EWEA

THE EUROPEAN WIND ENERGY ASSOCIATION

EWEA response on the CEER consultation on regulatory aspects of the integration of wind generation in European electricity markets

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1. General remarks

Given the expectation that 34% of the EU electricity consumption will be generated by renewables by 2020 due to the 2009 EU Renewable Energy Directive, EWEA welcomes the CEER consultation as the European regulatory framework for wind generators. As the most competitive renewable electricity option, onshore wind will be the key contributor to meet this level of penetration.

This consultation is a good starting point for feedback on electricity market and network access arrangements for wind energy as well as touching upon the urgent issue of an offshore supergrid. The deployment of renewables, particularly wind power, and the integration of European electricity markets, are fundamentally linked, and should not be approached as two separate topics. Moreover, it provides an instructive overview of how wind power generation is currently treated within national network, market and regulatory frameworks across Member States.

The consultation should facilitate deliberations on how the developing market and network arrangements can assist the integration of wind power, and is a way for market stakeholders to contribute views on all major aspects of the issue.

We believe that the consideration of the three key areas of work (electricity markets, network access arrangements and the concept of the supergrid) as outlined in the consultation are a good focus for scrutinising the existing regulatory framework. EWEA provides in this response a complete picture on what is essential to ensure a well designed regulatory framework for electricity markets, network access and electricity infrastructure development, with the large scale integration of wind power in mind.

EWEA furthermore agrees with the European Regulators' view that the new legislative context with the implementation of the RES Directive and the 3rd Liberalisation Package will have a significant impact on wind generation over the coming years. These two legislative packages should be the guiding principle for European Energy Regulators on any further policy options. In this regard, the CEER consultation and subsequent conclusions will be important to provide further input for a joint European approach to ensure fair and unbiased access to the grids for wind generators, to overcome planning and administrative barriers for infrastructures, lack of economic incentives for TSOs to invest, and finally to have market rules that allow for operation of the system such that there is an efficient international power exchange.

EWEA hopes that the consultation conclusions could be used as input with regard to the final deliverables foreseen in the 3rd Package, in particular network codes and framework guidelines on network access and electricity markets.

2. Questions for Public Consultation

Question 1: How will the expected growth in wind generation affect the markets in which you operate? What are the key challenges you foresee?

As a consequence of the adoption of the 2009 RES Directive (2009/28/EC), EWEA, in March 2009, increased its 2020 target from 180 GW. EWEA's scenarios, dubbed "baseline" or "high", in terms of expected growth in wind generation, are as follows[1]:

"Baseline" scenario for the EU
For the EU as a whole, the "baseline" scenario requires installed capacity to increase from 75 GW by end 2009 to 230 GW in 2020, including 40 GW offshore. That would require an average annual increase in capacity of 13.8 GW in 2009 - 2020. Wind energy production would increase from 163 TWh (2009) to 580 TWh (2020) and wind energy's share of total electricity demand would increase from 4.8% in 2009 to 14.2% in 2020.

High scenario for the EU
For the EU as a whole, the "High" scenario requires installed capacity to increase to 265 GW in 2020, including 55 GW offshore. That would require an average annual increase in capacity of 16.7 GW in 2009 - 2020. Wind energy production would increase to 681 TWh (2020) and wind energy's share of total electricity demand would increase to 16.7% in 2020.

By 2020, most of the EU's renewable electricity will be produced by onshore wind farms. Europe must, however, also use the coming decade to prepare for the large-scale exploitation of its largest indigenous resource, offshore wind power.

For this to happen in the most economical way Europe's electricity grid needs major investments, with a newly built offshore grid and major grid reinforcements on land. The present legal framework, with newly established bodies ENTSO-E and ACER as of 2011, the key deliverable of the 10-Year Network Development Plan, as well as the ongoing intergovernmental "North Seas Countries' Offshore Grid Initiative" is a step in the right direction and the political momentum for grid development and RES integration is evident.

The main challenge now lies in finding practical solutions on how to best incentivise a Europe-wide offshore grid, onshore transmission reinforcements and a trans-European overlay grid to ensure the transportation of substantial amounts of onshore and offshore wind power to consumers across Europe, while improving competition in the internal electricity market.

