

**REQUEST FOR AMENDMENT BY THE ITALY NORTH  
REGULATORY AUTHORITIES**

**OF**

**THE ITALY NORTH TSOs PROPOSALS FOR A D-2 AND  
INTRADAY COMMON CAPACITY CALCULATION  
METHODOLOGY IN ACCORDANCE WITH ARTICLE 21  
OF COMMISSION REGULATION 2015/1222 OF 24 JULY  
2015 ESTABLISHING A GUIDELINE ON CAPACITY  
ALLOCATION AND CONGESTION MANAGEMENT**

**23 November 2018**

## I. Introduction and legal context

This document elaborates an agreement of the Italy North Regulatory Authorities (in the following: IN NRAs), agreed on 23 November 2018 at Italy North Energy Regulators' Regional forum, on the Italy North TSO proposals for a D-2 and intraday common capacity calculation methodology (in the following: IN CCM), submitted as required by Article 20(2) and in accordance with Article 21 of Commission Regulation 2015/1222 of 24 July 2015 establishing a Guideline on Capacity Allocation and Congestion Management (in the following: CACM).

This agreement of the IN NRAs shall provide evidence that a decision on the IN CCM does not, at this stage, need to be adopted by ACER pursuant to Article 9(11) of CACM. It is intended to constitute the basis on which the IN NRAs will each subsequently request an amendment to the IN CCM pursuant to Article 9(12) of CACM.

The legal provisions that lie at the basis of the IN CCM, and this IN NRAs agreement on the above mentioned methodology, can be found in Articles 3, 8, 9, 14, 20, 21, 22, 23, 24, 25, 26, 29, 30, 46 and 58 of CACM. They are set out here for reference.

### Article 3

#### **Objectives of capacity allocation and congestion management cooperation**

*This Regulation aims at:*

- (a) Promoting effective competition in the generation, trading and supply of electricity;*
- (b) Ensuring optimal use of the transmission infrastructure;*
- (c) Ensuring operational security;*
- (d) Optimising the calculation and allocation of cross-zonal capacity;*
- (e) (...);*
- (f) (...);*
- (g) Contributing to the efficient long-term operation and development of the electricity transmission system and electricity sector in the Union;*
- (h) (...);*
- (i) (...);*
- (j) (...).*

### Article 8

#### **TSOs' tasks related to single day-ahead and intraday coupling**

1. *In Member States electrically connected to another Member State all TSOs shall participate in the single day-ahead and intraday coupling.*

2. *TSOs shall:*

*[...]*

*(c) establish and perform capacity calculation in accordance with Articles 14 to 30;*

*[...]*

*(e) calculate and send cross zonal capacities and allocation constraints in accordance with Articles 46 and 58;*

*[...]*

## Article 9

### **Adoption of terms and conditions or methodologies**

1. TSOs and NEMOs shall develop the terms and conditions or methodologies required by this Regulation and submit them for approval to the competent regulatory authorities within the respective deadlines set out in this Regulation. Where a proposal for terms and conditions or methodologies pursuant to this Regulation needs to be developed and agreed by more than one TSO or NEMO, the participating TSOs and NEMOs shall closely cooperate. TSOs, with the assistance of ENTSO for Electricity, and all NEMOs shall regularly inform the competent regulatory authorities and the Agency about the progress of developing these terms and conditions or methodologies.  
[...]
5. Each regulatory authority shall approve the terms and conditions or methodologies used to calculate or set out the single day-ahead and intraday coupling developed by TSOs and NEMOs. They shall be responsible for approving the terms and conditions or methodologies referred to in paragraphs 6, 7 and 8.
6. (...)
7. The proposals for the following terms and conditions or methodologies shall be subject to approval by all regulatory authorities of the concerned region:
  - a. the common capacity calculation methodology in accordance with Article 20(2);  
[...]
8. (...)
9. The proposal for terms and conditions or methodologies shall include a proposed timescale for their implementation and a description of their expected impact on the objectives of this Regulation. Proposals on terms and conditions or methodologies subject to the approval by several or all regulatory authorities shall be submitted to the Agency at the same time that they are submitted to regulatory authorities. Upon request by the competent regulatory authorities, the Agency shall issue an opinion within three months on the proposals for terms and conditions or methodologies.
10. Where the approval of the terms and conditions or methodologies requires a decision by more than one regulatory authority, the competent regulatory authorities shall consult and closely cooperate and coordinate with each other in order reach an agreement. Where applicable, the competent regulatory authorities shall take into account the opinion of the Agency. Regulatory authorities shall take decisions concerning the submitted terms and conditions or methodologies in accordance with paragraphs 6, 7 and 8, within six months following the receipt of the terms and conditions or methodologies by the regulatory authority or, where applicable, by the last regulatory authority concerned.
11. (...)
12. In the event that one or several regulatory authorities request an amendment to approve the terms and conditions or methodologies submitted in accordance with paragraphs 6, 7 and 8, the relevant TSOs or NEMOs shall submit a proposal for amended terms and conditions or methodologies for approval within two months following the requirement from the regulatory authorities. The competent regulatory authorities shall decide on the amended terms and conditions or methodologies within two months following their submission. Where the competent regulatory authorities have not been able to reach an agreement on terms and conditions or methodologies pursuant to paragraphs (6) and (7) within the two-month deadline, or upon their joint request, the Agency shall adopt a decision concerning the amended terms and conditions or methodologies within six months, in accordance with Article 8(1) of Regulation (EC) No 713/2009. If the relevant TSOs or NEMOs fail to submit a proposal for amended terms and conditions or methodologies, the procedure provided for in paragraph 4 of this Article shall apply.
13. (...)
14. TSOs and NEMOs responsible for establishing the terms and conditions or methodologies in accordance with this Regulation shall publish them on the internet after approval by the competent regulatory authorities or, if no such approval is required, after their establishment, except where such information is considered as confidential in accordance with Article 13.

