Methodology for an intraday common capacity calculation in accordance with Article 21 of CommissionRegulation (EU) 2015/1222 of 24 July 2015 establishinga guideline on capacity allocation and congestion management within Italy North CCR

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Whereas

(1) This document (hereafter referred to as "ID CCC methodology Proposal"), including its annexes, is the methodology for the common capacity calculation performed for the capacity allocation within the intraday timeframe for Italy North Capacity Calculation Region (hereafter referred to as "Italy North CCR"). This methodology is required by Article 21 of Regulation (EU) 2015/1222establishing a guideline on Capacity Allocation and Congestion Management (hereafter referred to as the "CACM Regulation").

(2) This methodology takes into account the general principles and goals set in the CACM Regulationwhile respecting the principles set in the Regulation (EC) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity (recast) (hereafter referredto as "Regulation (EC) 2019/943").

In addition, this methodology takes into account the effective structure of the grid and the borders between Italy and third countries by establishing TSO-TSO based contractual frameworks to include third countries as Technical Counterparties. Therefore, this methodology takes into account Technical Counterparties' grid elements.

(3) This methodology takes into account the general principles and goals set in CACM Regulation. Ensuring optimal use of the transmission infrastructure and operational security, which are amongthe objectives of capacity allocation and congestion management cooperation, laid down by Article 3 of CACM Regulation, requires the inclusion of Third Countries' grid elements in the capacity calculation process of Italy North CCR. CACM Regulation's objectives cannot be achieved in any other way but by including Third Countries' grid elements. This inclusion is in line with Article 13 of Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation (hereafter referred to as "SOGL Regulation"), providing that EU TSOs must establish "cooperation concerning secure system operation" with non-EU TSOs belonging to the same synchronous area via an agreement with these non-EU TSOs. In order to comply with the requirement laid down by EU Regulation, this methodology includes Third Countries' TSOs as Technical Counterparties.

Coordinated capacity calculators will take into account the whole Area of Common Interest (hereafter referred to as "ACI") of the Italy North CCR and include Technical Counterparties' remedial actions into coordinated remedial action preparation and the optimization procedure. TSOs of Italy North CCR will conclude an agreement with relevant Technical Counterparties. Inorder to be taken into consideration in the capacity calculation process and enter into a TSO-TSObased contractual framework, Technical Counterparties must fulfil the conditions laid down by Article 1(3) of the "*All TSOs' proposal for a common grid model methodology in accordance with Article 17 of Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management*", applicable to TSOs from jurisdictions outside the area referred to in Article 1(2) of CACM Regulation. The agreement between Italy North CCR TSOs and the Technical Counterparty will include ID CCC methodology's provisions and ensure that the Technical Counterparty is contractually bound by equivalent obligations as the ones binding upon TSOs of the Italy North CCR by virtue of EU Regulations. Such agreement will govern mutual obligations and responsibilities of the TechnicalCounterparty with TSOs of Italy North CCR in relation to the capacity calculation process on all elements of the Area of Common Interest. Ensuring optimal use of the transmission infrastructureand operational security, which are among the objectives of capacity allocation and congestion management cooperation, laid down by Article 3 of CACM Regulation, requires the inclusion ofTechnical Counterparties' grid elements in the capacity calculation process of Italy North CCR.

(4) The goal of the CACM Regulation is the coordination and harmonisation of capacity calculationand allocation in the day-ahead and intraday cross-border markets. To facilitate the achievement of these aims and implement single day-ahead and intraday coupling, it is necessary for TSOs to calculate in a coordinated manner the available cross-border capacity. In line with the requirements of the CACM Regulation, the TSOs of Italy North CCR will strive to cooperate withCapacity Calculation Regions (hereafter referred to as "CCR") connected to Italy North CCR order to ensure that capacity calculation takes place in the most efficient and thorough way.

(5) Article 21(1) of the CACM Regulation constitutes the legal basis for this methodology and defines several specific requirements that the ID CCC methodology 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 inaccordance 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, previouslyallocated cross-zonal capacity;

iv. rules on the adjustment of power flows on critical network elementsor 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 influencedby 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."

(6) Article 14 of the CACM Regulation defines the capacity calculation time-frames as "*intraday, forthe intraday market. For the intraday market time-frame, individual values for cross-zonal capacity for each remaining intraday market time unit shall be calculated. 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"* and Article 20 (3) of the CACM Regulationspecifies that: *"The TSOs from the capacity calculation region where Italy, as defined in point (c)of point 3.2 of Annex I 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."*

(8) TSOs of Italy North CCR agreed on a first version of ID CCC methodology proposing to apply a coordinated net transmission capacity methodology as interim approach for capacity calculationwithin the Italy North CCR, without prejudice to the future implementation of a Flow Based approach as the target methodology for the Italy North CCR as foreseen in Article 20(1) of the CACM Regulation.

(9) The first version of the ID CCC methodology was submitted to the NRAs of Italy North CCR according to Article 9(7)(a) of the CACM Regulation and was approved by the same NRAs on 25th November 2019.

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

(11) As per the definition set in Article 2(11) of the CACM Regulation, the coordinated capacity calculator is delegated the task of calculating transmission capacity, at regional level or above.

(12) Article 9(9) of the CACM Regulation requires that the proposed timescale for the implementationand the expected impact of the ID CCC methodology Proposal on the objectives of the CACM Regulation are described. The impact is presented below in the point (17) of this Whereas Section,while the timescale is included in the methodology.

(13) Article 16(8) of the Regulation (EC) 2019/943 complements the principles of the CACM Regulation, with the introduction of a requirement for a minimum level of capacity to be offeredto the market:
"Transmission system operators shall not limit the volume of interconnection capacity to be madeavailable to market participants as a means of solving congestion inside their own bidding zone or as a means of managing flows resulting from transactions internal to bidding zones. Without prejudice to the application of the derogations under paragraphs 3 and 9 of this Article and to the application of Article 15(2), this paragraph shall be considered to be complied with where thefollowing minimum levels of available capacity

for cross-zonal trade are reached:

(a) for borders using a coordinated net transmission capacity approach, the minimum capacity shall be 70 % of the transmission capacity respecting operational security limits after deduction of contingencies, as determined in accordance with the capacity allocation andcongestion management guideline adopted on the basis of Article 18(5) of Regulation (EC) No 714/2009;

(b) for borders using a flow-based approach, the minimum capacity shall be a margin set in the capacity calculation process as available for flows induced by cross-zonal exchange. The margin shall be 70 % of the capacity respecting operational security limits of internal and cross-zonal critical network elements, taking into account contingencies, as determined in accordance with the capacity allocation and congestion management guideline adopted on the basis of Article18(5) of Regulation (EC) No 714/2009.

The total amount of 30 % can be used for the reliability margins, loop flows and internal flows oneach critical network element."

(14) Articles 15(1), 15(2) and 15(4), and Article 16(9) of the Regulation (EC) 2019/943 introduce possible temporary exemptions to comply with the minimum level of capacity set in the Article 16(8) of the Regulation (EC) 2019/943 through action plans and derogations.

