All TSOs' of the Nordic Capacity Calculation Region proposal for amendment on capacity calculation methodology in accordance with Article 20(2) of Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management

20 June 2019

All TSOs of the Nordic Capacity Calculation Region, taking into account the following:

Whereas

(1)   This document is a common proposal for amendment (hereafter referred to as "Proposal for Amendment") developed by all Transmission System Operators (hereafter referred to as "TSOs") of the Nordic Capacity Calculation Region (hereafter referred to as "CCR Nordic") as defined in accordance with Article 15 of Commission Regulation (EU) 2015/1222 establishing a guideline on Capacity Allocation and Congestion Management (hereafter referred to as the "CACM Regulation") regarding a methodology for Capacity Calculation in accordance with Article 20 and Article 21 of the CACM Regulation.

(2)   All NRAs of CCR Nordic have approved proposal regarding methodology for Capacity Calculation in July 2018. These NRAs have sent request for amendment (hereafter referred to as "RfA") to all TSOs of CCR Nordic in December 2018 in accordance with Article 9(13) of the CACM Regulation.

(3)   The Proposal for Amendment takes into account the general principles and goals set in the CACM Regulation as well as Regulation (EC) No 714/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the network for cross-border exchanges in electricity (hereafter referred to as "Regulation (EC) No 714/2009"). The goal of the CACM Regulation is the coordination and harmonisation of capacity calculation and allocation in the day-ahead and intraday cross-border markets, and it sets requirements for the TSOs to co-operate on the level of CCR for coordinated capacity calculation.

(4)   The Proposal for Amendment takes into account the requested changes to capacity calculation methodology listed in the RfA. It expands Article 4(1) of the approved methodology to state that each Nordic TSO is required to provide the operational security limits to the CCC in an appropriate format compliant with the RfA. The Proposal for Amendment includes process of Figure 2 in a written format clarifying the roles and responsibilities of TSOs and the CCC.

(5)   The Proposal for Amendment takes into account the request that the TSOs start to develop an appropriate grid model in coordination with each other, in order for the CCC to handle dynamic stability in capacity calculation. The requirements concerning the calculation of dynamic stability limits can be fulfilled by creating the necessary processes and elements that would function alongside the current approved all-European CGM, without the need to amend the CGM methodology itself. The TSOs will revise the capacity calculation methodology so that it enables dynamic capacity calculation in the CCR Nordic – covering the bidding zones within the Nordic synchronous area – in a manner that would be compatible with the CGM.

(6)   According to Article 9(9) of the CACM Regulation, the expected impact of the proposal on the objectives of the CACM Regulation has to be described. This Proposal for Amendment contributes to, and does not hamper in any way, the achievement of the objectives of the CACM Regulation. In particular, the Proposal for Amendment serves the objective of ensuring operational security (Article 3(c) of the CACM Regulation).

(7)   The Proposal for Amendment ensures operational security (Article 3(c) of the CACM Regulation) as TSOs shall include a detailed description of the appropriate format used for the provision of operational security limits to the coordinated capacity calculator (hereafter referred

to as "CCC"). In addition, operational security is ensured by development of appropriate grid model and processes, in order for the CCC to handle dynamic stability in capacity calculation.

SUBMIT THE FOLLOWING PROPOSAL FOR AMENDMENT TO ALL REGULATORY AUTHORITIES OF CCR NORDIC:

TITLE 1
Amendments

Article 1
Amendment to Article 4 on methodology for determining operational security limits

1. All TSOs of CCR Nordic propose to amend Article 4(1) in the following way:

   The TSOs shall apply the same operational security limits as in the operational security analysis. These limits shall be defined in accordance with Article 25 of the SO Regulation. The TSOs shall present these operational security limits in an appropriate format describing a specific power system physical property. The appropriate format shall include such as

   a) thermal limits shall be presented as MVA or kA, for DC lines this implies MW;
   b) voltage limits shall be presented related to nominal voltage (per unit) or kV;
   c) frequency limits shall be presented related to nominal frequency or Hz; and
   d) dynamic stability limits shall be presented per unit for voltage and damping for electromechanical oscillations

2. All TSOs of CCR Nordic propose to amend Article 4(2) in the following way:

   Each TSO shall provide the operational security limits for all elements of its bidding zone(s) to the CCC to be used in the capacity calculation. These operational security limits shall not include any pre-calculation by the individual TSO, where the operational security limits have been transposed to power flow limits presented with MW values.

