

Supporting document for the Danish TSO, Energinet, of the Nordic Capacity Calculation Region proposal for splitting long-term cross-zonal capacity methodology in accordance with Article 16(1) of Commission Regulation (EU) 2016/1719 of 26 September 2016 establishing a guideline on forward capacity allocation.

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1. Introduction and executive summary

This document is the supporting document for the Nordic methodology for splitting long-term cross-zonal capacity (hereafter “MSR”). The document describes the MSR for the long term time frame for the Nordic Capacity Calculation Region (CCR). The intention of this document is to provide an explanation, background and motivation for the proposed legal text of the MSR. In the time of writing Energinet is the only TSO within CCR Nordic that is issuing transmission rights, which is why the MSR will only be submitted to the Danish National Regulatory Authority (NRA). The other TSOs within CCR Nordic have exemptions from the MSR in accordance with Article 30 (7) of the Commission Regulation (EU) 2016/1719 establishing a guideline on forward capacity allocation (FCA Regulation). Even though only Energinet in CCR Nordic will submit a proposal for approval with their NRA, the proposal has been presented to the other Nordic. Energinet has not received any objection to the proposal.

1.1 Proposal for the Splitting rule

With regard to the FCA Regulation Article 16, Energinet is proposing to introduce the MSR for capacity allocated to the long term timeframe. In accordance with Article 16 (2) the MSR shall

- meet the hedging needs of the market,
- be coherent with the capacity calculation methodology, and
- it shall not lead to restrictions in competition, in particular for access to the long-term transmission rights.

Energinet proposes a two-element approach for calculating the amount of long term transmission rights (LTTRs) for the time frames offered. The first element is about managing the risk of in-efficiency from the underselling of LTTRs. The second element divides the economically efficient volumes between the timeframes given by the Regional Design of LTTR, developed under FCA Article 31.

2. Motivation for the articles in the Splitting Rule proposal

This chapter presents explanations for the proposed MSR articles. The aim of the chapter is to provide an explanation and motivation for the content of each article.

2.1 Article 3 “Applying of capacity calculated for the long-term time frame”

This article ensures that the MSR proposal lives up to one of the requirements stated in Article 16 (2). Article 16 (2) states that the MSR proposal shall be coherent with the capacity calculation methodology. In article 3 this coherence is ensured, by taking the point of departure in the capacities calculated for the long term timeframe, applying the FCA CCM. Moreover, this article ensures coherence with the methodology developed under Article 31(2) of the FCA stating that the time frames shall at least be monthly and yearly.

2.2 Article 4 “Methodology for taking underselling into account”

This article deals with the concept of underselling. Underselling is defined as a situation where the marginal price of the LTTR determined in the auction of LTTRs, for a given timeframe, is lower than the average day ahead price spread between two bidding zones used as the reference price for settlement of the LTTRs. Underselling in short means a situation where the buyer of the LTTR *systematically* obtains a higher cash flow from the variable settlement than what was paid by the buyer of the transmission right. In case of well-functioning competition one should (to some degree) expect the auction price should be statistically distributed around the day ahead price spread. If underselling was present in a product, then with perfect competi-

tion it would be expected that new market participants enter the auctions and drive up the auction price until equality is reached where no underselling is present. However the Danish power market and market for LTTRs may not be perceived as a market with perfect competition. The market is characterized by illiquidity, as too few market participants have a natural hedging interest in the Danish LTTRs to create perfect competition. The market has also not attracted enough speculators to ensure the liquidity that would give perfect competition. The impact of underselling materializes in an increase of grid tariffs. The design of the grid tariffs shares many similarities with a tax for public finance as the objective is to generate revenue for financing the cost of system operation and grid maintenance. Increasing the tariff will increase the social dead weight loss as the current tariff is way above the short run marginal cost of exchanging in the transmission grid. On the other hand, allocating LTTRs is expected to improve the efficiency of the retail electricity market, thus the goal is to balance the potential marginal dead weight loss from increased tariffs with the gain from allocating LTTRs.

