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BDEW German Association of Energy and Water Industries
Reinhardtstrasse 32
10117 Berlin
Telephone +49 30 300 199-0
Fax +49 30 300 199-3900
Email info@bdew.de
www.bdew.de

Position Paper

Design of a decentralised capacity market

Berlin, 18 September 2013

Outline

Introduction

At the beginning of 2013, various stakeholders in the energy industry presented proposals for the creation of a decentralised capacity market. The background to these proposals is that, if the energy-only market (EOM) were to continue unchanged, it would increasingly jeopardise

- security of supply and
- the cost-effectiveness of the overall system.

At the centre of the proposals is the question as to the demand from electricity customers for guaranteed capacity. If the customers, or suppliers on their behalf, require more guaranteed capacity than can be financed through the EOM, a demand for an own capacity product arises.

Consequently, the core of all of the proposals assumes that the future of electricity supply comprises two components: the supply of electrical power **and** the supply of guaranteed capacity. The latter ensures the level of security of supply desired by the customer is provided. From these two components, two commercial products will develop:

- electrical power in the form of kilowatt-hours and
- guaranteed-capacity certificates (“capacity certificates”) in the form of kilowatts.

The capacity certificate ensures that the suppliers - and thus, implicitly, their customers - have capacity available to them **at any time and guaranteed**, up to the amount secured with the certificate. The suppliers only have to keep within these self-determined capacity limits in times of electricity shortage. As long as there is no shortage of electricity, electrical capacity can also be claimed beyond this limit.

The capacity certificate product thus represents the value of long-term guaranteed capacity which, until now, has not been represented by a product in the market and therefore has not been tradable. For the BDEW it is of great importance that the decentralised capacity market is designed such that smaller companies are not overstrained and thus the diversity of participants in the German market is secured long-term.

The goal of the capacity certificate model is that the guaranteed capacity demanded by the market participants is actually physically and cost-effectively available. The capacity certificate model is unable, however, to provide incentives for a regional differentiation in the supply of capacity or for the construction of new capacity at the "right" points in the network. Regional capacity balance is essential for system stability. For this purpose, a separate instrument could be necessary, in addition to the introduction of the capacity certificate model, such as a network reserve.

The BDEW has examined these proposals in detail and further developed them into a model which is implementable in practice ("capacity certificate model"). This document, which is intended as the foundation for the on-going decision making process surrounding a new electricity market design, presents the results of this analysis in detail.

As much market as possible - no more regulation than is necessary

An essential characteristic of the decentralised capacity market is that no state regulator prescribes, in the manner of a planned economy, the guaranteed generation capacity to be held available and then distributes the costs independently of the originator of the requirement. Instead, the total volume of capacity certificates which need to be held is defined by the actual demands of electricity customers and financed according to the originator of the demand. In addition, the capacity certificate model provides considerable freedom to include demand flexibilities which can reduce the demand of electricity customers in times of shortage.

In order to obtain a correct response to the core question of "How much guaranteed capacity is actually required?“, there must be a financial incentive. This incentive consists of a penalty which ensures that the suppliers obtain and hold sufficient capacity certificates for their customers. Sellers of capacity certificates are operators of guaranteed electricity generation capacity. They commit themselves, with the sale of a capacity certificate, to make electricity available in times of shortage.

With the liberalisation of the electricity market, the electricity customer was given the product, "security of supply", free of charge. This was also logical, since, in 1998, the German power station fleet only comprised generation units which fed-in power reliably. As a consequence of the ever more extensive use of intermittently generating renewable energies, reliable feed-in power stations have to supply the ever more fluctuating residual load. In a decentralised capacity market, the ability to supply guaranteed capacity at any time, so crucial for the security of supply, is given a value.

The customer, as a demander of guaranteed capacity, can choose to have a certain degree of flexibility in his electricity consumption and thus reduce the requirement for guaranteed capacity and the associated costs. If the customer opts for full supply, there is no reduction in the availability of electricity in the capacity certificate model.

The decentralised capacity market exclusively serves the provision of security of supply

A number of the capacity market models currently being debated pursue further objectives in addition to that of security of supply, in particular the promotion of particular power plant technologies to support the CO_2 reduction targets. The advantage sought in this way is revealed, upon closer inspection, to be a disadvantage: firstly, existing plants would be replaced by new - highly subsidised - plants, which have no advantages in terms of security of supply compared to the original plants. Secondly, there would be an effect on the instrument, "emissions trading", intended for the achievement of the CO_2- reduction target. The new, low emissions plants would reduce the demand for emissions permits. The resulting reduction in price would increase the competitiveness of higher emitting plants and thus counteract the desired additional emissions reduction.

