

EDP response to the CEER Consultation on regulatory aspects of the integration of wind generation in European electricity markets

INTRODUCTION

EDP welcomes the CEER consultation, which focuses on one of the most urgent challenges of European electricity markets. EDP fully agrees with CEER on the conclusions of the analysis: *"it is no longer practical to consider renewables and electricity markets as 2 separate topics: it is indeed essential to consider their interaction and to promote the integration of renewable generation in the wholesale electricity market"*. Furthermore, EDP believes that policymakers should make all possible efforts to complete the integration of EU wholesale electricity markets as soon as possible. Without integrated markets, not only it will be even more complex to integrate the vast amount of planned wind generation, but also markets functioning and system security could be seriously undermined, determining higher costs for end users.

The EU 2020 targets for renewable energy imply that these should make up between 30-35% of the total electricity generated in Europe. EDP is fully committed with these goals. Particularly, in 2007, the Portuguese government revised the minimum contribution which had initially been agreed within the EU concerning the total electricity generation from renewable sources from 39% to 45% by 2010. Moreover, it has been established a target for 2020 whereby 60% of the total electricity consumption will be supplied by RES.

Renewable energy sources (RES) are increasingly influencing wholesale markets bringing additional challenges to their operation and integration. EDP acknowledges this and proposes that further connection of renewable energy sources should not be hindered but adequately accommodated instead. Such a process should, however, meet a few important criteria. Regulatory initiatives should not interfere, whether directly or indirectly, with the attractiveness of investing in this type of generation so that compliance with established targets is not compromised in any way. Business processes have already accommodated existing regulations and this fact should be safeguarded. The subsidiary principle should be observed considering

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Member States are best positioned to perceive the local specificities and the particular contexts within which targets are to be met. Broadly, EDP foresees a gradual path of approximation between regulations which are specific to RES and market regulations in the course of which the commitment with the EU 2020 targets is not compromised.

EDP welcomes this consultation as an opportunity to contribute to identify and to propose solutions that may help regulators and policy makers build an adequate framework to meet these targets whilst maximising the overall social welfare.

ANSWERS TO SPECIFIC QUESTIONS

Question 1:

How will the expected growth in wind generation affect the markets in which you operate?

EDP expects wind generation to impact on multiple market parameters and variables mainly due to its intermittent nature coupled with its mandatory priority dispatch. Lower operating hours for conventional power plants and more frequent start-ups for flexible plants leading to an increased steepness on the merit order curve will drive operating costs upwards. A more complex regime of operation of conventional power plants, specifically CCGT, will require more flexibility in terms of the gas infrastructure management and operation. Specifically, gas capacity allocation management as well as congestion management procedures must evolve in order to facilitate a more flexible use of the system so that the direct impact on electricity costs for final customers is minimized. Also, gas contracts should have enough flexibility to accommodate CCGT lower average load factors, where possible spikes may occur occasionally.

Price formation is likely to reflect this resulting in higher price volatility and more frequent zero or negative prices (where allowed) may be observed. Such prices will reflect a growing volume of priority low priced wind energy offered to the market,

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input “take or pay” type contracts as well as lower price bids put by conventional generation attempting to avoid shut down and start up costs. Consequently, both existing and planned conventional generation assets will operate under different market conditions from those that were in place when investments were decided. This results in different economic equilibriums and risk profiles that will impact on investment funding.

EDP regards the profiles of existing and forecast price spikes (in terms of their frequency and magnitude) as insufficient economic signals provided by wholesale markets to promote new entry and maintenance of existing capacity. Moreover, the increasing risks associated with price volatility perceived by investors will impact the return rates that they will demand from the market. Further still, security of supply may be the central concern. The benefit derived by customers from new entry may overcome the market driven loss incurred by investors. Since investors are primarily focused on limiting their exposure to potential losses, under these particular circumstances, they will be unwilling to invest. Effectively, from a social point of view it may be the case that generation investment should in fact be made which materializes an externality– this is to say that “energy-only markets” may not be able, in many cases, to provide an efficient solution that assures security of supply. This should trigger the introduction of a mechanism, such as capacity payments¹, to internalise this frontier externality, which the market is unprepared to accommodate, conveying the right signals to generators and leading to the maximisation of the social welfare.

