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THE EUROPEAN WIND ENERGY ASSOCIATION

Wind farm related Health & Safety legislation

Report from the National Association Network

September 2009

Compiled by JM

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Introduction and background

In June 2009, the National Association Network was asked to collect information on Health & Safety legislation specifically aimed at wind turbines and wind farms (construction and operation and maintenance.

The aim was to collect and compare information on the rules and laws in the various EU Member States specifically designed to protect the public and other infrastructure from possible problems arising from the proximity of a wind farm.

The questionnaire was completed with a section on wind turbines as such and a section on occupational hazards.

The questionnaire was in the form of a matrix and is reproduced in fig 1. The members of the NAN were instructed to respond to questions, in any layout preferred and not necessarily fill in the matrix supplied.

Fig. 1 Questionnaire for National Association Network

Siting				
Distance from dwellings (please indicate whether there are laws or regulations determining minimum distances from houses, etc).	***Distance from roads*** (please indicate whether there are laws or regulations determining minimum distances from roads).	***Distance from railroads*** (please indicate whether there are laws or regulations determining minimum distances from railways).	***Distance from inland waterways*** (please indicate whether there are laws or regulations determining minimum distances from navigable canals and rivers).	***Distance from other infrastructure*** (please indicate whether there are laws or regulations determining minimum distances from other types of infrastructure – *excluding radars*).
Wind Turbines				
Official homologation or type approval procedure (please indicate whether there are laws or regulations providing for an official homologation or type approval of wind turbines – *excluding grid codes and grid compliance*).		***Most significant wind turbine failures*** (bearing in mind the inherent reliability of wind turbines, please indicate what, if any, are the most regularly reported reasons for wind turbine failures – lightning, fire, mechanical breakdown, collision with objects, etc).		
Occupational				
Specific health and safety laws for wind farm sites (please indicate whether there are specific laws or mandatory training requirements for people working on wind farm construction sites – *excluding laws and regulations applicable to all construction sites*).		***Main causes of injury during wind farm construction*** (please indicate what causes of accidents causing worker injury are more regularly reported on wind farm construction sites – *excluding operation and maintenance*).		***Main causes of injury during operation and maintenance of wind farms*** (please indicate what causes of accidents causing worker injury are more regularly reported during operation and maintenance of wind farms – *excluding construction*).

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By 25 September 2009, complete or partial responses had been received from 7 National associations: Austria, Belgium (Wallonia), Bulgaria, Finland, France, Greece and United Kingdom.

To obtain a more representative sample, results of a previous enquiry to the NAN on siting have been included in a specific chapter. However, this information being older may be less accurate then that received during summer 2009.

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Results of the June-August 2009 Helath & Safety enquiry

Austria

1) *Siting*

Construction permitting is a regional competence in Austria. Therefore, rules on distances can vary from region to region. In most cases there is no legal distance requirement, but the distances imposed in the permits vary according to noise, which results, generally, in distances of 800m minimum.

Lower Austria and upper Austria have specific requirements in its Regional Planning Act:

A) Dwellings

From the residential area in the municipality in which the farm is sites: 1200m (LA)

From the residential area in neighbouring municipalities: 2000m (1200m if neighbouring municipality agrees to project)(LA)

Agricultural buildings: 750m (LA)

From residential area: 800m (UA)

B) Roads: No specific legislation but 200m for an 105m hub height is generally required.

C) Railroads: No information or no specific legislation.

D) Other infrastructure: No information or no specific legislation.

2) *Wind Turbines*

A) Official homologation or type approval

Type approval is required.

B) Most significant wind turbine failures

- Rotor blade breakdown
- Lightning

3) *Occupational*

A) Specific health and safety laws for wind farm sites.

No wind farm specific legislation.

B) Main causes of injury during wind farm construction

No information or no injuries reported.

C) Main cause of injury during wind farm operation and maintenance

No information or no injuries reported.

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Belgium - Wallonia

1) Siting

Belgium is a federal country where issues of permitting are entrusted to the regions. The information contained hereunder concerns the Region of Wallonia. Other regions are Flanders and Brussels.

The Walloon region does not have legislation on wind turbine siting.

A) Dwellings

The territorial administration recommends a minimum distance of: 350m (increased up to 500m in sensitive areas)

B) Roads

A reference framework was adopted by the regional government and is currently being applied as a circular.

Minimum distance: equivalent to height of turbine (average 150m)

C) Railroads

A reference framework was adopted by the regional government and is currently being applied as a circular.

Minimum distance: equivalent to height of turbine (average 150m)

D) Waterways

A reference framework was adopted by the regional government and is currently being applied as a circular.