As a market-wide mechanism, the decentralised capacity market preserves competition

Selective capacity mechanisms cause the part of the power station fleet, which is least economically viable, to receive additional income and thus remain on the market. This leads to a deterioration of competitiveness of the plants not covered by this subsidy mechanism, so that these will also require support, sooner or later, in order to prevent their being shut down. Ultimately, there would be a completely regulated model, in which all generation plants receive subsidies. Bidding competition would cease to exist.

In contrast, the introduction of capacity certificates pursues the aim of creating a demand for the product, "guaranteed capacity". This would mean that all providers of guaranteed generation would compete for customers who are prepared to pay for guaranteed capacity. The price for guaranteed capacity would then be set in a free and non-discriminating competitive process between all providers of guaranteed capacity. That would ultimately lead to a very cost-efficient provision of guaranteed capacity due to, amongst other things, existing generation capacities not having to be replaced by expensive new investments. In the long term, technologies would prevail which most efficiently meet market requirements. Regulatory interventions would not be needed.

Functional simplicity of the decentralised capacity market

A central building block of the capacity market proposed by the BDEW is the existence of guaranteed capacity certificates. These can be issued by power stations or storage operators which are able to make capacity available as required. Suppliers are obligated to hold sufficient capacity certificates, in times of shortage, to meet their demand. They can acquire these from capacity certificate issuers or substitute them with demand-side management measures. A penalty ensures suppliers and certificate issuers comply with the system.

Low costs through standardisation

A key element, for the efficient achievement of security of supply, is the standardisation of capacity certificates. This would enable them to be traded between market participants with low transaction costs. For the execution of trades, an exchange such as the EEX would be suitable. Similar to other commodities such as electricity or CO_2, it will be possible to trade capacity certificates in advance. This creates transparency concerning future shortages and thus sufficient time to create new capacity where necessary. Investors are thus exposed to the normal risk that the market will not develop as assumed at the time of the investment decision.

The decentralised capacity market is feasible

The regulatory input required in centralised models is, in the decentralised capacity market, largely replaced by contractual agreements between end consumers, suppliers / traders and providers of guaranteed capacity. As it is essential for the proper functioning of the decentralised capacity market, that all market participants fulfil the obligations they enter into, compliance must be regularly checked. Aside from costs of these checks, the complexity of the capacity certificate model, in particular when compared to centralised models, is kept to a minimum.

The BDEW advocates a model which minimises regulatory intervention and central planning elements and thus rejects state control of volumes. State volume control has shown itself, in other electricity markets, to be extremely complex and as leading to inefficiences which increase costs such as the creation of excess capacity as well as to rigid demand which is not responsive to the current generation situation. A central body does not have a superior ability to estimate the future development of demand and supply of capacity - i.e. the behaviour of market participants.

The decentralised capacity market supports and promotes the completion of the European internal market

The inclusion of foreign capacities is possible. The only requirement is that foreign market participants have acquired the respective physical transmission rights (so-called PTRs). At the same time, it is possible for German power plants to participate not in the decentralised capacity market but in a capacity mechanism of a neighbouring country - provided that the cross-border coupling capacity allows the physical delivery of electricity and that the simultaneous multiple sale in both countries does not occur.

In particular, it should be stressed that the BDEW proposal is not solely limited to Germany but could be implemented, without any major hurdles, at least in all countries within the market coupling regime which exists at the time of implementation (currently, for example, in Central Western Europe).

Conclusion

In order to ensure security of supply as the basis for economic growth and prosperity, the decentralised capacity market creates a suitable, sustainable framework for private investment. This framework is, in particular, also sufficiently robust in respect of the expected changes to the market environment - implementation of the German energy transition and the EU Roadmap 2050.

1 Core elements of the capacity certificate model

1.1 When is the capacity mechanism triggered?

In the capacity certificate model, the demand for guaranteed capacity is not set by a central regulator in a planned economy manner, rather it is based on demand, i.e. the demand-side must articulate its guaranteed capacity requirements in the market place.
The amount of demand is thus set by the customer as the end consumer.

