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

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**February 2019**

TSOs of the SEE CCR, taking into account the following:

### Whereas

- (1) This document (hereafter referred to as “common capacity calculation methodology”, or “this methodology”) is a common proposal developed by all Transmission System Operators (hereafter referred to as “TSOs”) within the South East Europe Capacity Calculation Region (hereafter referred to as “SEE Capacity Calculation Region” or “SEE CCR”), 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 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”).
- (2) This proposal (hereafter referred to as the “common capacity calculation methodology Proposal”) takes into account the general principles and goals set in the CACM Regulation as well as Regulation (EC) No 714/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the network for cross-border exchanges in electricity and repealing Regulation (EC) No 1228/2003 (hereafter referred to as “Regulation (EC) No 714/2009”).
- (3) The goal of the CACM Regulation is the coordination and harmonization of capacity calculation and allocation in the day-ahead and intraday cross-border markets. To facilitate these aims the TSOs in the Capacity Calculation Region 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 common capacity calculation 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:*
    - (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) *(...)*

- (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, with reference to the day ahead timeframe, 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 14 of the CACM Regulation, with reference to the intraday ahead timeframe, defines the following: *“1. (...) TSOs shall calculate cross- zonal capacity for (...) (b) intraday, for the intraday market;” and “4. All TSOs in each capacity calculation region shall ensure that cross-zonal capacity is recalculated within the intraday market time-frame based on the latest available information. The frequency of this recalculation shall take into consideration efficiency and operational security”*
- (7) Article 20(1) of the CACM Regulation defines the approach to use in the common capacity calculation methodologies as *“flow-based approach” after the conditions Article 20 (4) are met and (4) specifies that: “No later than six months after at least all South East Europe Energy Community Contracting Parties participate in the single day-ahead coupling, the TSOs from at least Croatia, Romania, Bulgaria and Greece shall jointly submit a proposal to introduce a common capacity calculation methodology using the flow-based approach for the day-ahead and intraday market time-frame“. So, the common capacity calculation methodology Proposal is based on coordinated net transmission capacity approach.*
- (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 common capacity calculation methodology Proposal on the objectives of the CACM Regulation is described. The impact is presented below (point (11)) of this Whereas Section.
- (11) The common capacity calculation methodology Proposal generally contributes to 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 common capacity calculation methodology Proposal serves the objective of promoting effective competition in the generation, trading and supply of electricity by defining a set of harmonized 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 common capacity calculation 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 common capacity calculation 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 optimizing the calculation and allocation of cross-zonal capacity. By coordinating the timings for the delivery of inputs, calculation approach and validation requirements of the common capacity calculation between TSOs and the coordinated capacity calculator, the common capacity calculation methodology proposal contributes to achieve the objective of optimizing 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 SEE CCR, 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 common capacity calculation methodology Proposal contributes to the general objectives of the CACM Regulation to the benefit of all market participants and electricity end consumers.
- (13) The common capacity calculation methodology is based on forecast models of the transmissions system. 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. Nevertheless, in order to limit the impact of these uncertainties on available cross-zonal capacities, an overall limitation of reliability margin is needed and uncertainties exceeding this limitation should be managed in other ways. This methodology applies a temporary range for reliability margin, by using the reliability margin values already in operation in the existing capacity calculation initiatives. The first real calculation can only be done after some operational experience is gained with the application of this methodology.
- (14) The final definition of the capacity calculation inputs (the reliability margin, the list of critical network elements, the generation shift key, and remedial actions) shall be reviewed and redefined if needed after the implementation of this methodology once some operational experience is obtained. The SEE TSOs shall make ex-post analysis of these input parameters regularly and, if considered necessary, they will request to change them. If any change leads to an adaption of this methodology, SEE TSOs will amend this methodology according to Article 9(13) of the CACM Regulation.
- (15) To avoid undue discrimination between internal and cross-zonal exchanges (and the underlying discrimination between market participants trading inside or between bidding zones), this methodology introduces important measures. The SEE TSOs shall monitor only the elements significantly impacted by cross-zonal power exchanges. As mid-term and long-term measures, the SEE TSOs shall investigate a higher sensitivity threshold for the elements significantly impacted by cross-zonal power exchanges and consider future investments in the transmission grid.

- (16) Despite coordinated application of capacity calculation, SEE TSOs remain responsible for maintaining operational security. For this reason each SEE TSO shall validate and have the right to correct cross-zonal capacity relevant to the TSOs bidding zone border for reasons of operational security during the validation process. The validation process may lead to reductions of cross-zonal capacities. Thus, transparency, monitoring and reporting as well as exploration of alternative solutions in order to prevent similar cases in the future, is necessary.
- (17) Transparency and monitoring of capacity calculation is 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 market functioning. Furthermore, this methodology establishes significant reporting requirements in order for the stakeholders, regulatory authorities and other interested party to verify either the transmission infrastructure is operated efficiently and in the interest of consumers.

**SUBMIT THE FOLLOWING DAY-AHEAD AND INTRADAY COMMON CAPACITY CALCULATION METHODOLOGY TO NATIONAL REGULATORY AUTHORITIES OF THE SEE CCR:**

## **Article 1**

### **Subject matter and scope**

The common capacity calculation methodology shall be considered as a SEE TSOs methodology in accordance with Article 21 of the CACM Regulation and shall cover the day-ahead and intraday common capacity calculation methodology for the SEE CCR bidding zone borders.

## **Article 2**

### **Definitions and interpretation**

- (1) For the purposes of the day-ahead and intraday common capacity calculation methodology, the terms used in this document shall have the meaning of the definitions included in Article 2 of the CACM Regulation, of Regulation (EC) No 714/2009, in Article 2 of the Commission Regulation (EU) No 543/2013 of 14 June 2013 on submission and publication of data in electricity markets and amending Annex I to Regulation (EC) No 714/2009 of the European Parliament and of the Council, in Article 2 of the Directive 2009/72/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC.
- (2) In addition, the following definitions, abbreviations and notations shall apply:
1. 'AAC' means the already allocated capacities, which is the capacity allocated as an outcome of the latest capacity calculation in the SEE CCR;
  2. 'ANC' means the already nominated capacities, which is the nomination of the already allocated capacities;
  3. 'ATC' means the available transmission capacity, which is the transmission capacity that remains available for the allocation procedure and which respects the physical conditions of the transmission system;
  4. 'CCC' means the coordinated capacity calculator of the SEE CCR as defined in Article 2(11) of the CACM Regulation;
  5. 'CCR' means the capacity calculation region as defined in Article 2 (3) of the CACM Regulation;
  6. 'CGM' means the common grid model as defined in Article 2(2) of the CACM Regulation;
  7. 'CGMM' means the common grid model methodology, pursuant to Article 17 of the CACM Regulation;
  8. 'CNE' means a critical network element;
  9. 'CNEC' means a critical network element with a contingency;
  10. 'CNTC approach' means the coordinated net transmission capacity defined in Article 2(8) of the CACM Regulation;
  11. 'D-1' means the day before the day of delivery;
  12. 'D-2' means two days before the day of delivery;
  13. 'D-2 CGM' means the common grid model built for each market time unit two days before the day of delivery for the day-ahead capacity calculation time-frame in accordance with Article 17 of the CACM Regulation;
  14. 'D-1 CGM' means the common grid model built for each market time unit one day before the day of delivery for the intraday capacity calculation time-frame in accordance with Article 17 of the CACM Regulation;
  15. 'GR-BG border' means bidding zone border between Greece and Bulgaria;
  16. 'BG-RO border' means bidding zone border between Bulgaria and Romania;
  17. 'FCA Regulation' means the Commission Regulation (EU) 2016/1719 of 26 September 2016 establishing a guideline on forward capacity allocation;
  18. 'GSK' means the generation shift key as defined in Article 2(12) of the CACM Regulation;