Question 2: What are the implications for market rules? Can you identify changes which would better facilitate integration of wind generation, including management of intermittency?

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[1] Pure Power: Wind energy targets for 2020 and 2030. EWEA. 2009
http://www.ewea.org/fileadmin/ewea_documents/documents/publications/reports/Pure_Power_Full_Report.pdf

Regional electricity markets are evolving and starting to give clearer price signals for market participants regarding when to consume or not. Furthermore, electricity price differences between the control areas are increasingly providing signals on where new interconnectors and grid reinforcements are needed. The ongoing market integration across Europe could provide a further building block for a future power system characterised by flexibility. This would be characterised by dynamic electricity markets, where also demand responds to price signals (and an increased number of market participants) facilitating the integration of wind and other renewables – rather than one in which large-capacity, slow-ramping power plants provide inflexible baseload power.

Given the European generation mix of the future, market rules must be established that lead to an efficient allocation of wind and other renewable generation capacity. Particularly, the uptake of functioning intra-day markets is crucial for the efficient integration of large amounts of wind energy and for cost-efficient system operation in general. Allowing for intra-day rescheduling of cross-border exchange will lead to savings in systems costs in the range of €1-2 billion per year as compared to a situation where cross-border exchange must be scheduled a day ahead[2]. In order to ensure efficient interconnector allocation, they should be directly allocated to the market via implicit auction. The introduction of larger market areas through further market coupling should also be envisaged.

Together with improved interconnections, cross-border balancing markets should also be developed on an intra-day basis as intraday rescheduling of reserves should save €250 million annually in system operation costs[3].

<u>Question 3:</u> Would moving the market's gate-closure closer to real-time facilitate the deployment of wind generation? Would this have any adverse consequences on the functioning of the electricity power system?

The operational routines of the power system, for example, how often the forecasts of load and wind energy are updated (gate-closure times) and the accuracy, performance and quality of the forecast are crucial factors to facilitate the deployment of wind generation. Accurate forecasts of the likely wind power output, in the time intervals relevant for generation scheduling and transmission capacity, allow system operators and dispatch personnel to manage the variability of wind power in the system. Predictability is key to managing wind power's variability and improved accuracy of wind power prediction has a beneficial effect on the amount of balancing reserves needed, so the accurate forecasting of wind power is important for its economic integration into the power system.

Today, wind energy forecasting uses sophisticated numerical weather forecast models, wind power plant generation models and statistical methods to predict generation at five-minute to one-hour intervals, over periods of up to 48 to 72 hours in advance and for seasonal and annual periods.

Wind power prediction can be quite accurate, more so for aggregated wind power, as the variations are levelled out; and the larger the area, the better the overall prediction. Present day accuracy levels of forecast tools for regionally aggregated wind farms are

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[2] Page 12, Trade Wind Study ; http://www.trade-wind.eu/fileadmin/documents/publications/Final_Report.pdf
[3] See Trade Wind Study, ibid.

of the order of magnitude of 5-6% (RMS error as percentage of rated power) within an intraday time scale and 3-5% 1-4 hours ahead, based on state-of-the-art experience in Germany[4].

The quality of the short-term forecast should be considered in relation to the gate closure times in the power market. Reducing the gate closure time would allow shorter-term forecasts to be used, which could significantly reduce unpredicted variability and lead to more efficient system operation without compromising system security. Moving the market's gate-closure closer to real-time would therefore have a dramatic impact on accuracy and the cost of balancing the system.

System operators will have to adapt to these changes of managing power systems closer to real time, both the demand and supply side. A flexible power system is key to integrate large amounts of variable RES such as wind in an economically sound way. This can be achieved by exploiting the available flexibility resource of a power system and furthermore by optimising the operation of the existing grid through power flow control and heat control on transmission lines[5]. For example, a dedicated control centre for renewable energies in Spain has allowed the TSO to operate the system focusing on real time operation, improving the integration of wind energy. After such operational measures have been applied, investing in a more flexible resource, whether in terms of power plant, storage or interconnection should be considered. A future power system must therefore be characterized by flexibility with increased interconnection capacity playing a role to complement the integration of wind power and other renewables.

