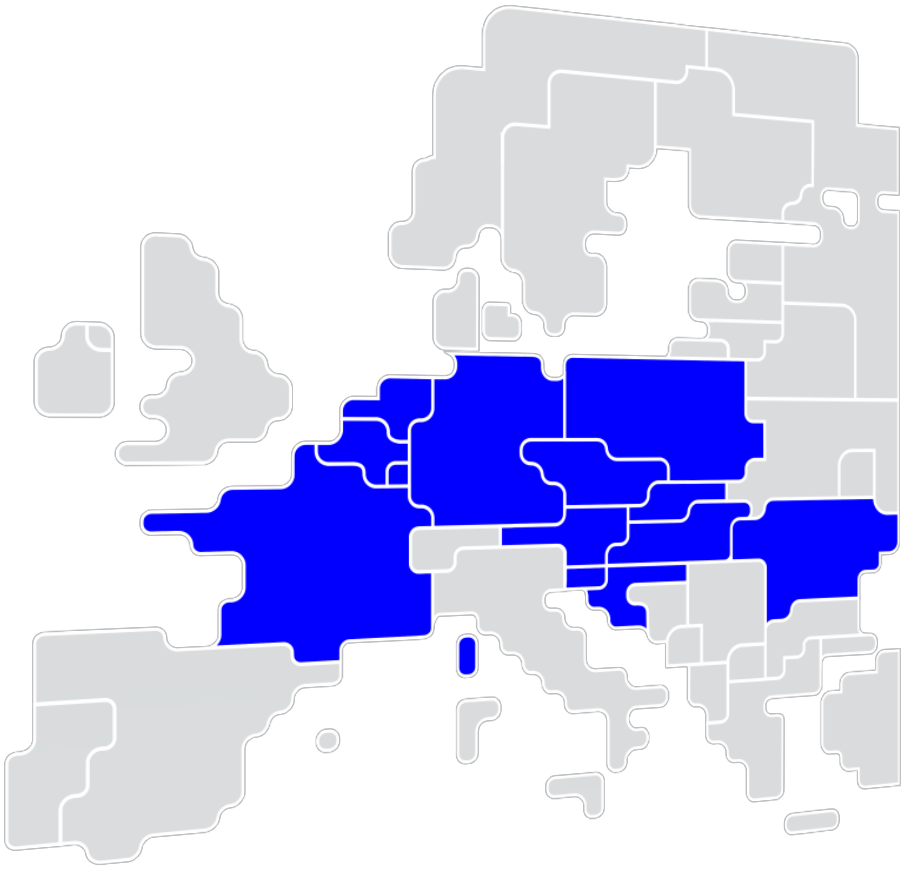
CORE

Balancing timeframe capacity calculation methodology for the Core capacity calculation region

in accordance with Article 37(3) of the Commission Regulation (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing

02 September 2022



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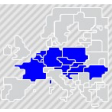

Content

TSOs OF THE CORE CCR, TAKING INTO ACCOUNT THE FOLLOWING,

Whereas

(1) This document sets out the capacity calculation methodology in accordance with article 37 and 38 of the COMMISSION REGULATION (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing (hereafter referred to as the "EB Regulation"). This methodology is hereafter referred to as the "balancing timeframe capacity calculation methodology".

(2) The balancing timeframe capacity calculation methodology serves the objective of calculating cross zonal capacity within the balancing timeframe for the exchange of balancing energy or for operating the imbalance netting process in accordance with article 37(3) EB Regulation. It provides the input regarding CZCL to the European Balancing Platforms.

(3) In accordance with article 37(3) EB Regulation the balancing timeframe capacity calculation methodology is consistent with the cross-zonal capacity calculation methodology applied in the intraday timeframe established under Regulation (EU) 2015/1222 because it is built up as a sequential process after the intraday capacity calculation and applies the same principles as ID for the input creation and calculation process. It relies on forecast data and uses elements from the flow based approach used in ID. Flow-based computations are performed in the scope of the intraday capacity calculation methodology and processes outputs of the last IDCC run in accordance with Article 4. Therefore, with reference to the capacity calculation methodology in the intraday timeframe, the general input parameters are created and only updated in case of specificities of the Balancing Timeframe:

- individual list of CNECs in accordance with Article 5;
- operational security limits in accordance with Article 6;
- allocation constraints in accordance with Article 7;
- FRMs in accordance with Article 8;
- GSKs in accordance with Article 9; and
- non-costly and costly RAs in accordance with Article 10.

Furthermore, following capacity calculation steps are processed in accordance with the Core Intraday capacities calculation methodology:

- Updates of the balancing timeframe cross-zonal capacities remaining after the IDCZGCT described in Article 11 and thus the consideration of already reserved capacities for the balancing timeframe or cross-zonal capacity allocations
- Integration of HVDC interconnectors on bidding zone borders of the Core CCR in accordance with Article 12
- Consideration of non-Core bidding zone borders in accordance with Article 13
- Calculations of NTCs for the exchange of balancing capacities and sharing of reserves in accordance with Article 14