19. 'HVDC' means a high voltage direct current network element;
20. ' $I_{\max}$ ' means the maximum admissible current;
21. 'LTA' means the long-term allocated capacity, which is capacity allocated as an outcome of the long-term capacity calculation in the SEE CCR;
22. 'LTN' means the long term nominated capacities, which is the long-term nomination of the long-term allocated capacity;
23. 'MTU' means a market time unit; the definition for 'market time' is provided at Article 2(15) of the CACM Regulation;
24. 'NTC' means the Net Transmission Capacity which is the maximum energy exchange for commercial purposes between adjacent bidding zones for each market time unit in a specific direction;
25. 'PST' means a phase-shifting transformer;
26. 'RA' means a remedial action as defined in Article 2(13) of the CACM Regulation;
27. 'RAC' means the RAs coordination;
28. 'RM' means the reliability margin as defined in Article 2(14) of the CACM Regulation;
29. 'SEE CCR' means the SEE capacity calculation region as established by the definition of capacity calculation regions pursuant to Article 15 of the CACM Regulation;
30. SEE TSOs are Independent Power Transmission Operator ('ADMIE'), Electricity System Operator EAD ('ESO EAD') and National Power Grid Company Tranelectrica S.A. ('Tranelectrica');
31. 'SO GL' means the System Operation Guideline (Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation);
32. 'TTC' means the Total Transmission Capacity which is the maximum exchange) complying with the operational security limits between adjacent bidding zones for each market time unit in a specific direction.
33. 'UD' means the unintended deviation;
34. 'UN' means the uncertainties.

- (3) In this day-ahead and intraday capacity calculation methodology, 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 methodology; and
  - 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 methodology**

This common capacity calculation methodology solely applies to the day-ahead and intraday common capacity calculation within the SEE CCR. Common capacity calculation methodologies within others capacity calculation regions or for others time-frames are not in scope of this methodology.

### **Article 4**

#### **Cross-zonal capacities for the day-ahead market**

- (1) Article 20 (4) of CACM Regulation states that *“No later than six months after at least all South East Europe Energy Community Contracting Parties participate in the single day-ahead coupling, the TSOs from at least Croatia, Romania, Bulgaria and Greece shall jointly submit a proposal to introduce a common capacity calculation methodology using the flow-based approach for the day-ahead and intraday market time-frame”*. Based on the above, 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 *CNTC* approach.

- (2) Each TSO of the SEE CCR shall provide the CCC without undue delay the following initial inputs:
  - a. operational security limits and contingencies in accordance with Article 7;
  - b. RMs in accordance with Article 6;
  - c. GSKs in accordance with Article 8; and
  - d. RAs in accordance with Article 9.
- (3) SEE TSOs, or an entity delegated by the SEE TSOs, shall send for each MTU of the day the LTA and LTN to the CCC, without undue delay. In accordance with article 81 of CACM Regulation, the delegating TSOs in such a case shall remain responsible for ensuring compliance with the obligations under the CACM Regulation.
- (4) When providing the inputs, the TSOs of the SEE CCR shall respect the formats commonly agreed between the TSOs and the CCC of the SEE CCR, while respecting the requirements and guidance defined in the CGMM.
- (5) The day-ahead capacity calculation is based on the unique D-2 CGM built in accordance with Articles 17 and 28 of CACM Regulation.
- (6) For the day-ahead common capacity calculation in the SEE CCR, performed by the CCC, the high-level process flow includes six steps until the final CNTC domain for the day-ahead market time-frame is set:
  - a. first, for the capacity calculation inputs as defined in Article 4(2) and Article 4(4) a quality check process shall be performed by the CCC;
  - b. the second process step is to determine the relevant CNECs in accordance with Article 7a used during common capacity calculation;
  - c. the third step is to determine the NTC values for each direction and border of SEE CCR in accordance with Article 11;
  - d. the fourth step is to check if the previously-allocated cross-zonal capacities are fully covered by the NTC values in accordance with Article 11;
  - e. after LTA assessment, the resulting cross-zonal capacities are validated by the TSOs of the SEE CCR;
  - f. finally, the ATC values are calculated for day-ahead market time-frame taking into account the LTN values.
- (7) As described before, for each SEE CCR border, direction and market time unit, the final available transmission capacity for the day-ahead market time-frame shall be defined as the difference between the computed NTC values and the already nominated capacities in the previous market time-frames.
- (8) In accordance with Article 46 of CACM Regulation, the CCC and TSOs of the SEE CCR shall ensure that cross-zonal capacity shall be provided to relevant entities before the day-ahead firmness deadline as defined in accordance with Article 69 of CACM Regulation.

## **Article 5**

### **Cross-zonal capacities for the intraday market**

- (1) Article 20 (4) of CACM Regulation states that “No later than six months after at least all South East Europe Energy Community Contracting Parties participate in the single day-ahead coupling, the TSOs from at least Croatia, Romania, Bulgaria and Greece shall jointly submit a proposal to introduce a common capacity calculation methodology using the flow-based approach for the day-ahead and intraday market time-frame”. Based on the above, for the intraday market time-frame, individual values for cross-zonal capacity for each remaining intraday MTU shall be calculated using the CNTC approach.



- (2) Each TSO of the SEE CCR shall provide the *CCC* without undue delay the following initial inputs for the first intraday capacity calculation and subsequent re-calculations of intraday cross-zonal capacity:
  - a. operational security limits and contingencies in accordance with Article 7;
  - b. *RMs* in accordance with Article 6;
  - c. *GSKs* in accordance with Article 8; and
  - d. *RAs* in accordance with Article 9.
- (3) A first intraday common capacity calculation is performed in the end of D-1 for all *MTUs* of day D, and a second intraday capacity calculation is performed during intraday (i.e. day D), for the remaining *MTUs* of day D.
- (4) SEE TSOs, or an entity delegated by the SEE TSOs, shall send for each market time unit the *AAC* and *ANC* to the coordinated capacity calculator, without undue delay. In accordance with article 81 of CACM Regulation, the delegating TSOs in such a case shall remain responsible for ensuring compliance with the obligations under the CACM Regulation.
- (5) When providing the inputs, the TSOs of the SEE CCR shall respect the formats commonly agreed between the TSOs and the coordinated capacity calculators of the SEE CCR, while respecting the requirements and guidance defined in the *CGMM*.
- (6) The capacity calculation is based on the unique D-1 and Intraday CGM built in accordance with Articles 17 and 28 of CACM Regulation.
- (7) For the intraday common capacity calculation in the SEE CCR, performed by the *CCC*, the high-level process flow includes five steps until the final *CNTC* domain for the intraday market time-frame is set:
  - a. first, for the capacity calculation inputs as defined in Article 4(2) and Article 4(4) a quality check process shall be performed by the *CCC*;
  - b. the second process step is to determine the relevant *CNECs* in accordance with Article 7a used during common capacity calculation;
  - c. the third step is to determine the *NTC* values for each direction and border of SEE CCR in accordance with Article 11;
  - d. after *NTC* values computation, the resulting cross-zonal capacities are validated by the TSOs of the SEE CCR;
  - e. finally, the *ATC* values are calculated for intraday market time-frame taking into account the *ANC* values.
- (8) As described before, for each SEE CCR border, direction and market time unit, the final available transmission capacity for the intraday market time-frame shall be defined as the difference between the computed *NTC* values and the already nominated capacities in the previous market time-frames.
- (9) Intraday cross-zonal capacity calculation shall be performed in the following sequence, by the time establish in Article 14(5):
  - a. Updating of cross-zonal capacities remaining after day-ahead CC for all intraday CC *MTUs* between 00:00 and 24:00 of day D and providing them as intraday cross-zonal capacities to relevant entity no later than 15 minutes before the intraday cross-zonal gate opening time;
  - b. Calculation of intraday cross-zonal capacities for all intraday 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 relevant entity no later than 15 minutes before the target start of allocation at 22:00 D-1;