## **Article 14**

### **Capacity calculation time-frames**

1. All TSOs shall calculate cross-zonal capacity for at least the following time-frames:
  - (a) day-ahead, for the day-ahead market;
  - (b) intraday, for the intraday market.
2. For the day-ahead market time-frame, individual values for cross-zonal capacity for each day-ahead market time unit shall be calculated. For the intraday market time-frame, individual values for cross-zonal capacity for each remaining intraday market time unit shall be calculated.
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.
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.

## **Article 20**

### **Introduction of flow-based capacity calculation methodology**

1. For the day-ahead market time-frame and intraday market time-frame the approach used in the common capacity calculation methodologies shall be a flow-based approach, except where the requirement under paragraph 7 is met.
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. [...]
3. The TSOs from the capacity calculation region where Italy, as defined in point (c) of point 3.2 of Annex 1 to Regulation (EC) No 714/2009, is included, may extend the deadline without prejudice to the obligation in paragraph 1 for submitting the proposal for a common coordinated capacity calculation methodology using flow-based approach for the respective region pursuant to paragraph 2 up to six months after Switzerland joins the single day-ahead coupling. The proposal does not have to include bidding zone borders within Italy and between Italy and Greece.

[...]

7. 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.

## **Article 21**

### **Capacity calculation methodology**

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) (...)

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

2. For the intraday capacity calculation time-frame, the capacity calculation methodology shall also state the frequency at which capacity will be reassessed in accordance with Article 14(4), giving reasons for the chosen frequency.
3. The capacity calculation methodology shall include a fallback procedure for the case where the initial capacity calculation does not lead to any results.
4. [...]

## **Article 22**

### **Reliability margin methodology**

1. The proposal for a common capacity calculation methodology shall include a methodology to determine the reliability margin. The methodology to determine the reliability margin shall consist of two steps. First, the relevant TSOs shall estimate the probability distribution of deviations between the expected power flows at the time of the capacity calculation and realised power flows in real time. Second, the reliability margin shall be calculated by deriving a value from the probability distribution.
2. The methodology to determine the reliability margin shall set out the principles for calculating the probability distribution of the deviations between the expected power flows at the time of the capacity calculation and realised power flows in real time, and specify the uncertainties to be taken into account in the calculation. To determine those uncertainties, the methodology shall in particular take into account:
  - (a) unintended deviations of physical electricity flows within a market time unit caused by the adjustment of electricity flows within and between control areas, to maintain a constant frequency;
  - (b) uncertainties which could affect capacity calculation and which could occur between the capacity calculation timeframe and real time, for the market time unit being considered.
3. In the methodology to determine the reliability margin, TSOs shall also set out common harmonised principles for deriving the reliability margin from the probability distribution.
4. On the basis of the methodology adopted in accordance with paragraph 1, TSOs shall determine the reliability margin respecting the operational security limits and taking into account uncertainties between the capacity calculation time-frame and real time, and the remedial actions available after capacity calculation.

5. *For each capacity calculation time-frame, the TSOs concerned shall determine the reliability margin for critical network elements, where the flow-based approach is applied, and for cross-zonal capacity, where the coordinated net transmission capacity approach is applied.*

### **Article 23**

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

1. *Each TSO shall respect the operational security limits and contingencies used in operational security analysis.*
2. *If the operational security limits and contingencies used in capacity calculation are not the same as those used in operational security analysis, TSOs shall describe in the proposal for the common capacity calculation methodology the particular method and criteria they have used to determine the operational security limits and contingencies used for capacity calculation.*
3. *If TSOs apply allocation constraints, they can only be determined using:*
  - (a) *constraints that are needed to maintain the transmission system within operational security limits and that cannot be transformed efficiently into maximum flows on critical network elements; or*
  - (b) *constraints intended to increase the economic surplus for single day-ahead or intraday coupling.*

### **Article 24**

#### **Generation shift keys methodology**

1. *The proposal for a common capacity calculation methodology shall include a proposal for a methodology to determine a common generation shift key for each bidding zone and scenario developed in accordance with Article 18.*
2. *The generation shift keys shall represent the best forecast of the relation of a change in the net position of a bidding zone to a specific change of generation or load in the common grid model. That forecast shall notably take into account the information from the generation and load data provision methodology.*

### **Article 25**

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

1. *Each TSO within each capacity calculation region shall individually define the available remedial actions to be taken into account in capacity calculation to meet the objectives of this Regulation.*
2. *Each TSO within each capacity calculation region shall coordinate with the other TSOs in that region the use of remedial actions to be taken into account in capacity calculation and their actual application in real time operation.*
3. *To enable remedial actions to be taken into account in capacity calculation, all TSOs in each capacity calculation region shall agree on the use of remedial actions that require the action of more than one TSO.*
4. *Each TSO shall ensure that remedial actions are taken into account in capacity calculation under the condition that the available remedial actions remaining after calculation, taken together with the reliability margin referred to in Article 22, are sufficient to ensure operational security.*
5. *Each TSO shall take into account remedial actions without costs in capacity calculation.*
6. *Each TSO shall ensure that the remedial actions to be taken into account in capacity calculation are the same for all capacity calculation time-frames, taking into account their technical availabilities for each capacity calculation timeframe.*

## **Article 26**

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

1. *Each TSO shall validate and have the right to correct cross-zonal capacity relevant to the TSO's bidding zone borders or critical network elements provided by the coordinated capacity calculators in accordance with Articles 27 to 31.*
2. *Where a coordinated net transmission capacity approach is applied, all TSOs in the capacity calculation region shall include in the capacity calculation methodology referred to in Article 21 a rule for splitting the correction of cross-zonal capacity between the different bidding zone borders.*
3. *Each TSO may reduce cross-zonal capacity during the validation of cross-zonal capacity referred to in paragraph 1 for reasons of operational security.*
4. *Each coordinated capacity calculator shall coordinate with the neighbouring coordinated capacity calculators during capacity calculation and validation.*
5. *Each coordinated capacity calculator shall, every three months, report all reductions made during the validation of cross-zonal capacity in accordance with paragraph 3 to all regulatory authorities of the capacity calculation region. This report shall include the location and amount of any reduction in cross-zonal capacity and shall give reasons for the reductions.*

[...]