Article 2
Amendment to Article 31 Capacity calculation process

All TSOs of CCR Nordic propose to amend Article 31 in the following way:

1. The capacity calculation process for the day-ahead timeframe and for each market time unit within that timeframe is as follows:
    a) Each TSO shall create an IGM for its bidding zone(s) and send it to the merging agent for merging IGMs to build the CGM in accordance with Article 17 of the CACM Regulation. The IGM shall include dynamic data for the CCC to facilitate dynamic stability analysis in capacity calculation;
    b) The merging agent shall send the CGM to the CCC for calculation of F_{max};
    c) Each TSO shall send GSK strategies (as defined in Article 7) to the CCC for calculation of F_{max};
    d) Each TSO shall send contingencies for its bidding zone(s) determined in accordance with Article 5 to the CCC for calculation of F_{max};
    e) Each TSO shall send operational security limits for its bidding zone(s) determined in accordance with Article 4 to the CCC for calculation of F_{max};
    f) Each TSO shall send CNEs for its bidding zone(s) determined in accordance with Article 11 to the CCC to be considered in capacity calculation;
    g) The CCC shall calculate F_{max} for each CNE in accordance with Article 15 applying the CGM, GSKs, contingencies, operational security limits and CNEs submitted by each TSO;
    h) Each TSO shall send RM for each CNE determined in accordance with Article 3 to the CCC for calculation of RAMs;
    i) Each TSO shall send AAC for each CNE determined in accordance with Article 13 to the CCC for calculation of RAMs;
    j) Each TSO shall send RA for each CNE determined in accordance with Article 9, Article 10 and Article 12 to the CCC for calculation of RAMs;
    k) The CCC shall calculate RAM for each CNE determined in accordance with Article 15 and PTDFs in accordance with Article 14 taking into account rules for sharing the power flow capabilities of CNEs among different CCRs in accordance with Article 16;
    l) The CCC shall send FB parameters to each TSO for validation in accordance with Article 17;
    m) Each TSO shall send validated FB parameters, including adjustments to FB parameters, to the CCC;
    n) Each TSO shall send allocation constraints determined in accordance with Article 6 to the CCC;
    o) The CCC shall send the validated FB parameters and allocation constraints to relevant NEMOs for the purpose of allocating cross-zonal capacity by MCO in accordance with the CACM Regulation;
    p) Relevant NEMOs shall publish validated FB parameters and allocation constraints to the market in accordance with Article 46(1) of the CACM Regulation; and
    q) The CCC shall publish validated FB parameters and allocation constraints in accordance with Article 30.

The capacity calculation process for the day-ahead timeframe is shown in Figure 2. The figure identifies the roles of the entities involved, and the input and output data in the capacity calculation process.
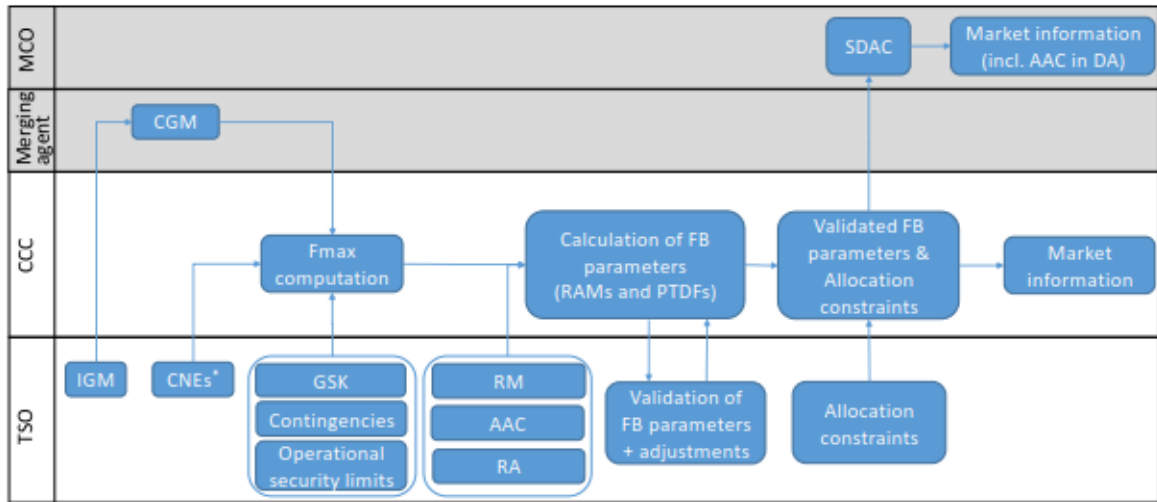
Figure 2. Roles of the entities involved, and input and output data, in the capacity calculation process for the day-ahead timeframe. MCO means Market Coupling Operator, and the Merging agent delivers the CGM.
* CNEs to be defined at least on weekly basis applying relevant historical CGMs.

2. The capacity calculation process of Article 31(1) shall be applied for the intraday timeframe when the FB approach has been implemented and the conditions as described in Article 32 have been fulfilled.

Article 3
Amendment to Article 32 Publication and Implementation

1. All TSOs of CCR Nordic propose to amend Article 32(1) in the following way:

   The TSOs shall publish the Proposal for Amendment together with the full amended CCM without undue delay after all NRAs in the CCR Nordic have approved the Proposal for Amendment or a decision has been taken by the Agency for the Cooperation of Energy Regulators in accordance with Article 9(10), Article 9(11) and 9(12) of the CACM Regulation.