- c. Re-calculation of intraday cross-zonal capacities for all intraday 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 D-1.
- (9) The SEE TSOs shall review the frequency of re-calculations no later than one year after the implementation of the common capacity calculation methodology for the intraday market time-frame.

## **Article 6**

### **Reliability margin methodology**

- (1) The day-ahead and intraday common capacity calculation methodologies are based on forecast models of the transmission system. 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.
- (2) In accordance with Article 22(2) and (4) of the CACM Regulation, the *RM*s cover the following forecast uncertainties:
  - a. cross-zonal exchanges on bidding zone borders outside SEE 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 the operation of frequency containment reserves.
- (3) SEE TSOs shall aim at reducing uncertainties by studying and tackling the drivers of uncertainty.
- (4) For the capacity calculation performed for day-ahead market time-frame, the TSOs of the SEE CCR shall compute the *RM*s for the BG-GR and BG-RO borders in accordance with Article 22 of the CACM Regulation and based on the analysis of the following data:
  - Unintended deviations of physical electricity flows within a MTU caused by the adjustment of electricity flows within and between control areas, to maintain a constant frequency;
  - Uncertainties which could affect capacity calculation and which could occur between D-2 and real time, for the MTU being considered.
- (5) For the capacity calculation performed for intraday market time-frame, the TSOs of SEE CCR shall compute the *RM*s for the BG-GR and BG-RO borders in accordance with Article 22 of the CACM Regulation and based on the analysis of the following data:
  - Unintended deviations of physical electricity flows within a MTU caused by the adjustment of electricity flows within and between control areas, to maintain a constant frequency;
  - Uncertainties which could affect capacity calculation and which could occur between the respective capacity calculation time and real time, for the MTU being considered.
- (6) Regarding the *UD* for control-related reasons, deviations occur between the scheduled values and the actual values during the exchange of energy between neighboring control areas. This implies that at any moment the exchange between two control areas can be significantly higher than the scheduled exchanged, endangering the security of supply.
- (7) Regarding the *UN* the CNTC methodology is based on different inputs provided by TSOs, they are based on best available forecast at the time of the capacity calculation for renewable energy sources, consumption, generation or available network elements and those could differ from the real-time situation.
- (8) The *RM*s can be considered as an indirect input to the capacity calculation process since it refers to the

difference when the TTC and the NTC limits are reached for the constraint under investigation.

(9) The RMs determination is based on a probability distribution function of the deviations between the expected power flows at the time of the capacity calculation and realized power flows in real time.

(10) The RMs on the SEE CCR borders are calculated in a three-step approach:

- a. In a first step, for each MTU of the observatory period, the relevant CGMs are updated in order to take into account the real-time situation of the RAs that are considered in the common capacity calculation. This step is undertaken by copying the real-time configuration of these RAs and applying them into the historical CGM where the capacity calculation was performed. The power flow on BG-RO and BG-GR borders of the SEE CCR, as expected with the common capacity calculation methodology is then compared with the real time power flow observed on the same borders. All differences for all MTUs of a one-year observation period shall constitute the probability distribution function of deviations between the expected flows at the time of capacity calculation and realized flows in real time. In case where not all required historical snapshots are available or simultaneous, an alternative approach is based on direct application of real time recordings provided by the TSOs. The impact on the capacity shall be defined with the following equation:

$$F_{err} = \frac{F_{real} - F_{up\ CGM}}{SF_{border}}$$

with

$F_{err}$	Active power flow error due to <i>UD</i> and <i>UN</i> ;
$F_{real}$	Active power flow through the border in real time;
$F_{up\ CGM}$	Active power flow through the border in the updated relevant CGM;
$SF_{border}$	Sensitivity factor for SEE CCR border in base case;

$$SF_{border} = \frac{F_f - F_i}{\Delta P} \times 100$$

with

$F_f$	Active power flow through the border after $\Delta P$ ;
$F_i$	Active power flow through the border based on the relevant CGM;
$\Delta P$	Increase of the exchange with 100 MW through the SEE CCR border.

- b. in a second step and in accordance with Article 22(3) of the CACM Regulation the 95th percentiles of the probability distributions for the BG-RO and BG-GR borders of the SEE CCR shall be calculated. This means that the TSOs apply a common risk level of 5% and thereby the RM values cover 95% of the historical forecast errors within the observation period.

- c. a possible third step could be to undertake an operational adjustment on the values derived previously, by modifying the computed RM values to a value within the range which will retain system security between 1% and 20% of the TTC calculated under normal weather conditions.

(11) The TSOs of the SEE CCR shall store for an unlimited period of time the differences between the realized and expected SEE CCR power flow in a database for statistical analyses. The probability distribution function and reliability margin values shall be stored for an unlimited period of time for further evaluation.

(12) The RM values shall be updated every year (including the risk level) in accordance with Article 15, based upon an observatory period of one year such that seasonal effects can be reflected in the values. The *RMs* values remain fixed until the next update.

(13) For the day-ahead common capacity calculation, the *RMs* for the SEE CCR borders shall be implemented 3 months after collecting 1 year of data since the day-ahead capacity calculation go-live.

- (14) For the intraday common capacity calculation, the *RM*s for the SEE CCR borders shall be implemented 3 months after collecting 1 year of data since the intraday capacity calculation go-live.
- (15) Before the first operational calculation of the *RM*s values, SEE CCR TSOs shall use the *RM* values already in operation in the existing capacity calculation initiatives. The *RM*s before the first operational calculation for the BG-RO and BG-GR borders shall be 100 MW for each direction.