By the same token, synergies with the ongoing policy development for smart metering and smart grids should be taken into account when considering consequences on the functioning of the electricity power system closer to real time: 80% of EU households should have smart meters installed by 2020 as required by the 3rd package. Together with ongoing developments in demand side management and the envisaged uptake of electric cars and other storage options, positive implications for the uptake of renewables and incentives for flexible system operation are most likely and should be examined by the regulators.

Question 4: Are emerging cross-border congestion management models compatible with wind generation? Should further attention or priority be given to intraday capacity allocation mechanisms and markets, in light of the issues associated with forecasting wind generation?

The recent deliberations of cross-border congestion management models at EU policy level should establish harmonised capacity calculation methodologies amongst European TSOs as well as introduce harmonised standards on information exchange amongst TSOs, generators and traders. Such harmonised capacity calculation methodologies will help provide the maximum possible capacities to a wider European market for each time horizon whilst respecting TSOs security standards. However,

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[4] Lange, Matthias; International workshop on wind power forecasting, Portland, July 2008

[5] Flexibility is an intrinsic feature of transmission networks. The flexibility resource of a power system is based on the quantity of fast-response capacity in the generation portfolio, storage availability, transmission interconnection capacity and demand side management (DSM) and response. See also: IEA report, Empowering Variable Renewables, 2008, http://www.iea.org/g8/2008/Empowering_Variable_Renewables.pdf

changes in system operation should be also considered as described in the response to question 3.

As mentioned above, the uptake of liquid intraday electricity markets is crucial for the smooth integration of large amounts of wind energy and constant cross-border trading in the intraday timescale, and should be facilitated through implicit continuous capacity allocation.

It is for this reason that EWEA advocates an EU-wide deployment of intra-day market trading with implicit auctioning and gate closure times as close to real time as possible, as well as the application of intra-day wind power forecasting for low reserve requirements.

Question 5: Should wind generation be subject to the same balancing obligations and the same types of charges as other types of generation?

As outlined earlier, different market rules are required given the envisaged increase of wind power generation. Wind generation should not be subject to the same balancing obligations and the same types of charges as other types of generation.

In order to give a complete and accurate picture of the relationship between balancing obligations and variable electricity generation from wind, a number of factors must be taken into account when estimating the balancing costs applicable to wind energy:

- The level of wind power penetration in the system, as well as the characteristic load variations and the pattern of demand compared with wind power variations;
- Geographical aspects such as the size of the balancing area, the geographical spread of wind power sites and aggregation;
- The type and marginal costs of reserve plants (such as fossil and hydro);
- Costs and characteristics of other integrating options present in the system, such as storage;
- The possibility of exchanging power with neighbouring countries via interconnectors; and
- The operational routines of the power system, for example, how often the forecasts of load and wind energy are updated (gate-closure times) and the accuracy, performance and quality of the forecast.

In general, the functioning and liquidity of wholesale markets and cross-border interconnectivity together with the forecast horizon influences to what extent wind farm operators *can* be at all in balance.

For this reason, wind generation should not be subject to the same balancing obligations and the same types of charges as other types of generation; at least as a truly integrated internal energy market is not yet established with balanced and fair market rules for all market players together with the adequate physical transmission infrastructure being in place. However, in regimes where balancing costs must be borne by the wind farm operator, regulators should ensure that these costs are transparent and represent only the real cost of balancing.

The variability of wind energy needs to be examined in the wider context of the power system, rather than at the individual wind farm or wind turbine level. The need for balancing and backup capacity applies to wind energy just as it applies to other power producing technologies that are integrated into the electricity grids. However, understanding wind power variations over all timescales (hours, days, months, seasons and years) and its predictability is of key importance for the integration and optimal utilisation of wind energy in the power system. Electric power systems are inherently variable in terms of both demand and supply. But they are designed to cope effectively with these variations through their configuration, control systems and interconnection.

