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South West Europe TSOs proposal of common capacity calculation methodology for the day-ahead and intraday market timeframe in accordance with Article 21 of Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management

September 2018

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All TSOs, taking into account the following:

Whereas

(1) This document (hereafter referred to as "South West Europe common capacity calculation methodology", or "SWE common capacity calculation methodology"), including its annexes, is a common proposal developed by all Transmission System Operators (hereafter referred to as "TSOs") within the South West Europe Capacity Calculation Region (hereafter referred to as "SWE Region") on the common capacity calculation performed for the capacity allocation within the day-ahead and intraday market timeframes. This proposal is required by Article 20 (2) and developed in accordance with Article 21 of Regulation (EU) 2015/1222 on Capacity Allocation and Congestion Management (the "CACM Regulation").

(2) This proposal (hereafter referred to as the "CCC methodology Proposal") takes into account the general principles and goals set in Commission Regulation (EU) 2015/1222 establishing a guideline on capacity allocation and congestion management (hereafter referred to as the "CACM Regulation") as well as Regulation (EC) No 714/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the network for cross-border exchanges in electricity (hereafter referred to as "Regulation (EC) No 714/2009").

(3) The goal of the CACM Regulation is the coordination and harmonisation of capacity calculation and allocation in the day-ahead and intraday cross-border markets. To facilitate these aims and implement single day-ahead and intraday coupling, the TSOs shall calculate in a coordinated manner the available cross-border capacity.

(4) Article 21 (1) of the CACM Regulation constitutes the legal basis for this proposal and defines several specific requirements that the CCC methodology Proposal should take into account:

"1. The proposal for a common capacity calculation methodology for a capacity calculation region determined in accordance with Article 20(2) shall include at least the following items for each capacity calculation time-frame:

(a) methodologies for the calculation of the inputs to capacity calculation, which shall include the following parameters:

(i) a methodology for determining the reliability margin in accordance with Article 22;

(ii) the methodologies for determining operational security limits, contingencies relevant to capacity calculation and allocation constraints that may be applied in accordance with Article 23;

(iii) the methodology for determining the generation shift keys in accordance with Article 24;

(iv) the methodology for determining remedial actions to be considered in capacity calculation in accordance with Article 25.

(b) a detailed description of the capacity calculation approach which shall include the following:

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(i) *a mathematical description of the applied capacity calculation approach with different capacity calculation inputs;*

(ii) *rules for avoiding undue discrimination between internal and cross-zonal exchanges to ensure compliance with point 1.7 of Annex I to Regulation (EC) No 714/2009;*

(iii) *rules for taking into account, where appropriate, previously allocated cross-zonal capacity;*

(iv) *rules on the adjustment of power flows on critical network elements or of cross-zonal capacity due to remedial actions in accordance with Article 25;*

(v) *for the flow-based approach, a mathematical description of the calculation of power transfer distribution factors and of the calculation of available margins on critical network elements;*

(vi) *for the coordinated net transmission capacity approach, the rules for calculating cross-zonal capacity, including the rules for efficiently sharing the power flow capabilities of critical network elements among different bidding zone borders;*

(vii) *where the power flows on critical network elements are influenced by cross-zonal power exchanges in different capacity calculation regions, the rules for sharing the power flow capabilities of critical network elements among different capacity calculation regions in order to accommodate these flows.*

(c) *a methodology for the validation of cross-zonal capacity in accordance with Article 26."*

(5) Article 14 of the CACM Regulation defines, the following: "*1. (…) TSOs shall calculate cross-zonal capacity for (…) (a) "day-ahead, for the day-ahead market;"* and *"2. For the day-ahead market time-frame, individual values for cross-zonal capacity for each day-ahead market time unit shall be calculated."*, and *"3. For the day-ahead market time-frame, the capacity calculation shall be based on the latest available information. The information update for the day-ahead market time-frame shall not start before 15:00 market time two days before the day of delivery"*.