## **Article 7**

### **Methodologies for operational security limits, contingencies and allocation constraints**

- (1) Each TSO of the SEE CCR shall define a list of proposed CNEs, which could be fully or partly located in its own control area. The list of CNEs shall be provided to the CCC, who shall monitor the CNEs during the coordinated NTC calculation process. This list shall be updated at least on a yearly basis and in case of topology changes (commissioning of new grid elements in the observability area of each TSO) in accordance with Article 15. A CNE is a network element, significantly impacted by SEE cross-zonal trades, which are supervised under certain operational conditions, the so-called contingencies. A CNE can be a cross zonal element or an internal network element. Those elements can be an overhead line, an underground cable, or a transformer.
- (2) Each TSO of the SEE CCR shall define a list of proposed contingencies used in operational security analysis in accordance with Article 33 of the SO GL, limited to their relevance for the set of CNEs as defined in Article 7(1) and pursuant to Article 23(2) of the CACM Regulation. The contingencies of a TSO shall be located within the observability area of that TSO. This list shall be updated at least on a yearly basis and in case of topology changes in the grid of the TSOs (commissioning of new grid elements in the observability area of each TSO) in accordance with Article 15.  
A contingency can be an unplanned outage of:
  - a line, a cable, or a transformer;
  - a busbar;
  - a generating unit;
  - a load; or
  - a set of the aforementioned contingencies.
- (3) Each TSO of the SEE CCR shall associate the contingencies established pursuant to Article 7(2) with the CNEs established pursuant to Article 7(1) following the rules established in accordance with Article 75 of SO GL. Until such rules are established and enter into force, the association of contingencies to CNEs shall be based on each TSO's operational practise.
- (4) Each TSO of the SEE CCR shall provide to the CCC a list of the proposed CNECs. The CCC shall merge the list of CNECs provided by all SEE CCR TSOs into a single list, which shall constitute the initial list of CNECs.
- (5) In accordance with Article 23(1) of the CACM Regulation, SEE TSOs shall respect the operational security limits used in operational security analysis carried out in line with Article 72 of the SO GL. The operational security limits used in the common capacity calculation are the same as those used in operational security analysis, therefore any additional descriptions pursuant to Article 23(2) of the CACM Regulation are not needed. In particular:

- a. SEE TSOs shall respect the maximum admissible current limit ( $I_{max}$ ) which is the physical limit of a CNE according to the operational security policy in accordance with Article 25 of the SO GL. The maximum admissible current can be defined with:
    - i. fixed limits for all MTUs of each of the four seasons;
    - ii. fixed limits for all MTUs in the case of transformers and certain types of conductors which are not sensitive to ambient conditions;
    - iii. fixed limits for all MTUs, in case of specific situations where the physical limit reflects the capability of substation equipment (such as circuit-breaker, current transformer, or disconnecter).
  - b. when applicable,  $I_{max}$  shall be defined as a temporary current limit of the CNE in accordance with Article 25 of the SO GL. A temporary current limit means that an overload is only allowed for a certain finite duration.
  - c.  $I_{max}$  shall represent only real physical properties of the CNE and shall not be reduced by any security margin, as all uncertainties in the common capacity calculation are covered on each CNEC by the reliability margin ( $RM$ ) in accordance with Article 6.
- (6) SEE TSOs shall not apply allocation constraints.
- (7) SEE TSOs shall review and update the application of the methodologies for determining operational security limits, list of CNEs and the list of CNECs, respectively, contingencies on a yearly basis in accordance with Article 15.

## Article 7a

### Rules for avoiding undue discrimination between internal and cross-zonal exchanges

- (1) In accordance with Article 21(1)(b)(iv) of the CACM Regulation, this day-ahead and intraday common capacity calculation methodology shall describe the rules to mitigate possible discrimination between the treatment of internal and cross-zonal transactions, in response to Article 21(1)(b)(ii) of the CACM Regulation and Article 1.7 of Annex I to the Regulation (EC) 714/2009 and in line with Article 3(a), 3(b) and 3(e) of the CACM Regulation.
- (2) The TSOs of SEE CCR shall monitor only the elements from initial list of CNECs significantly impacted by cross-zonal power exchange. The CCC shall calculate the sensitivity factors for selecting the CNECs that are significantly impacted by cross-zonal power exchange.
- (3) The sensitivity factors calculated as a percentage using the relevant CGM and GSK are defined as follow:

$$SF_{CNEC} = \frac{P_f - P_i}{\Delta P} \times 100$$

with

$SF_{CNEC}$	Sensitivity factor for CNEC;
$P_f$	CNEC active power flow after $\Delta P$ ;
$P_i$	CNEC active power flow based on the relevant CGM;
$\Delta P$	Increase of the exchange with 100 MW through the north Greek borders, respectively south Romania borders.

- (4) SEE CCR cross-zonal network elements are by definition considered to be significantly impacted. The other CNECs from initial list shall have a sensitivity factor equal or higher than 5% to be taken into account in all of the steps of the common capacity calculation to determine the cross-zonal capacity.

- (5) In an exceptional situation, such as extreme weather conditions, untypical flow conditions or topology or grid situation, a TSO may decide to modify the CNEC list defined in accordance with Article 7a(4) for one or several MTUs covering the expected period of presence of the exceptional situation.
  - a. In case a TSO decides, in an exceptional situation, to use a CNEC or node which is not significantly influenced by the changes in bidding zone net positions, the respective TSO shall inform SEE national regulatory authorities without undue delay and provide a clear description of the specific situation providing detailed information such as the specific topology or grid situation that led to this decision;
  - b. In case a TSO decides, in an exceptional situation, to exclude a CNEC or node which is significantly influenced by the changes in bidding zone net positions, the respective TSO shall inform SEE national regulatory authorities without undue delay and provide a clear description of the specific situation providing detailed information such as the specific topological or grid situation that led to this decision.
- (6) The TSOs shall investigate whether a higher sensitivity threshold could be taken into account while guarantying security of supply, as a mid-term measure. A study shall be provided to the relevant regulatory authorities in 3 months after collecting 1 year of data since the day-ahead capacity calculation go-live.
- (7) The TSOs shall consider efficient investments, as a long-term measure.

## **Article 8**

### **Generation shift keys methodology**

- (1) Each SEE TSO shall define for its bidding zone and for each MTU a GSK, which translates a change in a bidding zone net position into a specific change of injection or withdrawal in the CGM. This expectation shall be based on the observed historical response of generation units to changes in net positions, clearing prices and other fundamental factors, and thereby contributing to minimizing the RM.
- (2) In accordance with Article 24 of the CACM Regulation, SEE TSOs developed the following methodology to determine the common generation shift key:
  - a. SEE TSOs shall take into account the available information on generation available in the common grid model for each scenario developed in accordance with Article 18 of the CACM Regulation in order to select the nodes that will contribute to the GSK;
  - b. SEE TSOs shall aim to apply a GSK that resembles the dispatch and the corresponding flow pattern, thereby contributing to minimizing the reliability margins;
  - c. SEE TSOs shall define a constant generation shift key per market time unit.
- (3) For the application of the methodology, SEE TSOs shall define, for the capacity calculation process, GSKs impacted by the actual generation present in the relevant CGM, for each MTU. SEE TSOs shall take into account the available information on generation available in the CGM in order to select the nodes that will contribute to the GSK.
- (4) SEE TSOs have harmonized their GSK determination methodologies:
  - a. In its GSK, each TSO shall use flexible and controllable production units which are available inside the TSO grid;
  - b. Units unavailable due to outage or maintenance are not included;
  - c. GSK is reviewed on a daily basis or whenever there are changes in the expectations referred to in paragraph (1).
- (5) For the Greek bidding zone a proportional representation of the generation variation to the remaining capacity, based on ADMIE's best estimate of the initial generation profile, ensure the best modeling of the Greek

system.

