Italy North TSOs proposal for coordinated redispatching and countertrading methodology in accordance with Article 35 of Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management

February 2019

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TSOs of the Italy North Region taking into account the following:

Whereas

(1) Commission Regulation (EU) 2015/1222 establishes a guideline on capacity allocation and congestion management (hereafter referred to as the "CACM Regulation"), which entered into force on 14 August 2015.

(2) This document is a common proposal developed by all Transmission System Operators (hereafter referred to as "TSOs") of the Italy North Capacity Calculation Region (hereafter referred to as "Italy North Region"), as defined in accordance with Article 15(1) of Regulation (EU) 2015/1222 on Capacity Allocation and Congestion Management (the "CACM Regulation"), for the methodology for coordinated redispatching and countertrading (hereafter referred to as "RD and CT methodology"). This proposal is required by Article 35(1) of the CACM Regulation.

This proposal takes into account the effective structure of the grid by establishing TSO-TSO based contractual frameworks to include Third Countries as Technical Counterparties. Therefore, this proposal is developed by TSOs of the Italy North Region, taking into account Technical Counterparties' grid elements.

(3) This proposal takes into account the general principles and goals set in CACM Regulation.

(4) Ensuring optimal use of the transmission infrastructure and 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 of Third Countries' remedial actions in the countertrading and redispatching processes of Italy North Region. CACM Regulation's objectives cannot be achieved in any other way but by including Third Countries' remedial actions. 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 will include Third Countries as Technical Counterparties.

(5) Capacity Calculation Coordinators (hereafter referred to as "CCC"), will take into account the whole Area of Common Interest (hereafter referred to as "ACI") of the Italy North Region and include Technical Counterparties' remedial actions into the optimization procedure. TSOs of Italy North Region will conclude an agreement with relevant Technical Counterparties. In order to be taken into consideration in the countertrading and redispatching processes and enter into a TSO-TSO based 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 Regulation 2015/1222. This agreement will include this methodology's provisions and ensure that Technical Counterparty is contractually bound by the same obligations as the ones binding upon Italy North TSOs by virtue of EU Regulations. Such agreement will govern mutual obligations and responsibilities of Technical Counterparty with Italy North TSOs in relation to the RDCT procedure on all elements of the ACI. This agreement will ensure availability of Technical Counterparties' costly and non-

costly remedial actions in the optimization procedure as well as participation of Technical Counterparty in the cost sharing of RDCT costs for solving congestions on the ACI.

(6) Article 35(1) of CACM Regulation requires that *"the proposal on coordinated redispatching and countertrading shall be subject to consultation in accordance with Article 12"*. The Italy North RD and CT methodology Proposal was consulted from 23/02/2018 until 23/03/2018 in accordance with Article 12 of CACM Regulation.

(7) Article 9 (9) of the CACM Regulation requires that the proposed timescale for the implementation and the expected impact of the Italy North RD and CT methodology Proposal on the objectives of the CACM Regulation is described. The impact is presented below (point (8) of this Whereas Section).

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

Article 3 (a) of the CACM Regulation aims at promoting effective competition in the generation, trading and supply of electricity. The Italy North RD and CT methodology Proposal serves the objective of promoting effective competition in the generation, trading and supply of electricity by defining a set of harmonized rules for effectively relieving physical congestion at the minimum cost.

Article 3 (b) of the CACM Regulation aims at ensuring optimal use of the transmission infrastructure. The Italy North RD and CT methodology Proposal contributes to achieve the objective of ensuring optimal use of the transmission infrastructure by using last available inputs based on the best possible forecast of transmission systems and market results at the time the security monitoring is performed for the detection of Coordinated Redispatching and Countertrading needs.

Article 3 (c) of the CACM Regulation aims at ensuring operational security. The Italy North RD and CT methodology Proposal contributes to achieve the objective of ensuring operational security by coordinating the Redispatching and Countertrading at regional level to ensure its reliability and effectiveness for all the TSOs.

Article 3 (d) of the CACM Regulation aims at optimizing the calculation and allocation of cross-zonal capacity. The RD and CT methodology Proposal contributes to achieve the objective by defining the rules for detecting and activating coordinated Redispatching and Countertrading contributing to ensure the availability and firmness of the capacity and by integrating the timings of the Coordinated Redispatching and Countertrading process into the timings of the Capacity Calculation process steps for different timeframes.

(9) Coordinated Countertrading is by definition limited to relieve physical congestions by means of a cross zonal exchange initiated by system operators between two bidding zones. TSOs may also agree on other cross-zonal exchange procedure for reasons other than relieving physical congestions. Such arrangements are not within the scope of this RDCT methodology Proposal.

(10) The RD and CT methodology Proposal shall also consider the requirements of the SOGL Regulation, especially the interrelation with Articles 75 and 76 of this Regulation.

(11) In conclusion, the RD and CT methodology Proposal contributes to the general objectives of the CACM Regulation.

SUBMIT THE FOLLOWING COORDINATED REDISPATCHING AND COUNTERTRADING METHODOLOGY PROPOSAL TO THE NATIONAL REGULATORY AUTHORITIES OF THE REGION:

Article 1
Subject matter and scope

The RD and CT methodology as determined in this Proposal is the common proposal of all TSOs of the Italy North Region in accordance with Article 35 of the CACM Regulation. In line with the capacity calculation methodology defined for the same Capacity Calculation Region, Technical Counterparties can be involved in the processes described in this methodology. Technical Counterparties will set up separate contracts, provided that they fulfil the requirements set up in 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*".

Article 2
Definitions and interpretation

1. For the purposes of this RD and CT methodology Proposal, the terms used shall have the meaning set forth in Article 2 of Regulation (EC) 714/2009, Article 2 of Regulation (EC) 543/2013, which amends the previous, Article 2 of Regulation (EC) 2015/1222 and Article 3 of SOGL Regulation.
2. In addition, the following definitions shall apply:
   a. 'APG' is the Austrian Transmission System Operator;
   b. 'Area of Common Interest' (hereafter referred to as 'ACI') constitutes of the list of critical network elements, used in the capacity calculation process, whose congestions will be monitored and can be efficiently solved via the coordinated Redispatching and Countertrading;
   c. 'ELES' is the Slovenian Transmission System Operator;
   d. 'RTE' is the French Transmission System Operator;
   e. 'Sensitivity of a critical network element to a resource' means the variation of the flow over one critical network element with a change of 1MW of resources activated;
   f. 'Technical Counterparty' means any non-EU TSO to be included in procedures of this methodology through respective agreements;
   g. 'Third Country' means country from jurisdiction outside the area referred to in Article 1(2) of CACM Regulation;
   h. 'Terna' is the Italian Transmission System Operator.
3. In this RD and CT methodology Proposal, unless the context requires otherwise:
   a. the singular indicates the plural and vice versa;
   b. headings are inserted for convenience only and do not affect the interpretation of this proposal; and
   c. any reference to legislation, regulations, directives, orders, instruments, codes or any other enactment shall include any modification, extension or re-enactment of it when in force.

Article 3
Application of this proposal

This proposal applies solely to the methodology for coordinated redispatching and countertrading within Italy North Region. For the avoidance of doubt this proposal applies to any relevant Technical Counterparty of the Italy North Region.