(6) Article 20 (1) of the CACM Regulation defines the approach to use in the common capacity calculation methodologies as "*flow-based approach except where the requirements of paragraph 7 are met "* and (7) specifies that: *"TSOs may jointly request the competent regulatory authorities to apply the coordinated net transmission capacity approach in regions and bidding zone borders other than those referred to in paragraphs 2 to 4, if the TSOs concerned are able to demonstrate that the application of the capacity calculation methodology using the flow-based approach would not yet be more efficient compared to the coordinated net transmission capacity approach and assuming the same level of operational security in the concerned region."*

(7) Article 20 (2) of the CACM Regulation defines the deadline to submit the common proposal based on the coordinated net transmission capacity approach for the TSOs from the SWE region, as defined in point (e) of point 3.2 of Annex I to Regulation (EC) No 714/2009, as follows:

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2. "No later than 10 months after the approval of the proposal for a capacity calculation region in accordance with Article 15(1), all TSOs in each capacity calculation region shall submit a proposal for a common coordinated capacity calculation methodology within the respective region. The proposal shall be subject to consultation in accordance with Article 12. (…)"

(8) Article 2 (8) of the CACM Regulation defines the "*coordinated net transmission capacity approach*" as "*the capacity calculation method based on the principle of assessing and defining ex ante a maximum energy exchange between adjacent bidding zones"*.

(9) In the context of this proposal, the definition of "*coordinated capacity calculator*" is important and is defined in Article 2 (11) of the CACM Regulation as: "*the entity or entities with the task of calculating transmission capacity, at regional level or above"*.

(10) Article 9 (9) of the CACM Regulation requires that the proposed timescale for the implementation and the expected impact of the CCC methodology Proposal on the objectives of the CACM Regulation is described. The impact is presented below (point (10)) of this Whereas Section.

(11) The CCC methodology Proposal contributes to and does not in any way hinder the achievement of the objectives of Article 3 of the CACM Regulation :

Article 3 (a) of the CACM Regulation aims at promoting effective competition in the generation, trading and supply of electricity. The CCC methodology Proposal serves the objective of promoting effective competition in the generation, trading and supply of electricity by defining a set of harmonised rules for capacity calculation and congestion management, which contributes to the effectiveness of the single day-ahead and intraday coupling. Establishing common and coordinated processes for the capacity calculations within the day-ahead and intraday market timeframes contributes to achieve this objective.

Article 3 (b) of the CACM Regulation aims at ensuring optimal use of the transmission infrastructure. The CCC methodology Proposal contributes to achieve the objective of ensuring optimal use of the transmission infrastructure by using last available inputs based on the best possible forecast of transmission systems at the time of each capacity calculation, updated in a timely manner.

Article 3 (c) of the CACM Regulation aims at ensuring operational security. The CCC methodology Proposal contributes to achieve the objective of ensuring operational security by coordinating the capacity calculation with updated inputs for the day-ahead and intraday market timeframe at regional level to ensure its reliability.

Article 3 (d) of the CACM Regulation aims at optimising the calculation and allocation of cross-zonal capacity. By coordinating the timings for the delivery of inputs, calculation approach and validation requirements of the CCC between TSOs and the coordinated capacity calculator, the CCC methodology proposal contributes to achieve the objective of optimising the calculation and allocation of cross-zonal capacity.

Article 3 (g) of the CACM Regulation aims at contributing to the efficient long-term operation and development of the electricity transmission system and electricity sector in the Union. By using the best possible forecast of the transmission systems at the time of each capacity calculation within the SWE region, the results of the coordinated capacity calculation contributes to determine the most limiting branches within this region, thus supporting TSOs for a more efficient development of the electricity transmission system.

(12) In conclusion, the CCC methodology Proposal contributes to the general objectives of the CACM Regulation.

SUBMIT THE FOLLOWING CCC METHODOLOGY PROPOSAL TO ALL NATIONAL REGULATORY AUTHORITIES:

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Article 1
Subject matter and scope

The common capacity calculation methodology as determined in this CCC methodology Proposal is the common proposal of all SWE TSOs in accordance with Article 21 of the CACM Regulation.

