Greece-Italy 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

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All TSOs, taking into account the following:

Whereas

(1) This document (hereafter referred to as "Greece-Italy common capacity calculation methodology", or "GRIT common capacity calculation methodology") is a common proposal developed by all Transmission System Operators (hereafter referred to as "TSOs") within the Greece-Italy Capacity Calculation Region (hereafter referred to as "GRIT CCR") , as defined in accordance with Article 15(1) of Regulation (EU) 2015/1222 on Capacity Allocation and Congestion Management (the "CACM Regulation") CACM Regulation, 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 "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 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 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:

(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, 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 " 3. 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 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."

(8) 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 GRIT CCR, as follows:

"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. (...)"

(9) 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".*

(10) 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".*

(11) 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 (11)) of this Whereas Section.

(12) 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 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 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 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 CCC between TSOs and the Coordinated Capacity Calculator, the CCC 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 GRIT 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.

(13) 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:

Article 1
Subject matter and scope

The common capacity calculation methodology as determined in this Coordinated Capacity Calculation (CCC) methodology Proposal is the common proposal of all TSOs of GRIT CCR 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. 'Terna' is the Italian Transmission System Operator;

    b. 'ADMIE' is the Greek Transmission System Operator;

    c. 'GR-IT border' means bidding zone border between Greece and the connecting Italian bidding zone;

    d. 'Internal Italian borders' means a border between two bidding zones belonging to the Italian Control Area;

    e. 'D-1' means the day before the day of delivery;

    f. 'D-2' means two days before the day of delivery;

    g. '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;

    h. 'D-1 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;

    i. 'Power Transfer Distribution Factor ' means the variation of the flow in one critical network element with a change of 1MW in cross-zonal power exchanges of the bidding-zone border considered;

    j. 'Voltage Sensitivity Ratio' means the variation of the voltage in one network node with a change of 1MW in cross-zonal power exchanges of the bidding-zone border considered;

    k. 'CNTC' means Coordinated Net Transfer Capacity approach for capacity calculation;

    l. '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;

    m. '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
    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 GRIT CCR. 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, CNTC approach is adopted in the GRIT CCR. This approach has been selected since a flow-based approach:

- is equivalent to a CNTC approach in a radial network like the GRIT CCR's one, where Bidding Zones are radially connected (or connected by HVDC links);
- implies higher transition costs for its implementation;

Individual values for cross-zonal capacity for each day-ahead market time unit shall be calculated adopting the TTC calculation process described in Annex 1 and started in D-2 on D-2 Common Grid Models.

Article 5
Cross-zonal capacities for the intraday market

For the intraday market time-frame, CNTC approach is adopted in the GRIT CCR. This approach has been selected since a flow-based approach:

- is equivalent to a CNTC approach in a radial network like the GRIT CCR's one, where Bidding Zones are radially connected (or connected by HVDC links);
- implies higher transition costs for its implementation;

Individual values for cross-zonal capacity for each remaining intraday market time unit shall be calculated adopting the TTC calculation process described in Annex 1 and performed only once in the end of D-1 on D-1 Common Grid Models.

Article 6
Reliability margin methodology

1. Reliability margin is equal to 0MW on each border of the GRIT CCR.

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

4. Critical Network Element and Contingencies (CNECs) for each border of the GRIT CCR shall be defined according to the TTC calculation process described in the Annex 1.

5. The TSOs of the GRIT CCR shall define Operational Security Limits of their own grid elements according to the TTC calculation process described in the Annex 1.

6. Discriminations between internal and cross-zonal exchanges are avoided in the GRIT CCR capacity calculation methodology by the application of:
   - A proper Bidding Zones configuration;
   - A CNEC identification methodology described in the Annex 1.

7. The Coordinated Capacity Calculator shall apply the TTC calculation process described in the Annex 1 for the capacity calculation performed within GRIT CCR in order to determine the maximum net transmission capacity for each bidding-zone border.

8. The Italian TSO shall perform dynamic assessments in order to detect possible additional limitations to be applied (as upper limit) to TTC values. Where relevant, the Italian TSO shall perform these assessments at least once a year.

9. The Italian TSO shall inform Italian NRA about the results of the dynamic assessments mentioned at point 8.

10. The Italian TSO shall inform in timely manner the Coordinated Capacity Calculator on any relevant upper limit to be applied in the capacity calculation process for the internal Italian borders according to the outcomes of the dynamic assessment.

11. The Coordinated Capacity Calculator on the GRIT CCR shall apply the upper limits provided by the Italian TSO according to point 10 in the capacity calculation process for the internal Italian borders according to the TTC calculation process described in the Annex 1.

Article 8
Generation and load shift keys methodology

1. The TSOs of GRIT CCR shall define the generation and load shift keys methodology in accordance with Article 24 of CACM Regulation.

2. The TSOs of GRIT CCR shall define generation and load shift keys based on a merit order list for the Italian bidding zones and proportional to the remaining capacity available on generation in each base case for the Greek bidding zone according to the TTC calculation process detailed in the Annex 1.

Article 9
Methodology for remedial actions in capacity calculation

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

2. Each TSO of GRIT CCR shall define individually the remedial actions of its responsibility area to be used in the capacity calculation within GRIT CCR at least on yearly basis.