In order to take into account coincident effects, only the capacity demand aggregated on a balancing group level must be secured through capacity certificates in cases of shortage. The responsibility for this lies with the balancing group managers.

As suppliers (usually identical to the balancing group managers) are in competition with one another, an efficient process in relation to the volume and costs of the capacity certificates is set in motion (and not determined by a central regulator).

As long as no excess capacity exists, investment conditions are improved for the providers of guaranteed capacity as the costs for the provision of capacity no longer have to be covered by the EOM. Rather, costs can be additionally compensated according to demand via the capacity market.

Capacity certificates can only be offered by generators who can also deliver electricity in times of shortage. The providers earn revenues through the demand from end consumers for guaranteed capacity certificates, usually aggregated through the electricity suppliers. This triggers the flow of payments, via the market instrument, from the demand to supplier side.

It is essential for the operation of the capacity certificate model that in times of electricity shortage, the utilisation of electrical capacity is limited to the amount guaranteed through the capacity certificates and that the sellers of capacity certificates feed-in, in times of shortage, power according to the number of certificates sold. This leads to the following regulatory requirements:

- Amount of the penalty if in the case of shortage
    - more power is drawn from the system than is guaranteed via the capacity certificates or
    - less capacity is provided than is sold through capacity certificates.
- Method and time of checking that the participants are complying with their obligations.
- Definition of shortage.

The BDEW supports the notion that a market based, unbureaucratic and objective, factual definition of shortage is a high price in the day-ahead-market. The price level should be chosen such that the EOM is affected as little as possible and that the demand-side flexibility potential can be raised. When the defined price is reached, the electricity drawn from the system must be reduced to the level secured by the capacity certificates and the sellers of the certificates must offer electricity from their generation plants at least in the volume of the capacity certificates sold.

Alternative definitions, such as the peak load of the consumers allocated to the balancing group or the highest residual load of the balancing group, have the big disadvantage from a supply perspective that they are only known ex-post. It is conceivable that, in addition to the day-ahead price, the intraday price could also be used as a shortage signal.

In order to counter speculation by market participants that the "shortage price" will not occur, sellers of capacity certificates and the balancing group managers have to prove that they are able to fulfil the obligations they have entered into.

If a shortage occurs despite the efforts of the market participants, for example due to unexpected failures of operational resources or incorrect RE generation forecasts, then the shortage of capacity will be balanced, as it is today, by the TSOs using control energy. Independent of that, the factors which led, in February 2011, to power balancing problems have to be resolved.

1.2 Who declares that an electricity shortage exists?

The declaration that a shortage of electricity has occurred plays an extremely important role. This determination firstly means that the sellers of capacity certificates are obligated to offer electricity supply from physical generation units in the volume reflected in the capacity certificates they have sold. Secondly, balancing group managers are obligated, upon declaration of an electricity shortage, to limit the usage of their balancing group to the volume secured by the capacity certificates.

If, as suggested in point 1.1, the day-ahead price is used as the sole criterion for "electricity shortage", then a separate declaration is unnecessary. Electricity shortage is said to arise - by definition - when the clearing price on the day-ahead market published by the EPEX reaches the predefined limit.

1.3 Do capacity certificates have to be standardised?

A capacity certificate is a product which represents the value of long-term guaranteed capacity. Maintaining liquidity in capacity certificate trading requires that the certificates are standardised and that their price is independent of the control area and of the generation technology providing the energy. Every seller of capacity certificates who offers guaranteed capacity for a set time period receives the uniform market price determined through trade.

In addition, capacity certificates are always based on the feed-in capacity in the public network, as the purchasers of capacity certificates secure the power to be drawn from the public network. A self-supply generation plant, which does not feed-in to the public network, is thus not able to issue capacity certificates. Such a plant can, however, quite possibly reduce the number of capacity certificates needed.

The capacity certificate model does not provide for the creation of certificates offered by the demand-side. The main reasons for this are:

- In the capacity certificate model, the demand-side already benefits from the fact that no capacity certificates have to be obtained for any potential reductions in capacity.
- The creation of capacity certificates for capacity reduction, could, in certain circumstances, stimulate unnecessary energy consumption (electricity could be consumed, purely in order to be able to reduce consumption in times of "shortage").
- What would essentially amount to double remuneration (revenue from capacity certificate sales and no necessity to procure capacity certificates) would not be right and proper.