- (6) For the Bulgarian bidding zone a proportional representation of the generation variation to the remaining capacity respecting the limits of the generating units, based on ESO EAD's best estimate of the initial generation profile, ensure the best modeling of the Bulgarian system. The nuclear units are not included in the list.
- (7) The Transelectrica GSK file contains dispatchable units which are available in the day of operation. The nuclear units are not included in the list. The fixed participation factors of GSK are impacted by the actual generation present in the relevant CGM.
- (8) With the above GSKs, the SEE TSOs consider that the prediction error, between the forecasted and observed flows for all production units in each bidding zone for the day ahead and intraday time frame will be minimized. At the above GSKs, non-flexible production units, such as the nuclear production units are not included at the generation shift.
- (9) The GSKs shall be provided to the CCC to be used in the capacity calculation for each bidding zone and also the MTUs for which the GSKs shall be valid. The SEE TSOs shall make ex-post analysis of GSK regularly and if considered necessary request to change it.
- (10) SEE TSOs shall review and update the application of the generation shift keys methodology, on a yearly basis in accordance with Article 15.

## **Article 9**

### **Methodology for remedial actions in capacity calculation**

- (1) In accordance with Article 25(1) of the CACM Regulation and Article 20(2) of SO GL, SEE TSOs shall individually define RAs to be taken into account in the day-ahead and intraday common capacity calculation. The relevant RAs shall be coordinated between TSOs, clearly described, and communicated to other TSOs and the CCC.
- (2) Each TSO of SEE CCR shall inform the CCC in a timely manner on any change in its RAs within SEE CCR to ensure an efficient capacity calculation. The CCC which receives the RAs from the TSOs coordinates the process and either proposes the initial recommendations from the TSOs or develops new proposals for the TSOs.
- (3) In accordance with Article 25(2) and (3) of the CACM Regulation, these RAs will be used in calculation of cross-zonal capacities while ensuring operational security in real time.
- (4) In accordance with Article 25(4) of the CACM Regulation, a TSO may refrain from considering a particular RA in capacity calculation in order to ensure that the remaining RAs are sufficient to ensure operational security. 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.
- (5) In accordance with Article 25(5) of the CACM Regulation, the day-ahead and intraday common capacity calculation take non-costly RAs into account which can be explicitly modelled in the CGM. All TSOs of the SEE CCR shall provide to the CCC all available non-costly RAs, and for the purpose of capacity validation all TSOs of the SEE CCR shall provide to the CCC all expected non-costly RAs.
- (6) The RAs defined by each SEE TSOs shall be either preventive (pre-fault) or curative (post-fault), i.e. affecting

all CNECs or only pre-defined contingency cases, respectively. The capacity calculation may only take into account those non-costly RAs which can be modelled. The SEE TSOs may use the following non-costly RAs, but are not limited to:

- a. changing the tap position of a PST,
  - b. 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, connection/disconnection of reactor(s), capacitor(s).
- (7) In accordance with Article 25(6) of the CACM Regulation, the RAs taken into account are the same for day-ahead and intra-day common capacity calculation, depending on their technical availability.
- (8) The RAC in the day-ahead and intraday common capacity calculation shall be an automated, coordinated, and repeatable optimization process performed by the CCC. The CCC shall take into account in capacity calculation RAs to increase the cross-zonal capacity. After calculation the maximum power exchanges between bidding zones without RAs, necessary adjustment taking into account RAs are executed in the CGM and maximum power exchanges between bidding zones taking into account RAs shall be recalculated.
- (9) The RAC consists of the following objective function, constraints and variables:
- a. The RAC objective is to enlarge the capacity domain around the balanced net position of the Common Grid Model Alignment process, with the objective function to minimize the overload of the CNECs and/or the violation of the nodes voltage;
  - b. The constraints are the operational security limits in accordance with Article 7, minimum impact on objective function value for use RAs and without negative impact on the TTC values calculated according with Article 11.
  - c. The variables are the switching states of the topological measures and tap positions.
- (10) In case a RA is made available for the capacity calculation in the SEE CCR is also one which is made available in another CCR, the TSOs taking control of the RA shall take care, when defining it, of a consistent use in its potential application in both regions to ensure operational security. 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 SEE CCC shall take this information into account for the coordinated application of RAs in the SEE CCR.
- (11) In accordance with Article 21(1)(b)(iv) of the CACM Regulation, at this day-ahead and intraday common capacity calculation methodology:
- a. an exchange of foreseen remedial actions in each CCR, with sufficient impact on the cross-zonal capacity in other CCRs, should be coordinated among CCCs.
  - b. the coordinated application of RAs shall aim at increasing cross-zonal capacity in the SEE CCR in accordance with Article 29(4) of the CACM Regulation;
  - c. the applied RAs should be transparent to all TSOs, also of adjacent CCRs, and shall be an input to the coordinated operational security analysis established under SO GL Article 75.
- (12) SEE TSOs shall review and update remedial actions taken into account in capacity calculation, on a yearly basis in accordance to Article 15.

## **Article 10**

### **Cross-zonal capacity validation methodology**

- (1) Each TSO of the SEE CCR shall, in accordance with Article 26(1) and 26(3) of the CACM Regulation, validate and have the right to correct cross-zonal capacity relevant to the TSO's bidding zone borders for



reasons of operational security during the validation process. In exceptional situations cross-zonal capacities can be decreased by TSOs. These situations are:

- a. an occurrence of an exceptional contingency or forced outage pursuant to Article 3 of SO GL;
  - b. when RAs, that are needed to ensure the calculated capacity, are not sufficient to ensure operational security;
  - c. extremely low demand of a TSO which leads to low system inertia and high voltage conditions and so require a minimum number of power plants on the grid;
  - d. a mistake in input data, that leads to an overestimation of cross-zonal capacity from an operational security perspective.
- (2) When performing the validation, SEE TSOs may consider the operational security limits pursuant to Article 7. When considering such limits, they may consider additional grid models, and/or other relevant information from the real time situation. Therefore, SEE TSOs shall use tools developed by the CCC for analysis, but may also employ verification tools not available to the CCC.
  - (3) When one or more SEE TSOs do not validate the cross-zonal capacity calculated, the concerned TSO(s) shall provide the CCC 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 SEE TSOs of the border considered.
  - (4) Any reduction of cross-zonal capacities during the validation process shall be communicated and justified to market participants and to the SEE national regulatory authorities. The CCC shall issue a quarterly report to regulatory authorities that shall include the amount of reduction in cross-zonal capacity and reason for reduction, pursuant to Article 26(5) of CACM. In cases of reduction the report shall include information for each bidding zone border and direction affected by a reduction and for each MTU (i.e. the identification of the border and direction; the volume of reduction; detailed reasons for reduction, including the security constraint violated, and under which circumstances it was violated; the before and after the contingency values for the NTC; the RAs included in CGM before capacity calculation; in case of reduction due to individual validation, the TSO invoking the reduction) and the proposed measures to avoid similar reductions in the future. The report shall also include at least the following aggregate information: statistics on the number, causes, volume and estimated loss of economic surplus of applied of reductions by different TSOs and general measures to avoid capacity reduction in the future.
  - (5) When a given SEE TSO reduced capacity for its border in more than 1% of MTUs of analyzed quarter, the concerned TSO shall provide to 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.
  - (6) The CCC shall coordinate with neighboring CCCs during the validation process, where at least the reductions in cross-zonal capacity are shared among them. Any information on decreased cross-zonal capacity from neighboring CCCs shall be provided to SEE TSOs.

## **Article 11**

### **Mathematical description of the day-ahead and intraday capacity calculation approach**

- (1) The CNTC computation is a centralized calculation based on AC load flow which delivers the main parameter needed for the definition of CNTC domain: TTC. The TTC represent the maximum power exchange on a bidding zone border and calculation shall according to the following procedure:
  - (a) use the common grid model, generation shift keys, and list of CNECs defined in accordance with Article 7a to calculate maximum power exchange on bidding zone borders, which shall equal the

maximum calculated exchange between two bidding zones on either side of the bidding zone border respecting operational security limits;

(b) adjust maximum power exchange using remedial actions in accordance with Article 9.