(4) In accordance with article 5(5) EB Regulation this balancing timeframe capacity calculation methodology is compliant with the objectives mentioned in article 3(1) EB Regulation as set out below. This balancing timeframe capacity calculation methodology

a. in accordance with article 3(1) (a) EB Regulation fosters effective competition, non-discrimination and transparency in balancing markets by limiting situations where cross-zonal exchanges are limited by congestions inside bidding zones by using the criteria set out in Article 5 under which the network elements located inside bidding zones can be

considered as limiting for capacity calculation and publishing all relevant information about balancing capacities and its adjustments after validation. To avoid undue discrimination between internal and cross-zonal exchanges (and the underlying discrimination between market participants trading inside or between bidding zones), the day-ahead capacity calculation methodology introduces two important measures. The first measure aims to limit the situations where cross-zonal exchanges are limited by congestions inside bidding zones. The second measure aims to minimise the degree to which the flows resulting from exchanges inside a bidding zone on network elements located inside that zone (i.e. internal flows) or on network elements on the borders of bidding zones and inside neighbouring bidding zones (i.e. loop flows) are reducing the available cross-zonal capacity. This methodology also introduces the first measure, which is to limit the cases where congestions inside bidding zones impact cross-zonal capacity only to those situations that are proven to be the most efficient. However, the second measure, the introduction of minimum cross-zonal capacities, cannot be applied in the balancing timeframe capacity calculation methodology, since this principle requires extensive application of remedial actions, yet the time between the balancing timeframe capacity calculation and the first delivery hour is too short to identify, coordinate and apply the remedial actions that would be necessary to guarantee the minimum cross-zonal capacity. This principle is also not applied for intraday capacity calculation. Core TSOs provide market participants with reliable information on cross-zonal capacities and allocation constraints for balancing market in a transparent way and at the same time. This also includes information on all steps of capacity calculation and regular reporting on specific processes within capacity calculation. Effective competition is fostered by providing jointly the calculated capacity for the Core region through the balancing platforms;

b. in accordance with article 3(1) (b) EB Regulation enhances efficiency of balancing as well as efficiency of European and national balancing markets by maximizing capacities for the balancing timeframe by considering the latest market allocations and updating capacities for the balancing timeframe after each IDCZGT;

c. in accordance with article 3(1) (c) EB Regulation integrates balancing markets and promotes the possibilities for exchanges of balancing services while contributing to operational security by calculating capacities based on the flow-based approach as set out in Article 4 which aims at providing maximum capacities within the operational security limits and offering the possibility to validate balancing timeframe capacities before provision to the balancing markets as set out in Article 15;

d. in accordance with article 3(1) (d) EB Regulation contributes to the efficient long-term operation and development of the electricity transmission system and electricity sector in the Union while facilitating the efficient and consistent functioning of day-ahead, intraday and balancing markets by ensuring consistency with the Intraday capacity calculation methodology, applying principles based on a flow-based capacity calculation approach that is also used in day-ahead capacity calculation and implementing an efficient solution within the proposed timeline that is based on established principles from other timeframes. Due to the alignment and reuse of principles among the different capacity calculation methodologies, synergies in IT development and operational processes are created aiming for maximum efficiency for the long-term operation of all timeframes. The balancing timeframe methodology ensures coherency with the ROSC and IDCC process by facilitating a sequential process chain. Moreover, the balancing timeframe capacity calculation methodology requires the Core TSOs to perform a study to assess the benefits of increasing the frequency of Flow-Based computations based on more recent grid

models forecast available. The analysis shall focus on the overall efficiency of such an implementation;

e. in accordance with article 3(1) (e) EB Regulation ensures that the procurement of balancing services is fair, objective, transparent and market-based, avoids undue barriers to entry for new entrants, fosters the liquidity of balancing markets while preventing undue distortions within the internal market in electricity by providing capacities to the balancing platforms after the IDCZGT and publishing all relevant information regarding capacities used for the balancing timeframe and its adjustments. It provides market participants with reliable information on cross-zonal capacities and allocation constraints for balancing market in a transparent way and at the same time;

f. in accordance with article 3(1) (f) EB Regulation facilitates the participation of demand response including aggregation facilities and energy storage while ensuring they compete with other balancing services at a level playing field and, where necessary, act independently when serving a single demand facility by providing capacities to the balancing platforms in a transparent way where they can be used by the balancing platforms;

g. in accordance with article 3(1) (g) EB Regulation facilitates the participation of renewable energy sources and support the achievement of the European Union target for the penetration of renewable generation by considering forecast data of renewables and the latest market allocations during the computation of capacities for the balancing timeframe.

(5) In accordance with article 5(5) EB Regulation this balancing timeframe capacity calculation methodology is compliant with the regulatory aspects mentioned in article 3(2) EB Regulation as set out below. This balancing timeframe capacity calculation methodology

a. in accordance with article 3(2) (a) EB Regulation applies the principles of proportionality and non-discrimination as set out in Recital 5(a);

b. in accordance with article 3(2) (b) EB Regulation as set out in Recital 5(a). Further, the balancing timeframe capacity calculation methodology has been developed and adopted within a process that ensures the involvement of all relevant stakeholders;

c. in accordance with article 3(2) (c) EB Regulation applies the principle of optimization between the highest overall efficiency and lowest total costs for all parties involved by building up the balancing capacity calculation process based on the principles of the IDCC and establishing a sequential process chain with ROSC and IDCC while respecting current technical limitations that prevents performing FB computations on grid models including all recent information after ID CZGCT and before capacities for the balancing timeframe needs to be provided to the balancing platforms. Thus, it prevents significant investments in IT developments. However, the input used is an accurate forecast, although not created after the ID CZGCT. Updated forecasts after the ID CZGT are not available due to timing constraints and considering alternatives input as real-time data would not contain reliable information as it is not designed for the dedicated BT CC MTU. With this approach the frequency for updated capacities based on updated grid model forecasts is the same as for the intraday capacity calculation methodology. Moreover, the balancing timeframe capacity calculation methodology performs a study to assess the benefits of increasing the frequency of Flow-Based computations based on more recent grid model forecasts available. The analysis shall focus on the overall efficiency of such an implementation in accordance with Article 4;

