

*European Commission Consultation
Paper on generation adequacy,
capacity mechanisms and the internal
market in electricity*

– A response of TenneT TSO

February 2013

The following summary and answers of TenneT TSO B.V. and TenneT TSO GmbH to the EU Public Consultation on Generation Adequacy, capacity mechanisms and the internal market in electricity should be read in addition to the answer of ENTSO-E which we support. We are hereafter hinting at specific issues that are related to the consulted topics, however are not always perfectly covered by the questions. We feel that generalized conclusions and actions such as an all-European CRM design would not always necessarily meet the needs of a TSO and be of help; rather focused support is needed to enable TSOs to cope with the extreme changes in the electricity system induced by the Energy-Transition and to grant the high level of Security of Supply (SoS) that was provided during the past decades. In Germany alone, there are 31GW of wind generation and of 30GW photovoltaic generation installed. Renewables yield over 20% of the yearly consumed electrical energy.

Summary of TenneT's position

An effective electricity market should provide - additional to electrical power - sufficient generation capacity at the right time and place and with the characteristics required to maintain Security of Supply. The present discussion on Generation Adequacy is rather limited to the balance of supply and demand within a whole bidding zone or country. In addition to this rather global request we strongly recommend considering also the specific physical location of generation capacities within the relevant geographical areas and the given characteristics of such resources and their readiness to provide ancillary services. To ensure the secure operation of the power system sufficient reserves and ancillary services have to be well-distributed within relevant areas of the system.

TenneT emphasizes that the current energy-only market does not handle all needs TSOs have. Therefore, TenneT sees the urgent need for targeted measures basically on local level to maintain Security of Supply. These measures must be preferably reversible and operated without impacts on the market in order to support the transition towards a fully developed energy-only market.

The current inadequacies are in relevant parts caused and intensified by the on-going transition towards a mainly renewable electricity supply. The subsidized growth in renewables and its interference with the market, as witnessed especially in Germany due to the current supporting scheme¹, significantly decrease the operating time of conventional power plants while the prices in the remaining hours seem not to be yet high enough to make adequate returns on investments for some power plant operators. They decide to shut down or decommission power plants, which often causes local problems with respect to Security of Supply.

Challenges we are facing to keep up a stable system are mostly related to location, characteristics, flexibility, and regulatory framework.

(1) Location - TenneT observes that the actual decommissioning of conventional plants takes mainly place in wrong locations. In particular in the South of Germany we increasingly witness a lack of conventional generation capacities needed to ensure Security of Supply.

¹ The current German supporting scheme grants a feed-in tariff for RES energy as well as transport priority. TSOs are legally obliged to purchase the RES-energy from producers and to sell it at best price at the power exchange, i.e. offer it as price-taking bids. The difference between the infeed-tariff costs and the income from selling RES at the PX is borne by the end-consumer. In consequence, PX prices are driven down in times of high RES-infeed because of the high availability of energy with marginal costs of 0 EUR. Thus, the more RES energy is available, the more conventional energy gets out of the money at the PX. In particular gas-fired power plants, typically needed mid-day to meet peak demand, are often edged out by energy from photovoltaic generation. In consequence even modern gas-fired plants have been announced to be mothballed.

The development of the existing grid according to the Netzentwicklungsplan supports the North-to-South transfer of electricity but will, at least on short notice, not lead to a copper plate that equalizes the decommissioning of power plants in the South. This means, grid reinforcements will not completely eliminate the need for well distributed generators in the system in particular with a view to ancillary services to ensure a.o. voltage stability. While the site selection of some renewables naturally depends on local potentials (e.g. wind velocity and solar radiation), investments (or disinvestments) in locally more independent power plants should be encouraged to consider grid requirements. Hence, local investment signals would decongest the transmission system and increase the stability of the grid. Note that local investment signals would take effect on longer time scales. In consequence and to ensure a smooth transition of the system, short-time measures such as strategic reserves will remain necessary in the near future.

(2) Characteristics - With regard to specifications of generation capacities we have to be aware of the fact that renewable generators can provide energy otherwise stemming from conventional power stations and eventually replace them for mere power production, but up to now by far do not deliver the same support to the transmission system - such as flexibility in operating times, reactive power, control power and inertia which are crucial for a safe operation of the power system. This is mainly due to the fact that subsidy schemes that remunerate only the energy output of renewables discourage the provisioning of these services. Since technically the provision of such services can be mainly realized with renewable generation, subsidy schemes should be re-considered in that respect. Until renewables are technically enabled and financially incentivized to provide ancillary services, reserves are needed to safeguard a secure operation of the system. But it has to be noticed that these services are only available when there is renewable generation. In periods without wind and sun qualified alternatives are still required.