Article 4

Area of Common Interest (ACI) and definition of Cross-Border Relevance

1. The RD and CT methodology shall include actions of cross-border relevance.
2. An action of cross-border relevance or a cross-border relevant remedial action is a remedial action that relieves a congestion on a network element of cross-border relevance. A network element of cross-border relevance is a critical network element as defined in the Italy North TSOs' proposals for coordinated capacity calculation methodologies in accordance with Article 21 of CACM Regulation. Other cross border impacting remedial actions will be coordinated according to the methodologies required by Articles 75 and 76 of SOGL Regulation.
3. The RD and CT methodology shall enable all TSOs of the Italy North Region and relevant Technical Counterparties to effectively relieve physical congestion on ACI, irrespective of whether the reasons for the physical congestion fall mainly outside their control area or not. The coordination of redispatching and countertrading for the elements which are not part of the ACI is going to be defined with methodologies to be defined according to the SOGL Regulation. The ACI as defined in this methodology is the same list of elements used in capacity calculation (referred to also as Critical Network Elements or CNEs) in order to ensure consistency between different methodologies and timeframes and to safeguard the secure operation of the systems in the Region and to guarantee optimal use of the transmission infrastructure and the availability and firmness of the capacity. For avoidance of doubt, ACI includes also such grid elements of third countries which are part of the ACI in the Italy North TSOs' proposal for coordinated capacity calculation methodologies in accordance with Article 21 of CACM Regulation. In the scope of this RD and CT methodology Proposal, the extent of the ACI is possibly reduced by evaluating the effect of redispatching and countertrading on all its elements. Elements not or lowly affected by redispatching and countertrading are removed from the ACI.
4. The influence of the application of countertrading and redispatching in one or more TSOs or Technical Counterparties control areas is considered on all the flows of the elements of the ACI irrespective of whether they are inside or outside those TSOs or Technical Counterparties control areas.
5. The interaction of ACI with other capacity calculation regions will be in line with methodologies to be defined according to the SOGL Regulation.

Article 5
Resources for redispatching and countertrading

1. Each TSO or Technical Counterparty may redispatch all available generation units and loads in accordance with the appropriate mechanisms and agreements applicable to its control area, including interconnectors.
2. Each TSO or Technical Counterparty shall define for each time-frame its resources available for redispatching and countertrading and their prices. The available volumes of a TSO or Technical Counterparty shall not compromise the provision of ancillary services and not endanger the security of supply of its control area while maintaining its system in Normal state. The resources will be defined for two different services:
   a. increasing the control area balance or nodal injection (e.g. increasing generation/decreasing load);
   b. decreasing the control area balance or nodal injection (e.g. decreasing generation/increasing load).
3. Depending on the mechanisms and agreements applicable to its control area, each TSO or Technical Counterparty shall provide the actual prices of the redispatching and countertrading resources available in its control area or the best estimation of the incurred costs calculated transparently.

4. As regarding redispatching, each TSO or Technical Counterparty commits to activate localized units (generation/load).

5. As regarding countertrading, each TSO or Technical Counterparty commits to activate resources for a total amount without any commitment on the localized units (generation/load) which will be activated according to the merit order and the mechanisms and agreements applicable to its control area.

Article 6
Overall process for coordinated redispatching and countertrading

1. The methodology for coordinated redispatching and countertrading shall enable all TSOs of the Italy North Region and any relevant Technical Counterparty to effectively relieve physical congestion on the elements of the Area of Common Interest (ACI), irrespective of whether the reasons for the physical congestion fall mainly outside their control area or not.

2. The coordinated redispatching and countertrading actions shall be decided after all other available and effective non-costly actions (e.g. grid topology variations, coordinated use of PSTs) have been coordinated and if network elements within the ACI are still congested.

3. The coordination of remedial actions shall be harmonized and complemented in accordance with the methodologies of Articles 75 and 76 of the SOGL Regulation. The impact of cross-border relevant remedial action on elements outside the Area of Common Interest and its coordination shall be assessed within the coordinated security analysis methodology in accordance with Articles 75 and 76 of the SOGL Regulation.

4. TSOs or Technical Counterparty shall provide information about their available non-costly actions for congestion relieving in Italy North Region. Those actions shall be assigned exclusively to the Italy North Region only and shall not be used by other capacity calculation regions unless a cross-regional coordination between capacity calculation regions is established.

5. The coordinated redispatching and countertrading actions shall be activated by the corresponding TSOs or Technical Counterparty after the following preliminary coordinated processes:
   a. Coordinated security monitoring of the ACI performed by the CCC and identification of the congested grid element belonging to the ACI by the CCC. This process shall be complemented and harmonized with the one to be defined in accordance with Articles 75 and 76 of the SOGL Regulation;
   b. Coordination of the available non-costly remedial actions for relieving or reducing congestions on the elements of the ACI with the support of the CCC. This process shall be complemented and harmonized with the one to be defined in accordance with Articles 75 and 76 of the SOGL Regulation.

6. The selection of redispatching and countertrading resources shall be performed with the objective to minimize the overall estimated cost for the TSOs of the Italy North Region and for relevant Technical Counterparties. The estimated cost shall be calculated as the sum of the products of activated resources multiplied by their prices. The volume of each activated resource shall not exceed the volume available of that resource. The sum of all activated resources shall be zero (the system shall remain balanced). The activation of redispatching and countertrading resources shall lead to a situation where no element of the ACI is congested without raising overload in any other part of the system. This shall be achieved by evaluating the impact of activated resources for each element of the ACI as the sum of the products of the activated resources multiplied by the sensitivities of the element to the resources.

7. The redispatching and countertrading resources which have been decided by TSOs and Technical

Counterparties at the end of the coordination process shall be included in the common grid model as required by the respective methodologies for following coordinated security analysis.

8. A TSO or Technical Counterparty has the possibility to decline the activation of a redispatching and countertrading resources proposed by the CCC. The TSO or Technical Counterparty has to justify his rejection and should propose another remedial action to relieve the congestion on the grid element, which has to be verified by the CCC and validated by the other TSOs and Technical Counterparties.

Article 7
Fast activation process for sudden critical situations

1. In case of sudden critical situations (such as, but not limited to, an unplanned outage in real time or a relevant forecast error), that lead to overloads on ACI elements and requires fast actions, which cannot be effectively and promptly treated with the Regular process described in Article 6, a Fast Activation process for coordinated redispatching and countertrading will be adopted in order to cover the time horizon until the Regular process described at Article 6 can be applied effectively.
2. The Fast activation process is meant to be called in real time, or very close to it. The details about the timings of the process will be defined during the implementation phase, as an example, it could be called within a time window of half an hour before the next hour starts; its need may be justified by security violations which were not detected during the preceding regular processes.
3. The Fast Activation process for coordinated redispatching and countertrading shall also be considered as a fallback where coordination through the CCC is no longer possible due to an insufficient time and in any case the Regular process described at Article 6 could not be properly applied (e.g. missing data, tools failure).
4. The Fast Activation process for coordinated redispatching and countertrading would be activated by one or more TSOs of the Italy North Region or by a Technical Counterparty who identify overloads on ACI elements during the security monitoring of their own grids which is regularly performed by TSOs or Technical Counterparty in the framework of their operational activities and responsibilities.
5. Before activating the coordinated redispatching and countertrading with the Fast Activation process, the TSOs of the Italy North Region and Technical Counterparties shall coordinate the available non-costly remedial actions for relieving or reducing congestions on the elements of the ACI, without raising overload in any part of the system
6. After the available non-costly remedial actions have been considered, the redispatching and countertrading resources needed to be activated to relieve the remaining congestions on the elements of the ACI shall be selected;
7. Considering the application of this process should be very infrequent, being linked to extraordinary and unusual events, and that it must be characterized by fast activation and additional flexibility the coordination and calculation of resources may be performed by a TSO or Technical Counterparty instead of the CCC and it may be possible that not all remedial actions available are considered because there is not enough time to evaluate their impact. At least bilateral coordination and information to other TSOs and Technical Counterparties shall be guaranteed, and mostly countertrading could be considered due to its flexibility.

