

Explanatory document to Energinet, Fingrid, and Svenska kraftnät's proposal for the establishment of common and harmonised rules and processes for the exchange and procurement of mFRR balancing capacity between the bidding zones of Denmark, Finland and Sweden, and for the application of a market-based allocation process for the exchange of mFRR balancing capacity

in accordance with Article 33(1) and Article 38(1) of the Commission Regulation (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing

26 August 2024

Contents

1. Introduction	3
2. Background.....	3
2.1. Legal basis	4
2.2. Definitions.....	4
3. The proposal	6
3.1. Application of the TSO-TSO model.....	6
3.2. Product definition and bid characteristics.....	6
3.3. Geographical scope.....	7
3.4. The procurement rules.....	7
3.5. Activation of balancing energy bids.....	11
3.6. Publication of market information.....	12
3.7. Allocation of available cross-zonal capacity between capacity markets	12
3.8. Exchange of balancing capacity across bidding zones	12
3.9. TSO-TSO settlement	14
3.10. Market time unit (MTU).....	14
Appendix.....	15
Summary of Public Consultation.....	15

1. Introduction

This document gives background information for and the rationale behind Energinet, Fingrid, and Svenska kraftnät's (hereinafter referred to as "TSOs") proposal for the establishment of a trilateral mFRR capacity market with common and harmonized rules and processes for the exchange and procurement of mFRR balancing capacity in accordance with Article 33(1) and for the application of a market-based allocation process for the exchange of mFRR balancing capacity in accordance with Article 38(1) of the Commission Regulation (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing (hereinafter referred to as "EB GL"). Purpose of the Trilateral mFRR capacity market.

The purpose of the Danish, Finnish and Swedish mFRR capacity market is to utilize mFRR balancing capacity across bidding zones and thus improve both security of supply and socio-economic welfare. Furthermore, an optimized utilization of cross-zonal capacity is, in the opinions of the TSOs, the right way forward taking the future implementation of co-optimisation between balancing capacity and day-ahead procurement into consideration.

By introducing the trilateral mFRR capacity market the TSOs thus expect resources to be utilized across bidding zones. This will as a positive side effect avoid flexible assets being closed, because they can be utilized elsewhere. This is especially the case in DK2, where several assets are evaluating future availability. These assets could be beneficial for the power system in future periods with low wind and solar as well as they could improve the procurement possibilities in the Southern part of Sweden.

The main idea is thus to avoid flexible assets closing down, because they could be efficiently utilized in other bidding zones instead, but the basic idea of utilizing resources from high-liquidity areas in low-liquidity areas will also be a factor in the improvement of social welfare.

The ability to efficiently utilizing resources across bidding zones is also improving security of supply going into a future of 15-minute balancing, where higher demand of reserves is expected among all Nordic TSOs.

2. Background

Energinet, Fingrid and Svenska kraftnät have mutually agreed to propose a common market for the exchange and procurement of mFRR balancing capacity.

The common mFRR capacity market for Denmark, Finland and Sweden is based on the same fundamental market structure and market rules, which is approved for both the Nordic aFRR capacity market and the national Danish and Swedish mFRR capacity markets.

Energinet, Fingrid and Svenska kraftnät will use the market-based capacity procurement optimisation function for the allocation of CZC for the common mFRR capacity market. The methodology for the market-based allocation is developed according to Article 41 of the EB GL and approved by ACER in decision 22/2020. The 22/2020 is approved for the entire Nordic CCR and for both the aFRR and mFRR capacity market.

The market-based capacity procurement optimisation function will secure the most efficient allocation of capacity and thus the socio-economic optimal composition of bids.

Since the IT-platform and all other technicalities have already been developed and established due to the Nordic aFRR capacity market, very little additional costs are added to implement the trilateral market. Therefore, with the procurement optimization function always securing the most socio-economic optimal

procurement of mFRR across Denmark, Sweden and Finland, the trilateral mFRR capacity market will always be socio-economically beneficial no matter the size of the social welfare gain.

2.1. Legal basis

Regional capacity markets are not mandatory under European legislation, but they are regulated. Title III Chapter 2 of the EB GL, and Article 33 in particular, are relevant for the Nordic mFRR capacity market. Furthermore, the Nordic TSOs have agreed to allocate CZC for the exchange of mFRR balancing capacity; consequently, Title IV Chapter 1 of EB GL and, in particular, Articles 38 and 41 are of relevance.

According to Article 5(3) of the EB GL:

“The proposals for the following terms and conditions or methodologies shall be subject to approval by all regulatory authorities of the concerned region:

(b) for the geographical area concerning two or more TSOs exchanging or mutually willing to exchange balancing capacity, the establishment of common and harmonized rules and process for the exchange and procurement of balancing capacity pursuant to Article 33(1);

(g) in a geographical area comprising two or more TSOs, the application of the allocation process of cross-zonal capacity for the exchange of balancing capacity or sharing of reserves pursuant to Article 38(1);

(h) for each capacity calculation region, the methodology for a market-based allocation process of cross-zonal capacity pursuant to Article 41(1);

From the perspective of the EB GL, it should be stated that since the Nordic mFRR capacity market is based on a voluntary agreement between the Nordic TSOs, the Proposals is consequently not legally bound by a stipulated timeline.