A considerable impact on the development of transmission grids is expected particularly if the extension and the reinforcement of the grid is not able to meet the requirements of increasing wind production. This may lead to more grid congestions as well as to higher redispatch costs. Depending on the particular circumstances regarding the geographical concentration of wind production and the proximity to cross-border interconnections, congestions may occur and cross-border trading may be hindered.

¹ See, for instance: Joskow, Paul - “COMPETITIVE ELECTRICITY MARKETS AND INVESTMENT IN NEW GENERATING CAPACITY”, CEEPR, 2006; or the work by The Brattle Group

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EDP also believes cross-border capacity will increasingly be under stress as more frequent grid congestions and higher redispatch costs are to be expected. Network security concerns may cause TSOs to take a more conservative long-term allocation approach which may lead to capacity curtailments of conventional generation in order to cope with loop flows and higher unpredictability of wind generation.

Within this context, EDP would like to notice the absence of more mature intraday and balancing markets which should provide the framework for encouraging new technologies such as the roll out of smart grid technologies, demand side management and widespread electric mobility. Such a framework would also bring forward the need for further development of distribution networks which are required to enhance existing network capacity, network management and customer connections.

What are the key challenges you foresee?

EDP would like to point out the absence of clear economic signals that new and future investment in conventional generation assets will collect an adequate remuneration through the market. Both frequency and magnitude of price spikes appear to be insufficient, price caps exist in several markets and competition authorities may not understand the reasons behind price spikes, wrongly concluding that these reflect market power abuse². Therefore, a process should be implemented to ensure sufficient backup capacity and flexible mechanisms are in place when needed in terms of both quality and quantity. Such a process should secure sufficient and continuous investment in conventional generation capacity. In many cases it will not be feasible to rely on a regime based on "energy only markets" to fund these investments: it may be necessary to adopt complementary capacity payment mechanisms so that security of supply is not threatened. Hydro pumped storage and CCGT plants, in particular, may have an important role in facilitating the integration of wind generation and in managing its intermittency by delivering both the required

² See previous footnote.

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flexibility and also the necessary balancing services. CCGT plants are able to remain on-line and on part-load during off-peak times but increased flexibility will depend mostly on the provision of adequate incentives to develop, for instance, gas storage facilities. As mentioned in the previous question, gas capacity allocation management as well as congestion management procedures also impact on the level of flexibility which CCGT plants are able to deliver.

EDP identifies a few other key challenges that need to be addressed considering the growth of wind generation which is firmly expected. The integration of wholesale markets is of paramount importance. Effective and efficient management of wind intermittency will be best achieved through market coupling, by further developing intraday markets and through the implementation of cross border balancing markets.

Interconnection capacity is another key challenge that must not be neglected, particularly where bottlenecks are identified which prevent wind generation from supplying demand as well as access to balancing resources to match the increased need for cross border trading.

The development of transmission networks implies both a considerable amount of investment and a relatively extended time horizon associated with the delivery of these projects, which is usually longer than that required to develop a wind project. This is why EDP would like to emphasize that transmission network projects must be planned well in advance and their implementation anticipated in those areas where wind projects are expected to be developed.

Additionally, EDP acknowledges the need to develop tools and techniques to predict wind resource availability more accurately, particularly for D-1 and D-2, with the purpose of mitigating the need for balancing services.

An equally important challenge is to stimulate the implementation of flexible demand mechanisms which may simultaneously enable further efficiencies to be derived from the distribution network operation such as smart grids, demand side management tools and electric mobility.

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Question 2:

What are the implications for market rules?

Wholesale markets in operation today were in fact designed for a generation mix that is already different from the past and that will continue to evolve in such a way that by 2020 and beyond it will have changed considerably. Market rules will need to be reviewed as of now to cope with the priority dispatch and the guaranteed access to the grid for RES. EDP envisages a solution for wind integration, as far as market rules are concerned, that provides adequate incentives to accommodate the expected levels of wind generation whilst overcoming the challenges previously identified without compromising the accomplishment of the 2020 EU targets. The introduction of market based remuneration mechanisms should be regarded as optional for wind generators at least while cost parity between this and conventional generation is not verified.