Minimum distance: equivalent to height of turbine (average 150m).

E) Other infrastructure:

Radio relays: 100m circumference from relay posts.

All other: Determined on a case-by-case basis.

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2) *Wind Turbines*

A) Official homologation or type approval

No specific standard but requirements can be made during the environmental impact assessment.

B) Most significant wind turbine failures

- Electronic and electric failures.
- Mechanical elements

3) *Occupational*

A) Specific health and safety laws for wind farm sites.

No wind farm specific legislation.

B) Main causes of injury during wind farm construction

No injuries reported.

C) Main cause of injury during wind farm operation and maintenance

No injuries reported.

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Bulgaria

1) Siting

Wind turbines have to be installed outside of a town or village urbanisation

A) Dwellings

Distance from closest settlement: 500m

B) Roads: No specific legislation.

C) Railroads: No specific legislation.

D) Other infrastructure:

Other wind turbines: 5 to 7 rotor diameters from each other according to the main wind flow and 3 to 5 diameters opposite the main wind flow.

Water basins (lakes, reservoirs, etc.): from 50m to 1000m according to 3 defined health and safety zones. If within 200m, anti-erosion work has to be carried out. If no security zones defined, then 500m.

2) Wind Turbines

A) Official homologation or type approval

No information or no specific legislation

B) Most significant wind turbine failures

- Unexpected grid dips leading to break and bearing failure.
- Gear boxes

3) Occupational

B) Specific health and safety laws for wind farm sites.

No wind farm specific legislation.

C) Main causes of injury during wind farm construction

No information or no injuries reported.

D) Main cause of injury during wind farm operation and maintenance

No information or no injuries reported.

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Finland

1) Siting

Minimum distances are not defined by law. In practice, they are determined by noise levels.

A) Dwellings

Noise cannot exceed 40dB at night.

B) Roads: No specific legislation. In practice can be very close.

C) Railroads: No specific legislation. In practice can be very close.

D) Other infrastructure: No specific legislation.

2) Wind Turbines

A) Official homologation or type approval

No specific type approval defined.

B) Most significant wind turbine failures

- Gears (26%), hydraulics (13%), electronics (12%), Blades (12%)
- No reports of lightning strikes or fires.

3) Occupational

There is no national register of injuries at wind farms.

A) Specific health and safety laws for wind farm sites.

No wind farm specific legislation.

B) Main causes of injury during wind farm construction

No accidents reported on construction sites in 2008.

C) Main cause of injury during wind farm operation and maintenance

Minor injuries at near shore wind farm due to heavy winds and boat rolls in 2008.

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France

1) *Siting*

There are no specific rules on distances to dwellings, roads or other infrastructure. Each individual permit may contain ad hoc restrictions. Wind turbines are generally permitted only within "Wind turbine Development Zones".

The French renewable energy association, Syndicat des énergies renouvelables, has elaborated a quality Charter. The members of the SER that abide by the charter take a number of engagements including on the use of certified wind turbines and use of personnel properly trained to work on wind farm sites (use of machinery, working at heights, working with electricity, evacuation procedures, etc). Furthermore, the Charter also requires that the wind turbines are certified according to the **IEC 61-400** norm.

2) *Wind Turbines*

No information or no specific legislation.

3) *Occupational*

No information or no specific legislation.

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Greece

1) *Siting*

Distances

A) Dwellings

Cities, towns and villages (pop. >2000 or <2000 but dynamic, touristic or important): 1000m

Traditional settlements: 1500m (reduced to 1000m if pop. <20)

Other settlements: 500m

Monasteries: 500m

Stand alone dwellings: Maximum noise <45dB

Tourist installations: 1000m

Minimum distances are not taken into account if wind turbine nacelle is not visible from point of interest.

B) Roads: 1.5 times the rotor diameter

C) Railroads: 1.5 times the rotor diameter

D) Other infrastructure

Major archaeological sites and monuments: 3000m (not applicable if nacelle not visible)

Other archaeological sites: 7 times the rotor diameter with 500m minimum (not applicable if nacelle not visible)

Archaeological authorities have discretion to enforce stricter restrictions if deemed necessary at a particular sight.

High voltage lines: 1.5 times the rotor diameter

Aviation installations: According to the recommendation of the competent authority.

Farms (livestock and fish): 1.5 times the rotor diameter

Surface excavations and mining: 500m

Quarries: 150m

2) *Wind Turbines*

A) Official homologation or type approval

For grid connection, a wind turbine type approval certificate and a power quality measurement certificate according to **IEC 61400-21** are required. The certificates can be issued by the **Centre for Renewable Energy Sources** or by a foreign entity recognised by the former (usually Germanischer Lloyd or DNV, etc).

