EWEA

THE EUROPEAN WIND ENERGY ASSOCIATION

EWEA response to the ERGEG Public Consultation on the draft Guidelines of Good Practise on Electricity Grid Connection and Access

EWEA response on the consultation on the Green Paper: "Towards a secure, sustainable and competitive European Energy Network"

1. General remarks

EWEA welcomes the ERGEG Consultation and recognises it as a step forward towards the development of Framework Guidelines on Electricity Grid Connection and Access. This consultation facilitates an early start of the interim period of the Agency for the Cooperation of Energy Regulators (ACER) and is a way for market stakeholders to contribute to all major aspects of the matter.
We believe that the dedicated workshop on the GGP on Electricity Grid Connection and Access along with this consultation has brought additional benefits with regard to the quality of the final guidelines.
Stakeholders should be given an opportunity to exchange views and ideas on this highly complex topic in an open and direct dialogue with the regulators. EWEA hopes to give with this response an adequate picture on what is essential to ensure well designed grid connection and access guidelines with a large scale integration of a variable energy source like wind power in mind.

2. Main issues addressed in this public consultation

The ERGEG consultation paper rightly identifies four main issues to be addressed in order to lead to a more transparent, effective and non-discriminatory grid connection and access, namely:

- EU-wide non-discriminatory and fair treatment of all grid users;
- Provisions for sufficient transparency and information;
- EU-wide common connection principles for generation units (including distributed generation), for consumption units and for DSOs;
- Principles for provisions for the voltage and frequency quality.

In this section, further explanation on each of these main issues is provided and why they are relevant from the wind industry's perspective. Additionally, it is pointed out why priority access should be covered by these particular guidelines.

Fair and non-discriminatory treatment of all grid users and provisions for sufficient transparency and information

EWEA recognises these two issues stated above as paramount to achieve a more transparent and non-discriminatory grid connection and access practise when

connecting new generation units to the grid, not least to overcome some discriminatory practises which have evolved historically in the EU energy sector characterised by vertically-integrated power companies and non-transparent technical requirements for grid access, especially for RES generators.

Wind power is disadvantaged compared to the situation under which conventional power sources such as oil, gas, coal and nuclear power sources were developed and introduced. Until the 1980s, electricity generation, distribution, grid reinforcement, grid extensions, and electricity selling were undertaken by national, vertically integrated monopolies that were granted exclusive rights and mandates to finance investments and research in new capacity and technologies through state subsidies and levies on electricity bills. As Europe is moving in the direction of more liberalised power markets, those options are no longer available and new technologies are facing a more challenging environment on the path to market penetration and maturity.
When envisaging penetration levels of 34% renewable electricity by 2020 in the system as outlined in the RES directive, however, it is required that decision makers and stakeholders in the electricity sector make the necessary changes to the grid infrastructure in Europe, which has been constructed and operated in the last century with large centralised coal, hydro, nuclear and, more recently, gas fired power plants in mind.
Having said this, fair and unbiased access to the grids for wind power installations and other renewables must be ensured, not least to be in line with current EU legislation and meet the 2020 target of the RES directive.

However, system security and reliability is rightly of highest priority for any system operator when connecting new RES generation units to the grid. Clear rules are needed to guarantee safe system operation when increasing the share of variable generation technology such as wind energy. Accordingly, wind energy technology is developing to keep up with ever stricter technical requirements. On the other hand, there are continuous changes of grid codes, technical requirements and related regulation, often introduced on very short notice and with minimum involvement of the wind power sector.
Grid codes and other technical requirements should reflect the true technical needs for system operation and should be developed in cooperation between TSOs, the wind energy sector and energy regulators.
To this end, costly technical requirements should only be applied if there is a true technical rationale for them and if their introduction is required for reliable and stable power system operation. Especially when looking at insignificant penetration levels of wind energy (this still applies for about one third of the EU Member States), there is no technical justification for challenging requirements such as fault-ride through capability and primary control. The assessment of grid code requirements should be made by government bodies or TSOs that are fully unbundled from and unaffiliated with any generation activities, to avoid biased decisions.
Consequently, we agree with these framework guidelines that any contractual arrangements such as grid codes, connection agreements and similar should be transparent and in no way discriminatory between different generating technologies. Furthermore, all relevant stakeholders should have timely access to sufficient information on grid codes which should be made available to the public taking into account the needs of all market players and be translated at least in the local language and in English.