(3) Flexibility - Renewables like solar and wind are by nature very volatile and can only be forecasted with limited accuracy. Due to the high amount of renewables in Germany the deviations between the forecasted and the real in-feed can be quite high, which causes challenges for system operations. Flexible generators are needed to meet the more erratic residual load. However, in particular flexible gas-fired plants become unprofitable and are chosen for decommissioning as currently announced for the Southern part of Germany (e.g. Staudinger 4). The market is obviously unable to indicate the need for flexible generation capacities in form of reliable price signals.

(4) Regulatory Framework - The European electricity sector is in a state of flux. Industry and politics act in a rapidly changing framework and hence have to adapt continuously while their ability to do so very much differs. One-off decisions like the nuclear phase-out in Germany are in contradiction to a carefully planned and long-run efficient energy landscape and take years for the market to rebalance. Especially highly irreversible investments - such as power plants - need a stable market environment and a robust regulatory framework to not discourage investors. In the future these kinds of decisions should not be made on national level anymore because they seriously influence the market as such and SoS on regional level. Alignment of national policies and regulation at European or at least regional level is a necessity.

In order to keep the present system stable TenneT must contract local reserves for active and reactive power, inertia or similar ancillary services. In Germany a provisional solution in form of a cold reserve of mothballed power station already exists (c.f. Staudinger 4, Irsching 3 and some Austrian power stations during this winter). This cold reserve causes additional costs for consumers and significant efforts on TSO side. Such mechanisms have to be formalized including adding more flexibility with respect to utilization and could then also serve as a local, transitory strategic reserve until a mature electricity market has evolved. In any case these measures should be reversible and must not interfere with the market.

We have to accept the abovementioned challenges but at the same time we have to acknowledge that their causes and remedies can not be limited to the factors generation capacity and inescapable malfunctioning of energy-only markets. Efforts to stimulate demand side participation as well as the integration of the European electricity markets have to be continued as an additional measure to improve the market and SoS. The current market design has to be complemented by local investment signals and by participation of renewables on ancillary services to improve the efficiency of the electricity market and to facilitate its reorganization towards a RES-dominated electricity supply.

In conclusion, TenneT thinks abovementioned improvements should be considered first before extensive capacity mechanisms might be added which only take full effect in many years from now. Meanwhile, temporary support by punctual contracting of conventional reserve generation capacity is expected to be necessary to ease the transition and to further ensure SoS.

Q1: Do you consider that the current market prices prevent investments in needed generation capacity?

The current prospect of market prices prevents investments or does not prevent disinvestments in generation capacities respectively.

An increasing in-feed of renewables - especially in Germany due to the present supporting scheme for renewable energies - significantly decreases the operating time of conventional power plants while the prices in the remaining hours do not offset that reduction and hence do not prevent generators from a drop in revenues. A lot of generators do not make adequate returns on their investments and decide to mothball or decommission power plants. While yet there is no clear evidence whether prices will still be insufficient to attract investments in generation capacities when scarcity will increase on the bidding zone level, the current disinvestments cause serious local issues with respect to Security of Supply. The on-going decommissioning does not take into account TSO requirements with respect to their location and support to the transmission system.

In the view of TSOs, electric power from conventional power plants is a joint product of electric power and several beneficial characteristics which help to safeguard the operation of the power system such as flexibility, inertia of rotating masses and reactive power. As the power sector moves away from conventional plants, these formerly complimentary ancillary services can no longer be taken for granted. However, these characteristics are presently not reflected in the market price but required in several locations in the system. New framework conditions have to be elaborated on how TSOs could build or contract such services in an electricity system which is dominated by renewables.

Current electricity markets abstract from transmission constraints if no structural congestion exists and assume any temporary congestions are manageable at reasonable costs by applying redispatch. Well-designed bidding zones are therefore expected to have a compatible spatial distribution of load and supply which keeps the demand for internal transmission limited and available ancillary service providers well distributed.

However, the spatial distribution of generation significantly changed during the last years. Generally speaking, the distance between generation and load increased. In Germany the decommissioning of older power plants takes place mainly in the south of the country while the installation of wind turbines concentrates in the north.

To make investment decisions again consistent with grid requirements local investment signals and advanced ancillary services have to be introduced which contribute to Security of Supply.

Q2: Do you consider that support (e.g. direct financial support, priority dispatch or special network fees) for specific energy sources (renewables, coal, nuclear) undermines investments needed to ensure generation adequacy? If yes, how and to what extent?

The electricity market in Europe and especially in Germany is characterized by a politically-driven strong growth of renewable capacity. Renewables are paid a fixed feed-in subsidy for the electricity provided without taking care of proper predication/balancing and which is independent of the market price of electricity, however traded at marginal costs of 0EUR at the power exchange. Such supporting schemes (see footnote 1) lead to biased market results and reduce the efficiency of the market which have a negative impact in generation investments and hence on Generation Adequacy.

