Position Paper by
European Energy Exchange AG

The Need for and Design of Capacity Mechanisms in Germany

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1. Introduction

At present, a discussion as to whether the European power market can safeguard a secure power supply in the long run is underway in Germany. There are concerns that the market might not be able to provide sufficient securely available capacity[i] without further government intervention. This could lead to a situation in which the demand cannot be covered if it is high and if the generation of power from renewable resources is low. And the further expansion of renewable energies will only add to the problem.

In order to prevent a possible shortage in covering the demand and, as a result, a controlled switch-off of consumers the introduction of capacity mechanisms is being discussed. This concerns supplementary market rules creating an artificial demand for a guaranteed capacity[ii] which would not evolve on its own.

The need for capacity mechanisms is explained on the basis of the specific characteristics of power as a commodity. At the wholesale level, the demand for power is not price elastic (or it only has a very low price elasticity) in the short run. This means that the market does not have information on the final power consumers' willingness to pay. As a result, demand cannot be rationed efficiently in the event of an insufficient provision of capacity – however, this would be the precondition for ensuring that the market provides the efficient volume of capacity, which is what is happening on other markets. But because efficient rationing is not possible, the requirement is established that the demand should not be rationed at all. This leads to a higher demand for capacity and it is doubtful whether the market can cover this demand on its own.

Moreover, the need for a capacity mechanism is explained on the basis of the risks which a potential investor for a new power plant project faces: On the one hand, power plants which operate as a back-up for weather-dependent generating facilities only generate power during a few hours of the year. When they do generate electricity however, it is sold at a comparatively high price. As a result, the revenue from the sale of electricity is volatile, which increases the risk for investors. On the other hand, political parameters with a significant leverage effect on the profitability of a power plant have to be anticipated, e.g. regarding the design of emissions trading or the future subsidisation of renewable energies. Moreover, the debate regarding a lack of investment incentives as such has led to restraint in making investments.

Finally, the implementation of capacity mechanisms in neighbouring countries has led to a situation in which additional capacities are being constructed there. This, in turn, increases German imports from these countries and lowers wholesale prices. Furthermore, this effect also reduces investment activities in Germany. Figure 1 shows the diversity of capacity mechanisms throughout Europe which are being planned or have already been implemented. Moreover, there is no uniform solution within the CWE region either. On principle, there are further models under which generation capacity can be directly or indirectly remunerated, e.g. through markets for control energy or interruptible loads, in addition to these mechanisms. Since we will focus on mechanisms for controlling investments in generation capacities which have a long-term effect below, these models are not shown in Figure 1. However, we also have to take account of the fact that the further development of markets for control energy, in particular, can also make a contribution to safeguarding the security of supply in the long run.

As explained in the paper outlining the key energy policy cornerstones of the European Energy Exchange (EEX) entitled “Factors for the Success of the Energy Turnaround: Market and Europe” of 18th June 2013, EEX is committed to free, competitive, supervised and transparent markets. For this reason, capacity mechanisms should only be introduced after a very thorough consideration of all risks and even then only in case market-economy mechanisms with a lower intensity of intervention have not led to the required results (“ultima ratio”). Instead, the potential of the energy-only market should be fully developed and utilised – in particular, through the flexibilisation of the demand, the integration of renewable energies and European integration.

The minimum requirements which a capacity mechanism (if such is required) should fulfil as seen from the perspective of EEX are specified below. Afterwards, capacity mechanisms which are currently being discussed will be assessed and their advantages and disadvantages as seen from the perspective of the exchange will be presented.