(15) Article 16(3) of the Regulation (EC) 2019/943 describes the capacity calculation process and attributes the role of coordinated capacity calculator to the regional coordination centres: *"Regional coordination centres shall carry out coordinated capacity calculation in accordancewith paragraphs 4 and 8 of this Article, as provided for in point (a) of Article 37(1) and in Article 42(1). Regional coordination centres shall calculate cross-zonal capacities respecting operational security limits using data from transmission system operators including data on thetechnical availability of remedial actions, not including load shedding. Where regional coordination centres conclude that those available remedial actions in the capacity calculation region or between capacity calculation regions are not sufficient to reach the linear trajectorypursuant to Article 15(2) or the minimum capacities provided for in paragraph 8 of this Article while respecting operational security limits, they may, as a measure of last resort, set outcoordinated actions reducing the cross-zonal capacities accordingly. Transmission systemoperators may deviate from coordinated actions in respect of coordinated capacity calculationand coordinated security analysis only in accordance with Article 42(2). By 3 months after theentry into operation of the regional coordination centres pursuant to Article 35(2) of thisRegulation and every three months thereafter, the regional coordination centres shall submit areport to the relevant regulatory authorities and to ACER on any reduction of capacity ordeviation from coordinated actions pursuant to the second subparagraph and shall assess theincidences and make recommendations, if necessary, on how to avoid such deviations in thefuture. If ACER concludes that the prerequisites for a deviation pursuant to this paragraph arenot fulfilled or are of a structural nature, ACER shall submit an opinion to the relevant regulatoryauthorities and to the Commission. The competent regulatory authorities shall take appropriateaction against transmission system operators or regional coordination centres pursuant to Article59 or 62 of Directive (EU) 2019/944 if the prerequisites for a deviation pursuant to this paragraphwere not fulfilled. Deviations of a structural nature shall be addressed in an action plan referredto in Article 14(7) or in an update of an existing action plan."*

(16) Article 16(4) of the Regulation (EC) 2019/943 gives a framework for the consideration of costly remedial actions in the capacity calculation:
"The maximum level of capacity of the interconnections and the transmission networks affected by cross-border capacity shall be made available to market participants complying with the safetystandards of secure network operation. Counter-trading and redispatch, including cross-border redispatch, shall be used to maximise available capacities to reach

the minimum capacity provided for in paragraph 8. A coordinated and non-discriminatory process for cross-border remedial actions shall be applied to enable such maximisation, following the implementation of a redispatching and counter-trading cost-sharing methodology."

(17) The ID CCC methodology contributes to and does not in any way hinder the achievement of theobjectives 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 ID CCC methodology serves the objective of promoting effective competition in the generation, trading and supply of electricity by defining a set of harmonised rules for capacity calculation and congestion management which contributes to the effectiveness of the intraday market. Establishing common and coordinated processes for the capacity calculations within the intraday market timeframe contributes to achieving this aim.

Article 3(b) of the CACM Regulation aims at ensuring optimal use of the transmission infrastructure.
The ID CCC methodology contributes to the objective of ensuring optimal use of the transmissioninfrastructure 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 ID CCC methodology contributes to the objective of ensuring operational security by coordinating the capacity calculation with updated inputs for the intraday market timeframe at regional level to ensure its reliability.

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

Article 3(g) of the CACM Regulation aims at contributing to the efficient long-term operation anddevelopment 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 Italy North CCR, the results of the coordinated capacity calculation contribute to determine the most limiting branches within this region, by then help TSOs for a more efficient development of the electricity transmission system.

(18) In conclusion, the ID CCC methodology contributes to the general objectives of the CACMRegulation.

Article 1 Subject matter and scope

1. The ID CCC methodology as determined in this document is the common methodology for the capacitycalculation performed for the capacity allocation within the intraday timeframe for Italy North CCR in accordance with Article 21 of the CACM Regulation. The previous version of the ID CCC methodologyapproved by the NRAs of Italy North CCR on 24/07/2020 is repealed.

2. Considering the structure of the grid, Third Countries' borders are taken into account via a separate agreement in the capacity calculation process.

Article 2 Definitions and interpretation

1. For the purposes of the ID CCC methodology, the terms used shall have the meaning given to them in Article 2 of Regulation (EC) 2013/543, Article 2 of the CACM Regulation , and Article 2 of Regulation(EC) 2019/943.

2. In addition, the following definitions shall apply:

   a. 'APG' means Austrian Power Grid AG, the Austrian system operator;
   b. 'AT-IT border' means bidding zone border between Austria and Italy;
   c. CH-IT border' means bidding zone border between Switzerland and Italy;
   d. 'ELES' means ELES, d.o.o. , the Slovenian system operator;
   e. 'export corner calculation' means the common capacity calculation when at least one country isexpected to be importing from Italy;
   f. 'FR-IT border' means bidding zone border between France and Italy;
   g. 'RTE' means Réseau de Transport d'Electricité, the French system operator;
   h. 'SI-IT border' means bidding zone border between Slovenia and Italy;
   i. 'Technical Counterparty' means any non-EU TSO to be included in the procedures of thismethodology through respective agreements;
   j. 'TERNA' means TERNA S.p.A. Rete Elettrica Nazionale, the Italian system operator;
   k. Third Country means country from jurisdiction outside the area referred to in Article 1(2) of theCACM Regulation.

3. Definition of Acronyms

CC	Capacity Calculation
CCC	Common Capacity Calculation
CGM	Common Grid Model
CGMES	Common Information Model (CIM) for Grid Model Exchanges
CNE	Critical Network Element
CNEC	Critical Network Element and Contingency. For the purpose of this methodology, the term CNEC also cover the case where a CNE is used in capacity calculation without a specified contingency.
CRA	Curative Remedial Action
D-2	Two Days Ahead
D2CF	D-2 Congestion Forecast
DACF	Day Ahead Congestion Forecast
ID	Intraday
IDCF	Intraday Congestion Forecast
IDCM	Intraday Coupling Model

IGM	Individual Grid Model
MACZT	Margin Available for Cross Zonal Trade
MC	Market Coupling
MNE	Monitored Network Element
NEMOs	Nominated Electricity Market Operators
NRAs	National Regulatory Authorities
NTC	Net Transfer Capacity
PRA	Preventive Remedial Action
PST	Phase Shifter Transformer
RAO	Remedial Action Optimization
RSC	Regional Security Coordinator
SDAC	Single Day Ahead Coupling
SPS	Special Protection Scheme
TRM	Transmission Reliability Margin
TTC	Total Transfer Capacity (of the Italy North CCR)
Ur	Uncertainty of regulation
Us	Uncertainty of scenario
σ	Standard Deviation

4. In this ID CCC 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 otherenactment shall include any modification, extension or re-enactment of it when in force.

Article 3 Application of this methodology

1. This methodology applies solely to the ID common CCC based on the coordinated net transmission capacity approach within the Italy North CCR. For the avoidance of doubt the respective or relevant provisions of this methodology apply to any relevant Technical Counterparty of the Italy North CCR, by virtue of separate contracts as mentioned above in Article 1. The ID CCC methodology using the flow- based approach, the CCC methodologies within others CCRs and other timeframes are outside the scopeof this methodology.

Article 4 Cross-zonal capacities for the intraday market

1. For the intraday market time-frame, individual values for cross-zonal capacity for each remaining intraday market time unit shall be calculated using the ID CCC methodology.

Article 5 Reliability margin methodology

1. For the CC performed in ID, the TSOs of the Italy North CCR and Technical Counterparties shall definethe reliability margin in line with Article 22 of the CACM Regulation and based on the analysis of the following data:

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

    More details on the computation of the reliability margin are provided in the technical Annex of theID CCC methodology.

2. The reliability margin shall be defined as a fixed value, similar to the one described in the a D-2 CCC methodology developed in accordance with Article 21 of CACM Regulation until the TRM study described in Article 14(8) of said methodology is completed.

3. The TSOs of the Italy North CCR and Technical Counterparties shall review once a year the reliability margin for the whole Italy North CCR.

Article 6 Operational security limits, contingencies and allocation constraints

1. For the CC, each TSOs of the Italy North CCR and Technical Counterparties shall provide the coordinated capacity calculator with its individual list of CNECs created based on a common contingencylist. The coordinated capacity calculator shall then define the initial list of CNECs to be considered duringthe CC, by merging the individual list of CNECs provided by all TSOs of the Italy North CCR and Technical Counterparties into a single list.