The basic approach to manage the risk of underselling is done by calculating the amount of LTTRs that can be allocated, securing that the expected price spread is equal to the expected auction price. This means, that if the auction price is below the price spread, the amount of LTTRs will be reduced. On the other hand, if the auction price is above the price spread, the amount will be increased. The exact approach is explained in section 2.3.

Market participants have informally expressed concerns regarding price spikes due to e.g. an unplanned outage of an interconnector, yet Energinet did not receive any responses from the public consultation of the proposal. It was suggested to remove outliers before doing the calculation of LTTR capacity. Energinet has assessed the (informal) proposal of removing outliers and potential impact on LTTR of not doing so. Energinet has decided not to take price spikes into account by removing outliers:

- Introducing a methodology for removing outliers would complicate the LT CCM proposal even further and as the analysis below shows, outliers might not be due to outage of interconnectors
- From a theoretical point of view, Energinet does not consider the risk of high spot prices due to outage of interconnectors to impact underselling significantly. Some pre-requisites have to be fulfilled simultaneously in order for this to happen. Firstly, the interconnector shall be out of operation for a significant amount of time. Secondly, the marginal cost of the generation in the bidding zone that gets isolated shall be significantly higher than the adjacent bidding zone or market players shall take advantage of the situation and change bidding strategies (market manipulation) in the day ahead market in order to increase day ahead prices way above competitive level. We consider prolonged outages of the Greatbelt interconnector with extreme price spikes to be relatively low, due to the diversification of import into the DK2 area from multiple interconnectors and the development of Kriegers Flak CGS adding 400 MW of import in low wind scenarios in 2019. And due to the historic case on market abuse and current focus from competition authorities, we don't consider the risk of market manipulation to be high.
- From a practical point of view, the impact of outliers on underselling seems not to be significant as the analysis below shows.

If months where spikes are observed due to unplanned outages are included in the calculation it could risk reducing volumes for the LTTRs as underselling would be higher in these months. In order to investigate this Energinet has analyzed historical spreads, where we know that

Kontek was out most of the month which could lead to price spikes. The table below shows the area prices for DK1 and DK2 as well as the spread between the areas from January 2017 until November 2018. In this regard the interesting months are May, June and July 2018. The data in the table below shows that the price spread spiked between DK1 and DK2 several times in the period Jan 17 to Nov 18. The average import capacity for Kontek in June 2018 was 0 %, while it was 36,6 % and 77,0 % in May and July respectively, where some of the price spikes were observed.

Table 1 - Monthly day ahead average prices in EUR/MWh

	DK1	DK2	Spread
18 - Nov	54,04	54,68	0,64
18 - Oct	47,48	50,9	3,42
18 - Sep	49,89	51,79	1,9
18 - Aug	55,69	56,84	1,15
18 - Jul	52,14	53,37	1,23
18 - Jun	44,89	48,69	3,8
18 - May	34,95	37,93	2,98
18 - Apr	35,93	36,15	0,22
18 - Mar	37,96	42,93	4,97
18 - Feb	37,84	40,08	2,24
18 - Jan	30,76	31,57	0,81
17 - Dec	27,71	29,18	1,47
17 - Nov	33,01	34,68	1,67
17 - Oct	27,46	31,69	4,23
17 - Sep	33,77	38,49	4,72
17 - Aug	32,75	34,3	1,55
17 - Jul	31,57	31,94	0,37
17 - Jun	28,13	29,04	0,91
17 - May	29,24	29,61	0,37
17 - Apr	27,34	28,9	1,56
17 - Mar	29,22	29,76	0,54
17 - Feb	29,86	32,61	2,75
17 - Jan	31	33,55	2,55

In June 18 there was underselling observed, since the auction price of the monthly PTRs cleared at 1,98 EUR/MWh, while the price spread was 3,8 EUR/MWh. In this month the equilibrium amount would have been between 5 and 7 MW, which is due to the spread spiking on outage information that was not known at the time of the auction. This value of 5 to 7 MW would enter into the calculation of the volume of LTTRs. However when you take 12 months data, the effect of this outlier is marginal. Energinet created an average of all months of 2017. Depending if you include the presumed outlier the average volume for LTTRs changes from 378 MW to 346 MW, a difference of 32 MW.