## **Article 29**

### **Regional calculation of cross-zonal capacity**

[...]

8. *Each coordinated capacity calculator applying the coordinated net transmission capacity approach shall:*
  - (a) *use the common grid model, generation shift keys and contingencies 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 taken into account in capacity calculation in accordance with Article 25;*
  - (c) *adjust maximum power exchange, applying rules for avoiding undue discrimination between internal and cross-zonal exchanges in accordance with Article 21(1)(b)(ii);*
  - (d) *apply the rules set out in accordance with Article 21(1)(b)(vi) for efficiently sharing the power flow capabilities of critical network elements among different bidding zone borders;*
  - (e) *calculate cross-zonal capacity, which shall be equal to maximum power exchange adjusted for the reliability margin and previously allocated cross-zonal capacity*

[...]

## **Article 30**

### **Validation and delivery of cross-zonal capacity**

1. *Each TSO shall validate the results of the regional capacity calculation for its bidding zone borders or critical network elements, in accordance with Article 26.*
2. *(...)*
3. *Each coordinated capacity calculator shall provide the validated cross-zonal capacities and allocation constraints for the purposes of allocating capacity in accordance with Articles 46 and 58.*

## **Article 46**

### **Provision of input data**

1. *Each coordinated capacity calculator shall ensure that cross-zonal capacity and allocation constraints shall be provided to relevant NEMOs in time to ensure the publication of cross-zonal capacity and of allocation constraints to the market no later than 11.00 market time day-ahead.*

[...]

## Article 58

### **Provision of input data**

1. *Each coordinated capacity calculator shall ensure that cross-zonal capacity and allocation constraints are provided to the relevant NEMOs no later than 15 minutes before the intraday cross-zonal gate opening time.*

[...]

## **II. The Italy North TSOs proposals**

The IN CCM is constituted by two separate proposals, one related to the D-2 common capacity calculation (relevant for day-ahead market) and the other to intraday capacity calculation. Both proposals were consulted by the IN Italy TSOs through ENTSO-E for one month from 23 February 2018 to 23 March 2018, in line with Article 20 and Article 12 of CACM<sup>1</sup>. The final IN CCM proposals were received by the last Regulatory Authority of the Italy North Capacity Calculation Region on 24 May 2018. The proposals include timescales for their implementation and a description of their expected impact on the objectives of CACM, in line with Article 9(9) of CACM.

Article 9(10) of CACM requires IN NRAs to consult and closely cooperate and coordinate with each other in order to reach an agreement, and make decisions within six months following receipt of submissions of the last Regulatory Authority concerned. A decision is therefore required by 24 November 2018.

The IN CCM is based on a Coordinated Net Transmission Capacity (in the following: CNTC) approach:

- a) the cross-zonal capacity is computed by increasing the generation on the export side and by decreasing the generation on the import side; increase and decrease in each node are set according to the Generation Shift Keys (in the following: GSK), defined by each TSO;
- b) the D-2 process starts in D-2 and it is based on D-2 Common Grid Models; the intraday capacity calculation process is performed in the early morning of D, basing on D-1 Common Grid Models;
- c) the reliability margin is computed making reference to the 99<sup>th</sup> percentile of the unintended deviations;
- d) only network elements significantly influenced by cross-zonal power exchanges are included in the contingency and network constraints list; a sensitivity threshold equal to 5% is assumed;
- e) specific allocation constraints are introduced to take into account the operational constraints related to the control of voltage profiles and dynamic stability of the Italian system;
- f) both preventive and curative remedial actions are defined; costly curative remedial actions are allowed, in accordance with national legislation; only SPS (Special Protection Schemes) will act in curative stage, after tripping of grid elements;
- g) cross-zonal capacity computed by the coordinated capacity calculator are forced to be within a predefined limiting band (so called selection phase);
- h) the selected value is then validated by each TSO: in particular a reduction may be asked; the final capacity value is the minimum value sent by each TSO during the validation process;
- i) in case the capacity calculation process is not able to produce a result, the TSOs validate the last coordinated cross-zonal capacities: in particular the last coordinated values relevant for the long-term timeframe are used as a fallback for the day-ahead timeframe, while the last coordinated values relevant for the day-ahead timeframe are used as a fallback for the intraday timeframe;

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<sup>1</sup> The public consultations are available on the ENTSO-e website:  
<https://consultations.entsoe.eu/markets/italy-north-tso-proposal-id-ccm/> and  
<https://consultations.entsoe.eu/markets/italy-north-tso-proposal-da-ccm/>



- j) the D-2 capacity calculation will be implemented in 24 months from the approval by IN NRAs; the TSOs intend to complement the D-2 CNTC methodology in force since February 2016;
- k) the intraday capacity calculation will be implemented as soon as approved by the IN NRAs; it will be limited to the remaining market time units after the recalculation process;
- l) by March 2019 IN TSOs will submit study with the evaluation to increase the 5% threshold used to identify critical network elements and contingencies;
- m) the selection phase will be phased out in D-2 capacity calculation once a ID recalculation is implemented for all the 24 hours of the day; the selection will be phased out in intraday capacity calculation no later than 24 months from the NRAs approval.