Question 6: Should TSOs engage in research and development (R&D) to address issues associated with a large share of wind generation included in the network? If so, how should the regulatory framework require or support this?

Next to key deliverables such as networks codes and common network operation tools, the 3rd Package requires the newly established TSO body ENTSO-E to adopt R&D plans and include their planned R&D activities in their annual work programme (Regulation (EC) 714/2009). Accordingly ENTSO-E has published its first R&D Plan "Eurogrid" as announced in its work programme for 2010 to prepare a consolidated R&D plan for TSO needs in order to define priority research fields.

EWEA acknowledges the need for such a consolidated R&D plan as TSOs are important stakeholders for developing technical solutions for the large scale integration of wind power into the grid, in particular with regards to an offshore supergrid. TSO's R&D plans should be closely coordinated with the Strategic Energy Technologies (SET) plan of the European Commission. However, it should not only build on the Smartgrids initiative, but also on the European wind and solar industry initiatives and tackle in addition R&D topics on improved operation and integration of wind in relation to power electronics from FACTS and HVDC.

In general, closer cooperation between TSOs and the wind energy sector is needed, possibly also with a more institutionalised format. Outcomes from regional projects and corresponding R&D activities such as in the Kriegers Flak project should be taken into account.

The wind initiative has a total budget of € 6 billion over the next ten years, of which one third is dedicated to grid integration. It is very much complementary to the Smartgrids initiative since it focuses on ensuring the necessary grid technologies which should be in place to implement the more technically challenging elements of a future ENTSO-E 10 year network development plan, and should therefore be seen as a pillar for the development of the proposed R&D plan for TSO needs.

The grid section of the wind initiative will in particular demonstrate systems with a high penetration of wind, including innovative storage systems. It will furthermore demonstrate offshore wind farm designs connected to two or more countries, improve HVDC long distance technologies, enable the commercialisation of flexible HVDC connectors permitting both trading exchanges and the connection of offshore wind clusters. Overall, it prepares the technological ground for a future efficient pan-European electricity system. A high level of coordination between the different SET plan components and the ENTSO-E R&D plan is therefore advantageous and would be welcomed by the wind energy sector.

Question 7: **Should wind generators face the same types of network charges as other new generators, calculated using the same methodology? What is needed to provide a sufficient incentive for generation in choosing where to locate? What is needed to provide an appropriate balance of risk among market players? When should this not be the case?**

Any contractual arrangements such as grid codes, connection agreements and network charges should be transparent and equitable between different generating technologies, and not discriminate against wind plant. The overall aim should therefore be to remove any discriminatory practices and market distortions which wind and other renewable energy sources may still face and create a level playing field for all power generators in a future internal electricity market.

EU legislation stipulates certain requirements concerning renewable electricity. Directive 2009/28/EC on the promotion of the use of energy from renewable sources requires (subject to requirements relating to the maintenance of the reliability and safety of the grid and based on transparent and non-discriminatory criteria defined by the competent national authorities) that:

- transmission system operators and distribution system operators in their territory guarantee the transmission and distribution of electricity produced from renewable energy sources;
- either priority access or guaranteed access is granted to the grid-system of electricity produced from renewable energy sources;
- transmission system operators, when dispatching electricity generating installations, give priority to generating installations using renewable energy sources;
- appropriate grid and market-related operational measures are taken in order to minimise the curtailment of electricity produced from renewable energy sources;

All discussions and considerations should therefore take place within the existing legislative framework, and seek to implement that legislative framework. EWEA considers it necessary to strongly support priority access, including during dispatch, given the absence of properly functioning electricity markets in the EU. In the absence of effective competition, priority access and dispatch is necessary. Were all the electricity markets to function properly, wind's low marginal cost (no fuel and carbon cost) would ensure that all wind generated electricity was sold in the market ahead of any other generating technology.

In light of this, priority grid access for renewables should not be seen as positive discrimination, but as compensation given there is no functioning internal energy market.

