ACER
European Union Agency for the Cooperation of Energy Regulators

ACER Decision on Core ID CCM: Annex III

(text rectified by corrigendum of 4 April 2024)

Intraday capacity calculation methodology of the Core capacity calculation region

in accordance with Article 20ff. of the Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management

Consolidated version of

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Contents

TITLE 1 – General provisions

Article 1. Subject matter and scope

1. The intraday capacity calculation methodology is the Core TSOs' methodology in accordance with Article 20ff. of the CACM Regulation and covers the intraday capacity calculation methodology for the Core CCR bidding zone borders.

2. This methodology is without prejudice to the TSOs' rights and obligations under Commission Regulation (EU) 2017/1485 establishing a guideline on electricity transmission system operation, such as taking any remedial actions pursuant to this Regulation to maintain operational security and ensure that the system operates in a normal state. Accordingly, the management of cross-zonal capacities by the TSOs after their delivery to the allocation process is beyond the scope of this methodology.

Article 2. Definitions and interpretation

1. For the purposes of the intraday capacity calculation methodology, terms used in this document shall have the meaning of the definitions included in Regulation (EU) 2019/943, Directive (EU) 2019/944, Commission Regulation (EU) 2015/1222, Commission Regulation (EU) 2016/1719, Commission Regulation (EU) 2017/2195, Commission Regulation (EU) 543/2013, the definitions set out in Article 2 Annex I of ACER Decision No 02/2019 on the Core CCR TSOs' proposal for the regional design of the day-ahead and intraday common capacity calculation methodologies and the definitions set out in Article 2 Annex I of ACER Decision No 33/2020 on the methodology for regional operational security coordination for the Core capacity calculation region ("Core ROSC methodology"). In addition, the following definitions, abbreviations and notations shall apply:

   (a) 'AAC_{ID}' is the already allocated capacity which has been allocated in SIDC;

   (b) '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;

   (c) 'AMR_{DA}' means the adjustment for the minimum remaining available margin in accordance with the day-ahead capacity calculation methodology of the Core CCR;

   (d) 'annual report' means the report issued on an annual basis by the CCC and the Core TSOs on the intraday capacity calculation;

   (e) '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;

   (f) 'CCC' means the coordinated capacity calculator, as defined in Article 2(11) of the CACM Regulation, of the Core CCR, unless stated otherwise;

   (g) 'CCR' means the capacity calculation region as defined in Article 2(3) of the CACM Regulation;

   (h) '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;

   (i) 'CGMM' means the common grid model methodology, pursuant to Article 17 of the CACM Regulation;

(j) 'CNE' means a critical network element;

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

(l) 'Core DA CCM' means the Core day-ahead capacity calculation methodology;

(m) '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;

(n) '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;

(o) 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 Plc (HOPS d.d.) ("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");

(p) '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);

(q) 'curative remedial action' means a remedial action which is only applied after a given contingency occurs;

(r) 'D-1' means the day before electricity delivery;

(s) 'D-2' means the day two-days before electricity delivery;

(t) 'DACF' means day ahead congestion forecast;

(u) '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;

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

(w) '$F_{0,all}$' 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;

(x) 'F_i' means the expected flow in commercial situation i;

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

(z) '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;

(aa) 'F_{max}' means the maximum admissible power flow;

(bb) 'F_{ref}' means the reference flow;

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

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

(ee) ''IDA' means intraday auction;

(ff) '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;

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

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

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

(jj) 'IVA' means individual validation adjustment;

(kk) $LTA_{margin,DA}$ means the adjustment of remaining available margin to incorporate long-term allocated capacities in accordance with the day-ahead capacity calculation methodology of the Core CCR;

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

(mm) '$NP_{AAC,DA}$' means net position resulting from already allocated capacities in SDAC;

(nn) $NP_{AAC,ID}$' means net position resulting from already allocated capacities in SIDC;

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

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

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

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

(ss) 'PST' means a phase-shifting transformer;

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

(uu) '$\mathbf{PTDF}_{Core}$' means a matrix of power transfer distribution factors resulting from the intraday flow-based calculation for Core bidding zones;

(vv) '$\mathbf{PTDF}_{all}$' means a matrix of power transfer distribution factors resulting from the intraday flow-based calculation for all bidding zones of Continental Europe, and connection points of the bidding zones of Continental Europe with the bidding zones of other synchronous areas;

(ww) $\mathbf{PTDF}_{f,DA}$' means a matrix of power transfer distribution factors describing the final day-ahead flow-based domain;"

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

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

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

(aaa) 'RCC' means Regional Coordination Centre;

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

(ccc) 'SDAC' means the single day-ahead coupling;

(ddd) 'SIDC' means the single intraday coupling;

(eee) 'shadow price' means the dual price of a CNEC or allocation constraint representing the increase in the economic surplus if a constraint is increased by one MW;

(fff) '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;

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

(hhh) '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;

(iii) 'static grid model' means a list of relevant grid elements of the transmission system, including their electrical parameters;

(jjj) 'U' is the reference voltage;

(kkk) 'UAF' is an unscheduled allocated flow;

(lll) 'vertical load' means the total amount of electricity which exits the transmission system of a given bidding zone to connected distribution systems, end consumers connected to the transmission system, and to electricity producers for consumption in the generation of electricity;

(mmm) 'zone-to-slack $PTDF$' means the PTDF of a commercial exchange between a bidding zone and the slack node;

(nnn) 'zone-to-zone $PTDF$' means the PTDF of a commercial exchange between two bidding zones;

(ooo) the notation x denotes a scalar;

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

(qqq) the notation **x** denotes a matrix;

(rrr) 'LTA domain' means a set of bilateral exchange restrictions covering the previously allocated cross-zonal capacities;

(sss) 'Extended LTA inclusion approach' is an LTA inclusion approach in the Core DA CCM. When this approach is applied in the day ahead capacity calculation, the day ahead cross-zonal capacities consist of a flow-based domain (containing flow-based parameters) without LTA inclusion and a separate LTA domain (including LTA values);

(ttt) 'SEC_{DA}' means scheduled exchange resulting from already allocated capacities in the single day ahead coupling (SDAC). The parameter is provided by the SDAC based on the all TSO methodology for calculating scheduled exchanges resulting from single day-ahead coupling according to Article 43 of CACM Regulation;

(uuu) 'XNEC' means cross-border relevant network element with contingency, as defined in the Core ROSC methodology.

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

(a) the singular also includes 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 intraday capacity calculation, intraday capacity calculation process or the intraday capacity calculation methodology shall mean a common intraday capacity calculation, common intraday capacity calculation process and common intraday 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, regulation, directive, decision, 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 intraday capacity calculation methodology solely applies to the intraday 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 methodology

Article 4. Intraday capacity calculation process

1. For the intraday market time frame, the cross-zonal capacities shall be calculated using the flow-based approach as defined in this methodology.

2. The intraday cross-zonal capacity calculation shall be performed in the following sequence, by the times established in the process description document as referred to in paragraph 7:

   (a) IDCC(a): updating of cross-zonal capacities remaining after the SDAC for all ID CC MTUs between 00:00 and 24:00 of day D and providing them as intraday cross-zonal capacities to relevant NEMOs no later than 15 minutes before the intraday cross-zonal gate opening time, at 15:00 market time of day D-1;

   (b) IDCC(b): calculation of intraday cross-zonal capacities for all ID CC MTUs between 00:00 and 24:00 of day D. The cross-zonal capacities resulting from this calculation shall be published and submitted to NEMOs no later than 15 minutes before the target start of allocation at 22:00 market time of day D-1;

   (c) IDCC(c): re-calculation of intraday cross-zonal capacities for all ID CC MTUs between 06:00 and 24:00 of day D. The cross-zonal capacities resulting from this calculation shall be published and submitted to NEMOs no later than 15 minutes before the target start of allocation at 04:00 market time of day D;

   (d) IDCC(d): re-calculation of intraday cross-zonal capacities for all ID CC MTUs between 12:00 and 24:00 of day D. The cross-zonal capacities resulting from this re-calculation shall be published and submitted to NEMOs no later than 15 minutes before the target start of allocation at 10:00 market time of day D; and

   (e) IDCC(e): re-calculation of intraday cross-zonal capacities for all ID CC MTUs between 18:00 and 24:00 of day D. The cross-zonal capacities resulting from this re-calculation shall be published and submitted to NEMOs no later than 15 minutes before the target start of allocation at 16:00 market time of day D.

The reference to ID CC MTUs in the remainder of this methodology shall mean the MTUs as established in this paragraph.

3. Each calculation or re-calculation of cross-zonal capacities pursuant to paragraphs 2(b) to (2)(e), shall consist of three main stages:

   (a) the creation of capacity calculation inputs by the Core TSOs;

   (b) the capacity calculation process by the CCC; and

   (c) the capacity validation by the Core TSOs in coordination with the CCC. Capacity validation may also be applied for the update of capacities pursuant to paragraph 2(a).

4. Each Core TSO shall provide the CCC the following capacity calculation inputs by the times established in the process description document:

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

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

   (c) external 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.

5. In addition to the capacity calculation inputs pursuant to paragraph 3, the Core TSOs, or an entity delegated by the Core TSOs, shall send to the CCC, for each ID CC MTU of the delivery day, the following additional inputs by the times established in the process description document:

   (a) the Core net positions or, alternatively, the already allocated capacities on the Core bidding zone borders resulting from the SDAC;

   (b) the Core net positions or, alternatively, the already allocated capacities on the Core bidding zone borders resulting from the SIDC which are already included in the CGM;

   (c) the Core net positions or, alternatively, the already allocated capacities on the Core bidding zone borders resulting from the SIDC not already included in the CGM.

If the Core TSOs provided to the CCC the already allocated capacities on the Core biding zone borders instead of the Core net positions, the CCC shall convert them into Core net positions.

6. When providing the capacity calculation inputs pursuant to paragraphs 4 and 5, the Core TSOs shall respect the formats commonly agreed between the Core TSOs and the CCC while fulfilling the requirements and guidance defined in the CGMM.

7. No later than six months before the implementation of this methodology in accordance with Article 26(3)(b), the Core TSOs shall jointly establish a process description document as referred to in paragraphs 2, 4 and 5 and publish it on the online communication platform as referred to in Article 22. This document shall reflect an up-to-date detailed process description of all capacity calculation steps including the timeline of each step of the intraday capacity calculation.

8. The Core RCCs, acting as the CCC shall use the latest available CGMs, proposed and coordinated XRAs from the day ahead and intraday CROSAs, in accordance with the CSAM. During the interim period until ROSC CROSA process is implemented in accordance with Article 37 of Core ROSC methodology, only the latest available CGM shall be delivered.

9. In case the necessary outputs of the ROSC ICS/CROSA process cannot be provided within the foreseen timeframe, the delivery of the CGMs and XRAs pursuant to paragraph 8, and subsequent intraday capacity calculation and delivery of intraday capacities may be delayed only up to a point in time at which the target start of allocation pursuant to paragraphs 2(b), 2(c), 2(d) and 2(e) is not yet affected. If the target start of allocation becomes affected by such a delay, the fallback procedure pursuant to Article 19 applies.

10. The intraday capacity calculation process and validation in the Core CCR shall be performed by the CCC and the Core TSOs according to the following procedure:

Step 1. The CCC shall define the initial list of CNECs pursuant to Article 15;

Step 2. The CCC shall calculate the first flow-based parameters ($PTDF_{init}$ and $F_{ref,init}$) for each initial CNEC pursuant to Article 15;

Step 3. The CCC shall determine the final list of CNECs for subsequent steps of the capacity calculation pursuant to Article 16;

Step 4. The CCC shall calculate the RAM before validation (RAM_{bv}) based on the results of the previous processes pursuant to Article 17;

Step 5. The Core TSOs shall, according to Article 18, validate the RAM_{bv} with individual validation, and decrease RAM when operational security is jeopardised, which results in the final RAM_f;

Step 6. The CCC shall, according to Article 18, remove the redundant CNECs and redundant external constraints from final $PTDF_f$ and RAM_f;

Step 7. The CCC shall publish the $PTDF_f$ and RAM_f values in accordance with Article 22 and provide them to NEMOs for capacity allocation in accordance with paragraph 2.

11. All capacity updates, calculations and re-calculations pursuant to paragraph 2, including all steps pursuant to paragraph 3, shall be performed per ID CC MTU. Cross-zonal capacities shall be provided to the NEMOs for each ID CC MTU, but for capacity allocation they may be converted into a higher time resolution in accordance with the market time unit applicable on specific bidding zone border(s).

TITLE 3 – Capacity calculation inputs

Article 5. Definition of critical network elements and contingencies

1. Each Core TSO shall define a list of CNEs, which are fully or partly located in its own control area, and which can be overhead lines, underground cables, or transformers. All cross-zonal network elements shall be defined as CNEs, whereas only those internal network elements, which are defined pursuant to paragraph 6 or 7 shall be defined as CNEs. Until 30 days after the approval of the proposal pursuant to paragraph 6, all internal network elements may be defined as CNEs.

2. Each Core TSO shall define a list of proposed contingencies used in operational security analysis in accordance with Article 33 of the SO Regulation, limited to their relevance for the set of CNEs as defined in paragraph 1 and pursuant to Article 23(2) of the CACM Regulation. The contingencies of a Core TSO shall be located within the observability area of that Core TSO. This list shall be updated at least on a yearly basis and in case of topology changes in the grid of the Core TSO, pursuant to Article 21. A contingency can be an unplanned outage of:

   (a) a line, a cable, or a transformer;

   (b) a busbar;

   (c) a generating unit;

   (d) a load; or

   (e) a set of the aforementioned elements.

3. Each Core TSO shall establish a list of CNECs by associating the contingencies established pursuant to paragraph 2 with the CNEs established pursuant to paragraph 1 following the rules established in accordance with Article 75 of the SO Regulation. Until such rules are established and enter into force, the association of contingencies to CNEs shall be based on each TSO's operational experience. An individual CNEC may also be established without a contingency.

4. Each Core TSO shall provide to the CCC a list of CNECs established pursuant to paragraph 3.

5. No later than eighteen months after the implementation of this methodology in accordance with Article 26(2)(b), all Core TSOs shall jointly develop a list of internal network elements (combined with the relevant contingencies) to be defined as CNECs and submit it by the same deadline to all Core regulatory authorities as a proposal for amendment of this methodology in accordance with Article 9(13) of the CACM Regulation. After its approval in accordance with Article 9 of the CACM Regulation, the list of internal CNECs shall form an annex to this methodology.

6. The list pursuant to the previous paragraph shall be updated at least every two years. For this purpose, no later than eighteen months after the approval by all Core regulatory authorities of the proposal for amendment of this methodology pursuant to previous paragraph and this paragraph, all Core TSOs shall jointly develop a new proposal for the list of internal CNECs and submit it by the same deadline to all Core regulatory authorities as a proposal for amendment of this methodology in accordance with Article 9(13) of the CACM Regulation. After its approval in accordance with Article 9 of the CACM Regulation, the list of internal CNECs shall replace the relevant annex to this methodology.

7. The proposed list of internal CNECs pursuant to paragraph 5 and 6 shall not include any internal network element with contingency with a maximum zone-to-zone PTDF below 5%, calculated as the time-average over the last twelve months. An exception is applied for CNECs that are considered in accordance with Article 16(2) to (4).

8. The proposal pursuant to paragraphs 5 and 6 shall include at least the following:

   (a) a list of proposed internal CNECs with the associated maximum zone-to-zone PTDFs referred to in paragraph 7;

   (b) an impact assessment of increasing the threshold of the maximum zone-to-zone PTDF for exclusion of internal CNECs referred to in paragraph 7 to 10% or higher; and

   (c) for each proposed internal CNEC, an analysis demonstrating that including the concerned internal network element in capacity calculation is economically the most efficient solution to address the congestions on the concerned internal network element, considering, for example, the following alternatives:

      i. application of remedial actions;

      ii. reconfiguration of bidding zones;

      iii. investments in network infrastructure combined with one or the two above; or

      iv. a combination of the above.

Before performing the analysis pursuant to point (c), the Core TSOs shall jointly coordinate and consult with all Core regulatory authorities on the methodology, assumptions and criteria for this analysis.

9. The proposals pursuant to paragraphs 5 and 6 shall also demonstrate that the concerned Core TSOs have diligently explored the alternatives referred to in paragraph 8 sufficiently in advance taking into account their required implementation time, such that they could be applied or implemented by the time that the decisions of the Core regulatory authorities on the proposal pursuant to paragraphs 5 and 6 are taken.

10. The Core TSOs shall regularly review and update the application of the methodology for determining CNECs as defined in Article 21.

Article 6. Methodology for operational security limits

1. The Core TSOs shall use in the intraday capacity calculation the same operational security limits as those used in the operational security analysis carried out in accordance with Article 72 of the SO Regulation.

2. To take into account the thermal limits of CNEs, the Core TSOs shall use the maximum admissible current limit (I_{max}), which is the physical limit of a CNE according to the operational security limits in accordance with Article 25 of the SO Regulation. The maximum admissible current shall be defined as follows:

   (a) the maximum admissible current can be defined as:

      i. Seasonal limit, which means a fixed limit for all ID CC MTUs of each of the four seasons.

      ii. Dynamic limit, which means a value per ID CC MTU reflecting the varying ambient conditions.

      iii. Fixed limits for all ID CC MTUs, in case of specific situations where the physical limit reflects the capability of overhead lines, cables or substation equipment installed in the primary power circuit (such as circuit-breaker, or disconnector) with limits not sensitive to ambient conditions.

   (b) when applicable, I_{max} shall be defined as a temporary current limit of the CNE in accordance with Article 25 of the SO Regulation. A temporary current limit means that an overload is only allowed for a certain finite duration. As a result, various CNECs associated with the same CNE may have different I_{max} values.

   (c) I_{max} shall represent only real physical properties of the CNE and shall not be reduced by any security margin.[1]

   (d) the CCC shall use the I_{max} of each CNEC to calculate F_{max} for each CNEC, which describes the maximum admissible active power flow on a CNEC. F_{max} shall be calculated by the given formula:

$$F_{max} = \sqrt{3} \cdot I_{max} \cdot U \cdot cos(\varphi)$$

Equation 1

   (e) where I_{max} is the maximum admissible current of a critical network element (CNE), U is a fixed reference voltage for each CNE, and $\cos(\varphi)$ is the power factor.

   (f) the CCC shall, by default, set the power factor $\cos(\varphi)$ to 1 based on the assumption that the CNE is loaded only by active power and that the share reactive power is negligible (i.e. $\varphi = 0$). If the share of reactive power is not negligible, a TSO may consider this aspect during the validation phase in accordance with Article 18.

3. The Core TSOs shall aim at gradually phasing out the use of seasonal limits pursuant to paragraph 2(a)(i) and replace them with dynamic limits pursuant to paragraph 2(a)(ii), when the benefits are greater than the costs. If applicable, after the end of each calendar year, each TSO shall analyse for all its CNEs for which seasonal limits are applied and have a non-zero

[1] Uncertainties in capacity calculation are covered on each CNEC by the flow reliability margin (FRM) in accordance with Article 8 and adjustment values related to validation in accordance with Article 18.

shadow price at least in 0.1% of ID CC MTUs in the previous calendar year, the expected increase in the economic surplus in the next 10 years resulting from the implementation of dynamic limits, and compare it with the cost of implementing dynamic limits. Each TSOs shall provide this analysis to Core regulatory authorities. If the cost benefit analysis, taking into account other planned investments, is positive, the concerned TSO shall implement the dynamic limits within three years after the end of the analysed calendar year. In case of interconnectors, the concerned TSOs shall cooperate in performing this analysis and implementation when applicable.

4. TSOs shall regularly review and update operational security limits in accordance with Article 21.

Article 7. Methodology for allocation constraints

1. In case operational security limits cannot be transformed efficiently into I_{max} and F_{max} pursuant to Article 6, the Core TSOs may transform them into allocation constraints. For this purpose, the Core TSOs may only use external constraints as a specific type of allocation constraint that limits the maximum import and/or export of a given Core bidding zone within the SIDC.

2. The Core TSOs may apply external constraints as one of the following two options:

   (a) a constraint on the Core net position (the sum of cross-zonal exchanges within the Core CCR for a certain bidding zone in the SIDC), thus limiting the net position of the respective bidding zone with regards to its imports and/or exports to other bidding zones in the Core CCR. This option shall be applied until option (b) can be applied.

   (b) a constraint on the global net position (the sum of all cross-zonal exchanges for a certain bidding zone in the SIDC), thus limiting the net position of the respective bidding zone with regards to all CCRs, which are part of the SIDC. This option shall be applied when: (i) such a constraint is approved within all intraday capacity calculation methodologies of the respective CCRs, (ii) the respective solution is implemented within the SIDC algorithm and (iii) the respective bidding zone borders are participating in SIDC.

3. External constraints may be used by PSE during a transition period of two years following the implementation of this methodology in accordance with Article 26(2)(b) and in accordance with the reasons and the methodology for the calculation of external constraints as specified in Annex 1 to this methodology. During this transition period, PSE shall:

   (a) calculate the value of external constraints on a daily basis for each ID CC MTU;

   (b) if applicable and in case the external constraint had a non-zero shadow price in more than 0.1% of hours in a quarter, provide to the CCC a report analysing: (i) for each DA CC MTU when the external constraint had a non-zero shadow price the loss in economic surplus due to external constraint and the effectiveness of the allocation constraint in preventing the violation of the underlying operational security limits and (ii) alternative solutions to address the underlying operational security limits. The CCC shall include this report as an annex in the quarterly report as defined in Article 24(5);

   (c) if applicable and when more efficient, implement alternative solutions referred to in point (b).

4. In case that PSE could not find and implement alternative solutions referred to in the previous paragraph, it may, by eighteen months after the implementation of this methodology in

accordance with Article 26(2)(b), together with all other Core TSOs, submit to all Core regulatory authorities a proposal for amendment of this methodology in accordance with Article 9(13) of CACM Regulation. Such a proposal shall include the following:

(d) the technical and legal justification for the need to continue using the external constraints indicating the underlying operational security limits and why they cannot be transformed efficiently into I_{max} and F_{max};

(e) the methodology to calculate the value of external constraints including the frequency of recalculation.

In case such a proposal has been submitted by all Core TSOs, the transition period referred to in paragraph 3 shall be extended until the decision on the proposal is taken by all Core regulatory authorities.

5. For the SIDC fallback procedure, pursuant to Article 20, all external constraints, shall be modelled as constraints limiting the Core net position as referred to in paragraph 2(a).

6. PSE may discontinue the use of an external constraint. In such a case, PSE shall communicate this change to all Core regulatory authorities and to the market participants at least one month before discontinuation.

7. The Core TSOs shall review and update allocation constraints in accordance with Article 21.

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. The FRMs shall be calculated in two main steps. In the first step, the probability distribution of deviations between the expected power flows at the time of the capacity calculation and the realised power flows in real time shall be calculated. To calculate the expected power flows (F_{exp}), for each ID CC MTU of the observation period, the historical CGMs and GSKs used in capacity calculation shall be used. The historical CGMs shall be updated with the deliberated Core TSOs' actions (including at least the RAs considered during the capacity calculation) that

have been applied in the relevant ID CC MTU[2]. The power flows of such modified CGMs shall be recalculated (F_{ref}) and then adjusted to take into account the realised commercial exchanges inside the Core CCR. The latter adjustment shall be performed by calculating $PTDF$s according to the methodology as described in Article 12, but using the modified CGMs and the historical GSKs. The expected power flows at the time of the capacity calculation shall therefore be calculated using the final realised commercial exchanges in the Core CCR which are reflected in realised power flows. This above calculation of expected power flows (F_{exp}) is described with Equation 2.

$$\vec{F}_{exp} = \vec{F}_{ref} + \mathbf{PTDF}\left(\overrightarrow{NP}_{real} - \overrightarrow{NP}_{ref}\right)$$

Equation 2

with

$\vec{F}_{exp}$	expected power flow per CNEC in the realised commercial situation in Core CCR
$\vec{F}_{ref}$	flow per CNEC in the CGM updated to take deliberate TSO actions into account
PTDF	power transfer distribution factor matrix calculated with updated CGM
$\overrightarrow{NP}_{real}$	Core net position per bidding zone in the realised commercial situation
$\overrightarrow{NP}_{ref}$	Core net position per bidding zone in the updated CGM

4. The expected power flows on each CNEC of the Core CCR shall then be compared with the realised power flows observed on the same CNEC. When calculating the expected (respectively realised) flows for CNECs, the expected (resp. realised) flows shall be the best estimate of the expected (resp. realised) power flow which would have occurred, should the outage have taken place. Such estimate shall take curative remedial actions into account where relevant. All differences between these two flows for all ID CC MTUs of the observation period shall be used to define the probability distribution of deviations between the expected power flows at the time of the capacity calculation and the realised power flows;

5. In the second step, the 90th percentiles of the probability distributions of all CNECs shall be calculated[3]. This means that the Core TSOs apply a common risk level of 10% and thereby the FRM values cover 90% of the historical forecast errors within the observation period. Subject to the proposal pursuant to paragraph 6, the FRM value for each CNEC shall either be:

   (a) the 90th percentile of the probability distributions calculated for such CNEC;

   (b) the 90th percentile of the probability distributions calculated for the CNEs underlying such CNEC.

6. Each TSO may reduce the FRM values resulting from the second step for its own CNECs if it considers that the underlying uncertainties have been over-estimated. For CNECs used within both the Core day-ahead and intraday capacity calculations, the FRM values calculated

[2] These actions are controlled by the Core TSOs and thus not considered as an uncertainty.

[3] This value is derived based on experience in existing flow-based market coupling initiatives.

pursuant to this methodology shall not be higher than the FRM values for the same CNECs used within the Core day-ahead capacity calculation.

7. No later than eighteen months after the implementation of this methodology in accordance with Article 26(2)(b), the Core TSOs shall jointly perform the first FRM calculation pursuant to the methodology described above and based on the data covering at least the first year of operation of this methodology. By the same deadline, all Core TSOs shall submit to all Core regulatory authorities a proposal for amendment of this methodology in accordance with Article 9(13) of the CACM Regulation as well as the supporting document as referred to in paragraph 9 below.

8. The proposal for amendment of this methodology pursuant to the previous paragraph shall specify whether the FRM value shall be calculated for each CNEC based on the underlying probability distribution, or whether all CNECs with the same underlying CNE shall have the same FRM value calculated based on the probability distribution calculated for the underlying CNE. In case the proposal suggests calculating the FRMs at CNEC level, the proposal shall describe in detail how to estimate the expected and realised flows adequately, including the RAs that would have been triggered in order to manage the contingency when relevant.

9. The supporting document for the proposal for amendment of this methodology pursuant to paragraph 7 above shall include at least the following:

   (a) the FRM values for all CNECs calculated at the level of CNE and CNEC; and

   (b) an assessment of the benefits and drawbacks of calculating the FRM at the level of CNE or CNEC.

10. Until the proposal for amendment of this methodology pursuant to paragraph 7 is approved, the Core TSOs shall use the following FRM values:

    (a) if and as long as all Core TSOs apply FRM for the day-ahead capacity calculation equal to 10% of Fmax, the FRM value for intraday capacity calculation for each CNEC shall be min {5% of Fmax, FRM at day-ahead level};

    (b) as soon as the Core TSOs start applying the FRM calculation for the day-ahead capacity calculation pursuant to Article 8 of Core DA CCM, the FRM value for intraday capacity calculation shall be equal or lower than the FRM value at the day ahead level.

11. After the proposal for amendment of this methodology pursuant to paragraph 7 is approved, the FRM values shall be updated at least once every year based on an observation period of one year in order to reflect the seasonality effects. The FRM values shall then remain fixed until the next update.

Article 9. Generation shift key methodology

1. Each Core TSO shall define for its bidding zone and for each ID CC MTU a GSK, which translates a change in a bidding zone net position into a specific change of injection or withdrawal in the CGM. A GSK shall have fixed values, which means that the relative contribution of generation or load to the change in the bidding zone net position shall remain the same, regardless of the volume of the change.

2. For a given ID CC MTU, the GSK shall only include actual generation and/or load[4] present in the CGM for that ID CC MTU. The Core TSOs shall take into account the available information on generation or load available in the CGM in order to select the nodes that will contribute to the GSK.

3. The GSKs shall describe the expected response of generation and/or load units to changes in the net positions. This expectation shall be based on the observed historical response of generation and/or load units to changes in net positions, clearing prices and other fundamental factors, and thereby contributing to minimising the FRM.

4. The GSKs shall be updated and reviewed on a daily basis or whenever the expectations referred to in paragraph 3 change. The Core TSOs shall review and update the application of the generation shift key methodology in accordance with Article 21.

5. The Core TSOs belonging to the same bidding zone shall jointly define a common GSK for that bidding zone and shall agree on a methodology for such coordination. For Germany and Luxembourg, each TSO shall calculate its individual GSK and the CCC shall combine them into a single GSK for the whole German-Luxembourgian bidding zone, by assigning relative weights to each TSO's GSK. The German and Luxembourgian TSOs shall agree on these weights, based on the share of the generation in each TSO's control area that is responsive to changes in net position, and provide them to the CCC.

6. Within eighteen months after the implementation of this methodology in accordance with Article 26(2)(b), all Core TSOs shall develop a proposal for further harmonisation of the generation shift key methodology and submit it by the same deadline to all Core regulatory authorities as a proposal for amendment of this methodology in accordance with Article 9(13) of the CACM Regulation. The proposal shall at least include:

   (a) the criteria and metrics for defining the efficiency and performance of GSKs and allowing for quantitative comparison of different GSKs; and

   (b) a harmonised generation shift key methodology combined with, where necessary, rules and criteria for TSOs to deviate from the harmonised generation shift key methodology.

Article 10. Methodology for remedial actions in intraday capacity calculation

1. In accordance with Article 25(1) of the CACM Regulation and Article 20(2) of the SO Regulation, the Core TSOs shall individually define the RAs to be taken into account in the intraday capacity calculation.

2. In case a RA made available for the intraday capacity calculation in the Core CCR is also made available in another CCR, the TSO having control on this RA shall take care, when defining it, of a consistent use in its potential application in both CCRs to ensure operational security.

3. In accordance with Article 25(2) and (3) of the CACM Regulation, these RAs will be used for the coordinated calculation of cross-zonal capacities while ensuring operational security in real-time.

4. RAs used for intraday capacity calculation shall be aligned as much as technically feasible with the most recent ROSC CROSA. The latest version of coordinated RAs available at the time of

[4] And other elements connected to the network, such as storage equipment.

starting step 2 according to Article 4(9) shall be used. Such RAs will be only available once ROSC CROSA is implemented in accordance with Article 37 of Core ROSC methodology.

5. In accordance with Article 25(4) of the CACM Regulation, a TSO may withhold only those RAs, which are needed to ensure operational security in real-time operation and for which no other (costly) RAs are available, or those offered to the intraday capacity calculation in other CCRs in which the concerned TSO also participates. The CCC shall monitor and report in the annual report on systematic withholdings, which were not essential to ensure operational security in real-time operation.

6. The intraday capacity calculation may only take into account those non-costly RAs which can be modelled. These non-costly RAs can be, but are not limited to:

   (a) changing the tap position of a phase-shifting transformer (PST); and

   (b) a topological action: opening or closing of one or more line(s), cable(s), transformer(s), bus bar coupler(s), or switching of one or more network element(s) from one bus bar to another.

7. In accordance with Article 25(6) of the CACM Regulation, all RAs taken into account for day-ahead capacity calculation are also considered during the intraday timeframe, depending on their technical availability.

8. The RAs can be preventive or curative, i.e. affecting all CNECs or only pre-defined contingency cases, respectively.

9. TSOs shall review and update the RAs taken into account in the intraday capacity calculation in accordance with Article 21.

TITLE 4 – Update of intraday cross-zonal capacities

Article 11. Update of intraday cross-zonal capacities remaining after the SDAC

1. The CCC shall use the flow-based parameters resulting from day-ahead capacity calculation and the net positions resulting from already allocated capacities in the SDAC to calculate the updated day-ahead cross-zonal capacities, in the form of flow-based parameters, to be used as intraday cross-zonal capacities at the intraday cross-zonal gate opening time.

   For the updated intraday flow-based parameters, the PTDF values shall be the final PTDFs resulting from the day-ahead capacity calculation, and the RAM shall be derived as:

$$\overrightarrow{RAM}_{UID} = \overrightarrow{RAM}_{f,DA} - \mathbf{PTDF}_{f,DA}\,\overrightarrow{NP}_{AAC,DA}$$

Equation 3

with

$\overrightarrow{RAM}_{UID}$	updated remaining available margin for intraday cross-zonal capacities
$\overrightarrow{RAM}_{f,DA}$	final remaining available margin resulting from the day-ahead capacity calculation
$\mathbf{PTDF}_{f,DA}$	final power transfer distribution factor matrix resulting from the day-ahead capacity calculation
$\overrightarrow{NP}_{AAC,DA}$	net positions resulting from already allocated capacities in SDAC

2. For each CNEC, each TSO may decrease the $RAM_{f,DA}$ by decreasing the AMR_{DA} and $LTA_{margin,DA}$ as calculated pursuant to the day-ahead capacity calculation methodology while ensuring that there is no undue discrimination between internal and cross-zonal exchanges in line with Article 21(1)(b)(ii) of the CACM Regulation.

3. Irrespective of the options provided to each TSO pursuant to this paragraph, each TSO shall ensure that on each bidding zone border, the long-term capacities that are in effect taken into account in the $LTA_{margin,DA}$, are between 0.001 MW and 1500 MW.

4. Until the implementation of intraday auctions at 15:00 market time of day D-1, the Core TSOs may set to zero the cross-zonal capacities calculated pursuant to Article 4(2)(a), including those calculated pursuant to a transitional solution for updating the cross-zonal capacities remaining after the day-ahead capacity allocation pursuant to Article 26(5).

   (a) In case the final cross-zonal capacities, calculated in accordance with this Article and taking into account Article 20(1), are in the form of ATCs, such a decision may be made per bidding zone border by the competent TSOs;

   (b) In case the final cross-zonal capacities, calculated in accordance with this Article and taking into account Article 20(1) are in the form of flow-based parameters, such a decision shall be coordinated among all Core TSOs. Further details on the application of transitional solution are defined in Annex 2 to this methodology.

TITLE 5 - Description of the intraday capacity calculation process

Article 12. Calculation of power transfer distribution factors and reference flows

1. The flow-based calculation is a centralised calculation, which delivers two main classes of parameters needed for the definition of the flow-based domain: the power transfer distribution factors ($PTDFs$) and the remaining available margins ($RAMs$).

2. In accordance with Article 29(3)(a) of the CACM Regulation, the CCC shall calculate the impact of a change in the bidding zones net position on the power flow on each CNEC (determined in accordance with the rules defined in Article 5). This influence is called the zone-to-slack $PTDF$. This calculation is performed from the CGM and the GSK defined in accordance with Article 9.

3. The zone-to-slack $PTDFs$ are calculated by first calculating the node-to-slack $PTDFs$ for each node defined in the GSK. These nodal PTDFs are derived by varying the injection of a relevant node in the CGM and recording the difference in power flow on every CNEC (expressed as a percentage of the change in injection). These node-to-slack $PTDFs$ are translated into zone-to-slack $PTDFs$ by multiplying the share of each node in the GSK with the corresponding nodal PTDF and summing up these products. This calculation is mathematically described as follows:

$$\mathbf{PTDF}_{\text{zone-to-slack}} = \mathbf{PTDF}_{\text{node-to-slack}}\,\mathbf{GSK}_{\text{node-to-zone}}$$

Equation 4

with

$\mathbf{PTDF}_{zone-to-slack}$ matrix of zone-to-slack $PTDFs$ (columns: bidding zones; rows: CNECs)

$\mathbf{PTDF}_{node-to-slack}$	matrix of node-to-slack $PTDFs$ (columns: nodes; rows: CNECs)
$\mathbf{GSK}_{node-to-zone}$	matrix containing the $GSKs$ of all bidding zones (columns: bidding zones; rows: nodes; sum of each column equal to one)

4. The zone-to-slack $PTDFs$ as calculated above can also be expressed as zone-to-zone $PTDFs$. A zone-to-slack $PTDF_{A,l}$ represents the influence of a variation of a net position of bidding zone A on a CNEC l and assumes a commercial exchange between a bidding zone and a slack node. A zone-to-zone $PTDF_{A\rightarrow B,l}$ represents the influence of a variation of a commercial exchange from bidding zone A to bidding zone B on CNEC l. The zone-to-zone $PTDF_{A\rightarrow B,l}$ can be derived from the zone-to-slack $PTDFs$ as follows:

$$PTDF_{A\rightarrow B,l} = PTDF_{A,l} - PTDF_{B,l}$$

Equation 5

5. The maximum zone-to-zone $PTDF$ of a CNEC ($PTDF_{z2zmax,l}$) is the maximum influence that any Core exchange has on the respective CNEC, including exchanges over HVDC interconnectors which are integrated pursuant to Article 13:

$$\begin{aligned} PTDF_{z2zmax,l} = max\Big(&\max_{A\in BZ}\left(PTDF_{A,l}\right) \\ &- \min_{A\in BZ}\left(PTDF_{A,l}\right), \max_{H\in HVDC}\big(|(PTDF_{A,l} - PTDF_{VH\_1,l}) \\ &- (PTDF_{B,l} - PTDF_{VH\_2,l})|, |PTDF_{VH\_1,l} - PTDF_{VH\_2,l}|\big)\Big) \end{aligned}$$

Equation 6

6. with

$PTDF_{A,l}$	zone-to-slack $PTDF$ of bidding zone A on a CNEC l
HVDC	set of HVDC interconnectors integrated pursuant to Article 13
BZ	set of all Core bidding zones
$\max_{A\in BZ}(PTDF_{A,l})$	maximum zone-to-slack PTDF of Core bidding zones on a CNEC l
$\min_{A\in BZ}(PTDF_{A,l})$	minimum zone-to-slack PTDF of Core bidding zones on a CNEC l
	$PTDF_{VH\_1,l}$ zone-to-slack $PTDF$ of Virtual hub 1 on a CNEC l, with virtual hub 1 representing the converter station at the sending end of the HVDC interconnector located in bidding zone A
	$PTDF_{VH\_2,l}$ zone-to-slack $PTDF$ of Virtual hub 2 on a CNEC l, with virtual hub 2 representing the converter station at the sending end of the HVDC interconnector located in bidding zone B

7. The reference flow (F_{ref}) is the active power flow on a CNEC based on the CGM. In case of a CNEC without contingency, F_{ref} is simulated by directly performing the direct current load-flow calculation on the CGM, whereas in case of a CNEC with contingency, F_{ref} is simulated by first applying the specified contingency, and then performing the direct current load-flow calculation.

8. The expected flow F_i in the commercial situation i is the active power flow of a CNEC based on the flow F_{ref} and the deviation between the commercial situation considered in the CGM (reference commercial situation) and the commercial situation i:

$$\vec{F}_i = \vec{F}_{ref} + \mathbf{PTDF}\left(\overrightarrow{NP}_i - \overrightarrow{NP}_{ref}\right)$$

Equation 7

with

$\vec{F}_i$	expected flow per CNEC in the commercial situation i
$\vec{F}_{ref}$	flow per CNEC in the CGM (reference flow)
PTDF	power transfer distribution factor matrix
$\overrightarrow{NP}_i$	Core net position per bidding zone in the commercial situation i
$\overrightarrow{NP}_{ref}$	Core net position per bidding zone in the reference commercial situation

Article 13. Integration of HVDC interconnectors on bidding zone borders of the Core CCR

1. The Core TSOs shall apply the evolved flow-based (EFB) methodology when including HVDC interconnectors on the bidding zone borders of the Core CCR[5]. According to this methodology, a cross-zonal exchange over an HVDC interconnector on the bidding zone borders of the Core CCR is modelled and optimised explicitly as a bilateral exchange in capacity allocation, and is constrained by the physical impact that this exchange has on all CNECs considered in the final flow-based domain used in capacity allocation and constraints modelling the maximum possible exchange of the HVDC interconnector.

2. In order to calculate the impact of the cross-zonal exchange over a HVDC interconnector on the CNECs, the converter stations of the cross-zonal HVDC shall be modelled as two virtual hubs, which function equivalently as bidding zones. Then the impact of an exchange between two bidding zones A and B over such HVDC interconnector shall be expressed as an exchange from the bidding zone A to the virtual hub representing the sending end of the HVDC interconnector plus an exchange from the virtual hub representing the receiving end of the interconnector to the bidding zone B:

$$PTDF_{A\rightarrow B,l} = (PTDF_{A,l} - PTDF_{VH\_1,l}) + (PTDF_{VH\_2,l} - PTDF_{B,l})$$

Equation 8

with

[5] EFB is different from AHC. AHC imposes the capacity constraints of one CCR on the cross-zonal exchanges of another CCR by considering the impact of exchanges between two capacity calculation regions. E.g. the influence of exchanges of a bidding zone which is part of a CCR applying a coordinated net transmission capacity approach is taken into account in a bidding zone which is part of a CCR applying a flow-based approach. EFB takes into account commercial exchanges over the cross-border HVDC interconnector within a single CCR applying the flow-based method of that CCR.

$PTDF_{VH\_1,l}$ zone-to-slack $PTDF$ of Virtual hub 1 on a CNEC l, with virtual hub 1 representing the converter station at the sending end of the HVDC interconnector located in bidding zone A

$PTDF_{VH\_2,l}$ zone-to-slack $PTDF$ of Virtual hub 2 on a CNEC l, with virtual hub 2 representing the converter station at the receiving end of the HVDC interconnector located in bidding zone B

3. The PTDFs for the two virtual hubs $PTDF_{VH\_1,l}$ and $PTDF_{VH\_2,l}$ are calculated for each CNEC and they are added as two additional columns (representing two additional virtual bidding zones) to the existing $PTDF$ matrix, one for each virtual hub.

4. The virtual hubs introduced by this methodology are only used for modelling the impact of an exchange through a HVDC interconnector and no orders shall be attached to these virtual hubs in the coupling algorithm. The two virtual hubs will have a combined net position of 0 MW, but their individual net position will reflect the exchanges over the interconnector. The flow-based net positions of these virtual hubs shall be of the same magnitude, but they will have an opposite sign.

Article 14. Consideration of non-Core bidding zone borders

1. 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 where possible also with an advanced hybrid coupling (AHC).

2. In the standard hybrid coupling, the Core TSOs shall consider the electricity exchanges on bidding zone borders outside the Core CCR as fixed input to the intraday capacity calculation. These electricity exchanges, defined as best forecasts of net positions and flows for HVDC lines, are defined and agreed pursuant to Article 19 of the CGMM and are incorporated in each CGM. They impact the F_{ref} and $F_{0,Core}$ on all CNECs and thereby increase or decrease the RAM of the Core CNECs in order for those CNECs to accommodate the flows resulting from those exchanges. Uncertainties related to the electricity exchanges forecasts are implicitly integrated within the FRM of each CNEC.

3. In the AHC, the CNECs of the intraday capacity calculation methodology shall limit not only the net positions of the Core bidding zone borders, but also the electricity exchanges on the bidding zone borders of adjacent CCRs.

4. No later than twelve months after the implementation of this methodology in accordance with Article 26(2)(b), the Core TSOs shall jointly develop a proposal for the implementation of the AHC and submit it by the same deadline to all Core regulatory authorities as a proposal for amendment of this methodology in accordance with Article 9(13) of the CACM Regulation. The proposal for the implementation of the AHC shall aim to reduce the volume of unscheduled allocated flows on the CNECs of the Core CCR resulting from electricity exchanges on the bidding zone borders of adjacent CCRs. If before the implementation of this methodology, the AHC has been implemented on some bidding zone borders in existing flow-based capacity calculation initiatives, it may continue to be applied on those bidding zone borders as part of the day-ahead capacity calculation carried out according to this methodology until the amendments pursuant to this paragraph are implemented.

5. Until the AHC is implemented, the Core TSOs shall monitor the accuracy of non-Core exchanges in the CGM. The Core TSOs shall report in the annual report to all Core regulatory authorities the accuracy of such forecasts.

Article 15. Initial flow-based calculation

1. As a first step in the intraday capacity calculation process, the CCC shall merge the individual lists of CNECs provided by all Core TSOs in accordance with Article 5(4) into a single list, which shall constitute the initial list of CNECs.

2. Subsequently, the CCC shall use the initial list of CNECs pursuant to paragraph 1, the CGM pursuant to Article 4(7) and the GSK for each bidding zone in accordance with Article 9 to calculate the initial flow-based parameters for each ID CC MTU.

3. The initial flow-based parameters shall be calculated pursuant to Article 12 and shall consist of the **PTDF** values and $\vec{F}_{ref}$ values for each initial CNEC.

Article 16. Definition of final list of CNECs for intraday capacity calculation

1. The CCC shall use the initial list of CNECs determined pursuant to Article 15 and remove those CNECs, for which the maximum zone-to-zone $PTDF_{init}$ is below 5%. The remaining CNECs shall constitute the final list of CNECs.

2. If all available costly and non-costly RAs are not sufficient to ensure operational security on an internal network element with a specific contingency, which is not defined as a CNEC, the concerned Core TSO may exceptionally add such element to the final list of CNECs, provided that:

   (a) Its maximum zone-to-zone PTDF is equal or above the threshold of 5% referred to in paragraph (1);

   (b) Its voltage level must be 110 kV or above;

   (c) Its RAM shall be the highest RAM ensuring operational security considering all available costly and non-costly RAs, with the floor of zero.

3. In the first twelve months following the implementation of the ROSC methodology in accordance with Article 76(1) of the SO Regulation, the concerned Core TSO may also add an XNEC to the final list of CNECs, with no PTDF threshold, provided that:

   (a) It was loaded 100% or more before the latest CROSA and for which cross-border redispatch or countertrading were applied during that CROSA;

   (b) Its RAM shall be at least the difference between its Fmax and its loading after the CROSA.

   After twelve months following the implementation of the ROSC methodology, the PTDF threshold of 5% shall apply to the XNEC to CNEC conversion, unless the amendment pursuant to paragraph (4) is approved and implemented.

4. The Core TSOs shall study the effects and needs for the XNEC to CNEC and may propose an amendment to this methodology, which shall at least include:

   (a) the proposed PTDF threshold for XNEC to CNEC conversion;

(b) rules for avoiding undue discrimination between internal and cross zonal exchanges for such XNECs, which shall include limitations of such exchanges in proportion to the burdening effect of their consequential flows (internal flows and allocated flows, respectively).

Article 17. Calculation of flow-based parameters before validation

1. The flows assumed to result from commercial exchanges outside the Core CCR (F_{uaf}) shall be calculated in the following steps. First, the flows on CNECs in situations without commercial exchanges are calculated by setting the corresponding net positions $\overrightarrow{NP_i}$ to zero:

(a) The flows without Core exchanges are calculated as:

$$\vec{F}_{0,Core} = \vec{F}_{ref} - \vec{F}_{ref,Core}$$

Equation 8a

$$\vec{F}_{ref,Core} = \mathbf{PTDF_{Core}}\ \overrightarrow{NP}_{ref,Core}$$

Equation 8b

(b) The flows without exchanges in the whole Continental Europe and on its links towards other synchronous areas, are calculated as:

$$\vec{F}_{0,all} = \vec{F}_{ref} - \mathbf{PTDF_{all}}\ \overrightarrow{NP}_{ref,all}$$

Equation 8c

For this calculation, the CCC shall use the GSKs provided by the concerned TSOs, and when these are not available, the CCC shall use a GSK where all nodes with positive injections participate in shifting in proportion to their injection.

(c) The flow assumed to result from commercial exchanges outside the Core CCR (F_{uaf}) is then calculated for each CNEC as follows:

$$\vec{F}_{uaf} = \vec{F}_{0,Core} - \vec{F}_{0,all}$$

Equation 8d

with

$\vec{F}_{0,Core}$	flow per CNEC in a situation without commercial exchanges within the Core CCR
$\vec{F}_{ref}$	flow per CNEC in the CGM (which already contains the flows originated by SDAC process, and partially from the SIDC process)
$\vec{F}_{ref,Core}$	flow originated from the Core net positions which are already included in the CGM
$\mathbf{PTDF_{Core}}$	power transfer distribution factor matrix for all bidding zones of the Core CCR

$\mathbf{PTDF}_{all}$	power transfer distribution factor matrix for all bidding zones of Continental Europe, and connection points of the bidding zones of Continental Europe with the bidding zones of other synchronous areas
$\overrightarrow{NP}_{ref,Core}$	Core net position per bidding zone included in the CGM (resulting from SDAC and the SIDC exchanges already included in the CGM), excluding the net positions' changes resulting from the application of remedial actions in the previous CROSA process
$\overrightarrow{NP}_{ref,all}$	total net positions included in the CGM, of: all bidding zones of Continental Europe, and connection points of the bidding zones of Continental Europe with the bidding zones of other synchronous areas
$\vec{F}_{0,all}$	flow per CNEC in a situation without any commercial exchange between bidding zones within Continental Europe and any commercial exchange between the bidding zones of Continental Europe and the bidding zones of other synchronous areas
$\vec{F}_{uaf}$	unscheduled allocated flow, i.e. the flow per CNEC resulting from commercial exchanges outside Core CCR

2. Based on the initial flow-based domain and on the final list of CNECs, the Core CCC shall calculate for each CNEC the RAM before validation, according to the equation:

$$\overrightarrow{RAM}_{bv} = \vec{F}_{max} - \overrightarrow{FRM} - \vec{F}_{ref}$$

Equation 12

$\vec{F}_{max}$	Maximum active power flow pursuant to Article 6
$\overrightarrow{FRM}$	Flow reliability margin pursuant to Article 8
$\overrightarrow{RAM}_{bv}$	Remaining available margin before validation

3. In case an external constraint restricts the Core net positions pursuant to Article 7(2)(a), it shall be added as an additional row to the $\mathbf{PTDF}_{f}$ matrix and the $\overrightarrow{RAM}_{bv}$ vector as follows:

   (a) the $PTDF$ value in the column related to the bidding zone applying the concerned external constraint is set to 1 for an export limit and -1 for an import limit, respectively;

   (b) the $PTDF$ values in the columns related to all other bidding zones are set to zero; and

   (c) the RAM value is set to the amount of the external constraint, corrected for the net position included in the CGM.

Article 18. Validation of flow-based parameters

1. The Core TSOs shall validate and have the right to correct cross-zonal capacity for reasons of operational security during the validation process.

2. Each Core TSO shall validate and have the right to decrease the RAM for reasons of operational security during the individual validation. The adjustment due to individual validation is called 'individual validation adjustment' (IVA) and it shall have a positive value, i.e. it may only reduce the RAM. IVA may reduce the RAM only to the minimum degree that is needed to ensure operational security, and only after all the expected available costly and non-costly remedial actions pursuant to Article 22 of the SO Regulation are considered. In case certain remedial actions are not implemented, such as countertrading, Core TSOs shall ensure their implementation within twelve months following the application of IDCC(b) pursuant to Article 4(2)(b).

3. The individual validation adjustment may be done in the following situations:

   (a) an occurrence of an exceptional contingency or forced outage as defined in Article 3(39) and Article 3(77) of the SO Regulation;

   (b) when all available costly and non-costly RAs are not sufficient to ensure operational security;

   (c) a mistake in input data, that leads to an overestimation of cross-zonal capacity from an operational security perspective; and/or

   (d) a potential need to cover reactive power flows on certain CNECs.

4. When performing the validation, the Core TSOs shall consider the operational security limits pursuant to Article 6(1). While considering such limits, they may consider additional grid models, and other relevant information. Therefore, the Core TSOs shall use the tools developed by the CCC for analysis, but may also employ verification tools not available to the CCC.

5. In case of a required reduction due to situations as defined in paragraph 3(a), a TSO may use a positive value for IVA for its own CNECs or adapt the external constraints, pursuant to Article 7, to reduce the cross-zonal capacity for its bidding zone.

6. In case of a required reduction due to situations as defined in paragraph 3(b), (c), and (d), a TSO may use a positive value for IVA for its own CNECs. In case of a situation as defined in paragraph 3(c), a Core TSO may, as a last resort measure, request a common decision to launch the default flow-based parameters pursuant to Article 20.

7. After individual validation adjustments, the remaining available margin before validation ($\overrightarrow{RAM}_{bv}$) shall be adjusted for the flows resulting from net positions or already allocated capacities resulting from the SIDC in accordance with Article 4(5)c. The final RAM_f shall be calculated by the CCC for each CNEC and external constraint according to Equation 13.

$$\overrightarrow{RAM}_f = \overrightarrow{RAM}_{bv} - \overrightarrow{IVA} - \mathbf{PTDF}_{\boldsymbol{Core}} \ \overrightarrow{NP}_{AAC,IDadd}$$

Equation 13

with

$\overrightarrow{RAM}_f$ final remaining available margin

$\overrightarrow{RAM}_{bv}$	remaining available margin before validation
$\overrightarrow{IVA}$	individual validation adjustment
$\mathbf{PTDF}_{Core}$	final power transfer distribution factor matrix resulting from the intraday capacity calculation
$\overrightarrow{NP}_{AAC,IDadd}$	Core net positions resulting from SIDC which are not already included in the CGM

8. The CCC shall remove those $\overrightarrow{RAM_f}$ and $\mathbf{PTDF}_f$ values which are redundant and may therefore be removed without impacting the possible allocation of cross-zonal capacity. The pre-solved CNECs and external constraints shall thus ensure that the capacity allocation shall not exceed any limiting CNEC or external constraint.

9. Any reduction of cross-zonal capacities during the validation process shall be communicated and justified to market participants and to all Core regulatory authorities in accordance with Article 22 and Article 24, respectively.

10. Every three months, the CCC shall provide in the quarterly report all the information on the reductions of cross-zonal capacity and exceptional additions of internal network elements. The quarterly report shall include at least the following information for each CNEC of the pre-solved domain affected by a reduction and for each ID CC MTU:

    (a) the identification of the CNEC;

    (b) all the corresponding flow components pursuant to Article 22(2)(b)(vii);

    (c) the volume of reduction and, if applicable, the shadow price of the CNEC resulting from SIDC and the estimated market loss of economic surplus due to the reduction;

    (d) the detailed reason(s) for reduction, including the operational security limit(s) that would have been violated without reductions, specifying network elements on which these limits would have been violated, and under which circumstances they would have been violated, as well as the list of remedial actions with their detailed information, considered prior to the reduction;

    (e) the forecast flow in the CGM used for D-1 capacity calculation, in the CGM considered for the intraday capacity calculation within which the capacity reduction occurred, in the first CGM established after the considered intraday calculation and the realised flow, before (and when relevant after) contingency;

    (f) if an internal network element with a specific contingency was exceptionally added to the final list of CNECs pursuant to Article 16:

        i. a justification why adding the network element with a specific contingency to the list was the only way to ensure operational security;

        ii. the name or the identifier of the internal network element with a specific contingency;

        iii. the ID CC MTUs for which the internal network element with a specific contingency was added to the list;

iv. the maximum zone-to-zone PTDF calculated on the basis of the methodology in Article 12, calculated on the CGM for MTUs defined in paragraph iii;

v. for the cases under Article 16(3), the amount of total, internal, loop and allocated flows at the considered exceptionally added XNEC; and

vi. the information referred to in paragraphs (b), (c) and (e) above.

(g) the remedial actions included in the CGM before the intraday capacity calculation;

(h) in case of reduction due to individual validation, the TSO invoking the reduction; and

(i) the proposed measures to avoid similar reductions in the future.

11. The quarterly report shall also include at least the following aggregated information:

(a) statistics on the number, causes, volume and estimated loss of economic surplus of applied reductions by different TSOs; and

(b) general measures to avoid cross-zonal capacity reductions in the future.

12. When a given Core TSO reduces capacity for its CNECs in more than 1% of ID CC MTUs of the analysed quarter, the concerned TSO shall provide to the CCC a detailed report and action plan describing how such deviations are expected to be alleviated and solved in the future. This report and action plan shall be included as an annex to the quarterly report.

13. The final flow-based parameters shall consist of $\mathbf{PTDF}_f$ and $\overrightarrow{RAM}_f$ for CNECs and external constraints of the pre-solved domain.

Article 19. Intraday capacity calculation fallback procedure

According to Article 21(3) of the CACM Regulation, when the intraday capacity calculation for specific ID CC MTUs does not lead to the final flow-based parameters due to, *inter alia*, a technical failure in the tools, an error in the communication infrastructure, or corrupted, missing or delayed input data, the Core TSOs and the CCC shall define the missing parameters by calculating the default flow-based parameters. The calculation of default flow-based parameters shall be based on previously calculated flow-based parameters for the same delivery market time unit. The latest (intraday or day-ahead) available flow-based domain, which may be corrected during local validation in accordance with Article 18, for the considered delivery hour is first converted to zero Core balance. The RAM on each CNEC (including allocation constraints) is then decreased by the adjustments for minRAM and LTA inclusion (if present). The redundant constraints are removed, and pre-solved constraints are adjusted for the Core net positions resulting from the SDAC and the SIDC.

Article 20. Calculation of ATCs for SIDC fallback procedure

1. In case the SIDC is unable to accommodate flow-based parameters, the CCC shall convert them into available transmission capacities (hereafter referred as "ATCs for SIDC fallback procedure") for each Core oriented bidding zone border and each DA CC MTU. The Core TSOs may delegate this responsibility to a third party.

2. The flow-based parameters shall serve as the basis for the determination of the ATCs for SIDC fallback procedure. As the selection of a set of ATCs from the flow-based parameters leads to an infinite set of choices, the algorithm provided in paragraph 5 determines the ATCs for SIDC fallback procedure.