Article 8
Timeframes for coordinated redispatching and countertrading application

1. The RD and CT methodology shall enable the TSOs and Technical Counterparties to relieve physical congestion in all the time frames of the day of delivery.
2. The process for coordinated redispatching and countertrading for each time frame of the delivery day shall start after the day-ahead market results for that day are available and it is possible for the TSOs and Technical Counterparties to forecast the physical congestions on the ACI elements. The first session of the process for coordinated redispatching and countertrading for all time frames of the delivery day shall be finished before the start of the delivery day.
3. The process for coordinated redispatching and countertrading shall be repeated where needed during the day of delivery, for the remaining time frames of the same day, when the intraday market results are available, and it is possible for the TSOs and Technical Counterparties to forecast the physical congestions on the ACI elements.
4. Considering there may be inaccuracies in the congestion forecasts and that they should diminish getting closer to the real time they refer to, the TSOs of the Italy North Region and relevant Technical Counterparties may decide to postpone the actual activation of the redispatching and countertrading resources, necessary to relieve physical congestion on the elements of the ACI in a time frame, when a subsequent process for coordinated redispatching and countertrading is foreseen for the same time frame.
5. All the time frames may be covered by the Fast activation process of Article 7 when the Regular process of Article 6 cannot be applied effectively.

Article 9
Total costs calculation

1. The methodology for coordinated redispatching and countertrading minimizes the total expected costs for physical congestion relieving on the elements of the ACI.
2. The total expected costs to be minimized shall be calculated based on the prices of the resources declared by the TSOs and Technical Counterparties as defined in Article 5.
3. Considering the interrelation with Articles 75 and 76 of the SOGL Regulation which have the objective to coordinate and optimize resources within regions, the TSOs of the Italy North Region and relevant Technical Counterparties shall harmonize the proposed methodology for Coordinated redispatching and countertrading with the methodologies to be defined in accordance to SO GL.
4. The actual total costs of the coordinated redispatching and countertrading shall be calculated based on the costs the TSOs of the Italy North Region and relevant Technical Counterparties incurred at the activation of the actual resources.

Article 10
Publication and Implementation of the coordinated redispatching and countertrading methodology Proposal

1. The TSOs of Italy North Region shall publish the RD and CT methodology Proposal without undue delay after relevant national regulatory authorities have approved the proposed coordinated redispatching and countertrading methodology or a decision has been taken by the Agency for the Cooperation of Energy Regulators in accordance with Article 9 (10), Article 9 (11) and 9 (12) of the CACM Regulation.
2. The implementation of this RD and CT Methodology is subject to:

a. Regulatory approval of this RD and CT methodology in accordance with Article 9 of the CACM Regulation;
b. Regulatory approval of the Italy North TSOs' proposal for a redispatching and countertrading cost sharing methodology required by Article 74 of the CACM Regulation in accordance with Article 9 of the CACM Regulation;
c. Regulatory approval of the Italy North TSOs' proposal for a common coordinated capacity calculation methodology required by Article 21 of the CACM Regulation in accordance with Article 9 of the CACM Regulation and its implementation;
d. Development of the systems required to support the RD and CT methodology.

3. Considering the interrelation with Article 75 and 76 of the SOGL regulation, the TSOs of the Italy North Region shall subject the implementation of this RD and CT methodology to the approval of the methodologies according to articles 75 and 76 of SO GL and its implementations in order to have harmonized methodologies and processes.

4. The TSOs of Italy North Region shall implement this RD and CT methodology no later than 24 months after the conditions specified Article 10(2) and Article 10(3) are fulfilled. The TSOs of Italy North will revise this RD and CT methodology and submit it to the national regulatory authorities for approval once more details about the algorithm and other pending issues are available.

Article 11
Language

1. The reference language for this RD and CT methodology Proposal shall be English.

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

Article 12
Confidential treatment of information

1. The information and data handled during the redispatching and countertrading process is sensitive and should on this basis be treated as confidential. As a result, all information gathered, analysis performed and other data available to the involved Parties are deemed confidential and shall be managed in accordance with Article 13 of CACM Regulation and procedure to ensure its protection.

2. The information provided by generation units and loads or any other relevant costs for calculating the countertrading cost shall be shared between the relevant TSOs for countertrading purposes only, including reporting and monitoring obligations defined within the methodology of Article 74(5) of CACM Regulation.

3. The parties will prepare ad hoc non-disclosure agreements.

Annex

Objective function for the optimization of countertrading and redispatching resources

In case redispatching and/ or countertrading is necessary, the resources to be activated are selected with the objective to recover every security violation in the ACI at the minimum estimated cost and without raising overload in any other part of the system. Generations/loads will be shifted in the grid model until there are no more violations after having considered the effects of the Remedial Actions (both preventive and curative) identified in the steps before. The selection of generations/loads to be shifted to minimize the estimated cost for the Parties will be performed via an optimization algorithm1. This algorithm will take into account the sensitivities of the overloaded elements on all the resources made available by the TSOs and relevant Technical Counterparties (in line with Article 5)and their declared prices.

Without going into the details, which shall be defined during the implementation phase, the algorithm can be summarized as follows:

$$\min\left(\sum \Delta P_i \cdot p_i\right)$$

$$P_e + \sum \Delta P_i \cdot \sigma_{e,i} \leq P_{e,max}\,, \forall e \in ACI$$

$$P_e + \sum \Delta P_i \cdot \sigma_{e,i} \leq \max(P_e, P_{e,max})\,, \forall e \in other\ elements$$

$$\sum \Delta P_i = 0$$

$0 \leq \Delta P_i \leq P_{i,max}$ for upward resources

$P_{i,min} \leq \Delta P_i \leq 0$ for downward resources

Where:

- ΔP_i is the activated amount of the resource i;
- p_i is the price of the resource i;
- $P_{i,max}$ is the available volume of the upward resource i;
- $P_{i,min}$ is the available volume of the downward resource i (considered as negative);
- $\sigma_{e,i}$ is the sensitivity of the generic element e to the generic resource i;
- P_e is the power flow on the element e (it may be in N or N-1 situation depending on the congestion detected);
- $P_{e,max}$ is the maximum power admissible on the element e (it may be in N or N-1 situation depending on the congestion detected).

During this optimization phase, the optimization algorithm may consider at the same time redispatching and countertrading resources (in fact both are finally expressed in terms of power infeed change at a defined price) and its final outputs will be:

- a list of shifted generations/loads with their prices, amounts and type (for redispatching).
- the amounts of countertrading and their prices.

[1] A detailed definition of this optimization algorithm will be part of an implementation project

- the estimated cost.

Therefore, the outcome could be the selection of a mix of resources of redispatching and countertrading at the same time. The detailed activation of the resources for redispatching and/or countertrading will be performed by TSOs and Technical Counterparties considering that:

- the specific redispatching units selected by the algorithm shall be activated for exactly the selected amounts;
- for countertrading, each TSO or Technical Counterparty will activate enough internal resources to match with the volume of countertrading selected by the algorithm in accordance with the appropriate mechanisms and agreements applicable to its control area.

During the implementation phase, the TSOs and Technical Counterparties will define rules for cancelling or reducing the amount of energy already defined during the redispatching and countertrading process, when it is respectively not considered necessary anymore or for a smaller level of congestion.

18th February 2019

Letter of Intent for participation in the Coordinated Redispatching and Countertrading and the respective cost-sharing methodology proposed by TSOs of the Italy North CCR on the 18th of February 2019 in accordance with Article 35 and 74 of CACM

Swissgrid herewith expresses its strong intent to participate as a Technical Counterparty in the Coordinated Redispatching and Countertrading methodology as well as the related cost-sharing as proposed by TSOs of the Italy North CCR on the 18th of February 2019. In the framework of these methodologies, Swissgrid is willing to accept equal obligations, rights and responsibilities as TSOs of Italy North CCR.

