Draft Proposal for a common coordinated capacity calculation methodology for Capacity Calculation Region Hansa in accordance with Article 20 (2) of the Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a Guideline on Capacity Allocation and Congestion Management

15th of June 2017

DISCLAIMER

This document is released on behalf of all the transmission system operators (TSOs) of Capacity Calculation Region (CCR) Hansa solely for the purpose of public consultation on the Proposal for a common capacity calculation methodology in accordance with Article 20 (2) of Commission Regulation (EU) No. 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management. This is a draft Proposal and does not constitute a firm, binding or definitive position of the TSOs on the content.

The Transmission System Operators of Capacity Calculation Region Hansa, taking into account the following:

WHEREAS

(1) This document is a common Proposal of the Transmission System Operators (hereafter referred to as "TSOs") of Capacity Calculation Region (hereafter referred to as "CCR") Hansa as described in the ACER decision[1].

(2) This Proposal for a common coordinated capacity calculation methodology for the CCR Hansa (herafter referred to as "Proposal") takes into account the general principles and goals set in Commission Regulation (EU) 2015/1222, establishing a guideline on capacity allocation and congestion management (hereafter referred to as 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-bidding zone border exchanges in electricity (hereafter referred to as "Regulation (EC) No. 714/2009").

(3) The goal of the CACM Regulation is the coordination and harmonisation of capacity calculation and allocation in the day-ahead timeframe and the intraday timeframe.

(4) This Proposal is required by Article 20 (2) of the CACM Regulation:

"No later than 10 months after the approval of the Proposal for a capacity calculation region in accordance with Article 15(1), all TSOs in each capacity calculation region shall submit a Proposal for a common coordinated capacity calculation methodology within the respective region."

This Proposal is subject to consultation in accordance with Article 12 of the CACM Regulation.

(5) The proposed capacity calculation methodology (hereafter referred to as "CCM") for the CCR Hansa contributes to, and does not in any way hinder, the achievement of the objectives of Article 3 of the CACM Regulation.

(6) The CCM for the CCR Hansa secures optimal use of the transmission capacity as it takes advantage of the flow-based capacity calculation methodologies developed in CCR Nordic and CCR Core in order to represent the limitations in the alternating current (hereafter referred to as "AC") grids, while the actual interconnector capacities are addressed individually within CCR Hansa. The use of interconnector capacity and AC grid capacity is fully integrated in this way, thereby providing a fair competition for the scarce capacities in the system and an optimal system use. There is no predefined and static split of the capacities on critical network elements, and the flows through CCR Hansa from CCR Core and CCR Nordic are decided based on economic efficiency during the capacity allocation phase.

(7) The CCM for the CCR Hansa treats all bidding zone borders in the CCR Hansa and adjacent CCRs equally, and provides non-discriminatory access to cross-zonal capacity. It creates a basis for a fair and orderly market and a fair and orderly price formation by implementing a simple CCM solution which is integrated with the methodologies of the adjacent CCRs.

(8) The CCM for the CCR Hansa will fully apply in a situation where Advanced Hybrid Coupling (hereafter referred to as "AHC") is implemented in the flow-based CCM of CCR Nordic and CCR Core.

(9) The CCM for the CCR Hansa takes advantage of the flow-based capacity calculation from adjacent CCRs for the AC grids while also ensuring full transparency of the calculation of the actual interconnector capacity. This will in turn result in a better understanding for market participants and improve transparency and reliability of information compared to what is available today on the CCR Hansa bidding zone borders.

(10) The CCM for the CCR Hansa has no negative consequences on the development of capacity calculation methodologies in adjacent CCRs, and can evolve dynamically with the development

[1] ACER's definition of the Capacity Calculation Regions (CCRs) of 17 November 2016 (Annex I to CCR decision) http://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/ANNEXES_CCR_DECISION/Annex%20I.pdf

and merger of CCRs in the future. The CCM for the CCR Hansa therefore does not hinder an efficient long-term operation in CCR Hansa and adjacent CCRs, and the development of the transmission system in the European Union.

(11) With the CCM for the CCR Hansa being aligned with the flow-based CCMs in adjacent CCRs, the handling of adjustment of power flows on critical network elements due to remedial actions as well as the mathematical description for the calculation of power transfer distribution factors and the calculation of available margins on critical network elements, will be handled in the adjacent CCR's CCMs.

