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Report

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Capacity Mechanisms in the European Context: Can we ensure internal market synergies?

Summary report from the 'Future Power Market' workshop in Copenhagen, November 21st 2014
Karsten Neuhoff¹ and Sebastian Schwenen²

Summary

Using generating and demand resources across national borders brings synergies and improves supply adequacy in Europe as a whole. However, national capacity remuneration mechanisms (CRMs) may pose barriers for the participation of energy resources across borders. This ultimately challenges the idea of a common internal market. Given the current experience with the newly imposed CRMs, indeed the integration of foreign capacities seems challenging as certain regulatory requirements, for instance on interconnector capacity, have to be met. Although all current CRMs in the EU are explicitly of temporary nature, given the current divergence in EU power market design, the question will be not whether but how to agree and coordinate on different forms of capacity remuneration in the EU for the years to come.

Common grounds: Synergies from pooling international energy resources

The high potential of exploiting synergies for welfare and security of supply in European power markets by pooling international resources is generally acknowledged. Demand peaks usually occur in neighboring systems at different times and spare capacity in adjacent systems can in these instances always be used to satisfy domestic load and vice versa. However, for using these synergies a wide range of requirements for international market regulation and coordination of stakeholders has to be met, which are debated and summarized below together with existing experience and country cases.

International coordination and synergies in capacity markets

Different types of CRMs also require different regulatory arrangements for exploiting synergies from pooling international energy resources. These requirements relate to the consideration and allocation of interconnector capacity, procurement and dispatch of capacities for CRMs.

Interconnector capacity: Today, approaches to include interconnector capacity in CRMs differ. In the current UK approach the participation of foreign capacity is not considered at all for the first auctions in 2014. Foreign capacity cannot participate despite state aid clearance by the EC requiring inclusion of

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interconnection capacity, which accordingly has to be done for the second round of auctions. However, the market price for capacity might by then have changed and it remains to be seen if a significant stimulus for investment will remain in later auctions in which foreign capacity can participate. Nonetheless, in the UK it is envisaged that foreign resources can explicitly participate in the procurement of capacity. In France in contrast, interconnectors are considered by de-rating the obligations put on the demand side exactly by the amount that foreign capacity can contribute to serving load. In line with this, about 7% (corresponding to capacity requirement of about 7 GW of about 100 GW capacity demand in total) is deducted from the obligations to load. Hence, while in the UK foreign resources are accounted for in the supply of capacity (foreign capacity may participate in future auctions) in France foreign resources are accounted for on the demand side of the capacity market (deducted from load obligations).

The above shows that explicit approaches include challenges in regulatory coordination. If competition and synergies from international capacities are to be exploited, TSOs have to work together to attach a certain capacity value to foreign plants. Alternatively, penalties can be adjusted accordingly so that in the case of non-availability capacity providers have to pay compensation. However, such penalty design might in turn increase bids submitted to the auction. In either case, international coordination has to take place, for rating available capacity or for administering penalties.

In France, the explicit participation of foreign capacity is being discussed, showing that another issue may arise, namely how to allocate the overall capacity attached to non-domestic resources. For instance, it might be beneficial to not have all foreign capacity participating from Spain, but to have a larger portfolio of participating systems to minimize the likelihood of joint scarcity situations across borders.

Dispatch of cross-border resources: Many questions arise with regards to dispatch. Will flows go into the right direction (to the system that paid for capacity) as prices peak? And how will co-incidental supply shortages in neighboring systems be managed with TSOs on both sides being eager to dispatch in order to serve domestic load?

For France, the option of explicit TSO coordination via bilateral agreements is discussed. If adjacent systems experience stress situations jointly, TSOs could rely on previous agreements with partner countries on how to share load shedding (political agreement and technical cooperation; requires high level of trust among neighboring countries). Alternatively, a certification of the interconnection capacity itself to take part in CRMs could be undertaken, so that the use (flow direction) of the interconnector is contracted among TSOs right with the procurement of capacity. But as difficult inter-TSO congestion management rent agreements in the past showed, finding such an agreement seems challenging in general and is only applicable where capacity markets are centralized.