3. The following inputs are required to calculate ATCs for SIDC fallback procedure for each ID CC MTU:

   (a) final flow-based parameters ($\mathbf{PTDF_f}$ and $\overrightarrow{RAM_f}$) as calculated pursuant to 0 or final flow-based parameters ($\mathbf{PTDF_{f,DA}}$ and $\overrightarrow{RAM_{UID}}$) as calculated pursuant to Article 11;

   (b) if defined, the global allocation constraints shall be assumed to constrain the Core net positions pursuant to Article 7(5), and shall be described following the methodology described in Article 17(3). Such constraints shall be adjusted for offered cross-zonal capacities on the non-Core bidding zone borders.

4. the final PTDFs ($\mathbf{PTDF_f}$ and $\mathbf{PTDF_{f,DA}}$) of all or only a subset of CNECs can be adjusted before the ID ATC extraction by setting the positive zone-to-zone PTDFs below a certain threshold to zero. The following outputs are the outcomes of the calculation for each MTU:

   (a) ATCs for SIDC fallback procedure; and

   (b) constraints with zero margin after the calculation of ATCs for SIDC fallback procedure.

   (c) An ATC limitation on specific borders as set by relevant TSOs as output of the local validation as defined in Annex 6: $ATC_{A\rightarrow B\ validated}$

5. The calculation of the ATCs for SIDC fallback procedure is an iterative procedure, which gradually calculates ATCs for each DA CC MTU, while respecting the constraints of the final flow-based parameters pursuant to paragraph 3:

   (a) The initial ATCs are set equal to zero for each Core oriented bidding zone border, i.e.:

$$\overrightarrow{ATC}_{k=0} = 0$$

   with

$\overrightarrow{ATC}_{k=0}$	the initial ATCs before the first iteration

   (b) the remaining available margin at iteration zero is either equal to the final remaining available margin ($\overrightarrow{RAM_f}$) according to Article 18(8) or the updated remaining available margin for intraday cross-zonal capacities (RAM_UID) according to Article 11(1):

$$\overrightarrow{RAM}_{ATC}(0) = \overrightarrow{RAM_f}$$
$$\text{or } \overrightarrow{RAM}_{ATC}(0) = \overrightarrow{RAM}_{UID}$$

Equation 14

   with

$\overrightarrow{RAM}_{ATC}(0)$	remaining available margin for ATC calculation at iteration k=0
$\overrightarrow{RAM_f}$	remaining available margin of the flow-based parameters pursuant to paragraph 3.

$\overrightarrow{RAM}_{UID}$	updated remaining available margin for intraday cross-zonal capacities

(c) In the case when there are negative RAMs, negative ATCs are calculated for CNECs with negative $RAM_{ATC}(0)$ according to the following procedure:

i. Per CNEC with negative remaining available margin for ATC calculation at iteration *k*=0 ($RAM_{ATC}(0)$) negative ATCs are calculated for all oriented bidding zone borders with positive PTDFs according to Equation 14a:

$$ATC_{A\rightarrow B,CNEC\ i} = \frac{pPTDF_{A\rightarrow B,CNEC\ i}}{\sum_{(A,B)\in\ Core\ contract\ paths\ with\ positive\ z2zPTDFs} PTDF_{A\rightarrow B}^{2}}\ RAM_{ATC,CNEC\ i}(0)$$

Equation 14a

with

$ATC_{A\rightarrow B,CNEC\ i}$	negative ATC for the oriented bidding zone border A to B determined by CNEC i
A, B	Core bidding zones
$RAM_{ATC,CNEC\ i}(0)$	remaining available margin for ATC calculation at iteration *k*=0 of CNEC i
$pPTDF_{A\rightarrow B,CNEC\ i}$	Final positive zone-to-zone PTDF of the oriented bidding zone border A to B

ii. In case for an oriented Core bidding zone border more than one negative ATC has been calculated according to Equation 14athen for each oriented Core bidding zone border the most negative ATC is determined over all CNECs with negative remaining available margin.

$$\overrightarrow{ATC}_{A\rightarrow B} = min\left(\overrightarrow{ATC}_{A\rightarrow B,CNEC\ i}\right)$$

Equation 14b

iii. After extraction of negative ATCs a scaling factor (*SF*) is calculated for each CNEC with negative remaining available margin:

$$SF_{CNEC\ i} = \left|\frac{RAM_{ATC,CNEC\ i}(0)}{\sum_{(A,B)\in\ Core\ contract\ paths\ with\ positive\ z2zPTDFs} PTDF_{A\rightarrow B,CNEC\ i}\ ATC_{A\rightarrow B}}\right|$$

Equation 14c

The final scaling factor (SF_{final}) is the maximum of all calculated scaling factors:

$$SF_{final} = max(SF_{CNEC\ i})$$

Equation 14d

iv. The final negative ATCs are calculated by scaling the negative ATCs with the final scaling factor:

$$\overrightarrow{ATC}_{negative,final} = \overrightarrow{ATC}_{A \to B}\, SF_{final}$$

Equation 14e

(d) Before starting the iterative method applied to calculate the positive ATCs for SIDC fallback all the remaining available margins for ATC calculation at iteration k=0 ($\overrightarrow{RAM}_{ATC}(0)$) shall be adjusted to be non-negative:

$$\overrightarrow{RAM}_{ATC}(0) = \max\left(0, \overrightarrow{RAM}_{ATC}(0)\right)$$

Equation 14f

with

$\overrightarrow{RAM}_{ATC}(0)$	remaining available margin for ATC calculation at iteration *k*=0

The iterative method applied to calculate the positive ATCs for SIDC fallback procedure consists of the following actions for each iteration step *k*:

i. for each CNEC and external constraint of the flow-based parameters pursuant to paragraph 3, calculate the remaining available margin based on ATCs at iteration *k*-1

$$\overrightarrow{RAM}_{ATC}(k) = \overrightarrow{RAM}_{ATC}(0) - \mathbf{pPTDF}_{\boldsymbol{zone-to-zone}}\, \overrightarrow{ATC}_{k-1}$$

Equation 14g

with

$\overrightarrow{RAM}_{ATC}(k)$	remaining available margin for ATC calculation at iteration *k*
$\overrightarrow{ATC}_{k-1}$	ATCs at iteration *k*-1
$\mathbf{pPTDF}_{\boldsymbol{zone-to-zone}}$	positive zone-to-zone power transfer distribution factor matrix

ii. for each CNEC, share $RAM_{ATC}(k)$ with equal shares among the Core oriented bidding zone borders with strictly positive zone-to-zone power transfer distribution factors on this CNEC;

iii. from those shares of $RAM_{ATC}(k)$, the maximum additional bilateral oriented exchanges are calculated by dividing the share of each Core oriented bidding zone border by the respective positive zone-to-zone PTDF.

iv. for each Core oriented bidding zone border, $\overrightarrow{ATC}_k$ is calculated by adding to $\overrightarrow{ATC}_{k-1}$ the minimum of all maximum additional bilateral oriented exchanges for this border obtained over all CNECs and external constraints as calculated in the previous step;

v. $\overrightarrow{ATC_k}$ is limited to a maximum value of $ATC_{A\rightarrow B\ validated}$ if such value has been introduced by TSOs on the border A→B as a result of the ATC validation phase as described in Annex 6. Then go back to step i;

vi. iterate until the difference between the sum of ATCs of iterations *k* and *k*-1 is smaller than 1kW;

vii. the resulting positive ATCs for SIDC fallback procedure stem from the ATC values determined in iteration *k*, after rounding down to integer values;

viii. at the end of the calculation, there are some CNECs and external constraints with no remaining available margin left. These are, together with the CNECs and external constraints with initially negative $RAM_{ATC}(0)$, the limiting constraints for the calculation of ATCs for SIDC fallback procedure.

(e) positive zone-to-zone PTDF matrix ($\mathbf{pPTDF_{zone-to-zone}}$) for each Core oriented bidding zone border shall be calculated from the $\mathbf{PTDF_{Core}}$ as follows (for HVDC interconnectors integrated pursuant to Article 13, Equation 8 shall be used):

$$pPTDF_{zone-to-zone,A\rightarrow B} = \max\left(0, PTDF_{zone-to-slack,A} - PTDF_{zone-to-slack,B}\right)$$

Equation 15a

with

$pPTDF_{zone-to-zone,A\rightarrow B}$	positive zone-to-zone $PTDFs$ for Core oriented bidding zone border *A* to *B*
$PTDF_{zone-to-slack,m}$	zone-to-slack $PTDF$ for Core bidding zone border m

(f) The final ATCs per Core oriented bidding zone border are the minimum from positive and negative ATCs:

$$\overrightarrow{ATC}_{final} = \min\left(\overrightarrow{ATC}_k, \overrightarrow{ATC}_{negative,final}\right)$$

Equation 15b

TITLE 6 – Updates and data provision

Article 21. Reviews and updates

1. Based on Article 3(f) of the CACM Regulation and in accordance with Article 27(4) of the same Regulation, all TSOs shall regularly and at least once a year review and update the key input and output parameters listed in Article 27(4)(a) to (d) of the CACM Regulation.

2. If the operational security limits, critical network elements, contingencies and allocation constraints used for intraday capacity calculation inputs pursuant to Article 5 and Article 7 need to be updated based on this review, the Core TSOs shall publish the changes at least 1 week before their implementation.

3. In case the review proves the need for an update of the reliability margins, the Core TSOs shall publish the changes at least one month before their implementation.

4. The review of the list of RAs taken into account in the intraday capacity calculation, as defined in Article 10(4), shall include at least an evaluation of the efficiency of specific PSTs and the topological RAs considered from the CROSA process.

5. In case the review proves the need for updating the application of the methodologies for determining GSKs, critical network elements and contingencies referred to in Articles 22 to 24 of the CACM Regulation, changes have to be published at least three months before their implementation.

6. Any changes of parameters listed in Article 27(4) of the CACM Regulation shall be communicated to market participants, all Core regulatory authorities and ACER.

7. The Core TSOs shall communicate the impact of any change of allocation constraints and parameters listed in Article 27(4)(d) of the CACM Regulation to market participants, all Core regulatory authorities and ACER. 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 9(13) of the CACM Regulation.

Article 22. Publication of data

1. In accordance with Article 3(f) of the CACM 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 intraday 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 4(2) by the deadlines set therein;

   (b) the following information for intraday cross-zonal capacity calculation and re-calculation pursuant to Article 4(2)(b) to (e) shall be published by the deadlines established therein:

      i. maximum and minimum possible net position of each bidding zone;

      ii. maximum possible bilateral exchanges between all pairs of Core bidding zones;

      iii. if applicable, ATCs for SIDC fallback procedure;

      iv. names of CNECs (with geographical names of substations where relevant and separately for CNE and contingency) and external constraints of the final flow-based parameters before pre-solving and the TSO defining them;

      v. for each CNEC of the final flow-based parameters before pre-solving, the EIC code of CNE and Contingency;

vi. for each CNEC of the final flow-based parameters before pre-solving, the method for determining I_{max} in accordance with Article 6(2)(a);

vii. detailed breakdown of RAM for each CNEC of the final flow-based parameters before pre-solving: I_{max}, U, F_{max}, FRM, F_{ref}, $F_{0,\mathrm{core}}$, $F_{0,\mathrm{all}}$, $F_{\mathrm{ref,core}}$, F_{uaf}, IVA;

viii. value of each external constraint before pre-solving;

ix. indication of whether default flow-based parameters were applied;

x. indication of whether a CNEC is redundant or not;

xi. information about the validation reductions:

- the identification of the CNEC;
- the TSO invoking the reduction;
- the volume of reduction (IVA);
- the detailed reason(s) for reduction in accordance with Article 18(2) and 18(3), including the operational security limit(s) that would have been violated without reductions, and under which circumstances they would have been violated;
- if an internal network elements with a specific contingency was exceptionally added to the final list of CNECs during validation: (i) a justification of the reasons of why adding the internal network elements with a specific contingency to the list was the only way to ensure operational security, (ii) the name or identifier of the internal network elements with a specific contingency, along with the calculated set of PTDFs;

(c) the following forecast information contained in the CGM for each ID CC MTU shall be published by the deadlines established in Article 4(2):

i. vertical load for each Core bidding zone and each TSO;

ii. production for each Core bidding zone and each TSO;

iii. Core net position for each Core bidding zone and each TSO;

iv. reference net positions of all bidding zones in synchronous area Continental Europe and reference exchanges for all HVDC interconnectors within synchronous area Continental Europe and between synchronous area Continental Europe and other synchronous areas; and

(d) as soon as the SIDC directly applies the flow-based parameters, in case of intraday auctions, two hours after the auction, the information pursuant to paragraph 2(b)(vii) shall be complemented by the following information for each CNEC and external constraint of the final flow-based parameters.

i. shadow prices;

ii. flows resulting from net positions obtained at intraday auctions.

(e) every six months, the publication of an up-to-date static grid model by each Core TSO.

(f) The CCC shall include in its quarterly report as defined in Article 25(6) the flows resulting from net positions resulting from intraday auctions on each CNEC and external constraint of the final flow-based parameters. This requirement is valid after the SIDC will directly apply the flow-based parameters.

3. Individual Core TSO may withhold the information referred to in paragraph 2(b)(iv), 2(b)(v) and 2(e) if it is classified as sensitive critical infrastructure protection related information in their Member States as provided for in point (d) of Article 2 of the Council Directive 2008/114/EC of 8 December 2008 on the identification and designation of European critical infrastructures and the assessment of the need to improve their protection. In such a case, the information referred to in paragraph 2(b)(iv) and 2(b)(v) shall be replaced with an anonymous identifier which shall be stable for each CNEC across all ID CC MTUs. The anonymous identifier shall also be used in the other TSO communications related to the CNEC, including the static grid model pursuant to paragraph 2(e) and when communicating about an outage or an investment in infrastructure. The information about which information has been withheld pursuant to this paragraph shall be published on the communication platform referred to in paragraph 1.

4. Any change in the identifiers used in paragraphs 2(b)(iv), 2(b)(v) and 2(e) shall be publicly notified at least one month before its entry into force. The notification shall at least include:

(a) the day of entry into force of the new identifiers; and

(b) the correspondence between the old and the new identifier for each CNEC.

5. Pursuant to Article 20(9) of the CACM Regulation, the Core TSOs shall establish and make available a tool which enables market participants to evaluate the interaction between cross-zonal capacities and cross-zonal exchanges between bidding zones. The tool shall be developed in coordination with stakeholders and all Core regulatory authorities and updated or improved when needed.

6. 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 ACER. Each Core TSO may decide not to publish the additional information, which was not requested by its competent regulatory authority.

Article 23. Quality of the data published

1. No later than six months before the implementation of this methodology in accordance with Article 26(2)(b), 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 22. 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 24. Monitoring and reporting

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

2. At least, the information on non-anonymized names of CNECs for final flow-based parameters before pre-solving as referred to in Article 22(2)(b)(iv) and (v) shall be provided to all Core regulatory authorities on a monthly basis for each CNEC and each ID CC MTU. This information shall be in a format that allows easily to combine the CNEC names with the information published in accordance with Article 22(2).

3. In addition, each month, starting in January 2025 with data for December 2024, the Core TSOs shall provide the Core regulatory authorities and ACER with the following data for each MTU and each CNEC:

(a) final zone-to-hub PTDF values for all modelled bidding zones;

(b) Core net positions pursuant to Article 4(5); and

(c) flow components, consisting of the internal flow, loop flows (total loop flow and particular loop flows created by each bidding zone) and PST flow.

4. 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.

5. 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 10, 14, 23 and 26 of this methodology:

(a) according to Article 10(5), the Core TSOs shall report to the Core CCC on systematic withholdings which were not essential to ensure operational security in real-time operation.

(b) according to Article 14(5), the Core TSOs shall monitor the accuracy of non-Core exchanges in the CGM.

(c) according to Article 23(3), the CCC shall monitor and report on the quality of the data published on the dedicated online communication platform as referred to in Article 22, with supporting detailed analysis of a failure to achieve sufficient data quality standards by the concerned TSOs, where relevant.

(d) according to Article 26(4), 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.

6. The CCC, with the support of the Core TSOs where relevant, shall draft and publish a quarterly report satisfying the reporting obligations set in Articles 7, 19 and 26 of this methodology:

(a) according to Article 7(3)(b), the CCC shall collect all reports analysing the effectiveness of relevant allocation constraints, received from the concerned TSOs during the period covered by the report, and annex those to the quarterly report.

(b) according to Article 18(10), the CCC shall provide all information on the reductions of cross-zonal capacity, with a supporting detailed analysis from the concerned TSOs where relevant.

(c) according to Article 26(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.

(d) according to Article 22(2)(f), Core TSOs shall report on flows resulting from net positions resulting from the intraday auctions, on each CNEC and external constraint of the final flow-based parameters. This requirement is valid after the SIDC will directly apply the flow-based parameters.

7. The published annual and quarterly reports may withhold commercially sensitive information or sensitive critical infrastructure protection related information as referred to in Article 22(3). In such a case, the Core TSOs shall provide the Core regulatory authorities with a complete version where no such information is withheld.

TITLE 7 - Implementation

Article 25. TSOs' analyses

1. Core TSOs shall analyse possible measures to increase cross-zonal capacities in the intraday timeframe, and over time, to reach the minimum capacity threshold of 70% pursuant to Article 16(8) of the Regulation (EU) 2019/943, on each CNEC. The analyses shall consist of a common assessment by all Core TSOs and individual assessments by each Core TSO.

2. The common assessment by all Core TSOs shall identify and analyse both short-term and long-term systemic measures which would maximise the infrastructure utilisation and enable higher intraday capacities, and which can be jointly implemented by all Core TSOs. These measures shall at least include:

   (a) the ability to activate remedial actions closer to real time;

   (b) the possibility to ignore marginal PTDF values in case of flow-based to ATC conversion;

   (c) the possibility for a TSO to remove the interconnectors with the non-Core bidding zones from the list of critical network elements.

3. The individual assessments shall identify and analyse measures which can be implemented individually by each Core TSO for each of its CNECs, and shall at least consider:

   (a) remedial actions which can be activated within or after the intraday timeframe, including non-costly and costly ones;

   (b) targeted investments, contributing to meeting the minimum capacity requirement on specific CNECs, and specifying their expected implementation time;

   (c) alternative bidding zone configurations pursuant to ACER Decision 11/2022;

   (d) further potential refinements of capacity calculation principles and data, such as removing frequently redundant CNECs from the initial CNEC list.

4. The analyses, consisting of the assessments pursuant to paragraphs 1 to 3, shall be submitted to the Core regulatory authorities and ACER not later than 1 April 2025.

Article 26. Timescale for implementation

1. The TSOs of the Core CCR shall publish this methodology without undue delay after the decision has been taken by ACER in accordance with Article 9(12) of the CACM Regulation.

2. The TSOs of the Core CCR shall implement this methodology within the following timeframes:

   (a) IDCC(a): update of cross-zonal capacities pursuant to Article 4(2)(a) by the deadline for the implementation of day-ahead capacity calculation methodology as established in the day-ahead capacity calculation methodology of the Core CCR;

   (b) IDCC(b): calculation of intraday cross-zonal capacities pursuant to Article 4(2)(b) by **4 months** after the adoption of ACER Decision 03/2024 approving the related amendments;

   (c) IDCC(c): re-calculation of intraday cross-zonal capacities pursuant to Article 4(2)(c) by **9 months** after the implementation of calculation of intraday cross-zonal capacities pursuant to point (b) of this paragraph;

(d) IDCC(d): re-calculation of intraday cross-zonal capacities pursuant to Article 4(2)(d) by **22 months** after the implementation of calculation of intraday cross-zonal capacities pursuant to point (b) of this paragraph; and

(e) IDCC(e): re-calculation of intraday cross-zonal capacities pursuant to Article 4(2)(e) at the latest by **3 months** after the implementation of the corresponding intraday CROSA following the ROSC methodology.

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 intraday capacity calculation inputs, the intraday capacity calculation process and the intraday 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 Core NEMOs to test the implementation of this methodology, and market participants to test the effects of applying this methodology on the market. In accordance with Article 20(8) of CACM Regulation, this phase shall not be shorter than 6 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, ACER 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 day-ahead capacity calculation methodology, the Core TSOs shall apply a transitional solution to compute the cross-zonal capacities which remain after the day-ahead capacity allocation pursuant to Article 4(2)(a). This update shall be done based on day-ahead cross-zonal capacities used in existing day-ahead capacity calculation and allocation initiatives. The details on the application of this transitional solution are defined in Annex 2 to this methodology.

6. After the implementation of the day-ahead capacity calculation methodology and until the implementation of the intraday capacity calculation methodology pursuant to Article 4(2)(b), the Core TSOs shall apply a transitional solution for updating of intraday cross-zonal capacities remaining after the SDAC as referred to in Article 4(2)(a). The details on the application of this transitional solution are defined in Annex 2, Annex 3, Annex 4 and Annex 5 to this methodology. During this transition period:

(a) Annex 3 shall apply and replace Article 11;

(b) Annex 4 shall apply and replace Article 20; and

(c) Annex 5 shall apply.

7. In parallel to IVA validation and as long as SIDC is not able to directly apply flow-based parameters, the Core TSOs may also perform ATC based validation pursuant to Annex 6. Regardless of the ability of SIDC to apply the flow-based parameters, the ATC based validation shall no longer be allowed after 24 months following the implementation of the intraday capacity calculation methodology pursuant to Article 4(2)(b).

8. By 1 October 2025, all Core TSOs shall propose amendments to this methodology based on the outcomes of their analyses pursuant to Article 25.

9. If required, following the expected amendments to the CACM Regulation, this methodology shall be revised accordingly.

TITLE 8 - Final provisions

Article 27. Language

1. 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 9(14) of the CACM 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.

Annex 1: Justification of usage and methodology for calculation of external constraints

The following section depicts in detail the justification of usage and methodology currently used by PSE to design and implement external constraints, if applicable. The legal interpretation on eligibility of using external constraints and the description of their contribution to the objectives of the CACM Regulation is included in the Explanatory Note.

PSE may use an external constraint to limit the import and export of the Polish bidding zone.

Technical and legal justification

Implementation of external constraints as applied by PSE is related to integrated scheduling process applied in Poland (also called central dispatching model) and the way how reserve capacity is being procured by PSE. In a central dispatching model, in order to balance generation and demand and ensure secure energy delivery, the TSO dispatches generating units taking into account their operational constraints, transmission constraints and reserve capacity requirements. This is realised in an integrated scheduling process as a single optimisation problem called security constrained unit commitment (SCUC) and economic dispatch (SCED).

The integrated scheduling process starts after the day-ahead capacity calculation and SDAC and continues until real-time. This means that reserve capacity is not blocked by TSO in advance and in effect not removed from the wholesale market and SIDC. However, if balancing service providers (generating units) would already sold too much energy in the previous market timeframes because of high exports, they may not be able to provide sufficient upward reserve capacity within the integrated scheduling process.[6] Therefore, one way to ensure sufficient reserve capacity within integrated scheduling process is to set a limit to how much electricity can be imported or exported in the SIDC.

The objective to limit balancing service providers to sell too much energy in the intraday market in order to be able to provide sufficient reserve capacity in the integrated scheduling process cannot be efficiently met by translating this limit into capacities of critical network elements offered to the market. If this limit was to be reflected in cross-zonal capacities offered by PSE in the form of an appropriate adjustment of cross-zonal capacities, this would imply that PSE would need to guess the most likely market direction (imports and/or exports on particular interconnectors) and accordingly reduce the cross-zonal capacities in these directions. In the flow-based approach, this would need to be done on each CNEC in a form of reductions of the RAM. However, from the point of view of market participants, due to the inherent uncertainties of market results, such an approach is burdened with the risk of suboptimal splitting of allocation constraints onto individual interconnections – overestimated on one interconnection and underestimated on the other, or vice versa. Also, such reductions of the RAM would limit cross-zonal exchanges for all bidding zone borders having impact on Polish CNECs, whereas the allocation constraint has an impact only on the import or export of the Polish bidding zone, whereas the trading of other bidding zones is unaffected.

External constraints are determined for the whole Polish power system, meaning that they are applicable simultaneously for all CCRs in which PSE has at least one bidding zone border (i.e. Core, Baltic and Hansa). This solution is the most efficient application of external constraints. Considering allocation constraints separately in each CCR would require PSE to split global external constraints into CCR-related sub-values, which would be less efficient than maintaining the global value. Moreover, in the hours when Poland is unable to absorb any more power from outside due to violated minimal downward reserve capacity requirements, or when Poland is unable to export any more power due to insufficient

[6] This conclusion equally applies for the case of lack of downward balancing capacity, which would be endangered if balancing service providers (generating units) sell too little energy in the day-ahead market, because of too high imports.

upward reserve capacity requirements, Polish transmission infrastructure is still available for cross-border trading between other bidding zones and between different CCRs.

Methodology to calculate the value of external constraints:

When determining the external constraints, PSE takes into account the most recent information on the technical characteristics of generation units, forecasted power system load as well as minimum reserve margins required in the whole Polish power system to ensure secure operation and forward import/export contracts that need to be respected from previous capacity allocation time frames.

External constraints are bidirectional, with independent values for each ID CC MTU, and separately for directions of import to Poland and export from Poland.

For each hour, the constraints are calculated according to the below equations:

$$\mathrm{EXPORT}_{constraint} = \mathrm{P}_{CD} - \mathrm{P}_{NA} + \mathrm{P}_{NCD} - (\mathrm{P}_{L} + \mathrm{P}_{UPres}) \quad (1)$$

$$\mathrm{IMPORT}_{constraint} = \mathrm{P}_{L} - \mathrm{P}_{DOWNres} - \mathrm{P}_{CD_{min}} - \mathrm{P}_{NCD} \quad (2)$$

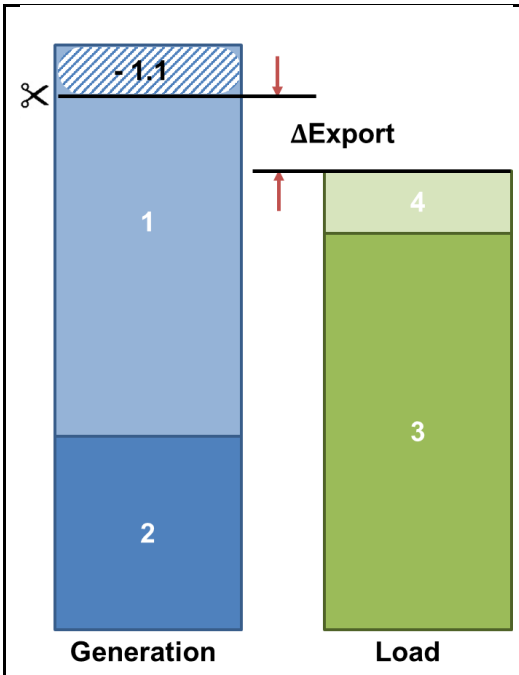
Where:

P_{CD}	Sum of operating generating capacities of centrally dispatched units as declared by generators[7]
$\mathrm{P}_{CD_{min}}$	Sum of technical minima of centrally dispatched generating units in operation
P_{NCD}	Sum of schedules of generating units that are not centrally dispatched, as provided by generators (for wind farms: forecasted by PSE)
P_{NA}	Generation not available due to grid constraints (both planned outage and/or anticipated congestions)
P_{L}	Demand forecasted by PSE
P_{UPres}	Minimum reserve for upward regulation
$\mathrm{P}_{DOWNres}$	Minimum reserve for downward regulation

For illustrative purposes, the process of practical determination of external constraints in the framework of the intraday capacity calculation is illustrated below in Figures 1 and 2. The figures illustrate how a forecast of the Polish power balance for each hour of the delivery day is developed by PSE in the morning of D-1 in order to determine reserves in generating capacities available for potential exports and imports, respectively, for the intraday market.

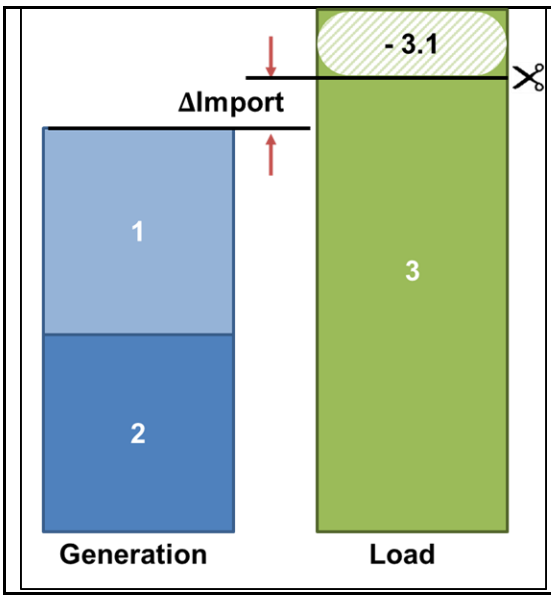
[7] Note that generating units which are kept out of the market on the basis of strategic reserve contracts with the TSO are not taken into account in this calculation.

External constraint in export direction is applicable if ΔExport is lower than the sum of cross-zonal capacities on all Polish interconnections in export direction. External constraint in import direction is applicable if ΔImport is lower than the sum of cross-zonal capacities on all Polish interconnections in import direction.



1. Sum of available generating capacities of centrally dispatched units as declared by generators, reduced by:
   1.1 Generation not available due to grid constraints
2. Sum of schedules of generating units that are not centrally dispatched, as provided by generators (for wind farms: forecasted by PSE)
3. Demand forecasted by PSE
4. Minimum necessary reserve for up regulation

Figure 1: Determination of external constraints in export direction (generating capacities available for potential exports) in the framework of the intraday capacity calculation.



1 Sum of technical minima of centrally dispatched generating units in operation

2 Sum of schedules of generating units that are not centrally dispatched, as provided by generators (for wind farms: forecasted by PSE)

3 Demand forecasted by PSE, reduced by:
3.1 Minimum necessary reserve for down regulation

Figure 2: Determination of external constraints in import direction (reserves in generating capacities available for potential imports) in the framework of intraday capacity calculation.

Frequency of re-assessment

External constraints are determined in a continuous process based on the most recent information, for each capacity allocation time frame, from forward till day-ahead and intra-day. In case of intraday

process, these are calculated for each intraday capacity calculation timeframe in accordance with Article 4(2), resulting in independent values for each ID CC MTU, and separately for directions of import to Poland and export from Poland.

Time periods for which external constraints are applied

As described above, external constraints are determined in a continuous process for each capacity allocation timeframe, so they are applicable for all ID CC MTUs of the respective allocation day.

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Annex 2: Calculated and allocated capacities in relation to the implementation of IDAs and Core intraday capacity calculation (IDCCb))

Intraday cross-zonal capacities	before the implementation of IDA1 (15:00 of D-1)		after the implementation of IDA1 (15:00 of D-1)	
	before the implementation of Core ID CCM at 22:00 (IDCCb))	after the implementation of Core ID CCM at 22:00 (IDCCb))	before the implementation of Core ID CCM at 22:00	after the implementation of Core ID CCM at 22:00
Between 15:00 and 22:00 of D-1	Leftovers from the day-ahead cross-zonal capacities based on Core DA CCM according to the transitional solution pursuant to Article 26(5) and Annexes 3, 4 and 5 OR Zero intraday cross-zonal capacities pursuant to Annex 3(4)	Leftovers from the day-ahead cross-zonal capacities based on Core DA CCM pursuant to Article 4(2)(a) OR Zero intraday cross-zonal capacities pursuant to Article 11(4)	Leftovers from IDA1	Leftovers from IDA1
From 22:00 of D-1 onwards	Leftovers from the day-ahead cross-zonal capacities based on Core DA CCM according to the transitional solution pursuant to Article 26(5) and Annexes 3, 4 and 5	Intraday cross-zonal capacities from Core ID CCM at 22:00 pursuant to Article 4(2)(b)	Leftovers from IDA1 & continuous trading process executed until 22h	Intraday cross-zonal capacities from Core ID CCM at 22:00 pursuant to Article 4(2)(b)

Annex 3: Update of intraday cross-zonal capacities remaining after the SDAC in the transition period

(1) The CCC shall use the final cross-zonal capacities resulting from day-ahead capacity calculation and the net positions resulting from already allocated capacities in the SDAC to calculate the updated day-ahead cross-zonal capacities to be used as intraday cross-zonal capacities at the intraday cross-zonal gate opening time.

(a) In the case that the LTA inclusion in day-ahead is ensured through the LTA margin approach, the intraday cross-zonal capacities are described as flow-based parameters;

(b) In the case that the LTA inclusion in day-ahead is ensured through the Extended LTA inclusion approach, the intraday cross-zonal capacities are described as a union of flow-based parameters and "LTA values" (LTA domain).

For the updated intraday flow-based parameters, the PTDF values shall be the final PTDFs resulting from the day-ahead capacity calculation, and the RAM shall be derived as:

$$\overrightarrow{RAM}_{UID} = \max\left(0, \overrightarrow{RAM}_f - \mathbf{PTDF_f}\,\overrightarrow{NP}_{AAC}\right)$$

Equation 3b

with

$\overrightarrow{RAM}_{UID}$	updated remaining available margin for intraday cross-zonal capacities
$\overrightarrow{RAM}_f$	final remaining available margin resulting from the day-ahead capacity calculation
$\mathbf{PTDF_f}$	final power transfer distribution factor matrix resulting from the day-ahead capacity calculation
$\overrightarrow{NP}_{AAC}$	net positions resulting from already allocated capacities in SDAC

The updated LTA values, applicable if the Extended LTA inclusion approach is applied in day-ahead, shall be derived as:

$$\overrightarrow{LTA}_{UID} = \max\left(0, \overrightarrow{LTA}_f - \overrightarrow{SEC}_{DA}\right)$$

Equation 3c

$\overrightarrow{LTA}_{UID}$	updated remaining available long-term capacities for provision to SIDC; value per oriented border
$\overrightarrow{LTA}_f$	LTA domain resulting from the day-ahead capacity calculation thus adjusted for long-term nominations; value per oriented border;
$\overrightarrow{SEC}_{DA}$	schedule exchange resulting from already allocated capacities in SDAC

(2) In case the LTA inclusion in day-ahead is ensured through:

(a) the LTA margin approach: for each CNEC, each TSO may decrease the RAM_f by decreasing $LTA_{margin,DA}$ as calculated pursuant to the day-ahead capacity calculation methodology while that there is no undue discrimination between internal and cross-zonal exchanges as referred to in Article 21(1)(b)(ii) of the CACM Regulation;

(b) the Extended LTA inclusion approach: each TSO may decrease the LTA_f on its borders while ensuring compliance with Article 16 of Regulation (EU) 2019/943.

Irrespective of the options provided to each TSO pursuant to (a) and (b), each TSO shall ensure that on each bidding zone border, the long-term capacities that are in effect taken into account pursuant to (a) and (b) are between 0.001 MW and 1500 MW.

(3) For each CNEC, each TSO may adjust the RAM_f by modifying the AMR_{DA} as calculated pursuant to the day-ahead capacity calculation methodology while ensuring compliance that there is no undue discrimination between internal and cross-zonal exchanges as referred to in Article 21(1)(b)(ii) of the CACM Regulation.

(4) Until the implementation of intraday auctions at 15:00 market time of day D-1, the Core TSOs may set to zero the cross-zonal capacities calculated pursuant to Article 4(2)(a). Such a decision may be made per bidding zone border by the competent TSOs.

Annex 4: Calculation of ATCs for SIDC fallback procedure in the transition period

1. In case the SIDC is unable to accommodate flow-based parameters or in case the leftovers from the day-ahead cross-zonal capacities based on Core DA CCM are used according to a transitional solution as defined in Annex 2 to this methodology, the CCC shall convert the cross-zonal capacities into available transmission capacities for each Core oriented bidding zone border and each DA CC MTU. The Core TSOs may delegate this responsibility to a third party.

2. The cross-zonal capacities shall serve as the basis for the determination of the ATCs for SIDC fallback procedure. As the selection of a set of ATCs from the cross-zonal capacities leads to an infinite set of choices, an applicable algorithm determines the ATCs for SIDC fallback procedure.

3. The following inputs are required to calculate ATCs for SIDC fallback procedure for each ID CC MTU:

   (a) the final flow-based parameters ($\mathbf{PTDF_f}$ and $\overrightarrow{RAM}_{UID}$) and $\overrightarrow{LTA}_{UID}$ as calculated pursuant to Annex 3 and, if applicable, $\overrightarrow{LTA}_{UID}$ calculated pursuant to Annex 3;

   (b) If defined, the global allocation constraints shall be assumed to constrain the Core net positions pursuant to Article 7(5), and shall be described following the methodology described in Article 17(2). Such constraints shall be adjusted for offered cross-zonal capacities on the non-Core bidding zone borders.

4. In case the cross-zonal capacities are described solely by flow-based parameters, the calculation of the ATCs for SIDC fallback procedure is an iterative procedure, which gradually calculates ATCs for each DA CC MTU, while respecting the constraints of the final flow-based parameters pursuant to paragraph 3:

   (a) The initial ATCs are set equal to zero for each Core oriented bidding zone border, i.e.:

$$\overrightarrow{ATC}_{k=0} = 0$$

   with

$\overrightarrow{ATC}_{k=0}$	the initial ATCs before the first iteration

   (b) the remaining available margin of the final flow-based parameters ($\overrightarrow{RAM}_f$) have to be adjusted for the flows resulting from net positions or already allocated capacities resulting from the SIDC in accordance with Article 4(5)(b):

$$\overrightarrow{RAM}_{ATC}(0) = \max\left(0, \overrightarrow{RAM}_f - \mathbf{PTDF_f}\ \overrightarrow{NP}_{SIDC}\right)$$

Equation 14

   with

$\overrightarrow{RAM}_{ATC}(0)$	remaining available margin for ATC calculation at iteration k=0

$\overrightarrow{RAM_f}$	remaining available margin of the flow-based parameters pursuant to paragraph 3, or equal to $\overrightarrow{RAM_{UID}}$ from Annex 3, if applicable.
$\mathbf{PTDF_f}$	PTDF matrix of the final flow-based parameters
$\overrightarrow{NP_{SIDC}}$	Core net positions resulting from SIDC which are not already included in the CGM

(c) The iterative method applied to calculate the ATCs for SIDC fallback procedure consists of the following actions for each iteration step *k*:

i. for each CNEC and external constraint of the flow-based parameters pursuant to paragraph 3, calculate the remaining available margin based on ATCs at iteration *k*-1

$$\overrightarrow{RAM_{ATC}}(k) = \overrightarrow{RAM_{ATC}}(0) - \mathbf{pPTDF_{zone-to-zone}}\ \overrightarrow{ATC}_{k-1}$$

with

$\overrightarrow{RAM_{ATC}}(k)$	remaining available margin for ATC calculation at iteration *k*
$\overrightarrow{ATC}_{k-1}$	ATCs at iteration *k*-1
$\mathbf{pPTDF_{zone-to-zone}}$	positive zone-to-zone power transfer distribution factor matrix

ii. for each CNEC, share $RAM_{ATC}(k)$ with equal shares among the Core oriented bidding zone borders with strictly positive zone-to-zone power transfer distribution factors on this CNEC;

iii. from those shares of $RAM_{ATC}(k)$, the maximum additional bilateral oriented exchanges are calculated by dividing the share of each Core oriented bidding zone border by the respective positive zone-to-zone PTDF. The maximum additional bilateral oriented exchanges may be negative, i.e. it may lead to decrease the exchange capacity;

iv. for each Core oriented bidding zone border, $\overrightarrow{ATC}_k$ is calculated by adding to $\overrightarrow{ATC}_{k-1}$ the minimum of all maximum additional bilateral oriented exchanges for this border obtained over all CNECs and external constraints as calculated in the previous step;

v. go back to step i;

vi. iterate until the difference between the sum of ATCs of iterations *k* and *k*-1 is smaller than 1 kW;

vii. the resulting ATCs for SIDC fallback procedure stem from the ATC values determined in iteration *k*, after rounding down to integer values;

viii. at the end of the calculation, there are some CNECs and external constraints with no remaining available margin left. These are the limiting constraints for the calculation of ATCs for SIDC fallback procedure.

(d) positive zone-to-zone PTDF matrix (**pPTDF**$_{zone-to-zone}$) for each Core oriented bidding zone border shall be calculated from the **PTDF**$_{Core}$ as follows (for HVDC interconnectors integrated pursuant to Article 13, Equation 8 shall be used):

$$pPTDF_{zone-to-zone,A\rightarrow B} = \max\left(0, PTDF_{zone-to-slack,A} - PTDF_{zone-to-slack,B}\right)$$

Equation 15

with

$pPTDF_{zone-to-zone,A\rightarrow B}$	positive zone-to-zone $PTDFs$ for Core oriented bidding zone border A to B
$PTDF_{zone-to-slack,m}$	zone-to-slack $PTDF$ for Core bidding zone border m

5. In case the cross-zonal capacities are described as the union of flow-based parameters and an LTA domain, the calculation of the ATCs for SIDC fallback procedure is a mathematical optimisation process.

The following objective function is applied:

$$Maximize\ \left[\left(\sum \overrightarrow{ATC}_{phys} / N_{oriented\ borders}\right) * W_{sum} + \left(\text{Min}\ \overrightarrow{ATC}_{phys}\right) * (1 - W_{sum})\right]$$

with

ATC_{phys}	Sum of the ATCs resulting from flow based parameters and possible long-term capacities, e.g. : $(\overrightarrow{ATC}_{phys} = \overrightarrow{ATC}_{FB} + \overrightarrow{ATC}_{LTA})$
$N_{oriented\ borders}$	The number of oriented borders in Core CCR
W_{sum}	A common weighting factor applied on all Core borders to adopt between maximizing the sum of ATCs averaged across all borders and maximizing the lowest ATC across all borders; this value is a scalar between 0 and 1, initially set to 0.5.

(a) This objective function is subject to the following constraints:

$$\overrightarrow{ATC}_{phys} = \overrightarrow{ATC}_{FB} + \overrightarrow{ATC}_{LTA}$$

$$\overrightarrow{ATC}_{LTA} \leq (\alpha - 1) * \overrightarrow{LTA}_{UID}$$

$$\overrightarrow{ATC}_{FB} \leq \alpha * \frac{\overrightarrow{RAM}_{UID}}{pPTDF_{zone-to-zone}}$$

$$\overrightarrow{ATC}_{FB} \geq 0$$

$$\overrightarrow{ATC}_{LTA} \geq 0$$

with

α	A single optimization variable, between 0 and 1 used for all ATC borders
$\overrightarrow{LTA}_{UID}$	Updated remaining available long-term capacities for ATC extraction pursuant to Annex 3
$\overrightarrow{RAM}_{UID}$	Updated remaining available margin for ATC calculation provided by the FB Domain pursuant to Annex 3
$\mathbf{pPTDF}_{zone-to-zone}$	positive zone-to-zone power transfer distribution factor matrix

Annex 5: Other transitional arrangements

1. Each Core TSO shall have the right to perform individual validation of ID ATCs calculated and provided to Core TSOs pursuant to Annex 4, by which these ATCs may be adjusted in case such adjustments are needed to maximise cross-zonal capacity and/or to maintain operational security. Pursuant to this validation, each Core TSO shall have the right to adjust ID ATCs on its bidding zone borders. The maximum of ID ATC increase per bidding zone border shall be 300 MW.

2. The ID ATC on a biding zone border shall always be the lowest value of ID ATCs set by TSOs on both sides of this bidding zone border.

3. As soon as possible after the implementation of DA CCM and no later than from four months after the adoption of this Decision, each Core TSO requiring amendment of ID ATCs shall provide to all Core TSOs the justification for each ATC adjustment. This justification shall be based on the assessment of the day-ahead or intraday congestion forecast common grid models and shall include the concerned CNECs on which the need for decrease or increase of flow or capacity was identified to maximise cross-zonal capacity and/or maintain operational security.

4. After the implementation of DA CCM, the Core TSOs shall regularly publish the following information about the update of intraday cross-zonal capacities remaining after the SDAC in the transition period:

   (a) the percentage of LTA and AMR applied on the intraday level pursuant to Annex 3;

   (b) applied Wsum value pursuant to Annex 4; and

   (c) the flow-based domain and, if relevant, LTA domain used for ATC extraction pursuant to Annex 3, in particular the values: $\overrightarrow{RAM_f}$ (before and after possible adjustment), $\overrightarrow{NP_{AAC}} * \mathbf{PTDF_{Core}}$, $\overrightarrow{RAM_{UID}}$, $\overrightarrow{LTA_f}$ (before and after possible adjustment), $\overrightarrow{SEC}_{DA}$ and $\overrightarrow{LTA_{UID}}$; and

   (d) ID ATC adjustments pursuant to paragraph 1 including justifications as of deadline pursuant to paragraph 3;

In case the information pursuant to point (c) cannot be published at the time of implementation of DA CCM, it shall be published as soon as feasible and for all days since the implementation of DA CCM.

5. As from four months after the start of the transition period pursuant to Article 26(5), the Core CCC shall assist the Core TSOs in the ATC validation, by providing at least the following information for each Core CNEC and for each MTU, based on the CGMs from the DACF procedure:

   (a) reference flows;

   (b) zone-to-zone PTDFs of Core oriented borders; and

   (c) potential maximal flows due to ID ATCs, superposed to the reference flows.

The CCC shall provide this information not later than 20:45 of D-1.

6. During the transition period pursuant to Article 26(5), the Core TSOs may apply and implement, without the need to amend the intraday capacity calculation methodology, further adjustments of the ATC extraction methodology pursuant to Annex 4 if it better meets the objectives of the CACM Regulation and is agreed among Core TSOs.

Annex 6: ATC based validation process

1. Each Core TSO has the right to perform an ATC based validation in order to ensure operational security. This is an additional process, next to the existing validation process described in Article 18 as IVA validation. Pursuant to this validation, each Core TSO can set a maximum ATC value for its own oriented border.
2. The ID ATC on a bidding zone border shall always be the lowest value of all ID ATCs set by all TSOs for this bidding zone border.

$$ATC_{A \rightarrow B\, validated} = \min\left(\overrightarrow{ATC}_{A \rightarrow B\, validated,TSO\,1}, \overrightarrow{ATC}_{A \rightarrow B\, validated,TSO\,2}, \overrightarrow{ATC}_{A \rightarrow B\, validated,TSO\,x}\right)$$

Equation 16

with

$ATC_{A \rightarrow B\, validated}$	Minimum of validated ATCs for border A→B by all Core TSOs adjacent to this border
$\overrightarrow{ATC}_{A \rightarrow B\, validated,TSO\,x}$	Validated ATC for border A→B by TSO x

3. The ATC limitation may be done only in the following situations:
   (a) an occurrence of an unexpected contingency impacting a CNE after the beginning of the related IDCC process;
   (b) as a fallback, in case IVA validation cannot be performed fully in time or if it faces IT issue; or
   (c) a mistake in input data that leads to an overestimation of cross-zonal capacity from an operational system security perspective.
4. In addition to the publication described in Article 22, Core TSOs and the CCC shall publish at least the following information and data items with regard to the ATC based validation for each IDCC MTU:
   (a) The TSO invoking the limitation;
   (b) The ATC limitation per border;
   (c) The situation applicable as per the previous paragraph; and
   (d) The detailed reason for the limitation of the ATC with the same level of information as IVA validation following the reasonings developed in Article 18(2), including the operational security limits (when relevant) that would have been violated without the reductions, and under which circumstances they would have been violated.
5. Every three months, the CCC, with the support of Core TSOs where relevant, shall provide in the quarterly report the data items given under paragraph 4(a), 4(b), 4(c) and 4(d), with regard to the ATC based validation for each IDCC MTU.

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ACER Decision on Core ID CCM: Annex ~~H~~III

(text rectified by corrigendum of ~~XX~~ 4 April 2024)

Intraday capacity calculation methodology of the Core capacity calculation region

in accordance with Article 20ff. of the Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management

~~**For information only**~~

~~FULL AMENDED~~**Consolidated version of** ~~the 1st amendment of ID CCM~~

14 March 2024

~~19 April 2022~~

Contents

Whereas

(1) This document sets out the capacity calculation methodology in accordance with Article 20ff. of Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on Capacity Allocation and Congestion Management (hereafter referred to as the "CACM Regulation"). This methodology is hereafter referred to as the "intraday capacity calculation methodology".

(2) The intraday capacity calculation methodology takes into account the general principles and goals set in the CACM Regulation as well as in Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity (hereafter referred to as "Regulation (EU) 2019/943"). 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. It sets, for this purpose, the requirements to establish an intraday capacity calculation methodology to ensure efficient, transparent and non-discriminatory capacity allocation.

(3) According to Article 9(9) of the CACM Regulation, the expected impact of the intraday capacity calculation methodology on the objectives of the CACM Regulation has to be described and is presented below.

(4) The intraday capacity calculation methodology serves the objective of promoting effective competition in the generation, trading and supply of electricity (Article 3(a) of the CACM Regulation) since it ensures that the cross-zonal capacity is calculated in a way that avoids undue discrimination between market participants and since the same intraday capacity calculation methodology will apply to all market participants on all respective bidding zone borders in the Core CCR, thereby ensuring a level playing field amongst market participants. Market participants will have access to the same reliable information on cross-zonal capacities and allocation constraints for intraday allocation, at the same time and in a transparent way.

(5) The intraday capacity calculation methodology contributes to the optimal use of transmission infrastructure and to operational security (Article 3(b) and (c) of the CACM Regulation) since the flow-based approach aims at providing the maximum available capacity to market participants on the intraday timeframe within the operational security limits.

(6) The intraday capacity calculation methodology contributes to avoiding that cross-zonal capacity is limited in order to solve congestion inside control areas by (i) defining clear criteria under which the network elements located inside bidding zones can be considered as limiting for capacity calculation, and (ii) ensuring that a minimum share of the capacity is made available for commercial exchanges while ensuring operational security (Article 3(a) to (c) of the CACM Regulation and Article 16(8) of the Regulation (EU) 2019/943).

(7) The intraday capacity calculation methodology serves the objective of optimising the allocation of cross-zonal capacity (Article 3(d) of the CACM Regulation), since it is using the flow-based approach, which optimises the way in which the cross-zonal capacities are allocated to market participants, and since it facilitates the efficiency of congestion management by comparing the capacity allocation with other congestion management alternatives, such as the application of remedial actions, bidding zone reconfiguration and network investments.

(8) The intraday capacity calculation methodology is designed to ensure a fair and non-discriminatory treatment of TSOs, nominated electricity market operators ('NEMOs'), the Agency, regulatory

authorities and market participants (Article 3(e) of the CACM Regulation) since the intraday capacity calculation methodology has been developed and adopted within a process that ensures the involvement of all relevant stakeholders and independence of the approving process.

(9) The intraday capacity calculation methodology determines the main principles and main processes for the intraday timeframe. It requires that the Core TSOs provide market participants with reliable information on cross-zonal capacities and allocation constraints for intraday allocation in a transparent way and at the same time. This includes information on all steps of capacity calculation and regular reporting on specific processes within capacity calculation. The intraday capacity calculation methodology therefore contributes to the objective of transparency and reliability of information (Article 3(f) of the CACM Regulation).

(10) The intraday capacity calculation methodology provides requirements for efficient use of existing electricity infrastructure and facilitates competitive and equal access to transmission infrastructure in particular in case of congestions. This provides a long-term signal for efficient investments in transmission, generation and consumption, and thereby contributes to the efficient long-term operation and development of the electricity transmission system and electricity sector in the Union (Article 3(g) of the CACM Regulation).

(11) The intraday capacity calculation methodology also contributes to the objective of respecting the need for a fair and orderly market and price formation (Article 3(h) of the CACM Regulation) by making available in due time the information about cross-zonal capacities to be released in the market, by maximising the available cross-zonal capacities and by ensuring a backup solution for the cases where capacity calculation fails to provide flow-based parameters.

(12) The intraday capacity calculation methodology facilitates a level playing field for NEMOs (Article 3(i) of the CACM Regulation) since all NEMOs and all their market participants will face the same rules and non-discriminatory treatment (including timings, data exchanges, results formats etc.) within the Core CCR.

(13) Finally, the intraday capacity calculation methodology contributes to the objective of providing non-discriminatory access to cross-zonal capacity (Article 3(j) of the CACM Regulation) by ensuring a transparent and non-discriminatory approach towards facilitating cross-zonal capacity allocation.

(14) In conclusion, the intraday capacity calculation methodology contributes to the general objectives of the CACM Regulation to the benefit of all market participants and electricity end consumers.

(15) The intraday capacity calculation methodology is structured into three stages: (i) the definition and provision of capacity calculation inputs by the Core TSOs, including the underlying principles and calculation methods for these inputs, (ii), the capacity calculation process by the coordinated capacity calculator in coordination with the Core TSOs, and (iii) the capacity validation by the Core TSOs in coordination with the coordinated capacity calculator. The roles and responsibilities of the Core TSOs and of the coordinated capacity calculator need to be clearly defined.

(16) The intraday capacity calculation methodology is based on forecast models of the transmission system. The inputs are created one day before the electricity delivery date 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.

(17) The methodology applies temporary solutions for reliability margins, generation shift keys and allocation constraints. As regards reliability margins, the first real calculation can only be done after some operational experience is gained with the application of this methodology. For generation shift keys, TSOs also need some operational experience in order to be able to improve

them. The final definition of these capacity calculation inputs should therefore be reviewed and redefined if needed after the effective implementation of this methodology.

(18) 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 legal and technical 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.

(19) 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 principle from the day-ahead capacity calculation methodology (i.e. introduction of minimum cross-zonal capacities) cannot be applied in the intraday capacity calculation methodology, since this principle requires extensive application of remedial actions, yet the time between the intraday 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.

(20) In the zonal congestion management model established by the CACM Regulation, bidding zones should be established such that physical congestions occur only on network elements located on the borders of such bidding zones. The network elements located within bidding zones should therefore *a priori* not limit cross-zonal capacity and should therefore not be considered in capacity calculation. Nevertheless, at the time of adoption of this methodology, some network elements located inside the Core bidding zones are often congested and therefore TSOs need some transition period to shift gradually from limiting cross-zonal capacity, as the main method to address these internal congestions, to other methods in which internal congestions limit cross-zonal capacity only when this is the most efficient solution considering other alternatives (such as remedial actions, reconfiguration of bidding zones or network investments). Only in case those alternatives are proven inefficient, TSOs should be able to continue addressing internal congestions by limiting cross-zonal capacity beyond the transition period.

(21) 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, as well as the exploration of alternative solutions are needed in case of reductions of cross-zonal capacities.

(22) 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 is required 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.~~

~~(23) The Core ID CCM (Annex II of Decision No. 02/2019 of ACER) is the subject of actions for annulment before the General Court (cases T-283/19 and T-631/19). The present amendment brings about targeted improvements in areas that are not the subject of those actions. It therefore does not affect the disputed parts of Decision No. 02/2019 of ACER and is without prejudice to their assessment by the Union Courts.~~

TITLE 1 – General provisions

Article 1. Subject matter and scope

1. The intraday capacity calculation methodology ~~shall be considered as a~~is the Core TSOs' methodology in accordance with Article 20ff. of the CACM Regulation and ~~shall cover~~covers the intraday capacity calculation methodology for the Core CCR bidding zone borders.

2. This methodology is without prejudice to the TSOs' rights and obligations under Commission Regulation (EU) 2017/1485 establishing a guideline on electricity transmission system operation, such as taking any remedial actions pursuant to this Regulation to maintain operational security and ensure that the system operates in a normal state. Accordingly, the management of cross-zonal capacities by the TSOs after their delivery to the allocation process is beyond the scope of this methodology.