Alternatively this could be handled by removing outliers. An example of such a method could be that outliers are removed by removing all equilibrium values that are more than two standard deviations from the mean in the dataset that is used for calculating the values. This however would have the effect that all outliers are removed. Even those where no outages at the TSO

happened, and thus the underselling represents a cost to the TSO that the TSO has no control over, like changing weather patterns and the like. An example of this is March 2018, where the realized spread is 4,97 EUR/MWh while the monthly auction in March cleared at 2,03 EUR/MWh. In March there were no outages of interconnectors that would explain the price spike in DK2. The prices were more influenced by rising coal/EUA costs and cold weather as well as fears of low nuclear output in France. These types of spikes should not be removed in the calculation.

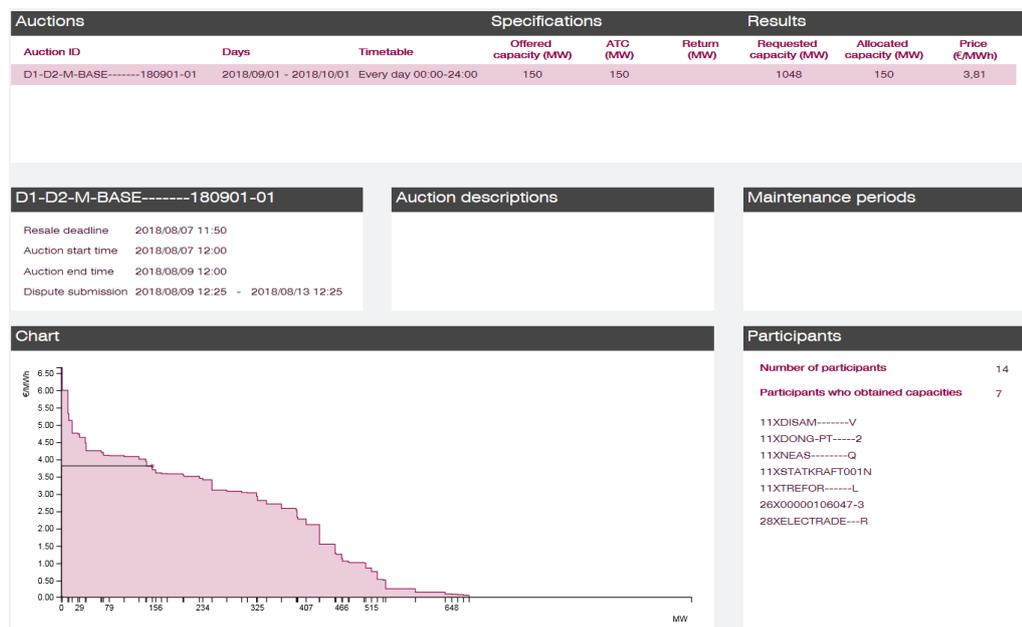
Energinet concludes that there does not exist a robust method to remove the correct outliers, and additionally the effect of the outliers is perceived to be relatively low given the amount of data that is used for the calculation of the amounts for the LTTRs.

2.3 Article 5 “Methodology for splitting long-term cross-zonal capacity”

This article describes precisely how underselling specifically will be taken into account and how the capacity shall be divided between the different long-term timeframes.

In order to take underselling into account Energinet will take the public data from the auctions on the Single Allocation Platform (SAP) as input to the calculation of volumes for the LTTRs.

