed to operate to high standards of safety. However, there has been a very small number of injuries and fatalities to operational staff across the world, though none has been reported in the UK. They have been caused by a failure to observe manufacturers' and operators' instructions. These few instances should be viewed in the context of the number of turbines worldwide (over 50,000), the vast majority of which have been operating safely since they were built.

Can wind turbines interfere with television reception?

Wind turbines could, potentially, interfere with television reception in a similar way to any other structure such as electricity pylons, silos and buildings. In the case of wind turbines there is the additional consideration of the rotation of the blades. In practice this has not proved to be a significant problem, partly because the investigations of any potential wind farm site should include an assessment of the effect on the broadcast reception of local people. Remedial measures are available and developers make provision for taking suitable remedial action if required.

What happens when a turbine finishes its life?

Wind turbines are typically designed to last for over 20 years. Some replacement of parts might be needed in this period, but the main structure is likely to be in place for at least that long. No wind farm in the UK has yet served its full life and only one has been decommissioned (for economic reasons it was replaced with larger turbines). Some experimental turbines have been taken down.

When a wind farm is decommissioned it is likely that the turbines will be replaced (subject to planning approval) or the structures removed (removal is often a condition of planning consent). Generally all visible traces of the wind farm are removed: the turbines themselves, as well as electrical equipment and roads are all taken away. It is also possible to remove the turbine foundations but sometimes these are left in situ as digging them up would cause greater environmental damage than leaving them.

References

The Assessment and Rating of Noise from Wind Turbines, ETSU-R-97, 1996, ETSU for the DTI*

Landscape impact assessment for wind turbine development in Dyfed, W/13/00354/034/REP, Chris Blandford Associates; Garrad, Hassan and Partners*

The visual impact of wind farms: lessons from the UK experience. With accompanying video. 1995, W/13/00395/REP, Dulas Environmental; Sue Griffiths Partnership*

A review of the impacts of wind farms on birds in the UK, 1996, SGS Environment, W/13/00426/REP/3*

The effect of wind turbines on the bird population at Blyth Harbour, 1996, Border Wind Ltd, W/13/00394/REP*

The Mynydd y Cemmaes wind farm impact study - Volume IID - ecological impact: final report. 1995, Dulas Ltd, W/13/00300/REP/2D*

Continuation of bird studies at Blyth Harbour wind farm and the implications for offshore wind farms. 1999, Border Wind Ltd, W/13/00495/REP*

The influence of colour on the aesthetics of wind turbine generators, 1999, TJP Envision, W/14/00533/REP*

Wind Energy Production in Cold Climate, 1999, Garrad Hassan & Partners Ltd, W/11/00452/REP*

***Available from the Renewable Energy Enquiries Bureau at ETSU – see below.**

Planning Policy Guidance Note 22, Renewable Energy (published by HMSO).

National Planning Policy Guideline 6 (NPPG6): Renewable Energy Developments (available from the Scottish Executive's web site: www.scotland.gov.uk/planning).

Other useful Web Sites:
BWEA: www.britishwindenergy.co.uk
Countryside Agency: www.countryside.gov.uk
Countryside Council for Wales: www.ccw.gov.uk
Scottish Natural Heritage : www.snh.org.uk

Further information

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