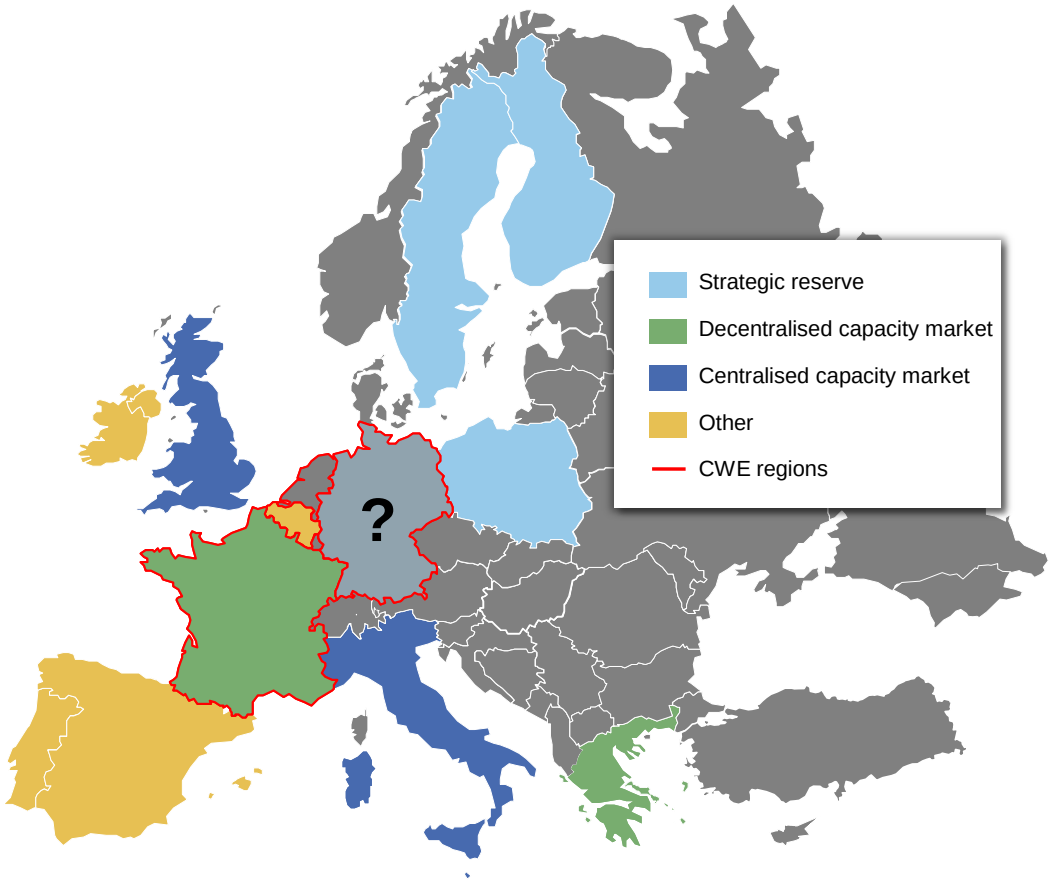

Figure 1: Existing and planned capacity mechanisms in Europe. Source: EEX

2. Minimum requirements for capacity mechanisms

At present, the question of whether a capacity mechanism is necessary in Germany cannot be answered conclusively. In view of efforts to ensure the capacity required to safeguard the peak load *nationally* the need for such a mechanism becomes more likely: The integration of the German power market into the European single market reduces the capacity which is needed for maintain-

ing the security of supply in Germany. And capacity mechanisms in neighbouring countries reinforce this effect. For this reason, a purely national approach will require over-capacities and, as a result, a capacity mechanism and lead to a more inefficient and expensive solution than would be required if a European approach were to be adopted. EEX is not convinced that capacity mechanisms are required to ensure the security of supply in Germany in a *European* context. First, the European Single Market should be developed, measures designed to improve energy efficiency should be taken, demand flexibility should be developed and renewable energies should be integrated into the energy market. And the introduction of a capacity market should only be considered after this – provided there is both a demand for new power plants and a lack of willingness to invest.

2.1. Strict unbundling of capacity and energy markets

Trading in or the remuneration of capacity should not have any impact on trading in power on the intraday, spot or derivatives markets. Even though it appears likely that a shift in border-crossing trading streams is unavoidable, any direct intervention in the short-term allocation, which would cause inefficiencies, should be avoided. In particular, any form of generation certificate should be avoided in shortage situations. After all, power outages do not arise today even though there is no generation obligation during periods involving a shortage; in those cases, power will be generated on a market basis during periods involving a shortage on account of the high prices in this situation.

