Supporting document for the Capacity Calculation Methodology Proposal for the Balancing Timeframe for Nordic CCR

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Abbreviations:

AAC	Already Allocated Capacity
ATCE	Available Transfer Capacity Extraction
BT	Balancing Timeframe
CACM Regulation	Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management
CC	Capacity Calculation
CCC	Coordinated Capacity Calculator
CCM	Capacity Calculation Methodology
CCR	Capacity Calculation Region
CGM	Common Grid Model
CMM	Capacity Management Module
CNEC	Critical Network Element monitored under a Contingency
DA	Day Ahead
EBGL	Commission Regulation (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing
EU	European Union
FB	Flow-Based
Fmax	Max Capacity on a CNEC
HVDC	High Voltage Direct Current
ID	Intraday
IDCZGCT	Intraday Cross-Zonal Gate Closure Time
NROSC	Nordic Regional Operational Security Coordination
RA	Remedial Action
RAM	Remaining Available Margin
SO Regulation	Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation
TSO	Transmission System Operator

1 Background and introduction

This document is the consultation document provided to the Stakeholders for the Nordic Capacity Calculation Methodology (CCM) proposal for the balancing timeframe (BT CCM). The consultation document describes the proposal for the Nordic Capacity Calculation Region (CCR). The intention of this document is to give the Stakeholders the opportunity to comment on the proposed methodologies.

The CCM proposal for the Nordic CCR is required by Article 37(3) of Commission Regulation (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing (EBGL).

This supporting document is structured as follows. Each section below mirrors the different Titles of the CCM with the objective of explaining the content of each Title. The explanation will not be given at a detailed level, only the most important issues will be highlighted. For more detailed and background explanations, the Nordic CCM project refers to the supporting document for the CCM for the Day-ahead (DA) and Intraday (ID) timeframe.

The BT CCM makes use of the Nordic capacity calculation process implemented for the intraday timeframe, which ensures consistency, maximum utilization of capacity and is in line with the requirement from article 37(3) of EBGL. The flow-based (FB) parameters computed for the intraday timeframe, by using dedicated ID common grid models (CGM), will be updated for the balancing timeframe (BT). If the common grid model used for the intraday timeframe has been updated, FB parameters based upon that CGM will be calculated. The latest available FB parameters will be adjusted by taking into account the already-allocated capacities (AAC) from the ID and DA timeframes and transmission capacity already reserved for the BT. As such, the left-over capacity – being the capacity remaining after the ID timeframe with the addition of capacity already reserved for the BT – can be provided to the BT for the exchange of balancing energy or for operating the imbalance netting process.

This CCM provides a transition period for the capacity calculation of cross-zonal capacity for the exchange of balancing energy: until the European platforms for the exchange of balancing energy from frequency restoration reserves with manual and automatic activation (MARI and Picasso platform for allocation) are able to support the allocation of cross-zonal capacity based on FB parameters, the coordinated capacity calculator (“CCC”) of the Nordic CCR transforms the FB parameters into available transmission capacity (“ATCE”) values on bidding zone borders of the Nordic CCR.

The BT CCM is structured according to three main elements (or TITLES) providing a logical structure, constituting *a methodology*. Firstly, the different CC elements that sum up to the maximum flow on a CNEC or combined dynamic constraint, F_{max}, are outlined. Secondly, the application of the different CC elements in the CC process are outlined, and thirdly the TSO validation approach is outlined. Finally, as the methodology is foreseen to go into force at an earlier stage than the allocation platform can cope

with the FB methodology, the Available Transmission Capacity Extraction (ATCE) methodology will be applied as a transitional solution. This is covered in TITLE 5: Miscellaneous.

2 TITLE 2: Description of capacity calculation input for balancing timeframe

The result of the capacity calculation for the BT will be provided to the balancing platforms MARI and PICASSO to facilitate cross-border trade of balancing energy. The BT CCM applies the FB approach and therefore the calculations take their point of departure in a CGM. The BT is the timeframe after intraday and before real time. The BT CCM utilizes three main inputs to the capacity calculation:

- the latest available CGM and its subsequent FB parameters of the Nordic CCR
- allocated cross-zonal capacity until intraday gate closure time (IDCZGCT)
- cross-zonal capacity already reserved for the balancing timeframe in the Nordic Balancing Capacity Market

If the latest available CGM is the one used for intraday capacity calculation of the FB parameters, no new FB parameters will be calculated for the BT. If the merging agent has compiled a newer CGM for the ID timeframe, then FB parameters based on this CGM will be used when updating the capacities. The BT FB parameters will be calculated in accordance to the same provisions as the Nordic CCR CCM for DA and ID. The provisions relevant for this calculation are copied into Annex 1 of the BT CCM to facilitate readability.