Swissgrid will sign separate contracts with all TSOs of the Italy North CCR, which will define mutual rights and obligation of Swissgrid and TSOs of the Italy North CCR. The content of such agreements will be aligned with the content of the Coordinated Redispatching and Countertrading methodology proposed by TSOs of the Italy North CCR on the 18th of February 2019 in accordance with Article 35 of CACM.

Swissgrid understands that it is of mutual interest of both the Italy North CCR TSOs and the Swiss TSO, that congestions in the Italy North CCR are efficiently eliminated in order to eensure optimal use of the transmission infrastructure and operational security, as provided by Article 3 of CACM Regulation. The inclusion of Swissgrid is in line with Article 13 SOGL, 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.

Therefore, Swissgrid will offer available non-costly and costly remedial actions in Switzerland to TSOs of the Italy North CCR in order to support efficient and least costly measures to solve congestions on the elements of the Area of Common Interest in the Italy North CCR. Those remedial actions will be assigned exclusively to the Italy North CCR only and will not be used by other CCRs unless a cross-regional coordination between CCRs is established.

With respect to the Cost Sharing, Swissgrid intends to participate in a balanced, fair and equal sharing of overall costs by all TSOs of Italy North for resources activated by Italy North CCR and Swissgrid in the framework of the Coordinated Redispatching and Countertrading methodology proposed by Italy North CCR in accordance with Article 74 of CACM. It being understood that a balanced, fair and equal cost sharing will be in line with the objective of the EU Regulations to share RD & CT costs equally and such treatment and principles extend to Swissgrid via the aforementioned contracts concluded with TSOs.

Swissgrid Ltd

Explanatory note to the Italy North TSOs proposal for a coordinated redispatching and countertrading methodology in accordance with Article 35 of Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management

February 2019

Disclaimer: This document is submitted by the TSOs of the Italy North region for information and clarification purposes only accompanying the TSOs' proposal for Coordinated Redispatching and Countertrading methodology in accordance with Article 35 of Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management.

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1. Introduction

This document provides a technical description of the methodology for coordinated redispatching and countertrading affecting the borders of the capacity calculation region (CCR) Italy North and complement the document with the methodology proposal submitted to the national regulators of the region for approval. Considering the structure of the grid, and in line with the capacity calculation principles defined for the same CCR, also the border Italy North – Switzerland is included in the scope of this methodology, in line with what is explained in paragraph 13 and justified in Annex 3. The participating TSOs to the coordinated redispatching and countertrading are therefore Terna (Italy), RTE (France), APG (Austria), ELES (Slovenia) and any technical counterparties.

The proposed methodology follows the Article 35 of the COMMISSION REGULATION (EU) 2015/1222 of 24 July 2015 establishing a guideline on Capacity Allocation and Congestion Management (CACM) and:

- Provides the principles for a common methodology for coordinated redispatching and countertrading;
- Paves the way to a future pragmatic implementation of the redispatch and countertrading processes, which will follow after the approval by the relevant Authorities of the present methodology.

2. Definitions and acronyms

This chapter deals with detailed definitions and interpretations to be used in the scope of the countertrading and redispatching common methodology, and the timeframes in which its different processes apply (with different purposes, such as guarantee firmness of capacity, emergency delivery, etc.). Before developing a glossary, a unique definition of the following acronyms is necessary:

ACI: Area of Common Interest

CNEC: Congested Network Element Contingency

CC: Capacity Calculation

CCC: Coordinated Capacity Calculator

CGM: Common Grid Model

CRA: Curative Remedial Action

CRAC: Contingencies, Remedial actions, Additional Constraints

CT: Counter Trading

D2CC: D-2 Capacity Calculation

DACF: Day Ahead Congestion Forecast

GSK: Generation Shift Key

IDCC: Intra Day Capacity Calculation

IDCF: Intra Day Congestion Forecast

PRA: Preventive Remedial Action

PST: Phase Shifting Transformer

RA: Remedial Action

RD: ReDispatching

RDCT: ReDispatching Counter Trading

RSC: Regional Security Coordinator

SCOPF: Security-Constrained Optimal Power Flow

SN: Snapshot

SO GL: System Operations Guide Line on Electricity Transmission System Operations

TSO: Transmission System Operator

On the base of these definitions, the Parties developed a shared glossary aimed at reaching a common understanding on the matter. For the avoidance of doubt, following definitions and interpretations do not replace any provision of national or European law that may apply to any of the Parties. They shall comply with and be complementary to the applicable regulations. In case of contradictions between these definitions and interpretations and the applicable law its provisions shall be interpreted in line with the applicable regulations or amended accordingly.

Area of Common Interest (ACI)	A detailed definition is given in chapter 3.
Aggregated Netted External (ANE) Schedule	Means a Schedule representing the netted aggregation of all External TSO Schedules and External Commercial Trade Schedules between two Scheduling Areas or between a Scheduling Area and a group of other Scheduling Areas.
Cross-border relevant Remedial Action	A detailed definition is given in chapter 3.
Economically efficient multilateral remedial actions	Means actions which are taken among different TSOs (at least three) with a goal to relieve the critical situation while minimizing the activation costs (in the moment of activation) and taking into account the influence of measure on the critical network element(s).
Internal relevant Remedial Action	Means a remedial action which is performed with the goal to relieve a constraint(s) without XB-Relevance.
Internal Commercial Trade (ICT) Schedule	Means a Schedule representing the commercial exchange of electricity within a Scheduling Area between different Market Participants or between Nominated Electricity Market Operators and Market Coupling Operators.

Multilateral remedial actions	Means actions which are taken among different TSOs (at least three) and used to solve xb-relevant security violations.		
Redispatching/Countertrading Measures	Defines all the different type of measures, modifying the injection of one or more power plants, taken to ensure system security and firmness of Capacity and Exchange Programs on and around the border of countries. All the Redispatching Measures can be applied bilaterally or among several TSOs.		
	Countertrading	This Redispatch Measure is a TSO-initiated transaction between two control areas in order to relieve a congestion between these two areas. The location in the two control areas where the increase or decrease of energy takes place is arbitrary, in the sense that it is not a specific action on a predefined generation unit, but rather a choice based on the merit order or any other location-independent method if such exists. This measure implies the modification of schedule.	
	Redispatching (National redispatching)	This Redispatch Measure is about increasing (decreasing) the level of production of a designated generation unit in one country (control area) and decreasing (increasing), by the same volume, the level of production of another designated generation unit located in the same country (control area), aiming to relieve a constraint in one control area (the affected generation units are mainly selected based on their sensitivity on that constraint). There are two distinct types of Redispatching, Internal Redispatching and External Redispatching and, both these types imply no modification of schedule between TSOs.	
		Internal Redispatching	This Redispatch Measure is implemented when a TSO decides to do Redispatching in its own country.

		External Redispatching	This Redispatch Measure is implemented when TSO A requests TSO B to do Redispatching in country B in order to relieve constraints in country A.
	Cross Border Redispatching	This Redispatch Measure is about increasing (decreasing) the level of production of a designated generation unit in country A and decreasing (increasing), by the same volume, the level of production of another designated generation unit in country B. To that end, TSO A increases or decreases the production by activating upward or downward offers based on both the location and costs of the generation units and TSO B counteracts in his country. In detail, generating units are mainly selected based on their sensitivity on the constrained element (and not only according to the economical merit order). Moreover at the same time, the TSO will have to initiate a transaction between the two control areas, corresponding to the amount of generation Redispatching done in each country. This measure implies the modification of schedule between TSOs.	
Schedule	Means a reference set of values representing the Generation, consumption or exchange of electricity between actors for a given time period.		
Remedial action (RA) (according to UCTE Operational Handbook Policy 3)	RA refers to any measure applied in due time by a TSO in order to fulfill the n-1 security principle of the transmission power system regarding power flows and voltage constraints.		
	Preventive Remedial Actions (PRAs)	PRAs are those launched to anticipate a need that may occur, due to the lack of certainty to cope efficiently and in due time with the resulting constraints once they have occurred.	
	Curative Remedial Actions (CRAs)	CRAs are those needed to cope with and to relieve rapidly constraints with an implementation delay of time for full effectiveness compatible with the Temporary Admissible Transmission	

		Loading. They are implemented after the occurrence of the contingencies.