Article 2
Definitions and interpretation

1. For the purposes of the CCC methodology Proposal, the terms used shall have the meaning set forth in Article 2 of Regulation (EC) 714/2009, Article 2 of Regulation (EC) 543/2013, which amends the previous, and Article 2 of Regulation (EC) 2015/1222.

2. In addition, the following definitions shall apply:
   a. 'RTE' means Réseau de Transport d'Electricité, the French system operator;
   b. 'FR-ES border' means the bidding zone border between France and Spain;
   c. 'REE' means Red Eléctrica de España, the Spanish system operator;
   d. 'PT-ES border' means the bidding zone border between Portugal and Spain;
   e. 'REN' means Rede Eléctrica Nacional, S.A., the Portuguese system operator;
   f. 'D-1' means the day before the day of delivery
   g. 'D-2' means two days before the day of delivery
   h. 'D-2 Common Grid Model' means the common grid model built for each market time unit two days before the day of delivery for the day-ahead capacity calculation timeframe in accordance with Article 17 of the CACM Regulation
   i. 'Day-ahead Common Grid Model' means the common grid model built for each market time unit on the day before the day of delivery for the intraday capacity calculation timeframe in accordance with Article 17 of the CACM Regulation
   j. 'Sensitivity ratio' means the variation of the flow, the voltage or the voltage phase angle difference in one critical network element with a change of 1MW in cross-zonal power exchanges of the bidding-zone border considered.
   k. 'NTC' means the net transfer capacity that amounts to the maximum total exchange program (MW) for commercial purposes between adjacent bidding zones for each market time unit in a specific direction. NTC is obtained by subtracting the reliability margin to the TTC.
   l. 'TTC' means the total transfer capacity that amounts to the maximum total exchange program (MW) complying with the operational security limits between adjacent bidding zones for each market time unit in a specific direction

3. In this CCC methodology Proposal, unless the context requires otherwise:
   a. the singular indicates the plural and vice versa;
   b. headings are inserted for convenience only and do not affect the interpretation of this proposal; and

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c. any reference to legislation, regulations, directives, orders, instruments, codes or any other enactment shall include any modification, extension or re-enactment of it when in force.

Article 3
Application of this proposal

This proposal applies solely to the common capacity calculation methodology within the SWE Region. Common capacity calculation methodologies within others Capacity Calculation Regions or others timeframes are outside the scope of this proposal.

Article 4
Cross-zonal capacities for the day-ahead market

For the day-ahead market time-frame, individual values for cross-zonal capacity for each day-ahead market time unit shall be calculated using the common capacity calculation methodology started in D-2. As the methodology study carried on by the SWE TSOs proved that the influence of one border on the other can be neglected, the TSOs of the SWE Region will not share the power flow capabilities of critical network elements among different bidding zone borders (article 21(1)(b)(vi) of the CACM Regulation). Taking into account the geographical and electrical distance between the SWE CCR and all other CCRs, the power flow capability of critical network elements will not be shared among different CCRs (article 21(1)(b)(vii) of the CACM Regulation).

Article 5
Cross-zonal capacities for the intraday market

For the intraday market timeframe, individual values for cross-zonal capacity for each remaining intraday market time unit shall be calculated using the common capacity calculation methodology performed in the end of D-1 on Day-ahead Common Grid Model. As the methodology study carried on by the SWE TSOs proved that the influence of one border on the other can be neglected, the TSOs of the SWE Region will not share the power flow capabilities of critical network elements among different bidding zone borders (articles 21(1)(b)(vi) of the CACM Regulation). Taking into account the geographical and electrical distance between the SWE CCR and all other CCRs, the power flow capability of critical network elements will not be shared among different CCRs (article 21(1)(b)(vii) of the CACM Regulation).

Article 6
Reliability margin methodology

1. For the capacity calculation performed in D-2, the TSOs of SWE Region shall define the reliability margin in line with Article 22 of the CACM Regulation and based on the analysis of the following data:

    a. unintended deviations of physical electricity flows within a market time unit caused by the adjustment of electricity flows within and between control areas, to maintain a constant frequency
    b. uncertainties which could affect capacity calculation and which could occur between D-2 and real time, for the market time unit being considered.