d. in accordance with article 3(2) (d) EB Regulation ensures that TSOs make use of market-based mechanisms, as far as possible, in order to ensure network security and stability by using principles of a flow based approach, although NTCs are calculated in accordance with Article 14. Market based mechanism are fostered by providing jointly the calculated capacity for the Core CCR through the balancing platforms;

e. in accordance with article 3(2) (e) EB Regulation ensures that the development of the forward, day-ahead and intraday markets is not compromised by fostering the development of the markets as set out in Recital 5(a) and the fact that the balancing capacity updates are made after the ID CZGCT and thus independent from the day-ahead and intraday processes which prevents compromising those;

f. in accordance with article 3(2) (f) EB Regulation respects the responsibility assigned to the relevant TSO in order to ensure system security, including as required by national legislation by using principles of a flow based approach and allowing an individual validation before capacities are provided to the balancing platforms where each TSO can check its own network;

g. in accordance with article 3(2) (g) EB Regulation consults with relevant DSOs and take account of potential impacts on their system by consulting with relevant DSO in this methodology consultation process if needed;

h. in accordance with article 3(2) (h) EB Regulation takes into consideration agreed European standards and technical specifications by building the balancing capacity calculation process up on established processes, principles and mechanisms that are used in the day-ahead and intraday capacity calculation methodologies and in sequence to the regional operational security coordination that creates the grid model inputs for this process.

(6) The balancing timeframe capacity calculation methodology is based on forecast models of the transmission system. Therefore, robustness and stability of the process are maximised due to the application of established principles. Alternatives as using real-time data as approximation for the future situation increase complexity as additional process steps needs to be introduced. Furthermore, the feasibility and increase of quality is not proven. The final inputs are created before the electricity delivery hour with the available knowledge at that time. Therefore, the outcomes are subject to inaccuracies and uncertainties. The aim of the reliability margin is to cover a level of risk induced by these forecast errors.

(7) Some operational security limits can be transformed into limitations on active power flows on critical network elements, whereas some other cannot and may be modelled as allocation constraints. Some of the operational security limits (inter alia frequency, voltage and dynamic stability) depend on the level of production and consumption in a given bidding zone, and these cannot be controlled by active power flow on critical network elements. Thus, specific limitations on production and consumption are needed, and these are expressed as maximum import and export constraints of bidding zones. External constraints are therefore a type of allocation constraints limiting the total import and export of a bidding zone. Nevertheless, given the lack of proper justification for these allocation constraints, their application is considered in this methodology as a temporary solution in order to allow TSOs to explore alternative solutions to the underlying problems. If none of the alternative solutions is more efficient to tackle the underlying problems, the concerned TSOs may propose to continue applying them.

(8) Despite coordinated application of capacity calculation, TSOs remain responsible for maintaining operational security. For this reason they need to validate the calculated cross-zonal capacities to ensure that they do not violate operational security limits. Each TSO may individually validate cross-zonal capacities. This may lead to reductions of cross-zonal capacities below the values needed to avoid undue discrimination. Thus transparency, monitoring and reporting will be applied in case of reductions of cross-zonal capacities.

(9) Transparency and monitoring of capacity calculation are essential for ensuring its efficiency and understanding. This methodology establishes significant requirements on TSOs to publish the information required by stakeholders to analyse the impact of capacity calculation on the market functioning. Furthermore, additional information in accordance with Article 18(3) and Article 20(2) is provided to allow regulatory authorities to perform their monitoring duties. Finally, the methodology establishes significant reporting requirements in order for stakeholders, regulatory authorities and other interested parties to verify whether the transmission infrastructure is operated efficiently and in the interest of consumers.

TITLE1 GENERAL PROVISIONS

Article 1 Subject, Matter and Scope

The Balancing Timeframe Capacity Calculation (BTCC) methodology as determined in this document is the common methodology for the capacity calculation performed for the capacity allocation within the balancing timeframe for the exchange of balancing energy or for operating the imbalance netting process for Core CCR in accordance with article 37 of the EB Regulation.

Article 2 Definitions and interpretation

1. For the purposes of the balancing timeframe capacity calculation methodology, terms used in this document shall have the meaning of the definitions included in Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity, Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU (recast), Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management (CACM Regulation), Commission Regulation (EU) 2016/1719 of 26 September 2016 establishing a guideline on forward capacity allocation (FCA Regulation), Commission Regulation (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing (EB Regulation) and Commission Regulation (EU) No 543/2013 of 14 June 2013 on submission and publication of data in electricity markets and amending Annex I to Regulation (EC) No 714/2009 of the European Parliament and of the Council. In addition, the following definitions, abbreviations and notations shall apply:

   (1) 'AAC' is the already allocated capacity which has been allocated as an outcome of the latest capacity calculation in the Core CCR;

   (2) ‘AHC’ means the advanced hybrid coupling which is a solution to take fully into account the influences of the adjacent CCRs during the capacity allocation;

   (3) ‘annual report’ means the report issued on an annual basis by the CCC and the Core TSOs on the intraday capacity calculation;

   (4) ‘ATC’ means the available transmission capacity, which is the transmission capacity that remains available after the allocation procedure and which respects the physical conditions of the transmission system;

   (5) ‘Balancing Platforms’ means European platforms for the exchange of balancing energy from frequency restoration reserves with manual and automatic activation as well as from replacements reserves and the imbalance netting process;