Article 2. Definitions and interpretation

1. For the purposes of the intraday capacity calculation methodology, terms used in this document shall have the meaning of the definitions included in Regulation (EU) 2019/943, Directive (EU) 2019/944, ~~Comission~~Commission Regulation (EU) 2015/1222, Commission Regulation (EU) 2016/1719, Commission Regulation (EU) 2017/2195, Commission Regulation (EU) 543/2013 ~~and~~, the definitions set out in Article 2 Annex I of ~~the~~ACER Decision No 02/~~2019 of the Agency for the Cooperation of the Energy Regulators of 21 February~~ 2019 on the Core CCR TSOs' proposal for the regional design of the day-ahead and intraday common capacity calculation methodologies~~.~~ and the definitions set out in Article 2 Annex I of ACER Decision No 33/2020 on the methodology for regional operational security coordination for the Core capacity calculation region ("Core ROSC methodology"). In addition, the following definitions, abbreviations and notations shall apply:

   (a) ~~'AAC'~~'AAC_{ID}' is the already allocated capacity which has been allocated ~~as an outcome of the latest capacity calculation in the Core CCR~~in SIDC;

   (b) '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;

   (c) 'AMR_{DA}' means the adjustment for the minimum remaining available margin in accordance with the day-ahead capacity calculation methodology of the Core CCR~~;~~';

   ~~(c)~~(d) 'annual report' means the report issued on an annual basis by the CCC and the Core TSOs on the intraday capacity calculation;

   ~~(d)~~(e) '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;

   ~~(e)~~(f) 'CCC' means the coordinated capacity calculator, as defined in Article 2(11) of the CACM Regulation, of the Core CCR, unless stated otherwise;

   ~~(f)~~(g) 'CCR' means the capacity calculation region as defined in Article 2(3) of the CACM Regulation;

   ~~(g)~~(h) '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;

~~(h)~~(i) 'CGMM' means the common grid model methodology, pursuant to Article 17 of the CACM Regulation;

~~(i)~~(j) 'CNE' means a critical network element;

~~(j)~~(k) 'CNEC' means a CNE associated with a contingency used in capacity calculation. For the purpose of this methodology, the term CNEC also cover the case where a CNE is used in capacity calculation without a specified contingency;

(l) 'Core DA CCM' means the Core day-ahead capacity calculation methodology;

~~(k)~~(m) '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;

~~(l)~~(n) '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;

~~(m)~~(o) 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.~~Plc (HOPS d.~~o.o~~d.) ("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");

~~(n)~~(p) '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);

~~(o)~~(q) 'curative remedial action' means a remedial action which is only applied after a given contingency occurs;

~~(p)~~(r) 'D-1' means the day before electricity delivery;

~~(q)~~(s) 'D-2' means the day two-days before electricity delivery;

~~(r)~~(t) 'DACF' means day ahead congestion forecast;

~~(s)~~(u) '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;

~~(t)~~(v) 'external constraint' means a type of allocation constraint that limits the maximum import and/or export of a given bidding zone;

~~(u)~~(w) '$F_{0,all}$' 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;

~~(v)~~(x) 'F_i' means the expected flow in commercial situation i;

~~(w)~~(y) 'flow-based domain' means a set of constraints that limit the cross-zonal capacity calculated with a flow-based approach;

~~(x)~~(z) '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;

~~(y)~~(aa) 'F_{max}' means the maximum admissible power flow;

~~1. 'F_{nraa}' means the expected flow change due to non-costly remedial actions optimisation;~~

~~(z)~~(bb) 'F_{ref}' means the reference flow;

~~2. '$F_{ref,init}$' means the reference flow calculated during the initial flow based calculation pursuant to Article 15;~~

~~(aa)~~(cc) 'GSK' or 'GSK' means the generation shift key as defined in Article 2(12) of the CACM Regulation;

~~(bb)~~(dd) 'HVDC' means a high voltage direct current network element;

(ee) 'IDA' means intraday auction;

~~(cc)~~(ff) '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;

~~(dd)~~(gg) 'IGM' means the intraday individual grid model as defined in Article 2(1) of the CACM Regulation;

~~(ee)~~(hh) 'internal CNEC' means a CNEC, which is not cross-zonal;

~~(ff)~~(ii) 'I_{max}' means the maximum admissible current;

~~(gg)~~(jj) ~~'loop flow threshold' is the maximum level of loop flows as defined by TSOs pursuant to Article 10(5) of the Core day-ahead capacity calculation methodology~~'IVA' means individual validation adjustment;

~~(hh)~~(kk) $LTA_{margin,DA}$ means the adjustment of remaining available margin to incorporate long-term allocated capacities in accordance with the day-ahead capacity calculation methodology of the Core CCR;

~~3. '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;~~

~~4. 'MNEC' means a monitored network element with a contingency;~~

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

~~5. 'NRAO' means the non-costly remedial action optimisation;~~

(mm) '$NP_{AAC,DA}$' means net position resulting from already allocated capacities in SDAC;

(nn) $NP_{AAC,ID}$' means net position resulting from already allocated capacities in SIDC;

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

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

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

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

~~(nn)~~(ss) 'PST' means a phase-shifting transformer;

~~(oo)~~(tt) 'PTDF' or '$PTDF$' means a power transfer distribution factor;

~~(pp)~~(uu) '~~$\mathbf{PTDF_{init}}$~~$\mathbf{PTDF_{Core}}$' means a matrix of power transfer distribution factors resulting from the ~~initial~~intraday flow-based calculation for Core bidding zones;

~~(qq)~~(vv) '~~$\mathbf{PTDF_{area}}$~~'~~means~~$\mathbf{PTDF_{all}}$' means a matrix of power transfer distribution factors ~~used during~~resulting from the ~~NRAO~~intraday flow-based calculation for all bidding zones of Continental Europe, and connection points of the bidding zones of Continental Europe with the bidding zones of other synchronous areas;

~~(rr)~~(ww) '~~$\mathbf{PTDF_f}$~~$\mathbf{PTDF_{f,DA}}$' means a matrix of power transfer distribution factors describing the final day-ahead flow-based domain~~;~~;"

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

~~(tt)~~(yy) 'RA' means a remedial action as defined in Article 2(13) of the CACM Regulation;

~~(uu)~~(zz) 'RAM' or 'RAM' means a remaining available margin;

(aaa) 'RCC' means Regional Coordination Centre;

~~(vv)~~(bbb) 'reference net position or exchange' means a position of a bidding zone or an exchange over HVDC interconnector assumed within the CGM;

(ccc) 'SDAC' means the single day-ahead coupling;

~~(ww)~~(ddd) 'SIDC' means the single intraday coupling;

~~(xx)~~(eee) 'shadow price' means the dual price of a CNEC or allocation constraint representing the increase in the economic surplus if a constraint is increased by one MW;

~~(yy)~~(fff) '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;

~~(zz)~~(ggg) 'SO Regulation' means Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation;

~~(aaa)~~(hhh) '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;

~~(bbb)~~(iii) 'static grid model' means a list of relevant grid elements of the transmission system, including their electrical parameters;

~~(ccc)~~(jjj) 'U' is the reference voltage;

~~(ddd)~~(kkk) 'UAF' is an unscheduled allocated flow;

~~(eee)~~(lll) 'vertical load' means the total amount of electricity which exits the transmission system of a given bidding zone to connected distribution systems, end consumers connected to the transmission system, and to electricity producers for consumption in the generation of electricity;

~~(fff)~~(mmm) 'zone-to-slack $PTDF$' means the PTDF of a commercial exchange between a bidding zone and the slack node;

~~(ggg)~~(nnn) 'zone-to-zone $PTDF$' means the PTDF of a commercial exchange between two bidding zones;

~~(hhh)~~(ooo) the notation x denotes a scalar;

~~(iii)~~(ppp) the notation $\vec{x}$ denotes a vector;

~~(jjj)~~(qqq) the notation **x** denotes a matrix;

~~(kkk)~~(rrr) 'LTA domain' means a set of bilateral exchange restrictions covering the previously allocated cross-zonal capacities;

~~(lll)~~(sss) 'Extended LTA inclusion approach' is an LTA inclusion approach in the Core ~~Day-Ahead (~~DA~~) Capacity Calculation Methodology.~~ CCM. When this approach is applied in the ~~DA~~day ahead capacity calculation, the ~~DA~~day ahead cross-zonal capacities consist of a flow-based domain (containing flow-based parameters) without LTA inclusion and a separate LTA domain (including LTA values);

~~(mmm)~~(ttt) 'SEC_{DA}' means scheduled exchange resulting from already allocated capacities in the single day ahead coupling (SDAC). The parameter is provided by the SDAC based on the all TSO methodology for calculating scheduled exchanges resulting from single day-ahead coupling according to Article 43 of CACM Regulation~~.~~;

(uuu) 'XNEC' means cross-border relevant network element with contingency, as defined in the Core ROSC methodology.

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

   (a) the singular ~~indicates~~also includes 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 intraday capacity calculation, intraday capacity calculation process or the intraday capacity calculation methodology shall mean a common intraday capacity calculation, common intraday capacity calculation process and common intraday 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~~regulation, directive, decision, 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

~~1.~~ This intraday capacity calculation methodology solely applies to the intraday 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 methodology

Article 4. Intraday capacity calculation process

1. For the intraday market time frame, the cross-zonal capacities shall be calculated using the flow-based approach as defined in this methodology.

2. The intraday cross-zonal capacity calculation shall be performed in the following sequence, by the times established in the process description document as referred to in paragraph 7:

(a) IDCC(a): updating of cross-zonal capacities remaining after the SDAC for all ID CC MTUs between 00:00 and 24:00 of day D and providing them as intraday cross-zonal capacities to relevant NEMOs no later than 15 minutes before the intraday cross-zonal gate opening time, at 15:00 market time of day D-1;

(b) IDCC(b): calculation of intraday cross-zonal capacities for all ID CC MTUs between 00:00 and 24:00 of day D. The cross-zonal capacities resulting from this calculation shall be published and submitted to NEMOs no later than 15 minutes before the target start of allocation at 22:00 market time of day D-1; ~~and~~

(c) IDCC(c): re-calculation of intraday cross-zonal capacities for all ID CC MTUs between 06:00 and 24:00 of day D. The cross-zonal capacities resulting from this calculation shall be published and submitted to NEMOs no later than 15 minutes before the target start of allocation at 04:00 market time of day D;

(d) IDCC(d): re-calculation of intraday cross-zonal capacities for all ID CC MTUs between 12:00 and 24:00 of day D. The cross-zonal capacities resulting from this re-calculation shall be published and submitted to NEMOs no later than 15 minutes before the target start of allocation at 10:00 market time of day D; and

~~(c)~~(e) IDCC(e): re-calculation of intraday cross-zonal capacities for all ID CC MTUs between 18:00 and 24:00 of day D. The cross-zonal capacities resulting from this re-calculation shall be published and submitted to NEMOs no later than 15 minutes before the target start of allocation at ~~10~~16:00 market time of day D.

The reference to ID CC MTUs in the remainder of this methodology shall mean the MTUs as established in this paragraph.

3. Each calculation or re-calculation of cross-zonal capacities pursuant to ~~paragraph~~paragraphs 2(b) ~~and~~to (2)(~~c), respectively~~e), shall consist of three main stages:

   (a) the creation of capacity calculation inputs by the Core TSOs;

   (b) the capacity calculation process by the CCC; and

   (c) the capacity validation by the Core TSOs in coordination with the CCC. Capacity validation may also be applied for the update of capacities pursuant to paragraph 2(a).

4. Each Core TSO shall provide the CCC the following capacity calculation inputs by the times established in the process description document:

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

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

   (c) external 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.

5. In addition to the capacity calculation inputs pursuant to paragraph 3, the Core TSOs, or an entity delegated by the Core TSOs, shall send to the CCC, for each ID CC MTU of the delivery day, the following additional inputs by the times established in the process description document:

   (a) the Core net positions or, alternatively, the already allocated capacities on the Core bidding zone borders resulting from the SDAC;

   (b) the Core net positions or ~~alternatively~~, alternatively, the already allocated capacities on the Core bidding zone borders resulting from the SIDC which are already included in the CGM;

   ~~(b)~~(c) the Core net positions or, alternatively, the already allocated capacities on the Core bidding zone borders resulting from the SIDC not already included in the CGM.

If the Core TSOs provided to the CCC the already allocated capacities on the Core biding zone borders instead of the Core net positions, the CCC shall convert them into Core net positions.

6. When providing the capacity calculation inputs pursuant to paragraphs 4 and 5, the Core TSOs shall respect the formats commonly agreed between the Core TSOs and the CCC while fulfilling the requirements and guidance defined in the CGMM.

7. No later than six months before the implementation of this methodology in accordance with Article 26(3)(b), the Core TSOs shall jointly establish a process description document as referred to in paragraphs 2, 4 and 5 and publish it on the online communication platform as referred to in Article ~~23~~22. This document shall reflect an up-to-date detailed process description of all capacity calculation steps including the timeline of each step of the intraday capacity calculation.

~~8. Once the merging agent receives all the IGMs established pursuant to the CGMM, it shall merge them to create the CGM in accordance with the CGMM and deliver the CGM to the CCC.~~

8. The Core RCCs, acting as the CCC shall use the latest available CGMs, proposed and coordinated XRAs from the day ahead and intraday CROSAs, in accordance with the CSAM. During the interim period until ROSC CROSA process is implemented in accordance with Article 37 of Core ROSC methodology, only the latest available CGM shall be delivered.

9. In case the necessary outputs of the ROSC ICS/CROSA process cannot be provided within the foreseen timeframe, the delivery of the CGMs and XRAs pursuant to paragraph 8, and subsequent intraday capacity calculation and delivery of intraday capacities may be delayed only up to a point in time at which the target start of allocation pursuant to paragraphs 2(b), 2(c), 2(d) and 2(e) is not yet affected. If the target start of allocation becomes affected by such a delay, the fallback procedure pursuant to Article 19 applies.

~~9.~~10. The intraday capacity calculation process and validation in the Core CCR shall be performed by the CCC and the Core TSOs according to the following procedure:

Step 1. The CCC shall define the initial list of CNECs pursuant to Article 15;

Step 2. The CCC shall calculate the first flow-based parameters ($PTDF_{init}$ and $F_{ref,init}$) for each initial CNEC pursuant to Article 15;

Step 3. The CCC shall determine the final list of CNECs ~~ and MNECs~~ for subsequent steps of the capacity calculation pursuant to Article 16;

~~Step 4. The CCC shall perform the non-costly remedial actions optimisation (NRAO) according to Article 17 and, as a result, obtain the applied non-costly RAs, along with the final $PTDF_f$ and F_{ref} adjusted for the applied RAs;~~

~~Step 5.~~Step 4. The CCC shall calculate the RAM before validation (RAM_{bv}) based on the results of the previous processes pursuant to Article ~~18~~17;

~~Step 6.~~Step 5. The Core TSOs shall, according to Article ~~19~~18, validate the RAM_{bv} with individual validation, and decrease RAM when operational security is jeopardised, which results in the final RAM_f;

~~Step 7.~~Step 6. The CCC shall, according to Article ~~19~~18, remove the redundant CNECs and redundant external constraints from final $PTDF_f$ and RAM_f;

~~Step 8.~~Step 7. The CCC shall publish the $PTDF_f$ and RAM_f values in accordance with Article ~~23~~22 and provide them to NEMOs for capacity allocation in accordance with paragraph 2.

~~10.~~11. All capacity updates, calculations and re-calculations pursuant to paragraph 2, including all steps pursuant to paragraph 3, shall be performed per ID CC MTU. Cross-zonal capacities shall be provided to the NEMOs for each ID CC MTU, but for capacity allocation they may be converted into a higher time resolution in accordance with the market time unit applicable on specific bidding zone border(s).

TITLE 3 – Capacity calculation inputs

Article 5. Definition of critical network elements and contingencies

1. Each Core TSO shall define a list of CNEs, which are fully or partly located in its own control area, and which can be overhead lines, underground cables, or transformers. All cross-zonal network elements shall be defined as CNEs, whereas only those internal network elements,

which are defined pursuant to paragraph 6 or 7 shall be defined as CNEs. Until 30 days after the approval of the proposal pursuant to paragraph 6, all internal network elements may be defined as CNEs.

2. Each Core TSO shall define a list of proposed contingencies used in operational security analysis in accordance with Article 33 of the SO Regulation, limited to their relevance for the set of CNEs as defined in paragraph 1 and pursuant to Article 23(2) of the CACM Regulation. The contingencies of a Core TSO shall be located within the observability area of that Core TSO. This list shall be updated at least on a yearly basis and in case of topology changes in the grid of the Core TSO, pursuant to Article ~~22~~21. A contingency can be an unplanned outage of:

   (a) a line, a cable, or a transformer;

   (b) a busbar;

   (c) a generating unit;

   (d) a load; or

   (e) a set of the aforementioned elements.

3. Each Core TSO shall establish a list of CNECs by associating the contingencies established pursuant to paragraph 2 with the CNEs established pursuant to paragraph 1 following the rules established in accordance with Article 75 of the SO Regulation. Until such rules are established and enter into force, the association of contingencies to CNEs shall be based on each TSO's operational experience. An individual CNEC may also be established without a contingency.

4. Each Core TSO shall provide to the CCC a list of CNECs established pursuant to paragraph 3. ~~Each Core TSO may also provide to the CCC a list of monitored network elements with contingency (MNEC), which need to be monitored during the capacity calculation.~~

5. No later than eighteen months after the implementation of this methodology in accordance with Article 26(~~3~~2)(b), all Core TSOs shall jointly develop a list of internal network elements (combined with the relevant contingencies) to be defined as CNECs and submit it by the same deadline to all Core regulatory authorities as a proposal for amendment of this methodology in accordance with Article 9(13) of the CACM Regulation. After its approval in accordance with Article 9 of the CACM Regulation, the list of internal CNECs shall form an annex to this methodology.

6. The list pursuant to the previous paragraph shall be updated at least every two years. For this purpose, no later than eighteen months after the approval by all Core regulatory authorities of the proposal for amendment of this methodology pursuant to previous paragraph and this paragraph, all Core TSOs shall jointly develop a new proposal for the list of internal CNECs and submit it by the same deadline to all Core regulatory authorities as a proposal for amendment of this methodology in accordance with Article 9(13) of the CACM Regulation. After its approval in accordance with Article 9 of the CACM Regulation, the list of internal CNECs shall replace the relevant annex to this methodology.

7. The proposed list of internal CNECs pursuant to paragraph 5 and 6 shall not include any internal network element with contingency with a maximum zone-to-zone PTDF below 5%, calculated as the time-average over the last twelve months. An exception is applied for CNECs that are considered in accordance with Article 16(2) to (4).

8. The proposal pursuant to paragraphs 5 and 6 shall include at least the following:

(a) a list of proposed internal CNECs with the associated maximum zone-to-zone PTDFs referred to in paragraph 7;

(b) an impact assessment of increasing the threshold of the maximum zone-to-zone PTDF for exclusion of internal CNECs referred to in paragraph 7 to 10% or higher; and

(c) for each proposed internal CNEC, an analysis demonstrating that including the concerned internal network element in capacity calculation is economically the most efficient solution to address the congestions on the concerned internal network element, considering, for example, the following alternatives:

i. application of remedial actions;

ii. reconfiguration of bidding zones;

iii. investments in network infrastructure combined with one or the two above; or

iv. a combination of the above.

Before performing the analysis pursuant to point (c), the Core TSOs shall jointly coordinate and consult with all Core regulatory authorities on the methodology, assumptions and criteria for this analysis.

9. The proposals pursuant to paragraphs 5 and 6 shall also demonstrate that the concerned Core TSOs have diligently explored the alternatives referred to in paragraph 8 sufficiently in advance taking into account their required implementation time, such that they could be applied or implemented by the time that the decisions of the Core regulatory authorities on the proposal pursuant to paragraphs 5 and 6 are taken.

~~10. The Core TSOs shall analyse the possibility of introducing the adjustment of a minimum RAM as applied in the day-ahead capacity calculation methodology in order to address the requirements of Article 21(1)(b)(ii) of the CACM Regulation and of Article 1.7 of Annex I to Regulation (EC) No 714/2009. TSOs shall provide a report on this analysis together with the proposal referred to in paragraph 6 and, if relevant, the necessary amendments to this methodology.~~

~~11.~~10. The Core TSOs shall regularly review and update the application of the methodology for determining CNECs as defined in Article ~~22~~21.

Article 6. Methodology for operational security limits

1. The Core TSOs shall use in the intraday capacity calculation the same operational security limits as those used in the operational security analysis carried out in accordance with Article 72 of the SO Regulation.

2. To take into account the thermal limits of CNEs, the Core TSOs shall use the maximum admissible current limit (I_{max}), which is the physical limit of a CNE according to the operational security limits in accordance with Article 25 of the SO Regulation. The maximum admissible current shall be defined as follows:

(a) the maximum admissible current can be defined as:

i. Seasonal limit, which means a fixed limit for all ID CC MTUs of each of the four seasons.

ii. Dynamic limit, which means a value per ID CC MTU reflecting the varying ambient conditions.

iii. Fixed limits for all ID CC MTUs, in case of specific situations where the physical limit reflects the capability of overhead lines, cables or substation equipment installed in the primary power circuit (such as circuit-breaker, or disconnector) with limits not sensitive to ambient conditions.

(b) when applicable, I_{max} shall be defined as a temporary current limit of the CNE in accordance with Article 25 of the SO Regulation. A temporary current limit means that an overload is only allowed for a certain finite duration. As a result, various CNECs associated with the same CNE may have different I_{max} values.

(c) I_{max} shall represent only real physical properties of the CNE and shall not be reduced by any security margin.[1]

(d) the CCC shall use the I_{max} of each CNEC to calculate F_{max} for each CNEC, which describes the maximum admissible active power flow on a CNEC. F_{max} shall be calculated by the given formula:

$$F_{max} = \sqrt{3} \cdot I_{max} \cdot U \cdot cos(\varphi)$$

Equation 1

(e) where I_{max} is the maximum admissible current of a critical network element (CNE), U is a fixed reference voltage for each CNE, and $\cos(\varphi)$ is the power factor.

(f) the CCC shall, by default, set the power factor $\cos(\varphi)$ to 1 based on the assumption that the CNE is loaded only by active power and that the share reactive power is negligible (i.e. $\varphi = 0$). If the share of reactive power is not negligible, a TSO may consider this aspect during the validation phase in accordance with Article ~~19~~18.

3. The Core TSOs shall aim at gradually phasing out the use of seasonal limits pursuant to paragraph 2(a)(i) and replace them with dynamic limits pursuant to paragraph 2(a)(ii), when the benefits are greater than the costs. If applicable, after the end of each calendar year, each TSO shall analyse for all its CNEs for which seasonal limits are applied and have a non-zero shadow price at least in 0.1% of ID CC MTUs in the previous calendar year, the expected increase in the economic surplus in the next 10 years resulting from the implementation of dynamic limits, and compare it with the cost of implementing dynamic limits. Each TSOs shall provide this analysis to Core regulatory authorities. If the cost benefit analysis, taking into account other planned investments, is positive, the concerned TSO shall implement the dynamic limits within three years after the end of the analysed calendar year. In case of interconnectors, the concerned TSOs shall cooperate in performing this analysis and implementation when applicable.

4. TSOs shall regularly review and update operational security limits in accordance with Article ~~22~~21.

Article 7. Methodology for allocation constraints

[1] Uncertainties in capacity calculation are covered on each CNEC by the flow reliability margin (FRM) in accordance with Article 8 and adjustment values related to validation in accordance with ~~0Article 19~~Article 18.

1. In case operational security limits cannot be transformed efficiently into I_{max} and F_{max} pursuant to Article 6, the Core TSOs may transform them into allocation constraints. For this purpose, the Core TSOs may only use external constraints as a specific type of allocation constraint that limits the maximum import and/or export of a given Core bidding zone within the SIDC.

2. The Core TSOs may apply external constraints as one of the following two options:

   (a) a constraint on the Core net position (the sum of cross-zonal exchanges within the Core CCR for a certain bidding zone in the SIDC), thus limiting the net position of the respective bidding zone with regards to its imports and/or exports to other bidding zones in the Core CCR. This option shall be applied until option (b) can be applied.

   (b) a constraint on the global net position (the sum of all cross-zonal exchanges for a certain bidding zone in the SIDC), thus limiting the net position of the respective bidding zone with regards to all CCRs, which are part of the SIDC. This option shall be applied when: (i) such a constraint is approved within all intraday capacity calculation methodologies of the respective CCRs, (ii) the respective solution is implemented within the SIDC algorithm and (iii) the respective bidding zone borders are participating in SIDC.

3. External constraints may be used by ~~ELIA, TenneT B.V. and~~ PSE during a transition period of two years following the implementation of this methodology in accordance with Article 26(~~3~~2)(b) and in accordance with the reasons and the methodology for the calculation of external constraints as specified in Annex 1 to this methodology. During this transition period, ~~the concerned Core TSOs~~PSE shall:

   (a) calculate the value of external constraints on a daily basis for each ID CC MTU ~~(for PSE only) or at least on a quarterly basis and publish the results of the underlying analysis (this obligation is for ELIA and TenneT B.V. only);~~;

   (b) if applicable and in case the external constraint had a non-zero shadow price in more than 0.1% of hours in a quarter, provide to the CCC a report analysing: (i) for each DA CC MTU when the external constraint had a non-zero shadow price the loss in economic surplus due to external constraint and the effectiveness of the allocation constraint in preventing the violation of the underlying operational security limits and (ii) alternative solutions to address the underlying operational security limits. The CCC shall include this report as an annex in the quarterly report as defined in Article ~~25~~24(5);

   (c) if applicable and when more efficient, implement alternative solutions referred to in point (b).

4. In case ~~the concerned Core TSOs~~that PSE could not find and implement alternative solutions referred to in the previous paragraph, ~~they~~it may, by eighteen months after the implementation of this methodology in accordance with Article 26(~~3~~2)(b), together with all other Core TSOs, submit to all Core regulatory authorities a proposal for amendment of this methodology in accordance with Article 9(13) of CACM Regulation. Such a proposal shall include the following:

   (d) the technical and legal justification for the need to continue using the external constraints indicating the underlying operational security limits and why they cannot be transformed efficiently into I_{max} and F_{max};

   (e) the methodology to calculate the value of external constraints including the frequency of recalculation.

In case such a proposal has been submitted by all Core TSOs, the transition period referred to in paragraph 3 shall be extended until the decision on the proposal is taken by all Core regulatory authorities.

5. For the SIDC fallback procedure, pursuant to Article ~~21~~20, all external constraints, shall be modelled as constraints limiting the Core net position as referred to in paragraph 2(a).

6. ~~A Core TSO~~PSE may discontinue the use of an external constraint. ~~The concerned Core TSO~~In such a case, PSE shall communicate this change to all Core regulatory authorities and to the market participants at least one month before discontinuation.

7. The Core TSOs shall review and update allocation constraints in accordance with Article ~~22~~21.

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. The FRMs shall be calculated in two main steps. In the first step, the probability distribution of deviations between the expected power flows at the time of the capacity calculation and the realised power flows in real time shall be calculated. To calculate the expected power flows (F_{exp}), for each ID CC MTU of the observation period, the historical CGMs and GSKs used in capacity calculation shall be used. The historical CGMs shall be updated with the deliberated Core TSOs' actions (including at least the RAs considered during the capacity calculation) that have been applied in the relevant ID CC MTU[2]. The power flows of such modified CGMs shall be recalculated (F_{ref}) and then adjusted to take into account the realised commercial exchanges inside the Core CCR. The latter adjustment shall be performed by calculating $PTDF$s according to the methodology as described in Article 12, but using the modified CGMs and the historical GSKs. The expected power flows at the time of the capacity calculation shall therefore be calculated using the final realised commercial exchanges in the Core CCR which are reflected in realised power flows. This above calculation of expected power flows (F_{exp}) is described with Equation 2.

[2] These actions are controlled by the Core TSOs and thus not considered as an uncertainty.

$$\vec{F}_{exp} = \vec{F}_{ref} + \mathbf{PTDF}\left(\overrightarrow{NP}_{real} - \overrightarrow{NP}_{ref}\right)$$

Equation 2

with

$\vec{F}_{exp}$	expected power flow per CNEC in the realised commercial situation in Core CCR
$\vec{F}_{ref}$	flow per CNEC in the CGM updated to take deliberate TSO actions into account
PTDF	power transfer distribution factor matrix calculated with updated CGM
$\overrightarrow{NP}_{real}$	Core net position per bidding zone in the realised commercial situation
$\overrightarrow{NP}_{ref}$	Core net position per bidding zone in the updated CGM

4. The expected power flows on each CNEC of the Core CCR shall then be compared with the realised power flows observed on the same CNEC. When calculating the expected (respectively realised) flows for CNECs, the expected (resp. realised) flows shall be the best estimate of the expected (resp. realised) power flow which would have occurred, should the outage have taken place. Such estimate shall take curative remedial actions into account where relevant. All differences between these two flows for all ID CC MTUs of the observation period shall be used to define the probability distribution of deviations between the expected power flows at the time of the capacity calculation and the realised power flows;

5. In the second step, the 90th percentiles of the probability distributions of all CNECs shall be calculated[3]. This means that the Core TSOs apply a common risk level of 10% and thereby the FRM values cover 90% of the historical forecast errors within the observation period. Subject to the proposal pursuant to paragraph 6, the FRM value for each CNEC shall either be:

   (a) the 90th percentile of the probability distributions calculated for such CNEC;

   (b) the 90th percentile of the probability distributions calculated for the CNEs underlying such CNEC.

6. Each TSO may reduce the FRM values resulting from the second step for its own CNECs if it considers that the underlying uncertainties have been over-estimated. For CNECs used within both the Core day-ahead and intraday capacity calculations, the FRM values calculated pursuant to this methodology shall not be higher than the FRM values for the same CNECs used within the Core day-ahead capacity calculation.

7. No later than eighteen months after the implementation of this methodology in accordance with Article 26(~~3~~2)(b), the Core TSOs shall jointly perform the first FRM calculation pursuant to the methodology described above and based on the data covering at least the first year of operation of this methodology. By the same deadline, all Core TSOs shall submit to all Core regulatory authorities a proposal for amendment of this methodology in accordance with Article 9(13) of the CACM Regulation as well as the supporting document as referred to in paragraph 9 below.

8. The proposal for amendment of this methodology pursuant to the previous paragraph shall specify whether the FRM value shall be calculated for each CNEC based on the underlying

[3] This value is derived based on experience in existing flow-based market coupling initiatives.

probability distribution, or whether all CNECs with the same underlying CNE shall have the same FRM value calculated based on the probability distribution calculated for the underlying CNE. In case the proposal suggests calculating the FRMs at CNEC level, the proposal shall describe in detail how to estimate the expected and realised flows adequately, including the RAs that would have been triggered in order to manage the contingency when relevant.

9. The supporting document for the proposal for amendment of this methodology pursuant to paragraph 7 above shall include at least the following:

   (a) the FRM values for all CNECs calculated at the level of CNE and CNEC; and

   (b) an assessment of the benefits and drawbacks of calculating the FRM at the level of CNE or CNEC.

10. Until the proposal for amendment of this methodology pursuant to paragraph 7 ~~has been~~is approved ~~by all Core regulatory authorities~~, the Core TSOs shall use the following FRM values:

    ~~(a)~~ if and as long as all Core TSOs apply FRM for ~~CNECs already used in existing flow-based~~the day-ahead capacity calculation ~~initiatives, the FRM values shall be~~ equal to 10% of Fmax, the ~~FRM values used in these initiatives at the time of adoption of this methodology; and~~

    ~~(b)~~(a) FRM value for ~~CNECs not already used in existing flow-based~~intraday capacity calculation ~~initiatives, the FRM values shall be equal to 10% of the F_{max} calculated under normal weather conditions.~~for each CNEC shall be min {5% of Fmax, FRM at day-ahead level};

    (b) as soon as the Core TSOs start applying the FRM calculation for the day-ahead capacity calculation pursuant to Article 8 of Core DA CCM, the FRM value for intraday capacity calculation shall be equal or lower than the FRM value at the day ahead level.

11. After the proposal for amendment of this methodology pursuant to paragraph 7 ~~has been~~is approved ~~by all Core regulatory authorities~~, the FRM values shall be updated at least once every year based on an observation period of one year in order to reflect the seasonality effects. The FRM values shall then remain fixed until the next update.

Article 9. Generation shift key methodology

1. Each Core TSO shall define for its bidding zone and for each ID CC MTU a GSK, which translates a change in a bidding zone net position into a specific change of injection or withdrawal in the CGM. A GSK shall have fixed values, which means that the relative contribution of generation or load to the change in the bidding zone net position shall remain the same, regardless of the volume of the change.

2. For a given ID CC MTU, the GSK shall only include actual generation and/or load[4] present in the CGM for that ID CC MTU. The Core TSOs shall take into account the available information on generation or load available in the CGM in order to select the nodes that will contribute to the GSK.

3. The GSKs shall describe the expected response of generation and/or load units to changes in the net positions. This expectation shall be based on the observed historical response of

[4] And other elements connected to the network, such as storage equipment.

generation and/or load units to changes in net positions, clearing prices and other fundamental factors, and thereby contributing to minimising the FRM.

4. The GSKs shall be updated and reviewed on a daily basis or whenever the expectations referred to in paragraph 3 change. The Core TSOs shall review and update the application of the generation shift key methodology in accordance with Article ~~22~~21.

5. The Core TSOs belonging to the same bidding zone shall jointly define a common GSK for that bidding zone and shall agree on a methodology for such coordination. For Germany and Luxembourg, each TSO shall calculate its individual GSK and the CCC shall combine them into a single GSK for the whole German-Luxembourgian bidding zone, by assigning relative weights to each TSO's GSK. The German and Luxembourgian TSOs shall agree on these weights, based on the share of the generation in each TSO's control area that is responsive to changes in net position, and provide them to the CCC.

6. Within eighteen months after the implementation of this methodology in accordance with Article 26(~~3~~2)(b), all Core TSOs shall develop a proposal for further harmonisation of the generation shift key methodology and submit it by the same deadline to all Core regulatory authorities as a proposal for amendment of this methodology in accordance with Article 9(13) of the CACM Regulation. The proposal shall at least include:

   (a) the criteria and metrics for defining the efficiency and performance of GSKs and allowing for quantitative comparison of different GSKs; and

   (b) a harmonised generation shift key methodology combined with, where necessary, rules and criteria for TSOs to deviate from the harmonised generation shift key methodology.

Article 10. Methodology for remedial actions in intraday capacity calculation

1. In accordance with Article 25(1) of the CACM Regulation and Article 20(2) of the SO Regulation, the Core TSOs shall individually define the RAs to be taken into account in the intraday capacity calculation.

2. In case a RA made available for the intraday capacity calculation in the Core CCR is also made available in another CCR, the TSO having control on this RA shall take care, when defining it, of a consistent use in its potential application in both CCRs to ensure operational security.

3. In accordance with Article 25(2) and (3) of the CACM Regulation, these RAs will be used for the coordinated ~~optimisation~~calculation of cross-zonal capacities while ensuring operational security in real-time.

~~4. For the purpose of the NRAO, all Core TSOs shall provide to the CCC all expected available non-costly RAs.~~

4. RAs used for intraday capacity calculation shall be aligned as much as technically feasible with the most recent ROSC CROSA. The latest version of coordinated RAs available at the time of starting step 2 according to Article 4(9) shall be used. Such RAs will be only available once ROSC CROSA is implemented in accordance with Article 37 of Core ROSC methodology.

5. In accordance with Article 25(4) of the CACM Regulation, a TSO may withhold only those RAs, which are needed to ensure operational security in real-time operation and for which no other (costly) RAs are available, or those offered to the intraday capacity calculation in other CCRs in which the concerned TSO also participates. The CCC shall monitor and report in the

annual report on systematic withholdings, which were not essential to ensure operational security in real-time operation.

6. The intraday capacity calculation may only take into account those non-costly RAs which can be modelled. These non-costly RAs can be, but are not limited to:

   (a) changing the tap position of a phase-shifting transformer (PST); and

   (b) a topological action: opening or closing of one or more line(s), cable(s), transformer(s), bus bar coupler(s), or switching of one or more network element(s) from one bus bar to another.

7. In accordance with Article 25(6) of the CACM Regulation, ~~the~~all RAs taken into account ~~are the same~~ for day-ahead ~~and intra-day~~ capacity calculation are also considered during the intraday timeframe, depending on their technical availability.

8. The RAs can be preventive or curative, i.e. affecting all CNECs or only pre-defined contingency cases, respectively.

~~9. The optimised application of non-costly RAs in the intraday capacity calculation is performed in accordance with Article 17.~~

~~10.~~9. TSOs shall review and update the RAs taken into account in the intraday capacity calculation in accordance with Article ~~22~~21.

TITLE 4 – Update of intraday cross-zonal capacities

Article 11. Update of intraday cross-zonal capacities remaining after the SDAC

1. The CCC shall use the ~~final~~ flow-based parameters resulting from day-ahead capacity calculation and the net positions resulting from already allocated capacities in the SDAC to calculate the updated day-ahead cross-zonal capacities, in the form of flow-based parameters, to be used as intraday cross-zonal capacities at the intraday cross-zonal gate opening time.

   For the updated intraday flow-based parameters, the PTDF values shall be the final PTDFs resulting from the day-ahead capacity calculation, and the RAM shall be derived as:

$$\overrightarrow{RAM}_{UID} = \overrightarrow{\sout{RAM_F}}\overrightarrow{RAM}_{f,DA} - \sout{\mathbf{PTDF_F}}\mathbf{PTDF}_{f,DA}\,\overrightarrow{NP}_{AAC,DA}$$

Equation 3

with

$\overrightarrow{RAM}_{UID}$	updated remaining available margin for intraday cross-zonal capacities
$\overrightarrow{\sout{RAM_F}}\overrightarrow{RAM}_{f,DA}$	final remaining available margin resulting from the day-ahead capacity calculation
$\sout{\mathbf{PTDF_F}}\mathbf{PTDF}_{f,DA}$	final power transfer distribution factor matrix resulting from the day-ahead capacity calculation
$\overrightarrow{\sout{NP_{AAC}}}\overrightarrow{NP}_{AAC,DA}$	net positions resulting from already allocated capacities in SDAC

2. For each CNEC, each TSO may decrease the $\overrightarrow{\sout{RAM_F}}\overrightarrow{RAM}_{f,DA}$ by decreasing the AMR_{DA} and $LTA_{margin,DA}$ as calculated pursuant to the day-ahead capacity calculation methodology while

ensuring ~~compliance with Article 16 of Regulation (EU) 2019/943 in order to avoid~~that there is no undue discrimination between internal and cross-zonal exchanges ~~as referred to~~ in line with Article 21(1)(b)(ii) of the CACM Regulation.

3. Irrespective of the options provided to each TSO pursuant to this paragraph, each TSO shall ensure that on each bidding zone border, the long-term capacities that are in effect taken into account in the $LTA_{margin,DA}$, are between 0.001 MW and 1500 MW.

4. Until ~~six months after~~ the implementation of intraday ~~capacity calculation pursuant to Article 4(2)(b),~~auctions at 15:00 market time of day D-1, the Core TSOs may set to zero the cross-zonal capacities calculated pursuant to Article 4(2)(a), including those calculated pursuant to a transitional solution for updating the cross-zonal capacities remaining after the day-ahead capacity allocation pursuant to Article 26(~~6). Intraday cross-zonal capacities may be set to zero until the target start of allocation as defined in Article 4(2)(b) and on the condition that offering non-zero cross-zonal capacities pursuant to Article 4(2)(a) could endanger operational security.~~5).

   ~~(a) In case the final cross-zonal capacities, calculated in accordance with this Article and taking into account Article 21(1), are in the form of ATCs, such a decision may be made per bidding zone border by the competent TSOs;~~

   (a) In case the final cross-zonal capacities, calculated in accordance with this Article and taking into account Article ~~21~~20(1), are in the form of ATCs, such a decision may be made per bidding zone border by the competent TSOs;

   (b) In case the final cross-zonal capacities, calculated in accordance with this Article and taking into account Article 20(1) are in the form of flow-based parameters, such a decision shall be coordinated among all Core TSOs. Further details on the application of transitional solution are defined in Annex 2 to this methodology.

TITLE 5 - Description of the intraday capacity calculation process

Article 12. Calculation of power transfer distribution factors and reference flows

1. The flow-based calculation is a centralised calculation, which delivers two main classes of parameters needed for the definition of the flow-based domain: the power transfer distribution factors ($PTDFs$) and the remaining available margins ($RAMs$).

2. In accordance with Article 29(3)(a) of the CACM Regulation, the CCC shall calculate the impact of a change in the bidding zones net position on the power flow on each CNEC (determined in accordance with the rules defined in Article 5). This influence is called the zone-to-slack $PTDF$. This calculation is performed from the CGM and the GSK defined in accordance with Article 9.

3. The zone-to-slack $PTDFs$ are calculated by first calculating the node-to-slack $PTDFs$ for each node defined in the GSK. These nodal PTDFs are derived by varying the injection of a relevant node in the CGM and recording the difference in power flow on every CNEC (expressed as a percentage of the change in injection). These node-to-slack $PTDFs$ are translated into zone-to-slack $PTDFs$ by multiplying the share of each node in the GSK with the corresponding nodal PTDF and summing up these products. This calculation is mathematically described as follows:

$$\mathbf{PTDF}_{\text{zone-to-slack}} = \mathbf{PTDF}_{\text{node-to-slack}}\,\mathbf{GSK}_{\text{node-to-zone}}$$

Equation 4

with

$\mathbf{PTDF}_{zone-to-slack}$	matrix of zone-to-slack $PTDFs$ (columns: bidding zones; rows: CNECs)
$\mathbf{PTDF}_{node-to-slack}$	matrix of node-to-slack $PTDFs$ (columns: nodes; rows: CNECs)
$\mathbf{GSK}_{node-to-zone}$	matrix containing the $GSKs$ of all bidding zones (columns: bidding zones; rows: nodes; sum of each column equal to one)

4. The zone-to-slack $PTDFs$ as calculated above can also be expressed as zone-to-zone $PTDFs$. A zone-to-slack $PTDF_{A,l}$ represents the influence of a variation of a net position of bidding zone A on a CNEC l and assumes a commercial exchange between a bidding zone and a slack node. A zone-to-zone $PTDF_{A\rightarrow B,l}$ represents the influence of a variation of a commercial exchange from bidding zone A to bidding zone B on CNEC l. The zone-to-zone $PTDF_{A\rightarrow B,l}$ can be derived from the zone-to-slack $PTDFs$ as follows:

$$PTDF_{A\rightarrow B,l} = PTDF_{A,l} - PTDF_{B,l}$$

Equation 5

5. The maximum zone-to-zone $PTDF$ of a CNEC ($PTDF_{z2zmax,l}$) is the maximum influence that any Core exchange has on the respective CNEC, including exchanges over HVDC interconnectors which are integrated pursuant to ~~Article 13:~~Article 13:

~~$$PTDF_{z2zmax,l} = max\left(\max_{A\in BZ}\left(PTDF_{A,l}\right) - \min_{A\in BZ}\left(PTDF_{A,l}\right), \max_{B\in HVDC}\left(PTDF_{B,l}\right)\right)$$~~

$$PTDF_{z2zmax,l} = max\Big(\max_{A\in BZ}\left(PTDF_{A,l}\right) - \min_{A\in BZ}\left(PTDF_{A,l}\right), \max_{H\in HVDC}\big(|(PTDF_{A,l} - PTDF_{VH\_1,l}) - (PTDF_{B,l} - PTDF_{VH\_2,l})|, |PTDF_{VH\_1,l} - PTDF_{VH\_2,l}|\big)\Big)$$

Equation 6~~1~~6

6. with

$PTDF_{A,l}$	zone-to-slack $PTDF$ of bidding zone A on a CNEC l
HVDC	set of HVDC interconnectors integrated pursuant to ~~Article 13~~Article 13
BZ	set of all Core bidding zones
$\max_{A\in BZ}(PTDF_{A,l})$	maximum zone-to-slack PTDF of Core bidding zones on a CNEC l
$\min_{A\in BZ}(PTDF_{A,l})$	minimum zone-to-slack PTDF of Core bidding zones on a CNEC l
	$PTDF_{VH\_1,l}$ zone-to-slack $PTDF$ of Virtual hub 1 on a CNEC l, with virtual hub 1 representing the converter station at the sending end of the HVDC interconnector located in bidding zone A

$PTDF_{VH\_2,l}$ zone-to-slack $PTDF$ of Virtual hub 2 on a CNEC l, with virtual hub 2 representing the converter station at the sending end of the HVDC interconnector located in bidding zone B

7. The reference flow (F_{ref}) is the active power flow on a CNEC based on the CGM. In case of a CNEC without contingency, F_{ref} is simulated by directly performing the direct current load-flow calculation on the CGM, whereas in case of a CNEC with contingency, F_{ref} is simulated by first applying the specified contingency, and then performing the direct current load-flow calculation.

8. The expected flow F_i in the commercial situation i is the active power flow of a CNEC based on the flow F_{ref} and the deviation between the commercial situation considered in the CGM (reference commercial situation) and the commercial situation i:

$$\vec{F}_i = \vec{F}_{ref} + \mathbf{PTDF}\left(\overrightarrow{NP}_i - \overrightarrow{NP}_{ref}\right)$$

Equation 7

with

$\vec{F}_i$	expected flow per CNEC in the commercial situation i
$\vec{F}_{ref}$	flow per CNEC in the CGM (reference flow)
PTDF	power transfer distribution factor matrix
$\overrightarrow{NP}_i$	Core net position per bidding zone in the commercial situation i
$\overrightarrow{NP}_{ref}$	Core net position per bidding zone in the reference commercial situation

Article 13. Integration of HVDC interconnectors on bidding zone borders of the Core CCR

1. The Core TSOs shall apply the evolved flow-based (EFB) methodology when including HVDC interconnectors on the bidding zone borders of the Core CCR[5]. According to this methodology, a cross-zonal exchange over an HVDC interconnector on the bidding zone borders of the Core CCR is modelled and optimised explicitly as a bilateral exchange in capacity allocation, and is constrained by the physical impact that this exchange has on all CNECs considered in the final flow-based domain used in capacity allocation and constraints modelling the maximum possible exchange of the HVDC interconnector.

2. In order to calculate the impact of the cross-zonal exchange over a HVDC interconnector on the CNECs, the converter stations of the cross-zonal HVDC shall be modelled as two virtual hubs, which function equivalently as bidding zones. Then the impact of an exchange between two bidding zones A and B over such HVDC interconnector shall be expressed as an exchange from the bidding zone A to the virtual hub representing the sending end of the HVDC

[5] EFB is different from AHC. AHC imposes the capacity constraints of one CCR on the cross-zonal exchanges of another CCR by considering the impact of exchanges between two capacity calculation regions. E.g. the influence of exchanges of a bidding zone which is part of a CCR applying a coordinated net transmission capacity approach is taken into account in a bidding zone which is part of a CCR applying a flow-based approach. EFB takes into account commercial exchanges over the cross-border HVDC interconnector within a single CCR applying the flow-based method of that CCR.

interconnector plus an exchange from the virtual hub representing the receiving end of the interconnector to the bidding zone B:

$$PTDF_{A\rightarrow B,l} = (PTDF_{A,l} - PTDF_{VH\_1,l}) + (PTDF_{VH\_2,l} - PTDF_{B,l})$$

Equation 8

with

$PTDF_{VH\_1,l}$ zone-to-slack $PTDF$ of Virtual hub 1 on a CNEC l, with virtual hub 1 representing the converter station at the sending end of the HVDC interconnector located in bidding zone A

$PTDF_{VH\_2,l}$ zone-to-slack $PTDF$ of Virtual hub 2 on a CNEC l, with virtual hub 2 representing the converter station at the receiving end of the HVDC interconnector located in bidding zone B

3. The PTDFs for the two virtual hubs $PTDF_{VH\_1,l}$ and $PTDF_{VH\_2,l}$ are calculated for each CNEC and they are added as two additional columns (representing two additional virtual bidding zones) to the existing $PTDF$ matrix, one for each virtual hub.

4. The virtual hubs introduced by this methodology are only used for modelling the impact of an exchange through a HVDC interconnector and no orders shall be attached to these virtual hubs in the coupling algorithm. The two virtual hubs will have a combined net position of 0 MW, but their individual net position will reflect the exchanges over the interconnector. The flow-based net positions of these virtual hubs shall be of the same magnitude, but they will have an opposite sign.

Article 14. Consideration of non-Core bidding zone borders

1. 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 where possible also with an advanced hybrid coupling (AHC).

2. In the standard hybrid coupling, the Core TSOs shall consider the electricity exchanges on bidding zone borders outside the Core CCR as fixed input to the intraday capacity calculation. These electricity exchanges, defined as best forecasts of net positions and flows for HVDC lines, are defined and agreed pursuant to Article 19 of the CGMM and are incorporated in each CGM. They impact the F_{ref} and $F_{0,Core}$ on all CNECs and thereby increase or decrease the RAM of the Core CNECs in order for those CNECs to accommodate the flows resulting from those exchanges. Uncertainties related to the electricity exchanges forecasts are implicitly integrated within the FRM of each CNEC.

3. In the AHC, the CNECs of the intraday capacity calculation methodology shall limit not only the net positions of the Core bidding zone borders, but also the electricity exchanges on the bidding zone borders of adjacent CCRs.

4. No later than ~~eighteen~~twelve months after the implementation of this methodology in accordance with Article 26(~~3~~2)(b), the Core TSOs shall jointly develop a proposal for the implementation of the AHC and submit it by the same deadline to all Core regulatory authorities as a proposal for amendment of this methodology in accordance with Article 9(13) of the CACM Regulation. The proposal for the implementation of the AHC shall aim to reduce the

volume of unscheduled allocated flows on the CNECs of the Core CCR resulting from electricity exchanges on the bidding zone borders of adjacent CCRs. If before the implementation of this methodology, the AHC has been implemented on some bidding zone borders in existing flow-based capacity calculation initiatives, it may continue to be applied on those bidding zone borders as part of the day-ahead capacity calculation carried out according to this methodology until the amendments pursuant to this paragraph are implemented.

5. Until the AHC is implemented, the Core TSOs shall monitor the accuracy of non-Core exchanges in the CGM. The Core TSOs shall report in the annual report to all Core regulatory authorities the accuracy of such forecasts.

Article 15. Initial flow-based calculation

1. As a first step in the intraday capacity calculation process, the CCC shall merge the individual lists of CNECs provided by all Core TSOs in accordance with Article 5(4) into a single list, which shall constitute the initial list of CNECs.

2. Subsequently, the CCC shall use the initial list of CNECs pursuant to paragraph 1, the CGM pursuant to Article 4(7) and the GSK for each bidding zone in accordance with Article 9 to calculate the initial flow-based parameters for each ID CC MTU.

3. The initial flow-based parameters shall be calculated pursuant to Article 12 and shall consist of the ~~**$PTDF_{init}$**~~ **PTDF** values and $\vec{F}_{ref,init}$ values for each initial CNEC.

Article 16. Definition of final list of CNECs ~~and MNECs~~ for intraday capacity calculation

1. The CCC shall use the initial list of CNECs determined pursuant to Article 15 and remove those CNECs, for which the maximum zone-to-zone $PTDF_{init}$ is ~~not higher than~~below 5%. The remaining CNECs shall constitute the final list of CNECs.

~~2. The CCC shall use the lists of MNECs submitted by the Core TSOs and merge them into a common list of MNECs, which shall be monitored during the NRAO process, based on information provided by the Core TSOs pursuant to Article 5. In accordance with Article 17(3)(d)(vi), the additional loading resulting from the application of the NRAO process on the MNECs may be limited during the NRAO process, while ensuring that a certain additional loading up to the defined threshold is always accepted.~~

~~Article 17.Non-costly remedial actions optimisation~~

~~3. The NRAO process coordinates and optimises the use and application of non-costly RAs pursuant to Article 10, with the aim of enlarging and securing the flow-based domain around the expected operating point of the grid, represented by the reference net positions and exchanges.~~

2. ~~The NRAO shall be an automated, coordinated, and reproducible optimisation process performed by the CCC that applies non-costly RAs defined~~If all available costly and non-costly RAs are not sufficient to ensure operational security on an internal network element with a specific contingency, which is not defined as a CNEC, the concerned Core TSO may exceptionally add such element to the final list of CNECs, provided that:

   (a) Its maximum zone-to-zone PTDF is equal or above the threshold of 5% referred to in paragraph (1);

(b) Its voltage level must be 110 kV or above;

(c) Its RAM shall be the highest RAM ensuring operational security considering all available costly and non-costly RAs, with the floor of zero.

~~4.~~ In the first twelve months following the implementation of the ROSC methodology in accordance with Article ~~10.~~

~~5. The NRAO shall consist of the following objective function, variables and constraints:~~

~~(a) the objective function of the NRAO is to maximise the smallest relative RAM of all limiting CNECs. External constraints shall not be included in this objective function.~~

$$\min_{limiting\ CNECs}(RAM_{rel}) \rightarrow to\ be\ maximised$$

~~6.~~3. ~~the optimisation process iterates[6] over switching states (i.e. activated or not activated) of topological measures and PST tap positions in order to maximise this objective. Preventive RAs~~76(1) of the SO Regulation, the concerned Core TSO may ~~jointly be associated with all~~ also add an XNEC to the final list of CNECs, ~~whereas curative RAs may be optimised independently for each contingency.~~ with no PTDF threshold, provided that:

~~(a) for a given state of the optimisation, the RAM_{nrao} of a CNEC takes into account flows coming from reference net positions and exchanges as well as switching states of RAs. As a result, the $PTDF_{nrao}$ and F_{nrao} are updated for each CNEC during each optimisation iteration. The calculations of RAM_{nrao} and relative RAM_{nrao} for a given CNEC are expressed in Equation 9 and Equation 10, and rely on F_{max}, FRM and $F_{ref,init}$.~~

$$\overrightarrow{RAM}_{nrao} = \vec{F}_{max} - \overrightarrow{FRM} - \vec{F}_{ref,init} + \vec{F}_{nrao}$$

(a) It was loaded 100% or more before the latest CROSA and for which cross-border redispatch or countertrading were applied during that CROSA;

(b) Its RAM shall be at least the difference between its Fmax and its loading after the CROSA.

After twelve months following the implementation of the ROSC methodology, the PTDF threshold of 5% shall apply to the XNEC to CNEC conversion, unless the amendment pursuant to paragraph (4) is approved and implemented.

4. The Core TSOs shall study the effects and needs for the XNEC to CNEC and may propose an amendment to this methodology, which shall at least include:

(a) the proposed PTDF threshold for XNEC to CNEC conversion;

(b) rules for avoiding undue discrimination between internal and cross zonal exchanges for such XNECs, which shall include limitations of such exchanges in proportion to the burdening effect of their consequential flows (internal flows and allocated flows, respectively).

[6] A global optimisation finding the optimal solution in one iteration would also be acceptable, as long as the final optimisation result is at least as good as the one obtained through the described iterative process, i.e. would lead to a higher value of the objective function while fulfilling all constraints.

Article 17. Calculation of flow-based parameters before validation

1. The flows assumed to result from commercial exchanges outside the Core CCR (F_{uaf}) shall be calculated in the following steps. First, the flows on CNECs in situations without commercial exchanges are calculated by setting the corresponding net positions $\overrightarrow{NP_i}$ to zero:

   (a) The flows without Core exchanges are calculated as:

$$\vec{F}_{0,Core} = \vec{F}_{ref} - \vec{F}_{ref,Core}$$

Equation 8a

$$\vec{F}_{ref,Core} = \mathbf{PTDF_{Core}}\ \overrightarrow{NP}_{ref,Core}$$

Equation 8b

   (b) The flows without exchanges in the whole Continental Europe and on its links towards other synchronous areas, are calculated as:

$$\vec{F}_{0,all} = \vec{F}_{ref} - \mathbf{PTDF_{all}}\ \overrightarrow{NP}_{ref,all}$$

Equation ~~9~~8c

~~with~~

   For this calculation, the CCC shall use the GSKs provided by the concerned TSOs, and when these are not available, the CCC shall use a GSK where all nodes with positive injections participate in shifting in proportion to their injection.

   (c) The flow assumed to result from commercial exchanges outside the Core CCR (F_{uaf}) is then calculated for each CNEC as follows:

$$\vec{F}_{uaf} = \vec{F}_{0,Core} - \vec{F}_{0,all}$$

Equation 8d

with

$\vec{F}_{0,Core}$	flow per CNEC in a situation without commercial exchanges within the Core CCR
~~$\overrightarrow{RAM}_{nrao}\vec{F}_{ref}$~~	~~RAM~~flow per CNEC ~~during~~in the ~~NRAO optimisation~~CGM (which already contains the flows originated by SDAC process, and partially from the SIDC process)
$\vec{F}_{ref,Core}$	flow originated from the Core net positions which are already included in the CGM
$\mathbf{PTDF_{Core}}$	power transfer distribution factor matrix for all bidding zones of the Core CCR

$\mathbf{PTDF}_{all}$	power transfer distribution factor matrix for all bidding zones of Continental Europe, and connection points of the bidding zones of Continental Europe with the bidding zones of other synchronous areas
~~$\vec{F}_{ref,init}$~~ $\overrightarrow{NP}_{ref,Core}$	~~Reference flow per CNEC in the CGM in the initial flow based calculation~~Core net position per bidding zone included in the CGM (resulting from SDAC and the SIDC exchanges already included in the CGM), excluding the net positions' changes resulting from the application of remedial actions in the previous CROSA process
$\overrightarrow{NP}_{ref,all}$	total net positions included in the CGM, of: all bidding zones of Continental Europe, and connection points of the bidding zones of Continental Europe with the bidding zones of other synchronous areas
~~$\vec{F}_{nrao}$~~ $\vec{F}_{0,all}$	~~Flow change per CNEC due to preventive and/or curative RAs, derived from simulations conducted on the CGM (and initially zero)~~flow per CNEC in a situation without any commercial exchange between bidding zones within Continental Europe and any commercial exchange between the bidding zones of Continental Europe and the bidding zones of other synchronous areas
$\vec{F}_{uaf}$	unscheduled allocated flow, i.e. the flow per CNEC resulting from commercial exchanges outside Core CCR

~~$$RAM_{rel} = \frac{RAM_{nrao}}{\sum_{(A,B)=neighbouring\ Core\ bidding\ zones\ pairs} |PTDF_{A=B,nrao}|} \quad if\ RAM_{nrao} \geq 0$$~~

~~$$RAM_{rel} = RAM_{nrao}\ if\ RAM_{nrao} < 0$$~~[7]

~~*Equation 10*~~

~~with~~

~~$PTDF_{A=B,nrao}$~~ ~~The zone-to-zone PTDFs for the current optimisation iteration~~

~~(b) The constraints of the NRAO are:~~

~~i. F_{max}, FRM and $F_{ref,init}$ per CNEC;~~

~~ii. the available range of tap positions of each PST;~~

~~iii. parallel PSTs, as defined by TSOs, shall have equal tap positions;~~

~~iv. a RA may only be associated with a CNEC, if it has a minimum positive impact on the objective function or constraint;~~

~~v. the maximum number of activated curative non-costly remedial actions per CNEC (with contingency);~~

[7] RAM_{rel} ignores PTDFs for overloaded CNECs, in order to solve the largest absolute overloads first.

vi. the RAM_{nraa} of the MNECs shall be positive. A minimum initial RAM_{nraa} (at reference point, without RAs) of 25 MW shall be applied for MNECs;

vii. the loop-flow on each cross-zonal CNEC, which is equal to $F_{a,alt}$ calculated pursuant to point (e), shall not increase above either:

b.vii.1.the initial value of $F_{a,alt}$ of the considered CNEC before the NRAO in case this value is higher than or equal to the loop-flow threshold;

b.vii.2.the loop-flow threshold in case the initial value of $F_{a,alt}$ of the considered CNEC before the NRAO is lower than the loop-flow threshold;

(e) The loop-flow on each cross-zonal CNEC $F_{a,alt}$ is a flow on each CNEC in a situation without any commercial exchange between bidding zones within Continental Europe, and between bidding zones within Continental Europe and bidding zones from other synchronous areas. For this calculation, the CCC shall set all exchanges on HVDC interconnectors between Continental Europe and other synchronous areas to zero, and then calculate the zonal PTDFs for all bidding zones within Continental Europe for each CNEC. For this calculation, the CCC shall use the GSKs provided by the concerned TSOs to the Common Grid Model platform, and when these are not available, the CCC shall use a GSK where all nodes with positive injections participate to shifting in proportion to their injection. Subsequently the CCC shall calculate $F_{a,alt}$ with the following equation:

$$\vec{F}_{a,alt} = \vec{F}_{ref} + \mathbf{PTDF}_{alt}\,\overrightarrow{NP}_{ref,alt}$$

Equation 11

with

$\vec{F}_{a,alt}$	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
$\mathbf{PTDF}_{alt}$	power transfer distribution factor matrix for all bidding zones within Continental Europe and all Core CNECs
$\overrightarrow{NP}_{ref,alt}$	total net positions per bidding zone within Continental Europe included in the CGM

7. As a result of the NRAO, a set of RAs is associated with each CNEC. $PTDF$ and F_{ref} are updated as follows:

(a) $\mathbf{PTDF}_f = \mathbf{PTDF}_{nraa}$ directly from the optimisation results;

(b) $\vec{F}_{ref} = \vec{F}_{ref,init} + \vec{F}_{nraa}$, based on the RAs associated with each CNEC by the NRAO.