2. Subsequently, the coordinated capacity calculator shall use the initial list of CNECs pursuant to paragraph1 to create the final list of CNECs to be considered in the CC by selecting only network elements significantly influenced by cross-zonal power exchanges. The selection of these CNECs shall be based on a sensitivity analysis performed for each calculated timestamp in the different network states includingbut not limited to base case, after contingency and after remedial action.

3. Only CNECs that include a tie-line as a CNE, elements that are necessary for the calculation process or the RAO process (i.e.: topological remedial actions) and CNECs with a sensitivity to cross-zonal power exchanges equal or higher than 5% shall be monitored during the CC process. The sensitivity shall be assessed as explained in Annex I. Any changeto the sensitivity threshold shall lead to an amendment of the entire ID CCC methodology Proposal according to Article 9(13) of CACM Regulation.

4. The TSOs of the Italy North CCR and Technical Counterparties may define also a list of monitored network elements (MNEs) that are influenced by the application of cross-border relevant remedial actionsin line with Articles 75 and 76 of the Regulation (EU) 2017/1485, but are not significantly influenced by the cross-zonal power exchanges. These MNEs shall only be monitored during the RAO. The additional loading, resulting from the application of RAs, on these monitored elements may be limited during the RAO, in accordance with Article 8(6).

5. The MNE concept is allowed for a temporary period of 18 months from the implementation of the exportcorner calculation.

6. Where the power flows on CNEs monitored in the CC are influenced by cross-zonal power exchanges indifferent CCRs, the TSOs of the Italy North CCR and Technical Counterparties shall define the rules forsharing the power flow capabilities of CNEs among different CCRs in order to accommodate these flows.These rules will be detailed in cooperation with the other CCRs during the implementation phase of thismethodology.

7. The TSOs of the Italy North CCR and Technical Counterparties shall review the list of CNEs and MNEsto be monitored in the CC process at least once a year.

8. The coordinated capacity calculator shall use the CNECs in accordance with Article 7(3) for the CC performed within Italy North CCR in order to determine the maximum net transmission capacity for eachbidding-zone border.

9. The Italian operational constraints related to the control of voltage profiles and dynamic stability of Italiansystem, which are needed to maintain the transmission system within operational security limits but cannot be transformed efficiently into maximum flows on CNEs, shall be expressed via allocation constraints pursuant to Article 2(6) of the CACM Regulation.

10. Ramping constraints, which are needed to avoid large variations of the exchange programs between oneMTU and the next that may endanger the grid security during real time operations, shall be expressed viaallocation constraints.

11. As a temporary solution, allocation constraints indicated in Article 6(9) and 6(10) will be directly appliedto the results of the calculation performed by the coordinated capacity calculator, in the form of computation constraints. During this period, the unconstrained capacity will be computed in any case andmade publicly and easily accessible according to the provisions set in Articles 12(5) and 12(6). Once themarket coupling algorithm will be fully capable of managing the above mentioned allocation constraintsn accordance with the definition given in Article 2(6) of the CACM Regulation, computation constraintswill be abandoned in favour of proper allocation constraints pursuant to Article 2(6) of the CACM Regulation.

12. Allocation constraints will be given with a level of discretization of 50 MW.

Article 7 Generation shift keys

1. The TSOs of Italy North CCR shall define the generation shift keys in accordance with Article 24 of theCACM Regulation.

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

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

4. ELES shall define generation shift keys proportional to the base case scenarios for each market time unitwith all expected generating units and selected loads in the IGM, reflecting ELES's best forecast of market behaviour.

5. APG shall define generation shift keys participation factors to the base case scenarios for each market time unit with all expected generating units in the IGM, reflecting APG's best forecast of market behaviour. To achieve this the shift is done in generation/load nodes (PV or PQ nodes), according to a participation factor. The chosen nodes are evaluated by APG and are nodes with generation/load units that will change along with a market change. The participation factor for each node is set by APG and reflects the best forecast of generation/load distribution in the Austrian grid.

6. The TSOs of the Italy North CCR have the possibility to use some nodes belonging to non-participatingTSOs for the shifting during winter period (from October 1st to April 30th).

Article 8 Remedial actions in capacity calculation

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

2. Each TSO of Italy North CCR shall define individually the remedial actions of its responsibility area to be made available used in the ID CCC within Italy North CCR.

3. The available remedial actions are those which can be activated in a coordinated way by the TSOs of Italy North CCR and Technical Counterparties to ensure the operational security.

4. The remedial actions to be defined by each TSO of Italy North CCR shall be either preventive (pre-fault)or curative (post-fault). The TSOs of Italy North CCR may use the following remedial actions, but not limited to:
    a. changing the tap position of a phase shifter transformer;
    b. topology measure: opening or closing of a line, cable, transformer, bus bar coupler;
    c. switching of a network element from one bus bar to another; or
    d. modification of generation.

   The remedial actions given to CC process are assessed by each TSO of the Italy North CCR on a dailybasis.

5. All types of remedial actions can be used in preventive and/or curative state. SPS will act only in curativestage, after tripping of grid elements. Due to this there are three different types of remedial actions usedin the Italy North CC process:
    a. PRA: They correspond, in operation, to remedial actions to be implemented independently of theoccurrence of any outage to relieve the grid. They are also implemented in the CGM.
    b. CRA: Each CRA is associated with a given Outage and applied after the Outage happened. Theyare taken into account during the CC process but not implemented in the model.
    c. SPS: This represents an automatic change in grid topology in case of predefined conditions (e.g.outage of 2 parallel lines) are met. They are taken into account during the CC process but not implemented in the model.

6. Preventive Remedial Actions are implemented in the final CGM of the CC. Their application during lateroperational security timeframes (IDCF and real time) shall be evaluated based on the Security Analysis taking into account the latest grid information and in line with the methodologies to be defined according to the Articles 75 and 76 of the Regulation (EU) 2017/1485 establishing a guideline on electricity transmission system operation.

7. In accordance with Article 6(4), each TSO of the Italy North CCR may define a list of MNEs. During the RAO, all the available transmission capacity of the MNEs can be used under the condition that MNEs' operational security limits including contingencies are respected. For the case where MNE is already overloaded over its operational limits ina contingency case, 5% of each MNE's respective thermal capacity in contingency case can be made available for the RAO, except for cases where the same percentage exceeding the operational security limits including contingencies was already deployed during D-2 CCC process.

8. Each TSO of Italy North CCR shall inform the coordinated capacity calculator in a timely manner on anychange in its remedial actions within Italy North CCR to ensure an efficient CC.

9. TSOs of the Italy North CCR shall coordinate with each other regarding the use of remedial actions to betaken into account in CC and their actual application in real time operation. The coordination of remedialactions is ensured by the CC methodology.

10. Each TSO of the Italy North CCR and Technical Counterparty shall ensure that the available remedial actions after CC are sufficient to ensure operational security. Furthermore, all TSOs of the Italy North CCR shall ensure that remedial actions agreed in the CC are also made available in the subsequent timeframes. In case multiple market directions are calculated (as, for example, in case of export corner calculation), the remedial actions representing the result closest to market outcome shall be considered in the subsequent timeframes. All TSOs of the Italy North CCR and Technical Counterparties shall in theday-ahead or intraday operational planning, when preparing a remedial action, make sure that cross- border relevant remedial actions agreed in the CC are coordinated pursuant to the processes defined in the methodologies developed according to Articles 75 and 76 of the SOGL Regulation.