2.2. No pursuit of secondary aims

The mechanism should only ensure that a defined level of security of supply is safeguarded. Secondary aims, such as the reduction of CO2 emissions, the promotion of flexible technologies, the integration of renewable energies, a shifting of rents or fighting potential market power on the wholesale market for power should not be addressed using a capacity mechanism but tackled separately.

2.3. European coordination of national mechanisms

Ideally, the question regarding the need for capacity mechanisms should not be answered for a single country but for Europe and a mechanism should be given a uniform design throughout Europe if possible. If this cannot be achieved, regional harmonisation, e.g. within the CWE region constitutes an improvement as against a purely national solution. In the case of national solutions (in the form in which such are currently emerging), the interactions with the European single market should, at least, be taken into account. Moreover, care should be taken to ensure that, overall, the national states do not procure too much capacity.

2.4. Full use of market forces

On principle, any capacity mechanism requires an intervention in existing markets by the state. For example, every intervention which is currently being discussed is based on the market players' obligation to procure capacity combined with a fine in the event of non-procurement. A market-based

mechanism should be limited to these two components of control in as far as possible, while as many features of the capacity mechanisms should be allowed to evolve on a market basis, such as e.g. the scope of the individual power plant technologies, the scope of the demand flexibility developed and the periods of time during which capacity is procured or traded. As a result, existing efficiency potentials can be used efficiently, e.g. through a strong integration of the demand side.

2.5. Equal treatment of existing and new plants

On principle, existing and new plants make the same contribution to the security of supply and should be given equal treatment as a result. This is also necessary because inefficient existing plants would be shut down otherwise. In addition, the selective support for new power plants would lead to a "slippery-slope" effect: Existing plants which are actually efficient would be forced out of the market by new subsidised power plants.

2.6. Regional measures to remedy congestion only as a transitional solution

Measures intended to remedy regional congestion, e.g. such as those measures provided for in the reserve power plant ordinance today, should only form a transitional solution until German and European grid congestion problems have been resolved. On principle, it is possible to consider congestion within Germany in the procurement of capacities under most of the capacities mechanisms discussed today. However, such a regionalisation can promote the reinforcement of congestion problems found today. Therefore, the expansion of the grids in Germany is urgently necessary with a view to the expansion of renewable energies in northern Germany since a lasting regional capacity mechanism would lead to further inefficiencies.

3. Requirements and effects of capacity mechanisms

The models which are relevant in the political discussion in Germany at the moment will be discussed briefly below. These comprise the *strategic reserve*, the *centralised selective capacity market ("focused" capacity market*), the *centralised comprehensive capacity market ("security-of-supply contracts"*) and the *decentralised capacity market*. In this process, these models will not be evaluated on the basis of a comprehensive presentation of all advantages and disadvantages but the evaluation will focus on those aspects which we consider to be most important.

3.1. Strategic reserve

The strategic reserve can make a short-term contribution to keeping in the market those existing plants which cannot cover their fixed costs on the market. At present, this is already done in the form of the so-called grid reserve according to the reserve power plant ordinance. The need for the grid reserve does not arise from the structural problems which we addressed at the beginning of this position paper but from grid congestion, which can lead to generation bottlenecks locally. Because of its inefficiency and lack of transparency, the grid reserve should only form a transitional solution.

As an instrument for the *procurement of new plants*, the strategic reserve is less successful than other capacity mechanisms. The strategic reserve is intended to ensure a defined target volume of overall available capacity (market + strategic reserve). A sensible design of such a strategic reserve requires existing plants and new plants to be allowed to participate in the procurement auction (or the tendering procedure) on an equal footing. As a result of the mechanism all existing plants whose cumulated contribution margins are lower than the capital costs of the most expensive procured new building project would move from the market to the strategic reserve. Therefore, a central authority would have to assess two aspects before the auction: the supply function for new building projects and the profitability of existing plants. The central authority would only be able to determine the volume to be procured, which would be correspondingly high, afterwards. However, because of the tremendous complexity of this task there would be a significant risk of over- or underinsurance so that neither effectiveness nor cost efficiency is ensured and that, as a result, it is very likely that these aims might be missed.