Besides the technical requirements, there is the issue of interconnection practice. There is a need for a transparent method to define the maximum interconnection capacity at a given network point as well as a definition of the maximum time for the TSO or DSO to perform relevant studies. Such method could ideally be defined by a neutral authority for example ACER or the respective national energy regulator.

EU-wide common connection principles

EWEA furthermore agrees with the main issue of EU-wide common connection principles for generation units as there is a large variety of grid code requirements throughout Europe, repeatedly with no technical justification and often paired with insufficient understanding of wind farm and grid interaction at distribution and transmission system operator level. For wind energy, there is clearly a need for a structural harmonisation of grid code requirements in order to avoid unnecessary costs for manufacturers and developers, to increase transparency, and to facilitate the process of further technical harmonisation of the requirements.
See the paragraph on "Harmonisation of Grid Codes" below for detailed recommendations.

Priority access for renewables should be covered in these Guidelines

The public consultation paper does not cover implications emerging from priority access for renewables although provisions for this are covered through recent EU legislation, both through the recently adopted Renewables Energy directive and the directive concerning common rules for the internal market in electricity.
EWEA is convinced that the provision for priority access to the grid is an absolutely vital aspect of the EU legislation on the promotion and use of renewable energies (see article 14 in the RES directive). Without priority grid access EWEA doubts whether the 20% renewables target will be met.
Priority access for renewables is essential if the 20% target is to be met, and is justified on the basis of:

- Discrimination of renewables in the non-functioning internal electricity market;
- Reducing electricity prices for consumers through low marginal costs and avoiding fuel costs of conventional electricity generation; and
- Reducing CO2 emissions with an optimal use of all available clean and renewable electricity sources.

EWEA considers it necessary to strongly support priority access, also during dispatch, given the absence of properly functioning electricity markets in the EU. In the absence of effective competition, such as full ownership unbundling, priority access, including dispatch is necessary. Were the electricity market to function properly, wind's low marginal cost would ensure that all wind generated electricity was sold in the market ahead of any other generating technology[1].

[1] Wind power normally has a low marginal cost due to its zero fuel costs. The effect of lower electricity prices with a high amount of wind energy in the system is known as the "merit-order effect". See also Page 101, The Economics of Wind Energy:
http://www.ewea.org/fileadmin/ewea_documents/documents/publications/reports/Economics_of_Wind_Main_Report_FINAL-lr.pdf

Against this background, EWEA calls for due acknowledgement of the principle of priority access for renewables established by the RES Directive and the 3rd Liberalisation Package within these framework guidelines additionally to the four outlined main points.

Principles for provisions for voltage and frequency quality

Connecting wind farms to the transmission and distribution grids causes changes in the local grid voltage levels. Careful voltage management is essential for the proper operation of the network. The actual voltage control is a highly localised activity, in order to enable the proper power flows from producer to demand.

It is evident that clear rules are needed to ensure that the grid keeps operating well and safely when generators are connected. TSOs impose grid connection requirements onto wind power plants – just like onto any other generator – in order to keep good order in the system and to prevent negative impacts on the network.

Wind farms are required to provide control and regulation capabilities encountered in conventional power plants, necessary for the safe, reliable and economic operation of the system. Most of the MW-size wind power technology installed today is capable of meeting the most severe grid code requirements, but that does not mean strict requirements should be applied for all regions.
Advanced features include fault-ride-through capabilities of wind farms, enabling them to assist in keeping the power system stable when large faults occur in the system, with active voltage and power control. However, the majority of existing wind farms has been built up in a period of approximately 20 years (with a technical lifetime of 20 to 25 years). In this period a considerable technical development has taken place. As a result there are different types of technology in operation, with a range of degrees of controllability from a grid operation perspective. On one end of the spectrum, the older wind turbine types (representing approximately 40% of today's wind power capacity) are less controllable: they do not possess advanced reactive power control properties, nor fault-ride through capability, for the simple reason that grid operators required that they disconnected from the system when the system failed.
Some TSOs have changed their operating procedures only recently, and now ask wind turbines to stay connected. The other end of the spectrum includes the most modern wind farms, equipped with central control systems enabling them to be operated much as power plants and to participate in network control (active power and voltage control).

Modern variable speed wind turbines are therefore capable of meeting all requirements set whereas older wind turbine models are inherently inferior. However, it is expected that in addition the use of phase shifters and the adoption of improved shut-down criteria for older wind turbines (following new grid codes), an increased “Repowering” (replacement of old wind energy converters by new ones) will considerably improve the situation.