   (6) ‘BTCC’ means Balancing Timeframe Capacity Calculation;

   (7) ‘BTCC MTU’ is the balancing timeframe capacity calculation market time unit, which means the time unit for the intraday capacity calculation and is equal to 15 minutes;

   (8) ‘CCC’ means the coordinated capacity calculator, as defined in article 2(11) of the CACM Regulation, of the Core CCR, unless stated otherwise;

   (9) ‘CCR’ means the capacity calculation region as defined in article 2(3) of the CACM Regulation;

   (10) ‘CGM’ means the common grid model as defined in article 2(2) of the CACM Regulation and means the intraday CGM established in accordance with the CGMM;

   (11) ‘CGMM’ means the common grid model methodology, pursuant to article 17 of the CACM Regulation;

   (12) ‘CNE’ means a critical network element;

(13) ‘CNEC’ means a CNE associated with a contingency used in capacity calculation. For the purpose of this methodology, the term CNEC also covers the case where a CNE is used in capacity calculation without a specified contingency;

(14) ‘Core CCR’ means the Core capacity calculation region as established by the determination of capacity calculation regions pursuant to article 15 of the CACM Regulation;

(15) ‘Core net position’ means a net position of a bidding zone in Core CCR resulting from the allocation of cross-zonal capacities within the Core CCR;

(16) Core TSOs are 50Hertz Transmission GmbH (“50Hertz”), Amprion GmbH (“Amprion”), Austrian Power Grid AG (“APG”), CREOS Luxembourg S.A. (“CREOS”), ČEPS, a.s. (“ČEPS”), Eles d.o.o. sistemski operater prenosnega elektroenergetskega omrežja (“ELES”), Elia System Operator S.A. (“ELIA”), Croatian Transmission System Operator Ltd. (HOPS d.o.o.) (“HOPS”), MAVIR Hungarian Independent Transmission Operator Company Ltd. (“MAVIR”), Polskie Sieci Elektroenergetyczne S.A. (“PSE”), RTE Réseau de transport d’électricité (“RTE”), Slovenská elektrizačná prenosová sústava, a.s. (“SEPS”), TenneT TSO GmbH (“TenneT GmbH”), TenneT TSO B.V. (“TenneT B.V.”), National Power Grid Company Transelectrica S.A. (“Transelectrica”), TransnetBW GmbH (“TransnetBW”);

(17) ‘CROSA’ or ‘coordinated regional operational security assessment’ means a process of an operational process of an operational security analysis performed by RCC(s) in accordance with article 78 of the SO Regulation;

(18) ‘CZCL’ means cross-zonal capacity limits;

(19) ‘cross-zonal CNEC’ means a CNEC of which a CNE is located on the bidding zone border or connected in series to such network element transferring the same power (without considering the network losses);

(20) ‘curative remedial action’ means a remedial action which is only applied after a given contingency occurs;

(21) ‘CZCA’ means cross-zonal capacity allocations for the exchange of balancing capacity or sharing of reserves;

(22) ‘default flow-based parameters’ means the pre-coupling backup values calculated in situations when the intraday capacity calculation fails to provide the flow-based parameters in three or more consecutive hours. These flow-based parameters are based on previously calculated flow-based parameters;

(23) ‘external constraint’ means a type of allocation constraint that limits the maximum import and/or export of a given bidding zone;

(24) ‘$F_{0,all}$’ means the flow per CNEC in a situation without any commercial exchange between bidding zones within Continental Europe and between bidding zones within Continental Europe and bidding zones of other synchronous areas;

(25) ‘F_i’ means the expected flow in commercial situation *i*;

(26) ‘flow-based domain’ means a set of constraints that limit the cross-zonal capacity calculated with a flow-based approach;

(27) ‘FRM’ or ‘FRM’ means the flow reliability margin, which is the reliability margin as defined in article 2(14) of the CACM Regulation applied to a CNE;

(28) ‘F_{max}’ means the maximum admissible power flow;

(29) ‘F_{ref}’ means the reference flow;

(30) '$F_{ref,init}$' means the reference flow calculated during the initial flow-based calculation pursuant to Article 15;

(31) 'F_0,$Core$' means the flow per CNEC in the situation without commercial exchanges within the Core CCR;

(32) 'GSK' or 'GSK' means the generation shift key as defined in article 2(12) of the CACM Regulation;

(33) 'HVDC' means a high voltage direct current network element;

(34) 'IDCC' means the intraday capacity calculation process in Core CCR;

(35) 'ID CC MTU' is the intraday capacity calculation market time unit, which means the time unit for the intraday capacity calculation and is equal to 60 minutes;

(36) 'IDCZGCT' means Intraday Cross Zonal Gate Closure Time and defines the end time of the ID market;

(37) 'IGM' means the intraday individual grid model as defined in article 2(1) of the CACM Regulation;

(38) 'internal CNEC' means a CNEC, which is not cross-zonal;

(39) 'I_{max}' means the maximum admissible current;

(40) 'merging agent' means an entity entrusted by the Core TSOs to perform the merging of individual grid models into a common grid model as referred to in article 20ff of the CGMM;

(41) 'MNEC' means a monitored network element with a contingency;

(42) 'NP' or 'NP' means a net position of a bidding zone, which is the net value of generation and consumption in a bidding zone;

(43) 'NTC' means Net Transfer Capacity;

(44) 'oriented bidding zone border' means a given direction of a bidding zone border (e.g. from Germany to France);

(45) 'pre-solved domain' means the final set of binding constraints for capacity allocation after the pre-solving process;

