

## **Response to CEER's Public Consultation on Regulatory aspects of the integration of wind generation in European electricity markets**

EDF welcomes the opportunity to comment on the issues raised in this consultation. Massively growing wind generation is indeed one of the challenges faced by electricity markets.

To face fluctuation in the electricity consumption, generation power plants must be controllable (control of injected energy, programs of production, fast modulations up and down).

However, wind generation is a fluctuating production on various horizons of time, with little flexibility and uncertain programs of production. Wind generation is "not controllable" and represents an additional risk for the system. This new risk creates several difficulties related to the electric system :

- connection to the network (ability of the network to receive such additional generation, quality of tension),
- functioning of the network (participation to the ancillary services of tension / frequency, reserve).

Concerning electricity markets, wind generation is not the most competitive type of generation considering its high investment cost and low marginal cost of production. With the massive arrival of wind energy, an additional risk is introduced into the markets on both the long and short terms. This risk will therefore have an impact on the management of generation.

To reduce the impacts of wind energy on the electricity system, wind energy must be predictable (generation forecasts should be improved), observable (real time observation through DSO and TSO) and controllable (modulation up and down of the production, preparation of a daily production program as for conventional power plants).

Finally, rules related to wind energy and to conventional power plants must be fair.

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European energy regulators consider three areas in particular where integration of wind generation needs to be factored into policy decisions:

**(A) electricity market arrangements**, including the benefits for wind generation of allowing bids or declarations closer to real-time and the importance of within-day (intraday) markets and cross-border trade, as well as balancing by Transmission System Operators (TSOs) as a last resort to maintain balance between supply and demand.

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

The growth in wind generation should have the following impacts :

On the market:

The growth in wind generation will increase the need for flexible power in the European generation portfolio, in order to offset the unpredictability and the variability of the wind power.

It is expected that it will increase the rate of very low prices on the market and could even generate negative prices. As a result of wind variability, wind power is also a factor that increases volatility of market prices. Therefore there is a risk that the market price will not provide a clear signal for new investments.

The difficulty to have good wind power forecast will generate more risk to tackle for the Balancing Responsible Parties with wind power in their portfolios, leading to extra costs to mitigate this risk.

On the cross border capacities:

TSOs will have more difficulties to forecast cross-border capacities, until close to the real time. Capacities offered by TSOs, at least up to the day-ahead stage, could decrease, due to this difficulty. Therefore, some additional capacity, in comparison to today situation, depending on last wind conditions forecasts, is expected at the intra-day stage.

Location of wind generation is far from being geographically uniform. It is likely that offshore wind generation will increase the concentration of generation spreading in continental Europe from the north of Germany (as it would be the case for the offshore supergrid). The massive loop flows, that we can already experience, would be even more significant in the future. That is why TSOs and National Regulation Authorities should focus on the management of the bottlenecks, which are still existing on national networks and which lead to those loop flows, and on the implementation of wind power dispatching (see Q2).

On the network

As wind generation increases, it will be necessary to consider the ancillary services issue. Wind power generation should contribute to provide these services like any other generation, as they benefit to the whole community.

**Key challenges:**

As a result of wind variability and low accuracy of forecasting before real time, the expected growth of wind generation will increase different types of risks and uncertainties, risks for which TSOs and market players should hedge. This will generate some increasing and/or extra charges.

- 1) For market players, it will be crucial to cover the risk of variations through investments in complementary flexible power plants, by improving the wind power forecast and increasing the intra-day trading (depending on the liquidity). They will have to hedge the price volatility, and to pay for additional balancing charges..
- 2) For TSOs, different impacts on safety and efficiency have to be analysed and treated as a consequence of a significant increase of wind generation. The development of interconnections will contribute to a good integration of wind power into the 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?***

Massive wind generation is expected, and will not be uniformly spread. Plans for network development should take this fact into account, by being pro-active in the investments, so that commercial cross border possibilities, but also the system security, are not jeopardized by wind generation.

