



Engineering Recommendation L44

Issue 1 2012

Separation between Wind Turbines and
Overhead Lines

Principles of Good Practice

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Amendments since publication

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Foreword

This engineering recommendation is published by the Energy Networks Association (ENA) and comes into effect from 1st August 2012. It has been prepared under the authority of the ENA Engineering Policy and Standards Manager.

This engineering recommendation has been compiled by the ENA Overhead Lines Panel in consultation with Renewable UK. The recommendation is based on national guidelines and research and may be varied to suit specific local applications.

Introduction

Renewable energy is becoming an increasing part of the UK energy production. Wind energy has now become the largest renewable generation source in the UK.

UK Transmission and Distribution companies are required to demonstrate network resilience under their license conditions and to comply with the requirements of the Electricity Supply, Quality, and Continuity Regulations (ESQCR)

This Engineering Recommendation has been produced to present a set of generic principles of “Best Practice” for both Electricity Network Operators and Wind Farm Developers for use when locating wind farms and stand-alone turbines in the vicinity of overhead lines or vice versa. It is not intended to be used as a fixed, standard set of criteria which are binding on all parties.

Wind farm developers and Electricity Network Operators are encouraged to open dialogue with each other to resolve any potential issues at the initial development stage

1 Scope

This Engineering Recommendation shall apply to all designs of wind turbines and overhead lines of all voltages

The Engineering Recommendation considers three principle areas:

- Toppling distances of wind turbines
- Wake effects on overhead lines
- Construction and Maintenance issues

Building mounted turbines are not covered by this document and clearances of these to overhead power lines shall be based on the requirements defined in ENA Technical Specification 43-08, (*Clearances to Objects criteria*).

2 Normative references

The following referenced documents, in whole or part, are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Standards publications

ENA TS 43-08 Overhead line Clearance

Other publications

HSE GS6 – Avoidance of Danger from Overhead Lines

Planning Policy Statement (England & Wales) PPS 22 - Renewable Energy

Planning Policy Statement (Scotland) SPP 6 - Renewable Energy

Guidelines for Onshore and Offshore Wind Farms. (Health & Safety in the Wind Energy Industry Sector 2010). Published by RenewableUK

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 - Overhead line

An Electric Line in the open air and above ground level conforming to the definition contained in the ESQCR 2002

3.2 - Wind Turbine

A free standing structure which uses wind driving a set of rotating blades (Horizontal and Vertical axis machines)

3.3 - DNO

Distribution Network Operator

3.4 - TSO

Transmission System Operator

3.5 - Tip height (Ht)

For free standing turbines, Ht equals the highest point from the ground scribed by the rotation of a wind turbine blade (or similar object).

3.6 – Rotor Diameter (D)

For horizontal axis machines, D equals the circle inscribed by the blade tips

For vertical axis machines, D equals the diameter of the cylinder.

See Annex A

4 Separation Between Wind Turbines and Overhead Power Lines

There are two criteria, described in more detail below that will determine the recommended minimum separation of wind turbines and overhead power lines:

- The turbine should be sufficiently distant to avoid the possibility of toppling onto the overhead line.
- The turbine should be sufficiently distant to avoid causing damage to the overhead line due to downwind wake effects.

These criteria are described in more detail below, with consideration of issues that include: prevailing wind direction and frequency, relative geometry of turbine and line, line design, mitigation measures, and wider system impacts.

It is accepted by DNO's and TSO's that if both of the above criteria are met, then the turbine position shall be deemed acceptable. If either, or both, criteria are not met, then contact should be made with the appropriate network owner to establish the suitability of any proposed turbine location.