3. The TSOs of GRIT CCR 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 GR-IT border.

4. Terna shall identify, prior to the capacity calculation, the remedial actions that can be applied in order to maximize the available cross-zonal capacities for the Internal Italian borders.

5. Each TSO of GRIT CCR shall provide the list of available remedial actions, for each border of the GRIT CCR and for each market time unit, to the Coordinated Capacity Calculator according to the

TTC calculation process detailed in the Annex 1.

6. Each TSO of GRIT CCR shall inform the Coordinated Capacity Calculator in a timely manner on any change in its remedial actions within GRIT CCR to ensure an efficient capacity calculation.

7. The TSOs of GRIT CCR can use curative remedial actions with costs where technically and economically relevant and in accordance with national regulation, for the capacity calculation within GRIT CCR.

Article 10
Cross-zonal capacity validation methodology

1. The TSOs of GRIT CCR shall validate the cross-zonal capacities calculated by the Coordinated Capacity Calculator of the GRIT CCR for the GR-IT border.

2. Terna shall validate the cross-zonal capacities calculated by the Coordinated Capacity Calculator of the GRIT CCR for the Internal Italian borders.

3. Upon request, for each border/direction and for the relevant market time unit, the Coordinated Capacity Calculator shall make available to the TSOs of GRIT CCR the common grid model where the final TTC value is simulated.

4. Where required, TSOs can validate the cross-zonal capacities calculated by performing security analysis with grid model provided in accordance with Article 10.3.

5. Where one or more TSOs of GRIT CCR 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 TSOs of GRIT CCR of the border considered.

Article 11
Day-ahead capacity calculation

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

2. The TSOs of GRIT CCR 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 capacity calculation process will take into account Remedial Action optimization according to the TTC calculation process detailed in the Annex 1.

4. The Coordinated Capacity Calculator shall define the values of TTC for each market time unit. These values shall be provided to TSOs of GRIT CCR for validation.

5. The Coordinated Capacity Calculator of the GRIT CCR shall provide the TSOs of GRIT CCR with the validated NTCs after application of the reliability margin defined in accordance with Article 6 for each bidding-zone border of GRIT CCR.

6. In accordance with Article 46 of CACM regulation, the Coordinated Capacity Calculator and TSOs of the GRIT CCR shall ensure that validated 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.

Article 12
Intraday capacity calculation

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

2. The TSOs of GRIT CCR shall provide the Coordinated Capacity Calculator with the last updated information on the transmission systems in a timely manner for the intraday capacity calculation that is performed in the end of D-1.

3. The capacity calculation process will take into account Remedial Action optimization according to the TTC calculation process detailed in the Annex 1.

4. The Coordinated Capacity Calculator shall define the values of TTC for each market time unit. These values shall be provided to TSOs of GRIT CCR for validation.

5. The Coordinated Capacity Calculator of the GRIT CCR shall provide the TSOs of GRIT CCR with the validated NTCs after application of the reliability margin defined in accordance with Article 6 for each bidding-zone border of GRIT CCR.

6. In accordance with Article 58 of CACM regulation, the Coordinated Capacity Calculator and TSOs of GRIT CCR shall ensure that validated cross-zonal capacity shall be provided to relevant NEMOs no later than 15 minutes before the intraday cross zonal gate opening time provided that until the Intraday Capacity Calculation process according to this methodology has been concluded, the Capacity for the Single Intraday Coupling is set between zero and the capacity calculated on the day-ahead timeframe.

Article 13
Fallback procedures

1. Prior to each capacity calculation started in D-2, the TSOs of GRIT CCR shall ensure the Coordinated Capacity Calculator is provided with the last coordinated cross-zonal capacities defined according to the long term capacity calculation processes (eg. yearly, monthly) and the most updated information about planned and unplanned outages.

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 TSOs of GRIT CCR 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 TSOs of GRIT CCR where applicable, shall provide the NEMOs of the GRIT CCR with a coordinated value

3. Prior to each capacity calculation performed in the end of D-1, the TSOs of GRIT CCR shall ensure the Coordinated Capacity Calculator is provided with the last coordinated cross-zonal capacities calculated within the day-ahead timeframe on each border of the GRIT CCR.

4. For the capacity calculation performed in the end of D-1, where an incident occurs in the capacity calculation process and the Coordinated Capacity Calculator is unable to produce results, the TSOs of

GRIT CCR shall validate the last cross-zonal capacities calculated within GRIT CCR for the market time unit considered and review it where relevant. The Coordinated Capacity Calculator or TSOs of GRIT CCR where applicable, shall provide the NEMOs of GRIT CCR with a coordinated value.

Article 14
Publication and Implementation of the CCC methodology Proposal

1. The TSOs of GRIT CCR shall publish the CCC methodology Proposal without undue delay after relevant 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 GRIT CCR shall implement the CCC methodology Proposal for the capacity calculation started in D-2 no later than S1-2020.

3. The TSOs of GRIT CCR shall implement the CCC methodology Proposal for the capacity calculation performed in the end of D-1 no later than S2-2020.

Article 15
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.