In order to correctly define the cross-zonal capacity available in the BT, all previous allocations need to be taken into account in the BT FB parameters. The already-allocated cross-zonal capacity until intraday gate closure time (IDCZGCT) is taken into account when adjusting the latest available FB parameters. The flow resulting from nominated cross-zonal capacities for the DA, ID, and balancing timeframes is calculated in accordance with article 29(7) of the CACM Regulation as described in article 16(5) of the Nordic CCR CCM for DA and ID.

The capacity reserved in the Nordic Balancing Capacity Market for the balancing timeframe, are reserved for the purpose of being used for the exchanges of balancing energy.

This amount of already-allocated cross-zonal capacity will be released to the Balancing Energy Market. The Nordic Balancing Capacity Market is operated before the DA auction and its results are inputs to the DA CC process as already-allocated capacity. The amount of cross-zonal capacity that can be allocated by the Balancing Capacity market is limited to 10 % of the total cross-zonal capacity according to article 41(2) of EB GL. This reservation in the ID timeframe is described by the subtraction of $F_{AAC(BT)}$ in the calculation of the remaining available margin in Equation 1 of article 12 in the BT CCM:

$$\overrightarrow{RAM}_{IDCC} = \vec{F}_{max} + \vec{F}_{RA} - \vec{F}_{RM} - \vec{F}_{0} - \vec{F}_{AAC\ (DA+ID)} - \vec{F}_{AAC\ (BT)} - IVA_{ID}$$

In article 12 of the BT CCM, the increase of the cross-zonal capacity available for balancing energy (RAM) is described by the addition of $F_{AAC(BT)}$ in Equation 2:

$$\overrightarrow{RAM}_{bv} = \overrightarrow{RAM}_{IDCC} + \vec{F}_{AAC\ (BT)}$$

For bidding zone borders outside the Nordic CCR the power flows will be shared according to the FB parameters to ensure consistency through the timeframes and to ensure operational security.

In order to ensure operational security, the same operational security limits, reliability margins, generation shift keys, critical network elements and contingencies, as well as allocation constraints applied in the ID timeframe, will be applied in the BT CC as well, with some additions.

One should especially note that there are specific provisions for exchanging and sharing FRR between synchronous areas - as described in the methodologies according to article 176 and 177 of the SO Regulation – that are not influencing the DA and ID calculations, yet will be taken into account in the BT. These provisions are taken into account by the means of allocations constraints.

Older HVDC links are often designed to transfer energy in one direction for a long period of time, to change the direction of transfer now and then, and to continue the transfer of energy in that direction. New HVDC links are generally more flexible. Therefore, specific physical and technical properties of the different HVDC links will need to be taken into account. This will especially be relevant as the settlement period decreases to fifteen minutes. As these physical and technical limits often have intertemporal dimensions, they will have to be described by means of allocation constraints.

For the BT, remedial actions (RAs) are taken into account in the validation step of the calculation process. The starting point for the RAs taken into account are those RAs reflected in the FB parameters from the latest ID CC following the latest Nordic Regional Operational Security Coordination (NROSC) process. In the NROSC process, the RAs taken into account in the CC process are re-evaluated based on the latest available information. If required, or for more efficient operation, the previously-identified RAs may change in the NROSC process.

3 TITLE 3: Description of the capacity calculation process and validation for the balancing timeframe

The flow-based (FB) parameters computed for the intraday timeframe, by using dedicated ID common grid models (CGM), will be updated for the balancing timeframe (BT). If the common grid model used for the intraday timeframe has been updated, FB parameters based upon that CGM will be calculated. The latest available FB parameters will be adjusted by taking into account the already-allocated capacities (AAC) from the ID and DA timeframes and transmission capacity already reserved for the BT: at IDCZGCT, the XBID CMM (the capacity management module of the platform for the continuous single intraday market coupling) will send the latest allocated capacities (AAC) to the CCC.

Each TSO may perform a validation of calculation of the cross-zonal capacities made available for the balancing energy market to ensure operational security. The TSOs can reduce the cross-zonal capacities by applying an individual adjustment value (IVA), i.e. the RAM will be reduced.