B) Most significant wind turbine failures

No concrete statistical data but most significant failures generally seem to be caused by **lightning**. Other reported problems are **gearbox/drive train**.

3) *Occupational*

A) Specific health and safety laws for wind farm sites.

There are no wind farm specific laws or regulations in Greece.

B) Main causes of injury during wind farm construction

- Using unskilled personnel
- Bad machinery operation
- Bad labour management caused by tight construction schedule
- Ignorance or negligence of health and safety rules and regulations

C) Main cause of injury during wind farm operation and maintenance

- Using unskilled personnel
- Ignorance or negligence of health and safety rules and regulations
- Poor condition of equipment due to defective maintenance schedule
- Wrong instructions given to maintenance personnel

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United Kingdom

1) Siting

Distances

A) Dwellings

There are no national laws stipulating distances from dwellings.
Planning guidance, however, states distances equivalent to fall over distance plus 10%.

B) Roads:

There are no national laws stipulating distances from roads.
Planning guidance states: no turbine blades to oversail a public right of way.
Highway agency guidance states: turbine height plus 10%.

C) Railroads:

There are no national laws stipulating distances from railroads and no specific railway regulator policy.

D) Other infrastructure

Power lines
There are no national laws stipulating distances from power lines. National Grid policy states that Overhead Lines should be 5 times the rotor diameter from existing turbines. Similar recommendations are made for new turbines near existing power lines.

Waterways
There are no national laws stipulating distances from railroads and no specific waterway authority policy.

Hazard sites (Seveso sites)
There are no national laws stipulating distances from major hazard sites, however government Health and Safety Executive is a statutory consultee for certain such sites.

2) Wind Turbines

A) Official homologation or type approval

There are no national laws on type approval but banks and insurers set out requirements and other tests or inspections can be carried out under general Health and Safety laws.

B) Most significant wind turbine failures

Statistical data is collected on a voluntary basis from industry.

3) *Occupational*

A) Specific health and safety laws for wind farm sites.

There are no wind farm specific laws or regulations.

B) Main causes of injury during wind farm construction

Statistical data is collected on a voluntary basis from industry.

C) Main cause of injury during wind farm operation and maintenance

Statistical data is collected on a voluntary basis from industry.

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Results of a previous September 2008 enquiry on minimum distances

Belgium (Flanders) – input to WindBarriers report
Distance between air generator and residential area
Minimum distance = mast height + ½ rotor diameter.
Distance between air generator and SEVESO establishments and SEVESO pipes and cables
Minimum distance 200m
Distance between air generator sensitive areas, such as hospitals
Minimum distance 200m
Distance between air generator and transport infrastructure
Minimum distance ½ rotor diameter
Distance between air generator and recreational areas
Minimum distance ½ rotor diameter

Czech Republic
Distance between air generator and residential area
No legal distance. Developers comply with the manufacturers' recommendations (500m). Lobby groups would like to have 1000m cast in law.

Denmark
Distance between air generator and residential area
The indicative distance between wind turbines and residential areas is of four times the total height of the turbines, sometimes this can be extended to 500m.

Hungary
Distance between air generator and residential area
Depends on noise: maximum tolerated noise is 40db, therefore minimum distance between 500 and 800m.

Italy
Distance between air generator and residential area
The distance is established by the Regions and can vary from 500 to 1000m. It is possible, although rare, to go below the established limit in cases of isolated houses, if an appropriate acoustic compatibility study has been carried out.

The Netherlands
Distance between air generator and residential area
There are no rules for the minimum distance between turbines and housing areas. The distance depends on noise and shadow nuisance.

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Romania – input to WindBarriers report
Distance between air generator and residential area
Minimum distance = height of the mast and blade multiplied by 3.
Distance between air generator and roads
Large road infrastructure, height of the mast and blade + 3 metres with a minimum of 30 metres.
Local roads, length of a blade with a minimum of 30 metres.
Distance between air generator and railways
Large road infrastructure, height of the mast and blade + 3 metres with a minimum of 100 metres.
Distance between air generator and bridges and dams
Height of the mast and blade + 3 metres
Distance between air generator and electricity transmission and distribution cables
Height of the mast and blade + 3 metres
Distance between air generator and sports grounds and parking lots
Height of the mast and blade + 3 metres

Slovakia
Distance between air generator and residential area
There is no law on minimum distances from homes or residential areas. However, the generally accepted distance used in EIAs is around 600m.

Spain
Distance between air generator and residential area
Varies according to regional legislation, but the most stringent is 500m.

United Kingdom
Distance between air generator and residential area
800m

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