Article 9 Intraday capacity calculation

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

2. The TSOs of Italy North CCR shall provide the coordinated capacity calculator with the last updated information on the transmission systems in a timely manner for the CC that is started in the end of D-1.

3. The coordinated capacity calculator shall use the CGM built in accordance with Article 28 of the CACMRegulation no later than 6 months after the implementation of the CGM methodology developed in accordance with Article 17 of the CACM Regulation, provided that the necessary tools are developed, and compatibility is ensured.

4. Before using the CGM built in accordance with Article 28 of the CACM Regulation, the CGM is createdby merging the whole IDCF data set which contains the single IDCF data sets from the participating andnon-participating TSOs.

5. The import direction to Italy is still expected to be the primary market direction. Therefore, a calculationin import direction from all the concerned countries to Italy is always performed. The export capacity from Italy for each border is principally reassessed every year, and this value is used for the daily allocation.
   Due to the increased probability of exports from Italy on one or more borders, the TSOs of the Italy NorthCCR and Technical Counterparties created a roadmap for the implementation of the CC process in export direction from Italy. This includes as well a method for the determination of the most likely market direction based on specific criteria. In case of forecasted exports from Italy on one or more borders, a second, parallel calculation based on this most likely market direction is performed. TSOs of the Italy North CCR and Technical Counterparties shall implement this

capacity calculation process according tothe roadmap provided in Article 13(5).

6. The CC is performed by the coordinated capacity calculator with an iterative process made up of thefollowing steps, these will be repeated until it is not possible to achieve a higher secure level of capacity:
    a. Security analysis on the CGM, considering the constraints defined in Article 6;
    b. RAO to secure the CGM;
    c. In case the CGM is secure, increase of exchanges between Italy and the concerned countries asexplained in Annex I.

7. The purpose of the RAO is to find an optimal set of Remedial Actions to secure the CGM. In case the operational security limits of a CNEC defined in Article 6 are exceeded, Remedial Actions are applied. The final set of Remedial Actions that has the highest positive effect on the congested CNEC without creating any negative impact on other CNECs and MNEs (as defined in Article 6) is chosen based on sensitivities.

8. As long as the temporary solution referred to in Article 6(11) is in place, the resulting capacity is correctedto take into account the constraints associated to voltage profiles and dynamic stability of the Italian system.

9. When the minimum capacity as defined in the day-ahead capacity calculation methodology in accordancewith with the Article 16(8) of the Regulation (EC) 2019/943 is not met in the D-2 timeframe, the coordinated capacity calculator shall ensure that the computed TTC within the intraday timeframe reachessuch minimum capacity level, by using remedial actions committed by Italy North TSOs. In accordancewith Article 16(3) of Regulation (EC) 2019/943, where the available remedial actions are not sufficient to reach the above-mentioned minimum capacities while respecting operational security limits, the coordinated capacity calculator may, as a measure of last resort, set out coordinated actions reducing thecross-zonal capacities accordingly.

10. The minimum capacity pursuant to paragraph 9 shall be 70 % of the transmission capacity respecting operational security limits after deduction of contingencies, except for those for which a derogation has been granted or an action plan to address structural congestions has been set in accordance with the Articles 15 and 16 of the Regulation (EC) 2019/943. In case of such a derogation or action plan, the minimum capacity shall be defined by the decisions on derogations or action plans in accordance with the Regulation (EC) 2019/943. The TSOs of the Italy North CCR affected by such derogations or actionplans shall inform all the NRAs of the Italy North CCR about the values of minimum capacity applicableduring the period covered by the derogation or the action plan.

11. The adjustment for minimum capacity pursuant to paragraphs 9 and 10 is computed as described in the Annex III of D-2 CCC methodology.

12. The coordinated capacity calculator shall define the values of TTC for each hour. These values shall be provided to TSOs of the Italy North CCR and Technical Counterparties on via separate contracts, for validation.

13. In case several coordinated capacity calculators compute the values of TTC for each market time unit inparallel, the minimum value of the computed TTCs is provided to TSOs of the Italy North CCR and Technical Counterparties for validation. The provided value shall ensure maximisation of social welfarewhile respecting operational security constraints. The TSOs of Italy North CCR shall in cooperation with the coordinated capacity calculators deliver a yearly report to the NRAs of Italy North CCR withexplanations on the significant differences in the calculated values.

14. The NTC Calculation for each border is achieved according to the following steps:
    a. TTC Selection: in this sub process, the TTC value is forced to be upper than a minimum value Lower Total Transfer Capacity (LTTC) corresponding to already allocated capacity (ID schedule) plus TRM;
    b. TTC Validation, performed in accordance with Article 9;
    c. Border NTC Calculation: the lowest value provided by the TTC Validation sub process is considered, reduced by the TRM and then split between the borders according to agreed splittingfactors. In this step, the already allocated long-term rights per border are taken into account.

15. In the DA Timeframe, in case a critical grid situation is declared, for adequacy reason, by one or several TSOs of Italy North region, then, an operational procedure (Tense situation procedure) is applied according to the ENTSO-E DA operational procedure for tense situation. In that case, the new NTCs agreed between the whole region to ensure minimum required adequacy, will be the final values of the IDCC process for the hours that the procedure was triggered.

16. In accordance with Article 58 of the CACM Regulation, the coordinated capacity calculator and the TSOsf the Italy North CCR shall ensure that the relevant NEMOs are provided with the validated NTCs for each bidding-zone border of Italy North CCR after application of the reliability margin defined in accordance with Article 5.

17. Discrimination between internal and cross-zonal exchanges is avoided by the proper bidding zones configuration and CNEC selection in accordance with Article 6 based on the methodology described in Annex I.

Article 10 Cross-zonal capacity validation methodology

1. The TSOs of Italy North CCR shall validate the cross-zonal capacities calculated by the coordinated capacity calculator of the Italy North CCR.

2. The coordinated capacity calculator shall make available the common grid model for Italy North CCR for all scenarios for the relevant market time unit to the TSOs of Italy North CCR.

3. TSOs of the Italy North CCR shall validate the cross-zonal capacities calculated by the coordinated capacity calculator with grid model provided in accordance with Article 9(2).

4. In case one of the following situations endangers the operational security, the TSOs of Italy North CCRshall assess and validate a secure capacity value.
    a. Contingencies or critical network elements are missing in the list of CNECs to be monitored inthe CC process;
    b. A mistake in an IGM, GSK or a CGM was found (e.g. a wrong topology);
    c. Unplanned outages or a trip of an element in the respective TSO grid occurred;
    d. An issue with the tools used in the CC process occurred;
    e. Expectation of significant changes in the flow distribution due to high discrepancies between forecast in ID CC and the expected real-time market outcome (e.g. change of net positions or market directions) which are not covered by the statistical uncertainty related to the TRM.
    f. Resulting NTC exceeds thermal limit of cross-border elements

5. Where one or more TSOs of the Italy North CCR do not validate the cross-zonal capacity calculated, theconcerned TSO(s) shall provide the updated amount of cross-zonal capacities for the border(s) consideredand the reasons for the change. The final cross-zonal capacity is the minimum value sent by the TSOs ofthe Italy North CCR.

6. Whenever a TSO of the Italy North CCR reduces the amount of cross-zonal capacity during the validation, the location and amount of the and further details about the reduction shall be stored.

Article 11 Fallback procedures

1. Prior to each CC performed in ID, the TSOs of Italy North CCR shall ensure the coordinated capacity calculator is provided with the already allocated capacities within the day-ahead timeframe.

