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# Wind power helps push grid code harmonisation

A necessary step for more efficiency *06/08/2012 - 10.08 am*

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*In a deregulated electricity market, grid code harmonisation is a necessary step towards maximising network efficiency and fair competition among suppliers. Wind farm integration into the system is likely to accelerate the trend.*

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Relationships between a power transmission system operator (TSO) and all the users of the transmission system are set out in a document called a "grid code". This term is commonly used to refer to the suite of codes, rules and laws that define the technical requirements for parties connected to public electricity systems – suppliers, consumers, generators and operators. It specifies day-to-day procedures for both planning and operational purposes and covers both normal and exceptional circumstances. Historically, each TSO has developed its own grid code. A country may have a single grid code (France, for example) or several (as in Germany). Generally, these codes are today harmonised in each country leading to what can be called "national codes". Some are very precise (over 600 pages for the UK grid code), others concise
(30-40 pages for one of the German operators).
Yet, they all have more or less the same framework, covering definition of technical, design and operational criteria for grid access and use, planning for grid development and reinforcement, system operation criteria and standards, scheduling and dispatch of supply and demand resources, data exchange, and metering policies and systems for power and energy transactions in the grid.

## 1 Market deregulation changed the landscape

For decades, these national grid codes adapted easily to the growing international transfer of electricity. “Things became complicated with market deregulation, when more and more players entered electric systems, and different private and public power producers or utilities connected to the grid,” explains Daudi Mushamalirwa, Alstom Grid Network Consulting Manager. As a result, to design, build and operate its products on a large scale, a power industry company has to consider a range of grid code requirements from a variety of countries. Even though the same voltage levels and synchronous frequencies (50 Hz or 60 Hz) are used across the globe, their operating values generally differ. “This is the case even inside Europe,” adds Mushamalirwa. “For example, the allowable voltage variation at 400 kV is between -10 % and +5 % in Austria, between -8 % and +10 % in Germany and between -13 % and +5 % in Ireland.”

*« A powerful driver comes from the wind energy industry. »*

Developers that operate in more than one country have to decipher and understand a number of grid codes with clauses that are formulated differently yet perform essentially the same function. Moreover, code requirements can often be insufficiently clear or not always technically justified or economically sound. Manufacturers frequently have to develop tailor-made software and hardware to achieve compliance in a particular region, where as a common approach could deliver a technically equivalent solution. This results in unnecessary extra costs and efforts from the power industry.

## 2__Wind energy: a powerful driver for harmonisation

Deregulation and internationalisation of electricity networks have led to an increasing need to develop a harmonised set of grid code requirements. This is under way at the international and European levels through standardisation efforts by associations such as the European Network of Transmission System Operators for Electricity (ENTSO-E), which groups 41 TSOs from 34 countries.

Harmonisation is progressing slowly. "However, a powerful driver comes from the wind energy industry, which urgently needs code clarification and unification," says Mushamalirwa. The operation of nuclear, fossil-fired or hydroelectric power plants can be planned and controlled in order to meet the daily load curve of the electricity demand on the grid, but the situation is not the same with power plants using renewable energies such as wind (or solar) energy, whose operation is dependent on weather conditions and can be controlled only in a limited way. There are also potential reliability concerns if a large amount of wind power trips off the grid because of grid faults. And as wind power is becoming a major generation source across the EU (a wind energy penetration level of 12 % is expected in 2020), “there is also some desire that wind contribute some grid support services such as reactive power or frequency and voltage control.”

According to the European Wind Energy Association (EWEA), harmonised technical requirements will maximise efficiency for all parties, and should be employed wherever possible and appropriate. This harmonisation strategy will be of particular benefit for manufacturers, who will be required only to develop common hardware and software platforms; for developers, who will benefit from reduced equipment and connection costs; for consumers, who will benefit from lower costs; and for system operators, especially those who have yet to develop their own grid code requirements for wind power plants.

**Alstom Grid, part of the French task force for wind farm grid connection**

Gimélec, the French association for electrical equipment, automation and related services that brings together 230 companies from the electrical industry, is launching a “task force” in order to support the grid connection for wind farms in France and its interest in fair competition.

“As an influential member of Gimélec, Alstom Grid will be one of the leaders of this task force, whose objective is to make the French electrical industry into a forceful lobby and have a strong voice in setting up regulatory requirements and incentives for wind power and other renewable energy plants,” says Daudi Mushamalirwa.

Promoting the electrical industry’s point of view is essential to ensure that grid code requirements are comprehensive and transparent so as to avoid misinterpretation and make sure they are as explicit as possible and include clear, commonly shared definitions of the terms used for wind turbines, wind farms and other equipment. Requirements should also focus on the essential aspects of technical performance, leaving an opening for ancillary services; they should balance cost and benefits of technical performance, and generally be specified so that these can be met at minimum overall system cost. Ultimately, requirements for wind power plants should not be excessive or discriminatory.

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