3.2. Centralised capacity market

On the *centralised capacity market*, a specified capacity volume is procured through an auction which is carried out centrally. The centralised capacity market can have a *selective* or *comprehensive* design.

- Under the selective version, the market is divided into capacities that qualify for support and capacities that do not qualify for support. This is based on secondary aims which are addressed in addition to the security of supply, such as e.g. a targeted promotion of certain technologies or a shifting of surplus. Based on its design such a mechanism is not cost-efficient – both in the short and in the long term. Moreover, in determining the capacity volume to be procured we encounter similar problems as in the case of the strategic reserve as a result of the segmentation. Finally, a “slippery-slope” effect (see above) can arise in selective mechanisms. For this reason, we do not recommend the introduction of a selective mechanism.
- If the mechanism is given a comprehensive design, all capacities can take part in the central procurement auction. This can include existing plants, new plants or demand-side response.

The proper consideration of existing plants forms the special challenge for a comprehensive capacity market. For reasons of efficiency care has to be taken to make sure that functional and cost-effective existing plants are not shut down in favour of more expensive new projects. For this reason, existing plants must be able to disclose their costs in the auction. This means that existing plants should be able to freely place bids in the auction – just like new plants. This is the only way that the required capacity payments for existing plants can be determined on a market basis.

On the other hand, large operators of existing plants have considerable potential for market power in the capacity auction. At the same time, it is virtually impossible to prove on an ex-post basis that market power was exercised. This is due to the very complex calculation involved in preparing bids and to the subjective assessment of relevant parameters by the market participants. For the same reason, sensible price caps for existing plants cannot be determined. The problem regarding potential exercising of market power in capacity auctions remains unresolved on the centralised capacity market.

On principle, the central procurement of capacity can, at least theoretically, bring about an efficient allocation. However, a number of obstacles which reduce efficiency have to be expected in the concrete implementation. On the one hand, the highly centralised structure of the model entails the risk that relevant parameters might be set incorrectly by the central authority. On the other hand, the capacity auctions have to be structured in terms of timing. And there is no optimum solution in this case – every conceivable scheme is heuristic and leads to a different structure of the capacity on the market. For example, the demand side response is potentially excluded for auctions which are too long term because demanders might not be able to sell the option for the load reduction over several years. If the term of the auctions is too short, however, new power plant projects with long lead times cannot be offered. For this reason, the question of how the timing of the procurement auctions can bring about an efficient allocation of capacities remains unresolved. Because of the problems cited we do not recommend the introduction of a central mechanism.

3.3. Decentralised capacity market

On the decentralised capacity market secured capacity is traded in a standardised form. Depending on the specific design, power consumers can or must procure certificates regarding secured capacity. As in the case of the centralised mechanism, existing plants, new plants and demand-side capacities can provide capacity and generate certificates as a result. The central authority checks both the procurement of secured capacity by the power consumers and the provision of capacity by the sellers of the certificates. Non-fulfilments are punished.

The decentralised capacity market is probably the most complex solution to be implemented. And even though, at first glance, the model promises to require only few decentralised specifications, a specific implementation of this model requires a high degree of centralised planning. The amount and the structure of the fines charged in case of non-fulfilment constitute the most important parameter to be controlled centrally. The fines indirectly determine the capacity volume which is brought about by the capacity mechanism.

Moreover, the question of whether a stable price for capacity certificates which provides a sufficient incentive for investors to safeguard a sufficient level of security of supply emerges has not been resolved. Under a given specific design it might be necessary to implement a security mechanism in the form of additional reserve capacity or in the form of centralised procurement auctions in order to guarantee the security of supply. This leads to further demand for centralised control.

However, the decentralised capacity market entails the major advantage of continuous and technology-neutral trading in capacity. Thus, the market participants themselves can determine the procurement period. As a result, capacity certificates can be traded both on derivatives and on spot markets. In contrast to a centralised mechanism, this can lead to the provision of secured capacity, which corresponds more closely to an efficient solution.