2. The reliability margin shall be defined as the 95 percentile of the convolution of the probability distribution functions of the two variables mentioned in Article 6.1.

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3. For the capacity calculation performed for the intra-Day market, the TSOs of SWE Region shall define the reliability margin in line with Article 22 of the CACM Regulation and based on the analysis of the following data:
   a. unintended deviations of physical electricity flows within a market time unit caused by the adjustment of electricity flows within and between control areas, to maintain a constant frequency;

   It can be defined by the following formula:

$$UD = E_{real} - E_{schedule}$$

Where:

UD is the unintended deviation calculated for a particular time (in MW)

E_{real} is the actual flow going through the border (in MW)
$E_{schedule}$ is the flow scheduled by the market (in MW)

   b. uncertainties which could affect capacity calculation and which could occur between the respective capacity calculation and real time, for the market time unit being considered. We will compare D-2 flows on CNEs and real time flows. We will then estimate its impact on the capacity by applying the following formula:

$$UN = \frac{P_{real} - P_{D-2}}{SI_{CNE}}$$

where:

UN is the error due to the uncertainties of the D-2 model (in MW)
SI_{CNE} is the Sensitivity Index for each CNE in base case
P_{real} is the CNE flow in the real time scenario (base case, in MW)
P_{D-2} is the CNE flow in the D-2 forecast (base case, in MW)

4. The reliability margin shall be defined as the 95 percentile of the convolution of the probability distribution functions of the two variables mentioned in Article 6.3.

Reliability Margin (percentile 95%) = Convolution (UD, UN)

5. The TSOs of SWE Region shall review once a year the reliability margin for each bidding zone border of the SWE region.

6. The TSOs of SWE Region shall investigate whether a lower percentile could be taken into account for the reliability margin computation while guarantying security of supply. A study will be provided to the relevant regulatory authorities after one year of data from external parallel run and real time operations and three month to compute these data (Q1 2020).

Article 7
Methodologies for operational security limits, contingencies and allocation constraints

1. The TSOs of SWE Region shall not apply allocation constraints in the capacity calculation within SWE Region.

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2. For the capacity calculation, the TSOs of SWE Region shall only monitor the operational security limits and contingencies on network elements significantly influenced by cross-zonal power exchanges. The selection of these critical network elements and contingencies shall be based on a sensitivity analysis updated at least once a year by the TSOs of the SWE Region in the different network states including but not limited to base case, after contingency and after remedial action.

3. The sensitivity can be defined as follow:

$$SI_{CNE} = \frac{P_{final} - P_{initial}}{\Delta E_{border}} \times 100$$

where:

SI_{CNE} is the Sensitivity Index for each monitored element (in %)
ΔE_{border} is the Increase of Exchange program through the border in MW (100 MW by default)
$P_{initial}$ is the CNE flow in initial state (in MW)
P_{final} is the CNE flow after a variation of ΔE through the border (in MW)

4. Only critical network elements with a sensitivity to cross-zonal power exchanges equal or higher than 5% shall be monitored during the capacity calculation process.

5. Only contingencies with a delta of sensitivity to cross-zonal power exchanges, between the base case and the case with the contingency of one critical network element, equal or higher than 5%, shall be considered in the capacity calculation process.

6. The TSOs of SWE Region shall review the list of critical network elements to be monitored in the capacity calculation process at least once a year.

7. The coordinated capacity calculator shall use the critical network elements in accordance with Article 7.3 for the capacity calculation performed within SWE Region in order to determine the maximum net transmission capacity for each bidding-zone border.

8. This methodology to select the monitored elements is in line with article 21(1)(b)(ii) since it is an objective way to use in the capacity calculation only monitored elements inside a bidding zones that are significantly taking part in the cross-zonal exchange. This way cross-zonal and internal exchanges are treated on the same level of importance, avoiding undue discrimination of one over the other.