8. The non-costly RAs applied at the end of the NRAO shall be transparent to all TSOs of the Core CCR, and also of adjacent CCRs, and shall be taken as an input to the coordinated operational security analysis established pursuant to Article 75 of the SO Regulation.

9. An exchange of foreseen RAs in each CCR, with sufficient impact on the cross-zonal capacity in other CCRs, shall be coordinated among CCCs. The CCC shall take this information into account for the coordinated application of RAs in the Core CCR;

10. Every year after the implementation of this methodology in accordance with Article 26(3)(b), the CCC, in coordination with the Core TSOs, shall analyse the efficiency of the NRAO and present the results of this analysis in the annual report. This analysis shall contain an ex-post analysis on whether the NRAO effectively increased cross-zonal capacity in the most valuable market direction. The analysis shall focus on data from the last year of operation, and shall include at least the following information:

    (a) an assessment of the availability of non-costly RAs provided by the Core TSOs, including the average number of non-costly RAs provided by each Core TSO;

    (b) for the Core TSOs which did not provide non-costly RAs, a justification why they did not do so;

    (c) for each CNEC with non-zero shadow price, if applicable: $\overrightarrow{PTDF}_{init}$, $\overrightarrow{PTDF}_f$, $F_{ref,init}$ and F_{nraa}; and

    (d) an estimate of the market clearing point (and related market welfare) which may have occurred, should the NRAO not have taken place (but including other capacity calculation steps such as minRAM, LTA inclusion and an estimate of the validation phase).

11. Based on the conclusion of the analysis mentioned in the previous paragraph, the Core TSOs may propose changes to the NRAO by submitting to all Core regulatory authorities a proposal for amendment of this methodology in accordance with Article 9(13) of the CACM Regulation.

Article 18.Calculation of flow-based parameters before validation

1. Based on the initial flow-based domain and on the final list of CNECs, the Core CCC shall calculate for each CNEC the RAM before validation, relying on the following sequential stepsaccording to the equation:

    (a) the calculation of F_{ref} and $PTDF_f$ through NRAO according to Article 17;

    (b) the calculation of RAM before validation as follows:

$$\overrightarrow{RAM}_{bv} = \vec{F}_{max} - \overrightarrow{FRM} - \vec{F}_{ref}\vec{F}_{ref}$$

Equation 12

with

$\vec{F}_{max}$	Maximum active power flow pursuant to Article 6
$\overrightarrow{FRM}$	Flow reliability margin pursuant to Article 8
$\vec{F}_{ref}$	Flow resulting from the net positions described in the CGM after NRAO, pursuant to Article 17(4)(b)
$\overrightarrow{RAM}_{bv}$	Remaining available margin before validation

2. In case an external constraint restricts the Core net positions pursuant to Article 7(2)(a), it shall be added as an additional row to the $\mathbf{PTDF}_f$ matrix and the $\overrightarrow{RAM}_{bv}$ vector as follows:

(a) the $PTDF$ value in the column related to the bidding zone applying the concerned external constraint is set to 1 for an export limit and -1 for an import limit, respectively;

(b) the $PTDF$ values in the columns related to all other bidding zones are set to zero; and

(c) the RAM value is set to the amount of the external constraint, corrected for the net position included in the CGM.

~~Article 19.~~Article 18. Validation of flow-based parameters

1. The Core TSOs shall validate and have the right to correct cross-zonal capacity for reasons of operational security during the validation process.

2. Each Core TSO shall validate and have the right to decrease the RAM for reasons of operational security during the individual validation. The adjustment due to individual validation is called 'individual validation adjustment' (IVA) and it shall have a positive value, i.e. it may only reduce the RAM. IVA may reduce the RAM only to the minimum degree that is needed to ensure operational security ~~considering~~, and only after all the expected available costly and non-costly ~~RAs, in accordance with~~remedial actions pursuant to Article 22 of the SO Regulation~~.~~ are considered. In case certain remedial actions are not implemented, such as countertrading, Core TSOs shall ensure their implementation within twelve months following the application of IDCC(b) pursuant to Article 4(2)(b).

~~2.~~3. The individual validation adjustment may be done in the following situations:

(a) an occurrence of an exceptional contingency or forced outage as defined in Article 3(39) and Article 3(77) of the SO Regulation;

(b) when all available costly and non-costly RAs are not sufficient to ensure operational security;

(c) a mistake in input data, that leads to an overestimation of cross-zonal capacity from an operational security perspective; and/or

(d) a potential need to cover reactive power flows on certain CNECs.

~~3. If all available costly and non-costly RAs are not sufficient to ensure operational security on an internal network element with a specific contingency, which is not defined as CNEC and for which the maximum zone-to-zone PTDF is above the PTDF threshold referred to in Article 16(1), the competent Core TSO may exceptionally add such internal network element with associated contingency to the final list of CNECs. The RAM on this exceptional CNEC shall be the highest RAM ensuring operational security considering all available costly and non-costly RAs.~~

4. When performing the validation, the Core TSOs shall consider the operational security limits pursuant to Article 6(1). While considering such limits, they may consider additional grid models, and other relevant information. Therefore, the Core TSOs shall use the tools developed by the CCC for analysis, but may also employ verification tools not available to the CCC.

5. In case of a required reduction due to situations as defined in paragraph ~~2~~3(a), a TSO may use a positive value for IVA for its own CNECs or adapt the external constraints, pursuant to Article 7, to reduce the cross-zonal capacity for its bidding zone.

6. In case of a required reduction due to situations as defined in paragraph ~~23~~(b), (c), and (d), a TSO may use a positive value for IVA for its own CNECs. In case of a situation as defined in paragraph ~~23~~(c), a Core TSO may, as a last resort measure, request a common decision to launch the default flow-based parameters pursuant to Article 20.

7. After individual validation adjustments, the remaining available margin before validation ($\overrightarrow{RAM}_{bv}$) shall be adjusted for the flows resulting from net positions or already allocated capacities resulting from the SIDC in accordance with Article 4(5)c. The final RAM_f shall be calculated by the CCC for each CNEC and external constraint according to Equation 13:Equation 13~~Equation 11~~

$$\overrightarrow{RAM}_f = \overrightarrow{RAM}_{bv} - \overrightarrow{IVA} - \mathbf{PTDF}_{Core}\ \overrightarrow{NP}_{AAC,IDadd}$$

Equation 13

with

$\overrightarrow{RAM}_f$	final remaining available margin
$\overrightarrow{RAM}_{bv}$	remaining available margin before validation
$\overrightarrow{IVA}$	individual validation adjustment
$\mathbf{PTDF}_{Core}$	final power transfer distribution factor matrix resulting from the intraday capacity calculation
$\overrightarrow{NP}_{AAC,IDadd}$	Core net positions resulting from SIDC which are not already included in the CGM

8. The CCC shall remove those $\overrightarrow{RAM}_f$ and $\mathbf{PTDF}_f$ values which are redundant~~,~~ and may therefore be removed without impacting the possible allocation of cross-zonal capacity. The pre-solved CNECs and external constraints shall thus ensure that the capacity allocation shall not exceed any limiting CNEC or external constraint.

9. Any reduction of cross-zonal capacities during the validation process shall be communicated and justified to market participants and to all Core regulatory authorities in accordance with Article ~~23~~22 and Article ~~25~~24, respectively.

10. Every three months, the CCC shall provide in the quarterly report all the information on the reductions of cross-zonal capacity and exceptional additions of internal network elements. The quarterly report shall include at least the following information for each CNEC of the pre-solved domain affected by a reduction and for each ID CC MTU:

    (a) the identification of the CNEC;

    (b) all the corresponding flow components pursuant to Article ~~23~~22(2)(b)(~~vi~~vii);

    (c) the volume of reduction and, if applicable, the shadow price of the CNEC resulting from SIDC and the estimated market loss of economic surplus due to the reduction;

    (d) the detailed reason(s) for reduction, including the operational security limit(s) that would have been violated without reductions, specifying network elements on which these limits would have been violated, and under which circumstances they would have been violated,

as well as the list of remedial actions with their detailed information, considered prior to the reduction;

(e) the forecast flow in the CGM used for D-1 capacity calculation, in the CGM considered for the intraday capacity calculation within which the capacity reduction occurred, in the first CGM established after the considered intraday calculation and the realised flow, before (and when relevant after) contingency;

(f) if an internal network ~~elements~~element with a specific contingency was exceptionally added to the final list of CNECs ~~during validation:~~ pursuant to Article 16:

i. a justification why adding the network ~~elements~~element with a specific contingency to the list was the only way to ensure operational security~~,~~;

ii. the name or the identifier of the internal network ~~elements~~element with a specific contingency~~,~~;

iii. the ~~DA~~ID CC MTUs for which the internal network ~~elements~~element with a specific contingency was added to the list;

iv. the maximum zone-to-zone PTDF calculated on the basis of the methodology in Article 12, calculated on the CGM for MTUs defined in paragraph iii;

v. for the cases under Article 16(3), the amount of total, internal, loop and allocated flows at the considered exceptionally added XNEC; and

~~i.~~vi. the information referred to in ~~points~~paragraphs (b), (c) and (e) above~~;~~.

~~(f)~~(g) the remedial actions included in the CGM before the intraday capacity calculation;

~~(g)~~(h) in case of reduction due to individual validation, the TSO invoking the reduction; and

~~(h)~~(i) the proposed measures to avoid similar reductions in the future.

11. The quarterly report shall also include at least the following aggregated information:

(a) statistics on the number, causes, volume and estimated loss of economic surplus of applied reductions by different TSOs; and

(b) general measures to avoid cross-zonal capacity reductions in the future.

12. When a given Core TSO reduces capacity for its CNECs in more than 1% of ID CC MTUs of the analysed quarter, the concerned TSO shall provide to the CCC a detailed report and action plan describing how such deviations are expected to be alleviated and solved in the future. This report and action plan shall be included as an annex to the quarterly report.

13. The final flow-based parameters shall consist of $\mathbf{PTDF}_f$ and $\overrightarrow{RAM}_f$ for CNECs and external constraints of the pre-solved domain.

~~Article 20.~~Article 19. Intraday capacity calculation fallback procedure

According to Article 21(3) of the CACM Regulation, when the intraday capacity calculation for specific ID CC MTUs does not lead to the final flow-based parameters due to, *inter alia*, a technical failure in the tools, an error in the communication infrastructure, or corrupted ~~or,~~ missing or delayed input data,

the Core TSOs and the CCC shall define the missing parameters by calculating the default flow-based parameters. The calculation of default flow-based parameters shall be based on previously calculated flow-based parameters for the same delivery market time unit. The latest (intraday or day-ahead) available flow-based domain, which may be corrected during local validation in accordance with Article 18, for the considered delivery hour is first converted to zero Core balance. The RAM on each CNEC (including allocation constraints) is then decreased by the adjustments for minRAM and LTA inclusion (if present). The redundant constraints are removed, and pre-solved constraints are adjusted for the Core net positions resulting from the SDAC and the SIDC.

~~Article 21.~~Article 20. Calculation of ATCs for SIDC fallback procedure

1. In case the SIDC is unable to accommodate flow-based parameters, the CCC shall convert them into available transmission capacities (hereafter referred as "ATCs for SIDC fallback procedure") for each Core oriented bidding zone border and each DA CC MTU. The Core TSOs may delegate this responsibility to a third party.

2. The flow-based parameters shall serve as the basis for the determination of the ATCs for SIDC fallback procedure. As the selection of a set of ATCs from the flow-based parameters leads to an infinite set of choices, the algorithm provided in paragraph 5 determines the ATCs for SIDC fallback procedure.

3. The following inputs are required to calculate ATCs for SIDC fallback procedure for each ID CC MTU:

   (a) final flow-based parameters ($\mathbf{PTDF}_f$ and $\overrightarrow{RAM}_f$) as calculated pursuant to ~~Article 19~~00Article 18 or final flow-based parameters (~~$\mathbf{PTDF}_f$~~$\mathbf{PTDF}_{f,DA}$ and $\overrightarrow{RAM}_{UID}$) as calculated pursuant to ~~Article 11;~~Article 11;

   (b) if defined, the global allocation constraints shall be assumed to constrain the Core net positions pursuant to Article 7(5), and shall be described following the methodology described in Article ~~18(2~~17(3). Such constraints shall be adjusted for offered cross-zonal capacities on the non-Core bidding zone borders.

4. the final PTDFs ($\mathbf{PTDF}_f$ and $\mathbf{PTDF}_{f,DA}$) of all or only a subset of CNECs can be adjusted before the ID ATC extraction by setting the positive zone-to-zone PTDFs below a certain threshold to zero. The following outputs are the outcomes of the calculation for each MTU:

   (a) ATCs for SIDC fallback procedure; and

   (b) constraints with zero margin after the calculation of ATCs for SIDC fallback procedure.

   (c) An ATC limitation on specific borders as set by relevant TSOs as output of the local validation as defined in Annex 6: $ATC_{A\rightarrow B\ validated}$

5. The calculation of the ATCs for SIDC fallback procedure is an iterative procedure, which gradually calculates ATCs for each DA CC MTU, while respecting the constraints of the final flow-based parameters pursuant to paragraph 3:

   (a) The initial ATCs are set equal to zero for each Core oriented bidding zone border, i.e.:

$$\overrightarrow{ATC}_{k=0} = 0$$

   with

$\overrightarrow{ATC}_{k=0}$	the initial ATCs before the first iteration

(b) the remaining available margin ~~of~~ at iteration zero is either equal to the final ~~flow-based parameters~~remaining available margin ($\overrightarrow{RAM}_f$) ~~have to be adjusted~~according to Article 18(8) or the updated remaining available margin for ~~the flows resulting from net positions or already allocated~~intraday cross-zonal capacities ~~resulting from the SIDC in accordance with~~(RAM_UID) according to Article ~~4(5)(b):~~11(1):

$$\overrightarrow{RAM}_{ATC}(0) = \overrightarrow{RAM}_f ~~- \mathbf{PTDF_f}~\overrightarrow{NP}_{SIDC}~~$$
$$\text{or } \overrightarrow{RAM}_{ATC}(0) = \overrightarrow{RAM}_{UID}$$

Equation 14

with

$\overrightarrow{RAM}_{ATC}(0)$	remaining available margin for ATC calculation at iteration k=0
$\overrightarrow{RAM}_f$	remaining available margin of the flow-based parameters pursuant to paragraph 3.
~~$\mathbf{PTDF_f}$~~ $\overrightarrow{RAM}_{UID}$	~~PTDF matrix of the final flow-based parameters~~updated remaining available margin for intraday cross-zonal capacities
~~$\overrightarrow{NP}_{SIDC}$~~	~~Core net positions resulting from SIDC which are not already included in the CGM~~

(c) In the case when there are negative RAMs, negative ATCs are calculated for CNECs with negative $RAM_{ATC}(0)$ according to the following procedure:

i. Per CNEC with negative remaining available margin for ATC calculation at iteration k=0 ($RAM_{ATC}(0)$) negative ATCs are calculated for all oriented bidding zone borders with positive PTDFs according to Equation 14a:

$$ATC_{A\rightarrow B,CNEC\ i} = \frac{pPTDF_{A\rightarrow B,CNEC\ i}}{\sum_{(A,B)\in\ Core\ contract\ paths\ with\ positive\ z2zPTDFs} PTDF^2_{A\rightarrow B}}\ RAM_{ATC,CNEC\ i}(0)$$

Equation 14a

with

$ATC_{A\rightarrow B,CNEC\ i}$	negative ATC for the oriented bidding zone border A to B determined by CNEC i
A, B	Core bidding zones
$RAM_{ATC,CNEC\ i}(0)$	remaining available margin for ATC calculation at iteration k=0 of CNEC i

$pPTDF_{A\rightarrow B,CNEC\,i}$ Final positive zone-to-zone PTDF of the oriented bidding zone border A to B

ii. In case for an oriented Core bidding zone border more than one negative ATC has been calculated according to Equation 14athen for each oriented Core bidding zone border the most negative ATC is determined over all CNECs with negative remaining available margin.

$$\overrightarrow{ATC}_{A\rightarrow B} = min\left(\overrightarrow{ATC}_{A\rightarrow B,CNEC\,i}\right)$$

Equation 14b

iii. After extraction of negative ATCs a scaling factor (*SF*) is calculated for each CNEC with negative remaining available margin:

$$SF_{CNEC\,i} = \left| \frac{RAM_{ATC,CNEC\,i}(0)}{\sum_{(A,B)\in \,Core\ contract\ paths\ with\ positive\ z2zPTDFs} PTDF_{A\rightarrow B,CNEC\,i}\ ATC_{A\rightarrow B}} \right|$$

Equation 14c

The final scaling factor (SF_{final}) is the maximum of all calculated scaling factors:

$$SF_{final} = max(SF_{CNEC\,i})$$

Equation 14d

iv. The final negative ATCs are calculated by scaling the negative ATCs with the final scaling factor:

$$\overrightarrow{ATC}_{negative,final} = \overrightarrow{ATC}_{A\rightarrow B}\, SF_{final}$$

Equation 14e

(d) ~~(cc)~~ Before starting the iterative method applied to calculate the positive ATCs for SIDC fallback all the remaining available margins for ATC calculation at iteration k=0 ($\overrightarrow{RAM}_{ATC}(0)$) shall be adjusted to be non-negative:

$$\overrightarrow{RAM}_{ATC}(0) = \max\left(0, \overrightarrow{RAM}_{ATC}(0)\right)$$

Equation 14f

with

$\overrightarrow{RAM}_{ATC}(0)$ remaining available margin for ATC calculation at iteration *k*=0

The iterative method applied to calculate the positive ATCs for SIDC fallback procedure consists of the following actions for each iteration step *k*:

i. for each CNEC and external constraint of the flow-based parameters pursuant to paragraph ~~3~~,3, calculate the remaining available margin based on ATCs at iteration *k*-1

$$\overrightarrow{RAM}_{ATC}(k) = \overrightarrow{RAM}_{ATC}(0) - \mathbf{pPTDF}_{zone-to-zone}\ \overrightarrow{ATC}_{k-1}$$

Equation 14g

with

$\overrightarrow{RAM}_{ATC}(k)$	remaining available margin for ATC calculation at iteration k
$\overrightarrow{ATC}_{k-1}$	ATCs at iteration k-1
$\mathbf{pPTDF}_{zone-to-zone}$	positive zone-to-zone power transfer distribution factor matrix

ii. for each CNEC, share $RAM_{ATC}(k)$ with equal shares among the Core oriented bidding zone borders with strictly positive zone-to-zone power transfer distribution factors on this CNEC;

iii. from those shares of $RAM_{ATC}(k)$, the maximum additional bilateral oriented exchanges are calculated by dividing the share of each Core oriented bidding zone border by the respective positive zone-to-zone PTDF. ~~The maximum additional bilateral oriented exchanges may be negative, i.e. it may lead to decrease the exchange capacity;~~

iv. for each Core oriented bidding zone border, $\overrightarrow{ATC}_k$ is calculated by adding to $\overrightarrow{ATC}_{k-1}$ the minimum of all maximum additional bilateral oriented exchanges for this border obtained over all CNECs and external constraints as calculated in the previous step;

~~v. go back to step i;~~

v. $\overrightarrow{ATC}_k$ is limited to a maximum value of $ATC_{A\rightarrow B\ validated}$ if such value has been introduced by TSOs on the border A→B as a result of the ATC validation phase as described in Annex 6. Then go back to step i;

vi. iterate until the difference between the sum of ATCs of iterations k and k-1 is smaller than ~~1 kW~~1kW;

vii. the resulting positive ATCs for SIDC fallback procedure stem from the ATC values determined in iteration k, after rounding down to integer values;

viii. at the end of the calculation, there are some CNECs and external constraints with no remaining available margin left. ~~These are~~These are, together with the CNECs and external constraints with initially negative $RAM_{ATC}(0)$, the limiting constraints for the calculation of ATCs for SIDC fallback procedure.

~~(e)~~(e) positive zone-to-zone PTDF matrix ($\mathbf{pPTDF}_{zone-to-zone}$) for each Core oriented bidding zone border shall be calculated from the ~~**PTDF$_F$**~~**PTDF$_{Core}$** as follows (for HVDC interconnectors integrated pursuant to ~~Article 13, Equation 8~~Article 13, Equation 8~~Equation 8Equation 8~~ shall be used):

$$pPTDF_{zone-to-zone,A\rightarrow B} = \max\left(0, PTDF_{zone-to-slack,A} - PTDF_{zone-to-slack,B}\right)$$

Equation 15a~~15~~2~~313~~

with

$pPTDF_{zone-to-zone,A\rightarrow B}$	positive zone-to-zone $PTDFs$ for Core oriented bidding zone border A to B
$PTDF_{zone-to-slack,m}$	zone-to-slack $PTDF$ for Core bidding zone border m

(f) The final ATCs per Core oriented bidding zone border are the minimum from positive and negative ATCs:

$$\overrightarrow{ATC}_{final} = \min\left(\overrightarrow{ATC}_{k}, \overrightarrow{ATC}_{negative,final}\right)$$

Equation 15b

TITLE 6 – Updates and data provision

~~Article 22.~~Article 21. Reviews and updates

1. Based on Article 3(f) of the CACM Regulation and in accordance with Article 27(4) of the same Regulation, all TSOs shall regularly and at least once a year review and update the key input and output parameters listed in Article 27(4)(a) to (d) of the CACM Regulation.

2. If the operational security limits, critical network elements, contingencies and allocation constraints used for intraday capacity calculation inputs pursuant to Article 5 and Article 7 need to be updated based on this review, the Core TSOs shall publish the changes at least 1 week before their implementation.

3. In case the review proves the need for an update of the reliability margins, the Core TSOs shall publish the changes at least one month before their implementation.

4. The review of the ~~common~~ list of RAs taken into account in the intraday capacity calculation, as defined in Article 10(4), shall include at least an evaluation of the efficiency of specific PSTs and the topological RAs considered ~~during~~from the ~~RAO~~CROSA process.

5. In case the review proves the need for updating the application of the methodologies for determining GSKs, critical network elements and contingencies referred to in Articles 22 to 24 of the CACM Regulation, changes have to be published at least three months before their implementation.

6. Any changes of parameters listed in Article 27(4) of the CACM Regulation shall be communicated to market participants, all Core regulatory authorities and ~~the Agency~~ACER.

7. The Core TSOs shall communicate the impact of any change of allocation constraints and parameters listed in Article 27(4)(d) of the CACM Regulation to market participants, all Core regulatory authorities and ~~the Agency~~ACER. 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 9(13) of the CACM Regulation.

~~Article 23.~~Article 22. Publication of data

1. In accordance with Article 3(f) of the CACM 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 intraday 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 4(2) by the deadlines set therein;

   (b) the following information for intraday cross-zonal capacity calculation and re-calculation pursuant to Article 4(2)(b) ~~and (c~~to (e) shall be published by the deadlines established therein:

      i. maximum and minimum possible net position of each bidding zone;

      ii. maximum possible bilateral exchanges between all pairs of Core bidding zones;

      iii. if applicable, ATCs for SIDC fallback procedure;

      iv. names of CNECs (with geographical names of substations where relevant and separately for CNE and contingency) and external constraints of the final flow-based parameters before pre-solving and the TSO defining them;

      v. for each CNEC of the final flow-based parameters before pre-solving, the EIC code of CNE and Contingency;

      vi. for each CNEC of the final flow-based parameters before pre-solving, the method for determining I_{max} in accordance with Article 6(2)(a);

      vii. detailed breakdown of RAM for each CNEC of the final flow-based parameters before pre-solving: I_{max}, U, F_{max}, FRM, ~~$F_{ref,init}$~~F_{ref}, ~~F_{trac}~~, ~~F_{ref}~~, $F_{0,\text{core}}$, $F_{0,\text{all}}$, $F_{\text{ref,core}}$, F_{uaf}, IVA;

      viii. value of each external constraint before pre-solving;

      ix. indication of whether default flow-based parameters were applied;

      x. indication of whether a CNEC is redundant or not;

      xi. information about the validation reductions:

         - the identification of the CNEC;
         - the TSO invoking the reduction;
         - the volume of reduction (IVA);

- the detailed reason(s) for reduction in accordance with Article ~~19~~18(2) and 18(3), including the operational security limit(s) that would have been violated without reductions, and under which circumstances they would have been violated;

- if an internal network elements with a specific contingency was exceptionally added to the final list of CNECs during validation: (i) a justification of the reasons of why adding the internal network elements with a specific contingency to the list was the only way to ensure operational security, (~~i~~ii) the name or identifier of the internal network elements with a specific contingency, along with the calculated set of PTDFs;

~~xii. for each RA resulting from the NRAO:~~

- ~~type of RA;~~
- ~~location of RA;~~
- ~~whether the RA was curative or preventive;~~
- ~~if the RA was curative, a list of CNEC identifiers describing the CNECs to which the RA was associated;~~

(c) the following forecast information contained in the CGM for each ID CC MTU shall be published by the deadlines established in Article 4(2):

i. vertical load for each Core bidding zone and each TSO;

ii. production for each Core bidding zone and each TSO;

iii. Core net position for each Core bidding zone and each TSO;

iv. reference net positions of all bidding zones in synchronous area Continental Europe and reference exchanges for all HVDC interconnectors within synchronous area Continental Europe and between synchronous area Continental Europe and other synchronous areas; and

(d) as soon as the SIDC directly applies the flow-based parameters, in case of intraday auctions, two hours after the auction, the information pursuant to paragraph 2(b)(vii) shall be complemented by ~~with~~ the following information for each CNEC and external constraint of the final flow-based parameters~~:~~.

i. shadow prices;

ii. flows resulting from net positions ~~resulting from~~obtained at intraday auctions.

(e) every six months, the publication of an up-to-date static grid model by each Core TSO.

(f) The CCC shall include in its quarterly report as defined in Article 25(6) the flows resulting from net positions resulting from intraday auctions on each CNEC and external constraint of the final flow-based parameters. This requirement is valid after the SIDC will directly apply the flow-based parameters.

3. Individual Core TSO may withhold the information referred to in paragraph 2(b)(iv), 2(b)(v) and 2(e) if it is classified as sensitive critical infrastructure protection related information in

their Member States as provided for in point (d) of Article 2 of the Council Directive 2008/114/EC of 8 December 2008 on the identification and designation of European critical infrastructures and the assessment of the need to improve their protection. In such a case, the information referred to in paragraph 2(b)(iv) and 2(b)(v) shall be replaced with an anonymous identifier which shall be stable for each CNEC across all ID CC MTUs. The anonymous identifier shall also be used in the other TSO communications related to the CNEC, including the static grid model pursuant to paragraph 2(e) and when communicating about an outage or an investment in infrastructure. The information about which information has been withheld pursuant to this paragraph shall be published on the communication platform referred to in paragraph 1.

4. Any change in the identifiers used in paragraphs 2(b)(iv), 2(b)(v) and 2(e) shall be publicly notified at least one month before its entry into force. The notification shall at least include:

   (a) the day of entry into force of the new identifiers; and

   (b) the correspondence between the old and the new identifier for each CNEC.

5. Pursuant to Article 20(9) of the CACM Regulation, the Core TSOs shall establish and make available a tool which enables market participants to evaluate the interaction between cross-zonal capacities and cross-zonal exchanges between bidding zones. The tool shall be developed in coordination with stakeholders and all Core regulatory authorities and updated or improved when needed.

6. 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~~ACER. Each Core TSO may decide not to publish the additional information, which was not requested by its competent regulatory authority.

~~Article 24.~~Article 23. Quality of the data published

1. No later than six months before the implementation of this methodology in accordance with Article 26(~~3~~2)(b), 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 ~~23~~22. 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 25.~~Article 24. Monitoring~~,~~ and reporting ~~and information to the Core regulatory authorities~~

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

2. At least, the information on non-anonymized names of CNECs for final flow-based parameters before pre-solving as referred to in Article ~~23~~22(2)(b)(iv) and (v) shall be provided to all Core regulatory authorities on a monthly basis for each CNEC and each ID CC MTU. This information shall be in a format that allows easily to combine the CNEC names with the information published in accordance with Article ~~23~~22(2).

3. In addition, each month, starting in January 2025 with data for December 2024, the Core TSOs shall provide the Core regulatory authorities and ACER with the following data for each MTU and each CNEC:

   (a) final zone-to-hub PTDF values for all modelled bidding zones;

   (b) Core net positions pursuant to Article 4(5); and

   (c) flow components, consisting of the internal flow, loop flows (total loop flow and particular loop flows created by each bidding zone) and PST flow.

~~3.~~4. 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.

~~4.~~5. 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 10, 14, ~~17, 24~~23 and 26 of this methodology:

(a) according to Article 10(5), the Core TSOs shall report to the Core CCC on systematic withholdings which were not essential to ensure operational security in real-time operation.

(b) according to Article 14(5), the Core TSOs shall monitor the accuracy of non-Core exchanges in the CGM.

~~(c) according to Article 17(7), the CCC shall monitor the efficiency of the NRAO.~~

~~(d)~~(c) ~~according to Article 24~~23(3), the CCC shall monitor and report on the quality of the data published on the dedicated online communication platform as referred to in Article ~~23~~22, with supporting detailed analysis of a failure to achieve sufficient data quality standards by the concerned TSOs, where relevant.

~~(e)~~(d) according to Article 26(~~3~~4), 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.

~~5.~~6. The CCC, with the support of the Core TSOs where relevant, shall draft and publish a quarterly report satisfying the reporting obligations set in Articles 7, 19 and 26 of this methodology:

(a) according to ~~Article 7(~~Article 7(3)(b), the CCC shall collect all reports analysing the effectiveness of relevant allocation constraints, received from the concerned TSOs during the period covered by the report, and annex those to the quarterly report.

(b) according to Article ~~19(11~~18(10), the CCC shall provide all information on the reductions of cross-zonal capacity, with a supporting detailed analysis from the concerned TSOs where relevant.

(c) according to Article 26(~~3~~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.

(d) according to Article 22(2)(f), Core TSOs shall report on flows resulting from net positions resulting from the intraday auctions, on each CNEC and external constraint of the final flow-based parameters. This requirement is valid after the SIDC will directly apply the flow-based parameters.

~~6.~~7. The published annual and quarterly reports may withhold commercially sensitive information or sensitive critical infrastructure protection related information as referred to in Article ~~23~~22(3). In such a case, the Core TSOs shall provide the Core regulatory authorities with a complete version where no such information is withheld.

TITLE 7 - Implementation

Article 25. TSOs' analyses

1. Core TSOs shall analyse possible measures to increase cross-zonal capacities in the intraday timeframe, and over time, to reach the minimum capacity threshold of 70% pursuant to Article

16(8) of the Regulation (EU) 2019/943, on each CNEC. The analyses shall consist of a common assessment by all Core TSOs and individual assessments by each Core TSO.

2. The common assessment by all Core TSOs shall identify and analyse both short-term and long-term systemic measures which would maximise the infrastructure utilisation and enable higher intraday capacities, and which can be jointly implemented by all Core TSOs. These measures shall at least include:

   (a) the ability to activate remedial actions closer to real time;

   (b) the possibility to ignore marginal PTDF values in case of flow-based to ATC conversion;

   (c) the possibility for a TSO to remove the interconnectors with the non-Core bidding zones from the list of critical network elements.

3. The individual assessments shall identify and analyse measures which can be implemented individually by each Core TSO for each of its CNECs, and shall at least consider:

   (a) remedial actions which can be activated within or after the intraday timeframe, including non-costly and costly ones;

   (b) targeted investments, contributing to meeting the minimum capacity requirement on specific CNECs, and specifying their expected implementation time;

   (c) alternative bidding zone configurations pursuant to ACER Decision 11/2022;

   (d) further potential refinements of capacity calculation principles and data, such as removing frequently redundant CNECs from the initial CNEC list.

4. The analyses, consisting of the assessments pursuant to paragraphs 1 to 3, shall be submitted to the Core regulatory authorities and ACER not later than 1 April 2025.

Article 26. 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~~ACER in accordance with Article 9(12) of the CACM Regulation.

2. The TSOs of the Core CCR shall implement this methodology within the following timeframes:

   (a) IDCC(a): update of cross-zonal capacities pursuant to Article 4(2)(a) by the deadline for the implementation of day-ahead capacity calculation methodology as established in the day-ahead capacity calculation methodology of the Core CCR;

   (b) IDCC(b): calculation of intraday cross-zonal capacities pursuant to Article 4(2)(b) by ~~twelve~~**4 months** after the ~~implementation~~adoption of ~~day-ahead capacity calculation methodology as established in~~ACER Decision ~~XX~~ 03/2024 approving the ~~day-ahead capacity calculation methodology of the Core CCR; and~~related amendments;

   (c) IDCC(c): re-calculation of intraday cross-zonal capacities pursuant to Article 4(2)(c) by ~~twelve~~**9 months** after the implementation of calculation of intraday cross-zonal capacities pursuant to point (b) of this paragraph;

(d) IDCC(d): re-calculation of intraday cross-zonal capacities pursuant to Article 4(2)(d) by **22 months** after the implementation of calculation of intraday cross-zonal capacities pursuant to point (b) of this paragraph; and

~~(c)~~(e) IDCC(e): re-calculation of intraday cross-zonal capacities pursuant to Article 4(2)(e) at the latest by **3 months** after the implementation of the corresponding intraday CROSA following the ROSC methodology.

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

   (a) internal parallel run, during which the TSOs shall test the operational processes for the intraday capacity calculation inputs, the intraday capacity calculation process and the intraday 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 Core NEMOs to test the implementation of this methodology, and market participants to test the effects of applying this methodology on the market. In accordance with Article 20(8) of CACM Regulation, this phase shall not be shorter than 6 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~~ACER 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 day-ahead capacity calculation methodology, the Core TSOs shall apply a transitional solution to compute the cross-zonal capacities which remain after the day-ahead capacity allocation pursuant to Article 4(2)(a). This update shall be done based on day-ahead cross-zonal capacities used in existing day-ahead capacity calculation and allocation initiatives. The details on the application of this transitional solution are defined in Annex 2 to this methodology.

6. After the implementation of the day-ahead capacity calculation methodology and until the implementation of the intraday capacity calculation methodology pursuant to Article 4(2)(b), the Core TSOs shall apply a transitional solution for updating of intraday cross-zonal capacities remaining after the SDAC as referred to in Article 4(2)(a). The details on the application of this transitional solution are defined in Annex 2, Annex 3, Annex 4 and Annex 5 to this methodology. During this transition period:

   (a) Annex 3 shall apply and replace Article 11;

   (b) Annex 4 shall apply and replace Article ~~21~~20; and

   (c) Annex 5 shall apply.

7. In parallel to IVA validation and as long as SIDC is not able to directly apply flow-based parameters, the Core TSOs may also perform ATC based validation pursuant to Annex 6. Regardless of the ability of SIDC to apply the flow-based parameters, the ATC based validation shall no longer be allowed after 24 months following the implementation of the intraday capacity calculation methodology pursuant to Article 4(2)(b).

8. By 1 October 2025, all Core TSOs shall propose amendments to this methodology based on the outcomes of their analyses pursuant to Article 25.

9. If required, following the expected amendments to the CACM Regulation, this methodology shall be revised accordingly.

TITLE 8 - Final provisions

Article 27. Language

1. 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 9(14) of the CACM 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.

Annex 1: Justification of usage and methodology for calculation of external constraints

The following section depicts in detail the justification of usage and methodology currently used by ~~each Core TSO~~PSE to design and implement external constraints, if applicable. The legal interpretation on eligibility of using external constraints and the description of their contribution to the objectives of the CACM Regulation is included in the Explanatory Note.

~~1. Belgium:~~

~~ELIA may use an external constraint to limit the import of the Belgian bidding zone.~~

~~**Technical and legal justification**~~

~~ELIA is facing voltage constraints and voltage collapse risks in case of low generation within the Belgium grid. Therefore ELIA requires to maintain a certain amount of power to be generated within Belgium to prevent violation of voltage constraints (i.e. to prevent voltage dropping below the lower safety limit). The risks of dynamic instability are also analysed to assess the amount of machines requested within the Belgium grid to provide a minimal dynamic stability to avoid transient phenomena. These analyses and results lead to the use of a maximum import constraint.~~

~~**Methodology to calculate the value of external constraints**~~

~~The value of maximum import constraint for the Belgian bidding zone shall be estimated with studies performed on a regular basis. The studies shall include a voltage collapse analysis and a stability analysis performed in line with Article 38 of the SO Regulation. The studies shall be performed and published at least on an annual basis and updated every time this external constraint had a non-zero shadow price in more than 0.1% of hours in a given quarter.~~

~~2. Netherlands:~~

~~TenneT B.V. may use an external constraint to limit the import and export of the Dutch bidding zone.~~

~~**Technical and legal justification**~~

~~The combination of voltage constraints and limitations following from using a linearised GSK make it necessary for TenneT B.V. to apply external constraints. Voltage constraints justify the use of a maximum import constraint, because a certain amount of power needs to be generated within the Netherlands to prevent violation of voltage constraints (i.e. to prevent voltage dropping below the lower safety limit). To prevent the deviations between forecasted and realised values of generation in feed following from the linear GSK to reach unacceptable levels, it is necessary to make use of external constraints to limit the feasible net position range for the Dutch import and export net position. This last point is explained in more detail below.~~

~~The intraday capacity calculation methodology uses a Generator Shift Key (GSK) to determine how a change in net position is mapped to the generating units in a specific bidding zone. The algorithm requires that the GSK is linear and that by applying the GSK the minimum and maximum net position ('the feasibility range') of a bidding zone can be reached. TenneT B.V. applies a GSK method that aims at establishing a realistic generator schedule for every hour and which is applicable to every possible net position within the flow-based domain. In order to realise this, generators can be divided in three groups based on a merit order: (i) rigid generators that always produce at maximum power output, (ii) idle generators that are out-of-service and (iii) 'swing generators' that provide the 'swing capacity' to reach all intermediate net positions required by the algorithm for a specific grid situation. To reach the maximum net position, all 'swing generators' shall produce at maximum power. To reach the minimum net position, all 'swing generators' shall produce at minimum power. The absolute difference between~~

~~the minimum and maximum net position thus determines the amount of required 'swing capacity', i.e. the total capacity required from 'swing generators'.~~

~~If TenneT B.V. would not apply external constraints, and higher import and export net positions would be possible, several generators that in practice operate as rigid generators (e.g. CHPs, coal fired power plants etc.) would need to be modelled as 'swing generators'. In some cases, a switch of a generator from 'idle' to 'swing' or from 'rigid' to 'swing' could mean a jump of roughly 50% in the power output of such a power plant, which in turn has significant impact on the forecasted power flows on the CNECs close to that power plant. This results in a reduced accuracy of the GSK as the generation of these plants is modelled less accurately and the deviations between the forecasted and realised flows on particular CNECs increase to unacceptable levels with significant impact on the capacity domain. The consequence of this would be that higher FRMs need to be applied to partly cover these deviations, which will constantly limit the available capacity for the market. To prevent too large deviations in generation in feed, the total feasibility range, which should be covered by the GSK, thus needs to be limited with external constraints.~~

~~The Netherlands is a small bidding zone with, in comparison to other bidding zones, a lot of interconnection capacity which implies a very large feasibility range compared to the total installed capacity. E.g. TenneT B.V. has applied external constraints of 5 GW for both the import and export position in the past, already implying a feasibility range of 10 GW on a total of roughly 15 GW generation capacity included in the GSK at that point in time. For other bidding zones with a much higher amount of installed capacity or relatively less interconnection capacity, the relative amount of 'swing capacity' in their GSK is much lower and therefore also the deviations between forecasted and realised generation are lower. Or in other words, the maximum feasibility range which can be covered by the GSK without increasing deviations between forecasted and realised generation to unacceptable levels, is larger than the total installed interconnection capacity for these bidding zones, making it not necessary to use external constraints as a measure to limit these deviations.~~

~~Methodology to calculate the value of external constraints~~

~~TenneT B.V. determines the maximum import and export constraints for the Netherlands based on studies, which combine a voltage collapse analysis, stability analysis and an analysis on the increased uncertainty introduced by the (linear) GSK during different extreme import and export situations in accordance to Article 38 of the SO Regulation. The studies shall be performed and published at least on an annual basis and updated every time this external constraint had a non-zero shadow price in more than 0.1% of hours in a given quarter.~~

~~Poland:~~

PSE may use an external constraint to limit the import and export of the Polish bidding zone.

Technical and legal justification

Implementation of external constraints as applied by PSE is related to integrated scheduling process applied in Poland (also called central dispatching model) and the way how reserve capacity is being procured by PSE. In a central dispatching model, in order to balance generation and demand and ensure secure energy delivery, the TSO dispatches generating units taking into account their operational constraints, transmission constraints and reserve capacity requirements. This is realised in an integrated scheduling process as a single optimisation problem called security constrained unit commitment (SCUC) and economic dispatch (SCED).

The integrated scheduling process starts after the day-ahead capacity calculation and SDAC and continues until real-time. This means that reserve capacity is not blocked by TSO in advance and in effect not removed from the wholesale market and SIDC. However, if balancing service providers (generating units) would already sold too much energy in the previous market timeframes because of

high exports, they may not be able to provide sufficient upward reserve capacity within the integrated scheduling process.[8] Therefore, one way to ensure sufficient reserve capacity within integrated scheduling process is to set a limit to how much electricity can be imported or exported in the SIDC.

The objective to limit balancing service providers to sell too much energy in the intraday market in order to be able to provide sufficient reserve capacity in the integrated scheduling process cannot be efficiently met by translating this limit into capacities of critical network elements offered to the market. If this limit was to be reflected in cross-zonal capacities offered by PSE in the form of an appropriate adjustment of cross-zonal capacities, this would imply that PSE would need to guess the most likely market direction (imports and/or exports on particular interconnectors) and accordingly reduce the cross-zonal capacities in these directions. In the flow-based approach, this would need to be done on each CNEC in a form of reductions of the RAM. However, from the point of view of market participants, due to the inherent uncertainties of market results, such an approach is burdened with the risk of suboptimal splitting of allocation constraints onto individual interconnections – overestimated on one interconnection and underestimated on the other, or vice versa. Also, such reductions of the RAM would limit cross-zonal exchanges for all bidding zone borders having impact on Polish CNECs, whereas the allocation constraint has an impact only on the import or export of the Polish bidding zone, whereas the trading of other bidding zones is unaffected.

External constraints are determined for the whole Polish power system, meaning that they are applicable simultaneously for all CCRs in which PSE has at least one bidding zone border (i.e. Core, Baltic and Hansa). This solution is the most efficient application of external constraints. Considering allocation constraints separately in each CCR would require PSE to split global external constraints into CCR-related sub-values, which would be less efficient than maintaining the global value. Moreover, in the hours when Poland is unable to absorb any more power from outside due to violated minimal downward reserve capacity requirements, or when Poland is unable to export any more power due to insufficient upward reserve capacity requirements, Polish transmission infrastructure is still available for cross-border trading between other bidding zones and between different CCRs.

Methodology to calculate the value of external constraints:

When determining the external constraints, PSE takes into account the most recent information on the technical characteristics of generation units, forecasted power system load as well as minimum reserve margins required in the whole Polish power system to ensure secure operation and forward import/export contracts that need to be respected from previous capacity allocation time frames.

External constraints are bidirectional, with independent values for each ID CC MTU, and separately for directions of import to Poland and export from Poland.

For each hour, the constraints are calculated according to the below equations:

$$\mathrm{EXPORT}_{constraint} = \mathrm{P}_{CD} - \mathrm{P}_{NA} + \mathrm{P}_{NCD} - (\mathrm{P}_{L} + \mathrm{P}_{UPres}) \quad (1)$$

$$\mathrm{IMPORT}_{constraint} = \mathrm{P}_{L} - \mathrm{P}_{DOWNres} - \mathrm{P}_{CD_{min}} - \mathrm{P}_{NCD} \quad (2)$$

[8] This conclusion equally applies for the case of lack of downward balancing capacity, which would be endangered if balancing service providers (generating units) sell too little energy in the day-ahead market, because of too high imports.

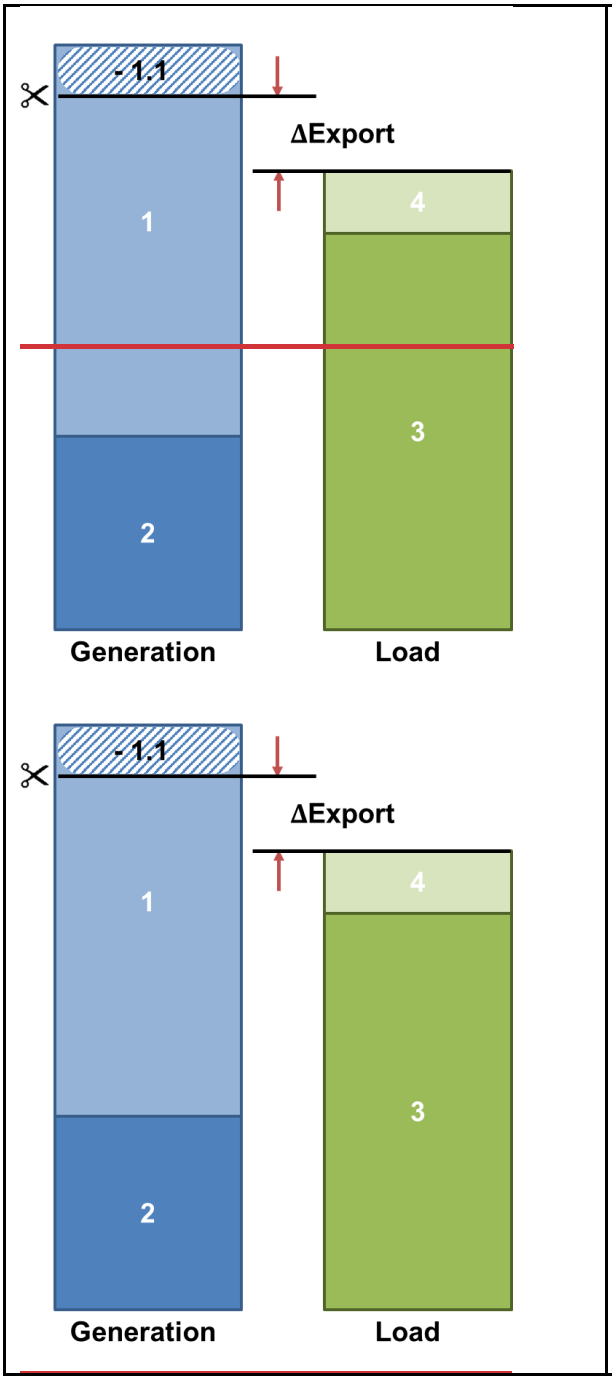
Where:

P_{CD}	Sum of operating generating capacities of centrally dispatched units as declared by generators[9]
$P_{CD_{min}}$	Sum of technical minima of centrally dispatched generating units in operation
P_{NCD}	Sum of schedules of generating units that are not centrally dispatched, as provided by generators (for wind farms: forecasted by PSE)
P_{NA}	Generation not available due to grid constraints (both planned outage and/or anticipated congestions)
P_{L}	Demand forecasted by PSE
P_{UPres}	Minimum reserve for upward regulation
$P_{DOWNres}$	Minimum reserve for downward regulation

For illustrative purposes, the process of practical determination of external constraints in the framework of the intraday capacity calculation is illustrated below in Figures 1 and 2. The figures illustrate how a forecast of the Polish power balance for each hour of the delivery day is developed by PSE in the morning of D-1 in order to determine reserves in generating capacities available for potential exports and imports, respectively, for the intraday market.

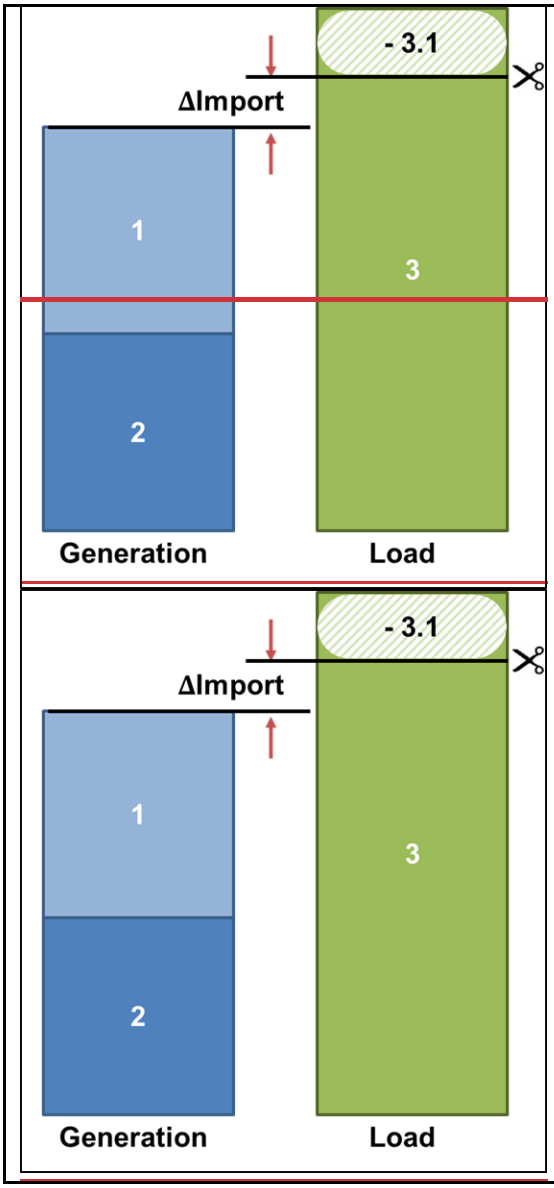
External constraint in export direction is applicable if ΔExport is lower than the sum of cross-zonal capacities on all Polish interconnections in export direction. External constraint in import direction is applicable if ΔImport is lower than the sum of cross-zonal capacities on all Polish interconnections in import direction.

[9] Note that generating units which are kept out of the market on the basis of strategic reserve contracts with the TSO are not taken into account in this calculation.



1. Sum of available generating capacities of centrally dispatched units as declared by generators, reduced by:
   1.1 Generation not available due to grid constraints
2. Sum of schedules of generating units that are not centrally dispatched, as provided by generators (for wind farms: forecasted by PSE)
3. Demand forecasted by PSE
4. Minimum necessary reserve for up regulation

Figure 1: Determination of external constraints in export direction (generating capacities available for potential exports) in the framework of the intraday capacity calculation.



1 Sum of technical minima of centrally dispatched generating units in operation

2 Sum of schedules of generating units that are not centrally dispatched, as provided by generators (for wind farms: forecasted by PSE)

3 Demand forecasted by PSE, reduced by:
3.1 Minimum necessary reserve for down regulation

Figure 2: Determination of external constraints in import direction (reserves in generating capacities available for potential imports) in the framework of intraday capacity calculation.

Frequency of re-assessment

External constraints are determined in a continuous process based on the most recent information, for each capacity allocation time frame, from forward till day-ahead and intra-day. In case of intraday process, these are calculated for each intraday capacity calculation timeframe in accordance with Article 4(2), resulting in independent values for each ID CC MTU, and separately for directions of import to Poland and export from Poland.

Time periods for which external constraints are applied

As described above, external constraints are determined in a continuous process for each capacity allocation timeframe, so they are applicable for all ID CC MTUs of the respective allocation day.

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Annex 2: ~~Requirements for calculation of intraday cross-zonal~~Calculated and allocated capacities ~~before full~~in relation to the implementation of IDAs and Core intraday capacity calculation (IDCCb))

Intraday cross-zonal capacities	before the implementation of IDA1 (15:00 of D-1)		after the implementation of IDA1 (15:00 of D-1)	
~~Intraday cross-zonal capacities~~	before the implementation of Core ~~DA~~ID CCM at 22:00 (IDCCb))	~~Between~~after the implementation of ~~Core DA CCM and implementation of~~ Core ID CCM at 22:00 (IDCCb))	~~Between the implementation of Core ID CCM at 22:00 and 6 months after~~before the implementation of Core ID CCM at 22:00	~~After 6 months~~ after the implementation of Core ID CCM at 22:00
Between ~~intraday cross-zonal gate opening time~~15:00 and 22:00 of D-1	Leftovers from the day-ahead cross-zonal capacities based on ~~existing~~Core DA ~~CC initiatives~~CCM according to the transitional solution pursuant to Article 26(~~6~~)5) and Annexes 3, 4 and 5 OR Zero intraday cross-zonal capacities pursuant to ~~Article 11~~(Annex 3(4)	Leftovers from the day-ahead cross-zonal capacities based on Core DA CCM ~~according to the transitional solution~~ pursuant to Article ~~26(6) and Annexes 3,~~ 4 ~~and 5~~(2)(a) OR Zero intraday cross-zonal capacities pursuant to ~~Annex 3~~Article 11(4)	Leftovers from ~~the day-ahead cross-zonal capacities based on Core DA CCM pursuant to Article 4(2)(a)~~ IDA1 ~~OR~~ ~~Zero intraday cross-zonal capacities pursuant to Article 11(3)~~IDA1	Leftovers from ~~the day-ahead cross-zonal capacities based on Core DA CCM pursuant to Article 4(2)(a)~~ IDA1
From 22:00 of D-1 onwards	Leftovers from the day-ahead cross-zonal capacities based on ~~existing~~Core DA ~~CC initiatives~~CCM according to the transitional solution pursuant to Article 26(~~6~~)	~~Leftovers from day-ahead~~Intraday cross-zonal capacities ~~based on~~from Core ~~DA~~ID CCM ~~according to the transitional solution~~at 22:00 pursuant to Article ~~26(6) and~~	~~Intraday cross-zonal capacities from Core ID CCM at 22:00 pursuant to Article 4(2)(b)~~ Leftovers from IDA1 & continuous trading process executed until 22h	Intraday cross-zonal capacities from Core ID CCM at 22:00 pursuant to Article 4(2)(b)

	5) and Annexes 3, 4 and 5	~~Annexes 3, 4 and 5~~4(2)(b)		

Annex 3: Update of intraday cross-zonal capacities remaining after the SDAC in the transition period

(1) The CCC shall use the final cross-zonal capacities resulting from day-ahead capacity calculation and the net positions resulting from already allocated capacities in the SDAC to calculate the updated day-ahead cross-zonal capacities to be used as intraday cross-zonal capacities at the intraday cross-zonal gate opening time.

(a) In the case that the LTA inclusion in day-ahead is ensured through the LTA margin approach, the intraday cross-zonal capacities are described as flow-based parameters;

(b) In the case that the LTA inclusion in day-ahead is ensured through the Extended LTA inclusion approach, the intraday cross-zonal capacities are described as a union of flow-based parameters and "LTA values" (LTA domain).

For the updated intraday flow-based parameters, the PTDF values shall be the final PTDFs resulting from the day-ahead capacity calculation, and the RAM shall be derived as:

$$\overrightarrow{RAM}_{UID} = \max\left(0, \overrightarrow{RAM}_f - \mathbf{PTDF_f}\,\overrightarrow{NP}_{AAC}\right)$$

Equation 3b

with

$\overrightarrow{RAM}_{UID}$	updated remaining available margin for intraday cross-zonal capacities
$\overrightarrow{RAM}_f$	final remaining available margin resulting from the day-ahead capacity calculation
$\mathbf{PTDF_f}$	final power transfer distribution factor matrix resulting from the day-ahead capacity calculation
$\overrightarrow{NP}_{AAC}$	net positions resulting from already allocated capacities in SDAC

The updated LTA values, applicable if the Extended LTA inclusion approach is applied in day-ahead, shall be derived as:

$$\overrightarrow{LTA}_{UID} = \max\left(0, \overrightarrow{LTA}_f - \overrightarrow{SEC}_{DA}\right)$$

Equation 3c

$\overrightarrow{LTA}_{UID}$	updated remaining available long-term capacities for provision to SIDC; value per oriented border
$\overrightarrow{LTA}_f$	LTA domain resulting from the day-ahead capacity calculation thus adjusted for long-term nominations; value per oriented border;
$\overrightarrow{SEC}_{DA}$	schedule exchange resulting from already allocated capacities in SDAC

(2) In case the LTA inclusion in day-ahead is ensured through:

(a) the LTA margin approach: for each CNEC, each TSO may decrease the RAM_f by decreasing $LTA_{margin,DA}$ as calculated pursuant to the day-ahead capacity calculation methodology while ~~ensuring compliance with Article 16 of Regulation (EU) 2019/943 in~~

~~order to avoid~~that there is no undue discrimination between internal and cross-zonal exchanges as referred to in Article 21(1)(b)(ii) of the CACM Regulation;

(b) the Extended LTA inclusion approach: each TSO may decrease the LTA_f on its borders while ensuring compliance with Article 16 of Regulation (EU) 2019/943.