(46) 'pre-solving process' means the identification and removal of redundant constraints from the flow-based domain;

(47) 'preventive remedial action' means a remedial action which is applied on the network before any contingency occurs;

(48) 'PTDF' or '$PTDF$' means a power transfer distribution factor;

(49) '$\mathbf{PTDF}_{init}$' means a matrix of power transfer distribution factors resulting from the initial flow-based calculation;

(50) '$\mathbf{PTDF}_f$' means a matrix of power transfer distribution factors describing the final flow-based domain;

(51) 'quarterly report' means a report on the intraday capacity calculation issued by the CCC and the Core TSOs on a quarterly basis;

(52) 'RA' means a remedial action as defined in article 2(13) of the CACM Regulation;

(53) 'RAM' or 'RAM' means a remaining available margin;

(54) ‘reference net position or exchange’ means a position of a bidding zone or an exchange over HVDC interconnector assumed within the CGM;

(55) ‘ROSC’ means Regional Operational Security Coordination within Core CCR;

(56) ‘SIDC’ means the single intraday coupling;

(57) ‘slack node’ means the single reference node used for determination of the PTDF matrix, i.e. shifting the power infeed of generators up results in absorption of the power shift in the slack node. A slack node remains constant for each ID CC MTU;

(58) ‘SO Regulation’ means Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation;

(59) ‘standard hybrid coupling’ means a solution to capture the influence of exchanges with non-Core bidding zones on CNECs that is not explicitly taken into account during the capacity allocation phase;

(60) ‘U’ is the reference voltage;

(61) the notation x denotes a scalar;

(62) the notation $\vec{x}$ denotes a vector;

(63) the notation $\mathbf{x}$ denotes a matrix.

2. In this balancing timeframe capacity calculation methodology unless the context requires otherwise:

(a) the singular indicates the plural and vice versa;

(b) the acronyms used both in regular and italic font represent respectively the term used and the respective variable;

(c) the table of contents and the headings are inserted for convenience only and do not affect the interpretation of this intraday capacity calculation methodology;

(d) any reference to the balancing timeframe capacity calculation, balancing timeframe capacity calculation process or the balancing timeframe capacity calculation methodology shall mean a common balancing timeframe capacity calculation, common balancing timeframe capacity calculation process and common balancing timeframe capacity calculation methodology respectively, which is applied by all Core TSOs in a common and coordinated way on all bidding zone borders of the Core CCR; and

(e) any reference to legislation, Regulations, directive, order, instrument, code, or any other enactment shall include any modification, extension or re-enactment of it when in force.

Article 3 Application of this methodology

This balancing timeframe capacity calculation methodology solely applies to the balancing timeframe capacity calculation within the Core CCR. Capacity calculation methodologies within other CCRs or for other time frames are not in the scope of this methodology.

TITLE 2 GENERAL DESCRIPTION OF THE CAPACITY CALCULATION PROCESS

Article 4 BTCC capacity calculation process

1. For the Balancing timeframe, the cross-zonal capacities shall be calculated using the flow-based approach as described in the Core Intraday capacity calculation methodology.

2. The balancing timeframe cross-zonal capacity calculation shall be performed to update the cross-zonal capacities remaining after the Intraday Cross Zonal Gate Closure Time (IDCZGCT).

3. The balancing timeframe cross-zonal capacity calculation will serve as input to the different Balancing Platforms. Until Flow-Based methodology is used in Balancing Platforms, Flow-Based domains outputs of Balancing capacity calculation process shall be converted to NTC/ATC in accordance with Article 14.

4. Each calculation of balancing timeframe cross-zonal capacities pursuant to paragraph 2 shall be performed by the CCC and the Core TSOs according to the following procedure for each BTCC MTU:

   (a) The CCC shall retrieve the capacity calculation outputs from the last IDCC run;

   (b) The CCC shall update the last capacity information available based on the latest outputs from IDCC process and the AAC available after IDCZGCT;

   (c) The Core TSOs shall perform the capacity validation in accordance with Article 15.

   (d) The CCC shall provide the capacities outputs to the Balancing Platforms.

5. In order to compute Flow-Based domains mentioned in the previous paragraph 4(a), each Core TSO shall provide the CCC with the following capacity calculation inputs by the times established in the IDCC process description document:

   (a) individual list of CNECs in accordance with Article 5;

   (b) operational security limits in accordance with Article 6;

   (c) allocation constraints in accordance with Article 7;

   (d) FRMs in accordance with Article 8;

   (e) GSKs in accordance with Article 9; and

   (f) non-costly and costly RAs in accordance with Article 10.

   The previous inputs provision process, as well as the Flow-Based computation process, are performed in the scope of each IDCC computation according to the Core intraday capacity calculation methodology. The specific BTCC process steps, as described in the previous paragraph 4, use them as inputs. The Articles 5, 6, 7, 8, 9 and 10 of this methodology therefore only indicate the relevant references to Core intraday capacity calculation methodology, as well as any specificities of Balancing timeframes.

6. Where the power flows on critical network elements in the capacity calculation, are influenced by cross-zonal power exchanges in different capacity calculation regions, the TSOs of Core CCR shall define rules for sharing the power flow capabilities of critical network elements among different capacity calculation regions in order to accommodate these flows. These rules will be detailed in cooperation with the other capacity calculation regions during the implementation phase of this methodology (as described in article 21(b7) CACM).

