



JRC Procedure for co-ordination of radio systems with wind energy systems

11 January 2007

Summary

1. This document explains the process to be used by JRC in assessing the potential for wind energy systems to cause disturbance to operational radio links used by the gas and electricity industries for management, safety and control of their networks. Our intention is to protect the operation of these links from interference which might be caused by proposed wind energy developments.
2. Where the potential for interference is predicted, this document explains the measures which can be taken to explore the possibilities for co-existence of the wind energy systems with utility radio links, the cost of which would be met by the wind developer.
3. The overall objective is to achieve co-existence of wind energy and utility radio systems in the most cost-effective manner. JRC does not have any remit to promote or hinder wind energy, but simply to reflect government priorities, which are designed to foster the growth of renewable energy systems but without detriment to telecommunications or any adverse impact on the efficiency and security of energy supplies to consumers.

Background

4. JRC manages 48 channels of UHF radio spectrum allocated by the UK Communications Regulator Ofcom to the UK fuel and power industries for telemetry and telecontrol of their networks. JRC holds the Wireless Telegraphy Act Licence for these channels and assigns frequencies to UK energy companies on an individual basis to operate designated radio links. JRC is responsible for the assignment of these frequencies, their protection and first line interference resolution.
5. JRC provides a number of other radio services to the electricity generation, transmission and distribution industry, plus similar services to the gas production, transmission and distribution licence holders. A number of other critical radio spectrum users also take advantage of JRC's services.
6. Within JRC's portfolio of services, JRC is contracted by a number of companies to protect their microwave fixed links from interference, and this includes the potential for harmful interference by wind turbines.
7. To assist the wind energy industry understand the potential for detrimental impact of wind turbines on radiocommunications links, JRC publishes a range of documents on its web site <www.JRC.co.uk/windfarms>, and has developed the procedures outlined below to expedite the co-ordination process.
8. JRC's core funding is derived from subscriptions from the UK gas and electricity industries responsible for delivery of services regulated by the British energy regulator Ofgem (and its equivalent in Northern Ireland). Costs legitimately attributable to the wind energy sector must therefore be borne by that sector as it would be inequitable for JRC costs attributable to renewable energy policies to be subsidised by energy consumers.

Procedure for evaluating wind energy proposals

Scanning Telemetry Links

9. Since 1 January 2005, JRC has adopted the following approach:
- Initial applications are sifted to ascertain whether any part of the wind energy development encroaches within a 1km exclusion zone around any utility radio infrastructure, or within 1 km of the path of any scanning telemetry link.
 - If any part of the wind energy development falls within the 1km zone then JRC will undertake an initial technical interference assessment. If our assessment is that the development will affect JRC services then the applicant is notified that JRC, as the licence holder, objects to the scheme, and will sustain that objection in respect to any planning application related to that scheme. JRC will advise the operator of the affected link(s) of the objection, and where instructed so to do, JRC will also object on behalf of the JRC member company concerned.
 - In those circumstances where, in spite of the proposed development impinging on the 1 km clearance zone, the initial technical assessment indicates that there will not be a conflict, the application may be cleared.
 - In advising the wind farm or turbine applicant of the co-ordination failure and likely planning objection, two services are offered to assist the applicant which will be chargeable to the applicant:
 - **Detailed co-ordination** of each interfering asset to ascertain the precise path profile and potential interaction with the utility radio service(s).
 - Consultancy advice to liaise with the affected JRC member to explore **mitigation options** to enable the wind energy development to co-exist with the utility radio link(s) in a manner acceptable to both parties.

Microwave links

10. For microwave fixed links, a similar process will be followed with the following exceptions:
- The separation distance between wind energy system and radio link with which an objection is triggered is reduced to 500m reflecting the shorter wavelengths at which microwave fixed links operate; and
 - Since JRC is not a licence holder in respect of the microwave fixed links service, the objection is raised only behalf of the operator of the fixed link(s).

Satellite links

11. In general terms, because satellite systems use a highly directional aerial and use an inclined path, the potential for interference between wind energy developments and satellite links is small. Where requested to evaluate the potential for harmful interference to a satellite link from a wind energy development, JRC will assess the compatibility on a case-by-case basis.

Grid connections

12. Wind energy developers are reminded that where a wind energy development is connected to the electricity distribution network, the electricity distribution company may require additional telemetry and telecontrol points for monitoring and control. Since the additional control points may be required to be monitored using a UHF telemetry link, it would be wise for this link to be included in any evaluation at the proposal stage.