Irrespective of the options provided to each TSO pursuant to (a) and (b), each TSO shall ensure that on each bidding zone border, the long-term capacities that are in effect taken into account pursuant to (a) and (b) are between 0.001 MW and 1500 MW.

(3) For each CNEC, each TSO may adjust the RAM_f by modifying the AMR_{DA} as calculated pursuant to the day-ahead capacity calculation methodology while ensuring compliance ~~with Article 16 of Regulation (EU) 2019/943 in order to avoid~~that there is no undue discrimination between internal and cross-zonal exchanges as referred to in Article 21(1)(b)(ii) of the CACM Regulation.

(4) ~~During~~Until the ~~transitional period pursuant to Article 26(6)~~implementation of intraday auctions at 15:00 market time of day D-1, the Core TSOs may set to zero the cross-zonal capacities calculated ~~in period before 22h at D-1. These intraday cross-zonal capacities may be set to zero on the condition that offering non-zero cross-zonal capacities~~ pursuant to Article 4(2)(a~~) could endanger operational security.~~). Such a decision may be made per bidding zone border by the competent TSOs.

Annex 4: Calculation of ATCs for SIDC fallback procedure in the transition period

1. In case the SIDC is unable to accommodate flow-based parameters or in case the leftovers from the day-ahead cross-zonal capacities based on Core DA CCM are used according to a transitional solution as defined in Annex 2 to this methodology, the CCC shall convert the cross-zonal capacities into available transmission capacities for each Core oriented bidding zone border and each DA CC MTU. The Core TSOs may delegate this responsibility to a third party.

2. The cross-zonal capacities shall serve as the basis for the determination of the ATCs for SIDC fallback procedure. As the selection of a set of ATCs from the cross-zonal capacities leads to an infinite set of choices, an applicable algorithm determines the ATCs for SIDC fallback procedure.

3. The following inputs are required to calculate ATCs for SIDC fallback procedure for each ID CC MTU:

   (a) the final flow-based parameters ($\mathbf{PTDF}_f$ and $\overrightarrow{RAM}_{UID}$) and $\overrightarrow{LTA}_{UID}$ as calculated pursuant to Annex 3 and, if applicable, $\overrightarrow{LTA}_{UID}$ calculated pursuant to Annex 3;

   (b) If defined, the global allocation constraints shall be assumed to constrain the Core net positions pursuant to Article 7(5), and shall be described following the methodology described in Article ~~18~~17(2). Such constraints shall be adjusted for offered cross-zonal capacities on the non-Core bidding zone borders.

4. In case the cross-zonal capacities are described solely by flow-based parameters, the calculation of the ATCs for SIDC fallback procedure is an iterative procedure, which gradually calculates ATCs for each DA CC MTU, while respecting the constraints of the final flow-based parameters pursuant to paragraph 3:

   (a) The initial ATCs are set equal to zero for each Core oriented bidding zone border, i.e.:

$$\overrightarrow{ATC}_{k=0} = 0$$

   with

$\overrightarrow{ATC}_{k=0}$	the initial ATCs before the first iteration

   (b) the remaining available margin of the final flow-based parameters ($\overrightarrow{RAM}_f$) have to be adjusted for the flows resulting from net positions or already allocated capacities resulting from the SIDC in accordance with Article 4(5)(b):

$$\overrightarrow{RAM}_{ATC}(0) = \max\left(0, \overrightarrow{RAM}_f - \mathbf{PTDF}_f \, \overrightarrow{NP}_{SIDC}\right)$$

Equation 14

   with

$\overrightarrow{RAM}_{ATC}(0)$	remaining available margin for ATC calculation at iteration k=0

$\overrightarrow{RAM_f}$	remaining available margin of the flow-based parameters pursuant to paragraph 3, or equal to $\overrightarrow{RAM_{UID}}$ from Annex 3, if applicable.
$\mathbf{PTDF_f}$	PTDF matrix of the final flow-based parameters
$\overrightarrow{NP_{SIDC}}$	Core net positions resulting from SIDC which are not already included in the CGM

(c) The iterative method applied to calculate the ATCs for SIDC fallback procedure consists of the following actions for each iteration step *k*:

i. for each CNEC and external constraint of the flow-based parameters pursuant to paragraph 3, calculate the remaining available margin based on ATCs at iteration *k*-1

$$\overrightarrow{RAM_{ATC}}(k) = \overrightarrow{RAM_{ATC}}(0) - \mathbf{pPTDF_{zone-to-zone}}\ \overrightarrow{ATC}_{k-1}$$

with

$\overrightarrow{RAM_{ATC}}(k)$	remaining available margin for ATC calculation at iteration *k*
$\overrightarrow{ATC}_{k-1}$	ATCs at iteration *k*-1
$\mathbf{pPTDF_{zone-to-zone}}$	positive zone-to-zone power transfer distribution factor matrix

ii. for each CNEC, share $RAM_{ATC}(k)$ with equal shares among the Core oriented bidding zone borders with strictly positive zone-to-zone power transfer distribution factors on this CNEC;

iii. from those shares of $RAM_{ATC}(k)$, the maximum additional bilateral oriented exchanges are calculated by dividing the share of each Core oriented bidding zone border by the respective positive zone-to-zone PTDF. The maximum additional bilateral oriented exchanges may be negative, i.e. it may lead to decrease the exchange capacity;

iv. for each Core oriented bidding zone border, $\overrightarrow{ATC}_k$ is calculated by adding to $\overrightarrow{ATC}_{k-1}$ the minimum of all maximum additional bilateral oriented exchanges for this border obtained over all CNECs and external constraints as calculated in the previous step;

v. go back to step i;

vi. iterate until the difference between the sum of ATCs of iterations *k* and *k*-1 is smaller than 1 kW;

vii. the resulting ATCs for SIDC fallback procedure stem from the ATC values determined in iteration *k*, after rounding down to integer values;

viii. at the end of the calculation, there are some CNECs and external constraints with no remaining available margin left. These are the limiting constraints for the calculation of ATCs for SIDC fallback procedure.

(d) positive zone-to-zone PTDF matrix (**pPTDF**$_{zone-to-zone}$) for each Core oriented bidding zone border shall be calculated from the ~~**PTDF$_{\mathcal{F}}$**~~**PTDF**$_{Core}$ as follows (for HVDC interconnectors integrated pursuant to Article 13, Equation 8 shall be used):

$$pPTDF_{zone-to-zone,A\rightarrow B} = \max\left(0, PTDF_{zone-to-slack,A} - PTDF_{zone-to-slack,B}\right)$$

Equation 15

with

$pPTDF_{zone-to-zone,A\rightarrow B}$	positive zone-to-zone $PTDFs$ for Core oriented bidding zone border A to B
$PTDF_{zone-to-slack,m}$	zone-to-slack $PTDF$ for Core bidding zone border m

5. In case the cross-zonal capacities are described as the union of flow-based parameters and an LTA domain, the calculation of the ATCs for SIDC fallback procedure is a mathematical optimisation process.

The following objective function is applied:

$$Maximize\ [\left(\sum \overrightarrow{ATC}_{phys} / N_{oriented\ borders}\right) * W_{sum} + \left(\text{Min}\ \overrightarrow{ATC}_{phys}\right) * (1 - W_{sum})]$$

with

ATC_{phys}	Sum of the ATCs resulting from flow based parameters and possible long-term capacities, e.g. : $(\overrightarrow{ATC}_{phys} = \overrightarrow{ATC}_{FB} + \overrightarrow{ATC}_{LTA})$
$N_{oriented\ borders}$	The number of oriented borders in Core CCR
W_{sum}	A common weighting factor applied on all Core borders to adopt between maximizing the sum of ATCs averaged across all borders and maximizing the lowest ATC across all borders; this value is a scalar between 0 and 1, initially set to 0.5.

(a) This objective function is subject to the following constraints:

$$\overrightarrow{ATC}_{phys} = \overrightarrow{ATC}_{FB} + \overrightarrow{ATC}_{LTA}$$

$$\overrightarrow{ATC}_{LTA} \leq (\alpha - 1) * \overrightarrow{LTA}_{UID}$$

$$\overrightarrow{ATC}_{FB} \leq \alpha * \frac{\overrightarrow{RAM}_{UID}}{pPTDF_{zone-to-zone}}$$

$$\overrightarrow{ATC}_{FB} \geq 0$$

$$\overrightarrow{ATC}_{LTA} \geq 0$$

with

α	A single optimization variable, between 0 and 1 used for all ATC borders
$\overrightarrow{LTA}_{UID}$	Updated remaining available long-term capacities for ATC extraction pursuant to Annex 3
$\overrightarrow{RAM}_{UID}$	Updated remaining available margin for ATC calculation provided by the FB Domain pursuant to Annex 3
$\mathbf{pPTDF}_{zone-to-zone}$	positive zone-to-zone power transfer distribution factor matrix

Annex 5: Other transitional arrangements

1. Each Core TSO shall have the right to perform individual validation of ID ATCs calculated and provided to Core TSOs pursuant to Annex 4~~.~~, by which these ATCs may be adjusted in case such adjustments are needed to maximise cross-zonal capacity and/or to maintain operational security. Pursuant to this validation, each Core TSO shall have the right to adjust ID ATCs on its bidding zone borders ~~in case such adjustments are needed to maximise cross-zonal capacity and/or to maintain operational security.~~. The maximum of ID ATC increase per bidding zone border shall be 300 MW.

2. The ID ATC on a biding zone border shall always be the lowest value of ID ATCs set by TSOs on both sides of this bidding zone border.

3. As soon as possible after the implementation of DA CCM and no later than from four months after the adoption of this Decision, each Core TSO requiring amendment of ID ATCs shall provide to all Core TSOs the justification for each ATC adjustment. This justification shall be based on the assessment of the day-ahead or intraday congestion forecast common grid models and shall include the concerned CNECs on which the need for decrease or increase of flow or capacity was identified to maximise cross-zonal capacity and/or maintain operational security.

4. After the implementation of DA CCM, the Core TSOs shall regularly publish the following information about the update of intraday cross-zonal capacities remaining after the SDAC in the transition period:

   (a) the percentage of LTA and AMR applied on the intraday level pursuant to Annex 3;

   (b) applied Wsum value pursuant to Annex 4; and

   (c) the flow-based domain and, if relevant, LTA domain used for ATC extraction pursuant to Annex 3, in particular the values: $\overrightarrow{RAM_f}$ (before and after possible adjustment), $\overrightarrow{NP_{AAC}} * \sout{\mathbf{PTDF_f}}\mathbf{PTDF_{Core}}$, $\overrightarrow{RAM_{UID}}$, $\overrightarrow{LTA_f}$ (before and after possible adjustment), $\overrightarrow{SEC_{DA}}$ and $\overrightarrow{LTA_{UID}}$; and

   (d) ID ATC adjustments pursuant to paragraph 1 including justifications as of deadline pursuant to paragraph 3;

In case the information pursuant to point (c) cannot be published at the time of implementation of DA CCM, it shall be published as soon as feasible and for all days since the implementation of DA CCM.

5. As from four months after the start of the transition period pursuant to Article 26(~~6~~5), the Core CCC shall assist the Core TSOs in the ATC validation, by providing at least the following information for each Core CNEC and for each MTU, based on the CGMs from the DACF procedure:

   (a) reference flows;

   (b) zone-to-zone PTDFs of Core oriented borders; and

   (c) potential maximal flows due to ID ATCs, superposed to the reference flows.

The CCC shall provide this information not later than 20:45 of D-1.

6. During the transition period pursuant to Article 26(~~6~~5), the Core TSOs ~~shall~~may apply and implement, without the need to amend the intraday capacity calculation methodology, further adjustments of the ATC extraction methodology pursuant to Annex 4 if it better meets the objectives of the CACM Regulation and is agreed among Core TSOs.

Annex 6: ATC based validation process

1. Each Core TSO has the right to perform an ATC based validation in order to ensure operational security. This is an additional process, next to the existing validation process described in Article 18 as IVA validation. Pursuant to this validation, each Core TSO can set a maximum ATC value for its own oriented border.
2. The ID ATC on a bidding zone border shall always be the lowest value of all ID ATCs set by all TSOs for this bidding zone border.

$$ATC_{A\rightarrow B\,validated} = \min\left(\overrightarrow{ATC}_{A\rightarrow B\,validated,TSO\,1}, \overrightarrow{ATC}_{A\rightarrow B\,validated,TSO\,2}, \overrightarrow{ATC}_{A\rightarrow B\,validated,TSO\,x}\right)$$

Equation 16

with

$ATC_{A\rightarrow B\,validated}$	Minimum of validated ATCs for border A→B by all Core TSOs adjacent to this border
$\overrightarrow{ATC}_{A\rightarrow B\,validated,TSO\,x}$	Validated ATC for border A→B by TSO x

3. The ATC limitation may be done only in the following situations:
   (a) an occurrence of an unexpected contingency impacting a CNE after the beginning of the related IDCC process;
   (b) as a fallback, in case IVA validation cannot be performed fully in time or if it faces IT issue; or
   (c) a mistake in input data that leads to an overestimation of cross-zonal capacity from an operational system security perspective.
4. In addition to the publication described in Article 22, Core TSOs and the CCC shall publish at least the following information and data items with regard to the ATC based validation for each IDCC MTU:
   (a) The TSO invoking the limitation;
   (b) The ATC limitation per border;
   (c) The situation applicable as per the previous paragraph; and
   (d) The detailed reason for the limitation of the ATC with the same level of information as IVA validation following the reasonings developed in Article 18(2), including the operational security limits (when relevant) that would have been violated without the reductions, and under which circumstances they would have been violated.
5. Every three months, the CCC, with the support of Core TSOs where relevant, shall provide in the quarterly report the data items given under paragraph 4(a), 4(b), 4(c) and 4(d), with regard to the ATC based validation for each IDCC MTU.

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ACER Decision on Core ID CCM: Annex I

(text rectified by corrigendum of 4 April 2024)

The second amendment to the intraday capacity calculation methodology of the Core capacity calculation region

in accordance with Article 20ff. of the Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management

14 March 2024

Whereas

TSOs of the Core CCR ("Core TSOs"), taking into account the following:

(1) Based on further developments and alignments with Core NRAs after the decision by the Agency in 21st February 2019, Core TSOs deemed it necessary to introduce the following changes.
(2) The following changes fulfil the objectives set out in Article 3 CACM.
(3) The amendments performed with respect to the integration of the ROSC aligned business process in Article 2 ensure operational security and an optimised calculation of cross-zonal capacity in accordance with Article 3(c) and Article 3(d) of CACM by establishing a consistent use of remedial actions between the CROSA and the IDCC process, which will ensure remedial actions applied in CROSA remain effective after providing intraday capacity to the intraday market. Including already coordinated remedial actions during the intraday capacity calculation process will lead to a more accurate representation of the grid and a grid model which is as much as possible congestion-free, thereby also ensuring optimal use of the transmission infrastructure in accordance with Article 3(b) CACM. These will also prevent that the impact of activated XRAs is diminished by additional intraday cross-zonal trade, which could be detrimental to ensuring operational security as set out by Article 3(c) CACM.;
(4) The amendments performed with respect to the avoidance of disproportionate negative ATCs on distant Core borders in Article 3 ensure a fair and non-discriminatory treatment of TSOs and market participants in accordance with Article 3(e) of CACM as high negative ATCs would basically block border directions for the intraday market although the benefit from grid security perspective would be very limited.

Amendments to Article 1

Article 1 'Subject matter and scope', shall be amended accordingly:

a) Paragraph 1 shall be replaced and be read accordingly:
"The intraday capacity calculation methodology is the Core TSOs' methodology in accordance with Article 20ff. of the CACM Regulation and covers the intraday capacity calculation methodology for the Core CCR bidding zone borders."

b) Paragraph 2 shall be included and be read accordingly:
"This methodology is without prejudice to the TSOs' rights and obligations under Commission Regulation (EU) 2017/1485 establishing a guideline on electricity transmission system operation, such as taking any remedial actions pursuant to this Regulation to maintain operational security and ensure that the system operates in a normal state. Accordingly, the management of cross-zonal capacities by the TSOs after their delivery to the allocation process is beyond the scope of this methodology."

Amendments to Article 2

Article 2. 'Definitions and interpretation', shall be amended accordingly:

a) Paragraph 1 shall be replaced and be read accordingly:

"For the purposes of the intraday capacity calculation methodology, terms used in this document shall have the meaning of the definitions included in Regulation (EU) 2019/943, Directive (EU) 2019/944, Commission Regulation (EU) 2015/1222, Commission Regulation (EU) 2016/1719, Commission Regulation (EU) 2017/2195, Commission Regulation (EU) 543/2013, the definitions set out in Article 2 Annex I of ACER Decision No 02/2019 on the Core CCR TSOs' proposal for the regional design of the day-ahead and intraday common capacity calculation methodologies and the definitions set out in Article 2 Annex I of ACER Decision No 33/2020 on the methodology for regional operational security coordination for the Core capacity calculation region ("Core ROSC methodology"). In addition, the following definitions, abbreviations and notations shall apply:

a. 'AAC_{ID}' is the already allocated capacity which has been allocated in SIDC;

b. '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;

c. 'AMR_{DA}' means the adjustment for the minimum remaining available margin in accordance with the day-ahead capacity calculation methodology of the Core CCR;

d. 'annual report' means the report issued on an annual basis by the CCC and the Core TSOs on the intraday capacity calculation;

e. '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;

f. 'CCC' means the coordinated capacity calculator, as defined in Article 2(11) of the CACM Regulation, of the Core CCR, unless stated otherwise;

g. 'CCR' means the capacity calculation region as defined in Article 2(3) of the CACM Regulation;

h. '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;

i. 'CGMM' means the common grid model methodology, pursuant to Article 17 of the CACM Regulation;

j. 'CNE' means a critical network element;

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

l. ‘Core DA CCM’ means the Core day-ahead capacity calculation methodology;

m. ‘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;

n. ‘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;

o. 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 Plc (HOPS d.d.) (“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”);

p. ‘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);

q. ‘curative remedial action’ means a remedial action which is only applied after a given contingency occurs;

r. ‘D-1’ means the day before electricity delivery;

s. ‘D-2’ means the day two-days before electricity delivery;

t. ‘DACF’ means day ahead congestion forecast;

u. ‘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;

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

w. '$F_{0,all}$' 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;

x. 'F_i' means the expected flow in commercial situation i;

y. 'flow-based domain' means a set of constraints that limit the cross-zonal capacity calculated with a flow-based approach;

z. '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;

aa. 'F_{max}' means the maximum admissible power flow;

bb. 'F_{ref}' means the reference flow;

cc. 'GSK' or 'GSK' means the generation shift key as defined in Article 2(12) of the CACM Regulation;

dd. 'HVDC' means a high voltage direct current network element;

ee. ''IDA' means intraday auction;

ff. '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;

gg. 'IGM' means the intraday individual grid model as defined in Article 2(1) of the CACM Regulation;

hh. 'internal CNEC' means a CNEC, which is not cross-zonal;

ii. 'I_{max}' means the maximum admissible current;

jj. 'IVA' means individual validation adjustment;

kk. $LTA_{margin,DA}$ means the adjustment of remaining available margin to incorporate long-term allocated capacities in accordance with the day-ahead capacity calculation methodology of the Core CCR;

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

mm. '$NP_{AAC,DA}$' means net position resulting from already allocated capacities in SDAC;

nn. $NP_{AAC,ID}$' means net position resulting from already allocated capacities in SIDC;

oo. ‘oriented bidding zone border’ means a given direction of a bidding zone border (e.g. from Germany to France);

pp. ‘pre-solved domain’ means the final set of binding constraints for capacity allocation after the pre-solving process;

qq. ‘pre-solving process’ means the identification and removal of redundant constraints from the flow-based domain;

rr. ‘preventive remedial action’ means a remedial action which is applied on the network before any contingency occurs;

ss. ‘PST’ means a phase-shifting transformer;

tt. ‘PTDF’ or ‘$PTDF$’ means a power transfer distribution factor;

uu. ‘$\mathbf{PTDF}_{Core}$’ means a matrix of power transfer distribution factors resulting from the intraday flow-based calculation for Core bidding zones;

vv. ‘$\mathbf{PTDF}_{all}$’ means a matrix of power transfer distribution factors resulting from the intraday flow-based calculation for all bidding zones of Continental Europe, and connection points of the bidding zones of Continental Europe with the bidding zones of other synchronous areas;

ww. ‘$\mathbf{PTDF}_{f,DA}$’ means a matrix of power transfer distribution factors describing the final day-ahead flow-based domain;”

xx. ‘quarterly report’ means a report on the intraday capacity calculation issued by the CCC and the Core TSOs on a quarterly basis;

yy. ‘RA’ means a remedial action as defined in Article 2(13) of the CACM Regulation;

zz. ‘RAM’ or ‘RAM’ means a remaining available margin;

aaa. ‘RCC’ means Regional Coordination Centre;

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

ccc. ‘SDAC’ means the single day-ahead coupling;

ddd. ‘SIDC’ means the single intraday coupling;

eee. ‘shadow price’ means the dual price of a CNEC or allocation constraint representing the increase in the economic surplus if a constraint is increased by one MW;

fff. ‘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;

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

hhh. ‘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;

iii. ‘static grid model’ means a list of relevant grid elements of the transmission system, including their electrical parameters;

jjj. ‘U’ is the reference voltage;

kkk. ‘UAF’ is an unscheduled allocated flow;

lll. ‘vertical load’ means the total amount of electricity which exits the transmission system of a given bidding zone to connected distribution systems, end consumers connected to the transmission system, and to electricity producers for consumption in the generation of electricity;

mmm. ‘zone-to-slack *PTDF*’ means the PTDF of a commercial exchange between a bidding zone and the slack node;

nnn. ‘zone-to-zone *PTDF*’ means the PTDF of a commercial exchange between two bidding zones;

ooo. the notation x denotes a scalar;

ppp. the notation $\vec{x}$ denotes a vector;

qqq. the notation $\mathbf{x}$ denotes a matrix;

rrr. ‘LTA domain’ means a set of bilateral exchange restrictions covering the previously allocated cross-zonal capacities;

sss. ‘Extended LTA inclusion approach’ is an LTA inclusion approach in the Core DA CCM. When this approach is applied in the day ahead capacity calculation, the day ahead cross-zonal capacities consist of a flow-based domain (containing flow-based parameters) without LTA inclusion and a separate LTA domain (including LTA values);

ttt. ‘SEC_{DA}’ means scheduled exchange resulting from already allocated capacities in the single day ahead coupling (SDAC). The parameter is provided by the SDAC based on the all TSO methodology for calculating scheduled exchanges resulting from single day-ahead coupling according to Article 43 of CACM Regulation;

uuu. ‘XNEC’ means cross-border relevant network element with contingency, as defined in the Core ROSC methodology.”

b) Paragraph 2. (a) shall be read accordingly:
“the singular also includes the plural and vice versa;”

c) Paragraph 2. (e) shall be read accordingly:

"any reference to legislation, regulation, directive, decision, order, instrument, code, or any other enactment shall include any modification, extension or re-enactment of it when in force."

Amendments to Article 4

Article 4 'Intraday capacity calculation process', shall be replaced and be read accordingly:

"

1. For the intraday market time frame, the cross-zonal capacities shall be calculated using the flow-based approach as defined in this methodology.

2. The intraday cross-zonal capacity calculation shall be performed in the following sequence, by the times established in the process description document as referred to in paragraph 7:

   (a) IDCC(a): updating of cross-zonal capacities remaining after the SDAC for all ID CC MTUs between 00:00 and 24:00 of day D and providing them as intraday cross-zonal capacities to relevant NEMOs no later than 15 minutes before the intraday cross-zonal gate opening time, at 15:00 market time of day D-1;

   (b) IDCC(b): calculation of intraday cross-zonal capacities for all ID CC MTUs between 00:00 and 24:00 of day D. The cross-zonal capacities resulting from this calculation shall be published and submitted to NEMOs no later than 15 minutes before the target start of allocation at 22:00 market time of day D-1;

   (c) IDCC(c): re-calculation of intraday cross-zonal capacities for all ID CC MTUs between 06:00 and 24:00 of day D. The cross-zonal capacities resulting from this calculation shall be published and submitted to NEMOs no later than 15 minutes before the target start of allocation at 04:00 market time of day D;

   (d) IDCC(d): re-calculation of intraday cross-zonal capacities for all ID CC MTUs between 12:00 and 24:00 of day D. The cross-zonal capacities resulting from this re-calculation shall be published and submitted to NEMOs no later than 15 minutes before the target start of allocation at 10:00 market time of day D; and

   (e) IDCC(e): re-calculation of intraday cross-zonal capacities for all ID CC MTUs between 18:00 and 24:00 of day D. The cross-zonal capacities resulting from this re-calculation shall be published and submitted to NEMOs no later than 15 minutes before the target start of allocation at 16:00 market time of day D.

The reference to ID CC MTUs in the remainder of this methodology shall mean the MTUs as established in this paragraph.

3. Each calculation or re-calculation of cross-zonal capacities pursuant to paragraphs 2(b) to (2)(e), shall consist of three main stages:

   (a) the creation of capacity calculation inputs by the Core TSOs;

   (b) the capacity calculation process by the CCC; and

   (c) the capacity validation by the Core TSOs in coordination with the CCC. Capacity validation may also be applied for the update of capacities pursuant to paragraph 2(a).

4. Each Core TSO shall provide the CCC the following capacity calculation inputs by the times established in the process description document:

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

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

   (c) external 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.

5. In addition to the capacity calculation inputs pursuant to paragraph 3, the Core TSOs, or an entity delegated by the Core TSOs, shall send to the CCC, for each ID CC MTU of the delivery day, the following additional inputs by the times established in the process description document:

   (a) the Core net positions or, alternatively, the already allocated capacities on the Core bidding zone borders resulting from the SDAC;

   (b) the Core net positions or, alternatively, the already allocated capacities on the Core bidding zone borders resulting from the SIDC which are already included in the CGM;

   (c) the Core net positions or, alternatively, the already allocated capacities on the Core bidding zone borders resulting from the SIDC not already included in the CGM.

If the Core TSOs provided to the CCC the already allocated capacities on the Core biding zone borders instead of the Core net positions, the CCC shall convert them into Core net positions.

6. When providing the capacity calculation inputs pursuant to paragraphs 4 and 5, the Core TSOs shall respect the formats commonly agreed between the Core TSOs and the CCC while fulfilling the requirements and guidance defined in the CGMM.

7. No later than six months before the implementation of this methodology in accordance with Article 26(3)(b), the Core TSOs shall jointly establish a process

description document as referred to in paragraphs 2, 4 and 5 and publish it on the online communication platform as referred to in Article 22. This document shall reflect an up-to-date detailed process description of all capacity calculation steps including the timeline of each step of the intraday capacity calculation.

8. The Core RCCs, acting as the CCC shall use the latest available CGMs, proposed and coordinated XRAs from the day ahead and intraday CROSAs, in accordance with the CSAM. During the interim period until ROSC CROSA process is implemented in accordance with Article 37 of Core ROSC methodology, only the latest available CGM shall be delivered.

9. In case the necessary outputs of the ROSC ICS/CROSA process cannot be provided within the foreseen timeframe, the delivery of the CGMs and XRAs pursuant to paragraph 8, and subsequent intraday capacity calculation and delivery of intraday capacities may be delayed only up to a point in time at which the target start of allocation pursuant to paragraphs 2(b), 2(c), 2(d) and 2(e) is not yet affected. If the target start of allocation becomes affected by such a delay, the fallback procedure pursuant to Article 19 applies.

10. The intraday capacity calculation process and validation in the Core CCR shall be performed by the CCC and the Core TSOs according to the following procedure:

Step 1. The CCC shall define the initial list of CNECs pursuant to Article 15;

Step 2. The CCC shall calculate the first flow-based parameters ($PTDF_{init}$ and $F_{ref,init}$) for each initial CNEC pursuant to Article 15;

Step 3. The CCC shall determine the final list of CNECs for subsequent steps of the capacity calculation pursuant to Article 16;

Step 4. The CCC shall calculate the RAM before validation (RAM_{bv}) based on the results of the previous processes pursuant to Article 17;

Step 5. The Core TSOs shall, according to Article 18, validate the RAM_{bv} with individual validation, and decrease RAM when operational security is jeopardised, which results in the final RAM_f;

Step 6. The CCC shall, according to Article 18, remove the redundant CNECs and redundant external constraints from final $PTDF_f$ and RAM_f;

Step 7. The CCC shall publish the $PTDF_f$ and RAM_f values in accordance with Article 22 and provide them to NEMOs for capacity allocation in accordance with paragraph 2.

11. All capacity updates, calculations and re-calculations pursuant to paragraph 2, including all steps pursuant to paragraph 3, shall be performed per ID CC MTU. Cross-zonal capacities shall be provided to the NEMOs for each ID CC MTU, but for capacity allocation they may be converted into a higher time resolution in accordance with the market time unit applicable on specific bidding zone border(s).”

Amendments to Article 5

Article 5 'Definition of critical network elements and contingencies', shall be replaced and be read accordingly:

“

1. Each Core TSO shall define a list of CNEs, which are fully or partly located in its own control area, and which can be overhead lines, underground cables, or transformers. All cross-zonal network elements shall be defined as CNEs, whereas only those internal network elements, which are defined pursuant to paragraph 6 or 7 shall be defined as CNEs. Until 30 days after the approval of the proposal pursuant to paragraph 6, all internal network elements may be defined as CNEs.

2. Each Core TSO shall define a list of proposed contingencies used in operational security analysis in accordance with Article 33 of the SO Regulation, limited to their relevance for the set of CNEs as defined in paragraph 1 and pursuant to Article 23(2) of the CACM Regulation. The contingencies of a Core TSO shall be located within the observability area of that Core TSO. This list shall be updated at least on a yearly basis and in case of topology changes in the grid of the Core TSO, pursuant to Article 21. A contingency can be an unplanned outage of:

   (a) a line, a cable, or a transformer;

   (b) a busbar;

   (c) a generating unit;

   (d) a load; or

   (e) a set of the aforementioned elements.

3. Each Core TSO shall establish a list of CNECs by associating the contingencies established pursuant to paragraph 2 with the CNEs established pursuant to paragraph 1 following the rules established in accordance with Article 75 of the SO Regulation. Until such rules are established and enter into force, the association of contingencies to CNEs shall be based on each TSO's operational experience. An individual CNEC may also be established without a contingency.

4. Each Core TSO shall provide to the CCC a list of CNECs established pursuant to paragraph 3.

5. No later than eighteen months after the implementation of this methodology in accordance with Article 26(2)(b), all Core TSOs shall jointly develop a list of internal network elements (combined with the relevant contingencies) to be defined as CNECs and submit it by the same deadline to all Core regulatory authorities as a proposal for amendment of this methodology in accordance with Article 9(13) of the CACM Regulation. After its approval in accordance with Article 9 of the CACM Regulation, the list of internal CNECs shall form an annex to this methodology.

6. The list pursuant to the previous paragraph shall be updated at least every two years. For this purpose, no later than eighteen months after the approval by all Core regulatory authorities of the proposal for amendment of this methodology pursuant to previous paragraph and this paragraph, all Core TSOs shall jointly develop a new proposal for the list of internal CNECs and submit it by the same deadline to all Core regulatory authorities as a proposal for amendment of this methodology in accordance with Article 9(13) of the CACM Regulation. After its

approval in accordance with Article 9 of the CACM Regulation, the list of internal CNECs shall replace the relevant annex to this methodology.

7. The proposed list of internal CNECs pursuant to paragraph 5 and 6 shall not include any internal network element with contingency with a maximum zone-to-zone PTDF below 5%, calculated as the time-average over the last twelve months. An exception is applied for CNECs that are considered in accordance with Article 16(2) to (4).

8. The proposal pursuant to paragraphs 5 and 6 shall include at least the following:

   (a) a list of proposed internal CNECs with the associated maximum zone-to-zone PTDFs referred to in paragraph 7;

   (b) an impact assessment of increasing the threshold of the maximum zone-to-zone PTDF for exclusion of internal CNECs referred to in paragraph 7 to 10% or higher; and

   (c) for each proposed internal CNEC, an analysis demonstrating that including the concerned internal network element in capacity calculation is economically the most efficient solution to address the congestions on the concerned internal network element, considering, for example, the following alternatives:

      i. application of remedial actions;

      ii. reconfiguration of bidding zones;

      iii. investments in network infrastructure combined with one or the two above; or

      iv. a combination of the above.

   Before performing the analysis pursuant to point (c), the Core TSOs shall jointly coordinate and consult with all Core regulatory authorities on the methodology, assumptions and criteria for this analysis.

9. The proposals pursuant to paragraphs 5 and 6 shall also demonstrate that the concerned Core TSOs have diligently explored the alternatives referred to in paragraph 8 sufficiently in advance taking into account their required implementation time, such that they could be applied or implemented by the time that the decisions of the Core regulatory authorities on the proposal pursuant to paragraphs 5 and 6 are taken.

The Core TSOs shall regularly review and update the application of the methodology for determining CNECs as defined in Article 21."

Amendments to Article 6

Article 6 'Methodology for operational security limits', shall be amended accordingly:

a) Paragraph 2. (f) shall be replaced and be read accordingly:

"the CCC shall, by default, set the power factor $\cos(\varphi)$ to 1 based on the assumption that the CNE is loaded only by active power and that the share reactive power is negligible (i.e. $\varphi = 0$). If the share of reactive power is not negligible, a TSO may consider this aspect during the validation phase in accordance with Article 18."

b) Paragraph 4. shall be replaced and be read accordingly:
"TSOs shall regularly review and update operational security limits in accordance with Article 21."

Amendments to Article 7

Article 7 'Methodology for allocation constraints', shall be replaced and be read accordingly:

"

1. In case operational security limits cannot be transformed efficiently into I_{max} and F_{max} pursuant to Article 6, the Core TSOs may transform them into allocation constraints. For this purpose, the Core TSOs may only use external constraints as a specific type of allocation constraint that limits the maximum import and/or export of a given Core bidding zone within the SIDC.

2. The Core TSOs may apply external constraints as one of the following two options:

   (a) a constraint on the Core net position (the sum of cross-zonal exchanges within the Core CCR for a certain bidding zone in the SIDC), thus limiting the net position of the respective bidding zone with regards to its imports and/or exports to other bidding zones in the Core CCR. This option shall be applied until option (b) can be applied.

   (b) a constraint on the global net position (the sum of all cross-zonal exchanges for a certain bidding zone in the SIDC), thus limiting the net position of the respective bidding zone with regards to all CCRs, which are part of the SIDC. This option shall be applied when: (i) such a constraint is approved within all intraday capacity calculation methodologies of the respective CCRs, (ii) the respective solution is implemented within the SIDC algorithm and (iii) the respective bidding zone borders are participating in SIDC.

3. External constraints may be used by PSE during a transition period of two years following the implementation of this methodology in accordance with Article 26(2)(b) and in accordance with the reasons and the methodology for the calculation of external constraints as specified in Annex 1 to this methodology. During this transition period, PSE shall:

   (a) calculate the value of external constraints on a daily basis for each ID CC MTU;

(b) if applicable and in case the external constraint had a non-zero shadow price in more than 0.1% of hours in a quarter, provide to the CCC a report analysing: (i) for each DA CC MTU when the external constraint had a non-zero shadow price the loss in economic surplus due to external constraint and the effectiveness of the allocation constraint in preventing the violation of the underlying operational security limits and (ii) alternative solutions to address the underlying operational security limits. The CCC shall include this report as an annex in the quarterly report as defined in Article 24(5);

(c) if applicable and when more efficient, implement alternative solutions referred to in point (b).

4. In case that PSE could not find and implement alternative solutions referred to in the previous paragraph, it may, by eighteen months after the implementation of this methodology in accordance with Article 26(2)(b), together with all other Core TSOs, submit to all Core regulatory authorities a proposal for amendment of this methodology in accordance with Article 9(13) of CACM Regulation. Such a proposal shall include the following:

(a) the technical and legal justification for the need to continue using the external constraints indicating the underlying operational security limits and why they cannot be transformed efficiently into I_{max} and F_{max};

(b) the methodology to calculate the value of external constraints including the frequency of recalculation.

In case such a proposal has been submitted by all Core TSOs, the transition period referred to in paragraph 3 shall be extended until the decision on the proposal is taken by all Core regulatory authorities.

5. For the SIDC fallback procedure, pursuant to Article 20, all external constraints, shall be modelled as constraints limiting the Core net position as referred to in paragraph 2(a).

6. PSE may discontinue the use of an external constraint. In such a case, PSE shall communicate this change to all Core regulatory authorities and to the market participants at least one month before discontinuation.

7. The Core TSOs shall review and update allocation constraints in accordance with Article 21."

Amendments to Article 8

Article 8 'Reliability margin methodology', shall be amended accordingly:

a) Paragraph 7 shall be replaced and be read accordingly:

"No later than eighteen months after the implementation of this methodology in accordance with Article 26(2)(b), the Core TSOs shall jointly perform the first FRM calculation pursuant to the methodology described above and based on the data covering at least the first year of operation of

this methodology. By the same deadline, all Core TSOs shall submit to all Core regulatory authorities a proposal for amendment of this methodology in accordance with Article 9(13) of the CACM Regulation as well as the supporting document as referred to in paragraph 9 below."

b) Paragraph 10 shall be replaced and be read accordingly:

"Until the proposal for amendment of this methodology pursuant to paragraph 7 is approved, the Core TSOs shall use the following FRM values:

(c) if and as long as all Core TSOs apply FRM for the day-ahead capacity calculation equal to 10% of Fmax, the FRM value for intraday capacity calculation for each CNEC shall be min {5% of Fmax, FRM at day-ahead level};

(d) as soon as the Core TSOs start applying the FRM calculation for the day-ahead capacity calculation pursuant to Article 8 of Core DA CCM, the FRM value for intraday capacity calculation shall be equal or lower than the FRM value at the day ahead level."

Amendments to Article 9

Article 9 'Generation shift key methodology', shall be amended accordingly:

a) Paragraph 4 shall be replaced and be read accordingly:

"The GSKs shall be updated and reviewed on a daily basis or whenever the expectations referred to in paragraph 3 change. The Core TSOs shall review and update the application of the generation shift key methodology in accordance with Article 21."

b) The first sentence of Paragraph 6 shall be replaced and be read accordingly:

"Within eighteen months after the implementation of this methodology in accordance with Article 26(2)(b), all Core TSOs shall develop a proposal for further harmonisation of the generation shift key methodology and submit it by the same deadline to all Core regulatory authorities as a proposal for amendment of this methodology in accordance with Article 9(13) of the CACM Regulation."

Amendments to Article 10

Article 10 'Methodology for remedial actions in intraday capacity calculation', shall be replaced and be read ccordingly:

"

1. In accordance with Article 25(1) of the CACM Regulation and Article 20(2) of the SO Regulation, the Core TSOs shall individually define the RAs to be taken into account in the intraday capacity calculation.

2. In case a RA made available for the intraday capacity calculation in the Core CCR is also made available in another CCR, the TSO having control on this RA shall take care, when defining it, of a consistent use in its potential application in both CCRs to ensure operational security.

3. In accordance with Article 25(2) and (3) of the CACM Regulation, these RAs will be used for the coordinated calculation of cross-zonal capacities while ensuring operational security in real-time.

4. RAs used for intraday capacity calculation shall be aligned as much as technically feasible with the most recent ROSC CROSA. The latest version of coordinated RAs available at the time of starting step 2 according to Article 4(9) shall be used. Such RAs will be only available once ROSC CROSA is implemented in accordance with Article 37 of Core ROSC methodology.

5. In accordance with Article 25(4) of the CACM Regulation, a TSO may withhold only those RAs, which are needed to ensure operational security in real-time operation and for which no other (costly) RAs are available, or those offered to the intraday capacity calculation in other CCRs in which the concerned TSO also participates. The CCC shall monitor and report in the annual report on systematic withholdings, which were not essential to ensure operational security in real-time operation.

6. The intraday capacity calculation may only take into account those non-costly RAs which can be modelled. These non-costly RAs can be, but are not limited to:

   (a) changing the tap position of a phase-shifting transformer (PST); and

   (b) a topological action: opening or closing of one or more line(s), cable(s), transformer(s), bus bar coupler(s), or switching of one or more network element(s) from one bus bar to another.

7. In accordance with Article 25(6) of the CACM Regulation, all RAs taken into account for day-ahead capacity calculation are also considered during the intraday timeframe, depending on their technical availability.

8. The RAs can be preventive or curative, i.e. affecting all CNECs or only pre-defined contingency cases, respectively.

TSOs shall review and update the RAs taken into account in the intraday capacity calculation in accordance with Article 21."

Amendments to Article 11

Article 11 'Update of intraday cross-zonal capacities remaining after the SDAC', shall be amended accordingly:

a) Paragraphs 2 to 4 shall be replaced and be read accordingly:

“

2. For each CNEC, each TSO may decrease the $RAM_{f,DA}$ by decreasing the AMR_{DA} and $LTA_{margin,DA}$ as calculated pursuant to the day-ahead capacity calculation methodology while ensuring that there is no undue discrimination between internal and cross-zonal exchanges in line with Article 21(1)(b)(ii) of the CACM Regulation.

3. Irrespective of the options provided to each TSO pursuant to this paragraph, each TSO shall ensure that on each bidding zone border, the long-term capacities that are in effect taken into account in the $LTA_{margin,DA}$, are between 0.001 MW and 1500 MW.

4. Until the implementation of intraday auctions at 15:00 market time of day D-1, the Core TSOs may set to zero the cross-zonal capacities calculated pursuant to Article 4(2)(a), including those calculated pursuant to a transitional solution for updating the cross-zonal capacities remaining after the day-ahead capacity allocation pursuant to Article 26(5).

   (a) In case the final cross-zonal capacities, calculated in accordance with this Article and taking into account Article 20(1), are in the form of ATCs, such a decision may be made per bidding zone border by the competent TSOs;

   (b) In case the final cross-zonal capacities, calculated in accordance with this Article and taking into account Article 20(1) are in the form of flow-based parameters, such a decision shall be coordinated among all Core TSOs. Further details on the application of transitional solution are defined in Annex 2 to this methodology.”

Amendments to Article 14

Article 14 'Consideration of non-Core bidding zone borders', shall be amended accordingly:

a) The first sentence of Paragraph 4 shall be replaced and be read accordingly:
   “No later than twelve months after the implementation of this methodology in accordance with Article 26(2)(b), the Core TSOs shall jointly develop a proposal for the implementation of the AHC and submit it by the same deadline to all Core regulatory authorities as a proposal for amendment of this methodology in accordance with Article 9(13) of the CACM Regulation.”

Amendments to Article 15

Article 15 'Initial flow-based calculation', shall be replaced and be read accordingly:

“

1. As a first step in the intraday capacity calculation process, the CCC shall merge the individual lists of CNECs provided by all Core TSOs in accordance with Article 5(4) into a single list, which shall constitute the initial list of CNECs.

2. Subsequently, the CCC shall use the initial list of CNECs pursuant to paragraph 1, the CGM pursuant to Article 4(7) and the GSK for each bidding zone in accordance with Article 9 to calculate the initial flow-based parameters for each ID CC MTU.

3. The initial flow-based parameters shall be calculated pursuant to Article 12 and shall consist of the **PTDF** values and $\vec{F}_{ref}$ values for each initial CNEC.”

Amendments to Article 16

Article 16 'Definition of final list of CNECs for intraday capacity calculation', shall be amended accordingly:

a) Paragraph 1 shall be replaced and be read accordingly:
“The CCC shall use the initial list of CNECs determined pursuant to Article 15 and remove those CNECs, for which the maximum zone-to-zone $PTDF_{init}$ is below 5%. The remaining CNECs shall constitute the final list of CNECs.”

b) Paragraph 2 shall be included and be read accordingly:
“If all available costly and non-costly RAs are not sufficient to ensure operational security on an internal network element with a specific contingency, which is not defined as a CNEC, the concerned Core TSO may exceptionally add such element to the final list of CNECs, provided that:

(a) Its maximum zone-to-zone PTDF is equal or above the threshold of 5% referred to in paragraph (1);

(b) Its voltage level must be 110 kV or above;

(c) Its RAM shall be the highest RAM ensuring operational security considering all available costly and non-costly RAs, with the floor of zero.”

c) Paragraph 3 shall be included and be read accordingly:
“In the first twelve months following the implementation of the ROSC methodology in accordance with Article 76(1) of the SO Regulation, the concerned Core TSO may also add an XNEC to the final list of CNECs, with no PTDF threshold, provided that:

(a) It was loaded 100% or more before the latest CROSA and for which cross-border redispatch or countertrading were applied during that CROSA;

(b) Its RAM shall be at least the difference between its Fmax and its loading after the CROSA.

After twelve months following the implementation of the ROSC methodology, the PTDF threshold of 5% shall apply to the XNEC to CNEC conversion, unless the amendment pursuant to paragraph (4) is approved and implemented."

d) Paragraph 4 shall be included and be read accordingly:
"The Core TSOs shall study the effects and needs for the XNEC to CNEC and may propose an amendment to this methodology, which shall at least include:

(a) the proposed PTDF threshold for XNEC to CNEC conversion;

(b) rules for avoiding undue discrimination between internal and cross zonal exchanges for such XNECs, which shall include limitations of such exchanges in proportion to the burdening effect of their consequential flows (internal flows and allocated flows, respectively)."

Amendments to Article 17

Article 17 'Non-costly remedial actions optimisation' shall be deleted, and the new Article 17 would be 'Calculation of flow-based parameters before validation', which shall be read accordingly:

"

1. The flows assumed to result from commercial exchanges outside the Core CCR (F_{uaf}) shall be calculated in the following steps. First, the flows on CNECs in situations without commercial exchanges are calculated by setting the corresponding net positions $\overrightarrow{NP_i}$ to zero:

   (a) The flows without Core exchanges are calculated as:

$$\vec{F}_{0,Core} = \vec{F}_{ref} - \vec{F}_{ref,Core}$$

Equation 8a

$$\vec{F}_{ref,Core} = \mathbf{PTDF_{Core}}\ \overrightarrow{NP}_{ref,Core}$$

Equation 8b

   (b) The flows without exchanges in the whole Continental Europe and on its links towards other synchronous areas, are calculated as:

$$\vec{F}_{0,all} = \vec{F}_{ref} - \mathbf{PTDF_{all}}\ \overrightarrow{NP}_{ref,all}$$

Equation 8c

For this calculation, the CCC shall use the GSKs provided by the concerned TSOs, and when these are not available, the CCC shall use a GSK where all nodes with positive injections participate in shifting in proportion to their injection.

(c) The flow assumed to result from commercial exchanges outside the Core CCR (F_{uaf}) is then calculated for each CNEC as follows:

$$\vec{F}_{uaf} = \vec{F}_{0,Core} - \vec{F}_{0,all}$$

Equation 8d

with

$\vec{F}_{0,Core}$	flow per CNEC in a situation without commercial exchanges within the Core CCR
$\vec{F}_{ref}$	flow per CNEC in the CGM (which already contains the flows originated by SDAC process, and partially from the SIDC process)
$\vec{F}_{ref,Core}$	flow originated from the Core net positions which are already included in the CGM
$\mathbf{PTDF_{Core}}$	power transfer distribution factor matrix for all bidding zones of the Core CCR
$\mathbf{PTDF_{all}}$	power transfer distribution factor matrix for all bidding zones of Continental Europe, and connection points of the bidding zones of Continental Europe with the bidding zones of other synchronous areas
$\overrightarrow{NP}_{ref,Core}$	Core net position per bidding zone included in the CGM (resulting from SDAC and the SIDC exchanges already included in the CGM), excluding the net positions' changes resulting from the application of remedial actions in the previous CROSA process
$\overrightarrow{NP}_{ref,all}$	total net positions included in the CGM, of: all bidding zones of Continental Europe, and connection points of the bidding zones of Continental Europe with the bidding zones of other synchronous areas
$\vec{F}_{0,all}$	flow per CNEC in a situation without any commercial exchange between bidding zones within Continental Europe and any commercial exchange between the bidding zones of Continental Europe and the bidding zones of other synchronous areas
$\vec{F}_{uaf}$	unscheduled allocated flow, i.e. the flow per CNEC resulting from commercial exchanges outside Core CCR

2. Based on the initial flow-based domain and on the final list of CNECs, the Core CCC shall calculate for each CNEC the RAM before validation, according to the equation:

$$\overrightarrow{RAM}_{bv} = \vec{F}_{max} - \overrightarrow{FRM} - \vec{F}_{ref}$$

Equation 12

$\vec{F}_{max}$ Maximum active power flow pursuant to Article 6

$\overrightarrow{FRM}$ Flow reliability margin pursuant to Article 8

$\overrightarrow{RAM}_{bv}$ Remaining available margin before validation

2. In case an external constraint restricts the Core net positions pursuant to Article 7(2)(a), it shall be added as an additional row to the $\mathbf{PTDF}_f$ matrix and the $\overrightarrow{RAM}_{bv}$ vector as follows:

   (a) the $PTDF$ value in the column related to the bidding zone applying the concerned external constraint is set to 1 for an export limit and -1 for an import limit, respectively;

   (b) the $PTDF$ values in the columns related to all other bidding zones are set to zero; and

   (c) the RAM value is set to the amount of the external constraint, corrected for the net position included in the CGM."

Amendments to Article 18

The previous Article 19 'Validation of flow-based parameters' shall become Article 18, and shall be read accordingly:

"

1. The Core TSOs shall validate and have the right to correct cross-zonal capacity for reasons of operational security during the validation process.

2. Each Core TSO shall validate and have the right to decrease the RAM for reasons of operational security during the individual validation. The adjustment due to individual validation is called 'individual validation adjustment' (IVA) and it shall have a positive value, i.e. it may only reduce the RAM. IVA may reduce the RAM only to the minimum degree that is needed to ensure operational security, and only after all the expected available costly and non-costly remedial actions pursuant to Article 22 of the SO Regulation are considered. In case certain remedial actions are not implemented, such as countertrading, Core TSOs shall ensure their implementation within twelve months following the application of IDCC(b) pursuant to Article 4(2)(b).

3. The individual validation adjustment may be done in the following situations:

   (a) an occurrence of an exceptional contingency or forced outage as defined in Article 3(39) and Article 3(77) of the SO Regulation;

   (b) when all available costly and non-costly RAs are not sufficient to ensure operational security;

   (c) a mistake in input data, that leads to an overestimation of cross-zonal capacity from an operational security perspective; and/or

   (d) a potential need to cover reactive power flows on certain CNECs.

4. When performing the validation, the Core TSOs shall consider the operational security limits pursuant to Article 6(1). While considering such limits, they may consider additional grid models, and other relevant information. Therefore, the Core TSOs shall use the tools developed by the CCC for analysis, but may also employ verification tools not available to the CCC.

5. In case of a required reduction due to situations as defined in paragraph 3(a), a TSO may use a positive value for IVA for its own CNECs or adapt the external constraints, pursuant to Article 7, to reduce the cross-zonal capacity for its bidding zone.

6. In case of a required reduction due to situations as defined in paragraph 3(b), (c), and (d), a TSO may use a positive value for IVA for its own CNECs. In case of a situation as defined in paragraph 3(c), a Core TSO may, as a last resort measure, request a common decision to launch the default flow-based parameters pursuant to Article 20.

7. After individual validation adjustments, the remaining available margin before validation ($\overrightarrow{RAM_{bv}}$) shall be adjusted for the flows resulting from net positions or already allocated capacities resulting from the SIDC in accordance with Article 4(5)c. The final RAM_f shall be calculated by the CCC for each CNEC and external constraint according to Equation 13.

$$\overrightarrow{RAM_f} = \overrightarrow{RAM_{bv}} - \overrightarrow{IVA} - \mathbf{PTDF_{Core}}\ \overrightarrow{NP_{AAC,IDadd}}$$

Equation 13

with

$\overrightarrow{RAM_f}$	final remaining available margin
$\overrightarrow{RAM_{bv}}$	remaining available margin before validation
$\overrightarrow{IVA}$	individual validation adjustment
$\mathbf{PTDF_{Core}}$	final power transfer distribution factor matrix resulting from the intraday capacity calculation

$\overrightarrow{NP_{AAC,IDadd}}$ Core net positions resulting from SIDC which are not already included in the CGM

8. The CCC shall remove those $\overrightarrow{RAM_f}$ and $\mathbf{PTDF_f}$ values which are redundant and may therefore be removed without impacting the possible allocation of cross-zonal capacity. The pre-solved CNECs and external constraints shall thus ensure that the capacity allocation shall not exceed any limiting CNEC or external constraint.

9. Any reduction of cross-zonal capacities during the validation process shall be communicated and justified to market participants and to all Core regulatory authorities in accordance with Article 22 and Article 24, respectively.

10. Every three months, the CCC shall provide in the quarterly report all the information on the reductions of cross-zonal capacity and exceptional additions of internal network elements. The quarterly report shall include at least the following information for each CNEC of the pre-solved domain affected by a reduction and for each ID CC MTU:

    (a) the identification of the CNEC;

    (b) all the corresponding flow components pursuant to Article 22(2)(b)(vii);

    (c) the volume of reduction and, if applicable, the shadow price of the CNEC resulting from SIDC and the estimated market loss of economic surplus due to the reduction;

    (d) the detailed reason(s) for reduction, including the operational security limit(s) that would have been violated without reductions, specifying network elements on which these limits would have been violated, and under which circumstances they would have been violated, as well as the list of remedial actions with their detailed information, considered prior to the reduction;

    (e) the forecast flow in the CGM used for D-1 capacity calculation, in the CGM considered for the intraday capacity calculation within which the capacity reduction occurred, in the first CGM established after the considered intraday calculation and the realised flow, before (and when relevant after) contingency;

    (f) if an internal network element with a specific contingency was exceptionally added to the final list of CNECs pursuant to Article 16:

        (a) a justification why adding the network element with a specific contingency to the list was the only way to ensure operational security;

        (b) the name or the identifier of the internal network element with a specific contingency;

        (c) the ID CC MTUs for which the internal network element with a specific contingency was added to the list;

(d) the maximum zone-to-zone PTDF calculated on the basis of the methodology in Article 12, calculated on the CGM for MTUs defined in paragraph iii;

(e) for the cases under Article 16(3), the amount of total, internal, loop and allocated flows at the considered exceptionally added XNEC; and

(f) the information referred to in paragraphs (b), (c) and (e) above.

(g) the remedial actions included in the CGM before the intraday capacity calculation;

(h) in case of reduction due to individual validation, the TSO invoking the reduction; and

(i) the proposed measures to avoid similar reductions in the future.

11. The quarterly report shall also include at least the following aggregated information:

(a) statistics on the number, causes, volume and estimated loss of economic surplus of applied reductions by different TSOs; and

(b) general measures to avoid cross-zonal capacity reductions in the future.

12. When a given Core TSO reduces capacity for its CNECs in more than 1% of ID CC MTUs of the analysed quarter, the concerned TSO shall provide to the CCC a detailed report and action plan describing how such deviations are expected to be alleviated and solved in the future. This report and action plan shall be included as an annex to the quarterly report.

13. The final flow-based parameters shall consist of $\mathbf{PTDF}_f$ and $\overrightarrow{RAM}_f$ for CNECs and external constraints of the pre-solved domain."

Amendments to Article 19

The previous Article 20 'Intraday capacity calculation fallback procedure' shall become Article 19, and shall be read accordingly:

"According to Article 21(3) of the CACM Regulation, when the intraday capacity calculation for specific ID CC MTUs does not lead to the final flow-based parameters due to, inter alia, a technical failure in the tools, an error in the communication infrastructure, or corrupted, missing or delayed input data, the Core TSOs and the CCC shall define the missing parameters by calculating the default flow-based parameters. The calculation of default flow-based parameters shall be based on previously calculated flow-based parameters for the same delivery market time unit. The latest (intraday or day-ahead) available flow-based domain, which may be corrected during local validation in accordance with Article 18, for the considered delivery hour is first converted to zero Core balance. The RAM on each

CNEC (including allocation constraints) is then decreased by the adjustments for minRAM and LTA inclusion (if present). The redundant constraints are removed, and pre-solved constraints are adjusted for the Core net positions resulting from the SDAC and the SIDC."

Amendments to Article 20

The previous Article 21 'Calculation of ATCs for SIDC fallback procedure', shall become Article 20 and shall be read accordingly:

"

1. In case the SIDC is unable to accommodate flow-based parameters, the CCC shall convert them into available transmission capacities (hereafter referred as "ATCs for SIDC fallback procedure") for each Core oriented bidding zone border and each DA CC MTU. The Core TSOs may delegate this responsibility to a third party.

2. The flow-based parameters shall serve as the basis for the determination of the ATCs for SIDC fallback procedure. As the selection of a set of ATCs from the flow-based parameters leads to an infinite set of choices, the algorithm provided in paragraph 5 determines the ATCs for SIDC fallback procedure.