7. After the implementation of this methodology in accordance with Article 21(2), the Core TSOs shall jointly perform a study to assess the benefits of increasing the frequency of Flow-Based computations based on more recent grid models forecast available. The analysis shall focus on the overall efficiency of such an implementation. Before performing the analysis Core TSOs shall jointly coordinate and consult with all Core regulatory authorities on the methodology, assumptions and criteria for this analysis. No later than twenty four months after the implementation of this methodology all Core TSOs shall submit to all Core regulatory authorities a proposal for amendment of this methodology in accordance with article 6(3) of the EB Regulation.

8. Any amendment of Core Intraday capacity calculation methodology should trigger an impact assessment on this methodology. In case any divergence from Core Intraday capacity calculation methodology appears, it should be justified by Core TSOs based on best practice and operational experience, and this methodology shall be updated accordingly.

TITLE 3 CAPACITY CALCULATION INPUTS

Article 5 Definition of critical network elements and contingencies

1. Each Core TSO shall define an initial list of CNECs pursuant to Core Intraday capacity calculation methodology article 5(3). Any update in the list of CNECs, as mentioned in Core Intraday capacity calculation methodology article 5(6), shall be reflected accordingly.

2. The list of CNECs defined in the previous paragraph shall be updated by removing all CNECs for which the maximum zone-to-zone PTDF is not higher than the threshold indicated in the Core Intraday capacity calculation methodology article 16(1).

3. Some additional cross-border relevant network elements with a specific contingency (XNECs) resulting from the most recently performed or running ROSC CROSA process, and not already part of the list of CNECs mentioned in the paragraph 2, may be exceptionally turned into CNECs. The inclusion of such additional elements complies to Core ROSC methodology article 31(3a) and shall applied pursuant to the methodology described in the Core Intraday capacity calculation methodology article 16(2).

4. The final list of CNECs shall consist of the addition of the lists defined in the previous paragraph 2 and 3.

Article 6 Methodology for operational limits

The Core TSOs shall use the methodology for operational security limits pursuant to article 6 of the Core Intraday capacity calculation methodology.

Article 7 Methodology for allocation constraints

In case operational security limits cannot be transformed efficiently into I_{max} and F_{max} pursuant to Article 6, all Core TSOs may transform them into allocation constraints pursuant to article 7(1) and 7(2) of the Core Intraday capacity calculation methodology.

Article 8 Reliability margin methodology

1. The FRMs shall cover the following forecast uncertainties:

   (a) cross-zonal exchanges on bidding zone borders outside the Core CCR;

   (b) generation pattern including specific wind and solar generation forecast;

   (c) generation shift key;

   (d) load forecast;

   (e) topology forecast;

   (f) unintentional flow deviation due to frequency containment process; and

   (g) flow-based capacity calculation assumptions including linearity and modelling of external (non-Core) TSOs' areas.

2. The Core TSOs shall aim at reducing uncertainties by studying and tackling the drivers of uncertainty.

3. For all CNECs defined in Article 5, the Core TSOs shall use FRM values not higher than the FRM values used in the Core Intraday capacity calculation which are defined pursuant to article 8 of the Core Intraday capacity calculation methodology.

Article 9 Generation shift key methodology

Each Core TSO shall define for its bidding zone and for each MTU a GSK, which translates a change in a bidding zone net position into a specific change of injection or withdrawal in the CGM. All GSK values shall be equal to the values pursuant to article 9 of the Core Intraday capacity calculation methodology.

Article 10 Methodology for remedial actions in BT capacity calculation

RAs used for the balancing timeframe capacity calculation shall be defined pursuant to article 10 of the Core Intraday capacity calculation methodology.

TITLE 4 DESCRIPTION OF THE BALANCING TIMEFRAME CAPACITY CALCULATION PROCESS

Article 11 Update of balancing timeframe cross-zonal capacities remaining after the IDCZGCT

1. The CCC shall use the final cross-zonal capacities resulting from intra-day capacity calculation and the net positions resulting from the latest already allocated capacities (AAC) in the SIDC after ID CZGCT to calculate Balancing cross-zonal capacities and the RAM shall be derived as:

$$\overrightarrow{RAM}_{UBT} = \overrightarrow{RAM}_{f,ID} - \mathbf{PTDF}_{f,ID}\,(\overrightarrow{NP}_{AAC,ID\_CZGCT} - \overrightarrow{NP}_{AAC,ID})$$

with

$\overrightarrow{RAM}_{UBT}$	updated remaining available margin for Balancing cross-zonal capacities
$\overrightarrow{RAM}_{f,ID}$	final remaining available margin resulting from the intraday capacity calculation pursuant to Core Intraday capacity calculation methodology article 19 (7)
$\mathbf{PTDF}_{f,ID}$	final power transfer distribution factor matrix resulting from the intraday capacity calculation pursuant to Core Intraday capacity calculation methodology articles 12(1 to 5) and 18
$\overrightarrow{NP}_{AAC,ID}$	net positions resulting from already allocated capacities in SIDC used during the latest Intraday capacity calculation.
$\overrightarrow{NP}_{AAC,ID\_CZGCT}$	net positions resulting from already allocated capacities in SIDC at the time of ID CZGCT

The consideration of already reserved capacities for the balancing timeframe or cross-zonal capacity allocations will be processed in accordance with the Core Intraday capacities calculation methodology.

Article 12 Integration of HVDC interconnectors on bidding zone borders of the Core CCR

1. The Core TSOs shall apply the evolved flow-based methodology when including HVDC interconnectors on the bidding zone borders of the Core CCR to model cross-zonal exchanges over an HVDC interconnector in consistency with article 13 of the Core Intraday capacity calculation methodology.