### III. The Italy North Regulatory Authorities position

The IN CCM proposals deal with all almost all the elements listed in Article 21 of CACM, nonetheless in some cases details are missing, while in other cases more transparency is required. In the following all these criticalities are addressed in detail.

#### Swiss involvement

From technical point of view, the capacity on the Italian Northern borders cannot be computed in an efficient manner without taking into account duly the transmission network of Swissgrid and the effects this network has on the neighbouring TSOs. IN NRAs are, thus, in favour that the IN CCM proposal contemplates the Swiss network and the associated GSK.

Nonetheless, IN NRAs would like to express some concerns from legal point of view. IN CCM proposal is developed according to CACM that, being a EU regulation, is legally binding only for EU Member States and not for Switzerland. Therefore, in IN NRAs' view, Swissgrid cannot be considered as a participating TSOs for the capacity calculation methodology, but only as a technical counterparty.

IN NRAs thus ask IN TSOs to modify the proposal accordingly, clarifying, wherever needed, that:

- a) the Italy-Switzerland border is significant from technical point of view and it cannot be neglected in order to have an efficient coordinated capacity calculation;
- b) the proposal is submitted to the respective regulatory authority only by Terna, RTE, ELES and APG, since they are the only TSOs legally bound by CACM Regulation;
- c) Swissgrid is involved in the capacity calculation process as a technical counterparty; the proposal shall give evidence of a voluntary agreement between Swissgrid and the other TSOs about this involvement; an agreement similar to the one cited in Article 1(3) of the CGM proposal would be welcomed.

#### CNTC approach

Article 21(1), letter b), of CACM foresees that the capacity calculation methodology shall include a detailed description of the capacity calculation approach with the relevant mathematical details.

In the IN CCM proposal the description is quite poor. Indeed, more details are given in the explanatory document (for example in paragraph 3.2.3 for D-2 common capacity calculation), but the IN NRAs deem it important that such details are included directly in the methodology. In particular a specific technical annex, subject to the approval, is requested to include at least:

- a) a proper reference to the load flow algorithm (mathematical equations are not required) for the capacity computation process;
- b) the description of the iterative process adopted for the TTC calculation with more details about the identification of Secure TTC and Unsecure TTC and some comments about the reasons underlining the dichotomy process;

- c) the description of the PTDF calculation adopted to select the critical network elements and contingencies and the details related to the application of the 5% threshold;
- d) the timings of the calculation process, i.e. a timetable reporting for each day at least when the capacity calculation process is initiated, when the coordinated capacity calculator (in the following: CCC) provides TSOs with the capacity values to be validated and by when each TSO is required to validate these values ; the link to the activities related to the building of the common grid model is also welcomed.

### Evolution towards flow based

IN NRAs are fine with the proposed CNTC approach, but they would like to remark that, according to Article 20(3) of CACM, flow based approach is the target model for Italy North CCR. IN NRAs indeed know that a flow based proposal would be compulsory only 6 months after Switzerland joins the single day-ahead coupling. Considering this short delay, IN NRAs deem it useful to set since now a proper timeline for the development and submission of a proper flow based proposal. Such timeline shall, in particular, be already included in the current CCM proposals. For the sake of clarity, the CCM proposals should make it clear that the CNTC approach will be enforced until the approval of a new methodology and its actual implementation.

### Discrimination between internal and cross-zonal exchanges

Article 21(1), letter b), point ii), foresees the inclusion in the capacity calculation methodology of rules to avoid discrimination between internal and cross-zonal congestions to ensure compliance with point 1.7 of Annex I to Regulation 714/2009.

In particular, treatment of internal congestions should not lead in general to limitations of cross-zonal exchanges; indeed a temporary limitation may be accepted, if needed to grant operational security and economically more efficient than other possible measures. Nonetheless limitations, if applied, should be discontinued by developing mid and long term measures such as a reconfiguration of bidding zones or new investments; the TSOs may continue to use limitations only if they are deemed more efficient than any other available mid and long term measures .

In IN CCM rules to avoid discrimination between internal and cross-zonal exchanges are not explicitly addressed. IN NRAs consider that the specific configuration of bidding zones in the Italian System might able per se to reduce all the discriminations and to maximize the capacity given to the market, nonetheless some clarifications about this point shall be included by IN TSOs at least in the explanatory note.

### Reliability margin

Article 5 of D-2 and intraday common capacity calculation are meant to establish the process to calculate the reliability margin in line with Article 22 of CACM. IN NRAs consider that the level of information provided by IN TSOs in the methodology is not sufficient.

IN TSOs shall amend this article in both D-2 and intraday proposals so that it provides a clear and enforceable methodology for calculating the reliability margin. In particular, it shall include a detailed description of the different steps of the calculation accompanied by clear mathematical equations including clear definition of all involved inputs, variables and outputs of the calculation. All the elements impacting the value of the reliability margin should be included in the methodology. As such, most of the description provided by TSOs within the explanatory note shall be adapted, complemented when necessary and included in the methodology itself.

In parallel, IN NRAs are concerned by the accepted risk-level proposed by TSOs. The suggested value (1%) is significantly lower than in other CCRs and is not justified by IN TSOs. IN NRAs are concerned that such a value may lead to an unexpected and unjustified increase of the reliability margin in the Italy North CCR and, as such, in a reduction of the capacity provided to the markets. IN NRAs understand that following CACM obligations, TSOs are required to develop a proper methodology to calculate the reliability margin. However, IN NRAs do not consider that such change should lead to an increase of the reliability margin, which, historically, proved to be relatively lower than on other European bidding zone borders while allowing safe operation of the system.