Market operation should not suffer distortions such as price caps/floors as they increase the risk of omitting signals of future shortages of both flexible and backup generation capacity. Nevertheless one should not assume from this that price caps removal is sufficient to pass the correct signals on to generators. As already mentioned, even in pure “energy-only” markets a set of obstacles will be faced by investors that may not find the appropriate incentives to invest in backup and flexible generation capacity. (see answer to question 1)

Can you identify changes which would better facilitate integration of wind generation, including management of intermittency?

Incentive mechanisms should be put in place that may overcome the market flaws which inhibit the generation of signals that flag the need for backup capacity and flexibility mechanisms. These may consist of various solutions. For instance, capacity related compensation (including pumping) has the potential to mitigate the

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uncertainty of existing and potential investors. The elimination of price caps, although not sufficient by itself, would remove a source of market distortion. The implementation of continuous intraday markets as well as of balancing services markets would provide the means to fund system flexibility transparently.

EDP does not question the rationale for gradually exposing RES to market mechanisms provided compliance with EU 2020 targets is not jeopardised. RES may be incentivised to progressively take on some of the responsibility for the compensation of production deviations. EDP suggests that RES may become market participants in the long term.

The effective implementation of Regional Market Initiatives should enable a faster integration of power systems, namely through market coupling, by integrating intraday continuous markets and through the implementation of cross-border balancing markets. The underlying rationale is based on the fact that the more integrated sub-systems participate, the less the intermittency impact is likely to be.

Legal and building permit constraints that affect TSO activities must be addressed in so far as the anticipation of necessary interconnection infrastructure is enabled. Congestion management practices should also be revisited with the purpose of increasing the available commercial interconnection capacity as well as its allocation transparency.

EDP envisages the creation of both political and regulatory conditions that facilitate the effective implementation of demand side mechanisms which introduce flexibility in the power system such as smart grids, electric mobility and demand side management in general.

Question 3:

Would moving the market's gate-closure closer to real-time facilitate the deployment of wind generation?

Theoretically, it can be argued that moving the gate-closure of the market closer to real-time would facilitate the integration of wind generation. Experience already shows that wind forecasting can be more accurate up to a few hours ahead of real

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time. Therefore, moving the gate-closure closer to real time would enable a more efficient integration of wind generation by encouraging market participation and also by inducing a reduction of the cost of balancing the system.

However, EDP regards the effective operation of fully integrated continuous intraday markets with adequate liquidity levels as a more important achievement. This would enable wind forecast related adjustments to take place nearer real time.

Would this have any adverse consequences on the functioning of the electricity power system?

EDP expects this measure will introduce additional market operation complexity. It will allow more trading opportunities, however. The required amount of time that must be allocated for the validation of both bids and technical options must be respected under any circumstances. These periods of time are already quite reduced in some markets. Therefore, additional complexities and difficulties may not justify any additional shortening of the gap between gate-closer-time and real time.

Question 4:

Are emerging cross-border congestion management models compatible with wind generation?

Congestion management models are compatible with wind generation. However, EDP regards this subject as a transitory concern given that the main focus should be to ensure adequate cross-border capacity is in place. Recent initiatives (e.g. Market Integration Design Project and the work of the Project Coordination Group and of the Ad-Hoc- Advisory Group) aimed at integrating markets based on EU target models are seen as beneficial. Nevertheless, in some cases, the implementation lags behind as seems to be the case of the interconnection capacity between Spain and France, which is clearly seen as insufficient in spite of the efforts of the recently appointed ex-EU commissioner, Dr. Mario Monti.

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Should further attention or priority be given to intraday capacity allocation mechanisms and markets, in light of the issues associated with forecasting wind generation?

Particularly relevant to wind generation is the treatment of intraday capacity allocation mechanisms and markets with respect to continuity, assurance of sufficient levels of liquidity and transparency.

Question 5:

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

EDP acknowledges the merits of the rationale of subjecting wind generation to the same balancing obligations and to the same types of charges as other types of generation. However, the introduction of such obligations at present may materialise a considerable obstacle (particularly, in certain systems) for its development. Clearly, this may impact on the attainment of the EU 2020 targets. EDP envisages that this commitment may be enforced gradually in agreement with any requirements which are specific to Member States. In the long run though, EDP admits that it may be feasible to eliminate those distinctions as far as balancing obligations are concerned provided these services may be obtained through market mechanisms as wind generation technology does not lend itself to fulfil the task.

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?

