

# The Electricity Transmission System Operators views on the Integration of Wind Energy in the European Electricity System



**E**lectricity Transmission System Operators (TSOs) firmly support the development of Renewable Energy Sources (RES) as well as their integration into the European power systems. TSOs already took specific operational and technical measures to contribute to the integration of wind power in the existing networks. It should be noticed that more than 70% of the world wide installed wind power is located in Europe.

The further integration of large wind power in accordance with national policy targets requires additional transmission and reserve generation capacities. TSOs are more and more concerned that these targets do not take into account adequate development in high voltage grids. Also, the regulatory frameworks favouring renewable energy sources are significantly different among European countries. Some regulations may even induce technical and economical decisions that might be not the most effective.

Fast wind power growth and geographical concentration in coastal and remote areas constitute serious challenges for the whole Europe. TSOs have therefore recently proposed the following actions aiming at better integration of wind power in the European power systems without jeopardizing the level of security and reliability in the future.

## 1. Speed up authorisation procedures for new grid infrastructure

New large-scale wind power, especially off-shore wind farms, should be carefully synchronized with the additional grid infrastructure both at national and European level. Time-consuming licensing procedures and legal proceedings for new high voltage transmission infrastructure (from 4 to more than 10 years) are not able to match the rapid development of wind power. TSOs therefore call upon both European and national legislators to take appropriate steps to accelerate approval procedures and thus significantly shorten realisation periods for the development of the present grid infrastructure.

## 2. Enable wind turbines to actively contribute to grid stability

Unlike conventional power plants, most existing wind turbines do not contribute to grid stability in the event of slight voltage drops in the transmission network – even if it is timely cleared by the network protection systems. Under these

circumstances, conventional wind generators may cause instantaneous disconnection of a significant number of wind farms. To this aim, TSOs propose that all power generators – including wind power units - should be obliged to meet given fault-ride standards. In certain areas with an important share of wind power, existing wind turbines which do not (yet) provide the necessary voltage support and system stability should be technically refurbished or re-powered by modern turbines. TSOs therefore call for harmonised grid code requirements to be fulfilled by wind power plants so as to minimize system instability.

## 3. Provide adequate Balance Management and Frequency Control

Due to limited predictability of wind power when compared with conventional power plants, adequate reserve and balancing power capacities must be available in due time. With growing wind power feed-in the demand for reserve and balancing power increases. Depending on national legislations, different parties are responsible for providing balance power. In case the TSO has to contract these services the costs will be part of the tariff and by this be paid by all customers. As a consequence, there is no market-based incentive for wind farms to reduce the costs of integration into the electricity system which remains a main issue to be investigated;

## 4. Fund R&D for improved Grid Integration

Along with an in-depth analysis of the shape of European Transmission Network of the future, dedicated R&D funding should focus on advanced technical solutions for better integration of renewable energy sources such as wind power. Such R&D activities could concern regional forecasting tools (wind and electricity), new or better storage systems as well as improved grid infrastructure and advanced stability technologies.

## 5. Promote Planning Security through RES Capacity Steering

High level of security of supply implies a coordinated approach between new renewable energy sources, reserve capacities and future grid extensions/enforcements. To this aim, TSOs propose a European wind capacity steering mechanism, e. g. through RES quotas. Capacity RES steering in Europe would become the cornerstone for improved coordination between RES extension and transmission infrastructural development.

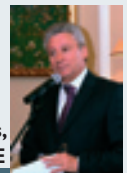
## 6. Evaluate the impact on cross-border electricity transits

Regions with a high density of wind generation and low electricity consumption cause flows in neighbouring grid regions. During the last two years, critical grid situations were observed when strong winds occurred in some regions. Electricity flows more than twice higher than expected implied major interventions from some TSOs. In such case, unlimited priority dispatch forces TSOs to reduce the tradable cross border transmission capacity. The impact of such priority rules should be investigated and, if necessary adapted, in those areas where security standards were not always complied with and security of the interconnected system correspondingly at threat.

In summary, the integration of wind power is nowadays a European issue. In order to further contribute to the development of RES, and Wind Power in particular, ETSO and UCTE are launching a wider-than-EU study that will tackle the above mentioned issues. The wind industry, among other stakeholders, will be invited to participate as advisors in this study the results of which are expected in about two years.



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