

For our Environment

**EWEA Technology Workshop:
Wind Turbine Sound 2014, Malmö**

Noise Protection Regulations for Wind Turbines in Germany

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Section I 3.4

Noise Abatement of Industrial Plants and Products, Noise Impact

Outline

- 1 Importance of renewable energy sources
- 2 Legal demands on planning and operation of wind turbines
- 3 Assessment of noise immissions
- 4 Conclusions

Objectives of energy reform in Germany



1. Renewable Energies

- rapid and continuous consolidation
- cost-effective and environment-friendly



2. Energy Efficiency

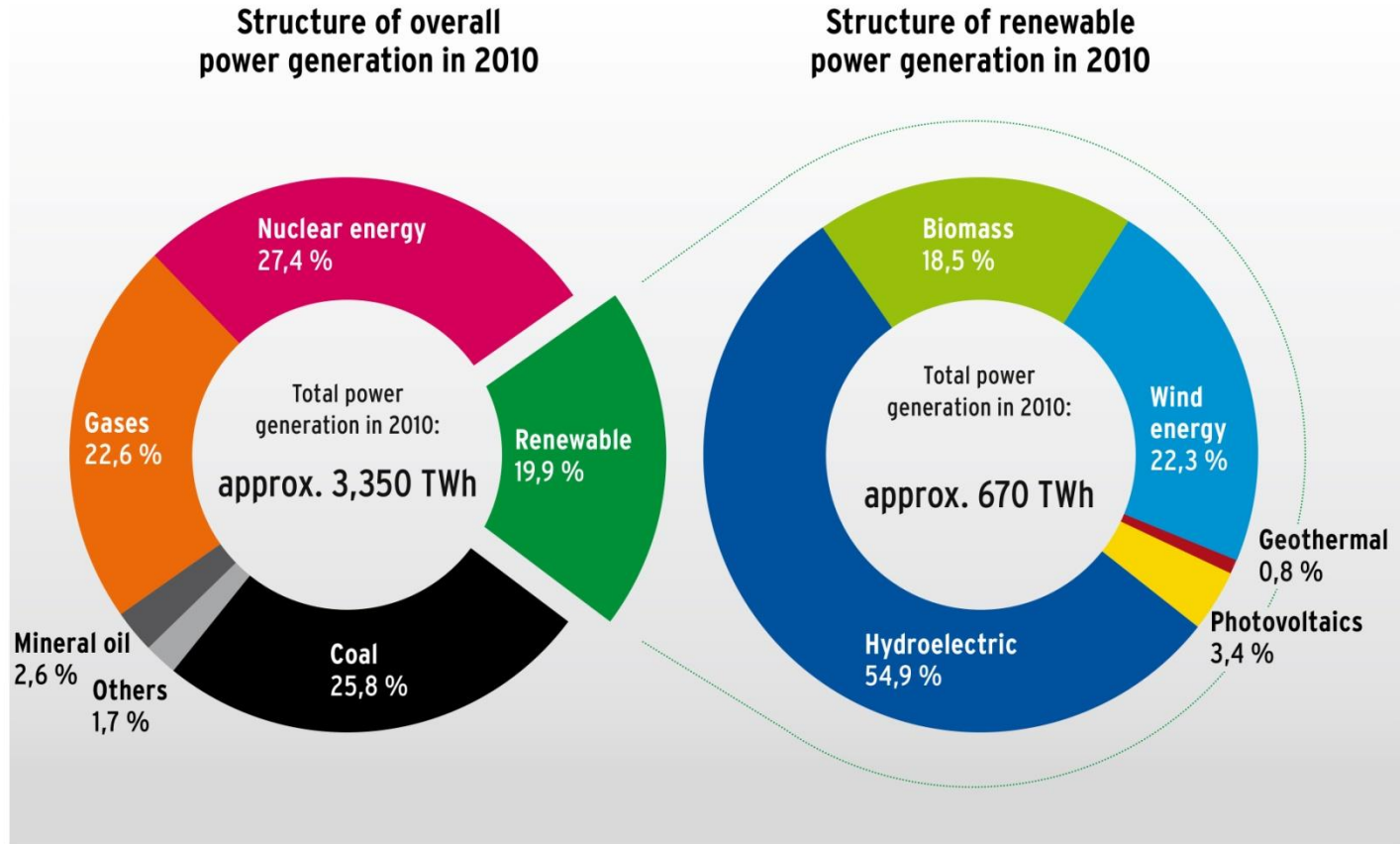
- Lowering of energy consumption
- Increase in energy efficiency