EDP welcomes TSO and DSO driven R&D initiatives in this field, particularly if they are focused on the reduction of system costs, provided that a set of criteria is met. TSOs and DSOs are the market agents who oversee the power system in general and R&D activities should therefore enhance their role as market facilitators. R&D should be correctly funded and the related expenditure should be supervised *a priori* by an independent body. Any liquid benefits derived from R&D initiatives should be funded

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by its beneficiaries. These benefits should be partly passed through to the beneficiaries (e.g. consumers) and to the TSO or DSO as an R&D incentive.

Additionally, network congestion mitigation incentives based on rewards and penalties for the TSO and for the DSO may be designed in order to promote efficient investment.

If so, how should the regulatory framework require or support this?

R&D should be promoted and any support schemes in place should contemplate both R&D and the transition from R&D to full implementation. In this respect, the EU may play an important role by promoting and funding projects such as the TENs. Likewise, the duplication of R&D initiatives should be monitored to ensure the sharing of best practices as well as to avoid unnecessary duplication of work.

Also, both legal and regulatory TSO and DSO specific frameworks may need to be revised according to the principles outlined in the previous question.

Question 7:

Should wind generators face the same types of network charges as other new generators, calculated using the same methodology?

EDP agrees that all generators should be treated equally in terms of network charges. This level playing field should be consistent across Member States, should be non-discriminatory between new and existing generators and should be coherent with EU energy policy in general. Notwithstanding this basic principle, certain specific situations such as offshore wind systems should be accounted for. In these circumstances, there may be advantage in sharing the costs with the connection of other new or nearby facilities which, given the significant amount of investment required, may justify and require the revision of some regulations.

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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?

The geographic location of wind resources where existing and future wind generators will be located is broadly known. It should also be noted that TSOs are expected to plan and to propose network developments 10 years in advance. EDP would like to point that these plans should be coherent with the expectation of the development of the wind sites. Together, the availability of both wind resource and proximity of the grid connection point should produce an incentive to invest in certain areas. Transmission network funding should be guaranteed (whether public or tariff based) subject to the approval of regulators. It is also envisaged that connection charges should be cost reflective.

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)?

EDP considers TSOs should play a proactive role in planning and developing the network with a strong focus on the long term approach as it takes much longer to build lines than wind farms. The planning of network expansion should take into account existing scenarios regarding both expected RES and conventional generation. Moreover, the investment and licensing timing of RES installations and grid development projects should be aligned. In order to minimise risks for investors and reduce inefficiencies, it is not sustainable to have RES installations ready for connection when there is no connection available yet (or vice versa).

Regulators and governments should limit uncertainty and share investment risks as much as possible. First of all they should recognise the need to reinforce networks, authorising investments on a timely basis and allocating the appropriate remuneration (or authorizing the necessary grid tariffs) to TSOs and DSOs. Network congestion charges should be used to fund the network development.

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Regulators should judge the socio economic welfare derived from transmission investments and support them accordingly, distributing costs between TSOs on a fair basis. Costs could be assigned to those TSOs who benefit from the investment, regardless whether they have or have not been involved in the construction of the particular infrastructure. This will require the conception and the implementation of a common incentive scheme.

Should this be different for wind generation? Where is harmonisation required?

No. However, new governance and funding models may be needed for developing offshore supergrids.

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?

EDP welcomes the views of European Regulators on this matter, namely, their acknowledgement of the advantages that may be derived from the integration of “supergrids”. EDP identifies a few key concerns, notably the definition of criteria to determine who should pay and who should benefit from these investments. Also, potential distortions originated by the simultaneous enforcement of several national regulations should be avoided. As previously mentioned, property and governance issues of offshore transmission networks must be established. To a great extent, these are key challenges that also need to be addressed for continental grids, perhaps more urgently, in order to better manage intermittent generation.

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?

Actual ownership of offshore network should be decided by each Member State. EDP would like to identify a major principle that should be safeguarded in any

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offshore regulatory framework. Access to networks should be granted to potential users who would compensate the owner of the assets whether through the sharing of costs or through payments of regulated access tariffs. This is a major issue that must be tackled if cost-efficient offshore wind generation is to be connected.