2. For the CC performed in ID, where an incident occurs in the CC process and the coordinated capacity calculator is unable to produce results within the allotted time for the calculation process, the TSOs of the Italy North CCR shall validate the last coordinated cross-zonal capacities calculated within the day- ahead timeframe. After this validation step, the coordinated capacity calculator or TSOs of the Italy NorthCCR where applicable, shall provide the relevant NEMOs with this coordinated value.

Article 12 Publication of data

1. The TSOs of the Italy North CCR and Technical Counterparties publish the following CC relevant data:
    a. For each reference hour and CNEC:
        i. Timestamp of the associated hour;
        ii. Clear name and EIC code of both CNE and Contingency;
        iii. Maximum flow of a CNE (F_{MAX});
        iv. Reference flow in base case scenario (F_{REF});
        v. Sensitivity used for CNEC selection and computed according to Annex I;
        vi. Final flow at the end of the CC process (F_{NTC});
        vii. Binary indicator whether the CNEC was limiting the NTC domain;
        viii. Zone to Zone PTDF for all the different borders (Italy – France, Italy – Switzerland, Italy – Austria, Italy - Slovenia) computed in the base case scenario ($PTDF_{REF}$);
        ix. Zone to Zone PTDF for all the different borders (Italy – France, Italy – Switzerland, Italy – Austria, Italy - Slovenia) computed at the end of the CC process ($PTDF_{NTC}$);
        x. MACZT within CCR IN (MCCC);
        xi. MACZT outside CCR IN (MNCC);
        xii. Total MACZT;
        xiii. Flow reliability margin (FRM);
        xiv. Flow after long term nomination (F_{LTN});
        xv. Remaining available margin (RAM);
        xvi. Adjustment for minimum RAM (AMR);
    b. For each market time unit and bidding zone:
        i. Forecasted vertical load;
        ii. Forecasted production;
        iii. Forecasted net position;
    c. Adjustment to NTC values to match 70% provisions.

2. For 2020 data defined in paragraph 1(a)(i) – (iii), (vii) and in paragraph 2(b) are provided on a quarterlybasis 10 working days after the end of each quarter.

3. Starting from 2021, all data listed in paragraph 1 are published on a daily basis contemporary to the provision to NEMOs of the cross-zonal capacity values. Until the implementation of a common coordinated CC methodology using flow-based approach referred to in Article 14(3), data defined in paragraph 2(a)(xiii)-(xvi) are populated with null entry values. Until the implementation of a regional process for the adjustment for minimum capacity and CNEC selection referred to in Article 14(4), in case data defined in paragraph 2(a)(iv),(v)(viii)-(xii) is not available, the reporting will be populated with null entry values.

4. As indicated in Article 6(11), as long as the allocation constraint is applied to the results of the calculationperformed by the coordinated capacity calculator, the unconstrained capacity will be published as well. Till the allocation constraint is shifted to the Euphemia algorithm, unconstrained capacity is provided ona quarterly basis (for 2020 along with the data referred in paragraph 3); eventually unconstrained capacityis provided on a daily basis (from 2021 along with the data referred in paragraph 4).

5. For voltage and stability constraints referred to in Article 6(9), TSOs of Italy North CCR publish at leastthe following elements for each market time unit:
    a. the expected total load in the Italian system;
    b. the expected total non-dispatchable production in the Italian system;
    c. the minimum dispatchable thermal generation needed to grant voltage and system stability in theItalian system.

    TSOs of Italy North CCR publish also a feature to provide an estimation of the cross-dependence between the level of the allocation constraint and the parameters listed above.

6. Starting from 1st January 2021 at the latest, all data mentioned in this Article shall be published on one centralized web-platform (e.g. JAO) based on API (application programming interface) interaction. Till end 2020 TSOs of Italy North CCR are allowed to use different solutions: in any of the platforms they intend to use, a document listing which data may be found in which platform shall be published.

Article 13 Reporting

1. In accordance with Article 26(5) of the CACM Regulation, the coordinated capacity calculator shall prepare a report about all reductions called during the validation of cross-zonal capacity, reporting all theinformation mentioned in Article 10(6). The report shall be sent to all the NRAs of Italy North CCR on a quarterly basis 45 working days after the end of each quarter.

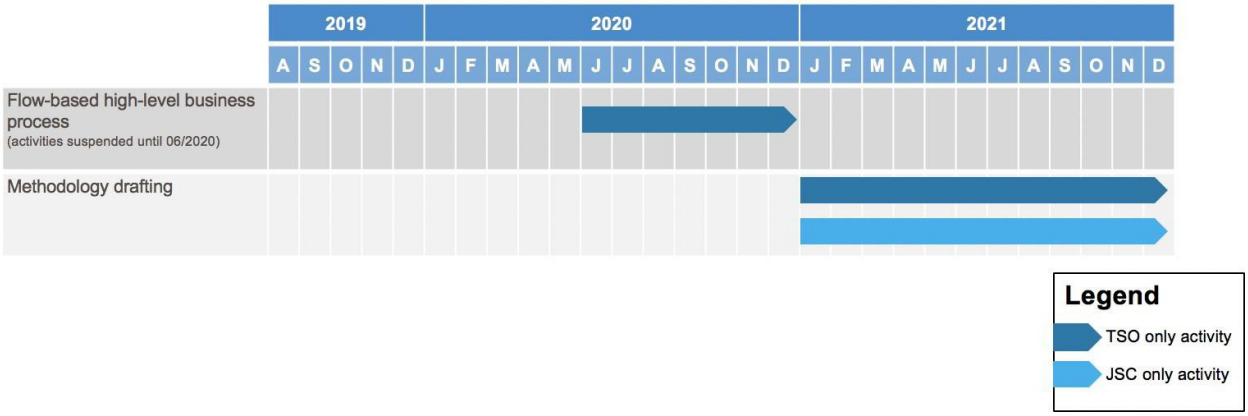
2. In accordance with Article 16(3) of the Regulation (EC) 2019/943, the coordinated capacity calculator shall prepare a report listing all the reductions disposed because of lack of enough remedial actions. Thereport shall be sent to all NRAs and to ACER on a quarterly basis 45 working days after the end of eachquarter.

3. The TSOs of Italy North CCR shall prepare a report listing all the market time units for which a MNE defined in accordance with Article 6(4) has limited the capacity. The report shall be sent to all the NRAsof Italy North CCR on a quarterly basis 10 working days after the end of each quarter starting from the quarter of the export corner calculation go-live.

Article 14 Publication and Implementation of the ID CCC methodology Proposal

1. The TSOs of Italy North CCR shall publish the ID CCC methodology Proposal without undue delay afterall NRAs of Italy North CCR have approved it.
2. The ID CC methodology is used immediately after the approval by the NRAs of Italy North CCR. The individual values for cross-zonal capacity are calculated and offered to the intraday market time units covered by the auction (12h-24h).

3. The TSOs of Italy North CCR shall develop a common coordinated CC methodology using flow-based approach as stated in Article 20(3) of the CACM Regulation. The TSOs of Italy North CCR will submitthis proposal based on the following planning:



The TSOs may adjust this planning due to dependencies with other deliverables: in the case the TSOs shall submit an updated plan to all the NRAs of Italy North CCR, specifying the new planning and the reasons behind the changes. In any case, the TSOs of Italy North CCR shall respect the deadline for submitting the proposal for a common coordinated CC methodology using flow-based approach at the latest within six months after Switzerland joins the single day-ahead coupling, in accordance with Article20(3) of the CACM Regulation.