3. Network Infrastructure

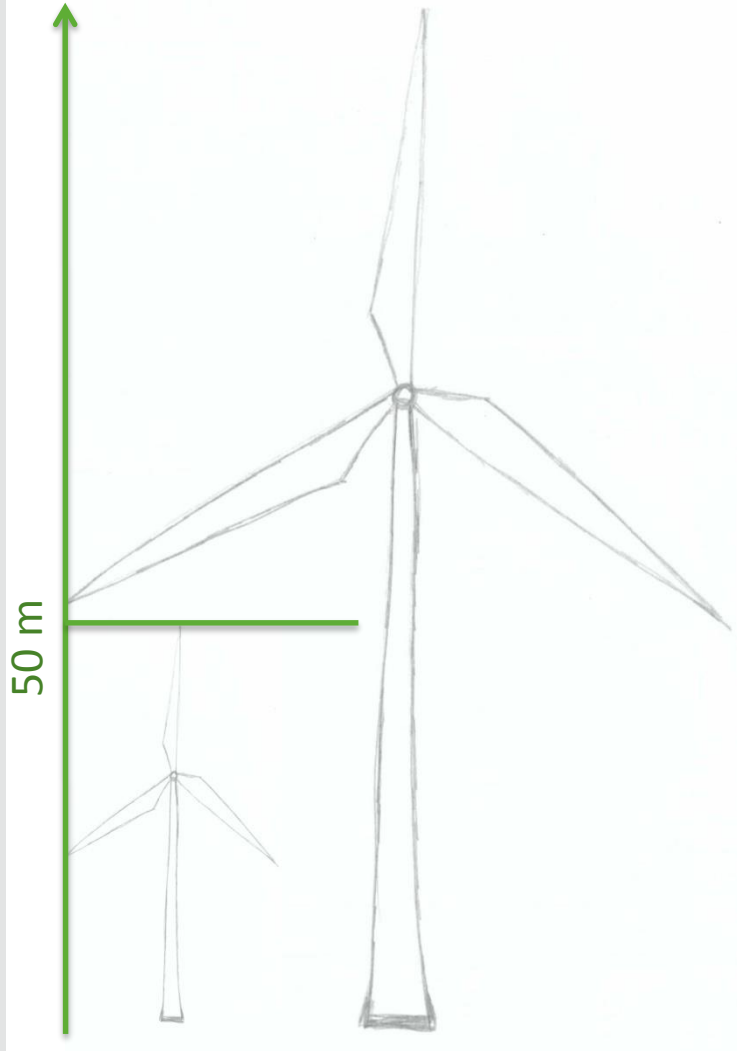
- Consolidation and Modernisation
- Integration of renewable energies

GENERATION OF ELECTRICITY FROM RENEWABLE ENERGY SOURCES IN THE EU



Others = Industrial waste, non-recyclable municipal waste, pumped storage station etc.
Solar thermal power plants and tidal energy are not included due to the low percentage they make up.