2.2. Definitions

Generally, the definition of terms found in the EB GL, the SO GL and the CACM regulation shall apply in the proposals and in the explanatory document. In order to ease the reading of this document, the definitions of the main terms used are as follows:

- (1) *‘balancing service provider* or *‘BSP’* means a market participant with reserve-providing units or reserve-providing groups able to provide balancing services to TSOs;
- (2) *‘capacity calculation region* or *‘CCR’* means the geographic area in which coordinated capacity calculation is applied;
- (3) *‘capacity procurement optimisation function’* means the function of operating the algorithm applied for the optimisation of the procurement of balancing capacity for TSOs exchanging balancing capacity;
- (4) *‘common merit order list’* means a list of balancing energy bids sorted in order of their bid prices, used for the activation of those bids;
- (5) *‘connecting TSO’* means the TSO that operates the scheduling area in which balancing service providers and balance responsible parties shall be compliant with the terms and conditions related to balancing;

- (6) *'divisibility'* means the possibility for a TSO to use only part of the balancing energy bids or balancing capacity bids offered by the balancing service provider, either in terms of power activation or time duration;
- (7) *'exchange of balancing capacity'* means the provision of balancing capacity to a TSO in a different scheduling area than the one in which the procured balancing service provider is connected;
- (8) *'FRR dimensioning rules'* means the specifications of the FRR dimensioning process of an LFC block;
- (9) *'full activation time'* means the period between the activation request by the connecting TSO in the TSO-TSO model or by the contracting TSO in the TSO-BSP model and the corresponding full delivery of the concerned product;
- (10) *'load-frequency control area'* or *'LFC area'* means a part of a synchronous area or an entire synchronous area, physically demarcated by points of measurement at interconnectors to other LFC areas, operated by one or more TSOs fulfilling the obligations of load-frequency control;
- (11) *'load-frequency control block'* or *'LFC block'* means a part of a synchronous area or an entire synchronous area, physically demarcated by points of measurement at interconnectors to other LFC blocks, consisting of one or more LFC areas, operated by one or more TSOs fulfilling the obligations of load-frequency control;
- (12) *'operational security limits'* means the acceptable operating boundaries for secure grid operation such as thermal limits, voltage limits, short-circuit current limits, frequency and dynamic stability limits;
- (13) *'standard product'* means a harmonised balancing product defined by all TSOs for the exchange of balancing services;
- (14) *'TSO-TSO model'* means a model for the exchange of balancing services where the balancing service provider provides balancing services to its connecting TSO, which then provides these balancing services to the requesting TSO;
- (15) *'transfer of balancing capacity'* means a transfer of balancing capacity from the initially contracted balancing service provider (hereinafter referred to as "BSP") to another BSP.

3. The proposal

3.1. Application of the TSO-TSO model

The TSOs will exchange mFRR balancing capacity based on a TSO-TSO model. This implies that each Balancing Service Provider (hereinafter “BSP”) provides balancing capacity to its connecting TSO, which has also prequalified the BSP. There shall only be contractual arrangements between the TSOs and, separately, between BSPs and their connecting TSO.

3.2. Product definition and bid characteristics

3.2.1. Pre-qualification of mFRR capacity

Only a BSP with prequalified mFRR resources can submit bids to the mFRR capacity market. Each TSO is responsible for the pre-qualification process and for monitoring delivery from the BSPs in their own control area.

The mFRR balancing capacity bids must fulfill the requirements of the standard product definition for mFRR energy bid¹.

3.2.2. Bid formats

From the start of mFRR capacity market, capacity bids will conform to the following requirements:

- The minimum bid quantity shall be 1 MW and bid granularity shall be in 1 MW steps.
- A bid shall include the bidding zone it belongs to. This implies that portfolio bids for units within a bidding zone are allowed.
- Single bids can be marked as indivisible. This means that either the bid must be accepted as a whole or rejected. Indivisible bids give BSPs greater flexibility when pricing bids and this flexibility can support higher bid volumes and help lower bid prices. On the other hand, indivisible bids make it harder for the optimisation function to find an efficient solution. A maximum bid size of 50 MW applies to indivisible bids to reduce the probability of potential problems and will help disincentivise strategic bidding that might result in a loss of efficiency.
- Bids may be linked across several balancing market time units (“block bids”).
- BSPs may provide a bid as part of an exclusively linked bid group (bid curve), linking one or more bids with an exclusivity constraint, which means that only one bid in the exclusively linked bid group can be selected in the same mFRR capacity market time unit.
- BSPs may also use exclusively linked bid groups to link aFRR and mFRR balancing capacity market bids, so that either the aFRR or the mFRR balancing capacity market bid in the exclusively linked group can be selected in the same aFRR capacity market time unit.