In a same way, for both market efficiency and network safety, wind generation should be able to be dispatched off. As a result of this dispatching possibility, for a good management of intermittency, both market players and TSOs should have direct observation on wind power, in real time, so that they can use the latest available data to optimise their portfolios (market parties) and operate the network (TSOs).

Efforts should be made for intra-day development, as it is at this stage that unscheduled volumes may be back on the market, or on the contrary large generation volumes may be needed, due to wind power forecast inaccuracy.

Efforts should be made on the cross border intra-day target, on the basis of the one defined at the Project Coordination Group. Works of the Ad'Hoc Advisory Group (AHAG) group will be crucial for its development.

***Question 3: 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?***

In some conditions, as a changing weather prospect, wind generation output is known with precision only a couple of hours before real time. A change in the day ahead GCT would not be very useful. It is however important that intra-day market allows participants to bid and offer up to one hour before real time. In France, the GCT will be soon one hour ahead the real time. A key challenge is the procurement of accurate prediction data by market players.

***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?***

Cross-border management model should facilitate market parties to deal at the intra-day stage and therefore, it should facilitate the integration of wind power in the electricity market. This is what is expected from the continuous trading model that will be assessed in the Ad Hoc Advisory Group (AHAG Group). It is understood that it is already a priority for market design definition, and it is indeed a necessity.

**(B) network access arrangements**, such as the rationale for different forms of charging for connection and how decisions are made to extend the network to accommodate new generation, including in locations which may be remote from existing infrastructure. This includes regulatory issues as well as barriers such as difficulties in authorisation and permitting for new transmission lines.

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

The answer is undoubtedly affirmative. Wind generation, as a renewable energy, is subject to a specific scheme, which may vary from one country to another (feed-in tariff, market prices + premium..). However, apart from this scheme, it is important that all generation is placed on the same level playing field. In particular, balancing obligations and different types of charges should be exactly the same as for other types of generation in order to guaranty the best incentives to contribute to the reliability.

***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?***

It is indeed within the TSOs ordinary tasks to foresee the potential problems that may occur in relation to the forecasted generation portfolio in their system. TSOs should therefore assess consequences of wind generation as they do for any other generation type. However, due to both the specificity of wind generation, and the expectation of upcoming massive amounts, TSOs should pay a particular attention to the subject.

***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?***

Wind generators should face the same types of networks charges as other new generators.

Access priority given to wind generation may, as a consequence, provide little incentive to connect in favourable locations for the electrical system. On the contrary, conventional generation often has an incentive (quicker connection, with enhanced output facilities) to locate in an adequate place for the system. An appropriate mechanism would be to assess for wind generation location incentive, in order to both avoid jeopardizing conventional generation connections, and maximize the social welfare.

***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?***

First of all, it is the responsibility of the TSOs to match the long run supply and demand forecasts and to warn the Member state or the NRA if there is no matching of those forecasts so that they give incentive to develop new generation, in particular flexible one, or network so that the system could face up to the variability of wind power and its negative effects. Therefore there is a need to launch the assessment of an appropriate incentive mechanism.

**(C) the concept of an offshore supergrid**, and the challenges in harmonising the range of differing policies and regulatory treatments, either on a broad scale or perhaps initially on regional projects.

***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 offshore supergrid is involving too many ERI for Regional Initiatives to be used to address the overall project. Furthermore, ERIs do not currently involve governments, that are however part of the project. The project could be organised like the Pentilateral Forum. Particular attention should be paid to market parties involvement.

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

European regulators should consider the impact of wind power on ancillary services. As indicated in Q1, the wind power generation should contribute to provide these services like any other generation, as they benefit to the whole community. Therefore the adequate level of participation of wind power to ancillary services should be more investigated.

European regulators should consider priority dispatch in the light of both security of supply and social welfare.

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