3. Cross- Border Relevance and Area of Common Interest (ACI)

A cross-border relevant network element is a CNEC considered relevant for Capacity Calculation as it is defined in the Capacity Calculation Methodology for the same Region.

A cross-border relevant remedial action is a remedial action that relieves a congestion on cross-border relevant network elements which are defined in line with the Capacity Calculation methodology and used for cost sharing according to CACM. Other cross border impacting remedial actions will be coordinated according to the methodologies required by SOGL articles 75 and 76.

For the purposes of this methodology the Area of Common Interest (ACI) is the set of grid elements with a cross-border relevance and whose potential physical congestions can be effectively relieved by cross border Redispatching and Countertrading measures. For a more general operational coordination the area of common interest will be defined according to SOGL.

In order to improve efficient and fair application of Redispatching and Countertrading and to keep operations as smooth, reliable and secure as possible, it is essential to have simple and clear procedure to identify and agree upon the elements of the transmission grid belonging to the ACI.

The definition of the ACI has to respect the following principles:

a) **Effectiveness**: the grid elements must have a cross-border relevance and their potential physical congestions must be effectively relieved by the Redispatching and Countertrading measures.

b) **Consistency**: the ACI has to be consistent with the one used during the Capacity Assessment at any stage.

c) **Flexibility**: the ACI shall be continuously adapted in line with the most updated information about the grid (e.g. unplanned outages, topological modifications, etc.).

d) **Transparency**: the criteria for the inclusion of grid elements in the ACI have to be shared and agreed among the involved TSOs.

The definition of the ACI is a key point of this methodology since only congestions occurring on its elements will be taken into account for RDCT applications.

In order to respect the above-mentioned principles and to be coherent with the operational experience, the ACI will come through the following two assessments:

1. Every TSO provides a list of its own grid elements consistent with the Capacity Calculation Methodology and whose potential physical congestions can be effectively relieved by cross border Redispatching and Countertrading measures available in the Italy North CCR. The elements in this list can be referred to normal conditions (N state) and to specific N-1 situations (e.g. an element can become relevant after the tripping/outage maintenance of a specific line).

2. The lists defined above are subject to a filtering process to remove the elements whose potential physical congestions cannot be effectively relieved by cross border Redispatching and Countertrading measures available in the CCR. The filtering is based on sensitivity analysis: the elements whose sensitivities to the application of RDCT measures is below a threshold are removed from the ACI. Therefore, the cross-border relevance of a Redispatching or Countertrading measure is implicitly defined during the filtering process. The filtering process will be better defined during the implementation phase.

The threshold introduced at point 2 above will be defined and fine-tuned by the TSOs via ad-hoc coordinated studies.

The list of CNEs used in DA and ID Capacity Calculation shall be consistent with the ACI for RDCT in order to ensure that all CNECs subject to RDCT have already been properly considered in CCC process. Without this consistency, some CNECs might not be considered during CCC, yielding incorrectly assessed capacities and remedial actions, resulting in the need for RDCT. According to IN TSOs the consistency between CCC and RDCT methodologies is therefore needed.

The ACI shall be reviewed periodically and the frequency of its updating shall depend on what will be agreed and considered technically feasible by the TSOs during the implementation phases. As an example, the list introduced at point 1 could be defined daily one day ahead and the filtering could be performed every 4 hours in intra-day.

The sensitivity analysis at point 2 will be performed using the same dataset used for assessing the RDCT volumes. This means that the cross-border exchanges will be realized by shifting the same resources (e.g. nodal generation/load adjustment, proportional generation/load up/downward in a wide area, etc.) declared available for RDCT (see paragraph 4).

4. Resources for RDCT

Even if they are implemented in different ways, both Redispatching and Countertrading aim at removing violations on grid elements of the ACI by shifting generation/load in one part of the grid and rebalancing the same amount in another part.

It is crucial to have suitable in advance a clear and reliable overview of the available resources and their actual or estimated prices in order to:

- Properly define the ACI and perform the filtering process (see paragraph 3).
- Calculate the amount of generation/load involved in RDCT.
- Identify the generation/load to be shifted (i.e. this is valid for Redispatching).
- Minimize the actual or estimated costs of RDCT for the Italy North region.

Each TSO shall declare, for each time frame, the resources available in its control area for RDCT and their prices. The prices shall reflect the actual prices of the resources, when the information is available, or the best estimation of the costs incurred by the TSOs in accordance with the appropriate mechanisms and agreements applicable to their control areas. Additional information regarding each country are

provided in paragraph 0. The resources will be defined for two different services:

1. increasing the control area balance (e.g. increasing generation/decreasing load);
2. decreasing the control area balance (e.g. decreasing generation/increasing load).

In case of Redispatching each TSO has to declare the location of the resources, the available upward/downward redispatching capacity, the prices of the potential generation or load units, and the time window of its availability. The TSOs will handle the technical constraints (e.g. minimum/maximum time of delivery, the full activation time[1]) in the definition of available resources.

In case of Countertrading each TSO has to specify the available countertrading capacities and their prices. The declared prices must be estimations of the market costs expected by the TSO (e.g. average cost for increasing area control balance by x MWh).

In accordance with the appropriate mechanisms and agreements applicable to the control areas, information about prices may be made available in advance by generation units and loads, thus allowing TSOs to estimate redispatching and countertrading prices.

TSOs shall provide the best estimations of expected costs and, for sake of transparency, to share the methodology they implement in order to define in advance the prices of their CT resources.

RDCT resources could be declared using a Generation Shift Keys (GSK) file format in a similar way as it is done for capacity calculation processes (e.g. D2CC, IDCC); the main difference will be the additional information about prices and technical constraints. Even if the GSK files would most likely include specific generators/loads also for CT (e.g. shift to be split among a set of generation units proportionally to their productions), there are different obligations for TSOs:

- for RD, a **TSO commits** itself **to use the specific units** (generation/load) included in its GSK, in case they are selected during the optimization phase, ;
- for CT, **the units** (generation/load) selected during the calculation phase **are not binding** but they are only references for calculation purposes; the actual units will be selected by the TSO according to their national market rules and the real resources available at the time of application.

All data (resources, quantities and specific units for RD) included in the GSKs will be considered binding for the TSOs until they update them by sending new GSKs (e.g. a TSO update its GSK after a market gate closure or after a generation unit became unavailable). Each TSO will do its best effort to update its GSKs as soon as some or all the resources declared are no more available.

During implementation phase, the TSOs will agree on specific and detailed procedures to send and amend GSKs.

[1] Full Activation Time = time needed between the reception of the order by the power plant and the "target power value" to be reached.

4.1. Information about RDCT resources declaration by TSOs

Terna

For the declaration of the resources to be taken into account in the coordinated RDCT process Terna will rely on the volumes and prices of bids available on the Ancillary Services Markets (MSD).