Q3: Do you consider that work on the establishment of cross-border day ahead, intraday and balancing markets will contribute to ensuring security of supply? Within what timeframe do you see this happening?

The on-going implementation of the Target Models for cross border day ahead, intraday and balancing markets will enhance Security of Supply at European level and will lead to an efficient utilization of existing infrastructure. TenneT is together with other TSOs engaged in several projects and committed to implement the Target Model as a priority. But these measures will not be sufficient to compensate the lack of ancillary services on specific geographic locations.

Q4: What additional steps, if any, should be taken at European level to ensure that internal market rules fully contribute to ensuring generation adequacy and security of supply?

Q5: What additional steps could Member States take to support the effectiveness of the internal market in delivering generation adequacy?

The European electricity sector is in a state of flux. Industry and politics act in a rapidly changing framework and hence have to adapt continuously while their ability to do so very much differs. Especially infrastructure investments - like power plants or transmission lines - take time and need a stable market environment and a robust regulatory framework. In this context we feel the need for an EU-wide concept for the future renewable energy system and a master plan to achieve this goal with respect to the following aspects:

- In order to deliver Resource Adequacy it is vital to facilitate **transmission grid extension** by coordinated grid development and investment plans and a stable regulatory framework.

- Changing of **support schemes for renewables** to at least more market price sensitive structures and ensure more coordination at European level on this topic. Additionally ancillary services should be urged.
- Furthermore, **local investment signals** have to be introduced to counteract shortcomings in a focused way, thus improving the overall efficiency of the electricity market and to facilitate the fundamental reorganization of the electricity sector.
- Facilitating **demand response** is crucial for the functioning of the energy market in the long run. Efforts to stimulate demand side participation as well as the integration of the European electricity markets have to be continued. As a contribution to the reorganization towards a CO₂-free system, the current supply-follows-load system will have to develop towards a more flexible load-follows-supply scheme.
- Further investigation and development of **smart grids** und adequate **storage** possibilities.

Q6: How should public authorities reflect the preferences of consumers in relation to security of supply? How can they reflect preferences for lower standards on the part of some consumers?

As long as consumers do not unveil their individual preferences in form of price-elastic demand we should stick to the assumption that a high level of Security of Supply is of common interest as electricity is a basic need. Nevertheless, facilitating demand response is essential for the functioning of the energy market in the long run. Efforts to stimulate demand side participation have to be continued.

Q12: Do you consider that capacity mechanisms should be introduced only if and when steps to improve market functioning are clearly insufficient?

TenneT strongly supports focusing on delivering the Internal Energy Market and the necessary infrastructure to deliver on the long term needs of the European power system. The current energy-only market is deteriorating and would finally fail due to market distortions from renewables support schemes, priority dispatch and additional local problems as described above. Therefore, we must expect that - at least on an interim basis - available supportive measures will remain necessary to safeguard the on-going transition towards a mature energy-only market. Such measures have to be reversible and operated out of the market to not interfere with the adjustment process of the market. Nevertheless, a straight European-wide capacity market which does not take into account local and technical requirements of the TSOs will be insufficient and inefficient as well.

Q14: In relation to strategic reserves:

Do you consider that the introduction of a strategic reserve can support the transition from a fossil fuel based electricity system or during a nuclear phase out?

What risks, if any, to effective competition and the functioning of the internal market do you consider being associated with the introduction of strategic reserves?

To promote the transition of the electricity sector towards the Target Model of the Internal Energy Market with mainly renewable electricity supply, TenneT as other TSOs will have to contract or establish local reserves for active and reactive power, inertia or similar ancillary services. In Germany a provisional solution in form of a cold reserve of mothballed power station already exists but could be improved with respect of flexibility. Such mechanisms have to be formalized and could then also serve as a kind of strategic reserve until the other aforementioned distortions have been overcome and additional capacity mechanism become redundant. In any case these measures should be reversible, i.e. should not request complicated and expensive mechanisms that will change the generation and market structure in a way hardly to undo, and must not interfere with the market (risks to effective competition can be materially mitigated, if the strategic reserves are designed so that they neither compete with commercial resources in the short nor long run).

Q18: Should the Commission set out to provide the blueprint for an EU wide capacity mechanism?

An EU wide capacity mechanism would have to aim at a moving target. Developing and implementing a mechanism which is limited to certain specific issues from which some are rather temporary does not make sense if such mechanism would only take full effect in many years from now. We rather recommend developing an overall master plan for a sustainable and reliable energy system for the future, building upon the proper implementation of the Target Model first.