(12) With the CCM for the CCR Hansa preconditioning the use of Advanced Hybrid Coupling in the adjacent CCRs Nordic and Core there will, when implemented, be no undue discrimination between cross-zonal flows within CCR Hansa or adjacent regions. It will also ensure that there will be no undue discrimination between bidding zone borders within CCR Hansa.

HEREBY SUBMIT THE FOLLOWING PROPOSAL FOR A COMMON COORDINATED CAPACITY CALCULATION METHODOLOGY FOR THE CCR HANSA:

Article 1
Subject, matter and scope

1. As required under Article 20 (2) of the CACM Regulation all TSOs in each CCR shall submit a Proposal for a common coordinated capacity calculation methodology within the respective region.

2. This document establishes a common coordinated CCM for all bidding zone borders allocated to the CCR Hansa.

Article 2
Definitions

1. For the purpose of this Proposal, the terms used will have the meaning of the definitions included in:

    a. Article 2 of the CACM Regulation and Regulation (EC) No. 714/2009 and Regulation (EC) No. 543/2013.

    b. Advanced Hybrid Coupling is understood as a part of the flow-based Capacity Calculation method allowing the capacity allocation algorithm to make an economic optimisation of the flow on direct current (hereafter referred to as "DC") lines on equal terms with the flow on AC lines.

2. In this Proposal, unless the context requires otherwise:

    a. The singular indicates the plural and vice versa.

    b. Headings are inserted for convenience only and do not affect the interpretation of the Proposal.

    c. References to an "Article" are, unless otherwise stated, references to an article of this Proposal; and

    d. Any reference to legislation, regulations, directives, orders, instruments, codes or any other enactment includes any modification, extension or re-enactment of it when in force.

CHAPTER 1
Capacity Calculation Methodology for the day-ahead timeframe

Article 3
Mathematical description

1. The following mathematical description applies for the calculation of available transfer capacity on the DC lines.

    The available transfer capacity $\mathrm{ATC}_{\mathrm{i,DC,A\rightarrow B}}$ on a DC line *i* in the direction A→B is calculated from:

$$\mathrm{ATC}_{\mathrm{i,DC,A\rightarrow B}} = \mathrm{TTC}_{\mathrm{i,A\rightarrow B}} - \mathrm{TRM}_{\mathrm{i,A\rightarrow B}} - \mathrm{AAC}_{\mathrm{i,A\rightarrow B}} + \mathrm{AAC}_{\mathrm{i,B\rightarrow A}}$$

    where

A	:=	Bidding zone A.
B	:=	Bidding zone B.
$\mathrm{ATC}_{\mathrm{i,DC,A\rightarrow B}}$	:=	Available transfer capacity on a DC line *i* in direction A→B provided to the day-ahead market.
$\mathrm{TTC}_{\mathrm{i,A\rightarrow B}}$	:=	Total transfer capacity of a DC line *i* in direction A→B, on the receiving end.

The TTC for a DC line *i* is defined as follows:

$$\mathrm{TTC}_{\mathrm{i,A\rightarrow B}} = \alpha_{\mathrm{i}} \cdot \mathrm{P}_{\mathrm{i,max\,thermal}} * \left(1 - \beta_{\mathrm{i,Loss,A\rightarrow B}}\right)$$

$\mathrm{TRM}_{\mathrm{i,A\rightarrow B}}$	:=	Transmission reliability margin for a DC line i in direction A→B.
$\mathrm{AAC}_{\mathrm{i,A\rightarrow B}}$	:=	Already Allocated and nominated Capacity for a DC line i in direction A→B.
$\mathrm{AAC}_{\mathrm{i,B\rightarrow A}}$	:=	Already Allocated and nominated Capacity for a DC line i in direction B→A.
α_{i}	:=	Availability factor of equipment defined through scheduled and unscheduled outages, α_{i}, being a real number in between and including 0 and 1.
$\mathrm{P}_{\mathrm{i,max\,thermal}}$	:=	Thermal capacity for a DC line *i.*
$\beta_{\mathrm{i.Loss,A\rightarrow B}}$	:=	Loss factor for a DC line *i* in direction A→B, which can be a different value depending on α_{i}.