In principle, capacity mechanisms could solve this issue explicitly, e.g. allocate Spanish generators to France if the former received payments from France, and allocate thus load shedding to Spain when Spanish firms received capacity payments from France. It remains to be seen, how stringent such rules can be applied. A particular concern of unilateral implemented capacity mechanisms could in this case be that power stations in neighboring countries might participate in the capacity mechanism but obtain very limited remuneration for this service as many generation assets might compete to serve a demand

limited by interconnection capacity. Despite insignificant remuneration, stringent requirements for subsequent dispatch might result in asymmetric security of supply outcomes in both countries. This winter might bring more experience with dispatch during (joint) scarcity situations; however, once the flow-based approach will be implemented new experience is to be gathered again.

Procurement: *In the UK*, capacity is procured four years ahead with a descending clock auction. Payments are settled according to the clearing price. Ex ante, there was no consensus on the economically meaningful merit order to be anticipated or expected. New plants get 15 year capacity contracts, while existing plants only receive annual contracts, however with significant refurbishment existing plants may receive a three year contract. Thus all new nuclear and some coal plants to be refurbished are likely subject to longer contracts. The procurement auctions are run by NationalGrid, with supervision from Ofgem.

The secretary of state decides on the procurement volume. With around 50 GW to be procured, some concerns of over-procurement have been pronounced. So far very little demand response is expected. The UK capacity market is intended to be a temporary policy for 10 years, but the phase out is not entirely clear yet. Plants receiving contracts for differences (e.g. Hinkley Point) are not entitled to participate in the capacity payment. Therefore, most nuclear and renewables cannot participate.

In France, a major reason to introduce the capacity market was to address peak load concerns. Capacity products are only annual, a long-term target is not explicitly addressed with this decentralized mechanism. Suppliers' obligations are based on peak load volumes and offer an incentive to reduce peak load. Demand response may offer capacity, too; in some scenarios demand response soon can be at a level of 5-6 GW. All generators can be taken into account, the only criteria is availability (whether newly built or existing).

Regulatory authorities will on a yearly base calculate and publish a reference for the annual capacity price, based on all information they receive from transaction prices. However, detailed market transactions will remain private information to the contract writers. Currently, the approval of the government is still needed and also the law would have to be changed to implement the regulation. The EU commission considers the scheme as a public service obligation, which is to be notified and inherits an ex-post check, rather than an ex-ante approval as for the UK.

From the start, the decentralized market design started with implicit consideration for cross-border capacities, but interest arose to go to explicit participation (with known challenges such as difficulties for controlling generation and demand response outside of control areas, especially in stress situations). However, thinking about explicit participation turned out to be a "Pandora's box" as with the current market coupling environment all foreign capacity would have to have secure interconnector capacity. Against this background, foreign capacity is deducted from the capacity obligations. Thus so far, for both France and UK there is no explicit integration of foreign resources in the proposed procurement respectively decentralized allocation mechanism.

International coordination and synergies with strategic reserves

As for capacity markets, also with strategic reserves international coordination is required. However, in most existing strategic reserves, reserve capacities are entirely domestic and hence experiences with foreign resources in SRs are limited in Europe. In principle, foreign resources could participate but to provide any real value to supply security also interconnector capacity would have to be available for foreign resources during scarcity. However, it remains to be discussed how capacity could be reserved, or if it should be reserved at all. In theory, during scarcity in one country, all capacity into this market should be fully booked already, at least day-ahead. There could be interconnector capacity left during intraday or at balancing times, which then could be allocated to foreign strategic reserve capacities, however this still has to be shown.

Also coordination of dispatch can be beneficial among adjacent TSOs, for example to provide mutual support during scarcity situations. If foreign resources directly participate in neighboring SRs this would need to be coordinated by adjacent TSOs when having to activate respective national sources.