¹ [ACER Decision SPBC Annex I.pdf \(europa.eu\)](#)

3.3. Geographical scope

The geographical scope of the trilateral mFRR capacity market is limited to the bidding zones of Denmark, Finland and Sweden. According to the current bidding zone configuration, this includes the following bidding zones: DK1, DK2, SE1, SE2, SE3, SE4 and FI.

While being a part of the Nordic Balancing Model, Kraftnät Åland does not employ mFRR resources and does not take active part in the trilateral mFRR capacity market.

The TSOs see this trilateral market as a first step towards a common Nordic market.

3.3.1. The procurement volume of mFRR capacity

The procurement volume and how it is distributed between the bidding zones shall follow the prevailing rules for dimensioning in accordance with SO GL. Each TSO is responsible for procuring the TSO demand for mFRR balancing capacity for its bidding zone(s) necessary to fulfil the requirements.

The trilateral mFRR capacity market will only be used for mFRR balancing capacity that fulfills the requirements of the standard product definition². National mFRR capacity procurement processes might be used for the procurement of specific products or other resources that do not fulfill the requirements of the standard product definition.

3.4. The procurement rules

3.4.1. The market process

The gate opening time (GOT) and gate closure time (GCT) is set to the same as for the approved Nordic aFRR capacity market. The gate opening time (GOT) is set to 00:00 (CET) in D-7 and the gate closure time (GCT) is set to 7:30 (CET) in D-1. Article 6(9) of Regulation (EU) 2019/943 on the internal market for electricity (recast), stipulates that “Contracts for balancing capacity shall not be concluded more than one day before the provision of the balancing capacity”. Setting the gate closure time to 7:30 (CET) in D-1 complies with this requirement.

Between the gate closure time and the deadline for the TSO approval of the market result, the TSOs will be able to review the bids of their control area. An overview of the timeline for the market process is shown in Figure 1.

² [ACER Decision SPBC Annex I.pdf \(europa.eu\)](#)

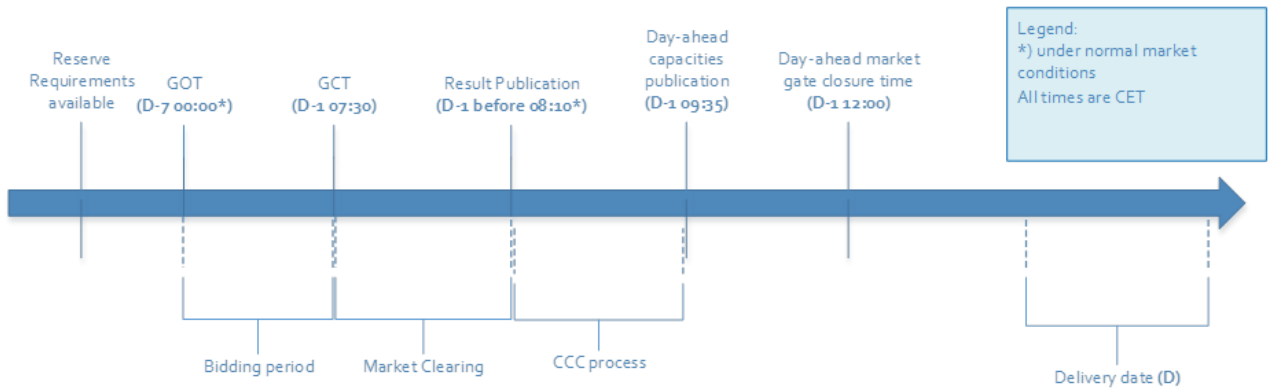


Figure 1. Overview of the market timeline

3.4.2. The overall process of bid submission and bid selection

A schematic illustration of the bid submission, optimisation and selection process is shown in Figure 2. The information can also be found in the BSP implementation guide – mFRR capacity market³.