4. In derogation to what stated in paragraph 2, The TSOs of Italy North CCR shall implement the followingparts of the ID CCC methodology, based on the timeline below:

IDCC	Deadline
Expert Corner Calculation Implementation	29/11/2023
CNEC Selection Implementation	06/05/2021
Regional process for the minimum capacity adjustment Implementation	29/10/2021
Allocation Constraints Adaptation of IDCC process to long term solution	17/02/2022

The TSOs of Italy North CCR shall provide all the NRAs of Italy North CCR with a report about the implementation of the ID CCC methodology according to the timeline above. The report shall be sent on aquarterly basis 10 working days after the end of each quarter.

5. In case TSOs of Italy North CCR cannot match any of the deadlines set in this Article, they shall informall the NRAs of Italy North CCR at least six months before the affected deadline.

Article 15 Language

1. The reference language for this ID CCC Methodology shall be English.

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

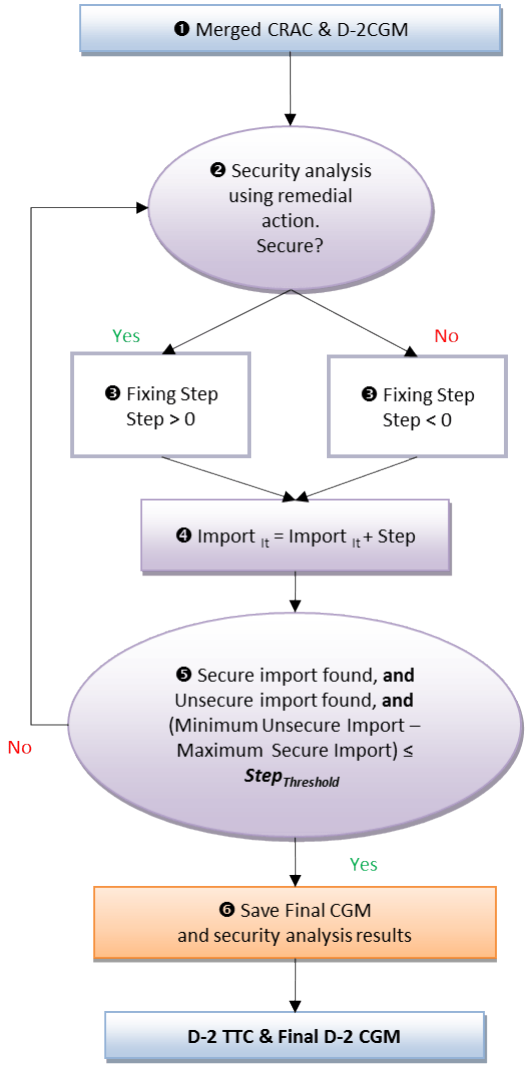
Annex I

Load Flow Algorithm

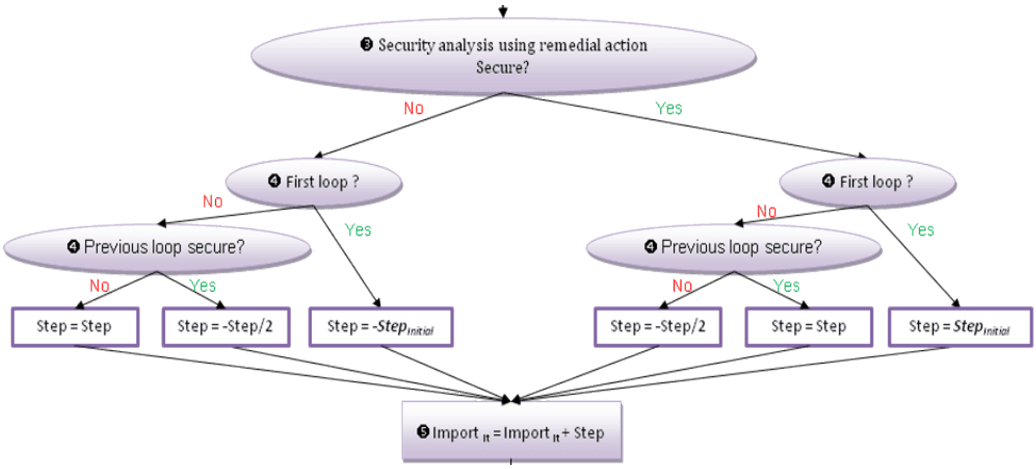
The CC process is performed using Alternate Current (AC) load flow algorithms (available in the technical literature), considering reactive power capability limits of generators.

Iterative Approach for TTC Calculation

The CC step can be described as a calculation by dichotomy. The coordinated capacity calculator will definea starting capacity level and check if this level of exchange allows the transmission system to be operated within its operational security limits (i.e. no overloads are observed on CNECs).
Starting capacity level is equal to the latest available control program of Italy.



If the level is secure or can be made secure by optimizing remedial actions, the coordinated capacity calculatorwill then test a higher value of TTC. Otherwise, it will then test a TTC value in between the secure and unsecure TTC values until it reaches the last secure TTC. Stopping criteria for optimization is finding last secure and first unsecure level of import. Once both are found, last secure import is considered as maximumItalian import.



The dichotomy is set with a 50 MW step in order to optimize the capacity offered to the market while reducingthe computation time. Considering optimal remedial actions have been applied in each step of CC, the dichotomy approach guaranties final solution is less than 50 MW suboptimal compared to absolute maximumItalian import.

PTDF computation for the selection of critical network elements

Critical network elements are selected based on their sensitivity to cross-zonal power exchanges, evaluated through a *PTDF* matrix. The elements of this matrix represent the influence of a commercial exchange between bidding zones on power flows on the considered combinations of CNECs. The calculation of the *PTDFs* matrix is performed on the basis of the CGM and the *GSK*.

The nodal *PTDFs* are first calculated by subsequently varying the injection on each node of the CGM. Forevery single nodal variation, the effect on every CNECs loading is monitored and calculated[1] as a percentage(e.g. if an additional injection of a 100 MW has an effect of 10 MW on a CNEC, the nodal *PTDF* is 10 %). Then the *GSK* translates the nodal *PTDFs* into zonal *PTDFs* (or zone-to-slack *PTDFs*) as it converts the zonalvariation into an increase of generation in specific nodes.

PTDFs can be defined as zone-to-slack *PTDFs* or zone-to-zone *PTDFs*. A zone-to-slack $PTDF_{Ail}$ represents the influence of a variation of a net-position on a CNEC. A zone-to-zone $PTDF_{A->Bi}$ represents the influenceof a variation of a commercial exchange from A to B on a CNEC *i*. The zone-to-zone $PTDF_{A->Bil}$ can be linkedto zone-to-slack *PTDFs* as follows:

$$PTDF_{A->Bil} = PTDF_{A,i} - PTDF_{Bil} \qquad \textit{Equation 1}$$

Zone-to-zone *PTDFs* must be transitory i.e.

$$PTDF_{A->C,i} = PTDF_{A->Bil} + PTDF_{B->C,i} \qquad \textit{Equation 2}$$

The validity of Equation 2 is ensured by Equation 1.