Timescale

13. JRC aims to respond to initial co-ordination requests within 20 working days.

Modifications to the procedure

Concessions to exclude micro turbines from co-ordination requirements

14. No co-ordination will be required for micro turbines:
 - If building mounted, the tip height is no greater than 4m above the prevailing roof line; or
 - If pole mounted, the hub height is no greater than 10m above the prevailing ground level and the supporting mast is less than 20m from the external wall of a significant building (considered to be one in respect of which planning consent would be required for its construction).
15. Micro turbines are considered to be those where the rotor does not exceed 2m in diameter (equivalent to a swept area of less than 3.5 square metres).

Processes to investigate co-ordination failure

Detailed co-ordination

16. Were an application fails the initial co-ordination assessment, it is possible that the objection may be lifted if it can be shown from a more detailed analysis that the potential for interference is minimal.
17. For **all telemetry links and microwave links operating at frequencies below 3 GHz**, the criteria against which such an evaluation will be conducted is contained within the Document “Calculation of Wind Turbine Clearance Zones, used by JRC for 460 MHz Telemetry Links, when turbine sizes and locations are accurately known”, the current version of which is published on the windfarms area of the JRC web site.
18. For **microwave links operating at frequencies greater than 3 GHz**, the criteria used are defined in the document published by the former Radiocommunications Agency “Fixed-link wind-turbine exclusion zone method” (the ‘David Bacon’ method), a copy of which is contained on the JRC web site for convenience. The W/U requirement for these links is 50 dB. The link uncertainty and microsite allowance will be as defined in JRC document “Calculation of the Clearance Zone”.
19. For **satellite links**, JRC will investigate each link on a case by case basis.
20. The **fee chargeable** for a detailed co-ordination will be quoted in advance and based on the time required to undertake the work. In order to fully assess all the parameters with sufficient precision to undertake an accurate detailed co-ordination, a site visit may be required.
21. Undertaking a detailed co-ordination enables the interaction between wind turbines and radio links to be more precisely defined, but does not guarantee in any way to diminish the potential for interference. Thus, having undertaken a detailed co-ordination, it is possible that the original objections may be sustained.
22. Using data obtained from the detailed co-ordination, JRC will, on request, supply a map of the proposed wind energy development showing exclusion corridors for the radio link(s). If the wind farm developer is able to modify the plans in such a way that no part of any wind turbine impinges upon the specified corridors, then the developer may wish to submit a revised proposal. If it is confirmed that the turbines no longer intrude into the exclusions zones, then the objections can be lifted.

23. JRC will endeavour to produce the data for a detailed co-ordination within 20 working days of receipt of a purchase order.

24. In conducting an evaluation, JRC seeks to act as an independent arbiter and, whilst having power to remove any of its own objections to an application if it considers them to be no longer necessary, individual JRC member companies will make their own judgement based on the findings and cannot be bound by any JRC decision.

Mitigation studies

25. A mitigation study will generally follow when a detailed co-ordination reveals that the potential for interference between the wind energy development and radio link(s) exists, and the wind energy developer wishes JRC to undertake an in-depth study to identify options which may exist for mitigating the interference potential.

26. JRC will then appoint a project manager to prepare a proposal to submit to the wind energy developer identifying the proposed schedule of work, cost and timescale for identifying mechanisms whereby the wind energy development might be made compatible with the radio links, or the telecommunications schemes modified to avoid the conflict.

27. This work has to be undertaken in collaboration with the link operator as ultimately the solution will usually require adaptation of the telecommunications system to overcome the conflict. The final outcome will normally take the form of an agreement between wind energy developer and link operator for a schedule of work to be funded by the developer if the scheme proceeds.

28. In conducting a mitigation study, JRC acts as an independent arbiter and, whilst having power to remove any of its own objections to an application if it considers them to be no longer necessary, individual JRC member companies will make their own judgement based on the findings and cannot be bound by any JRC decision.

Related matters

29. JRC's assessments are based on research reports and experiments, both published and unpublished. JRC has also undertaken its own tests and research programmes, and welcomes proposals for collaboration in further research activities to understand the interaction between wind turbines and radio links more fully.

30. Within the wind farms area of JRC's web site is information illustrating some of the problems which have been found to exist.

31. JRC is investigating whether it is possible to develop a map which can be published on the web site enabling wind farm developers to see areas where a substantial amount of JRC managed radio infrastructure already exists, and therefore wind energy developments would have an onerous task to meet JRC co-ordination requirements, but this is not possible at this point.

32. JRC is working with the industry to investigate whether there is the potential to relax the requirements described in the assessment document "Calculation of Wind Turbine Clearance Zones, used by JRC for 460 MHz Telemetry Links, when turbine sizes and locations are accurately known" for telemetry links designed to operate at lower availability than primary links and have intermittent duty cycles.

33. All assessments are carried out on the basis of location data currently available (unless verified by a site visit as part of a study). This data is largely historical, and was not recorded with the level of accuracy necessary for wind farm co-ordination, hence uncertainties have to be included in all calculations to reflect prevailing operating environment.

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