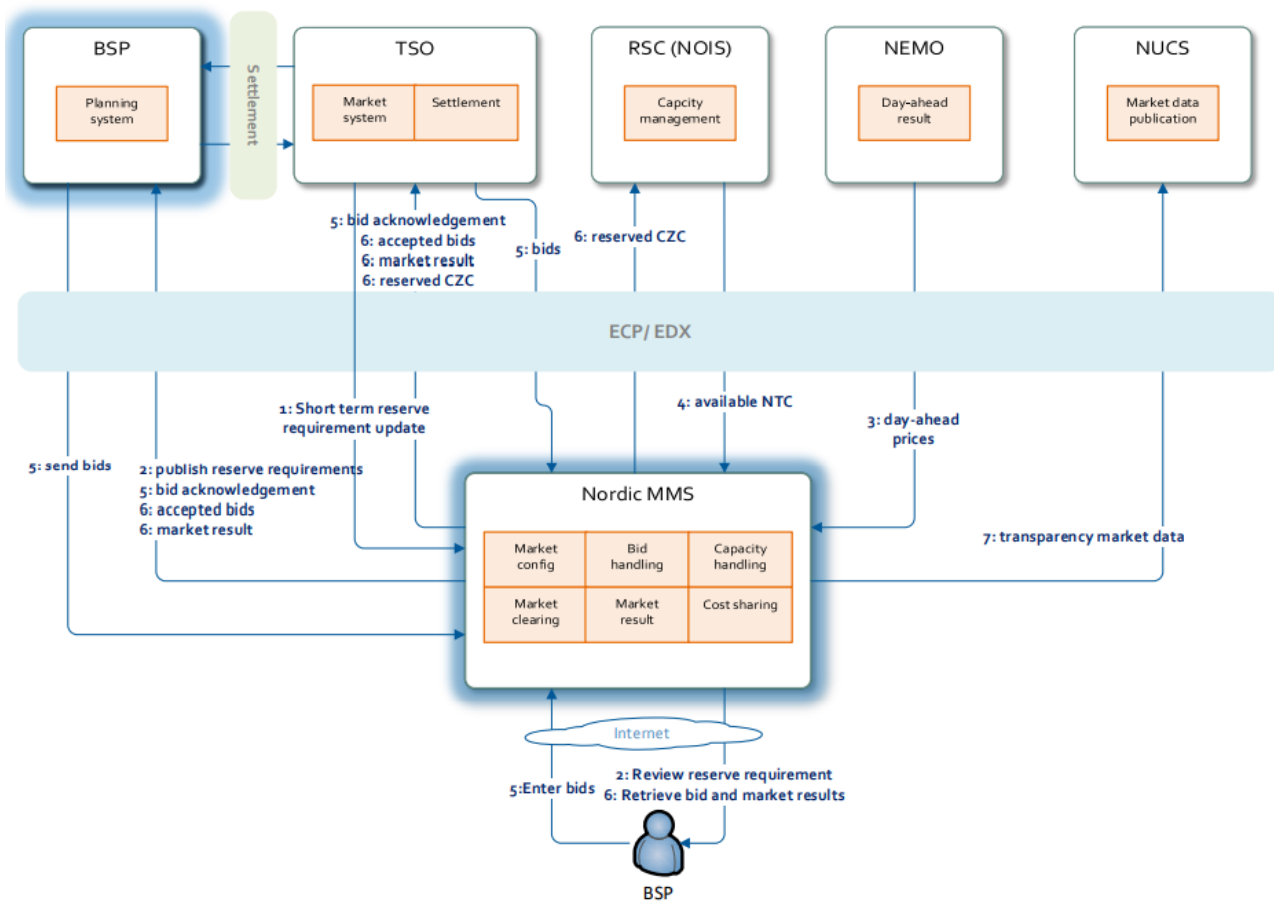


Figure 2. Bid submission, optimisation and bid selection in the Nordic mFRR capacity market

³ [Implementation guides – nordicbalancingmodel](#)

3.4.3. The procurement optimisation function

The objective of the algorithm for the balancing capacity procurement optimisation function is to minimise the provision costs of BSPs given the constraint summing across directions d (up-/down-regulation), day ahead market time units of the trading day t and mFRR balancing capacity bids i ,

$$\sum_d \sum_t \sum_i (bidcost_i \times bidvolume_i \times selected_i)_{td} \quad (\text{Equation 1})$$

Where:

$bidcost_i$ is the mFRR capacity bid cost of mFRR capacity bid i ;

$bidvolume_i$ is a valid increment of mFRR balancing capacity bid i ;

$selected_i$ is boolean denoting whether or not the mFRR balancing capacity bid increment is accepted.

The constraints of the optimisation

- All demand in each bidding zone, hour and direction must be met either by local or imported balancing capacity bids.
- Between all bidding zones there is defined a maximum CZC which represents the maximum volume of balancing capacity that can be transferred between the bidding zones. By default, the maximum CZC will equal 10 % of the expected NTC, but it can be set lower for operational security reasons in accordance with Article 165(g) of the SOGL. According to ACER decision 22/2020, the maximum CZC volume that can be transferred between bidding zones can be increased to 20 % if the demand in one bidding zone cannot be met within the 10 %.
- Divisible bids can only be selected in 1 MW steps.
- A bidding zone or a predefined set of adjacent bidding zones may have a pre-determined restriction on minimum volume and/or maximum volume that must be procured in the respective bidding zone or set of bidding zones.
- The restrictions entailed in bids, including links to other bids, minimum volume, maximum volume and price must be respected.

3.4.4. Maximum and minimum procurement volumes for a bidding zone, an area of a bidding zone or for a set of bidding zones

The maximum procurement volume can be applied as a constraint to prevent too large a share of the overall balancing capacity volume being located in a small part of the Nordic synchronous area and thereby reducing operational security in accordance with Article 165(g) of SOGL. This restriction will only be used if it is considered necessary based on experience with how the procured bids are distributed in the region.

The minimum procurement volume can be used if the dimensioning process according to Article 157(3)(g) requires such limitations in order to ensure that dimensioning requirements are fulfilled.

Where appropriate, TSOs can, due to congestions, set a minimum or maximum limitation in an area within a bidding zone.

Minimum and maximum constraints for procurement volumes can be applied to specific bidding zones, a set of bidding zones or an area within a bidding zone. The constraints must be made public before they are applied in the algorithm.