9. The TSOs of SWE Region shall investigate whether a higher sensitivity threshold could be taken into account for the critical network elements selection while guarantying security of supply. A study will be provided to the relevant regulatory authorities after one year of data from external parallel run and real time operations and three month to compute these data (Q1 2020).

Article 8
Generation and load shift keys methodology

1. The TSOs of SWE Region shall define the generation shift keys methodology in accordance with Article 24 of CACM Regulation.

2. RTE shall define generation shift keys proportional to the base case scenarios for each market time unit with all expected generating units in the IGM, reflecting RTE's best forecast of market behaviour.

3. REE shall define generation and load shift keys based on a merit order list, reflecting the best forecast of market behavior for each market time unit with all available loads that are enable to participate in balancing markets and all available generation.

4. REN shall define generation and load shift keys based on a merit order list, reflecting the best forecast of market behavior for each market time unit with all available loads that are enable to participate in balancing markets and all available generation.

Article 9
Methodology for remedial actions in capacity calculation

1. The TSOs of SWE Region shall define the remedial actions in accordance with Article 25 of CACM Regulation.

2. Each TSO of SWE Region shall define individually the remedial actions of its responsibility area to be used in the capacity calculation within SWE Region with market time unit resolution.

3. The remedial actions to be defined by each TSO of SWE Region shall be either preventive (pre-fault) or curative (post-fault). The TSOs of SWE Region may use the following remedial actions:
   a. Changing the tap position of a phase shifter transformer.
   b. Topology measure: opening or closing of a line, cable, transformer, bus bar coupler or switching of a network element from one bus bar to another.
   c. HVDC modulation.
   d. Modification of generation.
   e. Activation/deactivation of FACTS, reactance(s), capacitor(s).

4. The TSOs of SWE Region shall review the list of the remedial actions that can be used in the capacity calculation within SWE region at least once a year.

5. For each market time unit, in order to improve computation time and precision, SWE TSOs can adapt the list of available remedial actions offered for the capacity calculation. These remedial actions are adapted to the grid situation and forecast.

6. Each TSO of SWE Region shall inform the coordinated capacity calculator in a timely manner on any change in its remedial actions within SWE Region to ensure an efficient capacity calculation.

7. RTE and REE shall coordinate, prior to the capacity calculation, the remedial actions that can be shared with each other to maximize the available cross-zonal capacities for the FR-ES border.

8. REN and REE shall coordinate, prior to the capacity calculation, the remedial actions that can be shared with each other to maximize the available cross-zonal capacities for the PT-ES border.

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9. Each TSO of the SWE Region may decide, based on regulation, to make available costly remedial actions. Where a costly remedial action is used in the capacity calculation process, it shall be performed in accordance with the provisions of the methodology for coordinated redispatching and countertrading with cross-border relevance as defined in Article 35 of CACM Regulation. It shall also be applied only when economically relevant at Union level.

10. Based on expertise and experience, SWE TSOs can identify a costly remedial action which effects can be economically and technically relevant at Union Level in order to include it in the list of available remedial actions To prove so, SWE TSOs will then proceed with the following steps:

    a. SWE TSOs will compare the potential statistical cost of this identified curative remedial action over a year with the average gain in global welfare over a year applying this remedial action, estimated over 4 representing timestamps.
    b. If the gain in welfare is higher than the cost, the remedial action can be used in the capacity calculation.
    c. Once a year, or when a significant change will impact the remedial action effectiveness or cost, the economic and technical relevance of the remedial action is reassessed and the remedial action is removed from the capacity calculation if it is not efficient anymore.

11. An amendment to this methodology, as defined in Article 9 of CACM, to identify adequate costly remedial actions will be presented when implementing the intraday capacity calculation project to better fit the intraday timeframe.

Article 10
Cross-zonal capacity validation methodology

1. The TSOs of SWE Region shall validate the cross-zonal capacities calculated by the coordinated capacity calculator of the SWE Region.

2. The coordinated capacity calculator shall make available the common grid model for SWE Region in the extreme scenarios for the relevant market time unit to the TSOs of SWE Region.