- (2) The CCC shall define the values of TTC for each MTU for the north Greek borders, BG-GR border, south Romanian borders, BG-RO border. These values shall be provided to TSOs of the SEE CCR for validation of BG-RO and BG-GR borders.

- (3) The *TTC* on the BG-GR direction is a ratio of the total *TTC* value calculated from all north Greek systems (power systems of Albania, FYROM, Bulgaria and Turkey) to the Greek system:

$$TTC_{BG-GR} = k_{BG-GR} \cdot TTC_{north\ GR\ systems-GR}$$

with

$TTC_{BG-GR}$	<i>TTC</i> on the BG-GR direction
$k_{BG-GR}$	splitting factor for BG-GR direction
$TTC_{north\ GR\ systems-GR}$	<i>TTC</i> from all north Greek systems to the Greek system

- (4) The *TTC* on the GR-BG direction is a ratio of the total *TTC* value calculated from the Greek system to all north Greek systems (power systems of Albania, FYROM, Bulgaria and Turkey):

$$TTC_{GR-BG} = k_{GR-BG} \cdot TTC_{GR-north\ GR\ systems}$$

with

$TTC_{GR-BG}$	<i>TTC</i> on the GR-BG direction
$k_{GR-BG}$	splitting factor for GR-BG direction
$TTC_{GR-north\ GR\ systems}$	<i>TTC</i> from the Greek system to all north Greek systems

- (5) The *TTC* on the BG-RO direction is a ratio of the total *TTC* value calculated from all south Romanian systems (power systems of Bulgaria and Serbia) to the Romanian system:

$$TTC_{BG-RO} = k_{BG-RO} \cdot TTC_{south\ RO\ systems-RO}$$

with

$TTC_{BG-RO}$	<i>TTC</i> on the BG-RO direction
$k_{BG-RO}$	splitting factor for BG-RO direction
$TTC_{south\ RO\ systems-RO}$	<i>TTC</i> from all south Romanian systems to the Romanian system

- (6) The *TTC* on the RO-BG direction is a ratio of the total *TTC* value calculated from the Romanian system to all south Romanian systems (power systems of Bulgaria and Serbia):

$$TTC_{RO-BG} = k_{RO-BG} \cdot TTC_{RO-south\ RO\ systems}$$

with

$TTC_{RO-BG}$	<i>TTC</i> on the RO-BG direction
$k_{RO-BG}$	splitting factor for RO-BG direction
$TTC_{RO-south\ RO\ systems}$	<i>TTC</i> from the Romanian system to all south Romania systems

- (7) The splitting factor used for day-ahead and intraday capacity calculation in the year *Y* will be based on the NTC values from the last two years. This approach is based on the Article 3(h) of the CACM Regulation that contributes to the objective of respecting the need for a fair and orderly market and price formation and ensures a fair distribution of costs and benefits between the involved TSOs. Moreover the approach is in line with the distribution of the congestion income (as defined in the Article 73 of CACM Regulation and Article 57 of FCA Regulation) collected by the TSOs, and thus do not alter the signals for investments to TSOs given by the congestion income. The splitting factors used at the NTC computation will comply with the security operation in accordance with Article 3(c) of the CACM Regulation, will not alter the signals for investments

to TSOs given by the congestion income and allow reasonable financial planning according with Article 73 of the CACM Regulation.

- (8) The splitting factor for BG-GR direction is determined with the following equation:

$$k_{BG-GR} = NTC_{BG-GR} / NTC_{north\ GR\ systems-GR}$$

where:

$k_{BG-GR}$	splitting factor as percentage to be applied for BG-GR direction for day-ahead and intraday capacity calculation in the year Y
$NTC_{BG-GR}$	Average value of the NTC for the direction BG-GR (excluding the period when the tie-line BG-GR was out of operation for maintenance) in the last two years
$NTC_{north\ GR\ systems-GR}$	Average value of the total NTC for the direction north GR systems -GR (excluding the period when the tie-line BG-GR was out of operation for maintenance) in the last two years

- (9) The splitting factor for GR-BG direction is determined with the following equation:

$$k_{GR-BG} = NTC_{GR-BG} / NTC_{GR-north\ GR\ systems}$$

where:

$k_{GR-BG}$	splitting factor as percentage to be applied for GR-BG direction for day-ahead and intraday capacity calculation in the year Y
$NTC_{GR-BG}$	Average value of the NTC for the direction GR-BG (excluding the period when the tie-line BG-GR was out of operation for maintenance) in the last two years
$NTC_{GR-north\ GR\ systems}$	Average value of the total NTC for the direction GR-north GR systems (excluding the period when the tie-line BG-GR was out of operation for maintenance) in the last two years

- (10) The splitting factor for BG-RO direction is determined with the following equation:

$$k_{BG-RO} = NTC_{BG-RO} / NTC_{south\ RO\ systems-RO}$$

where:

$k_{BG-RO}$	splitting factor as percentage to be applied for BG-RO direction for day-ahead and intraday capacity calculation in the year Y
$NTC_{BG-RO}$	Average value of the NTC for the direction BG-RO in the last two years
$NTC_{south\ RO\ systems-RO}$	Average value of the total NTC for the direction south RO systems-RO in the last two years

- (11) The splitting factor for RO-BG direction is determined with the following equation:

$$k_{RO-BG} = NTC_{RO-BG} / NTC_{RO-south\ RO\ systems}$$

where:

$k_{RO-BG}$	splitting factor as percentage to be applied for RO-BG direction for day-ahead and intraday capacity calculation in the year Y
$NTC_{RO-BG}$	Average value of the NTC for the direction RO-BG in the last two years
$NTC_{RO-south\ RO\ systems}$	Average value of the total NTC for the direction RO-south RO systems in the last two years

- (12) The CCC of the SEE CCR shall provide to the SEE TSOs with the validated *NTCs* values after application of the *RMs* defined in accordance with Article 6 for the BG-RO and BG-GR borders.

- (13) The NTC on the BG-GR border is determined with the following equations:

$$NTC_{BG-GR} = TTC_{BG-GR} - RM_{BG-GR}$$

$$NTC_{GR-BG} = TTC_{GR-BG} - RM_{GR-BG}$$

with

$NTC_{BG-GR}$	<i>NTC</i> on the BG-GR direction
$NTC_{GR-BG}$	<i>NTC</i> on the GR-BG direction
$TTC_{BG-GR}$	<i>TTC</i> on the BG-GR direction
$TTC_{GR-BG}$	<i>TTC</i> on the GR-BG direction
$RM_{BG-GR}$	<i>RM</i> on the BG-GR direction
$RM_{GR-BG}$	<i>RM</i> on the GR-BG direction

(14) The *NTC* on the BG-RO border is determined with the following equations:

$$NTC_{BG-RO} = TTC_{BG-RO} - RM_{BG-RO}$$

$$NTC_{RO-BG} = TTC_{RO-BG} - RM_{RO-BG}$$

with

$NTC_{BG-RO}$	<i>NTC</i> on the BG-RO direction
$NTC_{RO-BG}$	<i>NTC</i> on the RO-BG direction
$TTC_{BG-RO}$	<i>TTC</i> on the BG-RO direction
$TTC_{RO-BG}$	<i>TTC</i> on the RO-BG direction
$RM_{BG-RO}$	<i>RM</i> on the BG-RO direction
$RM_{RO-BG}$	<i>RM</i> on the RO-BG direction

(15) In accordance with Article 21(1)(b)(iii) of the CACM Regulation, SEE TSOs shall apply the rules for taking into account the previously-allocated cross-zonal capacity. The objective of the rules is to verify that the *ATC* value of each border and direction of the SEE CCR remains non-negative in case of previously-allocated commercial capacity.