1.4 What period of validity should capacity certificates have?

The number of tradable products should initially be limited in order to enable liquidity in trading markets. In order for power plant operators to be able to take into account the planned availability of their power stations so that, for example, they do not have to book reserve capacities for the time period of the planned revisions, it is proposed that capacity certificates are initially issued for a standard period of one calendar quarter.

If there is a requirement beyond this for capacity certificates with shorter (e.g. month, week or day) or longer (year) validity periods, then a corresponding market for these will develop.

The time unit for exercise of a capacity certificate would be the standard market time unit in energy trading, i.e. currently one hour.

1.5 How should the implementation of a capacity market be designed?

At present, guaranteed capacity is not yet scarce. The introduction of the capacity certificate market should be linked to conditions, the details of which are still to be defined. These include, in particular, the actual need for a capacity market on a European scale as well as criteria for exactly when to introduce it to optimise the benefits to the economy.

Nevertheless, the regulatory framework for the introduction of the capacity market model should be created today so that it is available in the event the mechanism is activated at short notice. This is necessary because once the need has been ascertained, swift action is required for the purpose of maintaining security of supply.

Otherwise, following activation, an actual demand is needed for a significant price for capacity certificates to be reached. In the case of existing excess capacities, this market based model would at best result in an extremely low price for guaranteed capacity.

An essential point for the statutory regulation is the obligatory introduction of guaranteed capacity certificates. Beyond that, further regulation is needed, for example, in the establishment of a central register for the administration of capacity certificates.

2 Providers of capacity certificates (generators, storage)

2.1 What requirements should be made of sellers of capacity certificates?

Capacity certificates can be sold essentially only by generation units and storage, independent of the technology used and independent of whether the seller is an existing or new plant. A fundamental requirement of sellers of capacity certificates is that they offer electricity on the market or feed-in physical electricity in the volume equivalent to the capacity certificates they have sold.

Further requirements to be imposed on capacity certificate sellers would, in particular, address organisational and informational issues. They would have to, for example, ensure sellers are bound to the register for the purpose of capacity certificate administration.

However, a pre-qualification of individual generation plants by transmission system operators as a requirement for the sale of capacity certificates, equivalent to the technical pre-qualification for participation in the balancing energy market, is not necessary. In order to avoid possible abuses, a credit check would make sense.

2.2 Could capacity certificates also be offered by foreign generation plants?

Foreign capacities can participate in the capacity certificate system, provided the sellers ensure that the capacities made available on the foreign market fulfil the same criteria as those which domestic sellers fulfil. The criteria for fulfilment of capacity certificates covered from abroad is basically the registered, cross-border schedule.

As this requires the securing and nomination of physical transmission rights (PTRs), foreign secured generation capacities have less incentive to offer capacity certificates than domestic capacities. It should be noted, however, that a general discrimination against foreign providers does not exist within the capacity certificate model.

If the physical transmission rights are abolished, and cross border electricity supply only has to be settled financially, foreign generation units would only implicitly, as in the current French model purely mathematically, be considered.

2.3 Are generation units obligated to offer capacity certificates?

The possibility of earning additional profit margin constitutes a typical market incentive for power station operators to offer their capacity also on the capacity certificate market. There is thus no solid reason for introducing an obligation to issue capacity certificates. Furthermore, such an obligation would lead to a substantially greater testing and checking cost which would in no way be proportionate to the benefits gained from such an obligation. Therefore, the operators of generation units should have the right to offer capacity certificates but no obligation. The prevention of possibly abusive practices is, just as in other markets, the responsibility of the German Federal Cartel Office (Bundeskartellamt) or its Market Transparency Unit (Markttransparenzstelle).

2.4 How will the guaranteed capacity provided by a capacity certificate seller be determined?

With the purchase of a capacity certificate, the purchaser obtains the right to draw power at any time, equivalent to that covered by the respective certificate. Thus, sellers of capacity certificates must be able to make capacity available at any time, equivalent to that covered by the capacity certificates sold. Otherwise, the objective of the capacity certificate model, namely "security of supply", could not be achieved. This means that sellers of capacity certificates must guarantee one hundred percent availability. In order to achieve this, they must have a physical reserve available for technical outages and revisions, either within their own installations or via reserve agreements with third party plants. Alternatively, there is the possibility of buying back capacity certificates from the market.