2. The following mathematical description applies for the calculation of avaiblable transfer capacity on the AC lines.

   The available transfer capacity $\mathrm{ATC}_{\mathrm{AC,A\rightarrow B}}$ on a bidding zone border that is connected by AC lines in the direction A→B can be calculated from:

$$\mathrm{ATC}_{\mathrm{AC,A\rightarrow B}} = \mathrm{TTC}_{\mathrm{A\rightarrow B}} - \mathrm{TRM}_{\mathrm{A\rightarrow B}} - \mathrm{AAC}_{\mathrm{A\rightarrow B}} + \mathrm{AAC}_{\mathrm{B\rightarrow A}}$$

   where

A	:=	Bidding zone A.
B	:=	Bidding zone B.
$\mathrm{ATC}_{\mathrm{AC,A\rightarrow B}}$	:=	Available transfer capacity of a bidding zone border in direction A→B, provided to the day-ahead market.
$\mathrm{TTC}_{\mathrm{A\rightarrow B}}$	:=	Total transfer capacity of a bidding zone border in direction A→B.
$\mathrm{TRM}_{\mathrm{A\rightarrow B}}$	:=	Transmission reliability margin for a bidding zone border in direction A→B.
$\mathrm{AAC}_{\mathrm{A\rightarrow B}}$	:=	Already Allocated and nominated Capacity for a bidding zone border in direction A→B.
$\mathrm{AAC}_{\mathrm{B\rightarrow A}}$	:=	Already Allocated and nominated Capacity for a bidding zone border in direction B→A.

Article 4
Methodology for determining the reliability margin

1. The methodology for determining the TRM applies solely to the AC lines included in the CCR Hansa.
2. The TRM calculation shall consist of the following steps:
   a. Identification of sources of uncertainty for each TTC calculation process;
   b. Derivation of independent time series for each uncertainty and determination of probability distributions (PD) of each time series;
   c. Convolution of individual PDs and derivation of the TRM value from the convoluted PD.

Article 5
Methodology for determining operational security limits and contingencies relevant to capacity calculation and allocation constraints

1. Flow interactions between the CCR Hansa interconnections and the adjacent grids are reflected in the corresponding flow-based parameters applied by the CCR Nordic and CCR Core.

2. CCR Hansa TSOs assess individually the operational security limits which cannot be reflected in the flow-based parameters of adjacent CCRs.

3. Allocation constraints may be applied by individual TSOs if they are needed to either
   a. increase the economic surplus for single day-ahead or intraday coupling in accordance with Article 23 (3) of the CACM Regulation; or
   b. maintain the transmission system within operational security limits that can not be transformed efficiently into maximum flows on critical network elements in accordance with Article 23 (3) of the CACM Regulation.

Article 6
Methodology for determining generation shift keys

1. On the radial AC connection the generation shift key is modelled to represent the distribution of the power flow between the cross-bidding zone border lines.

2. Flow interactions between the CCR Hansa interconnections and the adjacent grids are reflected in the corresponding flow-based parameters.

Article 7
Methodology for determining remedial actions to be considered in capacity calculation

If it becomes relevant the impact of remedial actions will be considered by the Coordinated Capacity Calculator (hereafter referred to as "CCC") in the determination of the TTC value.

CHAPTER 2
Capacity Calculation Methodology for the Intraday timeframe

Article 8
Mathematical description

1. The following mathematical description applies for the calculation of avaiblable transfer capacity on DC lines.

   The available transfer capacity $\mathrm{ATC}_{\mathrm{i,DC,A\rightarrow B}}$ on a DC line *i* in the direction A→B is calculated from:

$$\mathrm{ATC}_{\mathrm{i,DC,A\rightarrow B}} = \mathrm{TTC}_{\mathrm{i,A\rightarrow B}} - \mathrm{TRM}_{\mathrm{i,A\rightarrow B}} - \mathrm{AAC}_{\mathrm{i,A\rightarrow B}} + \mathrm{AAC}_{\mathrm{i,B\rightarrow A}}$$

   where

A	:=	Bidding zone A.
B	:=	Bidding zone B.
$\mathrm{ATC}_{\mathrm{i,DC,A\rightarrow B}}$	:=	Available transfer capacity on a DC line *i* in direction A→B provided to the intraday market.
$\mathrm{TTC}_{\mathrm{i,A\rightarrow B}}$	:=	Total transfer capacity of a DC line *i* in direction A→B, on the receiving end.