Finally, on the decentralised capacity market power consumers themselves assume the responsibility for their peak load (and its costs) which can create long-term incentives for lowering peak load. In our opinion, the decentralised capacity market is slightly superior to the centralised solution.

3.4. Comparison of the models

Figure 2 allocates the mechanisms discussed above in terms of the extent of the capacity included. Moreover, it shows our assessment of the efficiency of the mechanisms. The decentralised capacity market combines characteristics of the strategic reserve and of the centralised capacity market which lead to inefficiencies. On account of continuous trading the decentralised capacity market has advantages as against the centralised capacity market.

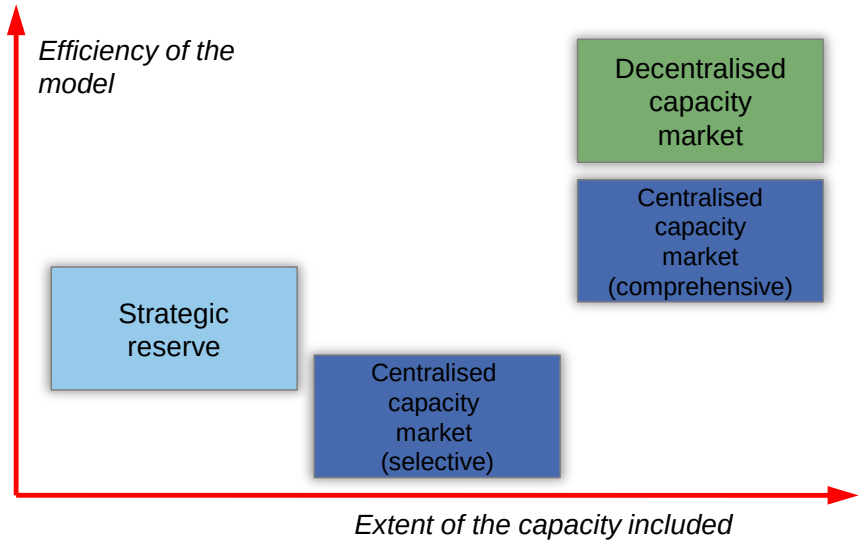

Figure 2: Classification and assessment oft he different mechanisms. Source: EEX

4. Conclusion

Safeguarding the security of supply at the national level is a political aim today. However, securing the security of supply nationally will probably require a capacity mechanism which could be dispensed with under a European approach. This is a conclusion drawn from the overcapacities of a national solution in a European context.

We are not convinced that a capacity mechanism will be required in Germany for the foreseeable future. And, in view of the complexity and of the unresolved problems of all the models, we advise against the introduction of such a mechanism.

We classify the models discussed today as follows:

- The strategic reserve is suitable as a short-term transitional solution for remedying cases of network grid congestion. However, it is inefficient and ineffective as a long-term mechanism.
- Centralised, selective capacity mechanisms also address secondary aims, in addition to the security of supply. This leads to inefficiencies which is why we reject selective mechanisms.
- As a long-term mechanism the centralised comprehensive capacity market is more effective and efficient than the strategic reserve. However, because of numerous parameters to be

determined centrally this mechanism is also prone to inefficiencies. Furthermore, significant potential for market power, which cannot be fought effectively, is created.

- If a proper design is adopted, market forces can develop their best effect in a decentralised capacity market. Continuous and technology-neutral trading in capacities and the sales organisations' direct responsibility for their customers' peak load lead to an efficient mix of power plant technologies, storage facilities or demand-side measures.

If the introduction of a capacity mechanism is to be considered, the decentralised version which is slightly superior to the comprehensive centralised version should be preferred. However, we are strictly opposed to a long-term strategic reserve or selective mechanisms.

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[i] Below we define all units in the power generation system which can provide positive capacity as capacities. This includes all power plants, storage facilities and the load reduction by means of demand-side response (DSR), etc.

[ii] We refer to the share of the nominal power of a capacity which is available with a sufficiently high likelihood at a certain time as the *secured capacity*.

Contact: Dr. Jan Richter
European Energy Exchange AG
Augustusplatz 9
04109 Leipzig
P: +49 341 2156 - 227
E-Mail: jan.richter@eex.com