2. The cross-zonal capacities for an HVDC interconnector shall be calculated as described in Article 14.

3. Ramping limitation of HVDC interconnectors in BT CC is applied to limit the operational impact in accordance with article 176 of the SO Regulation.

4. Technical limitations such as the ability to change flow directions or ramping limitations of HVDC interconnectors for the allocation of balancing energy or sharing of reserves will be treated as an allocation constraint by the capacity management function or the balancing platforms.

Article 13 Consideration of non-Core bidding zone borders

Where critical network elements within the Core CCR are also impacted by electricity exchanges outside the Core CCR, the Core TSOs shall take such impact into account with a standard hybrid coupling (SHC) and if applicable for the allocation of balancing energy and sharing of reserves with an advanced hybrid coupling (AHC) in accordance with article 14 of the Core Intraday capacity calculation methodology.

Article 14 Calculations of NTCs for the exchange of balancing capacities and sharing of reserves

1. As long as the exchange of balancing capacities and sharing of reserves requires ATCs or NTCs, the CCC shall convert the cross-zonal capacities into available or net transfer capacities (hereafter referred as “ATCs” or “NTCs”) for each Core oriented bidding zone border and each BT CC MTU. The Core TSOs may delegate this responsibility to a third party.

2. Therefore ATCs will be extracted for each BT CC MTU from the flow based domain. The cross-zonal capacities shall serve as the basis for the determination of the ATCs. As the selection of a set of ATCs from the cross-zonal capacities leads to an infinite set of choices, an iterative algorithm in a systematic way determines the ATCs, described in the Core Intraday capacity calculation methodology article 21. Core TSOs may delegate this responsibility to a third party.

3. After ATC Extraction, NTC will be calculated by the following:

$$\overrightarrow{NTC}_{BTCC} = \overrightarrow{ATC}_{BTCC} + \overrightarrow{AAC}_{Lastest}$$

Equation 14

with:

$\overrightarrow{NTC}_{BTCC}$	net transfer capacity for balancing platforms
$\overrightarrow{ATC}_{BTCC}$	available transfer capacity extracted from flow based domain for the balancing timeframe capacity calculation
$\overrightarrow{AAC}_{latest}$	latest available already allocated capacity after IDCZGCT

4. The following outputs are transferred to the balancing platforms, considering the validation process described in the Article 15.

Article 15 Validation of balancing timeframe capacities

1. Each Core TSO shall have the right to perform individual validation of Balancing capacities calculated and provided to Core TSOs pursuant to Article 14. Pursuant to this validation, each Core TSO shall have the right to decrease capacities on its bidding zone borders in case such adjustments are needed to maintain operational security.

2. Moreover, each Core TSO should also have the possibility to decrease balancing capacities on its own border at any time after the capacities provision deadline to the Balancing Platforms.

3. Any decrease of capacity should be justified. This justification shall include the concerned CNECs or any other reason that led to the decrease of capacity.

4. No later than six months before the implementation of this methodology Core TSOs should investigate additional measures to increase capacities during the validation phase.

Article 16 Balancing timeframe capacity calculation fallback procedure

1. In case the balancing timeframe capacity calculation for specific MTUs does not lead to the final capacities due to, inter alia, a technical failure in the tools, an error in the communication infrastructure, or corrupted or missing input data, the Core TSOs and the CCC shall use the remaining capacities after the IDCZGCT.

2. The Core TSOs shall have the possibility to validate the aforementioned capacities pursuant to Article 15.

TITLE 5 UPDATES AND DATA PROVISION

Article 17 Transparency and updates

1. Based on article 3 (Point 2(b)) of the EB Regulation, all TSOs shall ensure transparency of the balancing capacity calculation process.

2. If any change leads to an adaption of the methodology, the Core TSOs shall make a proposal for amendment of this methodology according to article 7(4) of the EB Regulation.

Article 18 Publication of data

1. In accordance with article 3 (Point 2(b)) of the EB Regulation aiming at ensuring and enhancing the transparency and reliability of information to all regulatory authorities and market participants, all Core TSOs and the CCC shall regularly publish the data on the balancing capacity calculation process pursuant to this methodology as set forth in paragraph 2 on a dedicated online communication platform where capacity calculation data for the whole Core CCR shall be published. To enable market participants to have a clear understanding of the published data, all Core TSOs and the CCC shall develop a handbook and publish it on this communication platform. This handbook shall include at least a description of each data item, including its unit and underlying convention.

2. The Core TSOs and the CCC shall publish at least the following data items (in addition to the data items and definitions of Commission Regulation (EU) No 543/2013 on submission and publication of data in electricity markets):

   (a) cross-zonal capacities in accordance with Article 14 and Article 16 by the deadlines set therein;

      i. NTC/ATCs for the balancing platforms;

      ii. Fallback NTC/ATCs for the balancing platforms

   (b) the following information for balancing cross-zonal capacity calculation pursuant to Article 15 shall be published by the deadlines established therein:

      i. information about the validation adjustment of capacities:

      ii. the TSO invoking the adjustment of capacities;

      iii. the detailed reason(s) for capacity adjustment in accordance with Article 15.

3. The Core regulatory authorities may request additional information to be published by the TSOs. For this purpose, all Core regulatory authorities shall coordinate their requests among themselves and consult it with stakeholders and the Agency. Each Core TSO may decide not to publish the additional information, which was not requested by its competent regulatory authority.