2. All TSOs of CCR Nordic propose to amend Article 32(2) in the following way:

   The TSOs shall implement the CCM and Proposal for Amendment on all bidding zone borders within the CCR Nordic after the CGM methodology developed in accordance with Article 17 of the CACM Regulation, the market coupling operator function developed in accordance with Article 7(3) of the CACM Regulation, the relevant requirements set in algorithm submitted in accordance with Article 37(5), and the coordinated capacity calculator in CCR Nordic has been set up in accordance with Article 27 of the CACM Regulation, are implemented in the CCR Nordic. The milestones and the criteria for implementing the CCM are presented in Table 2 and 3. A milestone is reached after all criteria listed above in the table for that milestone are being met.

Article 4
Language

The reference language for this Proposal for Amendment shall be English. For the avoidance of doubt, where TSOs need to translate this Proposal for Amendment into their national language(s), in the event of inconsistencies between the English version published by TSOs in accordance with Article 9(14) of the CACM Regulation and any version in another language the relevant TSOs shall, in accordance with national legislation, provide the relevant national regulatory authorities with an updated translation of this Proposal for Amendment.

Table 2. Milestones and criteria for implementation of FB approach for day-ahead timeframe.

#	Milestone	Criteria to be met before moving to the next milestone
1	Market simulations in Simulation Facility using prototype FB tool (overlapping with milestone #2)	• Requirements/specifications for the industrialized tool are finished and are based on the CCM and the experience gained by using the prototype tool; • In order to increase transparency, stakeholders are involved in the development of stakeholder information tool; • NRAs have approved the CCM.

2	Investment decision - FB industrialized tool	• Minimum of one year of FB market simulations (as described under milestone #1), where:
		    o FB approach is proven not to be less efficient compared to NTC, at the same level of operational security;
		    o FB approach is reliable in producing capacity calculation parameters and results.
		• Market simulation results are published to the stakeholders;
		• GSK and FRM methodologies are fully developed and ready for implementation;
		• CGMs are available and can be applied in the capacity calculation:
		    o Steady-state CGM is available to allow active and reactive power flow and voltage analyses in steady state;
		    o TSOs' apply local dynamic grid model to calculate dynamic stability limits.
		• KPIs for a go-live of the FB approach have been specified, in dialogue with NRAs and stakeholders.

3	Parallel runs including FB and NTC	• Parallel runs are performed in real NEMO systems (single day-ahead coupling) and capacity calculation parameters are submitted to NEMOs daily as with current NTC approach:
		    o Precondition is that Euphemia is able to handle FB parameters for a larger area including CCR Nordic when performing calculations for the geographical scope of single day-ahead coupling.
		• At the minimum 12 months of continuous parallel runs, where:
		    o FB approach is proven not to be less efficient compared to NTC, at the same level of operational security;
		    o FB approach is reliable in producing capacity calculation parameters and results.
		• Results from the parallel runs, and the KPIs, are published daily;
		• KPIs for a go-live of the FB capacity calculation have been met;
		• A final, exhaustive and binding list of all publication items, metrics and indicators, has been consulted with NRAs and stakeholders.

#	Milestone	Criteria to be met before moving to the next milestone
4	FB go-live	- KPIs for a go-live of TSOs applying a dynamic CGM for the calculation of dynamic CNEs have been specified, in dialogue with NRAs and stakeholders - Dynamic CGM – pilot model: - Establish common data format for exchanging dynamic data; - Develop common processes for exchanging dynamic data; - Issue and validate the pilot dynamic model. - Dynamic CGM - production model: - IT tool(s) for production grade model has been identified; - Validation of production grade model against other simulation tools and system incidents performed; - Parallel run between new and existing processes (TSO-to-TSO). - KPIs for a go-live of TSOs applying a dynamic CGM for the calculation of dynamic CNEs have been met
5	TSOs apply a dynamic CGM for calculation of dynamic CNEs (intermediate process to take into account dynamics)	- Processes and rules: - Develop processes for updating methodologies and tools; - Develop processes for upgrading and validating dynamic CGM; - Description of intermediate (TSO-to-TSO) and target (including the CC) solutions; - Development of business processes. - Development of IT requirements and specifications; - Tendering and procurement of IT tools; - Implementation (including parallel run);
6	The CCC will calculate dynamic operational security limits for the CC process	

Table 3. Milestones and criteria for implementation of CNTC approach and FB approach for intraday timeframe.

#	Milestone	Criteria to be met before moving to the next milestone
1	CGMs applied in capacity calculation using current NTC approach	• GSK and RM methodologies are fully developed and ready for implementation; • Coordination in capacity calculation implemented; • CGM can be based either on: o present process (as with milestone #2 of Table 2); o intermediate process or (as with milestone #5 of Table 2); o target process (as with milestone #6 of Table 2) which one is available at the time of implementation.
2	CNTC go-live	• FB approach fully developed, tested in day-ahead and intraday, and: o proven not to be less efficient compared to NTC, at the same level of operational security; o proven not to decrease system security, at the same level of efficiency; o reliable in producing capacity calculation parameters and results. • Single intraday coupling (SIDC) ready to support FB approach.
3	FB go-live	