In the case of a plant portfolio, the availability of the individual plants is not important, rather the availability of the entire portfolio.

2.5 How can it be ensured that sellers of capacity certificates actually provide the respective guaranteed capacity?

In principle, the marketing of electrical energy produced by capacity certificate sellers is undertaken independently of the marketing of capacity certificates.

In order to achieve the objective of "security of supply", pursued with the capacity certificate system, it is essential that in times of electricity shortage, the generation plants which have sold guaranteed capacity (through the certificates) can feed-in physical electricity. In return for the additional income generated by the sale of capacity certificates, the plant operators are obligated to make at least the volume of electricity available as is covered by the capacity certificates they have sold.

If, at the time of electricity shortage, the seller of capacity certificates has sold its production for future delivery, then, in order to fulfil its supply obligation (kWh), it must do so through physical delivery from its generation plants. The plant operator would thus have implicitly fulfilled its feed-in obligation.

If the seller of capacity certificates has not marketed its production at the time of electricity shortage, then it is obligated to offer the electricity from its generation plants on the day-ahead market.

Even in a capacity certificate system, the prices on the day-ahead market are set freely. In order to avoid a situation whereby a seller of capacity certificates earns proceeds from the sale of capacity certificates and then, in times of shortage, offers electricity at such a high energy price that it is not accepted in reality, a rule should be applied which requires a prequalification for bids in excess of the day-ahead price level defined under point 1.1 as the indication of electricity shortage, in order to ensure the availability of the seller. The same should apply for demand-side flexibilities which are offered at a price above that defined in point 1.1.

Thus, in times of shortage, every seller of capacity certificates must be able to generate electricity, whereby the total capacity must at least equal the volume of capacity certificates sold. This ensures that security of supply is intrinsically guaranteed at all times.

2.6 Will the seller of capacity certificates be penalised for not generating or offering electricity in times of shortage?

In the capacity certificate model, the penalty plays a crucial role. Firstly, the objective of "security of supply" can only be achieved if all sellers of capacity certificates are able to feed-in electricity in the volume of the capacity certificates they have sold. Secondly, the pre-qualification requirements on the capacity certificate sellers are very low.

The capacity certificate model consciously does not include a "volume control" element to induce additional margin of security, as that type of "volume control" constitutes a stronger regulatory market intervention. Therefore, the level of the penalty for capacity not provided by plant operators at times of shortage should encourage a margin of security to be incorporated. Ultimately, the level of the penalty for non-fulfilment will control the margin of security. The higher the penalty, the larger the margin for security will be.

The basis for calculating the penalty is the positive difference between capacity certificates sold, in kilowatts **and** the actually offered or actually fed-in electricity in kilowatts, for each hour the electricity shortage persists.

Probability theory considerations show that an effective and efficient penalty would be set at a multiple of the capacity certificate price. The key advantage of using a multiple of the capacity certificate price is that the margin of security is independent of the capacity certificate price. In the case of a fixed penalty, the margin of security would fall as the price of capacity certificates rise.

As capacity certificates have a standard validity period of one calendar quarter, it would be logical to take the capacity certificate price which applies for the quarter of the respective violation as the basis for the penalty. This price is calculated as the average of the closing prices on all trading days of the current quarter.

As non-compliant behaviour of a capacity certificate seller ultimately leads to increased balancing power costs for the TSO, the TSO should receive the penalty payment. In this way, the end customer also implicitly benefits, via lower network charges, from the penalty.

At present, the only open issue is who will check whether the sellers of capacity certificates have fulfilled their commitments in the case of shortage and who calculates any penalties which might be due. It is conceivable, for example, that the capacity certificate seller would present the body which administers the capacity certificate register with proof of the power offered or actually fed-in by the seller at the time of shortage. The administrator of the capacity certificate register could then check whether this value corresponds to the number of capacity certificates lodged by the seller in the register at the respective time.

2.7 Will capacity certificates be financial instruments and thus subject to monitoring outside the energy industry?

Capacity certificates represent contractually guaranteed capacity from power stations. Their use depends on factors within the energy industry. It is clear that only existing capacity will play a role in the issuing of capacity certificates. The application of financial market regulation, namely that providers of capacity certificates would have to obtain a banking license or use the services of a financial institution, would predominantly lead to undesirable regulatory developments. The supervision of the integrity of the capacity certificate market would already be within the remit of the German Federal Network Agency and ACER, as well as the market transparency unit which is soon to commence work.