If a TSO needs to procure mFRR capacity to handle internal congestions within a bidding area, the TSO can ask BSPs to provide bids for a smaller area, called sub area. Instead of making bids unavailable in the whole bidding area, a minimum constraint force acceptance within a geographic sub area.

3.4.5. Settlement of contracted capacity

Accepted mFRR balancing capacity bids will be settled at the clearing price prevailing in the relevant bidding zone, for the relevant mFRR direction and MTU. The rules used to determine the clearing price are set out in Paragraphs 2 and 3 of Article 8 of the *Methodology on the common and harmonised rules and process for the exchange and procurement of mFRR balancing capacity for the bidding zones of Denmark Finland and Sweden*. Essentially, these rules amount to the following:

1. Each connecting TSO shall settle with each BSP each accepted mFRR capacity bid volume for each day-ahead market time unit and for each direction.
2. The settlement shall be equal to the accepted balancing capacity bid volume multiplied with the respective balancing capacity clearing price(s) as defined in paragraph 3.
3. The balancing capacity price shall be a cross zonal marginal price calculated by the capacity procurement optimisation function for each standard balancing capacity product, for each direction and for each mFRR capacity market time unit in each uncongested area in accordance with the following principles:
 - a. the cross zonal marginal price of an uncongested area shall be the marginal price of the marginal accepted bid in this uncongested area and the imported cross zonal marginal price; or
 - b. linked bids of the types described in Article 4, paragraph 2 in the *Methodology on the common and harmonised rules and processes for the exchange and procurement of mFRR balancing capacity for the bidding zones of Denmark, Finland and Sweden* shall by default not set the cross-zonal marginal price in the uncongested area. However, such a linked bid can lead to setting a higher cross-zonal marginal price in one or more day ahead market time units to allow the linked bid to exactly recover its overall bid costs.
 - c. In case a minimum procurement limitation is set by a TSO to an area within a bidding zone, a cross zonal marginal price shall be calculated without any limitations and accepted bids having higher bid price than the calculated cross zonal marginal price, shall be remunerated with pay-as bid principle. By doing this paradoxically not accepted bids can be avoided in the uncongested market area.

The main principles for pricing of mFRR capacity are shown in figures 3 and 4 in the cases where minimum procurement limitations are used.

Be aware that price setting and settlement in the trilateral mFRR capacity market does not affect the price setting nor the auction in the aFRR capacity market, since it is separate markets, where the aFRR capacity market is cleared first.

The overall idea with the settlement of bids procured for minimum procurement limitation reason is, that by doing settlement this way, we can avoid the situation where the sub area is setting the market price and potentially raises the cross-zonal marginal price in multiple bidding zones..

- Cheapest bids are selected → no Pay as Bid remuneration
- Marginal price will be 35 €/MW



Figure 3. Pricing of mFRR capacity, when procurement limitation does not affect the price formation.

- In case no limitation, bids 1, 2, 3, 4 and 5 would have been selected → price would have been 36 €/MW.
- Due to the limitation, bid 6 is accepted instead of bid 4 → marginal price will be 35 €/MW.
- Bid 6 will be remunerated as Pay as Bid, 50 €/MW



Figure 4. Pricing of mFRR capacity, when procurement limitation affects the price formation.

The chosen pricing rule is designed to provide a clear and efficient price (and investment) signal to potential BSP providers. Specifically, if the clearing price were lower than the highest locally accepted bid, it would not signal to a potential investor with a lower supply cost, the potential ability to efficiently displace the high-cost bid. Similarly, if the clearing price were lower than the cost of imported balancing capacity including the cost of CZC, it would not signal the potential ability to free up valuable CZC by investing locally. Such investment would reduce the need to procure both mFRR in the neighbouring zone and to reserve CZC for the exchange of mFRR and, as such, the value of both is reflected in the price.

The rule covering the need to have the same price across uncongested bidding zones is intended to ensure that, where there is a group of uncongested bidding zones, the price in each zone reflects the potential value of investment in additional mFRR in each zone as a means of meeting the demand of the other zones in the group. Without this rule, one might get price splitting within the uncongested group of bidding zone due to local variations in accepted bid prices that does not really reflect the potential value of new investment in the group of uncongested bidding zones.

3.5. Activation of balancing energy bids

Balancing energy bids will be activated on the Nordic mFRR energy market until the TSOs enter the common European energy activation platform, MARI.

ACER decision 11/2020 on *the Methodology for a list of standard products for balancing capacity for frequency restoration reserves and replacement reserves*⁴ states the requirements for mFRR energy bids that

⁴ [Microsoft Word - EB_GL_A25.2_191218_ALL TSOs Standard products balancing capacity Proposal \(europa.eu\)](#)

are procured in the mFRR capacity market. The BSPs are expected to follow these requirements. It is e.g. stated in Article 3(2) that:

(2) For each contracted standard mFRR balancing capacity product, each BSP shall provide corresponding capacity in the form of integrated scheduling process bids or standard mFRR balancing energy product bid(s), defined in the all TSOs' proposal for the implementation framework for a European platform for the exchange of balancing energy from mFRR pursuant to Article 20 of the EB Regulation. Such bids shall be direct activatable bids, provided that the delivery period does not exceed the end of the last validity period for which the BSP is contracted.