3. The following inputs are required to calculate ATCs for SIDC fallback procedure for each ID CC MTU:

   (a) final flow-based parameters ($\mathbf{PTDF}_f$ and $\overrightarrow{RAM}_f$) as calculated pursuant to Article 18 or final flow-based parameters ($\mathbf{PTDF}_{f,DA}$ and $\overrightarrow{RAM}_{UID}$) as calculated pursuant to Article 11;

   (b) if defined, the global allocation constraints shall be assumed to constrain the Core net positions pursuant to Article 7(5), and shall be described following the methodology described in Article 17(3). Such constraints shall be adjusted for offered cross-zonal capacities on the non-Core bidding zone borders.

4. the final PTDFs ($\mathbf{PTDF}_f$ and $\mathbf{PTDF}_{f,DA}$) of all or only a subset of CNECs can be adjusted before the ID ATC extraction by setting the positive zone-to-zone PTDFs below a certain threshold to zero. The following outputs are the outcomes of the calculation for each MTU:

   (a) ATCs for SIDC fallback procedure; and

   (b) constraints with zero margin after the calculation of ATCs for SIDC fallback procedure.

   (c) an ATC limitation on specific borders as set by relevant TSOs as output of the local validation as defined in Annex 6: $ATC_{A\rightarrow B\ validated}$[1]

[1] Relates to the third amendment, for information only.

5. The calculation of the ATCs for SIDC fallback procedure is an iterative procedure, which gradually calculates ATCs for each DA CC MTU, while respecting the constraints of the final flow-based parameters pursuant to paragraph 3:

(a) The initial ATCs are set equal to zero for each Core oriented bidding zone border, i.e.:

$$\overrightarrow{ATC}_{k=0} = 0$$

with

$\overrightarrow{ATC}_{k=0}$	the initial ATCs before the first iteration

(b) the remaining available margin at iteration zero is either equal to the final remaining available margin ($\overrightarrow{RAM}_f$) according to Article 18(8) or the updated remaining available margin for intraday cross-zonal capacities (RAM_UID) according to Article 11(1):

$$\overrightarrow{RAM}_{ATC}(0) = \overrightarrow{RAM}_f$$
$$\text{or } \overrightarrow{RAM}_{ATC}(0) = \overrightarrow{RAM}_{UID}$$

Equation 14

with

$\overrightarrow{RAM}_{ATC}(0)$	remaining available margin for ATC calculation at iteration k=0
$\overrightarrow{RAM}_f$	remaining available margin of the flow-based parameters pursuant to paragraph 3.
$\overrightarrow{RAM}_{UID}$	updated remaining available margin for intraday cross-zonal capacities

(c) In the case when there are negative RAMs, negative ATCs are calculated for CNECs with negative $RAM_{ATC}(0)$ according to the following procedure:

i. Per CNEC with negative remaining available margin for ATC calculation at iteration k=0 ($RAM_{ATC}(0)$) negative ATCs are calculated for all oriented bidding zone borders with positive PTDFs according to Equation 14a:

$$ATC_{A\rightarrow B,CNEC\ i} = \frac{pPTDF_{A\rightarrow B,CNEC\ i}}{\sum_{(A,B)\in\ Core\ contract\ paths\ with\ positive\ z2zPTDFs} PTDF^2_{A\rightarrow B}} RAM_{ATC\ ,CNEC\ i}(0)$$

Equation 14a

with

$ATC_{A\rightarrow B,CNEC\,i}$	negative ATC for the oriented bidding zone border A to B determined by CNEC i
A, B	Core bidding zones
$RAM_{ATC,CNEC\,i}(0)$	remaining available margin for ATC calculation at iteration k=0 of CNEC i
$pPTDF_{A\rightarrow B,CNEC\,i}$	Final positive zone-to-zone PTDF of the oriented bidding zone border A to B

ii. In case for an oriented Core bidding zone border more than one negative ATC has been calculated according to Equation 14a then for each oriented Core bidding zone border the most negative ATC is determined over all CNECs with negative remaining available margin.

$$\overrightarrow{ATC}_{A\rightarrow B} = min\left(\overrightarrow{ATC}_{A\rightarrow B,CNEC\,i}\right)$$

Equation 14b

iii. After extraction of negative ATCs a scaling factor (*SF*) is calculated for each CNEC with negative remaining available margin:

$$SF_{CNEC\,i} = \left| \frac{RAM_{ATC,CNEC\,i}(0)}{\sum_{(A,B)\in Core\ contract\ paths\ with\ positive\ z2zPTDFs} PTDF_{A\rightarrow B,CNEC\,i}\ ATC_{A\rightarrow B}} \right|$$

Equation 14c

The final scaling factor (SF_{final}) is the maximum of all calculated scaling factors:

$$SF_{final} = max(SF_{CNEC\,i})$$

Equation 14d

iv. The final negative ATCs are calculated by scaling the negative ATCs with the final scaling factor:

$$\overrightarrow{ATC}_{negative,final} = \overrightarrow{ATC}_{A\rightarrow B}\ SF_{final}$$

Equation 14e

(d) Before starting the iterative method applied to calculate the positive ATCs for SIDC fallback all the remaining available margins for ATC calculation at iteration k=0 ($\overrightarrow{RAM}_{ATC}(0)$) shall be adjusted to be non-negative:

$$\overrightarrow{RAM}_{ATC}(0) = \max\left(0, \overrightarrow{RAM}_{ATC}(0)\right)$$

Equation 14f

with

$\overrightarrow{RAM_{ATC}}(0)$	remaining available margin for ATC calculation at iteration k=0

The iterative method applied to calculate the positive ATCs for SIDC fallback procedure consists of the following actions for each iteration step k:

i. for each CNEC and external constraint of the flow-based parameters pursuant to paragraph 3, calculate the remaining available margin based on ATCs at iteration k-1

$$\overrightarrow{RAM_{ATC}}(k) = \overrightarrow{RAM_{ATC}}(0) - \mathbf{pPTDF}_{\boldsymbol{zone-to-zone}}\,\overrightarrow{ATC}_{k-1}$$

Equation 14g

with

$\overrightarrow{RAM_{ATC}}(k)$	remaining available margin for ATC calculation at iteration k
$\overrightarrow{ATC}_{k-1}$	ATCs at iteration k-1
$\mathbf{pPTDF}_{\boldsymbol{zone-to-zone}}$	positive zone-to-zone power transfer distribution factor matrix

ii. for each CNEC, share $RAM_{ATC}(k)$ with equal shares among the Core oriented bidding zone borders with strictly positive zone-to-zone power transfer distribution factors on this CNEC;

iii. from those shares of $RAM_{ATC}(k)$, the maximum additional bilateral oriented exchanges are calculated by dividing the share of each Core oriented bidding zone border by the respective positive zone-to-zone PTDF.

iv. for each Core oriented bidding zone border, $\overrightarrow{ATC}_k$ is calculated by adding to $\overrightarrow{ATC}_{k-1}$ the minimum of all maximum additional bilateral oriented exchanges for this border obtained over all CNECs and extemal constraints as calculated in the previous step;

v. $\overrightarrow{ATC}_k$ is limited to a maximum value of $ATC_{A\rightarrow B\ validated}$ if such value has been introduced by TSOs on the border A→B as a result of the ATC validation phase as described in Annex 6. Then go back to step i;[2]

vi. iterate until the difference between the sum of ATCs of iterations k and k-1 is smaller than 1kW;

[2] Relates to the third amendment, for information only.

vii. the resulting positive ATCs for SIDC fallback procedure stem from the ATC values determined in iteration *k*, after rounding down to integer values;

viii. at the end of the calculation, there are some CNECs and external constraints with no remaining available margin left. These are, together with the CNECs and external constraints with initially negative $RAM_{ATC}(0)$, the limiting constraints for the calculation of ATCs for SIDC fallback procedure.

e) positive zone-to-zone PTDF matrix ($\mathbf{pPTDF_{zone-to-zone}}$) for each Core oriented bidding zone border shall be calculated from the $\mathbf{PTDF_{Core}}$ as follows (for HVDC interconnectors integrated pursuant to Article 13, *Equation 8* shall be used):

$$pPTDF_{zone-to-zone,A\rightarrow B} = \max\left(0, PTDF_{zone-to-slack,A} - PTDF_{zone-to-slack,B}\right)$$

Equation 15a

with

$pPTDF_{zone-to-zone,A\rightarrow B}$	positive zone-to-zone *PTDFs* for Core oriented bidding zone border *A* to *B*
$PTDF_{zone-to-slack,m}$	zone-to-slack *PTDF* for Core bidding zone border m

f) The final ATCs per Core oriented bidding zone border are the minimum from positive and negative ATCs:

$$\overrightarrow{ATC}_{final} = \min\left(\overrightarrow{ATC}_{k}, \overrightarrow{ATC}_{negative,final}\right)$$

Equation 15b"

Amendments to Article 21

The previous Article 22 'Reviews and updates', shall become Article 21 and shall be amended accordingly:

paragraphs 6 and 7 shall be amended by replacing "the Agency" with "ACER".

Amendments to Article 22

The previous Article 23 'Publication of data', shall become Article 22 and shall be read as follows:

"

1. In accordance with Article 3(f) of the CACM 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 intraday 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 4(2) by the deadlines set therein;

   (b) the following information for intraday cross-zonal capacity calculation and recalculation pursuant to Article 4(2)(b) to (e) shall be published by the deadlines established therein:

      i. maximum and minimum possible net position of each bidding zone;

      ii. maximum possible bilateral exchanges between all pairs of Core bidding zones;

      iii. if applicable, ATCs for SIDC fallback procedure;

      iv. names of CNECs (with geographical names of substations where relevant and separately for CNE and contingency) and external constraints of the final flow-based parameters before pre-solving and the TSO defining them;

      v. for each CNEC of the final flow-based parameters before pre-solving, the EIC code of CNE and Contingency;

      vi. for each CNEC of the final flow-based parameters before pre-solving, the method for determining I_{max} in accordance with Article 6(2)(a);

      vii. detailed breakdown of RAM for each CNEC of the final flow-based parameters before pre-solving: I_{max}, U, F_{max}, FRM, F_{ref}, $F_{0,\mathrm{core}}$, $F_{0,\mathrm{all}}$, $F_{\mathrm{ref,core}}$, F_{uaf}, IVA;

      viii. value of each external constraint before pre-solving;

      ix. indication of whether default flow-based parameters were applied;

      x. indication of whether a CNEC is redundant or not;

      xi. information about the validation reductions:

- the identification of the CNEC;
- the TSO invoking the reduction;
- the volume of reduction (IVA);
- the detailed reason(s) for reduction in accordance with Article 18(2) and 18(3), including the operational security limit(s) that would have been violated without reductions, and under which circumstances they would have been violated;
- if an internal network elements with a specific contingency was exceptionally added to the final list of CNECs during validation: (i) a justification of the reasons of why adding the internal network elements with a specific contingency to the list was the only way to ensure operational security, (ii) the name or identifier of the intemal network elements with a specific contingency, along with the calculated set of PTDFs;

(c) the following forecast information contained in the CGM for each ID CC MTU shall be published by the deadlines established in Article 4(2):

i. vertical load for each Core bidding zone and each TSO;

ii. production for each Core bidding zone and each TSO;

iii. Core net position for each Core bidding zone and each TSO;

iv. reference net positions of all bidding zones in synchronous area Continental Europe and reference exchanges for all HVDC interconnectors within synchronous area Continental Europe and between synchronous area Continental Europe and other synchronous areas; and

(d) as soon as the SIDC directly applies the flow-based parameters, in case of intraday auctions, two hours after the auction, the information pursuant to paragraph 2(b)(vii) shall be complemented by the following information for each CNEC and external constraint of the final flow-based parameters.

i. shadow prices;

ii. flows resulting from net positions obtained at intraday auctions.

(e) every six months, the publication of an up-to-date static grid model by each Core TSO.

(f) The CCC shall include in its quarterly report as defined in Article 25(6) the flows resulting from net positions resulting from intraday auctions on each CNEC and external constraint of the final flow-based parameters. This requirement is valid after the SIDC will directly apply the flow-based parameters.

3. Individual Core TSO may withhold the information referred to in paragraph 2(b)(iv), 2(b)(v) and 2(e) if it is classified as sensitive critical infrastructure protection related information in their Member States as provided for in point (d) of Article 2 of the Council Directive 2008/114/EC of 8 December 2008 on the identification and designation of European critical infrastructures and the assessment of the need to improve their protection. In such a case, the information referred to in paragraph 2(b)(iv) and 2(b)(v) shall be replaced with an anonymous identifier which shall be stable for each CNEC across all ID CC MTUs. The anonymous identifier shall also be used in the other TSO communications related to the CNEC, including the static grid model pursuant to paragraph 2(e) and when communicating about an outage or an investment in infrastructure. The information about which information has been withheld pursuant to this paragraph shall be published on the communication platform referred to in paragraph 1.

4. Any change in the identifiers used in paragraphs 2(b)(iv), 2(b)(v) and 2(e) shall be publicly notified at least one month before its entry into force. The notification shall at least include:

    (a) the day of entry into force of the new identifiers; and

    (b) the correspondence between the old and the new identifier for each CNEC.

5. Pursuant to Article 20(9) of the CACM Regulation, the Core TSOs shall establish and make available a tool which enables market participants to evaluate the interaction between cross-zonal capacities and cross-zonal exchanges between bidding zones. The tool shall be developed in coordination with stakeholders and all Core regulatory authorities and updated or improved when needed.

6. 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 ACER. Each Core TSO may decide not to publish the additional information, which was not requested by its competent regulatory authority."

Amendments to Article 23

The previous Article 24 'Quality of the data published', shall become Article 23 and shall be amended accordingly:

a) Paragraph 1 shall be replaced and be read accordingly:

    "No later than six months before the implementation of this methodology in accordance with Article 26(2)(b), 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 22. When doing so, they shall consult with relevant stakeholders and all Core regulatory authorities."

Amendments to Article 24

The previous Article 25 'Monitoring, reporting and information to the Core regulatory authorities', shall become Article 24 ‘Monitoring and reporting’, and shall be read accordingly:

“

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

2. At least, the information on non-anonymized names of CNECs for final flow-based parameters before pre-solving as referred to in Article 22(2)(b)(iv) and (v) shall be provided to all Core regulatory authorities on a monthly basis for each CNEC and each ID CC MTU. This information shall be in a format that allows easily to combine the CNEC names with the information published in accordance with Article 22(2).

3. In addition, each month, starting in January 2025 with data for December 2024, the Core TSOs shall provide the Core regulatory authorities and ACER with the following data for each MTU and each CNEC:

   (a) final zone-to-hub PTDF values for all modelled bidding zones;

   (b) Core net positions pursuant to Article 4(5); and

   (c) flow components, consisting of the internal flow, loop flows (total loop flow and particular loop flows created by each bidding zone) and PST flow.

4. 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.

5. 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 10, 14, 23 and 26 of this methodology:

   (a) according to Article 10(5), the Core TSOs shall report to the Core CCC on systematic withholdings which were not essential to ensure operational security in real-time operation.

   (b) according to Article 14(5), the Core TSOs shall monitor the accuracy of non-Core exchanges in the CGM.

   (c) according to Article 23(3), the CCC shall monitor and report on the quality of the data published on the dedicated online communication platform as referred to in Article 22, with supporting detailed analysis of a failure to achieve sufficient data quality standards by the concerned TSOs, where relevant.

(d) according to Article 26(4), 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.

6. The CCC, with the support of the Core TSOs where relevant, shall draft and publish a quarterly report satisfying the reporting obligations set in Articles 7, 19 and 26 of this methodology:

   (a) according to Article 7(3)(b), the CCC shall collect all reports analysing the effectiveness of relevant allocation constraints, received from the concerned TSOs during the period covered by the report, and annex those to the quarterly report.

   (b) according to Article 18(10), the CCC shall provide all information on the reductions of cross-zonal capacity, with a supporting detailed analysis from the concerned TSOs where relevant.

   (c) according to Article 26(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.

   (d) according to Article 22(2)(f), Core TSOs shall report on flows resulting from net positions resulting from the intraday auctions, on each CNEC and external constraint of the final flow-based parameters. This requirement is valid after the SIDC will directly apply the flow-based parameters.

7. The published annual and quarterly reports may withhold commercially sensitive information or sensitive critical infrastructure protection related information as referred to in Article 22(3). In such a case, the Core TSOs shall provide the Core regulatory authorities with a complete version where no such information is withheld. “

Amendments to Article 25

A new Article 25 'TSOs' analyses', shall be included and shall be read accordingly:

“

1. Core TSOs shall analyse possible measures to increase cross-zonal capacities in the intraday timeframe, and over time, to reach the minimum capacity threshold of 70% pursuant to Article 16(8) of the Regulation (EU) 2019/943, on each CNEC. The analyses shall consist of a common assessment by all Core TSOs and individual assessments by each Core TSO.

2. The common assessment by all Core TSOs shall identify and analyse both short-term and long-term systemic measures which would maximise the infrastructure utilisation and enable higher intraday capacities, and which can be jointly implemented by all Core TSOs. These measures shall at least include:

   (a) the ability to activate remedial actions closer to real time;

(b) the possibility to ignore marginal PTDF values in case of flow-based to ATC conversion;

(c) the possibility for a TSO to remove the interconnectors with the non-Core bidding zones from the list of critical network elements.

3. The individual assessments shall identify and analyse measures which can be implemented individually by each Core TSO for each of its CNECs, and shall at least consider:

(a) remedial actions which can be activated within or after the intraday timeframe, including non-costly and costly ones;

(b) targeted investments, contributing to meeting the minimum capacity requirement on specific CNECs, and specifying their expected implementation time;

(c) alternative bidding zone configurations pursuant to ACER Decision 11/2022;

(d) further potential refinements of capacity calculation principles and data, such as removing frequently redundant CNECs from the initial CNEC list.

4. The analyses, consisting of the assessments pursuant to paragraphs 1 to 3, shall be submitted to the Core regulatory authorities and ACER not later than 1 April 2025."

Amendments to Article 26

Article 26 'Timescale for implementation', shall be replaced and be read accordingly:

"

1. The TSOs of the Core CCR shall publish this methodology without undue delay after the decision has been taken by ACER in accordance with Article 9(12) of the CACM Regulation.

2. The TSOs of the Core CCR shall implement this methodology within the following timeframes:

(a) IDCC(a): update of cross-zonal capacities pursuant to Article 4(2)(a) by the deadline for the implementation of day-ahead capacity calculation methodology as established in the day-ahead capacity calculation methodology of the Core CCR;

(b) IDCC(b): calculation of intraday cross-zonal capacities pursuant to Article 4(2)(b) by **4 months** after the adoption of ACER Decision 03/2024 approving the related amendments;

(c) IDCC(c): re-calculation of intraday cross-zonal capacities pursuant to Article 4(2)(c) by **9 months** after the implementation of calculation of intraday cross-zonal capacities pursuant to point (b) of this paragraph;

(d) IDCC(d): re-calculation of intraday cross-zonal capacities pursuant to Article 4(2)(d) by **22 months** after the implementation of calculation of intraday cross-zonal capacities pursuant to point (b) of this paragraph; and

(e) IDCC(e): re-calculation of intraday cross-zonal capacities pursuant to Article 4(2)(e) at the latest by **3 months** after the implementation of the corresponding intraday CROSA following the ROSC methodology.

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 intraday capacity calculation inputs, the intraday capacity calculation process and the intraday 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 Core NEMOs to test the implementation of this methodology, and market participants to test the effects of applying this methodology on the market. In accordance with Article 20(8) of CACM Regulation, this phase shall not be shorter than 6 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, ACER 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 day-ahead capacity calculation methodology, the Core TSOs shall apply a transitional solution to compute the cross-zonal capacities which remain after the day-ahead capacity allocation pursuant to Article 4(2)(a). This update shall be done based on day-ahead cross-zonal capacities used in existing day-ahead capacity calculation and allocation initiatives. The details on the application of this transitional solution are defined in Annex 2 to this methodology.

6. After the implementation of the day-ahead capacity calculation methodology and until the implementation of the intraday capacity calculation methodology pursuant to Article 4(2)(b), the Core TSOs shall apply a transitional solution for updating of intraday cross-zonal capacities remaining after the SDAC as referred to in Article 4(2)(a). The details on the application of this transitional solution are defined in Annex 2, Annex 3, Annex 4 and Annex 5 to this methodology. During this transition period:

(a) Annex 3 shall apply and replace Article 11;

(b) Annex 4 shall apply and replace Article 20; and

(c) Annex 5 shall apply.

7. In parallel to IVA validation and as long as SIDC is not able to directly apply flow-based parameters, the Core TSOs may also perform ATC based validation pursuant to Annex 6. Regardless of the ability of SIDC to apply the flow-based parameters, the ATC based validation shall no longer be allowed after 24 months following the implementation of the intraday capacity calculation methodology pursuant to Article 4(2)(b).

8. By 1 October 2025, all Core TSOs shall propose amendments to this methodology based on the outcomes of their analyses pursuant to Article 25.

9. If required, following the expected amendments to the CACM Regulation, this methodology shall be revised accordingly."

Amendments to Annex 1

Annex 1 'Justification of usage and methodology for calculation of external constraints', shall be amended accordingly:

a) The first sentence shall be replaced and be read accordingly:

"The following section depicts in detail the justification of usage and methodology currently used by each Core TSO to design and implement external constraints, if applicable. The legal interpretation on eligibility of using external constraints and the description of their contribution to the objectives of the CACM Regulation is included in the Explanatory Note."

b) Chapters '1. Belgium: ' and '2. Nederlands' shall be deleted.

Amendments to Annex 2

Annex 2 shall be renamed to 'Calculated and allocated capacities in relation to the implementation of IDAs and Core intraday capacity calculation (IDCCb))', and shall be read accordingly:

"

Intraday cross-zonal capacities	**before the implementation of IDA1 (15:00 of D-1)**		**after the implementation of IDA1 (15:00 of D-1)**	
	before the implementation of Core ID CCM at 22:00 (IDCCb))	**after the implementation of Core ID CCM at 22:00 (IDCCb))**	**before the implementation of Core ID CCM at 22:00**	**after the implementation of Core ID CCM at 22:00**

Between 15:00 and 22:00 of D-1	Leftovers from the day-ahead cross-zonal capacities based on Core DA CCM according to the transitional solution pursuant to Article 26(5) and Annexes 3, 4 and 5 OR Zero intraday cross-zonal capacities pursuant to Annex 3(4)	Leftovers from the day-ahead cross-zonal capacities based on Core DA CCM pursuant to Article 4(2)(a) OR Zero intraday cross-zonal capacities pursuant to Article 11(4)	Leftovers from IDA1	Leftovers from IDA1
From 22:00 of D-1 onwards	Leftovers from the day-ahead cross-zonal capacities based on Core DA CCM according to the transitional solution pursuant to Article 26(5) and Annexes 3, 4 and 5	Intraday cross-zonal capacities from Core ID CCM at 22:00 pursuant to Article 4(2)(b)	Leftovers from IDA1 & continuous trading process executed until 22h	Intraday cross-zonal capacities from Core ID CCM at 22:00 pursuant to Article 4(2)(b)

”

Amendments to Annex 3

Annex 3 'Update of intraday cross-zonal capacities remaining after the SDAC in the transition period', shall be amended accordingly:

a) Paragraph 1(b) shall be replaced and be read accordingly:
“In the case that the LTA inclusion in day-ahead is ensured through the Extended LTA inclusion approach, the intraday cross-zonal capacities are described as a union of flow-based parameters and “LTA values” (LTA domain).”

b) Paragraph 2(a) shall be replaced and be read accordingly:
“the LTA margin approach: for each CNEC, each TSO may decrease the RAM_f by decreasing $LTA_{margin,DA}$ as calculated pursuant to the day-ahead capacity calculation methodology while that there is no undue discrimination between internal and cross-zonal exchanges as referred to in Article

21(1)(b)(ii) of the CACM Regulation;"

c) Paragraph 3 shall be replaced and be read accordingly:
"For each CNEC, each TSO may adjust the RAM_f by modifying the AMR_{DA} as calculated pursuant to the day-ahead capacity calculation methodology while ensuring compliance that there is no undue discrimination between internal and cross-zonal exchanges as referred to in Article 21(1)(b)(ii) of the CACM Regulation."

d) Paragraph 4 shall be replaced and be read accordingly:
"Until the implementation of intraday auctions at 15:00 market time of day D-1, the Core TSOs may set to zero the cross-zonal capacities calculated pursuant to Article 4(2)(a). Such a decision may be made per bidding zone border by the competent TSOs."

Amendments to Annex 4

Annex 4 'Calculation of ATCs for SIDC fallback procedure in the transition period', shall be amended accordingly:

a) Paragraph 3(b) shall be replaced and be read accordingly:
"If defined, the global allocation constraints shall be assumed to constrain the Core net positions pursuant to Article 7(5), and shall be described following the methodology described in Article 17(2). Such constraints shall be adjusted for offered cross-zonal capacities on the non-Core bidding zone borders."

b) Paragraph 4(d) shall be amended by replacing "$PTDF_{Core}$" with "$PTDF_f$".

c) Paragraph 5 shall be amended by replacing "a" with "an".

Amendments to Annex 5

Annex 5 'Other transitional arrangements', shall be replaced and be read accordingly:
"

1. Each Core TSO shall have the right to perform individual validation of ID ATCs calculated and provided to Core TSOs pursuant to Annex 4, by which these ATCs may be adjusted in case such adjustments are needed to maximise cross-zonal capacity and/or to maintain operational security. Pursuant to this validation, each Core TSO shall have the right to adjust ID ATCs on its bidding zone borders. The maximum of ID ATC increase per bidding zone border shall be 300 MW.

2. The ID ATC on a biding zone border shall always be the lowest value of ID ATCs set by TSOs on both sides of this bidding zone border.

3. As soon as possible after the implementation of DA CCM and no later than from four months after the adoption of this Decision, each Core TSO requiring amendment of ID ATCs shall provide to all Core TSOs the justification for each ATC adjustment. This justification shall be based on the assessment of the day-ahead or intraday congestion forecast common grid models and shall include the concerned CNECs on which the need for decrease or increase of flow or capacity was identified to maximise cross-zonal capacity and/or maintain operational security.

4. After the implementation of DA CCM, the Core TSOs shall regularly publish the following information about the update of intraday cross-zonal capacities remaining after the SDAC in the transition period:

   (a) the percentage of LTA and AMR applied on the intraday level pursuant to Annex 3;

   (b) applied Wsum value pursuant to Annex 4; and

   (c) the flow-based domain and, if relevant, LTA domain used for ATC extraction pursuant to Annex 3, in particular the values: $\overrightarrow{RAM_f}$ (before and after possible adjustment), $\overrightarrow{NP_{AAC}} * \mathbf{PTDF_{Core}}$, $\overrightarrow{RAM_{UID}}$, $\overrightarrow{LTA_f}$ (before and after possible adjustment), $\overrightarrow{SEC_{DA}}$ and $\overrightarrow{LTA_{UID}}$; and

   (d) ID ATC adjustments pursuant to paragraph 1 including justifications as of deadline pursuant to paragraph 3;

In case the information pursuant to point (c) cannot be published at the time of implementation of DA CCM, it shall be published as soon as feasible and for all days since the implementation of DA CCM.

5. As from four months after the start of the transition period pursuant to Article 26(5), the Core CCC shall assist the Core TSOs in the ATC validation, by providing at least the following information for each Core CNEC and for each MTU, based on the CGMs from the DACF procedure:

   (a) reference flows;

   (b) zone-to-zone PTDFs of Core oriented borders; and

   (c) potential maximal flows due to ID ATCs, superposed to the reference flows.

The CCC shall provide this information not later than 20:45 of D-1.

During the transition period pursuant to Article 26(5), the Core TSOs may apply and implement, without the need to amend the intraday capacity calculation methodology, further adjustments of the ATC extraction methodology pursuant to Annex 4 if it better meets the objectives of the CACM Regulation and is agreed among Core TSOs."

Introduction of a new Annex 6[3]

A new Annex 6: 'ATC based validation process', shall be introduced and be read accordingly:

"

1. Each Core TSO has the right to perform an ATC based validation in order to ensure operational security. This is an additional process, next to the existing validation process described in Article 18 as IVA validation. Pursuant to this validation, each Core TSO can set a maximum ATC value for its own oriented border.
2. The ID ATC on a bidding zone border shall always be the lowest value of all ID ATCs set by all TSOs for this bidding zone border.

$$ATC_{A\rightarrow B\,validated} = \min\left(\overrightarrow{ATC}_{A\rightarrow B\,validated,TSO\,1}, \overrightarrow{ATC}_{A\rightarrow B\,validated,TSO\,2}, \overrightarrow{ATC}_{A\rightarrow B\,validated,TSO\,x}\right)$$

Equation 16

with

$ATC_{A\rightarrow B\,validated}$	Minimum of validated ATCs for border A→B by all Core TSOs adjacent to this border
$\overrightarrow{ATC}_{A\rightarrow B\,validated,TSO\,x}$	Validated ATC for border A→B by TSO x

3. The ATC limitation may be done only in the following situations:
   (a) an occurrence of an unexpected contingency impacting a CNE after the beginning of the related IDCC process;
   (b) as a fallback, in case IVA validation cannot be performed fully in time or if it faces IT issue; or
   (c) a mistake in input data that leads to an overestimation of cross-zonal capacity from an operational system security perspective.
4. In addition to the publication described in Article 22, Core TSOs and the CCC shall publish at least the following information and data items with regard to the ATC based validation for each IDCC MTU:
   (a) The TSO invoking the limitation;
   (b) The ATC limitation per border;
   (c) The situation applicable as per the previous paragraph; and
   (d) The detailed reason for the limitation of the ATC with the same level of information as IVA validation following the reasonings developed in Article

[3] Relates to the third amendment, for information only.

18(2), including the operational security limits (when relevant) that would have been violated without the reductions, and under which circumstances they would have been violated.

Every three months, the CCC, with the support of Core TSOs where relevant, shall provide in the quarterly report the data items given under paragraph 4(a), 4(b), 4(c) and 4(d), with regard to the ATC based validation for each IDCC MTU."

ACER
European Union Agency for the Cooperation of Energy Regulators

ACER Decision on Core ID CCM: Annex I

(text rectified by corrigendum of ~~XX~~ 4 April 2024)

The second amendment ~~of~~to the intraday capacity calculation methodology of the Core capacity calculation region

in accordance with ~~Articles~~Article 20ff. of the Commission Regulation (EU) 2015/1222 of ~~24th~~24 July 2015 establishing a guideline on capacity allocation and congestion managemen~~t~~t

~~09 08 2022~~

~~Purpose:~~	~~☐ methodology draft~~ ~~☒ for NRA approval~~	~~☐ for public consultation~~ ~~☐ for final publication~~
~~Status:~~	~~☐ draft~~	~~☒ final~~
~~TSO approval:~~	~~☐ for approval~~	~~☒ approved~~
~~NRA approval:~~	~~☒ outstanding~~	~~☐ approved~~

14 March 2024

Whereas

TSOs of the Core CCR ("Core TSOs"), taking into account the following:

(1) Based on further developments and alignments with Core NRAs after the decision by the Agency in 21st February 2019, Core TSOs deemed it necessary to introduce the following changes.
(2) The following changes fulfil the objectives set out in Article 3 CACM.
(3) The amendments performed with respect to the integration of the ROSC aligned business process in Article 2 ensure operational security and an optimised calculation of cross-zonal capacity in accordance with Article 3(c) and Article 3(d) of CACM by establishing a consistent use of remedial actions between the CROSA and the IDCC process, which will ensure remedial actions applied in CROSA remain effective after providing intraday capacity to the intraday market. Including already coordinated remedial actions during the intraday capacity calculation process will lead to a more accurate representation of the grid and a grid model which is as much as possible congestion-free, thereby also ensuring optimal use of the transmission infrastructure in accordance with Article 3(b) CACM. These will also prevent that the impact of activated XRAs is diminished by additional intraday cross-zonal trade, which could be detrimental to ensuring operational security as set out by Article 3(c) CACM.;
(4) The amendments performed with respect to the avoidance of disproportionate negative ATCs on distant Core borders in Article 3 ensure a fair and non-discriminatory treatment of TSOs and market participants in accordance with Article 3(e) of CACM as high negative ATCs would basically block border directions for the intraday market although the benefit from grid security perspective would be very limited.

~~Article 1~~
Amendments ~~concerning definitions and interpretation~~to Article 1

~~1.~~ Article ~~2. Definitions~~1 'Subject matter and ~~interpretation~~scope', shall be amended accordingly:

a) ~~a)~~ Paragraph 1 shall be replaced and be read accordingly:

"The intraday capacity calculation methodology is the Core TSOs' methodology in accordance with Article 20ff. of the CACM Regulation and covers the intraday capacity calculation methodology for the Core CCR bidding zone borders."

b) Paragraph 2 shall be included and be read accordingly:

"This methodology is without prejudice to the TSOs' rights and obligations under Commission Regulation (EU) 2017/1485 establishing a guideline on electricity transmission system operation, such as taking any remedial actions pursuant to this Regulation to maintain operational security and ensure that the system operates in a normal state. Accordingly, the management of cross-

zonal capacities by the TSOs after their delivery to the allocation process is beyond the scope of this methodology."

Amendments to Article 2

Article 2. 'Definitions and interpretation', shall be amended accordingly:

a) Paragraph 1 shall be replaced and be read accordingly:

"For the purposes of the intraday capacity calculation methodology, terms used in this document shall have the meaning of the definitions included in Regulation (EU) 2019/943, Directive (EU) 2019/944, ~~Comission~~Commission Regulation (EU) 2015/1222, Commission Regulation (EU) 2016/1719, Commission Regulation (EU) 2017/2195, Commission Regulation (EU) 543/2013, the definitions set out in Article 2 Annex I of ~~the~~ACER Decision No 02/~~2019 of the Agency for the Cooperation of the Energy Regulators of 21 February~~ 2019 on the Core CCR TSOs' proposal for the regional design of the day-ahead and intraday common capacity calculation methodologies and the definitions set out in Article 2 Annex I of ~~the~~ACER Decision No 33/2020 ~~of the Agency for the Cooperation of the Energy Regulators of 4 December 2020~~ on the methodology for regional operational security coordination for the Core capacity calculation region~~.~~ ("Core ROSC methodology"). In addition, the following definitions, abbreviations and notations shall apply~~:"~~;

~~b) Number 1. shall be replaced and be read accordingly:~~

a. ~~" 'AAC_{ID}'~~'AAC_{ID}' is the already allocated capacity which has been allocated in SIDC~~;"~~;

~~c) Number 27, 36, 38, 39 & 41 shall be omitted~~
~~d) A new number 40a. shall be included and be read accordingly:~~

b. ~~"~~ '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;

c. 'AMR_{DA}' means the adjustment for the minimum remaining available margin in accordance with the day-ahead capacity calculation methodology of the Core CCR;

d. 'annual report' means the report issued on an annual basis by the CCC and the Core TSOs on the intraday capacity calculation;

e. '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;

f. 'CCC' means the coordinated capacity calculator, as defined in Article 2(11) of the CACM Regulation, of the Core CCR, unless stated otherwise;

g. ‘CCR’ means the capacity calculation region as defined in Article 2(3) of the CACM Regulation;

h. ‘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;

i. ‘CGMM’ means the common grid model methodology, pursuant to Article 17 of the CACM Regulation;

j. ‘CNE’ means a critical network element;

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

l. ‘Core DA CCM’ means the Core day-ahead capacity calculation methodology;

m. ‘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;

n. ‘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;

o. 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 Plc (HOPS d.d.) (“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”);

p. ‘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);

q. ‘curative remedial action’ means a remedial action which is only applied after a given contingency occurs;

r. ‘D-1’ means the day before electricity delivery;

s. ‘D-2’ means the day two-days before electricity delivery;

t. ‘DACF’ means day ahead congestion forecast;

u. ‘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;

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

w. ‘$F_{0,all}$’ 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;

x. ‘F_i’ means the expected flow in commercial situation i;

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

z. ‘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;

aa. ‘F_{max}’ means the maximum admissible power flow;

bb. ‘F_{ref}’ means the reference flow;

cc. ‘GSK’ or ‘GSK’ means the generation shift key as defined in Article 2(12) of the CACM Regulation;

dd. ‘HVDC’ means a high voltage direct current network element;

ee. ‘'IDA’ means intraday auction;

ff. ‘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;

gg. ‘IGM’ means the intraday individual grid model as defined in Article 2(1) of the CACM Regulation;

hh. ‘internal CNEC’ means a CNEC, which is not cross-zonal;

ii. ‘I_{max}’ means the maximum admissible current;

jj. ‘IVA’ means individual validation adjustment;

kk. $LTA_{margin,DA}$ means the adjustment of remaining available margin to incorporate long-term allocated capacities in accordance with the day-ahead capacity calculation methodology of the Core CCR;

ll. 'NP' or '*NP*' means a net position of a bidding zone, which is the net value of generation and consumption in a bidding zone;

~~b.~~mm. '$NP_{AAC,DA}$' means net position resulting from already allocated capacities in SDAC~~;"~~;

~~e) A new number 40b. shall be included and be read accordingly:~~

~~c.~~nn. ~~" '~~$NP_{AAC,ID}$' means net position resulting from already allocated capacities in SIDC~~;"~~;

~~f) Number 49. shall be replaced and be read accordingly:~~

oo. ~~" '~~**~~$PTDF_{f,DA}$~~**'oriented bidding zone border' means a given direction of a bidding zone border (e.g. from Germany to France);

pp. 'pre-solved domain' means the final set of binding constraints for capacity allocation after the pre-solving process;

qq. 'pre-solving process' means the identification and removal of redundant constraints from the flow-based domain;

rr. 'preventive remedial action' means a remedial action which is applied on the network before any contingency occurs;

ss. 'PST' means a phase-shifting transformer;

tt. 'PTDF' or '*PTDF*' means a power transfer distribution factor;

uu. '**$PTDF_{Core}$**' means a matrix of power transfer distribution factors resulting from the intraday flow-based calculation for Core bidding zones;

vv. '**$PTDF_{all}$**' means a matrix of power transfer distribution factors resulting from the intraday flow-based calculation for all bidding zones of Continental Europe, and connection points of the bidding zones of Continental Europe with the bidding zones of other synchronous areas;

~~d.~~ww. '**$PTDF_{f,DA}$**' means a matrix of power transfer distribution factors describing the final day-ahead flow-based domain;"

~~g) Number 50. shall be replaced and be read accordingly:~~

~~" '**$PTDF_f$**' means a matrix of power transfer distribution factors describing the final Intraday flow-based domain;"~~

~~h) A new number 55a. shall be included and be read accordingly:~~

xx. ~~"~~'quarterly report' means a report on the intraday capacity calculation issued by the CCC and the Core TSOs on a quarterly basis;

yy. 'RA' means a remedial action as defined in Article 2(13) of the CACM Regulation;

zz. 'RAM' or '*RAM*' means a remaining available margin;

aaa. 'RCC' means Regional Coordination Centre;

bbb. 'reference net position or exchange' means a position of a bidding zone or an exchange over HVDC interconnector assumed within the CGM;

~~e.~~ccc. 'SDAC' means the single day-ahead coupling~~;"~~;

ddd. ~~2. Article 11. Update of~~ 'SIDC' means the single intraday coupling;

eee. 'shadow price' means the dual price of a CNEC or allocation constraint representing the increase in the economic surplus if a constraint is increased by one MW;

fff. '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;

ggg. 'SO Regulation' means Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation;

hhh. '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;

iii. 'static grid model' means a list of relevant grid elements of the transmission system, including their electrical parameters;

jjj. 'U' is the reference voltage;

kkk. 'UAF' is an unscheduled allocated flow;

lll. 'vertical load' means the total amount of electricity which exits the transmission system of a given bidding zone to connected distribution systems, end consumers connected to the transmission system, and to electricity producers for consumption in the generation of electricity;

mmm. 'zone-to-slack *PTDF*' means the PTDF of a commercial exchange between a bidding zone and the slack node;

nnn. 'zone-to-zone *PTDF*' means the PTDF of a commercial exchange between two bidding zones;

ooo. the notation x denotes a scalar;

ppp. the notation $\vec{x}$ denotes a vector;

qqq. the notation $\mathbf{x}$ denotes a matrix;

rrr. 'LTA domain' means a set of bilateral exchange restrictions covering the previously allocated cross-zonal capacities ~~remaining after the SDAC~~;

sss. 'Extended LTA inclusion approach' is an LTA inclusion approach in the Core DA CCM. When this approach is applied in the day ahead capacity calculation, the day ahead cross-zonal capacities consist of a flow-based domain (containing flow-based parameters) without LTA inclusion and a separate LTA domain (including LTA values);

ttt. 'SEC_{DA}' means scheduled exchange resulting from already allocated capacities in the single day ahead coupling (SDAC). The parameter is provided by the SDAC based on the all TSO methodology for calculating scheduled exchanges resulting from single day-ahead coupling according to Article 43 of CACM Regulation;

uuu. 'XNEC' means cross-border relevant network element with contingency, as defined in the Core ROSC methodology."

b) Paragraph 2. (a) shall be ~~amended~~read accordingly:

~~a) In Equation 3~~"the singular also includes the plural and vice versa;"

c) Paragraph 2~~ $\overrightarrow{RAM_F}$~~. (e) shall be ~~replaced with $\overrightarrow{RAM_{F,DA}}$~~read accordingly:

~~b) In Equation 3 $\mathbf{PTDF_F}$ shall be replaced with $\mathbf{PTDF_{F,DA}}$~~

~~c) In Equation 3 $\overrightarrow{NP_{AAC}}$ shall be replaced with $\overrightarrow{NP_{AAC,DA}}$~~

~~Article 2~~

"any reference to legislation, regulation, directive, decision, order, instrument, code, or any other enactment shall include any modification, extension or re-enactment of it when in force."

Amendments ~~introducing the ROSC aligned business process~~
~~1.~~to Article 4~~. Intraday capacity calculation process shall be amended accordingly:~~

~~a) Paragraph 8~~Article 4 'Intraday capacity calculation process', shall be replaced and be read accordingly:

" "

1. For the intraday market time frame, the cross-zonal capacities shall be calculated using the flow-based approach as defined in this methodology.

2. The intraday cross-zonal capacity calculation shall be performed in the following sequence, by the times established in the process description document as referred to in paragraph 7:

(a) IDCC(a): updating of cross-zonal capacities remaining after the SDAC for all ID CC MTUs between 00:00 and 24:00 of day D and providing them as intraday cross-zonal capacities to relevant NEMOs no later than 15 minutes

before the intraday cross-zonal gate opening time, at 15:00 market time of day D-1;

(b) IDCC(b): calculation of intraday cross-zonal capacities for all ID CC MTUs between 00:00 and 24:00 of day D. The cross-zonal capacities resulting from this calculation shall be published and submitted to NEMOs no later than 15 minutes before the target start of allocation at 22:00 market time of day D-1;

(c) IDCC(c): re-calculation of intraday cross-zonal capacities for all ID CC MTUs between 06:00 and 24:00 of day D. The cross-zonal capacities resulting from this calculation shall be published and submitted to NEMOs no later than 15 minutes before the target start of allocation at 04:00 market time of day D;

(d) IDCC(d): re-calculation of intraday cross-zonal capacities for all ID CC MTUs between 12:00 and 24:00 of day D. The cross-zonal capacities resulting from this re-calculation shall be published and submitted to NEMOs no later than 15 minutes before the target start of allocation at 10:00 market time of day D; and

(e) IDCC(e): re-calculation of intraday cross-zonal capacities for all ID CC MTUs between 18:00 and 24:00 of day D. The cross-zonal capacities resulting from this re-calculation shall be published and submitted to NEMOs no later than 15 minutes before the target start of allocation at 16:00 market time of day D.

The reference to ID CC MTUs in the remainder of this methodology shall mean the MTUs as established in this paragraph.

3. Each calculation or re-calculation of cross-zonal capacities pursuant to paragraphs 2(b) to (2)(e), shall consist of three main stages:

(a) the creation of capacity calculation inputs by the Core TSOs;

(b) the capacity calculation process by the CCC; and

(c) the capacity validation by the Core TSOs in coordination with the CCC. Capacity validation may also be applied for the update of capacities pursuant to paragraph 2(a).

4. Each Core TSO shall provide the CCC the following capacity calculation inputs by the times established in the process description document:

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

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

(c) external 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.

5. In addition to the capacity calculation inputs pursuant to paragraph 3, the Core TSOs, or an entity delegated by the Core TSOs, shall send to the CCC, for each ID CC MTU of the delivery day, the following additional inputs by the times established in the process description document:

(a) the Core net positions or, alternatively, the already allocated capacities on the Core bidding zone borders resulting from the SDAC;

(b) the Core net positions or, alternatively, the already allocated capacities on the Core bidding zone borders resulting from the SIDC which are already included in the CGM;

(c) the Core net positions or, alternatively, the already allocated capacities on the Core bidding zone borders resulting from the SIDC not already included in the CGM.

If the Core TSOs provided to the CCC the already allocated capacities on the Core biding zone borders instead of the Core net positions, the CCC shall convert them into Core net positions.

6. When providing the capacity calculation inputs pursuant to paragraphs 4 and 5, the Core TSOs shall respect the formats commonly agreed between the Core TSOs and the CCC while fulfilling the requirements and guidance defined in the CGMM.

7. No later than six months before the implementation of this methodology in accordance with Article 26(3)(b), the Core TSOs shall jointly establish a process description document as referred to in paragraphs 2, 4 and 5 and publish it on the online communication platform as referred to in Article 22. This document shall reflect an up-to-date detailed process description of all capacity calculation steps including the timeline of each step of the intraday capacity calculation.

~~1.~~8. The Core RCCs ~~shall deliver~~, acting as the CCC shall use the latest available ~~CGM~~CGMs, proposed and coordinated XRAs from the day -ahead and intraday CROSAs, in accordance with the CSAM. During the interim period until ROSC CROSA process is implemented in accordance ~~of~~with Article 37 of Core ROSC methodology, only the latest available CGM shall be delivered~~.~~".

~~b) Step 3 of Paragraph 9 shall be replaced and be read accordingly:~~

9. "In case the necessary outputs of the ROSC ICS/CROSA process cannot be provided within the foreseen timeframe, the delivery of the CGMs and XRAs pursuant to paragraph 8, and subsequent intraday capacity calculation and delivery of intraday capacities may be delayed only up to a point in time at which the target start of allocation pursuant to paragraphs 2(b), 2(c), 2(d) and 2(e) is not yet affected. If the target start of allocation becomes affected by such a delay, the fallback procedure pursuant to Article 19 applies.

10. The intraday capacity calculation process and validation in the Core CCR shall be performed by the CCC and the Core TSOs according to the following procedure:

Step 1. The CCC shall define the initial list of CNECs pursuant to Article 15;

Step 2. The CCC shall calculate the first flow-based parameters ($PTDF_{init}$ and $F_{ref,init}$) for each initial CNEC pursuant to Article 15;

~~Step 1.~~Step 3. The CCC shall determine the final list of CNECs for subsequent steps of the capacity calculation pursuant to Article 16~~;"~~;

~~Step 2. c) Step 4 of Paragraph 9 shall be omitted~~

~~Step 3. d) A new paragraph 11 shall be added and be read accordingly:~~

~~Step 4. "Based on the latest available information regarding the actual system state, each TSO in the Core region shall have the right to reduce available cross-zonal capacity on their own borders after submitting capacity to SIDC in accordance with paragraph 2. Such reduction shall be coordinated amongst the TSOs sharing the border."~~

~~Step 5. d) A new paragraph 12 shall be added and be read accordingly:~~

~~Step 6. "Core TSOs aim at ensuring maximal coherence between operational processes run in Core CCR. In this context, the intraday capacity calculation shall take place only after the coordinated operational security analysis run within the scope of the ROSC ICS/CROSA processes on day-ahead and intraday . Considering the fact that these ROSC processes are key for planning remedial measures to ensure operational security, the intraday capacity calculation can only commence once the ROSC ICS/CROSA process is finalized and adequate up-to-date grid models are available. This implies, that in case the ROSC ICS/CROSA process cannot be finalized within the foreseen timeframe and more time is necessary to manage grid security, intraday capacity calculation and subsequent delivery of intraday capacities may be delayed. Core TSOs shall strive at ensuring that the delay in providing intraday capacity, according to the time of delivery mentioned in paragraph 2, is as small as possible."~~

Step 4. ~~2.~~ The CCC shall calculate the RAM before validation (RAM_{bv}) based on the results of the previous processes pursuant to Article 17;

Step 5. The Core TSOs shall, according to Article 18, validate the RAM_{bv} with individual validation, and decrease RAM when operational security is jeopardised, which results in the final RAM_f;

Step 6. The CCC shall, according to Article 18, remove the redundant CNECs and redundant external constraints from final $PTDF_f$ and RAM_f;

Step 7. The CCC shall publish the $PTDF_f$ and RAM_f values in accordance with Article 22 and provide them to NEMOs for capacity allocation in accordance with paragraph 2.

11. All capacity updates, calculations and re-calculations pursuant to paragraph 2, including all steps pursuant to paragraph 3, shall be performed per ID CC MTU. Cross-zonal capacities shall be provided to the NEMOs for each ID CC MTU, but for capacity allocation they may be converted into a higher time resolution in accordance with the market time unit applicable on specific bidding zone border(s)."

Amendments to Article 5~~. Definition~~

Article 5 'Definition of critical network elements and ~~contingencies~~contingencies', shall be ~~amended~~replaced and be read accordingly:

~~a) In Paragraph 4 the last sentence shall be removed and be read accordingly:~~

~~“~~“

1. Each Core TSO shall define a list of CNEs, which are fully or partly located in its own control area, and which can be overhead lines, underground cables, or transformers. All cross-zonal network elements shall be defined as CNEs, whereas only those internal network elements, which are defined pursuant to paragraph 6 or 7 shall be defined as CNEs. Until 30 days after the approval of the proposal pursuant to paragraph 6, all internal network elements may be defined as CNEs.

2. Each Core TSO shall define a list of proposed contingencies used in operational security analysis in accordance with Article 33 of the SO Regulation, limited to their relevance for the set of CNEs as defined in paragraph 1 and pursuant to Article 23(2) of the CACM Regulation. The contingencies of a Core TSO shall be located within the observability area of that Core TSO. This list shall be updated at least on a yearly basis and in case of topology changes in the grid of the Core TSO, pursuant to Article 21. A contingency can be an unplanned outage of:

   (a) a line, a cable, or a transformer;

   (b) a busbar;

   (c) a generating unit;

   (d) a load; or

   (e) a set of the aforementioned elements.

3. Each Core TSO shall establish a list of CNECs by associating the contingencies established pursuant to paragraph 2 with the CNEs established pursuant to paragraph 1 following the rules established in accordance with Article 75 of the SO Regulation. Until such rules are established and enter into force, the association of contingencies to CNEs shall be based on each TSO’s operational experience. An individual CNEC may also be established without a contingency.

~~1.~~4. Each Core TSO shall provide to the CCC a list of CNECs established pursuant to paragraph 3~~.”~~.

~~b) In Paragraph 7 a sentence shall be added and be read accordingly:~~

5. ~~“~~No later than eighteen months after the implementation of this methodology in accordance with Article 26(2)(b), all Core TSOs shall jointly develop a list of internal network elements (combined with the relevant contingencies) to be defined as CNECs and submit it by the same deadline to all Core regulatory authorities as a proposal for amendment of this methodology in accordance with Article 9(13) of the CACM Regulation. After its approval in accordance with Article 9 of the CACM Regulation, the list of internal CNECs shall form an annex to this methodology.

6. The list pursuant to the previous paragraph shall be updated at least every two years. For this purpose, no later than eighteen months after the approval by all

Core regulatory authorities of the proposal for amendment of this methodology pursuant to previous paragraph and this paragraph, all Core TSOs shall jointly develop a new proposal for the list of internal CNECs and submit it by the same deadline to all Core regulatory authorities as a proposal for amendment of this methodology in accordance with Article 9(13) of the CACM Regulation. After its approval in accordance with Article 9 of the CACM Regulation, the list of internal CNECs shall replace the relevant annex to this methodology.

~~2.~~7. The proposed list of internal CNECs pursuant to paragraph 5 and 6 shall not include any internal network element with contingency with a maximum zone-to-zone PTDF below 5%, calculated as the time-average over the last twelve months. An exception is applied for CNECs that are ~~added exceptionally~~considered in accordance with Article 16(2~~).”~~) to (4).

8. ~~3. Article 8. Reliability margin~~ The proposal pursuant to paragraphs 5 and 6 shall include at least the following:

(a) a list of proposed internal CNECs with the associated maximum zone-to-zone PTDFs referred to in paragraph 7;

(b) an impact assessment of increasing the threshold of the maximum zone-to-zone PTDF for exclusion of internal CNECs referred to in paragraph 7 to 10% or higher; and

(c) for each proposed internal CNEC, an analysis demonstrating that including the concerned internal network element in capacity calculation is economically the most efficient solution to address the congestions on the concemed internal network element, considering, for example, the following alternatives:

i. application of remedial actions;

ii. reconfiguration of bidding zones;

iii. investments in network infrastructure combined with one or the two above; or

iv. a combination of the above.

Before performing the analysis pursuant to point (c), the Core TSOs shall jointly coordinate and consult with all Core regulatory authorities on the methodology, assumptions and criteria for this analysis.

9. The proposals pursuant to paragraphs 5 and 6 shall also demonstrate that the concerned Core TSOs have diligently explored the alternatives referred to in paragraph 8 sufficiently in advance taking into account their required implementation time, such that they could be applied or implemented by the time that the decisions of the Core regulatory authorities on the proposal pursuant to paragraphs 5 and 6 are taken.

The Core TSOs shall regularly review and update the application of the methodology for determining CNECs as defined in Article 21.”

Amendments to Article 6

Article 6 'Methodology for operational security limits', shall be amended accordingly:

a) ~~a)~~ Paragraph ~~10~~2. (f) shall be replaced and be read accordingly:
"the CCC shall, by default, set the power factor $\cos(\varphi)$ to 1 based on the assumption that the CNE is loaded only by active power and that the share reactive power is negligible (i.e. $\varphi = 0$). If the share of reactive power is not negligible, a TSO may consider this aspect during the validation phase in accordance with Article 18."

b) Paragraph 4. shall be replaced and be read accordingly:
"TSOs shall regularly review and update operational security limits in accordance with Article 21."

Amendments to Article 7

Article 7 'Methodology for allocation constraints', shall be replaced and be read accordingly:

"

1. In case operational security limits cannot be transformed efficiently into I_{max} and F_{max} pursuant to Article 6, the Core TSOs may transform them into allocation constraints. For this purpose, the Core TSOs may only use external constraints as a specific type of allocation constraint that limits the maximum import and/or export of a given Core bidding zone within the SIDC.

2. The Core TSOs may apply external constraints as one of the following two options:

   (a) a constraint on the Core net position (the sum of cross-zonal exchanges within the Core CCR for a certain bidding zone in the SIDC), thus limiting the net position of the respective bidding zone with regards to its imports and/or exports to other bidding zones in the Core CCR. This option shall be applied until option (b) can be applied.

   (b) a constraint on the global net position (the sum of all cross-zonal exchanges for a certain bidding zone in the SIDC), thus limiting the net position of the respective bidding zone with regards to all CCRs, which are part of the SIDC. This option shall be applied when: (i) such a constraint is approved within all intraday capacity calculation methodologies of the respective CCRs, (ii) the respective solution is implemented within the SIDC algorithm and (iii) the respective bidding zone borders are participating in SIDC.

3. External constraints may be used by PSE during a transition period of two years following the implementation of this methodology in accordance with Article 26(2)(b) and in accordance with the reasons and the methodology for the calculation of external constraints as specified in Annex 1 to this methodology. During this transition period, PSE shall:

(a) calculate the value of external constraints on a daily basis for each ID CC MTU;

(b) if applicable and in case the external constraint had a non-zero shadow price in more than 0.1% of hours in a quarter, provide to the CCC a report analysing: (i) for each DA CC MTU when the external constraint had a non-zero shadow price the loss in economic surplus due to external constraint and the effectiveness of the allocation constraint in preventing the violation of the underlying operational security limits and (ii) alternative solutions to address the underlying operational security limits. The CCC shall include this report as an annex in the quarterly report as defined in Article 24(5);

(c) if applicable and when more efficient, implement alternative solutions referred to in point (b).

4. In case that PSE could not find and implement alternative solutions referred to in the previous paragraph, it may, by eighteen months after the implementation of this methodology in accordance with Article 26(2)(b), together with all other Core TSOs, submit to all Core regulatory authorities a proposal for amendment of this methodology in accordance with Article 9(13) of CACM Regulation. Such a proposal shall include the following:

(a) the technical and legal justification for the need to continue using the external constraints indicating the underlying operational security limits and why they cannot be transformed efficiently into I_{max} and F_{max};

(b) the methodology to calculate the value of external constraints including the frequency of recalculation.

In case such a proposal has been submitted by all Core TSOs, the transition period referred to in paragraph 3 shall be extended until the decision on the proposal is taken by all Core regulatory authorities.

5. For the SIDC fallback procedure, pursuant to Article 20, all external constraints, shall be modelled as constraints limiting the Core net position as referred to in paragraph 2(a).

6. PSE may discontinue the use of an external constraint. In such a case, PSE shall communicate this change to all Core regulatory authorities and to the market participants at least one month before discontinuation.