3. Where required, TSOs can validate the cross-zonal capacities calculated by performing security analysis with grid model provided in accordance with Article 10.2.

4. Where one or more SWE TSOs do not validate the cross-zonal capacity calculated, the concerned TSO(s) shall provide the coordinated capacity calculator with the updated amount of cross-zonal capacities for the border considered and the reasons for the reduction. The final cross-zonal capacity is the minimum value sent by the SWE TSOs of the border considered.

5. Where one or more SWE TSOs do not validate the cross-zonal capacity calculated, the reason for the reduction could be

    a. dynamic behavior of the grid,
    b. unplanned outage that occurs after the deadline to update the inputs and
    c. incomplete input.

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6. In accordance with Article 26 (5) of CACM regulation, the coordinated capacity calculator shall, every three months, report all reductions made during the validation of cross-zonal capacity to all regulatory authorities of the SWE region. This report shall include the location and amount of any reduction in cross-zonal capacity and shall give reasons for the reductions.

Article 11
Day-ahead capacity calculation

1. In accordance with Article 8 of CACM Regulation, the TSOs of SWE Region shall calculate cross-zonal capacities for each bidding-zone border of SWE Region.

2. The TSOs of SWE Region shall provide the coordinated capacity calculator with the last updated information on the transmission systems in a timely manner for the capacity calculation that is started in the end of D-2.

3. The TSOs of SWE Region shall provide the coordinated capacity calculator with the previously allocated cross-zonal capacities on each border of the SWE Region.

4. The coordinated capacity calculator shall retrieve the most recent common grid model as defined in Article 2.1 of CACM regulation.

5. The capacity calculation process is based on a Remedial Action Optimization methodology which aims to find the higher secure capacity based on the inputs provided by the TSOs and applying a dichotomy.

    a. The workflow shall test several level of cross-zonal exchange by using Generation Shift Keys and determine if this level of exchange is respecting all the monitored critical network elements after the occurrence of all the monitored contingencies as defined in article 29(8)(a) of CACM regulation, applying available remedial actions when necessary as defined in article 29(8)(b) of CACM regulation. All these inputs are sent by SWE TSOs.
    b. The computation will start from the Common Grid Model coordinated schedule.
    c. The TSOs of the SWE region will use a precision of 50 MW for the calculation in order to maintain a good balance between operationally acceptable calculation time and market needs.
    d. The coordinated capacity calculator will not apply rule for avoid undue discrimination between borders of the SWE CCR neither between the SWE CCR and any other CCR as defined in article 29(8)(c)&(d) of CACM regulation as already mentioned in Article 4.

6. The workflow will run a load flow at each level of the dichotomy applying a Newton-Raphson solution method.

7. The RAO will monitor at each step of the calculation the maximum flows, the adequate voltage levels and the maximum voltage phase angle differences defined by the TSOs on all the CNEs. The margin for a given CNE is defined as the difference between the maximum flow/voltage/angle difference allowed on the CNE and the measured flow/voltage/angle difference on the element after simulating a load flow. In the case of under-voltage assessment, the margin is defined as the difference between the measured voltage and minimum voltage allowed on the CNE.

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8. In the SWE region a positive margin methodology is used, meaning that as soon as all the margins computed with a given TTC value are positive, the remedial actions optimization stops and moves directly to the next TTC value.

9. The coordinated capacity calculator shall define the values of TTC for each market time unit up to the first unsecured situation. These values shall be provided to TSOs of the SWE Region for validation.

10. Once the TTC is validated, the reliability margin is deduced from the final TTC as defined in article 29(8)(e) of CACM regulation.

11. This computation should take place during the night before the day-ahead allocation.

12. The coordinated capacity calculator of the SWE Region shall provide relevant NEMOs with the validated NTCs after application of the reliability margin defined in accordance with Article 6 for each bidding-zone border of SWE Region.

13. In accordance with Article 46 of CACM Regulation, the coordinated capacity calculator and SWE TSOs shall ensure that cross-zonal capacity shall be provided to relevant NEMOs before the day-ahead firmness deadline as defined in accordance with Article 69 of CACM Regulation.