Categories of licensing of wind turbines



1. **Wind turbines with a height > 50 m** simplified licensing process

- no Environmental Impacts Assessment
- no public participation

formal licensing process

- Environmental Impacts Assessment
- public participation

2. **Wind turbines with a height < 50 m**

Construction approval is required

Cases of licensing of wind turbines (WT)

< 3 WT	3 to 5 WT		6 to 19 WT		> 19 WT
No environmental impact assessment (EIA)	site-specific environmental impact assessment		preliminary environmental impact assessment		obligatory EIA
	no EIA	EIA is required	no EIA	EIA is required	
simplified process by § 19 BImSchG	simplified process by § 19 BImSchG	formal process by § 10 BImSchG	simplified process by § 19 BImSchG	formal process by § 10 BImSchG	formal process by § 10 BImSchG

Assessment of noise immissions from wind turbines

- Wind turbines with a height of more than 50 m are subject to licensing pursuant to the German Federal Immission Control Act (BImSchG)
- Installations subject to licensing shall be established and operated in such a way that this does not involve harmful effects on the environment or other hazards, considerable disadvantages and considerable nuisance to the general public and neighbourhood and precautions are taken to prevent harmful effects on the environment
- Assessment of noise immissions from wind turbines is carried out according to the „Technical Instructions on Noise Abatement -TA Noise”

Technical Instructions on Noise Abatement - TA Noise

- These Instructions should protect the general public and the neighbourhood against harmful environmental effects caused by noise
- They describe in detail the methods for the determination and the assessment of noise generated from industrial or commercial installations, including wind turbines
- They especially contain binding immission values for immission points outside buildings
- If the area-related binding immission values are exceeded measures to reduce noise are necessary

Binding immission values according to TA Noise

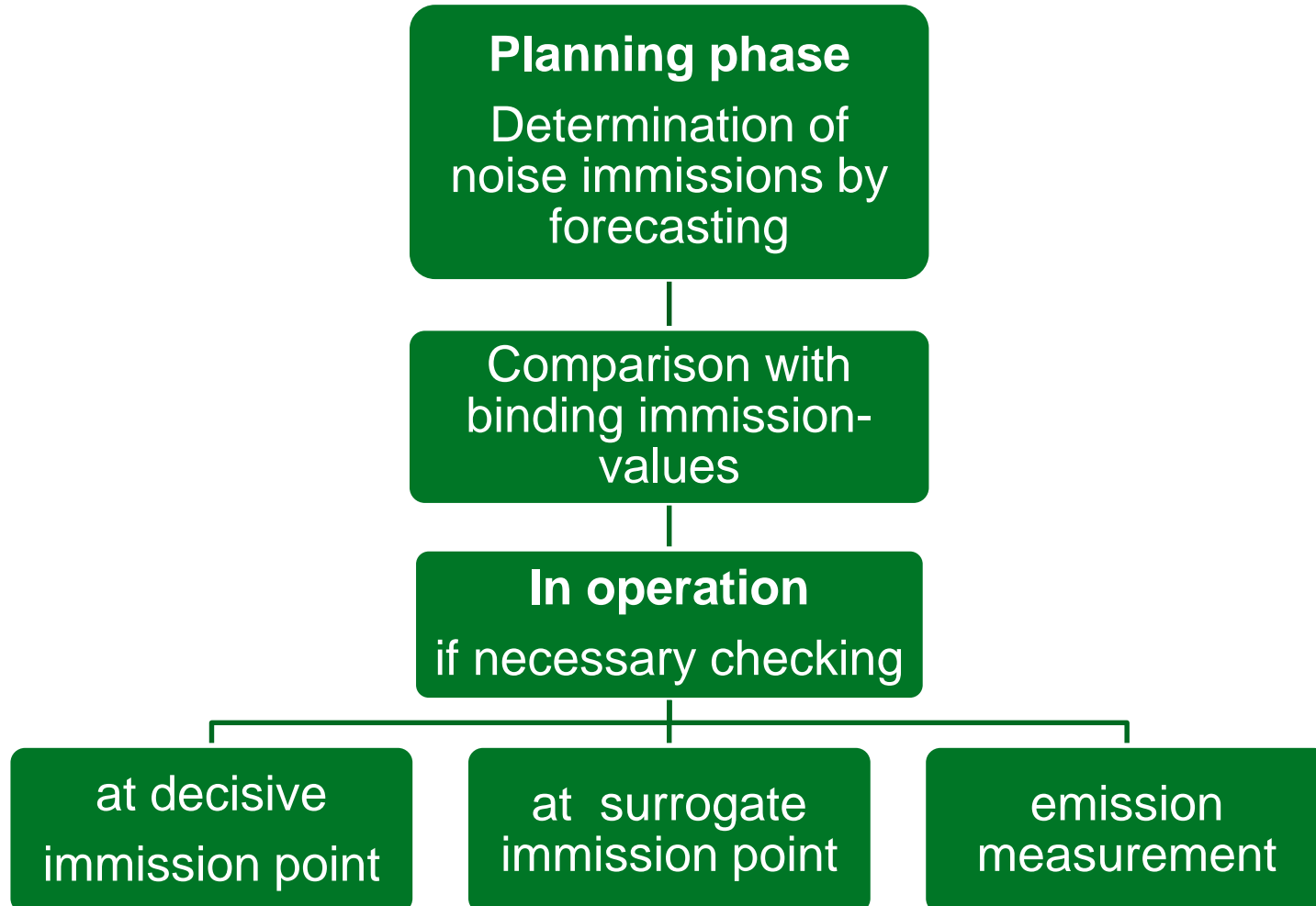
Types of areas	Day 6 p.m. – 10 a.m.	Night 10 a.m. – 6 p.m.
industrial areas	70 dB(A)	70 dB(A)
commercial zones	65 dB(A)	50 dB(A)
core areas, village areas and mixed-use zones	60 dB(A)	45 dB(A)
general residential areas and small residential estate areas	55 dB(A)	40 dB(A)
purely residential areas	50 dB(A)	35 dB(A)
spa areas, for hospitals and nursing homes	45 dB(A)	35 dB(A)