Joint Allocation Office (JAO) is appointed as SAP according to the methodology developed under Article 48 of the FCA. On JAOs website data for the historical auctions is available. The data includes all submitted bids and related prices, such that it can be investigated which volume would have resulted in no underselling for any given auction. The picture below is a graphical example of the data available on JAOs website for the September 2018 monthly auction.



It can be seen that the auction cleared at a price of 3,81 EUR/MWh. The realized price spread for September 2018 was 1,9 EUR/MWh. In this month there was no underselling, this means that the volume according to the methodology should have been higher than 150 MW. If this month is taken as a sample then the methodology would state that the volume should have been roughly 428 MW as the clearing price of 428 MW was 2,11 EUR/MWh and the clearing price of 429 MW was 1,75 EUR/MWh.

The methodology proposed for the MSR does however consider more than one historical data point to make the assessment of the volume of LTTR considering underselling. This is in order

to make the volumes more stable, and less volatile to a single months price spikes, that may be caused by sudden changes in outage planning or weather patterns.

Article 5 also states how the capacity shall be divided between all time frames defined by the Regional design, FCA article 31. This ensures robustness in the MSR.

For each of the time frames an individual amount will be calculated as the amount where the historical auction price is equal to the historical price spread. The result will be the amount offered to the market if this was the only time frame offered to the market. However, as two (or more) times frames are offered the amount calculated will be reduced to 50% in case of two time frames, 33 1/3% in case of three time frames etc.. An example could be that there is only allocated capacity to the yearly and monthly timeframe. In the individual calculation it is found that on the yearly data the equilibrium volume is 350 MW while it is 300 MW for the monthly timeframe. Then the allocation to the yearly auction would be $50\% * 350 = 175$ MW and the allocation to the monthly timeframe would be $50\% * 300 = 150$ MW.

The methodology does not need an amendment if a new product or timeframe should be introduced in the Regional Design. Energinet also believes that the proposal is transparent to the market, as they can use the JAO data to estimate the volumes, and then the simple rule that an equal share is allocated between the products. In order to make an overview of the data used for the calculations of volumes the table below has been created.

Table 2 - Overview of historical data for taking underselling into account

Auction	Data
Monthly auction	12 latest monthly auctions
Yearly auction	3 latest yearly auctions
Weekly auctions	12 latest weekly auctions
Quarterly auctions	12 latest quarterly auctions
Any product defined in SAP product list except for yearly products	12 latest respective auctions
Auctions of any product when there isn't sufficient data to follow method above	12 latest monthly auctions
First auction on a border when no LTTRs have been sold before, until data is available to follow the methods above	50 % of thermal capacity

Energinet has ensured that the MSR reflects the hedging needs of the market in accordance with Article 16 (2). By applying a questionnaire Energinet has asked a representative selection of market participants what kind of distribution between time frames they would find beneficial for hedging. The answers from the market participants have indicated that the equal distribution between products is preferred. When designing the splitting rule Energinet took market behavior into account. Hedging of consumer risk tends to be progressive towards delivery. This means that the hedging percentage of a consumer increases the closer to delivery they get. This hedging behavior was also confirmed by market participants in the questionnaire. Thus the fact that Energinet also allocates capacities progressively towards delivery complies with the hedging needs of the market.

Energinet asked for other factors that influence the hedging needs of the market. In this question the market mainly pointed to the risk of curtailment. When LTTRs are curtailed the market receives the market spread up to a monthly cap (for DC interconnectors) which is set at the

actual monthly congestion income for the border in question. This means if an unplanned outage happens that lasts a whole calendar month, then the market participant would only get the marginal price from the auction of the product as compensation, thus leaving them without a hedge. The risk of unplanned outages is reduced with the products with shorter time to delivery as outage planning is more firm month or quarter ahead compared to year ahead. On the other hand the market needs the progressive hedging volumes in order to mimic retailer hedging behavior. With these considerations Energinet thinks that the proposed MSR takes into consideration that curtailment of LTTRs should be limited as much as possible. It is also not in the interest of Energinet to curtail LTTRs as compensation up to the cap still has to be paid to the owner of the LTTR, thus Energinet is committed to curtail as little as possible when an LTTR has been sold on an auction. It should be noted that any curtailment that happens will always follow the Harmonized Allocation Rules as given by Article 51 of the FCA.