Other aspects should be carefully analysed by regulators. Generators that are connected to a given offshore network should be subjected to its national promotion framework only unless particular agreements exist between Member States. This should promote the maximization of the incentives granted by each national authority. Such offshore networks should then be regarded as other onshore transnational transmission networks and its design should minimize system connection costs with regard to present and future generators. The required funding for their construction might include the benefits derived in terms of the provision of balancing services (considering the differences of the electricity prices in different markets) and considering the contribution towards system reliability. Whenever appropriate, central European level coordination and co-funding actions should be made possible in the interest of the establishment of European bulk energy corridors which impact in more than one Member State.

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?

EDP agrees on the merit of using Regional Initiatives to address issues associated with the development of regional projects, from an organizational perspective, as these are key tools to accomplish the market integration goals as well as the wider European Internal Market .

However, it is a fact that the majority of the issues overcome the "regional" scope of ERIs and affect most of Europe. There are a number of competences and goals which ERIs are yet to deliver that pertain to congestion management and transparency, for instance, and it is questionable if additional contributions should be expected from these initiatives. Notwithstanding any particular mechanisms, it is crucial that political commitment is obtained from Member States and that clear

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guidance is provided regarding the implementation of the selected priorities. EDP would like to highlight the relevance of regulatory harmonization in particular.

A Regional dimension approach is definitely necessary for the development of RES. However, there is a clear risk that this will not be enough, at least with the current structure of the Regional Initiatives. Most of the issues at stake are broader than “regional”: they affect almost the whole of Europe. Tackling the relevant issues related to wind integration in different ways by Member States or by Regions may not sufficiently efficient or effective. An overarching structure and coordination is advised to address the key issues in a consistent manner.

For that purpose, we welcome some initiatives by Member States (like the signature of MoU) to cooperate: we hope they will soon realise all the issues at stake and that necessary measures are put forward that allow to handle the offshore grid challenges (in the North Sea first of all), but also the continental grid reinforcements, the need for harmonisation of support schemes, and the balancing regulatory regimes.

Question 12:

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

EDP notices there are a few issues regarding the integration of wind generation that should be carefully considered by European regulators, in addition to those which have extensively been dealt with in this document.

In most Member States, building permit processes are still a major issue which regulators themselves can do little about apart from calling for governments to speed up those processes. Despite the lengthy construction phases which could take up to two or three years for major network reinforcement projects, throughout Europe, previous permits and authorizations ultimately depend on national governments. These have been proven to be slow, inefficient and lengthy processes which may ultimately compromise the fulfilment of European energy policy targets.

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An essential prerequisite for obtaining building permits must consist on clear national criteria on the basis of which decisions may be made. This should include a strategic framework and transparent guidelines for the process to reach a decision and for setting clear deadlines.

Alternatively, a “National Policy Statement” agreed by each national government could set out the criteria against which the body making a planning decision would judge applications for development consent. This would produce a clearer and more predictable framework as well as a more friendly planning environment on the basis of which the investment decision making process could be engaged with more confidence. This in turn would result in planning decisions being supported in a more transparent set of standards that set out the national interest. Such a framework would adequately meet the expectations concerning the planning process of both public and investors.

The role of distribution network operators should not be neglected with respect to the integration of wind generation. A significant proportion of RES, including wind is connected to the distribution grid. Regulators should carefully attend to the requirements imposed by the new paradigm. The path towards a low carbon economy is progressively changing the roles of demand and supply. Increasing RES are being connected to all voltage levels of distribution networks whereas energy efficiency, electric mobility and smart grid applications are pressing for changes in the patterns of consumption. Regulators should aim at adapting their regulatory frameworks to efficiently support cost-beneficial investment that supports this shift before attending to the implications of these changes in the transmission network infrastructure requirements that need to be considered as well.

Distributed generation is already displacing local demand and, in certain locations, clear export patterns onto the transmission systems are being observed imposing serious implications for the requirements of transmission infrastructure. The lack of provision for an array of local system services is already calling for distribution network operators to make use of innovative solutions in real time, with growing involvement of customers, such as smart metering, voltage control, power flow management, dynamic circuit ratings and energy storage technologies. Regulators are crucial

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entities in promoting the most efficient arrangements on behalf of customers and society, in general. They should promote adequate coordination between the activities of DSOs and TSOs as well as the design of balanced incentive schemes to enable the necessary network investments to be carried out.