3.6. Publication of market information

The market results will be sent for publication to the ENTSO-E transparency platform in accordance with Article 12(3) of EB GL and Article 17 of Reg EU 543/2013 (Transparency Regulation). The result will also be published in NUCS ([Dashboard | Nordic Unavailability Collection System \(nucs.net\)](#)).

3.7. Allocation of available cross-zonal capacity between capacity markets

The allocation of cross-zonal capacity will be assigned to the aFRR capacity market first for the available cross zonal capacity allocated to the exchange of balancing capacity in accordance with the methodology applied pursuant to Article 38(1) of the EB Regulation. The allocation of cross-zonal capacity to the mFRR balancing capacity will be assigned secondly and the mFRR capacity market will thus use the remaining cross zonal capacity.

The reasoning for running the algorithm for the capacity procurement optimisation function for the aFRR capacity market first is, that the aFRR capacity market to have the highest prices, and therefore the value of reserving cross-zonal capacity to the aFRR capacity market is greatest.

The total cross-zonal capacity allocated to the aFRR and mFRR market will be maximum 10 %, according to ACER decision 22/2020.

When implementing the European Harmonized Cross-zonal Capacity Allocation methodology, a co-optimisation between aFRR and mFRR is performed, and the most valuable balancing capacity product is exchanged and allocated first.

3.8. Exchange of balancing capacity across bidding zones

The market-based methodology dictates that TSOs can reserve up to 10 % of available cross-zonal capacity. In the case of planned maintenance, less or no capacity will be given to the mFRR capacity market. Hence, if the available capacity is reduced, this will be taken into consideration in the market clearing process.

There will always be a risk, however extremely small, that the exchange of balancing capacity cannot be utilized in real time due to unexpected failure or outage on cables. The risk is thus so small, that the benefits of exchanging capacity are way higher than the risk of not being able to activate the necessary resources. This is also due to the fact that if one line falls out, energy can in many cases flow via other lines. In the Nordic work with the dynamic dimensioning model the probability of such a failure is less than 0,5 percent.

The trilateral mFRR capacity market is established to optimize the utilization of balancing resources across bidding zones. The mFRR capacity market is not supposed to violate system security in any way. To secure that, a broad reference to SO GL is put in the methodologies, such that each TSO is able to evaluate, if any

technical or system security limitations need to be taken into consideration when defining the available transmission capacity. TSOs are, according to SO GL, allowed to reduce capacity given to the balancing capacity markets, if system security is challenged in any way. These evaluations are done prior to the clearing of the capacity markets.

3.8.1.Potential Allocation Constraints

In general, the inclusion of allocation constraints in the balancing timeframe in the Nordic Capacity Calculation Methodology (CCM) is understood as constraints being listed in case they will be needed, but not being explicitly materialized or quantified. This means, that the allocation constraints are possible in the capacity calculation, but explicit measures or methodologies need to be established for the allocation constraints to be used in reality.

The inclusion of DK1 in the trilateral mFRR capacity market introduces exchange of balancing capacity via HVDC lines between synchronous areas.

The Nordic TSOs revealed that there potentially were conflicts in different objectives when exchanging FRR over HVDC lines. This was the main reason why the methodologies for the common Nordic mFRR capacity market were withdrawn in April 2023. This was also the reason why the amendment to the methodology for limits for exchange of FRR between synchronous areas was withdrawn (September 2023).

Currently, there is no common agreement on the need for restrictions for ramping of FRR on HVDC, and that is the starting point for this methodology. The Nordic mFRR EAM will go live in December 2024. Based on operation of mFRR EAM, TSOs will reevaluate the need for ramping restrictions on HVDC exchange prior to MARI.

Discussions are thus ongoing related to ramping restrictions in the balancing timeframe. The Nordic TSOs are evaluating the need, but also discussing if ramping restrictions are the right way to handle the underlying issues. TSOs must ensure that only necessary restrictions are put in place, such that the market (and system) is affected as little as possible.

The TSOs are thus aware of the transverse dependencies related to the usage and utilization of HVDC lines. Therefore, in case a methodology proposing ramping restrictions on HVDC lines in the balancing timeframe will be submitted, the TSOs are aware and acknowledge that this methodology should take reserved cross-zonal balancing capacity into consideration in order for that methodology to be compliant together with the methodologies for the trilateral mFRR capacity market.

As for ramping restrictions, discussions on polarity reversals on HVDCs are also being carried out right now. The explicit limitations and quantitative measures on polarity reversals have not been settled yet, but TSOs agree, that no matter the technical quantification, severe balancing needs from an operational perspective will always be prioritized. This means, that in case balancing energy is strictly needed, agreements on the number of polarity reversals will be exceeded and the necessary balancing energy will be transferred.

TSOs aim at establishing the best socio-economic utilization of the Nordic power system. This means, that resources are exchanged and shared, but it also means, that all measures are taken to ensure that the necessary energy resources are always available and can be activated when needed. Therefore, the TSOs must ensure that future usage of HVDC lines always takes exchanged balancing capacity into consideration.