Furthermore Energinet has chosen to include an assessment every third years of the market needs in the MSR. This is added to ensure that Energinet is aware if changing market needs or environment in the future would warrant an amendment of this methodology in order to ensure that the MSR lives up to the hedging needs of the market as required by Article 16 (2). This assessment will take place for the first time three years after the regulation has entered into force. The reason for this is that an assessment of market needs has been made in order to develop this methodology, which is why Energinet believes that the methodology takes market needs into consideration from the outset, and thus Energinet needs to assess if market needs change, which will be done after three years.

All in all Energinet believes that Article 5 ensures economic efficiency in the allocation of LTTRs to the market along with stability in volumes that ensures less uncertainty for the hedgers.

2.4 Article 6 “Rules for avoiding undue discrimination of access to purchase of long term transmission rights”

The approach is firstly to establish an understanding of what kind of service or good that is under consideration when talking about undue discrimination. Within the CACM CCM the service is “access to physical grid capacity”, hence it is about calculation of capacity up for allocation, where no undue discrimination between internal and external flows shall be avoided. On the other hand, within the splitting rule methodology, the service under consideration are LTTRs, hence the focus is on rules for avoiding undue discrimination of access to purchase of LTTRs.

Article 6 has been included in the legal text to explicitly ensure that no undue restriction in access to purchase takes place when Energinet sells the LTTRs. In accordance with the FCA Article 51 and 52 Harmonized Allocation Rules (HAR) is established for LTTRs. These rules describe that all market participants need to follow in order to be able to buy LTTRs, how to submit bids for LTTRs, how the allocation of LTTRs is done and how LTTRs are settled. These rules have been approved by All NRAs subject to the FCA. One of the requirements to the HAR is that the HAR should be non-discriminatory and be applicable for both physical and financial transmission rights. Since the HAR has been approved by all NRAs and Energinet in article 6 of the MSR refers to HAR the access to LTTRs is non-discriminatory and thus MSR lives up to the requirements in accordance with Article 16 (2).

3. Impact assessment

The impact of the MSR is difficult to quantitatively assess, as a quantitative assessment requires data regarding consumers hedging activity that Energinet does not have access to. Due to this the impact assessment will be purely qualitative.

Energinet is of the opinion that the MSR does not fundamentally change the practices already in place today for allocation of LTTR. The methodology primarily ensures a transparent way to split capacity between long term timeframes. This ensures that the market is able to better forecast the volumes allocated in the different auctions, and thus better prepare their hedging and bidding strategy.

The methodology also ensures that underselling is taken into account in a transparent way when calculating the volumes allocated to LTTRs. This ensures that Energinet incorporates an equilibrium view in the calculation of the volumes towards LTTRs and thus adjusts volumes according to market needs over a period of time, without introducing too much volatility in the volumes and thereby providing the market with instability.

4. Timeline

In Article 11 of the Splitting Rule methodology the time line is mentioned. It is the view of Energinet that the implementation of the MSR should follow the implementation of the long-term capacity calculation methodology. This is due to the fact that the point of departure for the MSR is the long-term capacity calculation methodology, and as such the MSR does not make sense to implement before the long-term capacity calculation methodology has been implemented.

5. Consultation

The proposal was in consultation on the ENTSOE consultation hub from 16 November 2018 until 17 December 2018. Energinet did not receive any consultation replies, which we interpret as the proposal fulfilling the market need for hedging.