(16) The *ATC* taking into consideration the AACs is determined with the following equations in case of BG – GR border:

$$ATC_{BG-GR} = NTC_{BG-GR} - AAC_{BG-GR} + AAC_{GR-BG}$$

$$ATC_{GR-BG} = NTC_{GR-BG} - AAC_{GR-BG} + AAC_{BG-GR}$$

with

$ATC_{BG-GR}$	<i>ATC</i> on the BG-GR direction
$NTC_{BG-GR}$	<i>NTC</i> on the BG-GR direction
$AAC_{BG-GR}$	<i>AAC</i> on the BG-GR direction
$AAC_{GR-BG}$	<i>AAC</i> on the GR-BG direction
$ATC_{GR-BG}$	<i>ATC</i> on the GR-BG direction
$NTC_{GR-BG}$	<i>NTC</i> on the GR-BG direction

(17) The *ATC* taking into consideration the AACs is determined with the following equations in case of BG – RO border:

$$ATC_{BG-RO} = NTC_{BG-RO} - AAC_{BG-RO} + AAC_{RO-BG}$$

$$ATC_{RO-BG} = NTC_{RO-BG} - AAC_{RO-BG} + AAC_{BG-RO}$$

with

$ATC_{BG-RO}$	<i>ATC</i> on the BG-RO direction
$NTC_{BG-RO}$	<i>NTC</i> on the BG-RO direction
$AAC_{BG-RO}$	<i>AAC</i> on the BG-RO direction
$AAC_{RO-BG}$	<i>AAC</i> on the RO-BG direction
$ATC_{RO-BG}$	<i>ATC</i> on the RO-BG direction
$NTC_{RO-BG}$	<i>NTC</i> on the RO-BG direction

- (18) The *ATC* for day-ahead market time-frame and also for the intraday market time-frame is determined with the following equations in case of BG – GR border, taking into account the *NTC* values calculated before and *ANC*:

$$ATC_{BG-GR} = NTC_{BG-GR} - ANC_{BG-GR} + ANC_{GR-BG}$$

$$ATC_{GR-BG} = NTC_{GR-BG} - ANC_{GR-BG} + ANC_{BG-GR}$$

with

$ATC_{BG-GR}$	<i>ATC</i> on the BG-GR direction
$NTC_{BG-GR}$	<i>NTC</i> on the BG-GR direction
$ANC_{BG-GR}$	<i>ANC</i> on the BG-GR direction
$ANC_{GR-BG}$	<i>ANC</i> on the GR-BG direction
$ATC_{GR-BG}$	<i>ATC</i> on the GR-BG direction
$NTC_{GR-BG}$	<i>NTC</i> on the GR-BG direction

- (19) The *ATC* for day-ahead market time-frame and also for the intraday market time-frame is determined with the following equations in case of BG – RO border, taking into account the *NTC* values calculated before and *ANC*:

$$ATC_{BG-RO} = NTC_{BG-RO} - ANC_{BG-RO} + ANC_{RO-BG}$$

$$ATC_{RO-BG} = NTC_{RO-BG} - ANC_{RO-BG} + ANC_{BG-RO}$$

with

$ATC_{BG-RO}$	<i>ATC</i> on the BG-RO direction
$NTC_{BG-RO}$	<i>NTC</i> on the BG-RO direction
$ANC_{BG-RO}$	<i>ANC</i> on the BG-RO direction
$ANC_{RO-BG}$	<i>ANC</i> on the RO-BG direction
$ATC_{RO-BG}$	<i>ATC</i> on the RO-BG direction
$NTC_{RO-BG}$	<i>NTC</i> on the RO-BG direction

- (20) If the *ATC* values calculated according with Article 11(18) and Article 11(19) are negative, no capacity will be made available for day-ahead, respectively intraday market time-frame.
- (21) In accordance with Article 46 of CACM regulation, the CCC and TSOs of the SEE CCR shall ensure that the day-ahead validated cross-zonal capacity shall be provided to relevant entity no later than the day-ahead firmness deadline as defined in accordance with Article 69 of CACM Regulation.
- (22) In accordance with Article 58 of CACM regulation, the CCC and TSOs of the SEE CCR shall ensure that the intraday validated cross-zonal capacity shall be provided to relevant entity no later than 15 minutes before the intraday cross-zonal gate opening time.

## **Article 12**

### **Fallback procedures**

- (1) Prior to the day-ahead common capacity calculation, the TSOs of SEE CCR shall provide to the CCC the coordinated cross-zonal capacities defined according with the long-term capacity calculation processes. For day-ahead market time-frame are used as fallback solution the *NTCs* values calculated for yearly and monthly processes.
- (2) For the day-ahead common capacity calculation, where an incident occurs in the capacity calculation process (incident due to, inter alia, a technical failure in the tools, an error in the communication infrastructure, or

corrupted or missing input data) and the CCC is unable to produce results within the allotted time for the calculation process, the SEE TSOs shall validate for day-ahead market time-frame the coordinated cross-zonal capacities calculated within the long-term time-frame.

- (3) Prior to the intraday common capacity calculation, the TSOs of SEE CCR shall provide to the CCC the coordinated cross-zonal capacities calculated within the day-ahead capacity calculation processes.
- (4) For the intraday common capacity calculation, where an incident occurs in the capacity calculation process (incident due to, inter alia, a technical failure in the tools, an error in the communication infrastructure, or corrupted or missing input data) and the CCC is unable to produce results, the SEE TSOs shall validate the cross-zonal capacities calculated within the day-ahead capacity calculation processes.
- (5) SEE TSOs provide inputs to the CCC a few hours before the gate opening of the relevant timeframe. The exact deadlines will be defined during the simulation period. In case TSOs provide inputs to the CCC that are proven to be incomplete by the CCC or are missing, the CCC uses the relevant values from the previous timeframe.

### **Article 13**

#### **Consideration of non-SEE CCR bidding zone borders**

- (1) In accordance with Article 21(1)(b)(vii) of the CACM Regulation, SEE TSOs take into account the influences of other CCRs by making assumptions on what will be the future non-SEE exchanges in accordance with Article 18(3) of the CACM Regulation and Article 19 of the CGMM.
- (2) The assumptions of non-SEE exchanges are implicitly captured in the relevant CGM by the non-SEE TSOs' best forecasts of net positions and flows for HVDC lines, according to Article 18(3) of CACM Regulation and are used as the basis for the common capacity calculation. In SEE CCR, this constitutes the rule for sharing power flow capabilities among different CCRs.