3.9. TSO-TSO settlement

As described in Article 9 of the *Methodology on the common and harmonised rules and processes for the exchange and procurement of mFRR balancing capacity for the bidding zones of Denmark, Finland and Sweden*, TSOs shall pay for the volume of mFRR balancing capacity required by their bidding zones.

As this volume requirement can be met by mFRR balancing capacity procured in other bidding zones, including zones with the control area of a different TSO, there is a need to settle transfers of mFRR balancing capacity. Where balancing capacity is exchanged across a bidding zone border that separates two TSO control areas, the TSO importing mFRR balancing capacity will pay the TSO exporting mFRR balancing capacity an amount equal to the volume of mFRR capacity transferred multiplied by the clearing price for the relevant mFRR balancing capacity product in the exporting bidding zone.

As clearing prices account for CZC reservations costs, this arrangement entails that the importing TSO pays the implied congestion rent. The congestion rent for the exchange of mFRR balancing capacity between bidding zone A and B is calculated as the product of the exchanged balancing capacity and the price differential (Clearing Price A – Clearing Price B) per border direction, regulation direction and market time unit. The rent is split 50/50 between the TSOs on the relevant border.

3.10. Market time unit (MTU)

The mFRR capacity market time unit has been defined explicitly and determined to be one hour. This is in line with the European Harmonized Cross-zonal Capacity Allocation methodology and the Nordic methodology for the market-based allocation process according to EB GL article 41, that gives the possibility for the market time unit to be the same as for the day-ahead market or a multiple of the day-ahead market time unit.

The determination of the mFRR capacity market time unit of one hour allows the TSOs to transition to higher time resolution, when it is relevant and valuable according to transmission capacity calculation methodologies and common grid models. When entering 15-minute time resolution in SDAC common grid models are still on hourly resolution, meaning that allocating capacity on 15-minute basis in the capacity markets would not change or influence the capacity calculation in any way.

The optimisation function of the trilateral mFRR capacity market is though taking 15-minute day-ahead market prices into consideration when evaluating the cost of cross-zonal capacity as the methodology of ACER decision 20/2022 pursuant to Article 41 of EB GL constitutes.

Appendix

Summary of Public Consultation

A public consultation for *Trilateral mFRR capacity market between Denmark, Finland and Sweden* was held from February 16th 2024 to March 18th 2024. During the public consultation Denmark, Finland and Sweden (the TSOs) received 5 responses.

The responses were submitted by UPM Energy, Elisa, Nord Pool, Green Power Denmark, and Statkraft and the documents are attached as an appendix.

A summary of the text is provided below alongside a response from the TSOs. The summary is divided into topics.

Time resolution

UPM: “UPM sees that the mFRR capacity bids should be procured on hourly resolution which would lead to better optimisation of assets. (...) Planning of the capacities in 15-minute resolution would not improve accuracy of the delivered capacities and would even increase complexity of the planning and bidding on mFRR capacity markets”

Response from the TSOs

The TSOs acknowledge the support for hourly resolution in the mFRR capacity market instead of changing to 15-minute time resolution with the day-ahead market. This is also the intention behind the amendment of the paragraph. The TSOs do not intend to have a time resolution shorter or longer than an hour for the capacity markets.

Co-optimization of aFRR and mFRR

UPM: “UPM suggests the developing [of] a calculation and procurement algorithm where the capacities are solved simultaneously as a pool and the market participants should not be made to decide on which market to bid.”

Response from the TSOs

It is a valid point that market participants would prefer a common clearing for aFRR and mFRR capacity making it easier to optimize the bidding. However, this change will be introduced in the common European harmonized methodology. This co-optimisation is rather difficult to implement, and the TSOs have not yet found the best way to introduce this co-optimisation. At the same time, the TSOs see a great value creation in the common aFRR capacity market and trilateral mFRR capacity market. This value creation should be realized as soon as possible, which is why the co-optimisation will only be introduced later with the harmonized methodology.

Bids can be linked by exclusive bid linking such that if one bid is not chosen in the aFRR market it can be chosen in the mFRR market.

Reservation of cross-zonal capacity

Elisa: “We see that the TSOs should be very cautious while allocating the cross-zonal capacity for balancing purposes before day-ahead auction as the effect to the day-ahead prices can be very hard to forecast precisely. (...) We highlight that the process is transparent and continuously monitored and improved.”

Nord Pool: “It is important that TSOs also carefully monitor the gains and losses in the overall market following reservation of the transmission capacity for balancing purposes cross border. If the gains from the capacity in the mFRR (and aFRR) capacity markets are smaller than the losses in other market segments, such as the day-ahead market, the reservation of capacity should be reevaluated.”

Response from the TSOs

The Nordics already have a decision (A41) on the market-based allocation process, which is not consulted here.

The TSOs strive to make the reservation of cross-zonal capacity as transparent as possible with continuous monitoring.