Recent wind farm designs incorporate monitoring and control features, which, in principle, enable them to perform various control functions of conventional power plants. In this way, virtual power plant properties are achieved. Such properties could enhance the integration possibilities of wind power at a large scale.

In this respect the wind energy technology has shown that it can do what is technically required to maintain system stability and follows thereby most provisions for voltage and frequency quality outlined in these Framework Guidelines.

Wind generation and technical framework for grid connection and access

With current technology, wind power plants can be designed to meet system operator expectations such as riding through voltage dips, supplying reactive power to the system, controlling terminal voltage, participating in system operation with output and ramp rate control, and providing SCADA information. In areas with limited penetration, system stability studies have shown that modern wind plants equipped with power electronic controls and dynamic voltage support capability can improve system performance by damping power swings and supporting postfault voltage recovery.

The results of studies performed in UK suggest that at higher penetration levels, requiring sufficient fault ride through capability for large wind power plants is economically efficient compared with modifying the power system operation for ensuring power system security in case wind farms are not having fault ride through capability[2]. In stability studies of the Iberian Peninsula it is shown that to reach penetration levels of more than 10 %, fault ride through capability is required in a majority of wind power plants. Also the German studies conclude that a passive fault ride through capability will not be sufficient in the future. In addition, the turbines have to be able to provide reactive power to the grid[3]. In a US study it was found that wind power plants with some dynamic reactive capability may reduce or eliminate the need for dynamic reactive devices on the transmission system[4].

Generally, EWEA agrees with the broad provision in these framework guidelines that the technical requirements may vary according to generation technology and size as far as it is technically justified and does not create undue discrimination.

[2] See Strbac, G., Shakoor, A., Black, M., Pudjianto, D. & Bopp, T. 2007. Impact of wind generation on the operation and development of the UK electricity systems. Electrical Power Systems Research, Vol. 77, Issue 9. Elsevier. Pp. 1143–1238.

[3] DENA, 2005. Planning of the grid integration of wind energy in Germany onshore and offshore up to the year 2020 (dena Grid study). Deutsche EnergieAgentur Dena, March 2005. English summary and full German version available at http://www.dena.de/themen/themareg/projektarchiv/

[4] See Loutan et al, November 2007, http://www.uwig.org/CAISOIntRenewablesNov2007.pdf

Harmonisation of Grid Codes

The way in which grid code requirements in Europe have developed has resulted in gross inefficiencies and additional costs for consumers, manufacturers and wind farm developers. With the growing penetration of wind energy, there is an increasing need to develop a harmonised set of grid code requirements. Harmonised technical requirements will maximise efficiency for all parties, and should be employed wherever

possible and appropriate. However, it is not practical to completely harmonise technical requirements immediately, since this could lead to the unnecessary implementation of the most stringent requirements from each Member State, which would not be efficient or economically sound.
EWEA has established a Grid Code Working Group among its members. The group consists of wind turbine manufacturers, wind farm operators, service providers, certification bodies and engineering companies. There is a consensus in the industry that there is an urgent need to carry out a harmonisation exercise, as wind penetration is forecast to increase significantly in the short to medium term.
The Working Group is working on a two step approach:

1. A structural harmonisation exercise, with the aim of establishing a grid code template with common definitions, parameters, units and figures, as well as a common structure; and

2. A technical harmonisation exercise, with the aim of adapting existing grid code parameters to the new grid code template.

The technical basis for the requirements can be then further developed by TSOs and the wind power industry.

This harmonisation strategy will be of particular benefit to:

- System operators, especially those who have yet to develop their own grid code requirements for wind power plants;
- Manufacturers, who will be required to develop only common hardware and software platforms;
- Developers, who will benefit from reduced costs.

A common template on the harmonisation of grid code requirements can be thus regarded as the main deliverable of this working group for the year 2009. Unfortunately, the common template document will not be finalised by the deadline given in this public consultation. However, once the common position on grid code requirements is finalised in the course of this year, EWEA proposes therefore to establish a co-ordinated dialogue at the European level with further stakeholders such as energy regulators and system operators.
Although a single EU Grid Code is unlikely, the long term outcome of this process should be that for EU there may be only 3-4 grid codes. In any case, a harmonised grid code for wind power should be coordinated at EU level by ACER and the European Commission with the participation of the relevant stakeholders, including the wind energy industry.