### **Article 14**

#### **Publication and Timescale for Implementation of the capacity calculation methodology**

- (1) The TSOs of the SEE CCR shall publish this day-ahead and intraday capacity calculation methodology without undue delay after all relevant national regulatory authorities have approved the proposed methodology or a decision has been taken by the Agency for the Cooperation of Energy Regulators in accordance with Article 9 (10), (11) and (12) of the CACM Regulation.
- (2) The TSOs of the SEE CCR shall start the implementation process of this common capacity calculation methodology with the entry into force of this methodology and shall consist of the following steps:
  - a. Internal parallel run, during which the TSOs shall test the operational processes for capacity calculation inputs, capacity calculation process and 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, SEE TSOs will involve 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.
- (3) During the internal and external parallel run, SEE TSOs shall continuously monitor the effects and the performance of the application of this methodology. For this purpose, they shall develop, in coordination with SEE NRAs, the Agency and stakeholders, the monitoring and performance criteria and report on the

outcome of this monitoring on a quarterly basis in a quarterly report. After the implementation of this methodology outcome of this monitoring shall be reported in the annual report.

- (4) The TSOs of the SEE CCR shall implement the day-ahead common capacity calculation methodology no later than 1<sup>st</sup> of July 2020.
- (5) The TSOs of the SEE CCR shall implement intraday capacity calculation within the following timeframes:
  - a. Update of cross-zonal capacities pursuant to Article 5(9)(a) by the deadline of implementation of day-ahead capacity calculation;
  - b. Calculation of intraday cross-zonal capacities pursuant to Article 5(9) (b) by 3 months after the implementation of day-ahead capacity calculation methodology; and
  - c. Re-calculation of intraday cross-zonal capacities pursuant to Article 5(9)(c) by 12 months after the implementation of calculation of intraday cross-zonal capacities pursuant to point (b) of this paragraph.
- (6) Parallel runs may start in the beginning of 2020 at the earliest due to time required for procurement, development and testing of the industrial capacity calculation tool.

## **Article 15**

### **Reviews and updates**

- (1) Based on Article 3(f) of the CACM Regulation and in accordance with Article 27(4) of the CACM 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) In case the review proves the need of an update of the reliability margins methodology, SEE TSOs shall publish the changes at least 1 month before the implementation.
- (3) In case the review proves the need of an update of the operational security limits, critical network elements and contingencies used for capacity calculation inputs pursuant to article 7, TSOs the SEE CCR shall publish the changes at least 1 week before the implementation.
- (4) The review of the common list of RAs taken into account in capacity calculation shall include at least an evaluation of the efficiency of RAs considered during RAC.
- (5) In case the review proves the need for updating the application of the methodologies for determining generation shift keys, operational security limits, critical network elements and contingencies referred to in Articles 23 to 24 of the CACM Regulation, changes have to be published at least 3 months before the final implementation.
- (6) Any changes of parameters listed in Article 27(4) of the CACM Regulation have to be communicated to market participants, SEE NRAs and the Agency.
- (7) The impact of any changes of the parameters listed in Article 27(4)(d) of the CACM Regulation have to be communicated to market participants, SEE regulatory authorities and the Agency. If any change leads to an adaption of this methodology, SEE TSOs will amend this methodology according to Article 9(13) of the CACM Regulation.

## **Article 16**

### **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 the regulatory authorities and market participants, SEE TSOs and CCC shall regularly publish the data on the capacity calculation process pursuant to this methodology on a dedicated online communication platform representing all SEE TSOs of the SEE CCR. To enable market participants to have a clear understanding of the published data, SEE TSOs and CCC shall develop a handbook and published it on this communication platform. This handbook shall include at least a description of each data item, including its unit and underlying convention.

- (2) SEE TSOs and CCC shall publish the following data items shall be published (in addition to the data items and definitions of Commission Regulation (EU) No 543/2013 on submission and publication of data in electricity markets) no later than 30 minutes before market gate opening time in case of day-ahead capacity calculation and no later than 15 minutes before market gate opening time in case of intraday capacity calculation, except point i):
- a. NTC values determined for day-ahead and intraday market time-frames;
  - b. RMs for each direction of the SEE CCR borders;
  - c. RAs resulting from the RAC and for each RA it shall be published the 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 CNEC to which the RA was associated;
  - d. Limiting CNECs;
  - e. For each CNEC, it shall be published the methods for determining  $I_{max}$  in accordance with article 7 (5) a);
  - f. For each CNEC the EIC code of CNE and Contingency;
  - g. Real names of CNECs;
  - h. The following forecast information contained in the CGM for each MTU and bidding zone of the SEE CCR:
    - i). Load
    - ii). Production
    - iii). Net position
    - iv). exchange programs on non-SEE bidding zone borders;
  - i. every 6 months, publication of an up-to date static grid model by each SEE TSO.
- (3) Individual SEE TSO may withhold the publication of information disclosing the locational information referred to in paragraph (2) c), (2) d), (2) e), (2) f), (2) g), (2) h) and (2) i) if required by a competent regulatory authority or by relevant national legislation on the grounds of protecting the critical infrastructure. In such case, the information referred to in paragraph (2) f) shall be replaced with an anonymous identifier which shall be stable for each CNEC across all market time units. The anonymous identifier shall also be used in the other TSO communications related to the CNEC, including when communicating about an outage or an investment in infrastructure. The list of data items 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) f) and (3) shall be publicly notified at least one month before its entry into force. The notification shall at least include the day of entry into force of the new identifiers and the correspondence between the old and the new identifier for each CNEC.
- (5) Regulatory authorities may request additional information to be published by the TSOs. The relevant TSOs shall publish this information if requested by their competent regulatory authority. All regulatory authorities shall coordinate their requests among themselves, the relevant stakeholders and the Agency.



## **Article 17**

### **Quality of the data published**

- (1) No later than six months before the implementation of this methodology, SEE 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 16. When doing so, they shall coordinate with relevant stakeholders and SEE CCR 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 monitor the following elements:
  - a. individually for each TSO and for the SEE 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 the data retrieval, for both manual and automated purposes;
  - c. perform automated data checks, which shall be conducted in order to automatically accept or reject individual data items before publication based on required data attributes (e.g. data type, lower/upper value bound, etc.).

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 regulatory authorities;
  - d. the suggestions for improving the quality of the provided data and/or the ease-of-use of data retrieval.
- (4) The TSOs of the SEE CCR 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 1 month following the infringement of the threshold, detailing reasons for the failure to provide information, as well as an action plan to correct past errors and prevent future errors. No later than three months after the infringement, this action plan shall fully be implemented and the issue resolved. This information shall be published on the online communication platform and in the annual report.

## **Article 18**

### **Monitoring, reporting and information to regulatory authorities**

- (1) With reference to the Whereas and Article 26(5) of the CACM Regulation, monitoring data shall be provided towards the SEE NRAs as basis for supervising a non-discriminatory and efficient SEE congestion management.
- (2) The provided monitoring data shall also be the basis for the biennial report to be provided according to Article 31 of the CACM Regulation.
- (3) The CCC, with the support of SEE CCR TSOs where relevant, shall draft and publish an annual report and a quarterly report satisfying the reporting obligations set in this methodology.

- (4) The final, exhaustive and binding list of all monitoring items, respective templates and the data access point shall be developed by the SEE TSOs in cooperation with NRAs. An agreement between the SEE NRAs and SEE TSOs shall be reached no later than three months before the implementation of this methodology.
- (5) All technical and statistical information related to this methodology shall be made available upon request to the NRAs in the SEE CCR.

### **Article 19** **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 TSOs shall, in accordance with national legislation, provide the relevant national regulatory authorities with an revised translation of the methodology.