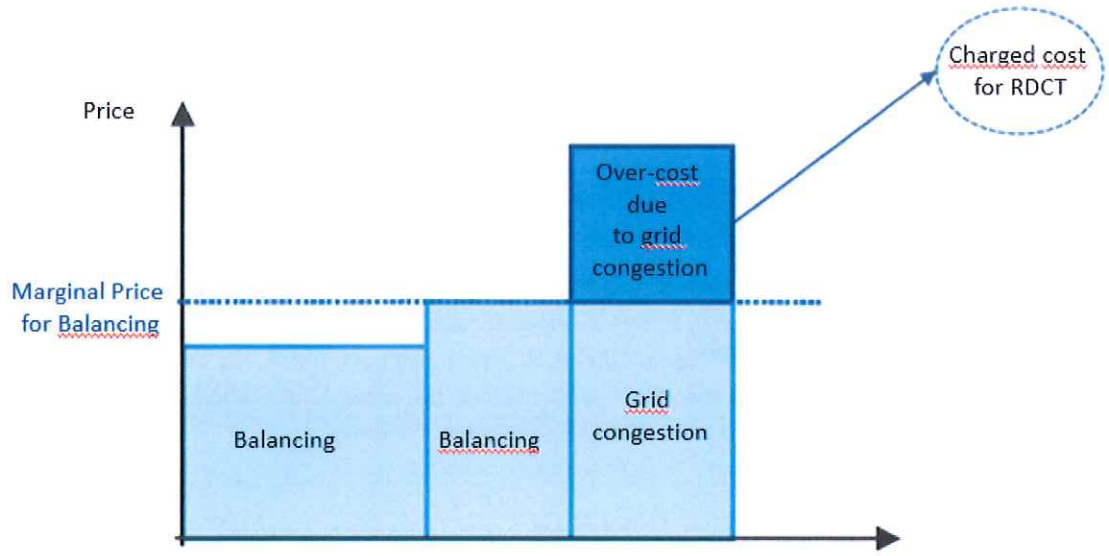
For Redispatching, the upward and downward volumes and their prices of the bids of the specific units eligible for redispatching will be considered. For sake of simplicity, only the units whose sensitivity to cross border relevant elements is sufficiently higher than the average may be considered for redispatching, all other units will be considered for countertrading.

For Countertrading, the available upward and downward margins of the system will be considered, and they will be divided into blocks with different prices according to merit order (e.g. first cheapest bids up to 1000 MW, second cheapest bids up to 1000 MW, etc..). For each block, the average price of its bids will be considered as the price for the countertrading resource. Units which are already declared available for redispatching cannot be counted also for countertrading.

RTE

To evaluate the available resources for RDCT, RTE will rely on the available volumes and associated prices of the balancing market. This is possible because in France, market parties have the obligation to offer what is available to the Balancing market since D-1 and to give the localization of their offers. Those prices and volumes are known in D-1 but can still be updated by producers during ID, which allows RTE only to estimate costs of the CTRD actions.

For Redispatching, only power units of the balancing market whose sensitivity to cross border relevant elements is sufficiently high (threshold yet to be determined, at least 5% as recommended by art 75 fo SOGL) may be considered for redispatching. Ex-ante, their upward and downward available volumes and associated prices on the Balancing market will be considered to estimate the costs of the RD action. For invoicing, only the incurred costs to solve the congestion will be charged.



For Countertrading, the available upward and downward margins of the system will be evaluated and RTE will offer the volumes that don't endanger the security of supply and ensuring to stay in a normal state. Costs will be estimated based on the prices available on the Balancing market. For invoicing, only the incurred costs to solve the congestion will be charged, taking into account system trend for balancing. So far countertrading measures are priced at the imbalancing cost since RTE is treated as any other BRP by national regulation.

RTE faces issues regarding the sharing of Countertrading and Redispatching resources between the different CCRs. Indeed, if for example an upward volume of 2000 MW is available for Countertrading in France, this volume can't be available for Core, Italy North, SWE and Channel at the same time. These issues have not been solved yet and mostly depends on how the CCRs will coordinate their RA, which is in the scope of SOGL art 76.

APG

In case of Redispatch APG considers powerplants in their Control Area with respect to their positive effectivity on the cross border relevant element and under attention of no negative effectivity on other grid elements, their availability and lead time, the limit of the pumpstorage because of the storage volume and costs of the power plant. The requested power plant operators calculate the price for Redispatch period based on their opportunity costs.

ELES

For the purpose of the coordinated RDCT process, ELES will rely on the volumes and prices of bids available from service providers. Collection of available bids will be performed through regular gathering process or on request separately for upward and downward energy per individual resources. All offers will be timely limited and after expiring service providers could use them for other purposes

(i.e. intraday or balancing market etc.) unless they are already activated. As a consequence of participating in different CCRs (NIB and CORE) ELES will provide the same offers in both regions and in case of unavailability both regions will be immediately informed.

In case of redispatching, only resources with sufficiently higher sensitivity than average one will participate in the process, all other units will be considered in the countertrading. In this case, ELES will activate required offers for upward or downward energy according to the average price of all activated resources. Units, which are already declared available for redispatching, cannot be considered for countertrading.

Technical Counterparties

The resources available from Technical Counterparties will be defined in the agreement between Italy North TSOs and these Technical Counterparties. An example is provided in Annex 3.

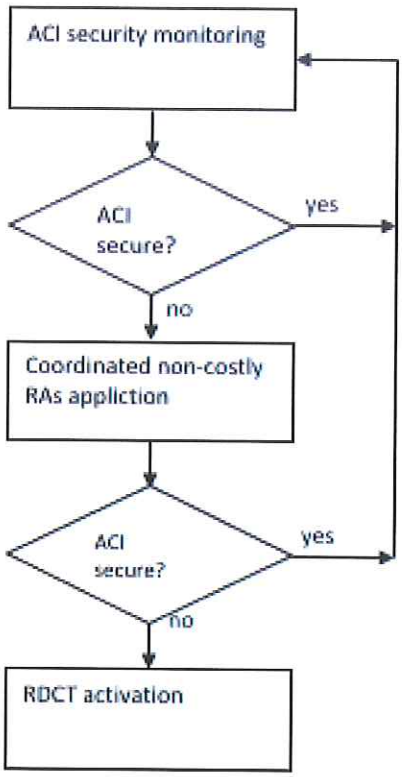
5. Overall process and RDCT resources calculation and commitment

5.1. Regular process

The aim of RDCT is to relieve congestions in the ACI but such costly remedial actions will only be used after all other effective non-costly remedial actions (e.g. grid topology variations, coordinated use of PSTs) have been taken into account. Hence, in case security violations occur in the ACI, TSOs, with the support of CCC, coordinate and use the available non-costly remedial actions in order to restore the security or at least to reduce the extent of the violations. Afterwards, they can turn to RDCT.

RDCT activation must be preceded by a security monitoring process and by a phase of selection and application of effective coordinated non-costly remedial actions; these two preliminary activities have to be taken into account in the methodology for RDCT and to be coordinated and complemented with the methodologies to be defined according to articles 75 and 76 of SO GL and be part of a common continuous process whose macro steps are:

- Step 0: ACI definition and filtering.
- Step 1: ACI security monitoring.
- Step 2: coordinated non-costly remedial actions (RAs) application, security assessment and sensitivity calculation.
- Step 3: RDCT activation.



Additional details about roles during the each step of this process can be found at paragraphs 6 and 1.

Detailed requirements for time frames and time needed for resources activation will be specified during the implementation phase.

In case RDCT is necessary, the resources to be activated are selected with the objective to recover every security violation in the ACI at the minimum estimated cost and without raising overload in any other part of the system. Generations/loads will be shifted in the grid model until there are no more violations after having considered the effects of the Remedial Actions (both preventive and curative) identified in the steps before. The selection of generations/loads to be shifted to minimize the estimated cost for the Parties will be performed via an optimization algorithm[2]. This algorithm will take into account the sensitivities of the overloaded elements on all the resources made available by the TSOs (see paragraph 4) and their declared prices.