By the same token, the outcomes of the working group in terms of the common template can be also taken into consideration in follow-up work of grid integration studies such as TradeWind and EWIS.

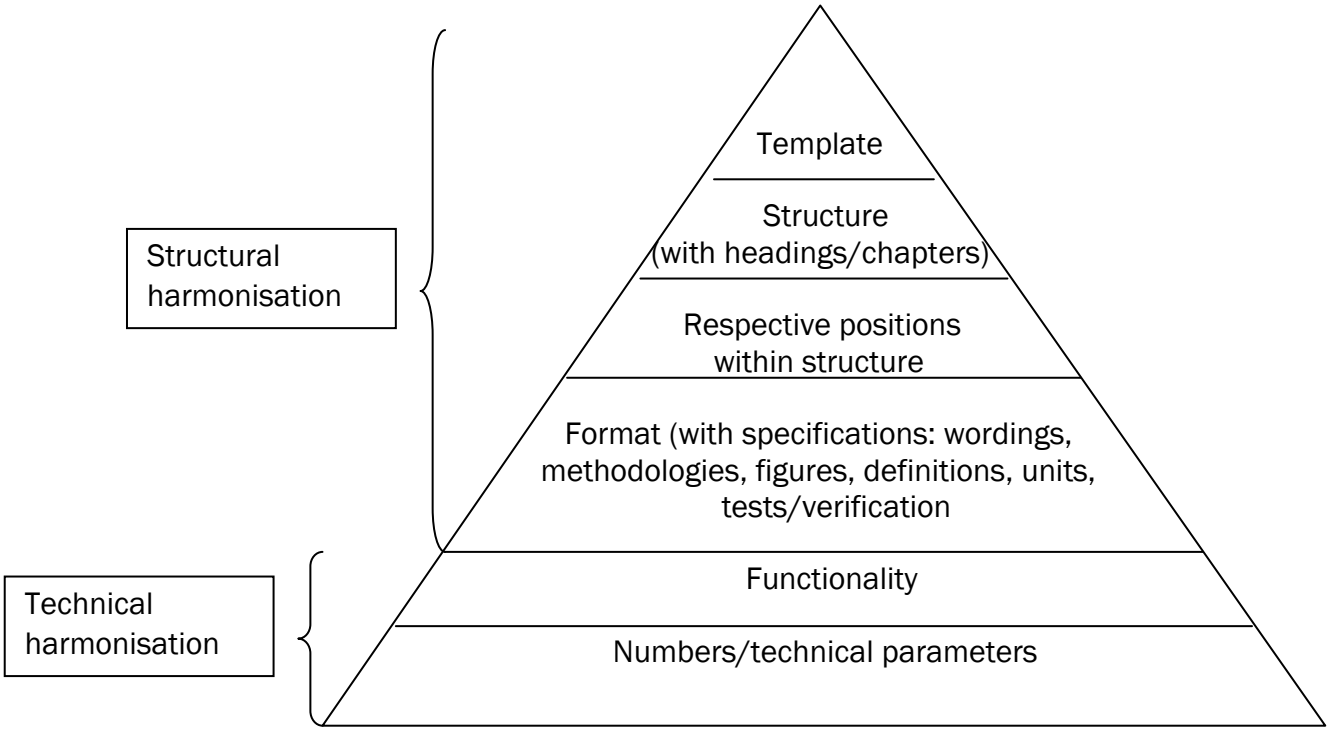
The working group has already identified important critical aspects needing further discussion which are also stated in the general requirements paragraph of the public consultation. The following critical aspects which need further elaboration have been identified so far by the working group:

- Point of common connection, PCC
- Technical minimum power production
- Voltage control
- Frequency control
- Fault Ride Through
- Simulation models
- Certification

Currently, these critical issues on the common template are handled by sub-committees within the WG. The results and recommendations will be included in the common template on the harmonization of grid code requirements.

In order to give a preliminary view of the structural harmonisation exercise, there are the following main points included in the structure of the common template on the harmonization of grid code requirements:

<u>Structure of the common template on the harmonization of grid code requirements:</u>



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The European Wind Energy Association (EWEA) is the voice of the wind industry, actively promoting the utilisation of wind power in Europe and worldwide. It now has over 600 members from 60 countries, including manufacturers with a 90% share of the world wind power market, plus component suppliers, research institutes, national wind and renewables associations, developers, electricity providers, finance and insurance companies and consultants. This combined strength makes EWEA the world's largest and most powerful wind energy network. www.ewea.org