As such, IN NRAs request IN TSOs:

- a) at a first stage, to cap the reliability margin at a predefined value not exceeding its historical value; the 2017 value can be used as reference;
- b) in the meanwhile, to conduct an analysis aimed to highlight the relation between the accepted risk level and the value of the reliability margin; the relevant results should be submitted to IN NRAs no later than 12 months from the approval of IN CCM,
- c) according to the results of the above mentioned analysis, to submit to the NRAs according to the results of the above mentioned analysis, to submit to the NRAs an amendment of the methodology, proposing the defined risk level that results in a reliability margin not higher than its historical value.

IN CCM proposals shall be amended accordingly to explicit in the methodology the above requests.

## Generation shift keys

A number of details, along with the relevant formulas used to compute the shifts, are given in the explanatory note. For sake of transparency IN TSOs are asked to move all these details into the methodology or in a separated technical annex subject to approval.

The motivations at the basis of the GSK strategy selected by each TSO are not clear: more clarifications are requested in the explanatory note, aimed to clarify how the selected strategy represents the best forecast of the relation between the change of the net position in a bidding zone and the change of generation or load in each node (as foreseen in Article 24(2) of CACM). In particular a strategy as proportional or reserve factor seems coherent with the above mentioned requirement only when the bid price of all the generators can be assumed more or less uniform across the entire bidding zone. On the contrary, participation and merit order strategies can address in a more efficient manner the bid price differences: nonetheless, while the merit order strategy shifts one generator/load at a time, the participation factor shifts all the generators and loads, according to the relevant factors, and this does not seem coherent with a merit order based market.

According to what is included in the explanatory document, the GSKs are differentiated for time interval in order to model the market differences (for example between peak and off peak hours). IN NRAs request more clarifications about this issue: in particular they would like to know whether the application of the same GSKs for all the market time units could be detrimental to the overall capacity calculation process.

According to Article 7(7) of intraday common capacity calculation proposal, IN TSOs can use nodes not belonging to IN TSOs and Swissgrid (the so called hybrid GSKs). IN NRAs are quite concerned by this approach: more clarifications are required about the reasons of this choice; moreover IN NRAs require clarifications on how hybrid GSKs will affect the process.

## Allocation Constraints

Specific constraints are introduced to take into account the operational constraints related to the control of voltage profiles and dynamic stability of Italian system. Other specific constraints are also introduced to allow the so called “NTC smoothing” process described in parts “3.5 Methodology of bilateral splitting among borders” of the explanatory notes.

IN NRAs are not a priori against this approach, but they have the following concerns.

### Alternative solutions to the specific constraints

IN NRAs request an explanation on whether the voltage and stability issues of the Italian system could be addressed by the mean of alternative measures with the same effectiveness and reliability than the proposed specific constraints, and without endangering the overall system security. More clarifications about this topic shall be included in the explanatory note.

IN NRAs would like also know whether the NTC smoothing constraints may be considered as mitigation measures pursuant to Article 138 of Commission Regulation 2017/1485 establishing a guideline on electricity transmission system operation.

### Allocation constraint vs computation constraint

According to Article 2(6) of CACM; “allocation constraints means the constraints to be respected during the capacity allocation [...]”; Article 23(3) of CACM clarifies also that allocation constraints may be applied when they cannot be transformed efficiently into maximum flows on critical network elements.

The specific constraints proposed by IN TSOs are not a proper allocation constraint in the sense considered in CACM, since they are not applied in the allocation phase, but they are aimed to limit a priori the transmission capacity on the Northern Italian borders. They can be, thus, considered as a computation constraint applied during capacity calculation.

IN NRAs’ understand the respective benefits and drawbacks of computation constraints and allocation constraints.

First of all, allocation constraints applied in the allocation process could potentially affect the revenue adequacy associated to the remuneration of long term transmission rights issued according to Regulation 2016/1719 (in the following: FCA)<sup>2</sup>. On the contrary, computation constraints do not lead to any such problems<sup>3</sup>.

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<sup>2</sup> This example helps the understanding. Let’s assume that 15% of the total Northern net transmission capacity is attributed to the Italy-Slovenia border and that an allocation constraint limits import to Italy on the Northern borders at 1000 MW.

If an allocation constraint is applied, it is not possible to estimate a priori on which specific border the commercial flow resulting from day-ahead market will circulate: since in the long term capacity allocation each border is auctioned separately, 150 MW of long term transmission rights might still be allocated on the Italy-Slovenia borders, but the revenue adequacy cannot be granted. In the day-ahead market, in fact, the allocation constraint could assign all the entire 1000 MW flow to another border (for example Italy-France): in this case a market spread between Italy and Slovenia might still arise, thus leading to a positive remuneration of long term transmission rights, but no congestion rent would be collected (due to the fact that the flow is void).

<sup>3</sup> Let’s consider the same example as in footnote 2.

If a computation constraint is applied, the capacity allocable on Italy-Slovenia border is set at 150 MW. In this way, if the presence of the constraint (i.e. the limitation of the capacity) can be estimated already in the long term timeframe, it’s possible to limit the amount of long term transmission rights allocated for the same market time unit on the Italy-Slovenia border to 150 MW (long term transmission rights in Italy North CCR include predefined reduction period): the revenue adequacy is granted (150 MW would give origin to congestion rent in day-ahead and 150 MW should be remunerated at market spread).