7. The Core TSOs shall review and update allocation constraints in accordance with Article 21."

Amendments to Article 8

Article 8 'Reliability margin methodology', shall be amended accordingly:

a) Paragraph 7 shall be replaced and be read accordingly:

"No later than eighteen months after the implementation of this methodology in accordance with Article 26(2)(b), the Core TSOs shall jointly perform the first FRM calculation pursuant to the methodology described above and based on the data covering at least the first year of operation of this methodology. By the same deadline, all Core TSOs shall submit to all Core regulatory authorities a proposal for amendment of this methodology in accordance with Article 9(13) of the CACM Regulation as well as the supporting document as referred to in paragraph 9 below."

b) Paragraph 10 shall be replaced and be read accordingly:

"Until the proposal for amendment of this methodology pursuant to paragraph 7 ~~has been~~is approved ~~by all Core regulatory authorities~~, the Core TSOs shall use the following ~~FRM~~*FRM* values:

(c) ~~(a)~~ if and as long as all Core TSOs apply FRM for ~~CNECs already used in existing flow based~~the day-ahead capacity calculation ~~initiatives, the FRM values~~equal to 10% of Fmax, the FRM value for intraday capacity calculation for each CNEC shall be min {5% of Fmax, FRM at day-ahead level};

(d) as soon as the Core TSOs start applying the FRM calculation for the day-ahead capacity calculation pursuant to Article 8 of Core DA CCM, the FRM value for intraday capacity calculation shall be equal or lower ~~to~~than the FRM ~~values used~~value at the day ahead level."

Amendments to Article 9

Article 9 'Generation shift key methodology', shall be amended accordingly:

a) Paragraph 4 shall be replaced and be read accordingly:

"The GSKs shall be updated and reviewed on a daily basis or whenever the expectations referred to in paragraph 3 change. The Core TSOs shall review and update the application of the generation shift key methodology in ~~these initiatives at the time of adoption~~accordance with Article 21."

b) The first sentence of Paragraph 6 shall be replaced and be read accordingly:

"Within eighteen months after the implementation of this methodology~~; and~~ in accordance with Article 26(2)(b), all Core TSOs shall develop a proposal for further harmonisation of the generation shift key methodology and submit it by the same deadline to all Core regulatory authorities as a proposal for amendment of this methodology in accordance with Article 9(13) of the CACM Regulation."

~~(b) for CNECs not already used in existing flow based capacity calculation initiatives, the FRM values shall be equal or lower to 10% of the F_{max} calculated under normal weather conditions."~~

~~4.~~

Amendments to Article 10. Methodology

Article 10 'Methodology for remedial actions in intraday capacity calculationcalculation', shall be amended accordinglyreplaced and be read ccordingly:

a) Paragraph 3 shall be replaced and be read accordingly:

"“

1. In accordance with Article 25(1) of the CACM Regulation and Article 20(2) of the SO Regulation, the Core TSOs shall individually define the RAs to be taken into account in the intraday capacity calculation.

2. In case a RA made available for the intraday capacity calculation in the Core CCR is also made available in another CCR, the TSO having control on this RA shall take care, when defining it, of a consistent use in its potential application in both CCRs to ensure operational security.

1.3. In accordance with Article 25(2) and (3) of the CACM Regulation, these RAs will be used for the coordinated calculation of cross-zonal capacities while ensuring operational security in real-time.”.

b) Paragraph 4 shall be replaced and be read accordingly:

2.4. “RAs used for intraday capacity calculation willshall be aligned as much as technically feasible with the most recent ROSC CROSA. The latest version of coordinated RAs available at the time of starting step 2 according to Article 4(9) should shall be used. Such RAs will be only available once ROSC CROSA is implemented in accordance ofwith Article 37 of Core ROSC methodology.”.

c) Paragraph 7 shall be replaced and be read accordingly:

5. “In accordance with Article 25(4) of the CACM Regulation, a TSO may withhold only those RAs, which are needed to ensure operational security in real-time operation and for which no other (costly) RAs are available, or those offered to the intraday capacity calculation in other CCRs in which the concerned TSO also participates. The CCC shall monitor and report in the annual report on systematic withholdings, which were not essential to ensure operational security in real-time operation.

6. The intraday capacity calculation may only take into account those non-costly RAs which can be modelled. These non-costly RAs can be, but are not limited to:

(a) changing the tap position of a phase-shifting transformer (PST); and

(b) a topological action: opening or closing of one or more line(s), cable(s), transformer(s), bus bar coupler(s), or switching of one or more network element(s) from one bus bar to another.

3.7. In accordance with Article 25(6) of the CACM Regulation, all RAs taken into account for day-ahead capacity calculation are also considered during the intraday timeframe, depending on their technical availability.”.

8. ~~d) Paragraph 9~~The RAs can be preventive or curative, i.e. affecting all CNECs or only pre-defined contingency cases, respectively.

TSOs shall ~~be omitted~~

~~5. Article 15. Initial flow-based~~review and update the RAs taken into account in the intra-day capacity calculation in accordance with Article 21."

Amendments to Article 11

Article 11 'Update of intraday cross-zonal capacities remaining after the SDAC', shall be amended accordingly:

a) ~~Paragraph 3~~Paragraphs 2 to 4 shall be replaced and be read accordingly:

"

"

2. For each CNEC, each TSO may decrease the $RAM_{f,DA}$ by decreasing the AMR_{DA} and $LTA_{margin,DA}$ as calculated pursuant to the day-ahead capacity calculation methodology while ensuring that there is no undue discrimination between internal and cross-zonal exchanges in line with Article 21(1)(b)(ii) of the CACM Regulation.

3. Irrespective of the options provided to each TSO pursuant to this paragraph, each TSO shall ensure that on each bidding zone border, the long-term capacities that are in effect taken into account in the $LTA_{margin,DA}$, are between 0.001 MW and 1500 MW.

4. Until the implementation of intraday auctions at 15:00 market time of day D-1, the Core TSOs may set to zero the cross-zonal capacities calculated pursuant to Article 4(2)(a), including those calculated pursuant to a transitional solution for updating the cross-zonal capacities remaining after the day-ahead capacity allocation pursuant to Article 26(5).

   (a) In case the final cross-zonal capacities, calculated in accordance with this Article and taking into account Article 20(1), are in the form of ATCs, such a decision may be made per bidding zone border by the competent TSOs;

   (b) In case the final cross-zonal capacities, calculated in accordance with this Article and taking into account Article 20(1) are in the form of flow-based parameters, such a decision shall be coordinated among all Core TSOs. Further details on the application of transitional solution are defined in Annex 2 to this methodology."

Amendments to Article 14

Article 14 'Consideration of non-Core bidding zone borders', shall be amended accordingly:

a) The first sentence of Paragraph 4 shall be replaced and be read accordingly:

"No later than twelve months after the implementation of this methodology in accordance with Article 26(2)(b), the Core TSOs shall jointly develop a proposal for the implementation of the AHC and submit it by the same deadline to all Core regulatory authorities as a proposal for amendment of this methodology in accordance with Article 9(13) of the CACM Regulation."

Amendments to Article 15

Article 15 'Initial flow-based calculation', shall be replaced and be read accordingly:

"

1. As a first step in the intraday capacity calculation process, the CCC shall merge the individual lists of CNECs provided by all Core TSOs in accordance with Article 5(4) into a single list, which shall constitute the initial list of CNECs.

2. Subsequently, the CCC shall use the initial list of CNECs pursuant to paragraph 1, the CGM pursuant to Article 4(7) and the GSK for each bidding zone in accordance with Article 9 to calculate the initial flow-based parameters for each ID CC MTU.

3. The initial flow-based parameters shall be calculated pursuant to Article 12 and shall consist of the ~~**PTDF$_{init}$** and $\vec{F}_{ref,init}$~~**PTDF** values and $\vec{F}_{ref}$ values for each initial CNEC~~, as well as for additional elements part of the pre-defined static list of network elements with contingencies mentioned in~~."

Amendments to Article 16~~(2)(a)."~~

~~6.~~ Article 16~~. shall be renamed to "Definition~~ 'Definition of final list of CNECs for intraday capacity ~~calculation"~~

~~7. Article 16. Definition of final list of CNECs for intraday capacity calculation~~calculation', shall be amended accordingly:

a) ~~a) In~~ Paragraph 1 ~~the last sentence~~ shall be replaced and be read accordingly:

"The CCC shall use the initial list of CNECs determined pursuant to Article 15 and remove those CNECs, for which the maximum zone-to-zone $PTDF_{init}$ is below 5%. The remaining CNECs shall constitute the ~~pre-~~final list of CNECs."

b) ~~b)~~ Paragraph 2 shall be ~~replaced~~included and be read accordingly:

~~"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 pre-final list of CNECs mentioned in paragraph 1, may be exceptionally turned into CNECs. The inclusion of such additional elements complies to Core ROSC methodology Article 31(3a) which emphasizes the need to prevent the effect of activated cross-border relevant RAs in ROSC-CROSA process on operational security to be diminished by additional cross-zonal trades. The selection of the additional elements shall be based on the list of overloaded XNECs prior to the application of costly cross-border remedial actions during CROSA process, after application of two sequential filters:~~

~~(a) The aforementioned overloaded XNEs must be part of a pre-defined static list of network elements with contingencies,~~

~~(b) The sensitivity of the activated costly cross-border relevant RAs in CROSA process on the filtered elements that result from the previous step (a) must be over a dedicated agreed global threshold amongst Core NRA and Core TSOs based on experience once the ROSC-CROSA process is implemented."~~

~~c)~~ "If all available costly and non-costly RAs are not sufficient to ensure operational security on an internal network element with a specific contingency, which is not defined as a CNEC, the concerned Core TSO may exceptionally add such element to the final list of CNECs, provided that:

(a) Its maximum zone-to-zone PTDF is equal or above the threshold of 5% referred to in paragraph (1);

(b) Its voltage level must be 110 kV or above;

(c) Its RAM shall be the highest RAM ensuring operational security considering all available costly and non-costly RAs, with the floor of zero."

c) Paragraph 3 shall be ~~added~~included and be read accordingly:

"In the first twelve months following the implementation of the ROSC methodology in accordance with Article 76(1) of the SO Regulation, the concerned Core TSO may also add an XNEC to the final list of CNECs, with no PTDF threshold, provided that:

(a) It was loaded 100% or more before the latest CROSA and for which cross-border redispatch or countertrading were applied during that CROSA;

(b) Its RAM shall ~~consist of both the pre-final list of CNECs from~~be at least the difference between its Fmax and its loading after the CROSA.

After twelve months following the implementation of the ROSC methodology, the PTDF threshold of 5% shall apply to the XNEC to CNEC conversion, unless the amendment pursuant to paragraph ~~1 and the selected network elements from the aforementioned process in paragraph 2~~(4) is approved and implemented."

d) ~~d)~~ Paragraph 4 shall be ~~added~~included and be read accordingly:

~~"Until the ROSC CROSA process is implemented in accordance of Article 37 of Core ROSC methodology, the addition of network elements as referred to in paragraph 2 is not applied. The final list of CNECs will therefore be the equal to the pre-final list of CNECs during this interim period."~~

~~8.~~"The Core TSOs shall study the effects and needs for the XNEC to CNEC and may propose an amendment to this methodology, which shall at least include:

(a) the proposed PTDF threshold for XNEC to CNEC conversion;

(b) rules for avoiding undue discrimination between internal and cross zonal exchanges for such XNECs, which shall include limitations of such exchanges in proportion to the burdening effect of their consequential flows (internal flows and allocated flows, respectively)."

Amendments to Article 17~~.~~

Article 17 'Non-costly remedial actions ~~optimisation~~optimisation' shall be ~~fully omitted~~

~~9.~~deleted, and the new Article ~~18. Calculation~~17 would be 'Calculation of flow-based parameters before ~~validation~~validation', which shall be ~~amended~~read accordingly:

~~a) In paragraph 1 letter (a) shall be replaced and be read accordingly:~~

~~"the calculation of F_{ref} and $PTDF_F$ as follows:~~

~~i. $PTDF_F = \mathbf{PTDF_{init}}$~~

~~ii. $\vec{F}_{ref} = \vec{F}_{ref,init}$"~~

~~b) In paragraph 1 letter (b) shall be replaced and be read accordingly:~~

~~"the calculation of RAM before validation as follows:~~

~~For all CNECs part of the pre-final list pursuant to Article 16(1):~~

$$\overrightarrow{RAM}_{bv} = \vec{F}_{max} - \overrightarrow{FRM} - \vec{F}_{ref}$$

~~Equation 1~~

~~Or for all CNECs part of the additional set of network elements pursuant to Article 16(2):~~

$$\overrightarrow{RAM}_{bv} = \max(0, \vec{F}_{max} - \overrightarrow{FRM} - \vec{F}_{ref})$$

~~Equation 12a~~

~~With~~

~~$\vec{F}_{max}$ Maximum active power flow pursuant to Article 6~~

~~$\overrightarrow{FRM}$ Flow reliability margin pursuant to Article 8~~

~~$\vec{F}_{uaf}$ Flow resulting pursuant to paragraph 1(a)~~

~~$\overrightarrow{RAM}_{av}$ Remaining available margin before validation"~~

~~10. Article 19. Validation of flow-based parameters shall be amended accordingly:~~

~~Paragraph 7 shall be replaced and be read accordingly:~~

""

1. The flows assumed to result from commercial exchanges outside the Core CCR (F_{uaf}) shall be calculated in the following steps. First, the flows on CNECs in situations without commercial exchanges are calculated by setting the corresponding net positions $\overrightarrow{NP}_i$ to zero:

   (a) The flows without Core exchanges are calculated as:

$$\vec{F}_{0,Core} = \vec{F}_{ref} - \vec{F}_{ref,Core}$$

Equation 8a

$$\vec{F}_{ref,Core} = \mathbf{PTDF}_{\boldsymbol{Core}} \ \overrightarrow{NP}_{ref,Core}$$

Equation 8b

   (b) The flows without exchanges in the whole Continental Europe and on its links towards other synchronous areas, are calculated as:

$$\vec{F}_{0,all} = \vec{F}_{ref} - \mathbf{PTDF}_{\boldsymbol{all}} \ \overrightarrow{NP}_{ref,all}$$

Equation 8c

   For this calculation, the CCC shall use the GSKs provided by the concerned TSOs, and when these are not available, the CCC shall use a GSK where all nodes with positive injections participate in shifting in proportion to their injection.

   (c) The flow assumed to result from commercial exchanges outside the Core CCR (F_{uaf}) is then calculated for each CNEC as follows:

$$\vec{F}_{uaf} = \vec{F}_{0,Core} - \vec{F}_{0,all}$$

Equation 8d

   with

   $\vec{F}_{0,Core}$ flow per CNEC in a situation without commercial exchanges within the Core CCR

$\vec{F}_{ref}$	flow per CNEC in the CGM (which already contains the flows originated by SDAC process, and partially from the SIDC process)
$\vec{F}_{ref,Core}$	flow originated from the Core net positions which are already included in the CGM
$\mathbf{PTDF}_{Core}$	power transfer distribution factor matrix for all bidding zones of the Core CCR
$\mathbf{PTDF}_{all}$	power transfer distribution factor matrix for all bidding zones of Continental Europe, and connection points of the bidding zones of Continental Europe with the bidding zones of other synchronous areas
$\overrightarrow{NP}_{ref,Core}$	Core net position per bidding zone included in the CGM (resulting from SDAC and the SIDC exchanges already included in the CGM), excluding the net positions' changes resulting from the application of remedial actions in the previous CROSA process
$\overrightarrow{NP}_{ref,all}$	total net positions included in the CGM, of: all bidding zones of Continental Europe, and connection points of the bidding zones of Continental Europe with the bidding zones of other synchronous areas
$\vec{F}_{0,all}$	flow per CNEC in a situation without any commercial exchange between bidding zones within Continental Europe and any commercial exchange between the bidding zones of Continental Europe and the bidding zones of other synchronous areas
$\vec{F}_{uaf}$	unscheduled allocated flow, i.e. the flow per CNEC resulting from commercial exchanges outside Core CCR

2. Based on the initial flow-based domain and on the final list of CNECs, the Core CCC shall calculate for each CNEC the RAM before validation, according to the equation:

$$\overrightarrow{RAM}_{bv} = \vec{F}_{max} - \overrightarrow{FRM} - \vec{F}_{ref}$$

Equation 12

$\vec{F}_{max}$	Maximum active power flow pursuant to Article 6
$\overrightarrow{FRM}$	Flow reliability margin pursuant to Article 8
$\overrightarrow{RAM}_{bv}$	Remaining available margin before validation

2. In case an external constraint restricts the Core net positions pursuant to Article 7(2)(a), it shall be added as an additional row to the $\mathbf{PTDF}_f$ matrix and the $\overrightarrow{RAM}_{bv}$ vector as follows:

(a) the $PTDF$ value in the column related to the bidding zone applying the concerned external constraint is set to 1 for an export limit and -1 for an import limit, respectively;

(b) the $PTDF$ values in the columns related to all other bidding zones are set to zero; and

(c) the RAM value is set to the amount of the external constraint, corrected for the net position included in the CGM."

Amendments to Article 18

The previous Article 19 'Validation of flow-based parameters' shall become Article 18, and shall be read accordingly:

"

1. The Core TSOs shall validate and have the right to correct cross-zonal capacity for reasons of operational security during the validation process.

2. Each Core TSO shall validate and have the right to decrease the RAM for reasons of operational security during the individual validation. The adjustment due to individual validation is called 'individual validation adjustment' (IVA) and it shall have a positive value, i.e. it may only reduce the RAM. IVA may reduce the RAM only to the minimum degree that is needed to ensure operational security, and only after all the expected available costly and non-costly remedial actions pursuant to Article 22 of the SO Regulation are considered. In case certain remedial actions are not implemented, such as countertrading, Core TSOs shall ensure their implementation within twelve months following the application of IDCC(b) pursuant to Article 4(2)(b).

3. The individual validation adjustment may be done in the following situations:

   (a) an occurrence of an exceptional contingency or forced outage as defined in Article 3(39) and Article 3(77) of the SO Regulation;

   (b) when all available costly and non-costly RAs are not sufficient to ensure operational security;

   (c) a mistake in input data, that leads to an overestimation of cross-zonal capacity from an operational security perspective; and/or

   (d) a potential need to cover reactive power flows on certain CNECs.

4. When performing the validation, the Core TSOs shall consider the operational security limits pursuant to Article 6(1). While considering such limits, they may consider additional grid models, and other relevant information. Therefore, the Core TSOs shall use the tools developed by the CCC for analysis, but may also employ verification tools not available to the CCC.

5. In case of a required reduction due to situations as defined in paragraph 3(a), a TSO may use a positive value for IVA for its own CNECs or adapt the external constraints, pursuant to Article 7, to reduce the cross-zonal capacity for its bidding zone.

6. In case of a required reduction due to situations as defined in paragraph 3(b), (c), and (d), a TSO may use a positive value for IVA for its own CNECs. In case of a situation as defined in paragraph 3(c), a Core TSO may, as a last resort measure, request a common decision to launch the default flow-based parameters pursuant to Article 20.

~~1.~~7. After individual validation adjustments, the remaining available margin before validation ($\overrightarrow{RAM}_{bv}$) shall be adjusted for the flows resulting from net positions or already allocated capacities resulting from the SIDC in accordance with Article 4(5~~)(b).~~)c. The final RAM_f shall be calculated by the CCC for each CNEC and external constraint according to Equation 13:Equation 1~~Equation 1Equation 1Equation 11.~~

$$\overrightarrow{RAM}_f = \overrightarrow{RAM}_{bv} - \overrightarrow{IVA} - \mathbf{PTDF}_{Core}\ \overrightarrow{NP}_{AAC,IDadd}$$

Equation ~~13~~1~~131~~2~~11~~

with

~~$\overrightarrow{RAM}_f$ final remaining available margin~~

~~$\overrightarrow{RAM}_{bv}$ remaining available margin before validation~~

~~$\overrightarrow{IVA}$ individual validation adjustment~~

~~$\mathbf{PTDF}_f$ final power transfer distribution factor matrix resulting from the intraday capacity calculation~~

~~$\overrightarrow{NP}_{AAC,ID}$ Core net positions resulting from SIDC which are not already included in the CGM"~~

~~11.~~

$\overrightarrow{RAM}_f$ final remaining available margin

$\overrightarrow{RAM}_{bv}$ remaining available margin before validation

$\overrightarrow{IVA}$ individual validation adjustment

$\mathbf{PTDF}_{Core}$ final power transfer distribution factor matrix resulting from the intraday capacity calculation

$\overrightarrow{NP}_{AAC,IDadd}$ Core net positions resulting from SIDC which are not already included in the CGM

8. The CCC shall remove those $\overrightarrow{RAM_f}$ and $\mathbf{PTDF_f}$ values which are redundant and may therefore be removed without impacting the possible allocation of cross-zonal capacity. The pre-solved CNECs and external constraints shall thus ensure that the capacity allocation shall not exceed any limiting CNEC or external constraint.

9. Any reduction of cross-zonal capacities during the validation process shall be communicated and justified to market participants and to all Core regulatory authorities in accordance with Article 22 and Article 24, respectively.

10. Every three months, the CCC shall provide in the quarterly report all the information on the reductions of cross-zonal capacity and exceptional additions of internal network elements. The quarterly report shall include at least the following information for each CNEC of the pre-solved domain affected by a reduction and for each ID CC MTU:

    (a) the identification of the CNEC;

    (b) all the corresponding flow components pursuant to Article 22(2)(b)(vii);

    (c) the volume of reduction and, if applicable, the shadow price of the CNEC resulting from SIDC and the estimated market loss of economic surplus due to the reduction;

    (d) the detailed reason(s) for reduction, including the operational security limit(s) that would have been violated without reductions, specifying network elements on which these limits would have been violated, and under which circumstances they would have been violated, as well as the list of remedial actions with their detailed information, considered prior to the reduction;

    (e) the forecast flow in the CGM used for D-1 capacity calculation, in the CGM considered for the intraday capacity calculation within which the capacity reduction occurred, in the first CGM established after the considered intraday calculation and the realised flow, before (and when relevant after) contingency;

    (f) if an internal network element with a specific contingency was exceptionally added to the final list of CNECs pursuant to Article 16:

        (a) a justification why adding the network element with a specific contingency to the list was the only way to ensure operational security;

        (b) the name or the identifier of the internal network element with a specific contingency;

        (c) the ID CC MTUs for which the internal network element with a specific contingency was added to the list;

        (d) the maximum zone-to-zone PTDF calculated on the basis of the methodology in Article 12, calculated on the CGM for MTUs defined in paragraph iii;

(e) for the cases under Article 16(3), the amount of total, internal, loop and allocated flows at the considered exceptionally added XNEC; and

(f) the information referred to in paragraphs (b), (c) and (e) above.

(g) the remedial actions included in the CGM before the intraday capacity calculation;

(h) in case of reduction due to individual validation, the TSO invoking the reduction; and

(i) the proposed measures to avoid similar reductions in the future.

11. The quarterly report shall also include at least the following aggregated information:

(a) statistics on the number, causes, volume and estimated loss of economic surplus of applied reductions by different TSOs; and

(b) general measures to avoid cross-zonal capacity reductions in the future.

12. When a given Core TSO reduces capacity for its CNECs in more than 1% of ID CC MTUs of the analysed quarter, the concerned TSO shall provide to the CCC a detailed report and action plan describing how such deviations are expected to be alleviated and solved in the future. This report and action plan shall be included as an annex to the quarterly report.

13. The final flow-based parameters shall consist of $\mathbf{PTDF}_f$ and $\overrightarrow{RAM}_f$ for CNECs and external constraints of the pre-solved domain."

Amendments to Article 19

The previous Article 20~~.~~ 'Intraday capacity calculation fallback ~~procedure~~procedure' shall ~~be amended accordingly:~~

~~The third sentence shall be replaced~~become Article 19, and shall be read accordingly:

~~"~~"According to Article 21(3) of the CACM Regulation, when the intraday capacity calculation for specific ID CC MTUs does not lead to the final flow-based parameters due to, inter alia, a technical failure in the tools, an error in the communication infrastructure, or corrupted, missing or delayed input data, the Core TSOs and the CCC shall define the missing parameters by calculating the default flow-based parameters. The calculation of default flow-based parameters shall be based on previously calculated flow-based parameters for the same delivery market time unit. The latest (intraday or day-ahead) available flow-based domain, which may be corrected during local validation in accordance with Article ~~19~~18, for the considered delivery hour is first converted to zero Core balance. The RAM on each

CNEC (including allocation constraints) is then decreased by the adjustments for minRAM and LTA inclusion (if present). The redundant constraints are removed, and pre-solved constraints are adjusted for the Core net positions resulting from the SDAC and the SIDC."

~~12. Article 22. Reviews and updates shall be amended accordingly:~~

~~Paragraph 4 shall be replaced and be read accordingly:~~

~~"The review of the list of RAs taken into account in the intraday capacity calculation, as defined in Article 10(4), shall include at least an evaluation of the efficiency of specific PSTs and the topological RAs considered from the CROSA process."~~

~~13. Article 23. Publication of data shall be amended accordingly:~~

~~a) In paragraph 2 letter (b)(vii) shall be replaced and be read accordingly:~~

~~"detailed breakdown of RAM for each CNEC of the final flow-based parameters before pre-solving: I_{max}, U, F_{max}, FRM, $F_{ref,init}$, $F_{0,core}$, $F_{0,all}$, IVA;"~~

~~b) In paragraph 2 letter (b)(xii) shall be omitted~~

~~14. Article 25. Monitoring, reporting and information to the Core regulatory authorities shall be amended accordingly:~~

~~In paragraph 4 letter (c) shall be omitted~~

~~Article 3~~
Amendments to ~~avoid disproportionate negative ATCs on very distant Core borders~~Article 20

~~1.~~The previous Article 21~~. Calculation~~ 'Calculation of ATCs for SIDC fallback procedure', shall become Article 20 and shall be read accordingly:

"

1. In case the SIDC is unable to accommodate flow-based parameters, the CCC shall convert them into available transmission capacities (hereafter referred as "ATCs for SIDC fallback procedure~~ shall be amended accordingly:~~") for each Core oriented bidding zone border and each DA CC MTU. The Core TSOs may delegate this responsibility to a third party.

~~a) In paragraph 5 letter (c) shall be replaced and be read accordingly:~~

~~"Negative ATCs are calculated for CNECs with negative $RAM_{ATC}(0)$ according to the following procedure:~~

2. ~~i.~~ The flow-based parameters shall serve as the basis for the determination of the ATCs for SIDC fallback procedure. As the selection of a set of ATCs from the flow-based parameters leads to an infinite set of choices, the algorithm provided in paragraph 5 determines the ATCs for SIDC fallback procedure.

3. The following inputs are required to calculate ATCs for SIDC fallback procedure for each ID CC MTU:

   (a) final flow-based parameters ($\mathbf{PTDF}_f$ and $\overrightarrow{RAM}_f$) as calculated pursuant to Article 18 ~~Article 18~~ or final flow-based parameters ($\mathbf{PTDF}_{f,DA}$ and $\overrightarrow{RAM}_{UID}$) as calculated pursuant to Article 11 ~~Article 11~~;

   (b) if defined, the global allocation constraints shall be assumed to constrain the Core net positions pursuant to Article 7(5), and shall be described following the methodology described in Article 17(3). Such constraints shall be adjusted for offered cross-zonal capacities on the non-Core bidding zone borders.

4. the final PTDFs ($\mathbf{PTDF}_f$ and $\mathbf{PTDF}_{f,DA}$) of all or only a subset of CNECs can be adjusted before the ID ATC extraction by setting the positive zone-to-zone PTDFs below a certain threshold to zero. The following outputs are the outcomes of the calculation for each MTU:

   (a) ATCs for SIDC fallback procedure; and

   (b) constraints with zero margin after the calculation of ATCs for SIDC fallback procedure.

   (c) an ATC limitation on specific borders as set by relevant TSOs as output of the local validation as defined in Annex 6: $ATC_{A\rightarrow B\ validated}$[1]

5. The calculation of the ATCs for SIDC fallback procedure is an iterative procedure, which gradually calculates ATCs for each DA CC MTU, while respecting the constraints of the final flow-based parameters pursuant to paragraph 3:

   (a) The initial ATCs are set equal to zero for each Core oriented bidding zone border, i.e.:

$$\overrightarrow{ATC}_{k=0} = 0$$

   with

   $\overrightarrow{ATC}_{k=0}$ the initial ATCs before the first iteration

   (b) the remaining available margin at iteration zero is either equal to the final remaining available margin ($\overrightarrow{RAM}_f$) according to Article 18(8) or the updated

[1] Relates to the third amendment, for information only.

remaining available margin for intraday cross-zonal capacities (RAM_UID) according to Article 11(1):

$$\overrightarrow{RAM}_{ATC}(0) = \overrightarrow{RAM}_{f}$$
$$\text{or } \overrightarrow{RAM}_{ATC}(0) = \overrightarrow{RAM}_{UID}$$

Equation 14

with

$\overrightarrow{RAM}_{ATC}(0)$	remaining available margin for ATC calculation at iteration k=0
$\overrightarrow{RAM}_{f}$	remaining available margin of the flow-based parameters pursuant to paragraph 3.
$\overrightarrow{RAM}_{UID}$	updated remaining available margin for intraday cross-zonal capacities

(c) In the case when there are negative RAMs, negative ATCs are calculated for CNECs with negative $RAM_{ATC}(0)$ according to the following procedure:

i. Per CNEC with negative remaining available margin for ATC calculation at iteration k=0 ($RAM_{ATC}(0)$) negative ATCs are calculated for all oriented bidding zone borders with positive PTDFs according to Equation 14a:

$$ATC_{A\to B,CNEC\ i} = \frac{pPTDF_{A\to B,CNEC\ i}}{\sum_{(A,B)\in\ Core\ contract\ paths\ with\ positive\ z2zPTDFs} PTDF_{A\to B}^{2}} RAM_{ATC\ ,CNEC\ i}(0)$$

Equation 14a

with

~~$ATC_{A\to B,CNEC\ i}$ negative ATC for the oriented bidding zone border A to B determined by CNEC i~~

~~A, B Core bidding zones~~

~~$RAM_{ATC,CNEC\ i}(0)$ remaining available margin for ATC calculation at iteration k=0 of CNEC i~~

~~$pPTDF_{A\to B,CNEC\ i}$ Final positive zone-to-zone PTDF of the oriented bidding zone border A to B~~

~~ii.~~

$ATC_{A\rightarrow B,CNEC\,i}$	negative ATC for the oriented bidding zone border A to B determined by CNEC i
A,B	Core bidding zones
$RAM_{ATC,CNEC\,i}(0)$	remaining available margin for ATC calculation at iteration k=0 of CNEC i
$pPTDF_{A\rightarrow B,CNEC\,i}$	Final positive zone-to-zone PTDF of the oriented bidding zone border A to B

ii. In case for an oriented Core bidding zone border more than one negative ATC has been calculated according to Equation 14a then for each oriented Core bidding zone border the most negative ATC is determined over all CNECs with negative remaining available margin.

$$\overrightarrow{ATC}_{A\rightarrow B} = min\left(\overrightarrow{ATC}_{A\rightarrow B,CNEC\,i}\right)$$

Equation 14b

iii. ~~iii.~~ After extraction of negative ATCs a scaling factor (*SF*) is calculated for each CNEC with negative remaining available margin:

$$SF_{CNEC\,i} = \left|\frac{RAM_{ATC,CNEC\,i}(0)}{\sum_{(A,B)\in \text{Core contract paths with positive z2zPTDFs}} PTDF_{A\rightarrow B,CNEC\,i}\ ATC_{A\rightarrow B}}\right|$$

Equation 14c

The final scaling factor (SF_{final}) is the maximum of all calculated scaling factors:

$$SF_{final} = max(SF_{CNEC\,i})$$

Equation 14d

iv. ~~iv.~~ The final negative ATCs are calculated by scaling the negative ATCs with the final scaling factor:

$$\overrightarrow{ATC}_{negative,final} = \overrightarrow{ATC}_{A\rightarrow B}\ SF_{final}$$

Equation 14e~~"~~

d) ~~d) b) In paragraph 5 a new letter (cc) shall be added and be read accordingly:~~

~~(cc)~~ ~~"~~Before starting the iterative method applied to calculate the positive ATCs for SIDC fallback all the remaining available margins for ATC calculation at iteration k=0 ($\overrightarrow{RAM}_{ATC}(0)$) shall be adjusted to be non-negative:

$$\overrightarrow{RAM}_{ATC}(0) = \max\left(0, \overrightarrow{RAM}_{ATC}(0)\right)$$

Equation 14f

with

~~$\overrightarrow{RAM}_{ATC}(0)$ remaining available margin for ATC calculation at iteration k=0~~

$\overrightarrow{RAM}_{ATC}(0)$ remaining available margin for ATC calculation at iteration k=0

The iterative method applied to calculate the positive ATCs for SIDC fallback procedure consists of the following actions for each iteration step k:

i. ~~i.~~ for each CNEC and external constraint of the flow-based parameters pursuant to paragraph ~~3,~~3, calculate the remaining available margin based on ATCs at iteration k-1

$$\overrightarrow{RAM}_{ATC}(k) = \overrightarrow{RAM}_{ATC}(0) - \mathbf{pPTDF}_{zone-to-zone}\,\overrightarrow{ATC}_{k-1}$$

Equation 14g

with

~~$\overrightarrow{RAM}_{ATC}(k)$ remaining available margin for ATC calculation at iteration k~~

~~$\overrightarrow{ATC}_{k-1}$ ATCs at iteration k-1~~

~~$\mathbf{pPTDF}_{zone-to-zone}$ positive zone-to-zone power transfer distribution factor matrix~~

~~ii.~~

$\overrightarrow{RAM}_{ATC}(k)$ remaining available margin for ATC calculation at iteration k

$\overrightarrow{ATC}_{k-1}$ ATCs at iteration k-1

$\mathbf{pPTDF}_{zone-to-zone}$ positive zone-to-zone power transfer distribution factor matrix

ii. for each CNEC, share $RAM_{ATC}(k)$ with equal shares among the Core oriented bidding zone borders with strictly positive zone-to-zone power transfer distribution factors on this CNEC;

iii. ~~iii.~~ from those shares of $RAM_{ATC}(k)$, the maximum additional bilateral oriented exchanges are calculated by dividing the share of each Core oriented bidding zone border by the respective positive zone-to-zone PTDF~~;~~.

iv. ~~iv.~~ for each Core oriented bidding zone border, $\overrightarrow{ATC}_k$ is calculated by adding to $\overrightarrow{ATC}_{k-1}$ the minimum of all maximum additional bilateral oriented exchanges for this border obtained over all CNECs and external constraints as calculated in the previous step;

~~v. go back to step i;~~

v. ~~vi.~~ $\overrightarrow{ATC}_k$ is limited to a maximum value of $ATC_{A\rightarrow B\ validated}$ if such value has been introduced by TSOs on the border A→B as a result of the ATC validation phase as described in Annex 6. Then go back to step ~~iiii~~;[2]

vi. iterate until the difference between the sum of ATCs of iterations *k* and *k*-1 is smaller than 1kW;

vii. ~~vii.~~ the resulting positive ATCs for SIDC fallback procedure stem from the ATC values determined in iteration *k*, after rounding down to integer values;

viii. ~~viii.~~ at the end of the calculation, there are some CNECs and external constraints with no remaining available margin left. These are, together with the CNECs and external constraints with initially negative $RAM_{ATC}(0)$, the limiting constraints for the calculation of ATCs for SIDC fallback procedure~~.~~".

~~c) In paragraph 5 a new letter (e) shall be added and be read accordingly:~~

e) "positive zone-to-zone PTDF matrix ($\mathbf{pPTDF}_{zone-to-zone}$) for each Core oriented bidding zone border shall be calculated from the $\mathbf{PTDF}_{Core}$ as follows (for HVDC interconnectors integrated pursuant to Article 13, *Equation 8* shall be used):

[2] Relates to the third amendment, for information only.

$$pPTDF_{zone-to-zone,A\rightarrow B} = \max\left(0, PTDF_{zone-to-slack,A} - PTDF_{zone-to-slack,B}\right)$$

Equation 2~~15a2213~~

with

$pPTDF_{zone-to-zone,A\rightarrow B}$	positive zone-to-zone $PTDFs$ for Core oriented bidding zone border A to B
$PTDF_{zone-to-slack,m}$	zone-to-slack $PTDF$ for Core bidding zone border m

~~(b)~~f) The final ATCs per Core oriented bidding zone border are the minimum from positive and negative ATCs:

$$\overrightarrow{ATC}_{final} = \min\left(\overrightarrow{ATC}_k, \overrightarrow{ATC}_{negative,final}\right)$$

Equation 15b"

~~Article 4~~
Amendments to ~~ensure a correct handling of HVDC interconnectors~~Article 21

~~1. Article 12. Calculation of power transfer distribution factors and reference flow shall be amended accordingly:~~

~~Paragraph 5 shall be replaced and be read accordingly:~~

~~"~~The ~~maximum zone-to-zone $PTDF$ of a CNEC ($PTDF_{zzzmax,t}$) is the maximum influence that any Core exchange has on the respective CNEC, including exchanges over HVDC interconnectors which are integrated pursuant to~~ previous Article ~~13:~~

~~$$PTDF_{zzzmax,t} = max\left(\max_{A\in BZ}\left(PTDF_{A,t}\right) - \min_{A\in BZ}\left(PTDF_{A,t}\right), \max_{HVDC}\left(\left|\left(PTDF_{A,t} - PTDF_{HVDC\_1,t}\right) - \left(PTDF_{B,t} - PTDF_{HVDC\_2,t}\right)\right|, \left|PTDF_{HVDC\_1,t} - PTDF_{HVDC\_2,t}\right|\right)\right)$$~~

~~*Equation 6*~~

~~with~~

~~$PTDF_{A,t}$~~	~~zone-to-slack $PTDF$ of bidding zone A on a CNEC l~~
~~HVDC~~	~~set of HVDC interconnectors integrated pursuant to~~ 22 'Reviews and updates', shall become Article ~~13~~

~~BZ set of all Core bidding zones~~

~~$\max_{A \in BZ}(PTDF_{A,l})$ maximum zone-to-slack PTDF of Core bidding zones on a CNEC l~~

~~$\min_{A \in BZ}(PTDF_{A,l})$ minimum zone-to-slack PTDF of Core bidding zones on a CNEC l~~

~~$PTDF_{VH\_1,l}$ zone-to-slack $PTDF$ of Virtual hub 1 on a CNEC l, with virtual hub 1 representing the converter station at the sending end of the HVDC interconnector located in bidding zone A~~

~~$PTDF_{VH\_2,l}$ zone-to-slack $PTDF$ of Virtual hub 2 on a CNEC l, with virtual hub 2 representing the converter station at the sending end of the HVDC interconnector located in bidding zone B"~~

~~2. Article 13. Integration of HVDC interconnectors on bidding zone borders of the Core CCR shall be~~ 21 and shall be amended accordingly:

~~In paragraph 1 the last sentence~~paragraphs 6 and 7 shall be ~~replaced and be~~ amended by replacing "the Agency" with "ACER".

Amendments to Article 22

The previous Article 23 'Publication of data', shall become Article 22 and shall be read ~~accordingly~~as follows:

"~~According~~

1. In accordance with Article 3(f) of the CACM 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 intraday 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 ~~exchange over an HVDC interconnector on the~~ capacities in accordance with Article 4(2) by the deadlines set therein;

   (b) the following information for intraday cross-zonal capacity calculation and recalculation pursuant to Article 4(2)(b) to (e) shall be published by the deadlines established therein:

i. maximum and minimum possible net position of each bidding zone ~~borders of the Core CCR is modelled and optimised explicitly as a~~;

ii. maximum possible bilateral ~~exchange in capacity allocation, and is constrained by the physical impact that this exchange has on all~~ exchanges between all pairs of Core bidding zones;

iii. if applicable, ATCs for SIDC fallback procedure;

~~i.~~iv. names of CNECs ~~considered in~~ (with geographical names of substations where relevant and separately for CNE and contingency) and external constraints of the final flow-based ~~domain used in capacity allocation and constraints modelling the maximum possible exchange of the HVDC interconnector."~~parameters before pre-solving and the TSO defining them;

~~Article 5~~
~~Amendments to ensure consistency with the amended day-ahead capacity calculation methodology~~

~~ii.~~v. ~~1. Article 19. Validation of~~ for each CNEC of the final flow-based parameters ~~shall be amended accordingly:~~before pre-solving, the EIC code of CNE and Contingency;

~~a) In Paragraph 3 a sentence shall be added and be read accordingly:~~

~~"If all available costly and non-costly RAs are not sufficient to ensure operational security on an internal network element with a specific contingency, which is not defined as CNEC and for which the maximum zone-to-zone PTDF is above the PTDF threshold referred to in Article 16(1), the competent Core TSO may exceptionally add such internal network element with associated contingency to the final list of CNECs. The RAM on this exceptional CNEC shall be the highest RAM ensuring operational security considering all available costly and non-costly RAs. $PTDF_{init}$ according to Article 15(3) shall be used to determine if the PTDF of the additional CNEC is above the PTDF threshold."~~

~~b) In paragraph 10 letter (e) shall be omitted~~
~~c) In Paragraph 10 letter (f) shall be replaced and be read accordingly:~~

vi. ~~"~~for each CNEC of the final flow-based parameters before pre-solving, the method for determining I_{max} in accordance with Article 6(2)(a);

vii. detailed breakdown of RAM for each CNEC of the final flow-based parameters before pre-solving: I_{max}, U, F_{max}, FRM, F_{ref}, $F_{0,\text{core}}$, $F_{0,\text{all}}$, $F_{\text{ref,core}}$, F_{uaf}, IVA;

viii. value of each external constraint before pre-solving;

ix. indication of whether default flow-based parameters were applied;

x. indication of whether a CNEC is redundant or not;

xi. information about the validation reductions:

- the identification of the CNEC;
- the TSO invoking the reduction;
- the volume of reduction (*IVA*);
- the detailed reason(s) for reduction in accordance with Article 18(2) and 18(3), including the operational security limit(s) that would have been violated without reductions, and under which circumstances they would have been violated;
- if an internal network ~~element~~elements with a specific contingency was exceptionally added to the final list of CNECs during validation: (i) a justification of the reasons of why adding the internal network elements with a specific contingency to the list was the only way to ensure operational security, (ii) the name or ~~the~~ identifier of the internal network elements with a specific contingency, ~~the~~along with the calculated set of PTDFs;

~~(b)~~(c) the following forecast information contained in the CGM for each ID CC ~~MTUs for which the internal network elements with a specific contingency was added to the list and the information referred to in points (b) and (c) above;"~~MTU shall be published by the deadlines established in Article 4(2):

~~2. Article 23. Publication of data shall be amended accordingly:~~

~~a) In paragraph 2 letter (d)(ii) shall be omitted~~
~~b) In paragraph 2 a new letter (f) shall be added and be read accordingly:~~

i. ~~"The CCC shall include in its quarterly report as defined in Article 25(5) the flows resulting from~~vertical load for each Core bidding zone and each TSO;

ii. production for each Core bidding zone and each TSO;

iii. Core net position for each Core bidding zone and each TSO;

iv. reference net positions ~~resulting from~~of all bidding zones in synchronous area Continental Europe and reference exchanges for all HVDC interconnectors within synchronous area Continental Europe and between synchronous area Continental Europe and other synchronous areas; and

as soon as the SIDC ~~on each CNEC and external constraint of the final~~ directly applies the flow-based parameters.~~"~~

c) A new paragraph 7 shall be added and be read accordingly:

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

3. Article 25. Monitoring, reporting and information to the Core regulatory authorities shall be amended accordingly:

In paragraph 5 a new letter (d) shall be added and read accordingly:

(c)(d) "according to Article 23(2)(f), Core TSOs shall report on flows resulting from net positions resulting from the SIDC on, in case of intraday auctions, two hours after the auction, the information pursuant to paragraph 2(b)(vii) shall be complemented by the following information for each CNEC and external constraint of the final flow-based parameters.".

Article 6
Amendments related to the ID ATC extraction to introduce the "Setting low PTDF to zero" feature and to clarify the wording

1. Article 21. Calculation of ATCs for SIDC fallback procedure shall be amended accordingly:

a) In paragraph 3 letter (a) $\mathbf{PTDF_F}$ shall be replaced with $\mathbf{PTDF_{F,DA}}$

b) In paragraph 3 a new letter (c) shall be added and be read accordingly:

"the final PTDFs ($\mathbf{PTDF_F}$ and $\mathbf{PTDF_{F,DA}}$) of all or only a subset of CNECs can be adjusted before the ID ATC extraction by setting the positive zone-to-zone PTDFs below a certain threshold to zero.

i. b) In paragraph 5 letter (b)shadow prices;

ii. flows resulting from net positions obtained at intraday auctions.

(e) every six months, the publication of an up-to-date static grid model by each Core TSO.

(f) The CCC shall include in its quarterly report as defined in Article 25(6) the flows resulting from net positions resulting from intraday auctions on each CNEC and external constraint of the final flow-based parameters. This requirement is valid after the SIDC will directly apply the flow-based parameters.

3. Individual Core TSO may withhold the information referred to in paragraph 2(b)(iv), 2(b)(v) and 2(e) if it is classified as sensitive critical infrastructure protection related information in their Member States as provided for in point (d) of Article 2 of the Council Directive 2008/114/EC of 8 December 2008 on the identification and designation of European critical infrastructures and the assessment of the need to improve their protection. In such a case, the information referred to in paragraph 2(b)(iv) and 2(b)(v) shall be replaced with an anonymous identifier which shall be stable for each CNEC across all ID CC MTUs. The anonymous identifier shall also be used in the other TSO communications related to the CNEC, including the static grid model pursuant to paragraph 2(e) and when communicating about an outage or an investment in infrastructure. The information about which information has been withheld pursuant to this paragraph shall be published on the communication platform referred to in paragraph 1.

4. Any change in the identifiers used in paragraphs 2(b)(iv), 2(b)(v) and 2(e) shall be publicly notified at least one month before its entry into force. The notification shall at least include:

   (a) the day of entry into force of the new identifiers; and

   (b) the correspondence between the old and the new identifier for each CNEC.

5. Pursuant to Article 20(9) of the CACM Regulation, the Core TSOs shall establish and make available a tool which enables market participants to evaluate the interaction between cross-zonal capacities and cross-zonal exchanges between bidding zones. The tool shall be developed in coordination with stakeholders and all Core regulatory authorities and updated or improved when needed.

6. 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 ACER. Each Core TSO may decide not to publish the additional information, which was not requested by its competent regulatory authority."

Amendments to Article 23

The previous Article 24 'Quality of the data published', shall become Article 23 and shall be amended accordingly:

a) Paragraph 1 shall be replaced and be read accordingly:

~~"the remaining available margin at iteration zero is either equal to the final remaining available margin ($\overrightarrow{RAM_F}$) according to Article 19(0) or the updated remaining available margin for intraday cross-zonal capacities ($\overrightarrow{RAM_{UID}}$) according to Article 11 (1):~~

~~$$\overrightarrow{RAM_{AAC}}(0) = \overrightarrow{RAM_F}$$~~
~~$$\text{or } \overrightarrow{RAM_{AAC}}(0) = \overrightarrow{RAM_{UID}}$$~~
~~Equation 3~~

~~with~~

~~$\overrightarrow{RAM}_{ATC}(0)$ remaining available margin for ATC calculation at iteration $k=0$~~

~~$\overrightarrow{RAM}_{F}$ final remaining available margin of the flow-based parameters~~"No later than six months before the implementation of this methodology in accordance with Article 26(2)(b), 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 22. When doing so, they shall consult with relevant stakeholders and all Core regulatory authorities."

Amendments to Article 24

The previous Article 25 'Monitoring, reporting and information to the Core regulatory authorities', shall become Article 24 'Monitoring and reporting', and shall be read accordingly:

"

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

2. At least, the information on non-anonymized names of CNECs for final flow-based parameters before pre-solving as referred to in Article 22(2)(b)(iv) and (v) shall be provided to all Core regulatory authorities on a monthly basis for each CNEC and each ID CC MTU. This information shall be in a format that allows easily to combine the CNEC names with the information published in accordance with Article 22(2).

3. In addition, each month, starting in January 2025 with data for December 2024, the Core TSOs shall provide the Core regulatory authorities and ACER with the following data for each MTU and each CNEC:

   (a) final zone-to-hub PTDF values for all modelled bidding zones;

   (b) Core net positions pursuant to Article 4(5); and

   (c) flow components, consisting of the internal flow, loop flows (total loop flow and particular loop flows created by each bidding zone) and PST flow.

4. 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.

5. 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 10, 14, 23 and 26 of this methodology:

(a) according to Article 10(5), the Core TSOs shall report to the Core CCC on systematic withholdings which were not essential to ensure operational security in real-time operation.

(b) according to Article 14(5), the Core TSOs shall monitor the accuracy of non-Core exchanges in the CGM.

(c) according to Article 23(3), the CCC shall monitor and report on the quality of the data published on the dedicated online communication platform as referred to in Article 22, with supporting detailed analysis of a failure to achieve sufficient data quality standards by the concerned TSOs, where relevant.

(d) according to Article 26(4), 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.

6. The CCC, with the support of the Core TSOs where relevant, shall draft and publish a quarterly report satisfying the reporting obligations set in Articles 7, 19 and 26 of this methodology:

(a) according to Article 7(3)(b), the CCC shall collect all reports analysing the effectiveness of relevant allocation constraints, received from the concerned TSOs during the period covered by the report, and annex those to the quarterly report.

(b) according to Article 18(10), the CCC shall provide all information on the reductions of cross-zonal capacity, with a supporting detailed analysis from the concerned TSOs where relevant.

(c) according to Article 26(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.

(d) according to Article 22(2)(f), Core TSOs shall report on flows resulting from net positions resulting from the intraday auctions, on each CNEC and external constraint of the final flow-based parameters. This requirement is valid after the SIDC will directly apply the flow-based parameters.

7. The published annual and quarterly reports may withhold commercially sensitive information or sensitive critical infrastructure protection related information as referred to in Article 22(3). In such a case, the Core TSOs shall provide the Core regulatory authorities with a complete version where no such information is withheld. "

Amendments to Article 25

A new Article 25 'TSOs' analyses', shall be included and shall be read accordingly:

"

1. Core TSOs shall analyse possible measures to increase cross-zonal capacities in the intraday timeframe, and over time, to reach the minimum capacity threshold

of 70% pursuant to Article 16(8) of the Regulation (EU) 2019/943, on each CNEC. The analyses shall consist of a common assessment by all Core TSOs and individual assessments by each Core TSO.

2. The common assessment by all Core TSOs shall identify and analyse both short-term and long-term systemic measures which would maximise the infrastructure utilisation and enable higher intraday capacities, and which can be jointly implemented by all Core TSOs. These measures shall at least include:

   (a) the ability to activate remedial actions closer to real time;

   (b) the possibility to ignore marginal PTDF values in case of flow-based to ATC conversion;

   (c) the possibility for a TSO to remove the interconnectors with the non-Core bidding zones from the list of critical network elements.

3. The individual assessments shall identify and analyse measures which can be implemented individually by each Core TSO for each of its CNECs, and shall at least consider:

   (a) remedial actions which can be activated within or after the intraday timeframe, including non-costly and costly ones;

   (b) targeted investments, contributing to meeting the minimum capacity requirement on specific CNECs, and specifying their expected implementation time;

   (c) alternative bidding zone configurations pursuant to ACER Decision 11/2022;

   (d) further potential refinements of capacity calculation principles and data, such as removing frequently redundant CNECs from the initial CNEC list.

4. The analyses, consisting of the assessments pursuant to paragraphs 1 to 3, shall be submitted to the Core regulatory authorities and ACER not later than 1 April 2025."

Amendments to Article 26

Article 26 'Timescale for implementation', shall be replaced and be read accordingly:

"

1. The TSOs of the Core CCR shall publish this methodology without undue delay after the decision has been taken by ACER in accordance with Article 9(12) of the CACM Regulation.

2. The TSOs of the Core CCR shall implement this methodology within the following timeframes:

(a) IDCC(a): update of cross-zonal capacities pursuant to Article 4(2)(a) by the deadline for the implementation of day-ahead capacity calculation methodology as established in the day-ahead capacity calculation methodology of the Core CCR;

(b) IDCC(b): calculation of intraday cross-zonal capacities pursuant to Article 4(2)(b) by **4 months** after the adoption of ACER Decision 03/2024 approving the related amendments;

(c) IDCC(c): re-calculation of intraday cross-zonal capacities pursuant to Article 4(2)(c) by **9 months** after the implementation of calculation of intraday cross-zonal capacities pursuant to point (b) of this paragraph;

(d) IDCC(d): re-calculation of intraday cross-zonal capacities pursuant to Article 4(2)(d) by **22 months** after the implementation of calculation of intraday cross-zonal capacities pursuant to point (b) of this paragraph; and

(e) IDCC(e): re-calculation of intraday cross-zonal capacities pursuant to Article 4(2)(e) at the latest by **3 months** after the implementation of the corresponding intraday CROSA following the ROSC methodology.

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 intraday capacity calculation inputs, the intraday capacity calculation process and the intraday 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 Core NEMOs to test the implementation of this methodology, and market participants to test the effects of applying this methodology on the market. In accordance with Article 20(8) of CACM Regulation, this phase shall not be shorter than 6 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, ACER 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 day-ahead capacity calculation methodology, the Core TSOs shall apply a transitional solution to compute the cross-zonal capacities which remain after the day-ahead capacity allocation pursuant to Article 4(2)(a). This update shall be done based on day-ahead cross-zonal capacities used in existing day-ahead capacity calculation and allocation initiatives. The details on the application of this transitional solution are defined in Annex 2 to this methodology.

6. After the implementation of the day-ahead capacity calculation methodology and until the implementation of the intraday capacity calculation methodology pursuant to Article 4(2)(b), the Core TSOs shall apply a transitional solution for updating of intraday cross-zonal capacities remaining after the SDAC as referred to in Article 4(2)(a). The details on the application of this transitional solution are defined in Annex 2, Annex 3, Annex 4 and Annex 5 to this methodology. During this transition period:

   (a) Annex 3 shall apply and replace Article 11;

   (b) Annex 4 shall apply and replace Article 20; and

   (c) Annex 5 shall apply.

7. In parallel to IVA validation and as long as SIDC is not able to directly apply flow-based parameters, the Core TSOs may also perform ATC based validation pursuant to Annex 6. Regardless of the ability of SIDC to apply the flow-based parameters, the ATC based validation shall no longer be allowed after 24 months following the implementation of the intraday capacity calculation methodology pursuant to Article 4(2)(b).

8. By 1 October 2025, all Core TSOs shall propose amendments to this methodology based on the outcomes of their analyses pursuant to Article 25.

9. If required, following the expected amendments to the CACM Regulation, this methodology shall be revised accordingly."

Amendments to Annex 1

Annex 1 'Justification of usage and methodology for calculation of external constraints', shall be amended accordingly:

a) The first sentence shall be replaced and be read accordingly:

   "The following section depicts in detail the justification of usage and methodology currently used by each Core TSO to design and implement external constraints, if applicable. The legal interpretation on eligibility of using external constraints and the description of their contribution to the objectives of the CACM Regulation is included in the Explanatory Note."

b) Chapters '1. Belgium: ' and '2. Nederlands' shall be deleted.

Amendments to Annex 2

Annex 2 shall be renamed to 'Calculated and allocated capacities in relation to the implementation of IDAs and Core intraday capacity calculation (IDCCb))', and shall be read accordingly:

"

Intraday cross-zonal capacities	**before the implementation of IDA1 (15:00 of D-1)**		**after the implementation of IDA1 (15:00 of D-1)**	
	before the implementation of Core ID CCM at 22:00 (IDCCb))	**after the implementation of Core ID CCM at 22:00 (IDCCb))**	**before the implementation of Core ID CCM at 22:00**	**after the implementation of Core ID CCM at 22:00**
Between 15:00 and 22:00 of D-1	Leftovers from the day-ahead cross-zonal capacities based on Core DA CCM according to the transitional solution pursuant to Article 26(5) and Annexes 3, 4 and 5 OR Zero intraday cross-zonal capacities pursuant to Annex 3(4)	Leftovers from the day-ahead cross-zonal capacities based on Core DA CCM pursuant to Article 4(2)(a) OR Zero intraday cross-zonal capacities pursuant to Article 11(4)	Leftovers from IDA1	Leftovers from IDA1
From 22:00 of D-1 onwards	Leftovers from the day-ahead cross-zonal capacities based on Core DA CCM according to the transitional solution pursuant to Article 26(5) and Annexes 3, 4 and 5	Intraday cross-zonal capacities from Core ID CCM at 22:00 pursuant to Article 4(2)(b)	Leftovers from IDA1 & continuous trading process executed until 22h	Intraday cross-zonal capacities from Core ID CCM at 22:00 pursuant to Article 4(2)(b)

”

Amendments to Annex 3

Annex 3 'Update of intraday cross-zonal capacities remaining after the SDAC in the transition period', shall be amended accordingly:

a) Paragraph 1(b) shall be replaced and be read accordingly:

“In the case that the LTA inclusion in day-ahead is ensured through the Extended LTA inclusion approach, the intraday cross-zonal capacities are

described as a union of flow-based parameters and "LTA values" (LTA domain)."

b) Paragraph 2(a) shall be replaced and be read accordingly:

"the LTA margin approach: for each CNEC, each TSO may decrease the RAM_f by decreasing $LTA_{margin,DA}$ as calculated pursuant to the day-ahead capacity calculation methodology while that there is no undue discrimination between internal and cross-zonal exchanges as referred to in Article 21(1)(b)(ii) of the CACM Regulation;"

c) Paragraph 3 shall be replaced and be read accordingly:

"For each CNEC, each TSO may adjust the RAM_f by modifying the AMR_{DA} as calculated pursuant to the day-ahead capacity calculation methodology while ensuring compliance that there is no undue discrimination between internal and cross-zonal exchanges as referred to in Article 21(1)(b)(ii) of the CACM Regulation."

d) Paragraph 4 shall be replaced and be read accordingly:

"Until the implementation of intraday auctions at 15:00 market time of day D-1, the Core TSOs may set to zero the cross-zonal capacities calculated pursuant to Article 4(2)(a). Such a decision may be made per bidding zone border by the competent TSOs."