Experience for procurement of foreign resources does not exist as of today. In Belgium for example, the strategic reserve started being intensively discussed when ELIA started to get worried with CCGTs leaving the market. The regulatory response was to i) implement a strategic reserve which established the public tendering of around 800 MW ii) a lifetime extension of one nuclear plant against earlier odds iii) an increase in interconnector capacity plus iv) the development of demand side management sources.

However, all sources in the strategic reserve are domestic sources. ELIA engages in one year ahead probabilistic calculation of available capacity and establish how much safety margin and accordingly how much additional capacity is to contract. SR plants have to be connected to the control area of ELIA.

Effects on investment in renewables, demand response and distributed energy

Currently, all European power markets face a decreasing price of energy, and, following the major roadmaps, are in the long run converging to a market dominated by wind and solar power.

As for new investment in renewables, of course market prices respectively remuneration in capacity markets has to be appropriate – despite the current support, which will ultimately phase out, and is already phasing out in the years to come for very early installations. However, the uncertainty on detailed provisions of capacity markets create risks of fair and predictable remuneration in particular for intermittent renewable energy sources like wind and solar. At the same time through reduction of peak prices induced by comprehensive capacity mechanisms the revenue also for intermittent renewable energy sources from the wholesale market could decline.

It was debated whether thus capacity mechanisms are way of shifting revenue from certain technologies and firms to the system and discretion of regulators. In this vein, also the energy market reform in the UK has its objective for a holistic system perspective with i) capacity market ii) contracts for differences (off-shore fixed, on-shore auction) iii) a carbon price floor and iv) emissions performance standard (for new generation). Ultimately, future investments in the EU both in renewables and in conventional power will be to a high degree determined by the procurement rules for capacity and other mechanisms such as

contracts-for-differences of feed-in premia. It is not clear, however, how different ‘holistic national mechanisms’ collide or work together in addressing efficient investments.

With strategic reserves, technology choice for investment outside of the reserve is not impacted. However, the strike price of a strategic reserve may impact choices outside of the reserve. A very low price strike may preclude operation or reduce the revenue available to generation, demand response and storage from peak prices. However, very high strike prices or spot prices could increase the risk of regulatory intervention. Thus the determination of such a strike price requires not only a short-term but also a longer-term perspective on power system development. The Belgium SR as well as a Danish proposal at the moment include a strike price of 3000 Euro, while the Finish and Swedish SR design avoids the explicit determination of a strike price and dispatches the SR if the market does not clear at the price of the last commercial bid available in the market.

For demand response in particular, it was noted that the major regulatory requirement currently is to build a level playing field for all generation, including demand response. Given this, capacity markets may offer the advantage to attract demand resources simply because of more steady revenue streams compared to energy payments only. However, as technical characteristics of demand response – e.g. the duration of availability – differs from conventional generation assets, some differentiation may be warranted and could in turn create regulatory uncertainty about the sustainability of business models dependent on the revenue streams through capacity mechanisms.

Coordination at European level

All currently implemented and debated schemes are explicitly of a temporary nature. The explicit temporary nature might be merely reflecting an attempt to avoid violation of state aid guidelines, however may also show that the energy only market idea, as once envisaged during the liberalization, remains a relevant paradigm and capacity mechanisms are designed as corrective elements during transition periods.

This raises the question how to evaluate and coordinate capacity mechanisms. The Target Model for EU power markets under the third energy market is based on a philosophy of energy only markets and does thus also provide no guidance on capacity mechanisms. More recent guidance from the EU Commission comprises a set of criteria to test EU market compatibility of national capacity mechanisms, but does not describe a preferred type and design of a capacity mechanism. The differing requirements and preferences reflected in national capacity mechanism debates suggest that at the moment a common capacity mechanism might also be difficult to impose at the European level.

Given the often emotional national debates on capacity mechanisms, it seems warranted to provide more robust evaluation and quantification of benefits and drawbacks of national mechanisms and their interaction and coordination at regional level.

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