Financial instruments are defined under current regulations (MiFID) as being traded on regulated financial markets, executed by cash settlement or exhibiting the characteristics of derivatives.

The design must therefore ensure that capacity certificates are not traded on financial markets, that they require physical settlement and that they are clearly differentiated from derivatives. This has certainly been ensured in the current draft, which means that financial market regulations do not apply.

The German Federal Government is planning (coordinated through the German Ministry of Finance, BMF), however, to define all futures transactions as financial instruments and thus advocates the current amendment to MiFID. If these proposals are accepted, capacity certificates would definitely become financial instruments. In this case, an explicit exception for capacity certificates would have to be included in the legislation.

3 Consumers of capacity certificates (suppliers)

3.1 How would suppliers calculate the number of capacity certificates it requires?

Balancing group managers are obligated to procure capacity certificates with a volume equivalent to the power they require in times of shortage. In addition, the suppliers must anticipate when electricity shortages could occur and how high their demand for guaranteed capacity is at that point.

The advantage of this approach is that both the supply of capacity certificates and the demand for them relates to times at which electricity shortage exists. Power stations thus sell as many capacity certificates as suppliers demand for times of electricity shortage. Hence, supply and demand are perfectly aligned and security of supply is ensured.

3.2 How is it ensured that suppliers acquire sufficient capacity certificates?

In the capacity certificate model, the penalty plays a key role as the objective of "security of supply" requires all participants to comply with the rules. The principles already laid out in point 2.6 above in respect of sellers of capacity certificates who do not fulfil their obligations should be similarly applied to balancing group managers who do not reduce their use of power in times of electricity shortage to the amount secured by capacity certificates.

A penalty will be applied, in times of electricity shortage, for power drawn from the balancing group, for which the balancing group manager has not acquired capacity certificates. The basis for calculating the penalty will be the difference, in times of shortage, between the physical feed-in and draw-off of power in a balancing group. For this purpose, the physical power fed-in and covered by the capacity certificates sold, is eliminated from the balancing group. The penalty will be applied to the remaining volume of energy discharged, in times of electricity shortage, which is not covered by capacity certificates.

The level of the penalty is equivalent to that defined in 2.6. The recipient of the penalty here should also be the transmission system operator, for the reasons given in point 2.6 above.

In this case also, a statistical analysis concludes that a sensible penalty would be a multiple of the capacity certificate price. The reason is, that a supplier will seek the minimum probable total cost of capacity certificates and penalties together. The purchase of additional capacity certificates heavily reduces the expected value of the penalty. If further capacity certificates are procured, the costs of the additionally purchased capacity certificates will exceed the amount of the expected penalty. For the supplier, the payment of a penalty becomes more attractive than the purchase of further capacity certificates.

A fundamental problem is that the day-ahead price above which, by definition, electricity shortage exists, only rarely occurs. In the last four years, there were only 128 hours where prices exceeded 100 €/MWh. A price of 250 €/MWh was not exceeded at any point during this period.

If it can be assumed that the shortage signal will not occur for long periods of time, this becomes a strong incentive for suppliers not to cover their demand with sufficient capacity certificates. They would speculate that electricity shortage occurs so rarely that the costs of the penalty which then falls due is lower than the costs of system compliant purchases of capacity certificates. The resulting low demand would lead to falling prices for capacity certificates which would jeopardise the functional capability of the capacity market.

If enough market participants do not act in accordance with the rules, this could lead to a situation whereby insufficient physical generation capacity would exist to cover physical energy demanded in a real time of shortage. As a consequence, end consumers would have to be switched off against their will in order to avoid a large-scale blackout. Security of supply would no longer be comprehensively guaranteed.

One possible method for eliminating incentives for market participants, who speculate that no shortage signal will occur, is to send an artificial shortage signal, if no "natural" shortage signal occurs ("test drill").

The artificial shortage signal should be set by an independent body. The warning time for the artificial signal should reflect that of the "natural" signal and should only be sent in times of high demand.