14. In accordance with Article 26 (5) of CACM regulation, the coordinated capacity calculator shall, every three months, report all reductions made during the validation of cross-zonal capacity to all regulatory authorities of the capacity calculation region. This report shall include the location and amount of any reduction in cross-zonal capacity and shall give reasons for the reductions.

Article 12
Intraday capacity calculation

1. In accordance with Article 14 of CACM Regulation, the TSOs of SWE Region shall calculate cross-zonal capacities for each bidding-zone border of SWE Region.

2. The TSOs of SWE Region shall provide the coordinated capacity calculator with the last updated information on the transmission systems in a timely manner for a first intraday capacity calculation that is performed in the end of D-1, and for a second calculation performed in intraday.

3. The TSOs of SWE Region shall provide the coordinated capacity calculator with the previously allocated cross-zonal capacities on each border of the SWE Region.

4. The coordinated capacity calculator shall retrieve the most recent common grid model as defined in Article 2.1 of CACM regulation.

5. The capacity calculation process is based on a Remedial Action Optimization methodology which aims to find the higher secure capacity based on the inputs provided by the TSOs and applying a dichotomy.
    a. The workflow shall test several level of cross-zonal exchange by using Generation Shift Keys and determine if this level of exchange is respecting all the monitored critical network elements after the occurrence of all the monitored contingencies as defined in article 29(8)(a) of CACM

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regulation, applying available remedial actions when necessary as defined in article 29(8)(b) of CACM regulation. All these inputs are sent by SWE TSOs.

b. The computation will start from the Common Grid Model coordinated schedule.
c. The TSOs of the SWE region will use a precision of 50 MW for the calculation in order to maintain a good balance between operationally acceptable calculation time and market needs.
d. The coordinated capacity calculator will not apply rule for avoid undue discrimination between borders of the SWE CCR neither between the SWE CCR and any other CCR as defined in article 29(8)(c)&(d) of CACM regulation as already mentioned in Article 4.

6. The workflow will run a load flow at each level of the dichotomy applying a Newton-Raphson solution method.

7. The coordinated capacity calculator shall define the values of TTC for each market time unit up to the first unsecured situation. These values shall be provided to TSOs of the SWE Region for validation.

8. In the SWE region a positive margin methodology is used, meaning that as soon as all the margins computed with a given TTC value are positive, the remedial actions optimization stops and moves directly to the next TTC value.

9. Once the TTC is validated, the reliability margin is deduced from the final TTC as defined in article 29(8)(e) of CACM regulation.

10. The coordinated capacity calculator of the SWE Region or the TSOs of the SWE Region shall provide the NEMOs with the validated ATCs for each bidding-zone border of SWE Region in accordance with Article 58 of CACM Regulation.

11. In accordance with Article 56 of CACM Regulation, the coordinated capacity calculator and SWE TSOs shall ensure that cross-zonal capacity shall be provided to relevant NEMOs before the intraday firmness deadline as defined in accordance with Article 71 of CACM Regulation.

12. In accordance with Article 26 (5) of CACM regulation, the coordinated capacity calculator shall, every three months, report all reductions made during the validation of cross-zonal capacity to all regulatory authorities of the capacity calculation region. This report shall include the location and amount of any reduction in cross-zonal capacity and shall give reasons for the reductions.

13. The TSOs of SWE Region shall review the frequency of recalculation no later than two years after the implementation of the capacity calculation for the intraday market timeframe by performing a cost-benefit analysis on the SWE Region. The results of this cost-benefit analysis shall be submitted to all regulatory authorities of the SWE region.

Article 13
Fallback procedures

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1. Prior to each capacity calculation started in D-2, the TSOs of SWE Region shall ensure the coordinated capacity calculator is provided with the last coordinated cross-zonal capacities calculated within the long term timeframe.

2. For the capacity calculation performed in D-2, where an incident occurs in the capacity calculation process and the coordinated capacity calculator is unable to produce results within the allotted time for the calculation process, the SWE TSOs shall validate the last coordinated cross-zonal capacities calculated within the long term timeframe and review it where relevant. After this validation step, the coordinated capacity calculator or SWE TSOs where applicable, shall provide the relevant NEMOs with this coordinated value.