Once all $PTDF_{A->B,i}$ are computed for each element *i*, all the elements which satisfy the condition:

$$PTDF_{FR->IT,i}*SF_{FR-IT} + PTDF_{CH->IT,i}*SF_{CH-IT} + PTDF_{AT->IT,i}*SF_{AT-IT} + PTDF_{SI->IT,i}*SF_{SI-IT} \geq threshold$$

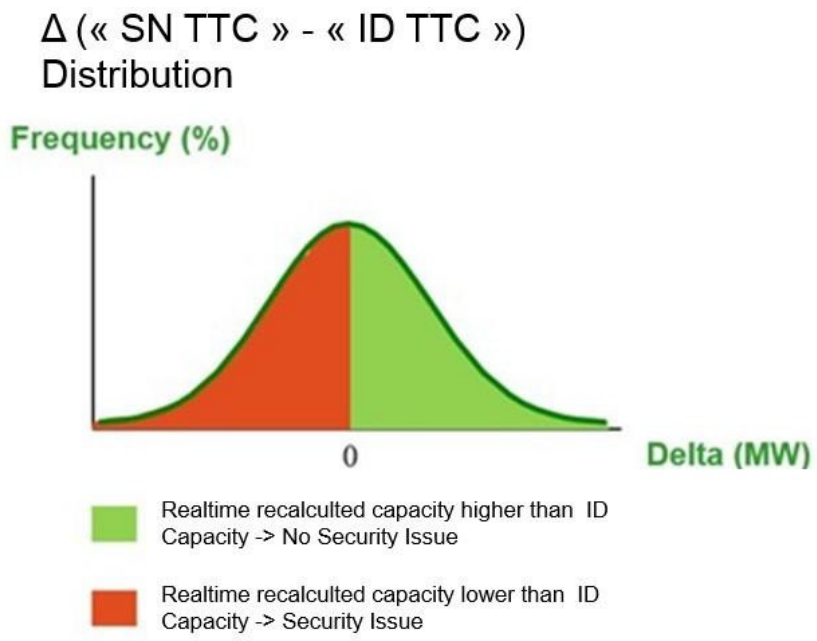
1 In this load flow calculation the variation of the injection of the considered node is balanced by an inverse change of the injection at the slack node.

can be classified as CNEC significantly impacted by cross zonal power exchanges of the Italy North CCR, where $SF_{j\text{-}IT}$ represents the splitting factor for the border j-IT, in line with the shifting methodology applied during CC.

TRM figure computation

The process for the TRM_1 determination could be described as follows:

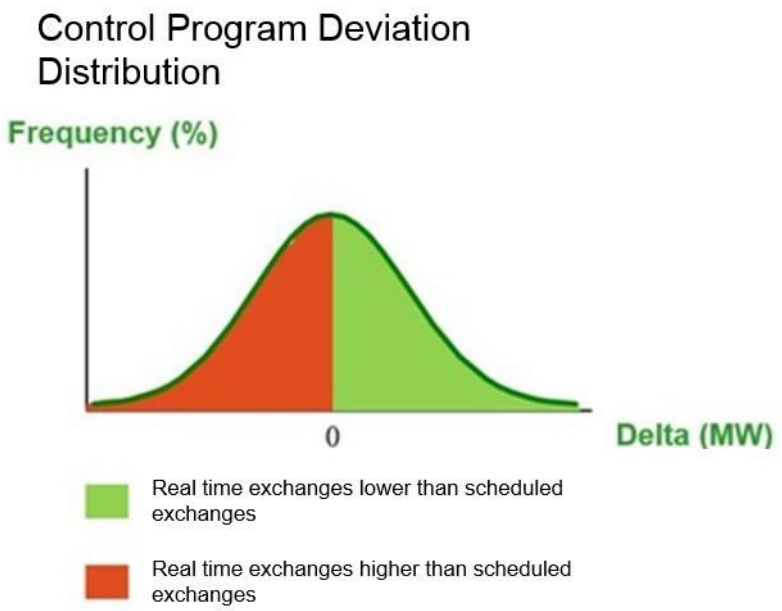
- Step 1: define the statistical period: one full year.
- Step 2: discard the timestamps (TSs) of the statistical period not useful for the study (e.g. TS whereno CC has been performed, etc.).
- Step 3: retrieve the following data for all the selected TS:
  - ID TTC without cap/floor (referred as "TTC ID"),
  - the Real time CGM for the selected TS,
  - reduced Splitting factors.
- Step 4: estimate the TTC on the real time CGM (referred as "TTC RT") selected after step 3 for all the selected TS. The estimation will be based on a linearised approach checking the operational security limits of a fixed set of CNECs. Then compute all the difference between ID and real-time estimated TTCs ("TTC RT" – "TTC ID") and plot those deltas in a distribution curve.



TRM_1= uncertainties of the forecast

The process for the TRM_2 determination could be described as follows:

- Step 1: define the statistical period: one full year.
- Step 2: for the statistical period retrieve the control program error for the Italian control area (difference between the scheduled program and the actual physical exchange at the Northern Italianinterconnection). One minute average values could be used.
- Step 3: plot those deltas in a distribution curve:



TRM_2= unintended deviation

Once TRM_1 and TRM_2 distribution functions have been calculated (f_{TRM1} and f_{TRM2}, respectively) the TRM distribution function (f_{TRM}) can be calculated as convolution of above mentioned distribution functions:

$f_{TRM} = f_{TRM1} * f_{TRM2}$

The TRM shall be defined as the percentile of the convolution of the probability distribution functions of thetwo variables TRM_1 and TRM_2, with risk level kept below 10% (e.g. 90 percentile means 10% risk, 99 percentile 1% risk). When defining the percentile and the risk level, the historical experiences (i.e. TRM of 500 MW) should be taken into account.

Generation and Load Shift Keys

GSK file is defined for:

- an area;
- a time interval: GSK is dedicated to individual daily hours in order to model differences between peak and off-peak conditions per TSO.

Generation and Load shift keys are needed to transform any change in the balance of control area into a change of injections in the nodes of that control area. In order to avoid newly formed unrealistic congestionscaused by the process of generation shift, TSOs define both generation shift key (GSK) and load shift key (LSK), where GSKs constitute a list specifying those generators that shall contribute to the shift and LSKs constitute a list specifying those load that shall contribute to the shift in order to take into account the contribution of generators connected to lower voltage levels (implicitly contained in the load figures of the nodes connected to the 220 and 400 kV grid). Each TSO can decide how to represent its best generation shift.If GSK and LSK are defined, a participation factor is also given:

- G(a) Participation factor for generation nodes
- L(a) Participation factor for load nodes

The sum of G(a) and L(a) for each area has to be to 1 (i.e. 100%).

Definition of GSK and LSK Nodes:

The list of GSK nodes contains one or more node defined by:

- the name of UCTE Node
- the maximum power production of the node (optional for prop and fact, mandatory for the othermethods)
- the minimum power production of the node (optional for prop and fact, mandatory for the othermethods)

Several methods are supported by the process:

- *Proportional:*

Shift in defined generation/load nodes, proportionally to the base case generation/load.

- Pg(n) Active generation in node n, belonging to area a (nodes n defined in GSK list) or
- Pl(n) Active load in node n, belonging to area a (nodes n defined in

LSK list)The participation of node n in the shift, among selected gen. nodes

$$Kg(n,a) = G(a) \cdot \frac{Pg(n)}{\sum_n Pg(n)}$$

(GSK) is given by:

The participation of node n in the shift, among selected load nodes (LSK) is given by:

$$Kl(n,a) = L(a) \cdot \frac{Pl(n)}{\sum_n Pl(n)}$$

- *Participation factors:*

Shift in defined generation/load nodes (PV or PQ nodes), according to the participation factors:

- kg(n) Participation factor for generation in node n, belonging to area a
- kl(n) Participation factor for load in node n, belonging to area a

The participation of node n in the shift, among selected gen. nodes (GSK) is given by:

$$Kg(n,a) = G(a) \cdot \frac{kg(n)}{\sum_n kg(n)}; 0 \leq kg(n) \leq 10$$

The participation of node n in the shift, among selected load nodes (LSK) is given by:

$$Kl(n,a) = L(a) \cdot \frac{kl(n)}{\sum_n kl(n)};\ 0 \leq kl(n) \leq 10$$

- *Reserve:*

All power plants, which are chosen for the shift, are modified proportionally to the remaining available capacity, as presented hereafter in these equations (1) and (2).

$$P_i^{inc} = P_i + \Delta E. \frac{P^{max} - P_i}{\sum_{i=1}^{max} (P_i^{max} - P_i)} \quad (1)$$

$$P_i^{dec} = P_i + \Delta E. \frac{P^{min} - P_i}{\sum_{i=1}^{n} (P_i^{min} - P_i)} \quad (2)$$

Where:

P_i = Actual power production.