Nonetheless, on a technical point of view<sup>4</sup>, computation constraints can be applied only in a CNTC approach where the result of the capacity computation is the net transmission capacity made available on each concerned border. On the contrary, they do not work in a flow based approach, where the capacity computation process provides the remaining available margin on each critical network element and where the effective capacity for allocation on each border depends on the combination of the different bidding zone net positions. Also, computation constraints pose a potential issue of transparency regarding the size of the constraint.

The introduction of allocation constraints require also changes in the market coupling algorithm: a request for change is needed and the effective timeline for implementation will depend also on NEMOs activities. Computation constraints, instead, can be easily implemented involving only TSOs and the designated CCC.

Moreover, computation constraints are similar to the approach in force since February 2016 in the Pentalateral agreement context.

Given what stated above, IN NRAs consider the computation constraint acceptable as a temporary initial measure: being similar to the procedure currently adopted, it neither would delay the implementation of the overall capacity calculation, nor would affect the revenue adequacy.

For the future, nonetheless, IN NRAs consider the implementation of a proper allocation constraint inescapable, above all when a flow based approach is implemented in the Italy North CCR pursuant to the requirements stated in Article 20(3) of CACM. IN TSOs are, thus, invited to start working on such new formulation, making, in particular, all the necessary arrangements with the NEMOs for the required changes to the market coupling algorithm and to introduce the allocation constraint as soon as possible. The timescale for implementation shall foresee the introduction of the allocation constraint.

In conclusion, IN TSOs are requested:

- a) to amend the D-2 and intraday capacity calculation proposals, clarifying that the computation constraint is a temporary measure that will be phased out as soon as a proper allocation constraint can be arranged according to the algorithm changes;
- b) to amend the D-2 and intraday capacity calculation proposals, clarifying that in this temporary phase where the computation constraint is applied, the unconstrained capacity will be nonetheless calculated for all MTUs and will be made publicly and easily accessible;
- c) to propose the formulation of allocation constraints for both voltage and stability issues and NTC smoothing process, along with the timeline to implement such constraints and all the necessary activities that shall be performed (for example, the request for change to the market coupling algorithm), giving evidence, for each of them, of the involved subjects and the expected timings;
- d) to provide IN NRAs with figures stating the impact that an allocation constraint may have on the revenue adequacy, along with possible alternative measures that could be adopted to mitigate such impact (as, for example, to deal with these issues in the proposal about firmness costs to be submitted pursuant to Article 61 of FCA).

### Transparency

A good understanding of the reasons underlying the application of the specific constraints is of utmost importance for all market participants.

In IN NRAs' view, a mere publication of the maximum flows (in case of an allocation constraint) or of both the unconstrained and constrained capacities (in case of a computation constraint) is not enough, but it shall be accompanied by more information about the main elements at the basis of such constraint.

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<sup>4</sup> On a legal point of view, computation constraints are not foreseen by CACM.



For this reason, IN NRAs request IN TSOs to provide all necessary explanations to allow market participants to forecast (ex-ante) and understand (ex-post) the levels of the constraints.

For voltage and stability constraints, IN TSOs shall publish at least the following elements for each market time unit:

- the expected total load in the Italian system;
- the expected total non-dispatchable production in the Italian system;
- the minimum dispatchable thermal generation needed to grant voltage and system stability in the Italian system.

IN NRAs also request from IN TSOs to publish a feature (e.g. a table or a figure) that would provide an estimation of the cross-dependence between the level of the allocation constraint and the parameters listed above (or any other relevant parameter). Looking at the capacity values currently adopted, it seems, in fact, that the maximum allocable capacity in presence of the specific constraints is a multiple of 500 MW. Such a step seems to suggest that a relevant first estimation can be obtained rather easily.

Moreover, IN NRAs consider this level of discretization too high. IN TSOs are, thus, requested to clarify the reasons underlying these rounded values and to amend the D-2 and intraday capacity calculation proposals in order to assume a lower level of discretization (no higher than 250 MW; ideally the same 50 MW step used in the dichotomy process).

For NTC smoothing constraints, the maximum difference between NTC in each market time unit shall be published.

## Export Capacity

D-2 and intraday cross-zonal capacities shall be calculated on a daily basis in both directions for all market time units. Anything less cannot be considered compliant with CACM.

In D-2 and intraday capacity calculation proposals for Italy North CCR, a true calculation of simultaneously feasible cross-zonal capacities in both directions is currently not in place and not foreseen for the future. Indeed, the proposal on day-ahead common capacity calculation introduces the step of calculating the capacity for export from the bidding zone Italy North into one adjacent bidding zone (so called export corner process or transit scenario). It was explained that the border for this calculation is not predetermined and can alternate. The choice of which bidding zone border is to be considered relies on the market outcome anticipated by the TSOs, but the criteria for this choice are not reported. A roadmap to implement the export corner process is included in the explanatory document: the activities started in May 2018 and the go live is expected on 03/06/2019. A similar approach is also suggested in the intraday common capacity calculation, but no timeline is proposed

IN NRAs consider the export corner process as a very first measure to be acceptable in a short-term perspective, but a full coordinated capacity calculation in export direction on all the Italian Northern borders shall be necessarily implemented in a mid-term perspective. In particular, IN NRAs consider that the calculation of the export capacity is a necessary step towards a full flow-based approach

Given what stated above, IN NRAs request IN TSOs to amend the CCM proposals (both D-2 and intraday) including the following:

- Short term - export corner process
  - a) clear description of the criteria and methodology to be used to select the bidding zone border(s), with reference to cross-zonal capacities for export from the bidding zone Italy North are being calculated; this shall include a description on how discrimination with other bidding zone borders is avoided;
  - b) the methodology to compute cross-zonal export capacities (if different from the methodology used to compute cross-zonal capacities for import to the bidding zone Italy North);

- c) a binding timeline for the implementation of the export corner process; in particular the timeline proposed in the explanatory note for D-2 common capacity calculation (go live on 03/06/2019) is acceptable, but it shall be directly included in the legal methodology; for intraday common capacity calculation a proper timeline shall be developed, with a go live no later than 31/12/2019;;
- Mid-term - calculation of simultaneously feasible cross-zonal capacities on all bidding zone borders in both directions:
  - a) statement whether IN TSOs intend to deal with cross-zonal export capacities by complementing the CNTC approach proposed for cross-zonal import capacities or by developing a flow based approach on a voluntary basis<sup>5</sup>; if a CNTC approach is adopted, IN TSOs are requested to provide at least preliminary details on the relevant methodology to compute export capacities, along with the rules to grant that the computed values are simultaneously feasible;
  - b) the timescale for the development of the full coordinated calculation of the export capacity.