3. Prior to each capacity calculation performed for intraday market timeframe, the TSOs of SWE Region shall ensure the coordinated capacity calculator is provided with the already allocated capacities in previous timeframes.

4. For each capacity calculation performed for intraday market timeframe, where an incident occurs in the capacity calculation process and the coordinated capacity calculator is unable to produce results, the SWE TSOs shall validate the last cross-zonal capacities calculated within SWE Region for the market time unit considered and review it where relevant. The coordinated capacity calculator or TSOs of SWE Region where applicable, shall provide the NEMOs of SWE Region with coordinated value.

Article 14
Publication and Implementation of the CCC methodology Proposal

1. The TSOs of SWE Region shall publish the CCC methodology Proposal without undue delay after all national regulatory authorities have approved the proposed CCC methodology or a decision has been taken by the Agency for the Cooperation of Energy Regulators in accordance with Article 9 (10), Article 9 (11) and 9 (12) of the CACM Regulation.

2. The TSOs of SWE Region shall implement the CCC methodology Proposal for the capacity calculation started in D-2 no later than Q1-2020, including the methodology of the Reliability Margin in line with Article 22 of the CACM Regulation.

3. The TSOs of SWE Region shall implement the CCC methodology Proposal for the capacity calculation performed in the end of D-1 no later than Q3-2021 including the methodology of the reliability margin in line with Article 22 of the CACM Regulation. The second calculation for intraday market timeframe shall be implemented no later than one year after the implementation of the first calculation for intraday market timeframe.

Article 15
Transitory period

1. For a transitory period, the TSOs of SWE Region shall define the reliability margin as such:

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a. For FR-ES border, in both directions, the reliability margin for the capacity calculation performed in D-2 is calculated as the maximum value between 200 MW, covering the unintended deviation part of the reliability margin, and 7.5% of the TTC value, covering the uncertainties of the forecast part of the reliability margin based on a preliminary analysis of the concerned TSOs.

b. For PT-ES border, in both directions, the reliability margin for the capacity calculation performed in D-2 is calculated as the maximum value between 100 MW, covering the unintended deviation part of the reliability margin, and 10% of the TTC value, covering the uncertainties of the part of the reliability margin based on preliminary analysis of the concerned TSOs.

c. For FR-ES border, in both directions, the reliability margin for the capacity calculation performed for the intraday market timeframe is defined as the same value of reliability margin as calculated for the capacity calculation performed in D-2.

d. For PT-ES border, in both directions, the reliability margin for the capacity calculation performed for the intraday market timeframe is defined as the same value of reliability margin as calculated for the capacity calculation performed in D-2.

2. The TSOs of SWE Region shall implement the CCC methodology Proposal for the capacity calculation started in D-2 no later than S1-2019, excluding the methodology of the Reliability Margin in line with Article 22 of the CACM Regulation.

3. The TSOs of SWE Region shall implement the CCC methodology Proposal for the capacity calculation performed in the end of D-1 no later than S2-2020 excluding the methodology of the reliability margin in line with Article 22 of the CACM Regulation.

4. For a transitory period, the reliability margin shall be determined in accordance with Article 15.1.

5. For a transitory period and until the Common Grid Model is available at Union level, coordinated capacity calculator shall merge the individual grid model provided by each TSO of the SWE region. During the merging process, quality checks of the information provided by each TSO of the SWE Region shall be performed by the coordinated capacity calculator.

Article 16
Language

1. The reference language for this common capacity calculation Proposal shall be English.

2. For the avoidance of doubt, where TSOs need to translate this CCC methodology Proposal into their national language(s), in the event of inconsistencies between the English version published by TSOs in accordance with Article 9 (14) of the CACM Regulation and any version in another language, the relevant TSOs shall be obliged to dispel any inconsistencies by providing a revised translation of this CCC methodology Proposal to their relevant national regulatory authorities.