A correctly parameterised penalty is enough to efficiently ensure that sufficient guaranteed capacity is provided across the market in the capacity certificate model. In order to address possible concerns that during the initial phase of the capacity certificate model, the penalty set might not represent a sufficient guarantee of security, guaranteed generation capacity could be provided outside the market as an additional, physical reserve which would only be used on request of the transmission system operator. For this purpose, a strategic reserve which had been set up in advance could be used. This would then be abolished as soon as it was proved that it was no longer needed.

3.3 Do suppliers' products for temporary limiting of power need to be standardised?

The potential for flexibility gains will only be wholly increased when the suppliers offer products which are individually tailored to the needs of customers. This can be achieved either through standardised products for specific customer groups or through individually adjusted products.

3.4 How will the power balancing of the balancing group manager be checked?

For the purposes of checking the power balancing, the balancing group coordinator (usually the TSO) would be a logical choice as the balancing coordinator calculates the power withdrawn from the balancing group in the scope of the balancing group account anyway.

In addition, the balancing group manager reports a "capacity certificate time series" to the balancing group coordinator. In this way, the coordinator has all information on hand to check, in the scope of the balancing group account, whether the sum of the power used by the end consumers in a time of shortage was covered by capacity certificates.

For all of the balancing groups which exist today, the respective balancing group manager would procure capacity certificates. In cases of electricity shortage, the balancing groups of each balancing group manager in all four German balancing zones have to be considered altogether. In this context, there is the possibility of trading capacity certificates on an ex-post, cross balancing zone basis and to reallocate them between balancing groups. The latter can, for example, take place monthly in the scope of the BaBIS processes (BaBIS = market rules for the settlement of balancing group accounts in respect of electricity).

The balancing group manager is said to be acting within the rules if, in the case of shortage, the end consumers do not draw-off more power from the balancing group than is covered by the capacity certificates allocated to it.

3.5 What must the balancing group manager do in cases of electricity shortage?

If electricity shortage exists, the balancing group manager is only entitled to draw-off power from its balancing group for which it holds capacity certificates. That means, it must inform those end consumers of the power limitation, with whom it has entered into respective contractual agreements. The allocation of the guaranteed capacity to the various drawing-off points, is the sole responsibility of the balancing group manager.

3.6 How will the voluntarily contractually agreed power reduction of customers be undertaken?

The highest principle is that in the capacity certificate model, no end consumer can be switched off against his will or be restricted in terms of the power demanded. The utilisation of power by full-supply customers will not be reduced nor interrupted even in times of shortage.

A power restriction will only be applied to customers with whom this option has been explicitly, contractually agreed. These agreements also regulate the information process and procedures bilaterally, whereby the signal for a power reduction comes from the supplier or the balancing group manager.

As it is of great importance for the security of supply and system stability that power is actually reduced to the level secured by capacity certificates, the voluntarily agreed power reduction or, where necessary, interruption must occur physically. If the customer violates his contractual obligations by - contrary to the agreement entered into with the supplier - not reducing its power upon request, this would be settled within the relationship between supplier and customer.

One of the key advantages of the proposed capacity certificate mode is that it enables the suppliers to offer new products which increase the existing flexibility potential amongst end consumers and thus promises a higher benefit to the economy as a whole.

Within the scope of the capacity certificate mode, there is no provision for checking individual customers for compliance with power limits. Rather, tests are only carried out on the aggregated level of “balancing groups” to ascertain whether the draw-off allocated to the balancing group is covered by capacity certificates.

4 Pricing of capacity certificates

4.1 How is the price for capacity certificates formed and how transparent is the pricing process?

The price for capacity certificates is set on the exchange according to the formalities published there. Thus, maximum transparency and control is guaranteed. In addition to trade on the exchange, capacity certificates can also be traded over the counter (OTC).The prevention of possibly abusive practices is, just as in other markets, the responsibility of the German

Federal Cartel Office (Bundeskartellamt) or its Market Transparency Unit (Markttransparenzstelle).

4.2 Will a futures market price for capacity certificates be formed which offers investors sufficient security for their long-term investments in generating capacity?

The balancing groups are obligated to procure capacity certificates in the amount of their load in cases of electricity shortage. Thus, the demand for guaranteed capacity is provided long term and is predictable. The power station investor can thus assume that his product, "guaranteed capacity", will also be demanded in the long-term, provided this is not changed through politically promoted market alterations. The estimated risk of the market disappearing due to a collapse in demand, as can often be witnessed in other industries, is lower. The risk that third parties might be able to offer the product, "guaranteed capacity certificate", at lower cost (e.g. due to technical advancements or better cost management) is a fundamental feature of every competitively organised market and leads to cost-efficient results.

