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Framework Guidelines and Network Codes on Grid Connection – Views from the Wind Energy Sector

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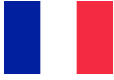

Florence Forum Meeting
11 December 2009

Why are we here? Seeing differences - looking for harmonisation



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FRT REQUIREMENTS

	 Codice Rete Terna A17 2008	 arrêté 23 avr. 08	 Mittelspannungs- richtlinie 2008
Reference voltage	V_N $\%V_N$	contradictory statements U/U_{dim}	U/U_c
Voltage measurement	?	?	lowest phase to phase voltage
current during fault	power reduction allowed	?	negotiable
fault location	Generator Terminals	POC	POC

POC vs terminals

Issues with connection of wind power plants: *Concerns about Grid Codes*



- Wind power industry has to consider a range of Grid Code requirements from a variety of countries.
- The set of Grid Code documents from the different EU countries is not at all homogeneous.
- Documents are often not available in English and are therefore rather inaccessible.

>>> Unnecessary extra costs and efforts from the wind power industry.

- Requirements are often not clear enough, and are not always technically justified nor economically sound from the point of view of the system.
- In general the involvement of the wind power industry in the Grid Code development process should be improved, especially at European level, in order to compensate for the current lack of standardisation in requirements and approach.

Underlying drivers of the issues

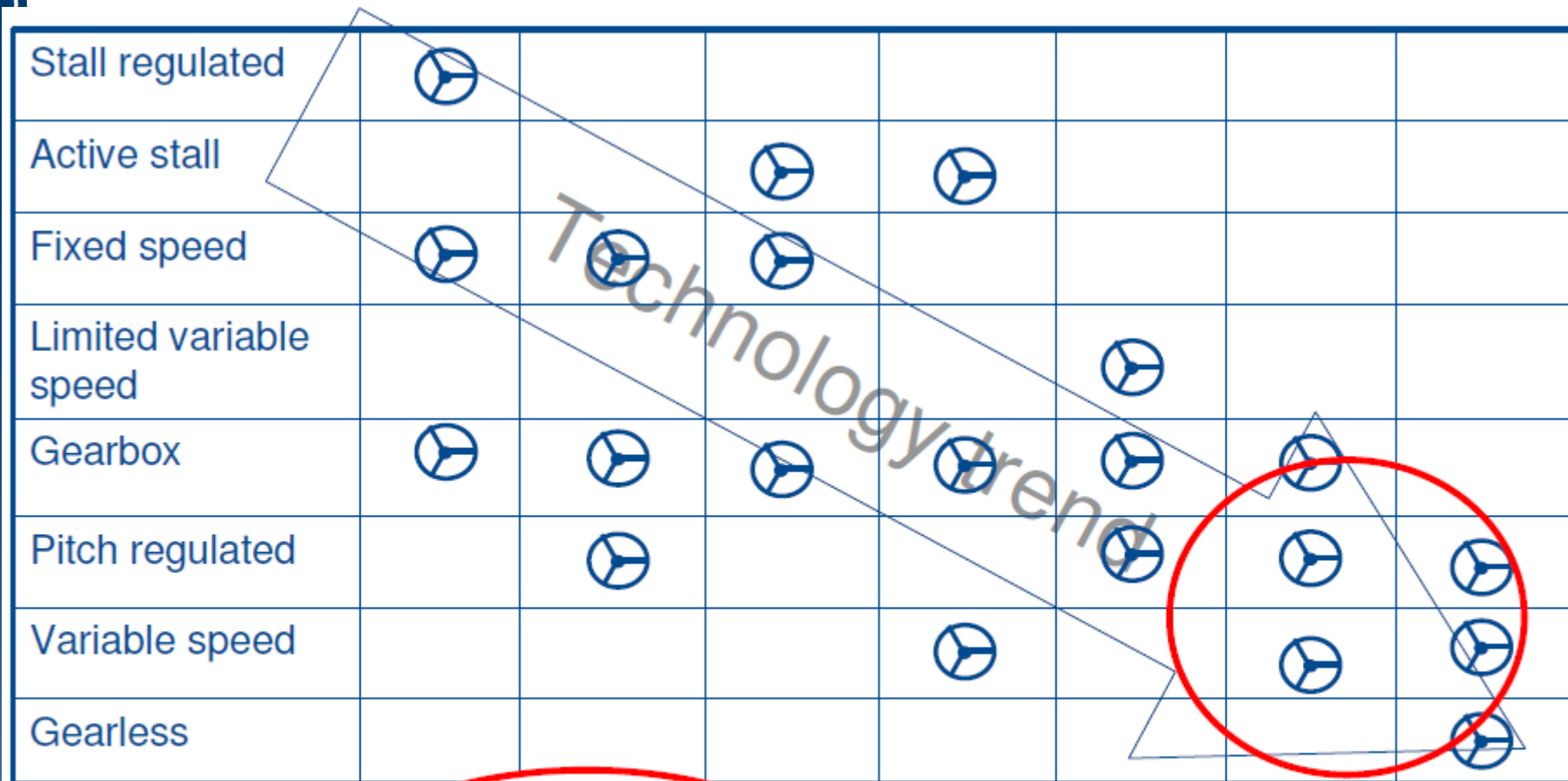


- 1980s: attention to mechanical design issues and distribution level requirements: flicker, power quality, limitation of inrush currents, power factor requirements
- With increasing WP levels on transmission: new TSO needs: fault-ride through, reactive fault current injection and fast active power recovery, which gave rise to new requirements such as voltage and frequency control, FRT capability
- WT manufacturers continuously improved wind turbines in order to facilitate system operation in countries with varying degrees of penetration.
- The industry has gained an increasing understanding and acceptance of the need for these requirements. However, meeting new requirements at short notice is problematic.

Technology Spectrum



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**Design driver:
NOT FALL APART**

**Design driver:
Assist the grid?**

Concerned parties

- Wind turbine manufacturers
 - Developers and wind power plant operators