Publication of information

Nord Pool: “Publication of the activated orders cannot be later than when results are sent to market participants. Otherwise, market participants will be put in inside position and at risk of doing inside trading.”

Response from the TSOs

The Nordic TSOs are by EBGL 12.3.f obliged to publish the result no later than one hour after the results of the procurement have been notified to the participating BSPs.

The Nordic system is set up in a way where market results are published within minutes of the notification to the participating BSPs. Hence, there exist no informational advantages and results are always published well in advance to SDAC gate closure time.

Minimum and/or maximum level on the procurement limitations for a bidding zone or an area within a bidding zone.

Nord Pool: “If volumes are to be procured in an area within a bidding zone, it is necessary to have unit bidding, or another arrangement that identifies where the volume is located within the bidding zone.”

Further, we believe that doing market monitoring according to Article 15 of REMIT will be significantly more efficient if unit bidding is implemented in these aFRR and mFRR capacity mechanisms. This should also be seen in relation to the requirement that all assets should be pre-qualified. Based on the above, and to create necessary trust in these capacity mechanisms we recommend unit bidding.”

Green Power Denmark: “Green Power Denmark urges Energinet, Fingrid, and Svenska kraftnät to define this minimum amount and ensure transparent communication well in advance of the procurement.”

“Green Power Denmark urges Energinet, Fingrid, and Svenska kraftnät to support the trilateral market and only use national markets where absolutely necessary.”

“If TSOs wish to use this option [maximum volume in specific geographic area], they must communicate the maximum limit and the rationale well in advance of the procurement.”

Fortum: “. If we understand the proposal correctly it means that some market participants would receive pay-as-clear and some pay-as-bid prices for the same MTU? We fail to understand how this would work out in a fair or efficient way, or what the reason would be (as it is not explained).”

Statkraft: “(...) the obligation should be on the bidding zone as this will ensure a more efficient production planning. If it is changed from an obligation on the bidding zone level to an obligation for each unit, it will change the bidding strategy for the BSPs.”

Response from the TSOs

TSOs acknowledge that further explanation is needed, and the Explanatory document is amended accordingly.

At least two hours before GCT, TSO demand will be defined. If there are congestions that set minimum and/maximum restrictions within a bidding zone or

in an area of a bidding zone, this will be informed at this point in time as well. This has been added to the methodology referring to A33 article 6.

The TSOs implement the trilateral market to utilize resources across borders.

The TSOs are not implementing unit-based bidding. The introduction of sub-areas is a necessity to comply with internal congestions when renewable energy sources are increased. The choice of sub-areas instead of more bidding zones is chosen because the need to use and distinguish between sub-areas within a bidding zone is foreseen to be very seldom.

Bid formats

UPM: “UPM supports the product offering to include block bids.”

Green Power Denmark: “Green Power Denmark therefore urges Energinet, Fingrid, and Svenska kraftnät to ensure full transparency in bid selection and, as a starting point, follow the merit order curve to select the cheapest bids. (...) Green Power Denmark therefore urges Energinet, Fingrid, and Svenska kraftnät to prioritize a wellfunctioning, transparent, and future-proof market over short-term optimisation.”

Response from the TSOs

The TSOs acknowledge UPM’s support for block bids. Furthermore, the TSOs will continue to work with the bid selection in order to improve the issues coming from the use of block bids that causes smaller bids that are in the money to be skipped. A well-functioning market is the highest priority for the TSOs.

Price for buy-back

Statkraft: “If a BSP get a bid accepted as pay-as-bid in the auction, it is not clear from the provided documents what the price for buying back the balancing capacity will be. Statkraft encourage the TSOs to explain this in the final documentation.”

Response from the TSOs

The rules for not delivering contracted capacity are regulated in national terms and conditions. These rules differ across the three TSOs, but is not violated and thus still valid from the potential use of pay-as-bid in sub-areas.

Common markets

Statkraft: “(...) we support a common market for mFRR balancing capacity in Denmark, Finland and Sweden. (...) we would also like encourage the Nordic TSOs to work towards a Nordic mFRR balancing capacity market including Norway.”

Fortum: “MFRR CM will differ from AFRR CM as Norway will be left out, without a reason in the explanatory document”

Response from the TSOs

The TSOs acknowledge Statkraft’s comment and will work towards a common mFRR market, once this is feasible. The Nordic TSOs see this trilateral market as a Nordic process with a trilateral go-live. A common Nordic market is still the end-goal. No implementation date is however set for the inclusion of Norway

A comment about why the mFRR capacity market is a trilateral market instead of a common Nordic market is added to the explanatory note.

Implementation

Green Power Denmark: “Green Power Denmark encourages Energinet, Fingrid, and Svenska kraftnät to engage in dialogue with market participants to establish an ambitious yet realistic implementation plan.”

Response from the TSOs

The TSOs will establish an ambitious yet realistic implementation plan that allows for the trilateral mFRR CM to be implemented as soon as possible, but still allowing time for the approval of the methodology and IT-development. At this moment the TSOs expect a trilateral go-live in Mid-November 2024.

The TSOs will communicate the implementation plan as soon as it is known.