5 Effects of the current market design on the generation fleet

5.1 Which effects does the model have on existing plants?

As long as only a financing deficit exists in respect of existing plants and no general excess capacities are present, existing plants remain in the market. If excess capacities exist, these will be reduced as a result of lower prices in the capacity certificate model. In connection with the equal treatment of new and existing plants, this ultimately leads to a very cost efficient provision of guaranteed capacity. Contrary to models like the selective capacity market, existing low-cost generating capacity must not be replaced by expensive new investments.

5.2 How are the costs of the capacity certificates passed on?

The costs of the capacity certificates are priced into the end customer products in the scope of competition. This reveals the willingness of end customers to pay for security of supply and creates a strong incentive for increasing the flexibility potential of final consumers.

5.3 What happens to capacity certificates whose generation units are shut-down within the validity period?

A situation cannot be ruled out in which capacity certificates are sold for future delivery but the generating unit on which the certificate is based is no longer in operation at the respective exercise date. As the seller of a capacity certificate promises, in return for the payment of the purchase price, to offer or physically feed-in power in cases of shortage, the seller must, in the case of shut-downs, procure "replacement", e.g. through buying back capacity certificates

in the capacity market. The following applies: Once issued, i.e. sold, capacity certificates cannot be withdrawn again.

5.4 If windfall profits have been generated in this model, how are these to be treated?

All power stations, which offer the product, "guaranteed capacity" in the same quality, receive the market price for this product. The principle is: "Same pay for same products". Just as the income of the power plants, which have hitherto been operated in the base load, from the EOM falls with increasing RE development, their remaining in the market place is increasingly dependent on a secondary income from the capacity market.

A key weakness of technology discrimination would be that this would lead to high costs, in addition to the considerable regulatory cost, to be borne by the national economy. If only new generating plants with high overall costs were permitted to earn an additional income from the capacity market, existing plants operating at lower costs would be pushed out, at great expense to the economy. Deciding against differentiating between plants is efficient.

6 Effects on flexibility: How will the growing need for flexibility (steeper curves and larger strokes of residual load) be covered?

A distinction must be made between balancing capacity and guaranteed capacity. The provision of flexibility is primarily the responsibility of the balancing energy market which already exists today, namely the spot market and the intraday market. In contrast to that, the capacity market should ensure, through the capacity certificates, that enough secured generating capacity is provided.

There are currently no indications to suggest that the balancing energy or spot market will not be able to master the increasing demands in flexibility. If there were, then adjustments to the balancing energy market would be necessary, or the introduction of an additional instrument to guarantee the required flexibility.

7 Market roles & effect on the EU internal energy market

7.1 Who bears ultimate responsibility if an electricity supplier has not purchased sufficient capacity certificates to cover its needs and customers must be switched off?

Whether a supplier has procured sufficient cover through capacity certificates can only be determined ex-post. In this case, the supplier will be penalised accordingly. This has no immediate effect on the suppliers' customers. In particular, customers will not be switched off as a consequence.

7.2 How should imports and exports be handled?

Foreign trade in electricity is not affected by the domestic capacity market and is performed, as it is today, according to the rules of the market coupling regime. Accordingly, the lower priced market territory supplies the higher priced market territory until either prices have equalised or the capacity of the interconnection points is completely exhausted. Foreign trade in the market coupling system is organised according to day-ahead prices.

7.3 Does the model breach EU state aid rules?

Any aid granted by the state or through state resources in any form whatsoever, which distorts or threatens to distort competition by favouring certain undertakings or the production of certain goods, insofar as it may affect trade between member states, is incompatible with the internal market. The market design presented here, with guaranteed capacity certificates, is no capacity mechanism as per EU state aid rules, as no state regulations on capacity are defined and no state payments are made to power station operators. Therefore, European Union state aid rules are not applicable to the proposed market design.

Contact person:

Dr. Stephan Krieger
Strategy and Policy Division
Telephone: +49 30 300199-1060
stephan.krieger@bdew.de

Mario Meinecke
Strategy and Policy Division
Telephone: +49 30 300199-1066
mario.meinecke@bdew.de