

Small wind certifications, innovation and lessons learned - Danish perspective

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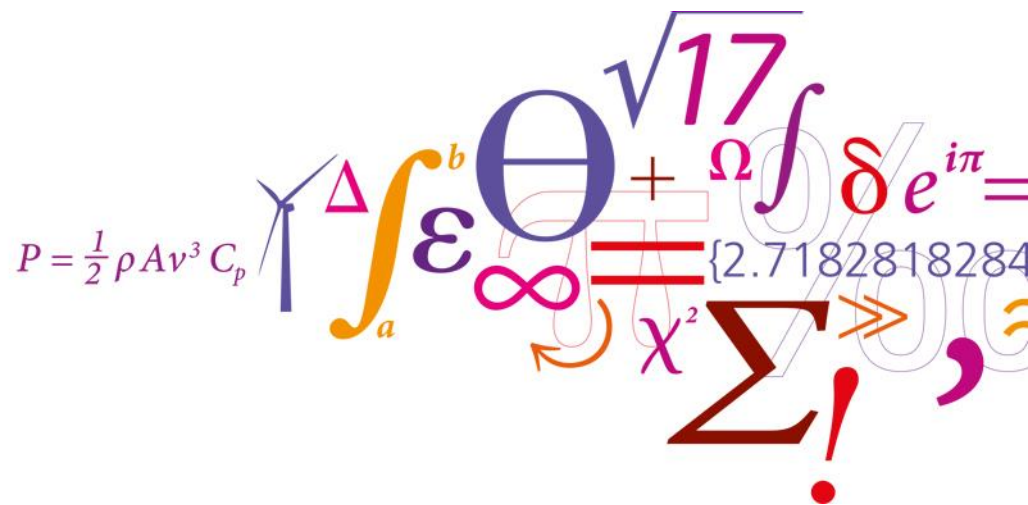
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DTU Vindenergi
 Institut for Vindenergi



Danish Certification Scheme

- Wind turbines including foundation to be installed, maintained and serviced in Denmark or in Danish waters must be certified according to the requirements in the Danish Certification Scheme.
- The rules and procedures are described The Danish Energy Agency's Executive Order on The Technical Certification Scheme for wind turbines no. 73 of January 25th 2013 and the appurtenant guideline.

Certification scheme – Order no 73; 2013

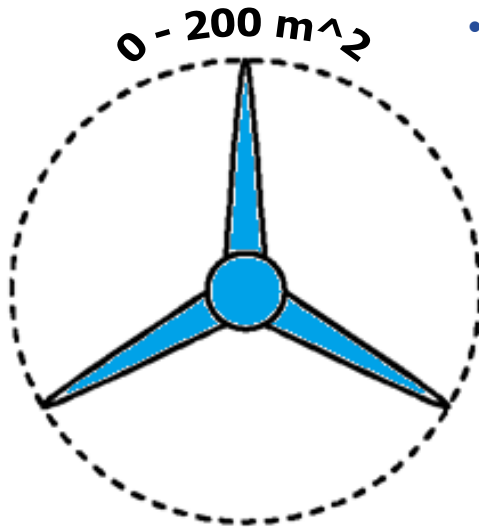
Purpose: Ensuring requirements for wind turbines:

- ✓ Energy production,
- ✓ Safety and the environment,
- ✓ Service and maintenance

➤ *Energy Agency's Secretariat for Danish Wind Turbine Certification Scheme – **EGV** (DTU Wind Energy)*



Certification scheme – BEK 73

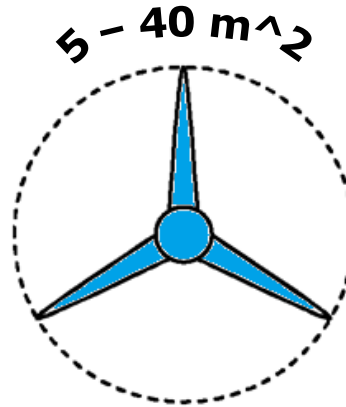


- *IEC 61400-2* Design requirement for SWT
 - Loads modeling and structural analysis
 - Safety and Function Test
 - Operational Test > 6 months
 - Static Blade Test

- *IEC 61400-11* Acoustic noise measurements
- *IEC 61400-12-1* Power performance

Certification scheme – Order no. 73

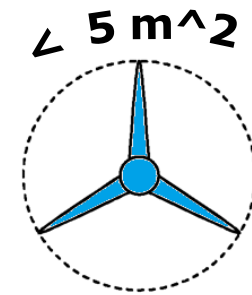
- *IEC 61400-2*
or either
Danish Regulation



- ✓ Test of strenght of tower and blades - Thrust of 300 N/m²
- ✓ Safety and function test - @ ws > 25% of nominal
- ✓ Operational test – >3 months & El. production of 500 peak load-hours
- ✓ Acoustic measurement (IEC61400-11)

Certification scheme – BEK 73

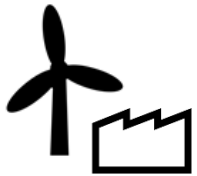
- Exempted from certification
- ✓ Technical description & Safety system
- ✓ Instruction for use & Installation
- ✓ Operational manual
- ✓ Maintenance & service manual
- ✓ AEP
- ✓ Acoustic measurement (IEC61400-11)



Certified turbines October 2015



Service & Maintenance



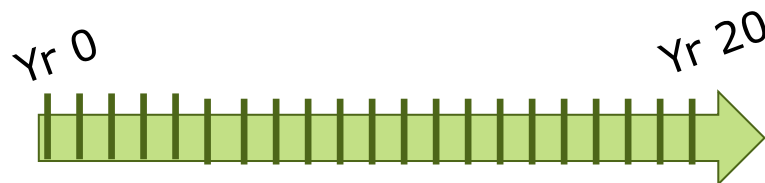
Producer

- Deliver service manual & Forward updates



Owner

- Responsible for service & maintenance



Service

- Accredited or approved service company
- **Exceptional circumstances:** Owner performs service

Small Wind - Project



✓ Leading *Danish* SWT Market players



✓ Identify Market Potential



✓ Promoting international partnership



✓ Realization of export campaign

Small Wind @ CanWEA 2015 boot 328



myWindTurbine.com

for small & medium sized wind turbines



- ✓ Optimize siting of turbine (Online WAsP engine)
- ✓ Energy, environmental and financial analysis of individual WT
- ✓ Monitor performance



Cluster data

- ✓ Wind statistics (Global Wind Atlas, European Atlas)
- ✓ Terrain conditions & obstacles
- ✓ Turbine catalog (only certified turbines)

Thank you

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