Without going into the details, which shall be defined during the implementation phase, the algorithm can be summarized as follows:

$$\min\left(\sum \Delta P_i \cdot p_i\right)$$

$$P_e + \sum \Delta P_i \cdot \sigma_{e,i} \leq P_{e,max}, \forall e \in ACI$$

[2] A detailed definition of this optimization algorithm will be part of an implementation project.

$$P_e + \sum \Delta P_i \cdot \sigma_{e,i} \leq \max(P_e, P_{e,max}), \forall e \in other\ elements$$

$$\sum \Delta P_i = 0$$

$0 \leq \Delta P_i \leq P_{i,max}$ for upward resources

$P_{i,min} \leq \Delta P_i \leq 0$ for downward resources

Where:

- ΔP_i is the activated amount of the resource i;
- p_i is the price of the resource i;
- $P_{i,max}$ is the available volume of the upward resource i;
- $P_{i,min}$ is the available volume of the downward resource i (considered as negative);
- $\sigma_{e,i}$ is the sensitivity of the generic element e of the ACI to the generic resource i;
- P_e is the power flow on the element e (it may be in N or N-1 situation depending on the congestion detected);
- $P_{e,max}$ is the maximum power admissible on the element e (it may be in N or N-1 situation depending on the congestion detected).

During this optimization phase, the optimization algorithm may consider at the same time RD and CT resources (in fact both are finally expressed in terms of power infeed change at a defined price) and its final outputs will be:

- a list of shifted generations/loads with their prices, amounts and type (RD).
- the amounts of CT and their prices.
- the estimated cost.

Therefore, the outcome could be the selection of a mix of resources of RD and CT at the same time. The detailed activation of the resources for RD and/or CT will be performed by TSOs considering that:

- the specific RD units selected by the algorithm shall be activated for exactly the selected amounts;
- for CT, each TSO will activate enough internal resources to match with the volume of CT selected by the algorithm in accordance with the appropriate mechanisms and agreements applicable to its control area.

During the implementation phase, the TSOs will define rules for cancelling or reducing the amount of energy already defined during the redispatching and countertrading process, when it is respectively not considered necessary anymore or for a smaller level of congestion.

5.2. Fast activation process for sudden critical situations

In case of sudden critical situations (e.g. due to an unplanned outage in real time), that leads to an overload of an ACI element and requires very fast actions, which cannot be effectively and promptly treated with the Regular process described at paragraph 5, a Fast Activation process will be adopted in order to cover the time horizon until the Regular process can be applied effectively. This second process can also be considered as a backup in case the RDCT regular process is not properly working (e.g. missing data, tools failure). The Fast activation process is meant to be called in real time or very close to it, as an example, it could be called within a time window of half an hour before the next hour starts; its need may be justified by security violations which were not detected during the preceding regular processes (e.g. because a relevant event, such as an unplanned outage, occurred).

Considering the application of this process should be very infrequent, being linked to extraordinary and unusual events, and that it must be characterized by fast activation and additional flexibility due to the very short time for actions, the coordination and calculation of resources may be performed by real time control operators of a TSO instead of CCC. It may be possible that not all the available remedial actions are considered because there is not enough time to evaluate their impact but at least full bilateral coordination and information to other TSOs will be performed. A simplified calculation approach could be used (e.g. Bilateral or Pro-quota countertrading, standard proportional GSKs/LSKs).

This process would be triggered by one or more TSOs who detect security violations during their own real time monitoring activities. TSOs, with the contribution of CCC, will first try to coordinate non-costly RAs in order to avoid or to reduce the need for RDCT resources. As soon as RDCT is considered to be necessary, the involved entities calculate the amount of RDCT resources to be activated. Depending on TSOs agreements, one TSO could play a central role (e.g. in case of security violations due to the Italian import, Terna could perform the calculation). The aim of the calculation will always be relieving congestions without raising overload in any other part of the system but, considering the short time available for actions, the objective of cost minimization could be neglected and, as a consequence, only the total volume of resources would be minimized. The final output will be the amount and type (RD or CT) of resources to be activated by each TSO.

The calculation could be performed using Snapshot files, also for next future hours, and the internal tools of TSOs, without necessarily using the common tool (see paragraph 7.2).

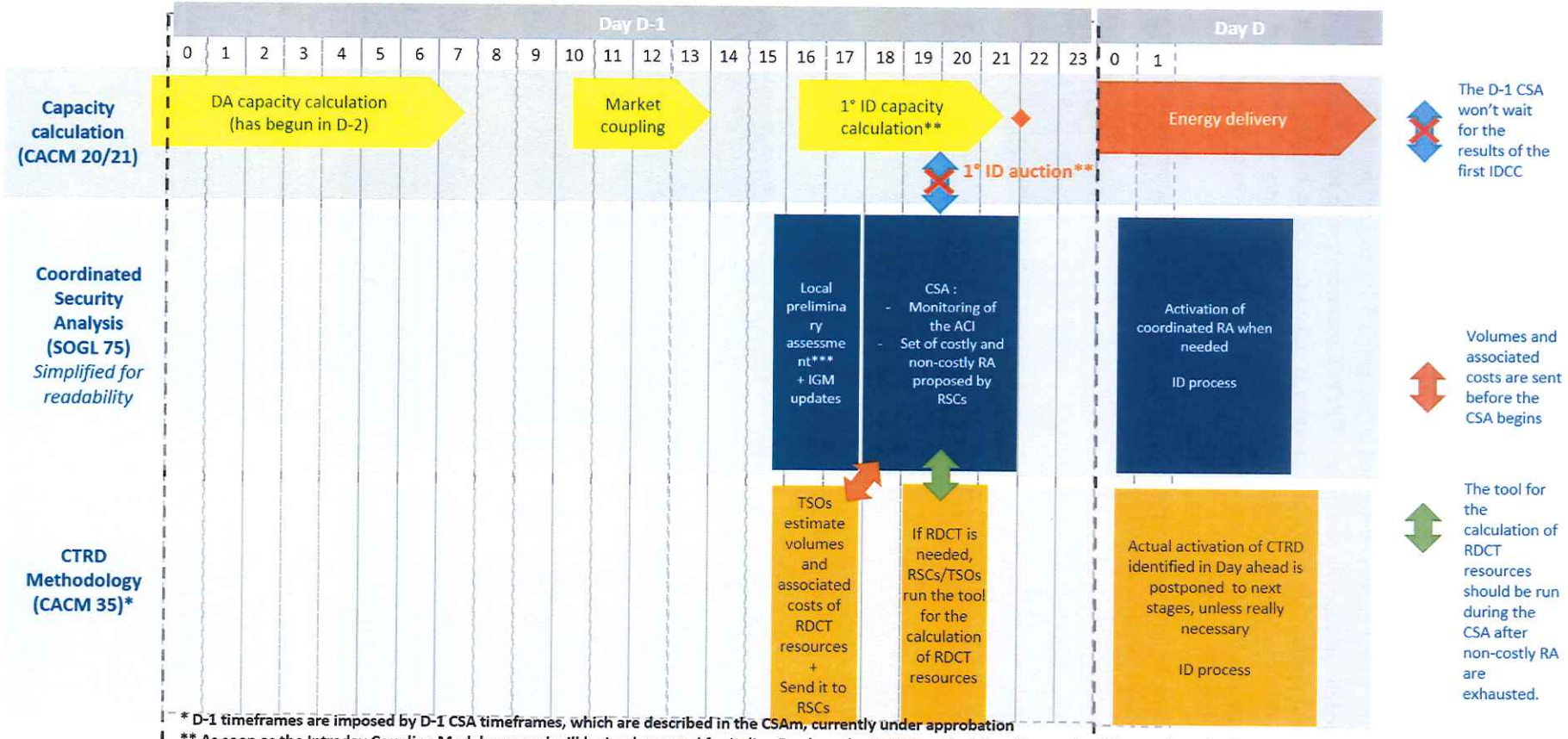
A different cost sharing methodology may be defined for RDCT costs arisen from the fast activation process as detailed in the Cost Sharing Methodology pursuant to CACM article 74.