   The TTC for a DC line *i* is defined as follows:

$$\mathrm{TTC}_{\mathrm{i,A\rightarrow B}} = \alpha_{\mathrm{i}} \cdot \mathrm{P}_{\mathrm{i,max\,thermal}} * \left(1 - \beta_{\mathrm{i,Loss,A\rightarrow B}}\right)$$

$\mathrm{TRM}_{\mathrm{i,A\rightarrow B}}$	:=	Transmission reliability margin for a DC line i in direction A→B.
$\mathrm{AAC}_{\mathrm{i,A\rightarrow B}}$	:=	Already Allocated and nominated Capacity for a DC line i in direction A→B.
$\mathrm{AAC}_{\mathrm{i,B\rightarrow A}}$	:=	Already Allocated and nominated Capacity for a DC line i in direction B→A.
α_{i}	:=	Availability factor of equipment defined through scheduled and unscheduled outages, α_{i}, being a real number in between and including 0 and 1.

$P_{i,max\,thermal}$:= Thermal capacity for a DC line *i.*

$\beta_{i.Loss,A\rightarrow B}$:= Loss factor for a DC line i in direction A→B, which can be a different value depending on α_i.

2. The following mathematical description applies for the calculation of avaiblable transfer capacity on the AC lines.

   The available transfer capacity $ATC_{AC,A\rightarrow B}$ on a bidding zone border that is connected by AC lines in the direction A→B is calculated from:

$$ATC_{AC,A\rightarrow B} = TTC_{A\rightarrow B} - TRM_{A\rightarrow B} - AAC_{A\rightarrow B} + AAC_{B\rightarrow A}$$

   where

   A := Bidding zone A.

   B := Bidding zone B.

   $ATC_{AC,A\rightarrow B}$:= Available transfer capacity of a bidding zone border in direction A→B, provided to the intraday market.

   $TTC_{A\rightarrow B}$:= Total transfer capacity of a bidding zone border in direction A→B.

   $TRM_{A\rightarrow B}$:= Transmission reliability margin for a bidding zone border in direction A→B.

   $AAC_{A\rightarrow B}$:= Already Allocated and nominated Capacity for a bidding zone border in direction A→B.

   $AAC_{B\rightarrow A}$:= Already Allocated and nominated Capacity for a bidding zone border in direction B→A.

Article 9
Frequency of reassement of the capacity in the intraday timeframe

The frequency of the reassessment of intraday capacity shall be dependent on the availability of input data relevant for capacity calculation, as well as any events impacting the capacity on the cross-zonal lines.

Article 10
Methodologies for determining the reliability margin, operational security limits and contingencies relevant to capacity calculation and allocation constraints, generation shift keys and remedial actions to be considered in capacity calculation

The methodologies according to Article 4 to 7 of this Proposal for the day-ahead timeframe also apply for the intraday timeframe.

CHAPTER 3
Common provisions

Article 11
Methodology for the validation of cross-zonal capacity

1. Each TSO shall validate and have the right to correct cross-zonal capacity relevant to the TSO's bidding zone border(s) provided by the CCC.

2. Each TSO may reduce cross-zonal capacity during the validation of cross-zonal capacity referred to in paragraph 1 for reasons of operational security.

3. Each TSO sends its capacity validation result to the relevant CCC and to the other TSOs of CCR

Hansa.

Article 12
Fallback for capacity calculation in the day-ahead and intraday timeframe

In case the capacity calculation cannot be performed by the CCC, the concerned TSOs will bilaterally calculate and agree on cross-zonal capacities. The concerned TSOs shall submit the capacities to the relevant CCC and to the other TSOs of the relevant CCR.

Article 13
Implementation

Implementation of this Proposal will be according to the following milestones:

a. Implementation of the methodology for the Common Grid Model.
b. The CCC for CCR Hansa is appointed and in operation pursuant to Article 27 (2) of CACM Regulation.
c. The flow-based CCM of CCR Core and of CCR Nordic have been implemented including Advanced Hybrid Coupling for the lines in CCR Hansa.
d. The Single Intraday Coupling solution can apply flow-based parameters.

Article 14
Language

The reference language for this Proposal is English. To avoid any doubt, where TSOs need to translate this Proposal into their national language(s), in the event of inconsistencies between the English version published by the TSOs in accordance with Article 9 (14) of the CACM Regulation and any version in another language, the concerned TSOs shall, in accordance with national legislation, provide the relevant National Regulatory Authorities with an updated translation of the Proposal.