 - Network operators
 - End users
- Solving the issues related to Grid Code harmonisation is considered essential to reach 2020 renewable targets in a cost effective way

Targets for wind energy: Between 230 and 265 GW installed capacity in EU-27 by 2020,
Target for 2030: 400 GW



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Benefits of harmonisation and outlook

- Higher efficiency for all stakeholders: TSO, DSO, manufacturers, developers, customers and other
 - Reduced costs
 - Plants entering the grid will have a better and more homogeneous performance
- = true **win-win situation**

Disadvantages of not proceeding in this way:
mutatis mutandis

EWEA WG Grid Codes Position paper 2008

- WG recognises that – in view of the significant increase in Wind Power penetration - there is a need for harmonisation to solve present inefficiencies in Grid Code Requirements
- An immediate complete technical harmonisation is not appropriate
- WG proposes a two step approach:
 - Structural harmonisation: common template
 - Technical harmonisation: adapting existing national Grid Codes to the common template, to be performed gradually where technically possible

Important steps in WG work process

- WG GCR has developed Generic Grid Code Format – exchanged with ENTSO-E for information
- Document GGCF ready mid December 09
- GGCF proposed as basis for common developments of Grid Code Requirements (including verification and statement of compliance) for wind power generation

Views on objectives of Framework Guidelines and Network Codes

- Overall objective: facilitating the economic and efficient connection of the targeted RES capacity for 2020 and beyond
- Specific objectives:
 - Harmonised requirements all over Europe,
 - Specific Wind Turbine Grid Code
 - Structural cooperation between stakeholders: network operators, wind industry, regulators

Summarizing



- Grid codes need to be so strict in due time that a given future penetration level is not blocked due to technical reasons.
- TSO and wind sector about to start to co-operate at EU level for further development of grid code requirements, basic elements are:
 - EWEA is working on an industry strategy on **European harmonisation** (structural / technical) of Grid code requirements for wind power
 - ENTSO-E: Pilot Code for Wind Power connection
 - Framework Guidelines on Grid Connection to take due consideration of the above developments



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Thank you very much for your attention

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