Amendments to Annex 4

Annex 4 'Calculation of ATCs for SIDC fallback procedure in the transition period', shall be amended accordingly:

a) Paragraph 3(b) shall be replaced and be read accordingly:

"If defined, the global allocation constraints shall be assumed to constrain the Core net positions pursuant to Article 7(5), and shall be described following the methodology described in Article 17(2). Such constraints shall be adjusted for offered cross-zonal capacities on the non-Core bidding zone borders."

b) Paragraph 4(d) shall be amended by replacing "$PTDF_{Core}$" with "$PTDF_f$".

c) Paragraph 5 shall be amended by replacing "a" with "an".

Amendments to Annex 5

Annex 5 'Other transitional arrangements', shall be replaced and be read accordingly:

"

1. Each Core TSO shall have the right to perform individual validation of ID ATCs calculated and provided to Core TSOs pursuant to Annex 4, by which these ATCs

may be adjusted in case such adjustments are needed to maximise cross-zonal capacity and/or to maintain operational security. Pursuant to this validation, each Core TSO shall have the right to adjust ID ATCs on its bidding zone borders. The maximum of ID ATC increase per bidding zone border shall be 300 MW.

2. The ID ATC on a biding zone border shall always be the lowest value of ID ATCs set by TSOs on both sides of this bidding zone border.

3. As soon as possible after the implementation of DA CCM and no later than from four months after the adoption of this Decision, each Core TSO requiring amendment of ID ATCs shall provide to all Core TSOs the justification for each ATC adjustment. This justification shall be based on the assessment of the day-ahead or intraday congestion forecast common grid models and shall include the concemed CNECs on which the need for decrease or increase of flow or capacity was identified to maximise cross-zonal capacity and/or maintain operational security.

4. After the implementation of DA CCM, the Core TSOs shall regularly publish the following information about the update of intraday cross-zonal capacities remaining after the SDAC in the transition period:

   (a) the percentage of LTA and AMR applied on the intraday level pursuant to Annex 3;

   (b) applied Wsum value pursuant to Annex 4; and

   (c) the flow-based domain and, if relevant, LTA domain used for ATC extraction pursuant to Annex 3, in particular the values: $\overrightarrow{RAM_f}$ (before and after possible adjustment), $\overrightarrow{NP_{AAC}} * \mathbf{PTDF_{Core}}$, $\overrightarrow{RAM_{UID}}$, $\overrightarrow{LTA_f}$ (before and after possible adjustment), $\overrightarrow{SEC_{DA}}$ and $\overrightarrow{LTA_{UID}}$; and

   ~~(a)~~(d) ID ATC adjustments pursuant to paragraph ~~3~~1 including justifications as of deadline pursuant to paragraph 3;

   ~~$\overrightarrow{RAM_{UID}}$ updated remaining available margin for intraday cross-zonal capacities"~~

In case the information pursuant to point (c) cannot be published at the time of implementation of DA CCM, it shall be published as soon as feasible and for all days since the implementation of DA CCM.

5. As from four months after the start of the transition period pursuant to Article 26(5), the Core CCC shall assist the Core TSOs in the ATC validation, by providing at least the following information for each Core CNEC and for each MTU, based on the CGMs from the DACF procedure:

   (a) reference flows;

   (b) zone-to-zone PTDFs of Core oriented borders; and

   (c) potential maximal flows due to ID ATCs, superposed to the reference flows.

The CCC shall provide this information not later than 20:45 of D-1.

During the transition period pursuant to Article 26(5), the Core TSOs may apply and implement, without the need to amend the intraday capacity calculation methodology, further adjustments of the ATC extraction methodology pursuant to Annex 4 if it better meets the objectives of the CACM Regulation and is agreed among Core TSOs."

Introduction of a new Annex 6[3]

A new Annex 6: 'ATC based validation process', shall be introduced and be read accordingly:

"

1. Each Core TSO has the right to perform an ATC based validation in order to ensure operational security. This is an additional process, next to the existing validation process described in Article 18 as IVA validation. Pursuant to this validation, each Core TSO can set a maximum ATC value for its own oriented border.
2. The ID ATC on a bidding zone border shall always be the lowest value of all ID ATCs set by all TSOs for this bidding zone border.

$$ATC_{A\rightarrow B\,validated} = \min\left(\overrightarrow{ATC}_{A\rightarrow B\ validated,TSO\ 1}, \overrightarrow{ATC}_{A\rightarrow B\ validated,TSO\ 2}, \overrightarrow{ATC}_{A\rightarrow B\,validated,TSO\ x}\right)$$

Equation 16

with

$ATC_{A\rightarrow B\,validated}$	Minimum of validated ATCs for border A→B by all Core TSOs adjacent to this border
$\overrightarrow{ATC}_{A\rightarrow B\,validated,TSO\,x}$	Validated ATC for border A→B by TSO x

3. The ATC limitation may be done only in the following situations:

   (a) an occurrence of an unexpected contingency impacting a CNE after the beginning of the related IDCC process;

   (b) as a fallback, in case IVA validation cannot be performed fully in time or if it faces IT issue; or

   (c) a mistake in input data that leads to an overestimation of cross-zonal capacity from an operational system security perspective.

[3] Relates to the third amendment, for information only.

4. In addition to the publication described in Article 22, Core TSOs and the CCC shall publish at least the following information and data items with regard to the ATC based validation for each IDCC MTU:

(a) The TSO invoking the limitation;

(b) The ATC limitation per border;

(c) The situation applicable as per the previous paragraph; and

(d) The detailed reason for the limitation of the ATC with the same level of information as IVA validation following the reasonings developed in Article 18(2), including the operational security limits (when relevant) that would have been violated without the reductions, and under which circumstances they would have been violated.

Every three months, the CCC, with the support of Core TSOs where relevant, shall provide in the quarterly report the data items given under paragraph 4(a), 4(b), 4(c) and 4(d), with regard to the ATC based validation for each IDCC MTU."

ACER
European Union Agency for the Cooperation of Energy Regulators

ACER Decision on Core ID CCM: Annex II

The third amendment to the intraday capacity calculation methodology of the Core capacity calculation region

in accordance with Articles 20ff. of the Commission Regulation (EU) 2015/1222 of 24th July 2015 establishing a guideline on capacity allocation and congestion management

14 March 2024

Whereas

TSOs of the Core CCR ("Core TSOs"), taking into account the following:

(1) Based on further developments and alignments with Core NRAs after the decision by the Agency in 21st February 2019, Core TSOs deemed it necessary to introduce the following changes.
(2) The Intraday process is subject to constrained timings. Core TSOs identified the need to validate the outcome of the IDCC process during an ATC based validation step in addition to the CNEC based validation. The validation step could identify ATC which are too high and jeopardize grid security. These calculated ATCs can then be reduced by the validating TSO during the ATC validation step, as long as an ATC extraction will be performed from the Flow-Based domains resulting from the final computation.
(3) The following changes fulfil the objectives set out in Article 3 CACM.
(4) The introduction of an ATC based validation step will further increase the operational security as set out in Article 3 (c) CACM by allowing to make sure that grid security is maintained with the ATCs given to the market.

Article 1
Amendments concerning the introduction of an ATC validation step

The previous Article 21 'Calculation of ATCs for SIDC fallback procedure' shall become Article 20 and shall be amended accordingly:

Paragraph 4(c) shall be added and be read accordingly:

> "An ATC limitation on specific borders as set by relevant TSOs as output of the local validation as defined in Annex 6 $ATC_{A\rightarrow B\ validated}$ "

In paragraph 5 letter (cc)(v) shall be replaced and be read accordingly:

> ''$\overrightarrow{ATC_k}$ is limited to a maximum value of $ATC_{A\rightarrow B\ validated}$ if such value has been introduced by TSOs on the border A→B as a result of the ATC validation phase as described in Annex 6. Then go back to step i''

Article 2
Introduction of a new Annex 6

A new Annex 6: 'ATC based validation process' shall be introduced and be read accordingly:

"

1. Each Core TSO has the right to perform an ATC based validation in order to ensure operational security. This is an additional process, next to the existing validation process described in Article 18 as IVA validation. Pursuant to this validation, each Core TSO can set a maximum ATC value for its own oriented border.
2. The ID ATC on a bidding zone border shall always be the lowest value of all ID ATCs set by all TSOs for this bidding zone border.

$$ATC_{A\rightarrow B\ validated} = \min\left(\overrightarrow{ATC}_{A\rightarrow B\ validated,TSO\ 1}, \overrightarrow{ATC}_{A\rightarrow B\ validated,TSO\ 2}, \overrightarrow{ATC}_{A\rightarrow B\ validated,TSO\ x}\right)$$

Equation 16

with

$ATC_{A\rightarrow B\ validated}$	Minimum of validated ATCs for border A→B by all Core TSOs adjacent to this border
$\overrightarrow{ATC}_{A\rightarrow B\ validated,TSO\ x}$	Validated ATC for border A→B by TSO x

3. The ATC limitation may be done only in the following situations:

(a) an occurrence of an unexpected contingency impacting a CNE after the beginning of the related IDCC process;

(b) as a fallback, in case IVA validation cannot be performed fully in time or if it faces IT issue; or

(c) a mistake in input data that leads to an overestimation of cross-zonal capacity from an operational system security perspective.

4. In addition to the publication described in Article 22, Core TSOs and the CCC shall publish at least the following information and data items with regard to the ATC based validation for each IDCC MTU:

(a) The TSO invoking the limitation;

(b) The ATC limitation per border;

(c) The situation applicable as per the previous paragraph; and

(d) The detailed reason for the limitation of the ATC with the same level of information as IVA validation following the reasonings developed in Article 18(2), including the operational security limits (when relevant) that would have been violated without the reductions, and under which circumstances they would have been violated.

Every three months, the CCC, with the support of Core TSOs where relevant, shall provide in the quarterly report the data items given under paragraph 4(a), 4(b), 4(c) and 4(d), with regard to the ATC based validation for each IDCC MTU."

ACER
European Union Agency for the Cooperation of Energy Regulators

ACER Decision on Core ID CCM: Annex II

The third amendment ofto the intraday capacity calculation methodology of the Core capacity calculation region

in accordance with Articles 20ff. of the Commission Regulation (EU) 2015/1222 of 24th July 2015 establishing a guideline on capacity allocation and congestion management

~~19.01.2023~~

14 March 2024

Whereas

TSOs of the Core CCR ("Core TSOs"), taking into account the following:

(1) Based on further developments and alignments with Core NRAs after the decision by the Agency in 21st February 2019, Core TSOs deemed it necessary to introduce the following changes.
(2) The Intraday process is subject to constrained timings. Core TSOs identified the need to validate the outcome of the IDCC process during an ATC based validation step in addition to the CNEC based validation. The validation step could identify ATC which are too high and jeopardize grid security. These calculated ATCs can then be reduced by the validating TSO during the ATC validation step, as long as an ATC extraction will be performed from the Flow-Based domains resulting from the final computation.
(3) The following changes fulfil the objectives set out in Article 3 CACM.
(4) The introduction of an ATC based validation step will further increase the operational security as set out in Article 3 (c) CACM by allowing to make sure that grid security is maintained with the ATCs given to the market.

Article 1
Amendments concerning the introduction of an ATC validation step

The previous Article 21~~. Calculation~~ 'Calculation of ATCs for SIDC fallback ~~procedure~~procedure' shall become Article 20 and shall be amended accordingly:

~~In paragraph 3 letter (d~~Paragraph 4(c) shall be added and be read accordingly:

"An ATC limitation on specific borders as set by relevant TSOs as output of the local validation as defined in Annex 6 $ATC_{A\rightarrow B\ validated}$ "

In paragraph 5 letter (cc)(v) shall be replaced and be read accordingly:

''$\overrightarrow{ATC}_k$ is limited to a maximum value of $ATC_{A\rightarrow B\ validated}$ if such value has been introduced by TSOs on the border A→B as a result of the ATC validation phase as described in Annex 6. Then go back to step i''

Article 2
Introduction of a new Annex 6

A new Annex 6: 'ATC based validation process' shall be introduced and be read accordingly:

"

1. Each Core TSO has the right to perform an ATC based validation in order to ensure operational security. This is an additional process, next to the existing validation process described in Article ~~19~~18 as IVA validation. Pursuant to this validation, each Core TSO can set a maximum ATC value for its own oriented border.
2. The ID ATC on a bidding zone border shall always be the lowest value of all ID ATCs set by all TSOs for this bidding zone border.

$$ATC_{A\rightarrow B\,validated} = \min\left(\overrightarrow{ATC}_{A\rightarrow B\ validated,TSO\ 1}, \overrightarrow{ATC}_{A\rightarrow B\ validated,TSO\ 2}, \overrightarrow{ATC}_{A\rightarrow B\ validated,TSO\ x}\right)$$

Equation 16

with

$ATC_{A\rightarrow B\,validated}$	Minimum of validated ATCs for border A→B by all Core TSOs adjacent to this border
$\overrightarrow{ATC}_{A\rightarrow B\,validated,TSO\,x}$	Validated ATC for border A→B by TSO x

3. The ATC limitation may be done only in the following situations:

(a) an occurrence of an unexpected contingency impacting a CNE after the beginning of the related IDCC process;

(b) as a fallback, in case IVA validation cannot be performed fully in time or if it faces IT issue; or

(c) a mistake in input data that leads to an overestimation of cross-zonal capacity from an operational system security perspective.

~~3.~~4. In addition to the publication described in Article ~~23~~22, Core TSOs and the CCC shall publish at least the following information and data items with regard to the ATC based validation for each IDCC MTU:

(a) The TSO invoking the limitation;

(b) The ATC limitation per border;

(c) The situation applicable as per the previous paragraph; and

~~(c)~~(d) The detailed reason for the limitation of the ATC with the same level of information as IVA validation following the reasonings developed in Article ~~19~~ 18(2~~) of the CCM~~), including the operational security limits (when relevant) that would have been violated without the reductions, and under which circumstances they would have been violated.

Every three months, the CCC, with the support of Core TSOs where relevant, shall provide in the quarterly report the ~~following~~ data items given under paragraph 4(a), 4(b), 4(c) and 4(d), with regard to the ATC based validation for each IDCC MTU~~:~~

~~The TSO invoking the limitation~~
~~The ATC limitation per border~~
~~The detailed reason for the limitation of the ATC following the reasonings developed in article 19 (2) of the CCM"~~

."

ACER
European Union Agency for the Cooperation of Energy Regulators

CORRIGENDUM

of 4 April 2024

to Annexes I, Ia, III and IIIa of Decision No 03/2024 of the European Union Agency for the Cooperation of Energy Regulators of 14 March 2024 on the second and third amendment of the intraday capacity calculation methodology of the Core capacity calculation region

In Annex I, 'Amendments to Article 17', paragraph 2, Equation 12; and

in Annex Ia, 'Amendments to Article 17', paragraph 2, Equation 12; and

in Annex III, Article 17, paragraph 2, Equation 12; and

in Annex IIIa, Article 17, paragraph 2, Equation 12:

for: ' $\overrightarrow{RAM}_{bv} = \vec{F}_{max} - \overrightarrow{FRM} - \vec{F}_{ref,Core}$'

read: ' $\overrightarrow{RAM}_{bv} = \vec{F}_{max} - \overrightarrow{FRM} - \vec{F}_{ref}$'[1]

In Annex III, Article 6, paragraph 2(c), footnote 1; and

in Annex IIIa, Article 6, paragraph 2(c), footnote 1:

for: 'Uncertainties in capacity calculation are covered on each CNEC by the flow reliability margin (FRM) in accordance with Article 8 and adjustment values related to validation in accordance with 0.'

read: 'Uncertainties in capacity calculation are covered on each CNEC by the flow reliability margin (FRM) in accordance with Article 8 and adjustment values related to validation in accordance with Article 18.'[2]

[1] By mistake in the editing process, reference to F_{ref} in Equation 12 has been revised to $F_{ref, Core}$. The correct reference is F_{ref}.
[2] Formatting error.

In Annex III, Article 12, paragraph 5; and

in Annex IIIa, Article 12, paragraph 5:

for: '*Equation 1*'

read: '*Equation 6*'[3]

In Annex I, 'Amendments to Article 18', paragraph 7; and

in Annex Ia, 'Amendments to Article 18', paragraph 7:

for: 'After individual validation adjustments, the remaining available margin before validation ($\overrightarrow{RAM_{bv}}$) shall be adjusted for the flows resulting from net positions or already allocated capacities resulting from the SIDC in accordance with Article 4(5)c. The final RAM_f shall be calculated by the CCC for each CNEC and external constraint according to Equation 1.

$$\overrightarrow{RAM_f} = \overrightarrow{RAM_{bv}} - \overrightarrow{IVA} - \mathbf{PTDF_{Core}}\ \overrightarrow{NP_{AAC,IDadd}}$$

Equation 1'

read: 'After individual validation adjustments, the remaining available margin before validation ($\overrightarrow{RAM_{bv}}$) shall be adjusted for the flows resulting from net positions or already allocated capacities resulting from the SIDC in accordance with Article 4(5)c. The final RAM_f shall be calculated by the CCC for each CNEC and external constraint according to Equation 13.

$$\overrightarrow{RAM_f} = \overrightarrow{RAM_{bv}} - \overrightarrow{IVA} - \mathbf{PTDF_{Core}}\ \overrightarrow{NP_{AAC,IDadd}}$$

Equation 13'[4]

In Annex III, Article 18, paragraph 7; and

in Annex IIIa, Article 18, paragraph 7:

[3] See footnote 2.
[4] See footnote 2.

for: ‘After individual validation adjustments, the remaining available margin before validation ($\overrightarrow{RAM_{bv}}$) shall be adjusted for the flows resulting from net positions or already allocated capacities resulting from the SIDC in accordance with Article 4(5)c. The final RAM_f shall be calculated by the CCC for each CNEC and external constraint according to Equation 2.

$$\overrightarrow{RAM_f} = \overrightarrow{RAM_{bv}} - \overrightarrow{IVA} - \mathbf{PTDF_{Core}}\ \overrightarrow{NP_{AAC,IDadd}}$$

Equation 2’

read: ‘After individual validation adjustments, the remaining available margin before validation ($\overrightarrow{RAM_{bv}}$) shall be adjusted for the flows resulting from net positions or already allocated capacities resulting from the SIDC in accordance with Article 4(5)c. The final RAM_f shall be calculated by the CCC for each CNEC and external constraint according to Equation 13.

$$\overrightarrow{RAM_f} = \overrightarrow{RAM_{bv}} - \overrightarrow{IVA} - \mathbf{PTDF_{Core}}\ \overrightarrow{NP_{AAC,IDadd}}$$

Equation 13’[5]

In Annex I, ‘Amendments to Article 20’, paragraph 5(e); and
in Annex Ia, ‘Amendments to Article 20’, paragraph 5(e):

for: ‘*Equation 2*’

read: ‘*Equation 15a*’[6]

In Annex III, Article 20, paragraph 5(e); and
in Annex IIIa, Article 20, paragraph 5(e):

[5] See footnote 2.
[6] See footnote 2.

for:	'*Equation 3*'
read:	'*Equation 15a*'[7]

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[7] See footnote 2.

ACER Decision on the second and third amendment of the intraday capacity calculation methodology of the Core capacity calculation region: Annex IV

Evaluation of responses to the public consultation on the Core TSOs' proposal for the second and third amendment of the intraday capacity calculation methodology of the Core capacity calculation region

1 INTRODUCTION

This document provides a summary of responses to ACER's public consultation on the Core TSOs' proposal for the second and third amendment of the intraday capacity calculation methodology for the Core capacity calculation region ('Proposal').
In order to take an informed decision and in accordance with Article 14(6) of Regulation (EU) 2019/942, on 4 July 2023, ACER launched a public consultation inviting all interested stakeholders, including regulatory authorities and the TSOs, to provide comments on the Proposal. The closing date for comments was 31 July 2023.

2 LIST OF RESPONDENTS

ACER received comments from eight respondents:

Organisation	Country	Type
APG	AT	TSO
ELIA	BE	TSO
HOPS	HR	TSO
SEPS	SK	TSO
EFET-MPP-IFIEC	BE	Associations
CEZ	CZ	Energy company
EDF	FR	Energy company
HEP	HR	Energy company

3 PUBLIC CONSULTATION TOPICS AND QUESTIONS

1. **Alignment of intraday capacity calculation (IDCC) with the regional operational security assessment (ROSC)**
    - Do you agree with the proposed alignment of ROSC and IDCC processes?
    - Do you have any other comment regarding this topic?

2. **Recalculation of intraday capacities**
    - Do you agree with proposed recalculation of intraday capacities based on outputs of a completed coordinated regional operational security assessment (CROSA)?
    - Do you have any other comment regarding this topic?

3. **Conversion of cross-border relevant network elements with contingencies (XNECs) from CROSA to critical network elements with contingencies (CNECs)**
    - Do you agree with the proposed possibility of conversion of XNECs from CROSA to CNECs? (as a permanent/temporary solution)
    - Do you have any other comment regarding this topic?

4. **Minimum capacity values and flow-based domain extension**
    - Do you have any view regarding this topic? If yes, please explain.

5. **ATC-based validation**
    - Do you agree with the ATC-based validation as proposed by the Core TSOs?

6. **Other proposed changes**

    Applying intraday flow reliability margin (FRM) lower or equal to the day ahead FRM (changes to Article 8(10) of the Core intraday capacity calculation methodology (Core ID CCM));

    Specifying a right to reduce the capacities provided for intraday trade in exceptional network situations (new Article 4(11) Core ID CCM);

    Providing for a possibility to delay the delivery of intraday capacities (new Article 4(12) Core ID CCM);

    Converting potential negative RAM values into negative ATCs: changes to Article 21 Core ID CCM.

    - Do you have any comment regarding these proposed changes?

4 RESPONSES

ACER has carefully considered all stakeholders' comments in assessing the proposed amendments of the Core ID CCM and taking its decision. In some areas, this is explicit in the amendments made and reasoning presented in the Decision. In these instances, the table below refers to the relevant amendments and recitals of the Decision. This is complemented by additional observations in response to the main points raised by the stakeholders. Respondents' views are summarised in the left side of the table, and ACER's views are provided in the right side of the table.

	Respondents' views	ACER views
Topic 1: Alignment of intraday capacity calculation (IDCC) with the regional operational security assessment (ROSC) • *Do you agree with the proposed alignment of ROSC and IDCC processes?* • *Do you have any other comment regarding this topic?*		
APG	("Yes"). APG agrees with the proposed alignment of the ROSC and IDCC processes as they are both coordinated processes that should be linked sequentially and have to be carried out in an optimal and efficient way. APG considers that calculating ID capacities based on a complete Core ROSC output that resolves congestions, available by around 20:00 D-1, would lead to more accurate and reliable capacity calculations. Eliminating the nRAO step from IDCC1 is the only option to address the performance issues and timing constraints caused by the parallel operation timings of both processes.	ACER in principle agrees with the alignment of the ROSC outputs and intraday capacity calculation inputs, as well as removing the nRAO step from intraday capacity calculation. Further details are provided in recital (107) of ACER's decision.
SEPS	("Yes").	
HOPS	("Yes"). The proposed alignment of ROSC and IDCC process aims to enhance operational coordination, optimize capacity calculations and improve cross-border trading while ensuring security and reliable operation of the interconnected power system. The decision to leave out the nRAO in the IDCC process was based on Core TSO's operational experience from the current CSA process and from the Core DA CC process. Also looking at the time duration of the nRAO process, ROSC is the only acceptable option in order to comply with the HLBP. We agree with ACER's point of view and strive to ensure a good level of coordination between ROSC and IDCC in the future. The coordination between the creation of CGM, ROSC/CROSA and IDCC should and will be improved by sequential order of different processes.	
ELIA	("Yes"). Elia is strongly in favor to align the different IDCCs with the parallel ROSC processes (DA & ID CROSAs). It is the role of ROSC to solve congestions by coordinating the application of RAs.	

	Respondents' views	ACER views
	- After every CROSA run a recalculation of capacities has to take place to ensure capacities are consistent with how ROSC steers the flows / dispatch. - In general this requires an efficient IDCC process to minimize the time gap between the decision-making in ROSC and the release of updated capacities to the market. - For IDCC1 in particular, the timing challenge is massive as DA security analysis and IDCC are taking place in the same dense timeframe. It is key that as much as possible the non-costly and costly RA's are integrated into the starting point of IDCC1. - By removing the NRAO step (non-costly remedial action optimizer) in the IDCC process, we minimize the time needed to perform IDCC which allows to much better integrate the (partial) outcome of the DA security analysis. - Although the objective function of the NRAO (i.e. optimize the CNEC with the lowest RAM) and the CROSAs differ (i.e. solve congestions on all XNECs), Elia deems the CROSAs more effective also from IDCC perspective, seen the high level of congestions in initial DACF models. The NRAO lacks a true remedial action potential to resolve this level of congestions with only non-costly remedial actions.	
EDF	("No"). EDF considers that the ROSC and IDCC processes should indeed be aligned to the best possible extent so that the IDCC takes the latest system state into account, and acknowledges the timing constraints that justify the proposed simplifications (notably the suppression of the NRAO step). However, EDF is concerned that, until the full and stable implementation of ROSC, the IDCC could systematically lead to lower offered capacities compared to the current DA leftovers process, and to a disproportionate frequency of zero or negative ATCs on certain borders (e.g. FR-BE, FR-DE), as exemplified by the results of the parallel run presented by TSOs in CCG – in that respect, EDF shares the TSOs' view that one should focus on the ATC reductions in the directions which are actually used by the market, but regrets that no indicator is provided to assess this point in the presented results. Therefore, EDF considers that during the interim period before the full implementation of ROSC, TSOs should consider offering the current DA leftovers process in lieu of the calculated ID	

	Respondents' views	ACER views
	capacities, or the maximum between both values. EDF considers this solution as a feasible and safe one, since offering the DA leftovers was the historical solution before the implementation of IDCC and has never caused, to EDF's knowledge, significant security of system issues even if these leftovers result from a DA capacity calculation that is outdated in ID.	
CEZ	("No"). We are a bit concerned that the first IDCC1 is assumed to take place at 22:00 hours, not prior to 15:00 hours, before the first IDA an opening of the cross-border intraday trading. Trading only with the rest of DA capacities at least until 22:00 hours leads to postponing the real start of ID cross-zonal trading. Recalculation of capacities and related ROSC processes should start as early as possible. We do not favour changes in Article 4, paragraph 12. which could further postpone availability of results of ID calculation. Moreover, we have strong concerns over right of TSOs to reduce available cross-zonal capacities even after they have been already sent to ID processes (granted by new changes to Article 4, paragraph 10). This would mean a direct influence of cross-border trade when it is already opened, hence risking market manipulation (even if not intentional).	
EFET-MPP-IFIEC	("Yes"). Target model: The proper alignment between ROSC and IDCC is more than just a helpful addition to the capacity calculation methodology. We rather view it as an absolute necessity for the success of the target model. The congestion relief provided by the Coordinated Regional Operational Security Assessment (CROSA) runs must be incorporated in the capacity calculations, otherwise the benefits of the method are not leveraged on time. Moreover, even with fully synchronized processes, we currently have to rely on unquantified statements that ROSC will indeed truly be able to provide congestion-free domains. As a result of low capacity and isolated zones, the utility of the IDCCM would decrease as market participants would have greater difficulties to rebalance cross-zonal portfolios.	

	Respondents' views	ACER views
	Interim solution: Full ROSC (v2) is not planned to go-live before late 2026, meanwhile the Core IDCC go-live is expected earlier (gradually between June 2023 and June 2024). Therefore, in the interim period, the market will face the drawbacks of the solution (removal of minRAM, NRAOs,) without benefitting from its advantages (de-congested domains). To avoid a scenario with reduced ID capacity due to an inability to address pre-congestions during years of record-high renewable development, we oppose the implementation of such an interim solution. It is at the very least essential to find an alternative solution until ROSC becomes operational: - One possibility would be to add a minRAM inclusion in the proposed ID CCM, until the full implementation of ROSC. - Alternatively, the existing ID CCM process (current process) could be maintained until the ROSC solution is fully tested and implemented.	

	Respondents' views	ACER views
Topic 2: Recalculation of intraday capacities • *Do you agree with proposed recalculation of intraday capacities based on outputs of a completed CROSA?* • *Do you have any other comment regarding this topic?*		
APG	("Yes"). APG is in favour of a recalculation of intraday capacities after 22:00 D-1 based on a complete CROSA output that resolves all congestions. APG is assessing whether the recalculation should take place after the complete DA-CROSA or after the complete first ID-CROSA. For both options, validation concepts for the capacities must be implemented. It should also be discussed, if the capacities for hours of the day D where an update is expected (in the course of a sub-sequent IDCC run) should be initially calculated with a more conservative approach, to deal with the uncertainties stemming from not fully coordinated/completed models used as basis for the 1.IDCC. APG sees that with a potentially joint ROSC process after the merge of the CCRs Italy North and Core, there is no relevance of Cross-CCR-Coordination with respect to IDCC anymore. Therefore, process time in ROSC/CROSA could be saved, which is beneficial not only for the efficient handling of RA, but also for the timings of ID-markets.	ACER supports the calculation of intraday capacities based on complete CROSA outputs. To that end, and to address concerns that the IDCC(b) in the evening of D-1 may be performed on incomplete DA CROSA outputs, ACER supports the inclusion of an additional CROSA and IDCC run during early hours of day D. Further details are provided in Section 7.2.2.2 of ACER's Decision.
SEPS	("Yes"). Recalculation of capacities after finalization of DA CROSA could be beneficial in terms of ID ATCs and occurrence of isolated state of particular bidding zone/s.	
HOPS	("Yes"). We support the recalculation of intraday capacities based on outputs of a completed CROSA. There is a dependency on other upcoming processes such as ROSC and BTCC.	
ELIA	("Yes"). - Elia for the target model strongly supports 4 IDCC calculations. In that target model 4 IDCCs are sufficient, if timings are not aligned with the CROSAs, this should be resolved there.	

	Respondents' views	ACER views
	- For the interim period until ROSC v1 is live, thus with the current DA security analysis process which ends often well after D-1 22h00, the introduction of an additional recalculation (let's call it IDCC 1b), will have added value for the remaining MTUs. This because IDCC 1b captures the margin on the CNECs that is freed up by the DA security analysis process after 20:30 D-1 (= starting point IDCC1). Elia does not deem it realistic to further adapt the IDCC process, to be able to await more mature results for IDCC1. Thus, an additional recalculation is the only possibility to capture the freed up margin. - Expectation management in terms of capacities: the current DA security analysis consists of a manual coordination with as result that often some margin is created on the congested network elements by reducing their loading below 100%. IDCC1b will pick up this margin and hence can turn a negative or zero RAM/ATC from IDCC1 into a positive value. When ROSC is in place, the congestion is reduced to 100% loading but ROSC will not create extra margin, hence there is no guarantee that a negative or zero RAM/ATC from IDCC1 can be turned into a positive value. - The added value of IDCC1b will fade out with the implementation of the target model (ROSC with 4 IDCCs). Hence to capture its value, it is required to prioritize the implementation of IDCC1b over other Core (ID) developments. - An open point to be resolved is the alignment with parallel ID trades taking place (both IDA1, IDA2 and continuous trading). In case IDA2 is heavily used by the market, the re-computation done early on in the day should consider these exchanges (e.g. via usage of IDCFs).	
EDF	("Yes"). EDF supports in principle the idea of additional capacity recalculations that would allow a better alignment with the latest system state including full remedial action coordination (provided these recalculations also reflect the progressive reduction of uncertainties), even if the resulting capacities are not allocated through ID auctions (in EDF's understanding, the recalculation envisaged by ACER would be the "IDCC 3" mentioned during last CCG, which would result in capacities allocated through the continuous SIDC). But conversely, EDF considers that a consistent capacity calculation is a prerequisite for a useful ID auction, and that a later additional capacity calculation cannot be a satisfactory replacement solution in case IDCC 1 cannot be performed on a sound base	

	Respondents' views	ACER views
	case due to a systematic delay in the delivery of the CGM incorporating the remedial actions from CROSA. Therefore, EDF would like a quantification of the frequency of cases where this delay could prevent a proper coordination of the CROSA and IDCC processes. In that case – as for the general case during the interim solution between the implementation of the IDCC 1 and ROSC v1 (cf. answer to question 1) – EDF considers that offering the DA leftovers in lieu of the calculated ID capacities (or the maximum between both values) should be preferred.	
CEZ	("Yes"). We have already stated in the past that if the recalculation leads to change / improvement in cross-border capacities, it should be done. Hence, suggested approach seems to be correct. However, we´re bit worried about a timeline, which foresees that recalculation taking place only between 12-24 hours of the D day. This should be done earlier, as suggested by ACER.	
EFET-MPP-IFIEC	("Yes"). We strongly support the proposal to improve the CCM during the interim period and to recalculate capacities after the CROSA runs to ensure the IDCC is as synchronized as possible with "interim versions" of ROSC (awaiting ROSC v2). As such, we find the introduction of a temporary IDCC1bis to be a no-regret step towards a workable interim solution. Still, as mentioned by a working group on 17 July: "the final result of the current DA security analysis process is not always congestion free. Thus, there will be moments where an IDCC1bis has no impact." It is therefore difficult for market participants to assess how effective this measure will be in bringing additional capacity - in particular at times of high pre-congestions. Nonetheless, we would encourage Core TSOs to pursue the implementation of this improvement, keeping in mind that further analyses/measures may be necessary to fully make up for the absence of minRAM, NRAO or full ROSC in the interim period.	

	Respondents' views	ACER views
Topic 3: Conversion of cross-border relevant network elements with contingencies (XNECs) from CROSA to critical network elements with contingencies (CNECs) • *Do you agree with the proposed possibility of conversion of XNECs from CROSA to CNECs? (as a permanent/temporary solution)* • *Do you have any other comment regarding this topic?*		
APG	("Yes, as a permanent solution") APG agrees with converting XNECs, which are overloaded before CROSA, into CNECs, viewing it as a critical functionality after the introduction of ROSC. This conversion is essential to ensure that the XRAs ordered in ROSC remain effective and to prevent any ID market trading counteracting those XRAs. This conversion should be done considering an appropriate threshold (minimum sensitivity). If relevant XNECs are not considered in IDCC, each XRA applied for a non-CNEC-XNEC in the ROSC process would result inefficient, as the outcome of the IDCC would allow to overload the XNEC again, worsening the congestion and mitigating the relieving effect of the XRAs. As it is very likely that the ID market trades in the already congested direction additional XRAs would be necessary, resulting in lower overall process efficiency. Furthermore, APG sees not considering the relevant XNECs from CROSA during IDCC as a threat to system security, because of reduced XRA potential and reduced lead times for resolving overloads after IDCC.	ACER considers that if there was a security issue on a XNEC with low sensitivity to cross-zonal transactions (and hence with a maximum zone-to-zone PTDF below 5%), this would be primarily due to internal transactions causing internal flows on that XNEC. Therefore, a permanent solution based on reducing cross-zonal transactions (which cause allocated flows) to slightly decrease the loading of an XNEC with low sensitivity to cross-zonal exchanges would be considered disproportionate and discriminatory towards cross-zonal exchanges. However, since experience is needed to analyse this approach, ACER has allowed for a temporary one-year conversion
SEPS	("Yes, as a permanent solution") We consider the conversion of XNECs to CNECs as the most effective solution how to ensure that the effect of applied RAs from ROSC will not be counteracted by additional ID trading. This is important especially in situations when internal RD is not available and only cross-border RAs are available to solve the congestions.	
HOPS	("Yes, as a temporary solution") There should be a synergy between the ROSC and IDCC processes. However, as XNECs are used in operational security analysis, potential influences on CNECs should be assessed and criteria agreed by all Core TSOs. The right balance between these two coordinated processes (ROSC and IDCC)	

	Respondents' views	ACER views
	should lead to additional exchanges on ID market. With the aim to solve all congestions of all XNECs by applying cross-border redispatch, converting XNEC to CNECs with an agreed minimum sensitivity can free up additional ID capacity although we understand that technically (ignore elements with low sensitivity) and legally (CACM) this is very clear. At this stage, we agree with ACER's position, while after implementation of ROSC it could be reconsidered.	of XNECs to CNECs, regardless of their PTDF, but under a number of conditions, including that the TSOs would analyse and propose appropriate specifications for this conversion. Such conversion is meant to be a temporary solution, and only to be used as a last resort measure. Further details are provided in Section 7.2.2.5.1 of ACER's Decision.
ELIA	("No") The legal framework is imposing antagonistic requirements upon TSOs (ROSC Art 31.3a vs. CACM Art 29.3b) thus making it subject to interpretation. Elia has no intention to include XNEC with PTDF<5% in capacity calculation, and interprets that the significance criterion put forward by CACM prevails. Elia therefore answers "no" to this question. At the same time, Elia acknowledges that other Core TSOs can make different interpretations. Therefore it can be expected that concerned Core TSOs will apply IVA or reduce ATCs during individual validation if not all XNECs are considered during the calculation. This will be even more the case if virtual capacity would be considered. Elia considers the application of IVA or ATC to be less transparent and less efficient compared to the inclusion of XNECs with PTDF < 5%. As this topic is 'only' relevant as from the go-live of Core ROSC, it should be part of the broader discussion to have on the target model (ROSC vs. IDCC objective function).	
HEP	("No") Not having market for redispatching measures in Croatia, we express fear that additional critical elements in the network after Day-ahead concludes, TSOs in Croatia and the region won't have availability for additional counter measures apart from extra reducing already congested cross zonal/border capacities necessary for intraday trading. Comparing period from the June 2022 till May 2023 we can already see reduction in the flow based intraday availability of the cross-border capacity comparing the same period and NTC method. For Croatia especially problematic is reduction of HU -> HR direction when Croatia imports electricity (summer 2022) and HR -> SI when Croatia exports electricity (spring 2023).	

	Respondents' views	ACER views
EDF	("No") EDF only agrees with the conversion of XNECs from CROSA to CNECs under the conditions stated by ACER, i.e. if their sensitivity to cross-zonal exchanges is above the standard threshold of 5% used in capacity calculations (but in that case, EDF wonders whether there can be XNECs which are not already CNECs in the IDCC). Indeed, while EDF agrees with the need to avoid a loop of cross-border RAs increasing capacities in the aggravating direction and subsequent trade using these additional capacities, EDF sees no reason to deviate from the general principle that under a certain sensitivity threshold, overloaded network elements (no matter whether this overload is identified in the CC or in the CROSA) should not limit cross-border exchanges – which is way to implement the requirement that there should be no undue discrimination between internal and cross-zonal exchange. EDF thus shares the view that congestion management for XNECs with a low sensitivity should be left to internal redispatching, or to cross-border RAs that are decided at a later point in time and not incorporated in the CGM resulting from the DA CROSA.	
EFET-MPP-IFIEC	("No") For this topic, we refer to our general feedback in the introduction. We believe the overarching principal is for the ID timeframe to provide a smooth transition from the DA to the balancing timeframe, in terms of market opportunities (i.e. capacity provided) and convergence to the reality of the grid. We do not fundamentally oppose the conversion of XNECs to CNECs, as long as the resulting capacities in ID do not reduce drastically compared to the DA. In other words, this conversion should be made only when the CROSA runs are sufficiently able to mitigate pre-congestions. Otherwise, the additional network elements simply impose another layer of capacity restrictions and the market has to accept a second-best solution in terms of welfare creation, with few benefits. Two additional elements: (1) It is still important to remove XNECs that are below the 5% threshold. This prevents elements with low remaining capacity from being overly restrictive in the ATC calculation when they are in	

	Respondents' views	ACER views
	fact not heavily impacted by cross-zonal exchanges. The higher this threshold, the less restrictive CNECs become, and the more ATC can be extracted. (2) The inclusion of excessively large amounts of network elements would eventually approach a nodal grid model within a market timeframe, which would go against the philosophy of the EU's IEM.	
Topic 4: Minimum capacity values and flow-based domain extension • *Do you have any view regarding this topic? If yes, please explain.*		
APG	APG is strongly against the concept of any type of virtual capacities in intraday. The requirement according to Article 16 of the Regulation (EU) 2019/943 (Electricity Regulation) is complied with in the Day-Ahead Capacity Calculation. Considering the risk for operational security, APG does not accept minimum capacity values in intraday, whether applied explicitly by using a minimum RAM or implicitly by extending the flow-based domain at CNEC level, or by any other modification. There are three main reasons for this stance: (1) Minimum capacities pose a risk for operational security as capacities may rely on the short-term activation of (costly) remedial actions. As the intraday operations are close to real time and most of the trading activities occur close to gate closure, time to detect overloads and lead times to coordinate and activate RAs for the magnitude of minimum capacities is insufficient. Thus, minimum capacities are impossible to implement from the current aspect. (2) If minimum capacities were applied, TSOs would be forced to "guess" the market outcome and to apply preventive (costly) RAs with high uncertainties regarding volume and market direction. Depending on the real market outcome such remedial actions could even end up being counterproductive and therewith increasing operational security risk. Finally, these capacities enabled by RAs may not be utilized by the market, causing welfare losses and even pose a high risk for operational security due to missing concepts and processes. (3) The introduction of minimum capacities would significantly impact the planning of several other processes by increasing their complexity and operational stress (e.g. a rolling congestion management dealing with multiple possible market outcomes simultaneously).	ACER considers that the minimum capacity target specified in Article 16(8) of the Electricity Regulation applies to the intraday timeframe. At the same time, ACER notes the Core TSOs' concerns that immediate implementation of the requirement in the intraday timeframe may result in excessive reliance on virtual capacities. In view of these concerns, ACER's Decision provides the Core TSOs with additional time to analyse possible implementation measures, including structural measures, such as targeted investments and bidding zone reconfiguration.

	Respondents' views	ACER views
SEPS	Enlarging the domain with virtual margins so close to real time poses big operational risks. Introduction of minimum ID capacities would also require fundamental changes in the business process, timings, adaptations of central and local tools, etc. It would inevitably lead to significant delay of IDCC go-live.	Further details are provided in Section 7.2.2.7.1 of ACER's Decision.
HOPS	We do not agree with the application of minimum capacity values (70% minRAM in ID) concept. It is not acceptable for us. We support the initial flow-based domain extension at the CNEC level equivalent to an increase of available transmission capacity (ATC) by a certain amount on each border (minimum ATC concept, approx. 100 MW) until CROSA/ROSC Go-live as a transitional arrangement within which during validation phase each TSO will have a right to adjust ID capacity values (RAM or ID ATC to lower values). It can be noticed that during external parallel run (https://parallelrun-publicationtool.jao.eu/coreID/ID2_validationReductions) there was application of validation reduction mainly in exceptional cases. The main CROSA outputs may not include a final list of remedial actions, which could result in additional intraday capacities and this can be done during additional checks during validation phase after applying the minimum ATC concept (an increase/decrease concept similar to Annex 5 of 1st IDCC amendment) until outputs from ROSC can be used. This is still in line with ID CCM that offers TSOs the possibility to validate the calculated flow-based parameters with the aim to correct cross-zonal capacity for reason of operational security. So far similar approach was successfully used (ID ATC equivalents from DA FB CC process and afterwards bilateral ATC updating) which in the end created added values for market participants.	
ELIA	Applying virtual capacity to reach minimum capacity targets is a known recipe from day ahead capacity calculation to avoid undue discrimination. The intrinsic motivation to avoid undue discrimination is also relevant in the ID context, yet ignoring internal congestion becomes critical as we are approaching real time grid operation: a) TSOs need to resort to local processes as there is no time anymore to run a coordinated CROSA b) TSOs depend on the availability of local volume of fast resources to manage the congestion.	

	Respondents' views	ACER views
	c) The validation step in IDCC & BTCC also turns into a shadow capacity calculation, with in comparison to DACC much less time to execute and without a perspective to coordinate across borders. Therefore the structural solution cannot be found by only looking at the IDCC process. For the target model (i.e. with ROSC CROSAs + 4 IDCCs) Elia agrees with CREG that the ROSC objective function is part of the fundamental debate to have. Elia is convinced that this goes beyond the decision-making process for ID CCM. The fundamental debate belongs to the revision of electricity regulation and network codes (CEP update, CACM 2.0, SOGL 2.0), the Core ID CCM updates required will follow afterwards. Yet, seen the limitations observed with aligning the Core IDCC process with today's less (time) performant DA security analysis processes, there is a need for a temporary "patch" within the IDCC process. Any possible use of virtual capacities must however be proportionate and possible. A mere extension of the 70% rule in ID or giving additional capacity in Intraday, on top of what was already used in Day Ahead is not. For the temporary "patch", an appropriate level would be to include the use of virtual capacity in ID (minRAM based) as done today in the DA leftover process. This means 20% minRAM minus already allocated capacities. Core TSOs already have experience with this type and level of minRAM application for the ID timeframe. By considering already allocated capacities in the minRAM application, heavily utilized market directions during previous allocation moments are not further (over)burdened, but (ideally) possibilities are created for some capacities in the opposite market direction(s). Elia believes that the combination of IDCC1b and the 20% minRAM patch is the right way forward to bridge the period until the implementation of the target model. It enables to implement an important stepping stone of the target model, namely a proper recalculation of ID capacities upon a D-1 grid model in which RAs are coordinated. And it is expected to tackle the rightful concern on BZ isolation.	
HEP	As already mentioned, in Croatia we don't have any remedial actions available as market service. Instead, HOPS can only force any market participant to curtail their generation or make topology	

	Respondents' views	ACER views
	switches without paying any cost which they caused for the market participants (floods, consumption curtailment, etc.).	
EDF	EDF considers that the time constraints mentioned by TSOs cannot be equally applied for all MTUs covered by the CC: while the remaining time to activate RAs is indeed limited for the first ones, at least the application of a min RAM could probably be envisaged for the last ones. The opportunity of such a minRAM application (or the other option of flow-based domain extension at CNEC level, which should be further detailed) depends, in EDF's view, on the way RAs are managed by TSOs: if these RAs are ordered early enough, preferably through countertrading performed in ID which is better in terms of price signals sent to the market, it makes little sense to continue to apply a minRAM in ID once the corrective measures to deal with the previously allocated virtual capacity have taken place; if, on the contrary, RAs are ordered late (e.g. in the balancing timeframe), it seems legitimate that the market continues to work in ID with the virtual capacities that result from the requirement of Article 16 of the Electricity Regulation.	
CEZ	In general, we would welcome implementation of either of these options, to ensure there is at least some cross-zonal capacity available for intraday cross-zonal trade.	
EFET-MPP-IFIEC	The first results of the IDCC1 parallel runs – which are performed without minRAM nor LTA inclusion - show a resurgence of higher frequency of bidding zone isolation in the Core region and lower average cross-zonal capacities compared to operational values. This is particularly significantly for NL and few other BZs (BE, CZ, RO export). The domain is fully dependent on the TSOs' individual ability to manually solve pre-congestions (non-coordinated/automated process). We are in favour of maintaining current operational safeguarding practices so that there is no step back from the current standard of capacity availability. In this sense, we share the view that the use of minimum capacity remains necessary during the interim period and until the advent of ROSC. This should mitigate the isolation risk for bidding zones that are particularly sensitive to it, while allowing the TSOs to take a step forward in grid quality by implementing the domain recalculation on more recent grid models.	

	Respondents' views	ACER views
Topic 5: ATC-based validation • *Do you agree with the ATC-based validation as proposed by the Core TSOs?*		
APG	APG re-confirms the necessity and value of an ATC-based validation as proposed by the Core TSOs, as it considers it to be a reliable, transparent and fast approach to validate capacities during intraday capacity calculation.	Validation in a flow-based capacity calculation must be performed on a CNEC level, to maintain the information on the location of the congestion and to allow for capacity reduction only to the extent necessary to guarantee operational security. However, to address the Core TSOs' concerns about the constrained timings of the CNEC-based validation, ACER has allowed for a temporary ATC-based validation, under the conditions set out in Annex 6 of the Core ID CCM. Further details are provided in Section 7.2.2.8 of ACER's Decision.
SEPS	We agree with proposal to use it as a fallback solution on a temporary basis.	
HOPS	We agree with the ATC-based validation as a temporary solution until the intraday allocation process is able to accept the flow-based parameters as inputs (instead of ATCs converted from the flow-based domain).	
ELIA	Elia is in favour of the ATC-based validation possibility, seen it gives the possibility to reduce capacities on border level, as a fallback, in case the IDCC results are deemed not representative anymore for certain bidding zone (borders). This could be required in situations where the used grid model in the IDCC is not accurate (anymore), e.g. in case of last-minute outages of significant grid elements. In such cases, it could be beneficial to limit capacities on a BZ border level only, instead of CNEC level. Bidding zones that are further away, and which are less impacted by the grid "inaccuracy" could then be left out in the capacity reduction. Elia deems this "fallback" option useful until the moment SIDC switches to Flow-Based Allocation.	
EDF	EDF is very cautious on any validation step that may lead to arbitrary capacity reductions at the end of the CC process and would like to be sure that this ATC-based validation doesn't give an additional degree of freedom to TSOs to reduce capacities for reasons that are not truly related to network security (e.g. to cope with a failure of the new CC tools and processes, or to more easily manage internal congestions). EDF therefore requests a close monitoring, by NRAs and ACER, of the capacity reductions performed through this ATC-based validation, using the detailed information that TSOs commit to provide in such a case. EDF however welcomes the information given in CCG that RTE doesn't plan to apply neither IVAs, nor ATC validation on a daily basis, and hopes that RTE will stick to this commitment.	

	Respondents' views	ACER views
EFET-MPP-IFIEC	As already mentioned in our response to the consultation on the 3rd amendment of the IDCCM, we favour keeping the validation purely flow-based, since ATC allocation should be phased out starting in 2026/2027. However, while we support and understand the need for TSOs to ensure grid security, we also call for a strictly proportional and justified use of such Individual Validation Adjustment (IVA) validation. In DA, we already observe occurrences of IVA where bulk reductions are applied, leading to no capacity remaining on some CNECs/borders. In ID, the time window for validation is shorter, thus bulk reductions could be applied even more often, as a straight-forward shortcut compared to more sophisticated solutions. Finally, if an ATC validation were to be implemented nonetheless, we find it essential that the validation must be included as additional constraints in the extraction algorithm itself, rather than ex-post. Indeed, if the extraction selects a particular ATC domain which is then shrunk ex-post, this represents in our view a sub-optimal capacity allocation because another solution domain, which could satisfy both the ATC validation and the FB constraints could have been found instead.	

	Respondents' views	ACER views
Topic 6: Other proposed changes *Applying intraday flow reliability margin (FRM) lower or equal to the day ahead FRM (changes to Article 8(10) Core ID CCM);* *Specifying a right to reduce the capacities provided for intraday trade in exceptional network situations (new Article 4(11) Core ID CCM);* *Providing for a possibility to delay the delivery of intraday capacities (new Article 4(12) Core ID CCM);* *Converting potential negative RAM values into negative ATCs: changes to Article 21 Core ID CCM.* • *Do you have any comment regarding these proposed changes?*		
APG	APG re-confirms the proposed changes as we see a need for the possibility to reduce capacities during the day, as well as reflecting negative RAMs in extracted ATCs. In contrast to the introduction of virtual capacities, APG sees the reduction of FRMs as a more appropriate and reasonable measure to provide acceptable capacities for intraday and thus principally supports this change. Non-the-less further focused efforts are necessary to increase the quality of CGMs and processes, including the coordination and further harmonization amongst highly interdependent regions, as we partly observe high uncertainties between ID and real-time, that are exceeding the magnitude of the currently applied FRMs. A further FRM-reduction would worsen the situation. As long as this remains, the validation concepts and tools need to be able to identify such problems and timely mitigate them to ensure secure system operation.	ACER agrees with APG's position on the need to improve the CGM quality and coordination processes. ACER's position on negative capacities is set out in sections 7.2.2.2 and 7.2.2.5.3 of ACER's Decision.
ELIA	Applying intraday flow reliability margin (FRM) lower or equal to the day ahead FRM: changes to Article 8(10) Core ID CCM; - Elia is in favor of this change, seen it is compatible & aligned with the foreseen DA lump sum FRM approach (of 10% of Fmax), while giving the possibility to select a different lump sum value (e.g. 5% as intended by Core TSOs). Specifying a right to reduce the capacities provided for intraday trade in exceptional network situations: new Article 4(11) Core ID CCM;	ACER's position on applying intraday FRM lower or equal to the day ahead FRM is set out in recital (87) of ACER's Decision.

	Respondents' views	ACER views
	- The SOGL and Core ROSC methodology do allow for a reduction of cross-zonal capacity, mentioning a depletion of available (X)RAs as a criterion. This link to completely used RAs could be made within the ID CCM. - Elia supports that Core TSOs have the right to unilaterally limit cross-zonal capacities outside of the coordinated capacity calculation. - Elia underlines this must be a last resort measure to guarantee operational security and properly justified e.g. it must be explicitly linked with avoiding to go in alert state or an emergency state despite the use of available RAs, as defined in SOGL Article 18 Providing for a possibility to delay the delivery of intraday capacities: new Article 4(12) Core ID CCM; - Elia is in favor of this change, seen at ROSC go-live, the IDCC process will become dependent on a timely executed DA / ID CROSA. This change in the ID CCM allows to submit capacities until the latest moment that IDA can still accept them. This to maximize chances to avoid an application of a fallback, and still use a ROSC output. Converting potential negative RAM values into negative ATCs: changes to Article 21 Core ID CCM. - Elia is in favor of this change, seen the two main components (PTDF scaling + PTDF filtering) will prevent that distant borders get disproportionate negative ATCs in case of negative RAMs, or are even not considered in case deemed distant enough (i.e. below PTDF filtering threshold). This will allow cross-zonal exchanges to be less blocked by far away CNECs with very low or negative RAMs.	ACER's position on the 'right to reduce' is set out in recitals (76) and (81) of ACER's Decision. ACER's position on providing a possibility to delay the delivery of intraday capacities is set out in recital (82) of ACER's Decision. Related amendments are in Article 4(9) and Article 20 of Core ID CCM.
HEP	Unfortunately, we have a fear that HOPS will only apply this measure: specifying a right to reduce the capacities provided for intraday trade in exceptional network situations: new Article 4(11) Core ID CCM	See above.
EDF	EDF welcomes the addition of the possibility to apply in ID a FRM that is lower than the one applied in DA (as for the parallel run), but considers that this should not only be an option: EDF hardly sees how there could be no difference between both values given the significant reduction of	See above.

	Respondents' views	ACER views
	uncertainty between the two timeframes (notably because the IDCC is performed after the first schedule of generation assets and because the forecasts of consumption and RES generation are more precise), and considers that this uncertainty reduction must necessarily be reflected in ID FRM values. EDF considers that the right to reduce the capacities provided for intraday trade in exceptional network situations should be more clearly framed and that the applicable (coordinated) process in that case should be described. As for the validation steps, the application of this right should be closely monitored by NRAs. EDF disagrees with the possibility to delay the delivery of intraday capacities as stated in Article 4(12) of the Core ID CCM: cf. answer to question 2. EDF is a priori supportive of the new proposed method for converting negative RAM values into negative ATCs, which avoids disproportionate negative ATCs on distant Core borders with a small negative RAM. However, a more detailed impact assessment would be needed – which could by the way also study the possibility of an evolution of the rules for RAM sharing in case it is positive. To avoid the drawbacks of any fixed rule for RAM sharing (positive or negative), EDF considers that the best solution remains the quick implementation of a flow-based allocation in ID. Finally, EDF considers that negative ATCs should not only be offered in the continuous SIDC, but also in the ID auctions, and should act here as a hard constraint, which would allow to solve the identified congestions through the market – the result being equivalent to a coordinated countertrading. A way of implementation could be that negative congestions rents resulting from the negative ATCs (and corresponding to congestion management costs to be incurred by TSOs) are allowed in the allocation process.	
CEZ	We would like to ask for a clarification of new changes in Article 8 of Proposal 2 - FRM may now be equal or lower than initial FRM for CNECs already used in the capacity calculation processes. Why there is a new suggestion that FRM may be lower? We rather disagree with this change. Article 4(11) is missing - hence we cannot provide opinion on this.	See above. Regarding FRM-related question, the approved amendments to Article 8(10) ensure that the FRM in intraday

	Respondents' views	ACER views
	As mentioned above, we do not agree with the possibility to further postpone delivery of intraday capacities pursuant to 4(12).	is at least equal or lower than the FRM in the day-ahead timeframe. ACER considers it technically justified as the level of uncertainties is lower when getting closer to real time. We also note that lower FRM entails higher RAM, and thus more capacity for the cross-zonal market exchanges.
EFET-MPP-IFIEC	We encourage ACER to continue investigating all elements with potential benefits. One example of such elements could be the potential benefits of keeping negative ATCs as hard constraints in the intraday auctions. Within the proposed methodology, negative ATCs can indeed be extracted, as a result of having CNECs with negative RAMs in the domain due to the absence of any minRAM. While these negative values are allocated to the continuous trading segment, they are capped to 0MW during the Intraday Auctions (IDAs), supposedly because this could cause the clearing algorithm to fail. Having negative ATCs in the auction would effectively provide a signal for participants to help TSOs alleviate congestion in the domain, in a transparent and market-based setting. Since such negative values derive from pre-congestions, they should have in principle been solved by TSOs before the auction. This provides additional incentives for TSOs to apply all possible remedial actions and can reduce the overall cost for the system. Besides, we find the algorithm failure argument (no solution can exist if all the negative capacity is not fully taken) to be rather weak, and easily manageable by adding price bounds or slack variables.	See above.