As the economics of a wind power plant are crucially depended on the site wind resource, suitable locations may be far from the actual load. Wind power has for that reason the particularity that wind farm location is dictated by resource availability. However, all systems differ and distances of wind generators to the load within countries can be entirely variable. The range of network charges can vary significantly between projects and should therefore not be subject to specific charging regimes due to a possibly remote location. Furthermore, it should be taken into account by the regulators that smaller investors are often hampered when it comes to investing in remote areas. Recital 63 and article 16 of Directive 2009/28 are vital in this respect, as locational charging disadvantages wind generators in the market.

Question 8: Broadly, what is the appropriate allocation of responsibilities, risk and cost among market players in developing new network infrastructure (e.g. ahead of or in response to new generation connections)? Should this be different for wind generation ? Where is harmonisation required?

It is clear that investment decisions on building new transmission lines have to be supported by proper feasibility studies showing the economic benefit. On a European level it has been shown by various studies such as TradeWind[6] and EWIS[7] that properly selected network upgrades will lower operational costs of power generation, which should be beneficial rather than costly for consumers. It should be the task of the regulators (together with governments) to design and implement schemes that favour the right investment decisions, and ensure a cost recovery for the investors, especially on cross-border projects, which require a more coordinated approach.

EWEA calls on all relevant stakeholders to recognise that the benefits of developing a truly European grid network would lie not only in overcoming the present congestions on some of the main transmission lines but would also provide for savings in balancing and system operation costs and enabling a functioning internal market. A European approach towards an optimised European electricity system should be promoted. Such an approach should not be based on the profitability of the lines alone, but as any strategic investment, reflect European priorities. Investments should therefore take into account security of supply, market integration and connection of renewable energy technologies. In general, a more proactive approach of regulators would be needed to engage with governments in order to trigger the political decisions to build new transmission infrastructure.

The discussion on financing new interconnectors should be placed in the broader context of the development of an internal electricity market, thereby not relating the benefits of grid development solely to wind power and other renewables.

For any cross-border investments, any framework must allow for both public and private entities to construct, own and operate grids. The European Energy Regulators, TSOs, Governments and the EU should therefore help plan and coordinate the development of new electricity networks. Guidance should be provided throughout the entire investment cycle. Furthermore, the EU should facilitate investments in infrastructure projects of European interest by providing financial incentives that provide an adequate return on grid investments, for example with a revised TEN-E instrument. This could be combined with loan guarantees and other financial products, e.g. from the European Investment Bank (EIB) and other national and international finance institutions.

Question 9: Do you agree that the "supergrid" issues for regulators identified in 5.1 are relevant? Is there anything else European regulators should be considering?

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[6] TradeWind Study ; http://www.trade-wind.eu/fileadmin/documents/publications/Final_Report.pdf

[7] European Wind Integration Study (EWIS): http://www.wind-integration.eu/

EWEA welcomes the overall positive assessment of the European Energy Regulators towards a European supergrid. The issues for further consideration for regulators have been rightly identified in the consultation paper under item 5.1. In this regard, EWEA urges the European Energy Regulators to take due account of the outlined arguments for building new electricity infrastructure in the response to question 8. In addressing the allocation of costs, European Energy Regulators should take into account the long-term economic benefits of improved transmission, as demonstrated in European transmission studies (TradeWind and EWIS), and from recent experience (for example the fast cost recovery by the NorNed cable). Present price differentials in different market areas also indicate the economic case for new cross border lines and should be further incentives to build new infrastructure.

Coordination is critical for tackling the challenges of potential distortions created by different interconnection and transmission regimes. Possibly, it is neither practical nor realistic to foresee a "Super-regulator" or "Super-system operator", as the newly established European bodies ACER and ENTSO-E could fulfil this role of coordinating authorities to a certain extent. However, European regulators should take into account recent developments when deliberating on these issues such the emergence of first cross border TSOs and ongoing intergovernmental initiatives such as "North Seas Countries' Offshore Grid Initiative".

Question 10: Is the current ownership structure of the offshore lines or their regulatory framework a potential issue for the integration of offshore network? Are there other considerations affecting this ownership structure?