While evaluating which approach (CNTC or flow based) to be followed for the cross-zonal export capacities calculation, IN TSOs are invited to take into account the effort to develop the proposal and the synergies with the development of a full flow-based approach. Therefore, IN NRAs ask IN TSOs to provide a roadmap for the implementation of the calculation of export capacity that fits into the implementation of the full flow-based approach, pursuant to Article 20(3) of CACM. In particular if a CNTC approach is chosen, the proposed timeline shall foresee a go live of the export capacity calculation no later than 24 months from the approval of CCM proposals, along with the elements of this CNTC export calculation that will be reused in the flow based domain. If, instead, in relation with the above paragraph “Evolution toward the flow based approach”, a flow based approach is more relevant, IN NRAs will expect that the flow based proposal is submitted no later than 30/06/2020, with an implementation timeline no longer than 24 months from the approval.

## Selection phase and validation process

### Phase out of the selection step

According to Article 26 of CACM, the validation step represents the opportunity for TSOs to correct (increase or reduce) the capacity provided by the CCC before it is sent to the market. Only the possible causes for a reduction of the capacity are set, along with the reporting obligation resulting of such reduction, but IN NRAs would like to remind that, according to CACM, the validation step could be used also to increment the capacity and not only to reduce it.

At several occasions, and in particular in article 10 of both D-2 and intraday common capacity calculation methodologies, IN TSOs refer to a selection process at the end of the capacity calculation, aimed to establish that the capacity calculated for day-ahead and intraday timeframes cannot be outside a range of values defined ex-ante by IN TSOs. This seems a sort of pre-validation step conducted by the CCC before the proper validation step of each TSO.

IN NRAs consider that the selection process is not be compliant with CACM that explicitly states that TTC computed by the coordinated capacity calculator can be corrected only by each TSOs during validation step.

IN TSOs argued that such process is meant to intercept potential failures in the common grid model (or in the individual grid models submitted by the TSOs) that may lead to unreliable capacity values. IN NRAs consider this argument is not valid:

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<sup>5</sup> Despite a proposal for a flow based approach in Italy North CCR would be compulsory submitted by 6 months after Switzerland joins the market coupling, earlier implementation is possible, as confirmed by EU Commission in the letter sent in July 2017.

- a) Grid models defined in D-2 and D-1 should by construction be more accurate than the ones defined much earlier in time;
- b) Undetected mistakes in IGM or CGM with a significant and obvious impact on the calculated capacities can be corrected by TSOs within the validation step;
- c) IN TSOs should take necessary actions to detect such mistakes before the capacity calculation is triggered (when the CGM is built).

IN NRAs thus ask IN TSOs to cease to apply the selection step (the so called LTTC/UTTC) and amend the methodology accordingly. For the D-2 common capacity calculation, the selection step should not be applied (starting from Q4 2018) and should be completely removed from the methodology. For the D-1 common capacity calculation, the selection step can be accepted as a temporary measure and it shall stop being applied as soon as possible and no later than Q4 2019. IN NRAs are conscious that in the first stage the intraday capacity calculation will not deal with all the market time units, but they are confident that for the market time units not covered by intraday calculation, IN TSOs can efficiently correct the D-2 capacity values provided by the coordinated capacity calculator in the validation step. Moreover IN NRAs consider that 12 months are more than enough to have reliable common grid model also in the intraday capacity calculation. IN TSOs are thus asked to amend the methodology to display the above mentioned deadlines at which the lower and upper limits shall be completely abandoned.

Finally, IN NRAs note that the calculation process of the LTTC and UTTC levels is only provided in the explanatory note. IN NRAs ask IN TSOs to include the description of this process within the methodology alongside with the values that set the size of the band. IN NRAs consider that the band proposed in the explanatory note is nonetheless very narrow and, pending the complete phase out of the selection step, the UTTC should be increased to 1000 MW.

IN NRAs, thus, request IN TSOs to amend both D-2 and D-1 common capacity calculation methodologies accordingly.

#### Validation step

IN TSOs mention in Article 9(4) of both D-2 and intraday common capacity calculation proposals that the TSOs could modify the capacity calculated by the CCC in case they expect different flow patterns compared with the assumptions of the capacity calculation process. CACM GL Art. 26(3) refers only to “operational security” as a reason for reducing cross-zonal capacity. The current wording of Article 9(4) fails to precisely describe the exact conditions that would trigger a reduction of the capacity. Also, IN NRAs would like to underline that uncertainties in generation or consumption patterns are accounted for while setting the reliability margin and they should not constitute a reason to modify the capacity value.

IN NRAs thus ask IN TSOs to amend Article 9(4) to comply with the above requests.

Finally, Article 9(6) of both D-2 and intraday proposals should also be amended in order to set out the reporting obligations provided by article 26(5) of CACM. Indeed such reporting obligations are included in Article 12 in both proposals, but IN NRAs would prefer to have them included in Article 9 together with all the other provisions referred to the validation step.