P_i^{min} = Minimal power production.

P_i^{max} = Maximal power production.

ΔE = Power to be shifted.

P_i^{inc} = New power production after positive shift.

P_i^{dec} = New power production after negative shift.

- *Merit order*

The chosen generation nodes shift up or down according to the correspondent merit order list GSKup or GSKdown, as described following:

- upward list contains the generation nodes which performs the total positive shift.
- downward list contains the generation nodes which performs the total negative shift.

Merit order factor defines the number of generation node to be shifted simultaneously.
It means that the first group (number defined with Merit order factor) of generating nodes are shifted togetherand if it is not sufficient, the next group generating nodes are used to complete the total shift, and so on.
The total shift is distributed to the last group of Merit order factor generation nodes proportionally to theiravailable margin as defined for Reserve shift.
Generation shift keys in Italy North CCR are determined by each TSO individually on the basis of the latest available information about the generating units and loads.

Activities and timings of the process

The main activities of the process are summarized in the following table:

ID	Activity	Start Time	End Time
001	Italy North TSOs deliver input files to Coordinated Capacity Calculator	-	2:15
002	Quality check of the inputs by the Coordinated Capacity Calculator	2:15	2:40
002	Merge of the inputs, TTC Calculation and transmission of the selected results to Italy North TSOs	2:40	7:00
003	Validation of the results by Italy North TSOs and NTC Calculation	7:00	9:30

The intermediate timings may be subject to adjustments in the future if deemed necessary by Italy North TSOs.

Annex II

Handling of Remedial Actions

The scheme below summarizes the conditions to be fulfilled with this combination of remedial actions to state that all security constraints are respected. Each rounded square represents a different network state.

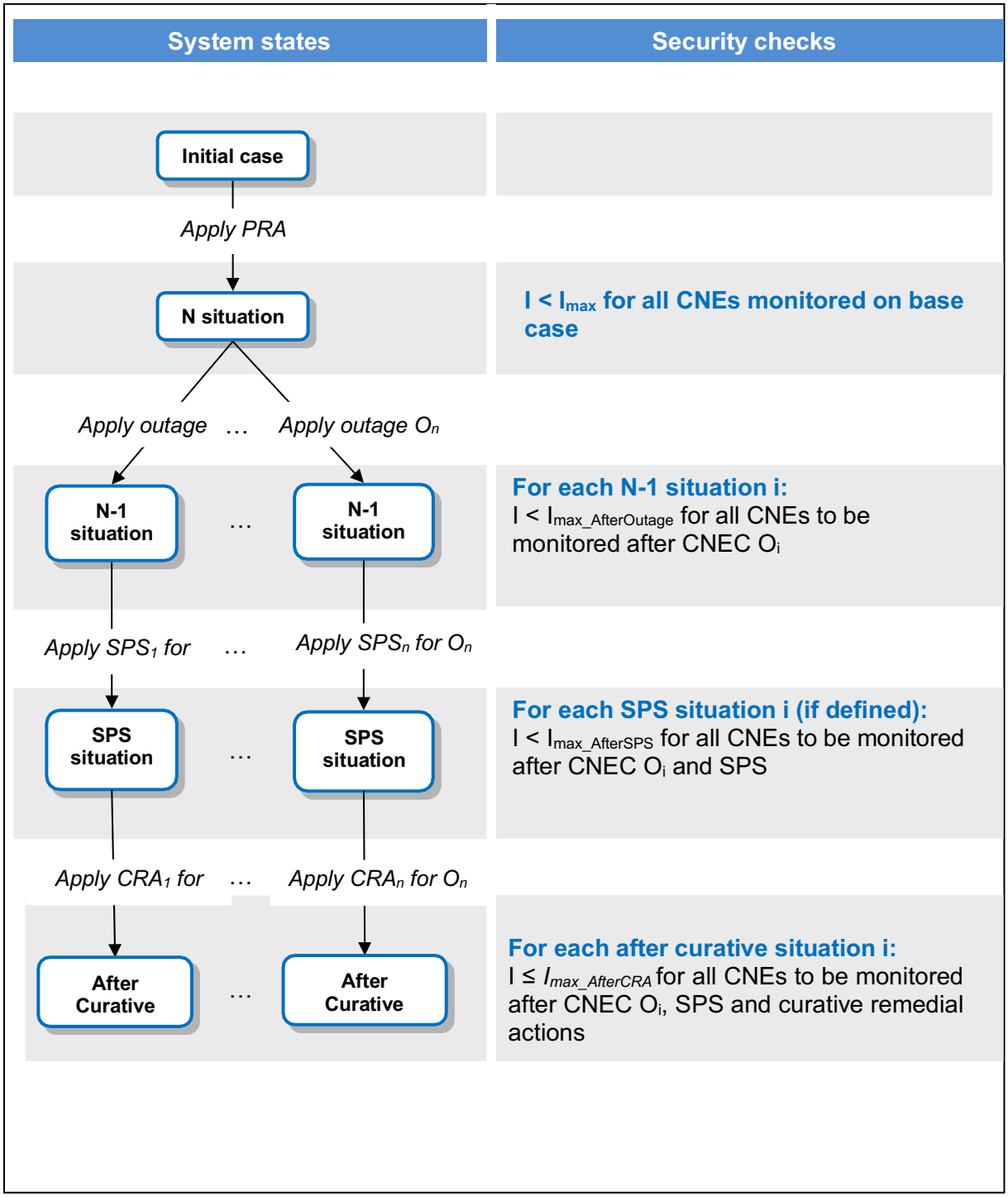
On N state, preventive remedial actions are implemented and Imax of “base case” CNEs are monitored.

On N-1 states, CNECs are applied and Imax_AfterOutage are monitored. They represent transient admissiblecurrent on the monitored branches. Transient current can exceed permanent admissible current provided thatavailable SPS and curative remedial actions are sufficient to keep permanent current not greater than permanent admissible current.

On After Curative states, outage, SPS and curative remedial actions are implemented and Imax_AfterCRA are monitored. They represent permanent admissible current on the monitored branches.

If an outage or a remedial action leads to an unbalance situation due to a modification of generation or load pattern, this unbalance has to be compensated inside the concerned country, by using the GSK of this one.

On SPS states, outage and SPS are applied, Imax_AfterSPS are monitored. Imax_AfterSPS represent transient admissible current on the monitored branches after SPS. Transient current can exceed permanent admissible current, provided that available curative remedial actions are sufficient to keep permanent currentnot greater than permanent admissible.



In order to prevent overloading of network elements that are influenced by the application of cross-border relevant remedial actions during the CC, these network elements can be included as MNEs in the RAO. For each MNE i in a contingency case, the following has to hold:

$$Loading_{after\ RAO,i} \leq max(OL_i; Loading_{before\ RAO,i})$$

$Loading_{before\ RAO\ i}$ … Loading of the MNE in a contingency case (based on maximum thermal capacity)before RAO

$Loading_{after\ RAO\ i}$ … Loading of the MNE in a contingency case (based on maximum thermal capacity) after application of a remedial action during the RAO

OL_i … Represents operational limits of the respective MNE in a

contingency case

In words:
If $Loading_{before\ RAO}$ is over OL_i the $Loading_{after\ RAO}$ cannot become bigger than $Loading_{before\ RAO}$.