There is currently a wide variety of ownership regimes for offshore lines across Member States. Considerations by the European Energy Regulators as outlined in the consultation document are rightly taking into account the development from current radial connections to a more meshed network where HVDC-connections to offshore wind farms could also serve as interconnectors[8]. The benefits of having such a meshed offshore network structure over radial point-to-point connections have been outlined by the TradeWind study. The offshore grid enables the different electricity markets to be interconnected in a much better way and with a significant surplus, with markets relying on import and at the same time providing access to cheap balancing power to deal with the added variability introduced by the offshore wind resource.

The problem with the current ownership structure is that regulatory frameworks for interconnectors and offshore transmission are not compatible between Member States. Regulators with the involvement of the governments and other relevant stakeholders from the wind energy sector should coordinate and develop interfaces between different schemes. Complete harmonisation may as a first step not be necessary, but an alignment of commercial and operational drivers for offshore lines is of huge importance. As a best case, offshore grid connection should be provided by the TSOs with a proper incentivisation.

[8] See the Energinet.dk Prefeasibility Study on Kriegers Flak: http://www.energinet.dk/NR/rdonlyres/648CA739-6890-4E03-B18A-F21BB6A3FC5F/0/KriegersFlakPrefeasibilityReport.pdf and EWEA offshore Report: http://www.ewea.org/fileadmin/ewea_documents/documents/publications/reports/Offshore_Report_2009.pdf

Question 11: **Do you agree that the Regional Initiatives should be used to address the issues associated with the development of the regional projects? What challenges does this present?**

The so-called Regional Initiatives (RIs) have developed seven regional electricity markets over the last three years at different speeds in a voluntary manner. The aim of these RIs is to speed up the integration of Europe's national electricity markets by creating regional electricity markets as an interim step to a single EU electricity market. There has been various progress in different regions, prominent achievements include the creation of two regional auction offices[9], the development of regional transparency reports and several new market coupling projects. The European Commission has consequently launched a study to review advancement of the RIs and to define a roadmap for the RIs to converge towards a single market.

Next to the RIs there has been the intergovernmental Pentalateral Energy Forum which has now established the so-called "North Seas Countries' Offshore Grid Initiative" and the Baltic Energy Market Interconnection Plan's intention to develop the electricity markets of the Baltic States. However, EWEA would welcome if particular RIs could facilitate the progress of regional projects, especially if the scope of the project would fit well with a RI region and there would be no conflict of interest with the above mentioned intergovernmental initiatives.

Question 12: What other issues should European regulators consider in relation to the Integration of wind generation?

European Regulators, together with the EU and Governments, should acknowledge the contribution of wind generation to security of supply in Europe. The EU stands out as an energy intensive region heavily reliant on imports (more than 50% of the EU's primary demand) and additionally, the use of fossil fuel fired power plants exposes consumers and society as a whole to the risk of volatile fuel and carbon prices.

Wind generation is a capital-intensive technology, with rather low variable cost and zero fossil-fuel cost, whereas coal and gas-powered plants have high variable costs due to the fuel fill and, particularly in the case of new gas power plants, low capital costs. However, international oil price projections all indicate a steady rise in oil prices providing further uncertainty on the future generation cost of fossil fuel based generation[10]. The key advantage of wind power over conventional technologies is that investors have control over generation cost for the life time of the plant: mean site wind speed and the cost of a fully installed wind plant are known from the outset. European Energy Regulators should therefore recognise that the apparently higher wind energy prices have to be compared with the opportunity to plan the economic future of Europe on the basis of known and predictable costs.

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[9] CASC-CWE (Capacity Allocation Service Company for the Central West European Electricity market) started operation in 2009 and a regional auction office in the Central-East RI will be operational in 2010.

[10] Data from both the US and UK governments suggest an oil price of around $ 100 a barrel by 2012 and $ 120 a barrel by 2020. The IEA assumes slightly lower oil prices by these timeframes.

In this context wind energy provides a domestic energy source, which is not only fossil-fuel free, but also free from any economic risk emerging from fuel and carbon price volatility as experienced in the recent years.

For further information please contact: Paul Wilczek, EWEA: pw@ewea.org

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EWEA
WIND IS POWER

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.