4. Core TSOs shall provide Core regulatory authorities on a monthly basis the underlying capacity calculation related to the quarterly reports. The reporting framework shall be developed in coordination with Core regulatory authorities and updated and improved when needed

Article 19 Quality of the data published

1. No later than six months before the implementation of this methodology in accordance with article 21 of Commission Regulation (EU) No 543/2013, the Core TSOs shall jointly establish and publish a common procedure for monitoring and ensuring the quality and availability of the data on the dedicated online communication platform as referred to in Article 18. When doing so, they shall consult with relevant stakeholders and all Core regulatory authorities.

2. The procedure pursuant to paragraph 1 shall be applied by the CCC and shall consist of continuous monitoring process and reporting in the annual report. The continuous monitoring process shall include the following elements:

   (a) individually for each TSO and for the Core CCR as a whole: data quality indicators, describing the precision, accuracy, representativeness, data completeness, comparability and sensitivity of the data;

   (b) the ease-of-use of manual and automated data retrieval;

   (c) automated data checks, which shall be conducted in order automatically to accept or reject individual data items before publication based on required data attributes (e.g. data type, lower/upper value bound, etc.); and

   (d) satisfaction survey performed annually with stakeholders and the Core regulatory authorities.

   The quality indicators shall be monitored in daily operation and shall be made available on the platform for each dataset and data provider such that users are able to take this information into account when accessing and using the data.

3. The CCC shall provide in the annual report at least the following:

   (a) the summary of the quality of the data provided by each data provider;

(b) the assessment of the ease-of-use of data retrieval (both manual and automated);

(c) the results of the satisfaction survey performed annually with stakeholders and all Core regulatory authorities; and

(d) suggestions for improving the quality of the provided data and/or the ease-of-use of data retrieval.

4. The Core TSOs shall commit to a minimum value for at least some of the indicators mentioned in paragraph 2, to be achieved by each TSO individually on average on a monthly basis. Should a TSO fail to fulfil at least one of the data quality requirements, this TSO shall provide to the CCC within one month following the failure to fulfil the data quality requirement, detailed reasons for the failure to fulfil data quality requirements, as well as an action plan to correct past failures and prevent future failures. No later than three months after the failure, this action plan shall be fully implemented and the issue resolved. This information shall be published on the online communication platform and in the annual report.

Article 20 Monitoring, reporting and information to the Core regulatory authorities

1. The Core TSOs shall provide to the Core regulatory authorities data on balancing timeframe capacity calculation for the purpose of monitoring its compliance with this methodology and other relevant legislation.

2. The Core regulatory authorities may request additional information to be provided by the TSOs. For this purpose, all Core regulatory authorities shall coordinate their requests among themselves. Each Core TSO may decide not to provide the additional information, which was not requested by its competent regulatory authority.

3. The CCC, with the support of the Core TSOs where relevant, shall draft and publish an annual report satisfying the reporting obligations set in Articles 18, 19 and 21 of this methodology:

(a) according to Article 19(2), the CCC shall monitor and report on the quality of the data published on the dedicated online communication platform as referred to in Article 18, with supporting detailed analysis of a failure to achieve sufficient data quality standards by the concerned TSOs, where relevant.

(b) according to Article 21(2), after the implementation of this methodology, the Core TSOs shall report on their continuous monitoring of the effects and performance of the application of this methodology.

4. The CCC, with the support of the Core TSOs where relevant, shall draft and publish a quarterly report satisfying the reporting obligations set in Article 18 of this methodology:

(a) according to Article 18(2), the CCC shall provide all information on the reductions of cross-zonal capacity, with a supporting detailed analysis from the concerned TSOs where relevant.

(b) according to Article 21(4), during the implementation of this methodology, the Core TSOs shall report on their continuous monitoring of the effects and performance of the application of this methodology.

TITLE 6 IMPLEMENTATION

Article 21 Timescale for implementation

1. The TSOs of the Core CCR shall publish this methodology without undue delay after the decision has been taken by the Agency in accordance with article 6(1 and 2) of the EB Regulation.

2. The TSOs of the Core CCR shall implement this methodology no later than 12 months after the implementation of the second step of ROSC Methodology as indicated in Core ROSC methodology article 37, which contains the implementation of the 3 intraday CROSA.

3. The implementation process, which shall start with the entry into force of this methodology and finish by the deadlines established in paragraph 2, shall consist of the following steps:

   (a) internal parallel run, during which the TSOs shall test the operational processes for the balancing capacity calculation process and the balancing capacity validation, and develop the appropriate IT tools and infrastructure;

   (b) external parallel run, during which the TSOs will continue testing their internal processes and IT tools and infrastructure. In addition, the Core TSOs will involve the external stakeholders participants to test the effects of applying this methodology on the system. This phase shall not be shorter than 3 months.

4. During the internal and external parallel runs, the Core TSOs shall continuously monitor the effects and the performance of the application of this methodology. For this purpose, they shall develop, in coordination with the Core regulatory authorities, the Agency and stakeholders, the monitoring and performance criteria and report on the outcome of this monitoring on a quarterly basis in a quarterly report. After the implementation of this methodology, the outcome of this monitoring shall be reported in the annual report.

5. After the adoption of this methodology and until the implementation of the balancing capacity calculation methodology, the Core TSOs shall use the remaining cross-zonal capacities after IDCZGCT, as indicated in EB Regulation art. 37(2).

TITLE 7 FINAL PROVISIONS

Article 22 Language

The reference language for this methodology shall be English. For the avoidance of doubt, where TSOs need to translate this methodology into their national language(s), in the event of inconsistencies between the English version published by TSOs in accordance with article 7 of the EB Regulation and any version in another language, the relevant TSO shall, in accordance with national legislation, provide the relevant Core regulatory authorities with an updated translation of the methodology.