#### Remedial actions

In Article 8 of IN CCM only a list (not exhaustive) of possible remedial actions is given, but all the details about how they are taken into account in the capacity calculation process are given only in the explanatory note. Indeed, articles 10(5) of D-2 proposal and 10(6) of Intraday proposal mention a Remedial Action optimization to be used in the capacity calculation process by the CCC, but without any details. The TSO shall provide in the methodology more details about the Remedial Action optimization process: the description shall be included in a separate Annex, subject to approval.

Moreover, the frequency at which the remedial actions are reassessed shall be specified.



Finally, more details about the so called special protection scheme remedial actions and how this is different from an N-2 system operation shall be provided: some examples in the explanatory note would be much appreciated.

## Implementation timeline

D-2 common capacity calculation will be fully implemented 24 months after the approval by the concerned regulatory authorities. IN NRAs consider that the proposed implementation timeline is not duly justified, since a CNTC calculation has been in force on the Italian Northern borders since February 2016. IN TSOs are thus invited to detail the implementation timeline, by listing all the issues that are not already in force and the timings for their implementation taking into account all the specific requests included in the current RFA.

Intraday common capacity calculation is expected to start by end 2018, but limited to a subset of market time units. A complete intraday capacity calculation will be implemented as soon as the intraday proposal is approved by the concerned regulatory authorities. IN NRAs consider this statement too generic: a binding timeline for the implementation of the intraday capacity calculation on all the market time units, along with the timings of the computation process, shall be included.

## Other topics

Article 10(3) of D-2 proposal foresees the usage of common grid model no later than 24 months after its implementation at European level, while Article 10(3) of intraday proposal foresees the usage of common grid model since the very beginning. IN TSOs are requested to align the two provisions: IN NRAs considers that the common grid model should be used as soon as possible; some months for testing the reliability of such model may be allowed, but no more than a semester.

The proposals neglect the requirement set in Article 21(1), letter b), point (vii) of CACM on the inclusion of rules on how to share power flow capabilities of critical network elements affected by more than one CCR. As Italy North and Core are highly interdependent and three out of four IN TSOs are also part of the Core CCR, IN TSOs are requested to incorporate such rules in the amended proposals

## Conclusions

The IN NRAs have consulted and closely cooperated and coordinated to reach agreement that **they request an amendment to the IN CCM proposals submitted by IN TSOs pursuant to Article 20 of CACM**. The amended proposals shall take into account the IN NRAs position stated above, and shall be submitted by TSOs no later than 2 months after the last national decision to request an amendment has been made, in accordance with Article 9(12) of CACM.

The IN NRAs must make their national decisions to request an amendment to the capacity calculation methodology, on the basis of this agreement.

## List of Action points:

- Clarify the conditions about the involvement of Swissgrid
- Develop a specific technical annex with all the mathematical details about the capacity calculation, the description of the PTDF calculation and the timing of the calculation process;
- Include a timeline for the submission of a flow based proposal
- Address explicitly the rules to avoid discrimination between internal and cross-zonal exchanges
- Improve the methodology to compute the reliability margin with clear and enforceable mathematical equations
- Apply a cap to the reliability margin, based on 2017 historical value

- Conduct an analysis aimed to highlight the relation between the reliability margin and the accepted risk value; the results shall be used to review the risk level, by submitting an amended methodology
- Include more details about GSK in the methodology or technical annex;
- Give more clarifications about the specific GSK strategy adopted by each TSO, the GSK differentiation for market time unit and the application of the hybrid GSK involving nodes belonging to TSOs other than the IN TSOs and Swissgrid
- Clarify whether it's possible to address voltage and stability issues of the Italian system by the mean of alternative measures than the additional constraints, without endangering the overall system security
- Clarify whether the NTC smoothing process can be considered as mitigation measures pursuant to Article 138 of Commission Regulation 2017/1485
- Amend IN CCM, clarifying that computation constraints are a temporary solution to be abandoned once proper allocation constraints are implemented; in the meanwhile the unconstrained capacity shall be computed and made publicly and easily accessible
- Propose a formulation of the allocation constraints both for voltage and stability issues and NTC smoothing process, along with a timeline for the implementation of such constraints reporting the description of each step, the involved subjects and the expected timings
- Provide figures stating the impact that an allocation constraint may have on the revenue adequacy, along with alternative measures that could be adopted to mitigate such impact
- Improve transparency by providing more elements and information about the additional constraints and by assuming a low level of discretization
- Include in the methodology a detailed description of the export corner process, including the criteria to select the target border and to compute the associated capacity and the roadmap for its implementation
- Include a timeline for the development of a full coordinated calculation of export capacity, stating whether IN TSOs intend to deal with this process by complementing the CNTC approach proposed for cross-zonal import capacities or by developing a flow based approach
- Cease the selection step in D-2 capacity calculation starting from Q4 2018 and foresee the phase out of the selection step for intraday capacity calculation by 12 months
- Improve the description of LTTC and UTTC and increase UTTC to 1000 MW
- Clarify the criteria triggering for a capacity reduction in the validation step, avoiding overlapping with the conditions triggering the reliability margin
- Include reporting obligations pursuant to article 26(5) of CACM
- Give more details about remedial actions optimization process, the frequency of reassessment of the remedial actions and the special protection scheme
- Detail the implementation timeline for D-2 capacity calculation, listing all the issues that are not already in force and the expected timings for their implementation
- Provide the timeline to implement intraday capacity calculation for all market time units
- Align the provisions to use common grid model between D-2 and intraday capacity calculation proposals
- Incorporate the rules to share power flow capabilities between different CCRs according to Article 21(1), letter b), point (vii) of CACM