Individual short-term noise peaks may exceed binding immission values during the day by not more than 30 dB(A), and at night by not more than 20 dB(A)

Principles for the determination of noise immissions

- Determination of noise is carried out according to TA Noise
- Operation mode that produces the maximum rating level
- Supplements for tonality and impulsiveness of either 3 or 6 dB may be applied
- If no emission values of at least 3 wind turbines are available
→ a supplement of 2 dB is applied
- For the calculation of existing noise immissions of old wind turbines a supplement of 3 dB is applied if the emission data are only determined at a wind speed of 8 m/s in a height of 10 m

Assessment procedure according to TA Noise



Noise protection obligations according TA Noise



Source: Frank-Andreas Jütte / pixelio.de

Binding immission values according to TA Noise may not be exceeded; sum of all commercial installations is considered

Exceptions

- No harmful effects on the environment are to be assumed from the installation when the additional exposure emanating from the installation is at least 6 dB(A) under the binding immission values
- It is ensured on a permanent basis that binding immission values are exceeded not more than 1 dB(A)

Consideration of low-frequency noise

- Information on determination and assessment of low-frequency noise is given in the German standard DIN 45680 (1997) “Measurement and assessment of low-frequency noise immissions”, and in the accompanying Supplement 1
- Harmful effects on the environment are not to be expected if the reference values in Supplement 1 are not exceeded
- DIN 45680 is currently under revision

Checking of compliance with noise protection obligations by measurements

- DIN EN 61400-11: Applying for wind turbines - part 11: acoustic noise measurement techniques; IEC 61400-11: edition 2.1
- Technical guideline for wind turbines part 1: Determination of noise emission values; available in German only
measurement method is similar to IEC
- Calculation of sound propagation is conducted according to DIN ISO 9613-2
- German standard DIN 45681 is used for the determination of tonality of noise

Conclusions

- Wind turbines are of great importance to meet the demand for electricity with renewable sources of energy
- Wind turbines should be operated in such way that they do not cause noise or harm to sensitive protected areas
- Determination and assessment of noise from wind turbines is described in detailed legal regulations in Germany
- Technical Instructions especially contain ambitious binding immission values for immission points outside buildings

Thank you for your attention

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