6. Timeframes for RDCT application

RDCT measures could be applied starting from the day-ahead stage, after the cross-border exchange schedules are fixed. However, considering the uncertainties of the day-ahead datasets and in order to avoid unnecessary costly measures, the application should be postponed to Intraday and to Real Time timeframes, when a better overview of the factual conditions of the grid is available. Activation of RDCT measures in the day ahead should be limited to extreme cases, such as when huge amounts of countertrading are expected and they could require the start up of additional conventional power plants for balancing the load and keeping suitable reserve margins.

In **Day ahead**, the RDCT process described at paragraph 5 is executed for the 24 hours of the next day using DACF models. In case the activation of RDCT measures prove to be necessary, their amount is calculated but the decision on the final activation is left to the TSOs. In case the TSOs consider they cannot postpone the activation to the next timeframes (e.g. Intraday or real time) the RDCT is implemented immediately, otherwise they consider this indication only as early warnings to better tackle the potential issue in the next hours.

The following chart describes the interactions between IDCC, Coordinated Security Analysis and CRTD process and associated timeframes for D-1.



*** D-1 timeframes are imposed by D-1 CSA timeframes, which are described in the CSAm, currently under approbation**
**** As soon as the Intraday Coupling Model proposal will be implemented for Italian Borders, the ID CCC methodology Proposal will be used to calculate the individual values for cross-zonal capacity offered to the complementary regional intraday auctions.**
***** Local preliminary assessment is optional as IGM are not required to be free of congestions before the merging**

D-1 timeframes for CTRD process are imposed by D-1 CSA timeframes, which are described in the Coordinated Security Analysis Methodology (CSAm) required by art 75 of SOGL. The CSAm, currently under approbation, specifies that one CSA is done in Day-Ahead.
In D-1 timeframe TSOs have to deliver their IGMs latest until 18:00h. Afterwards the day ahead common grid model incorporating all day-ahead results is

built and an operational security analysis based on day-ahead results is coordinated ideally until 21:00h.
During Intraday timeframe a common grid model for Intraday Capacity Calculation is built latest at 1:30h and Capacity Calculation starts at 2:00h.
Timeslots for Intraday RDCT will be in accordance with SOGL 76.

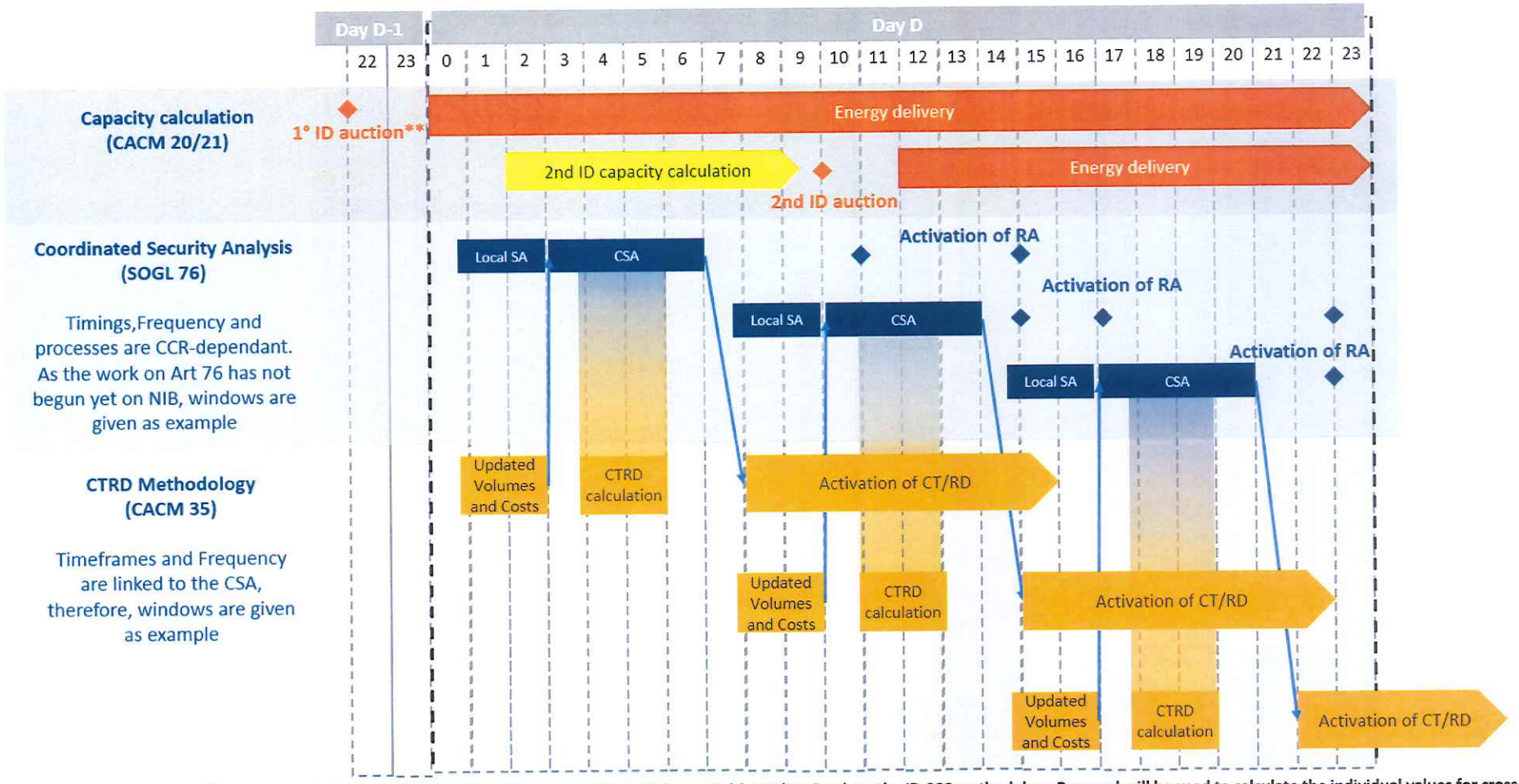
In Intraday, the RDCT process described at paragraph 5 is executed for a rolling time window of N[3] hours by using IDCF models. As an example, the process could be run every 4 hours and at 10:00 it's monitored the security for the time window between 12:00 and 18:00. RDCT measures proposed by the process in intra-day will be implemented without any postponement.

The RDCT intraday process should normally guarantee the security of real time operations but it is not possible to completely exclude that security risks still pop up in real time. In fact, out-of-range events affecting the ACI could always occur (e.g. unpredicted outage of grid elements or generation, unavailability of remedial actions declared beforehand, uncertainty associated with capacity calculation, etc.) and normal differences between forecasts and real operation may have a relevant impact.

The frequency of the CTRD process depends on the frequency of the Coordinated Security Analysis (CSA). In Intra-Day, CSA timings, frequency and processes are CCR-dependent (methodology required by art 76 of SOGL) and the CSA can be either sequenced or event-triggered. As the work on Art 76 has not begun yet on North Italian Borders, main timings can't be given for countertrading and redispatching process but interactions with CSA can be described.

The following chart describes the interactions between IDCC, Coordinated Security Analysis and CRTD process and associated timeframes for Intraday.

[3] The exact number of process runs for a day and the size of the time window to be monitored will be decided during the implementation phase in line with what is considered as feasible and reasonable.

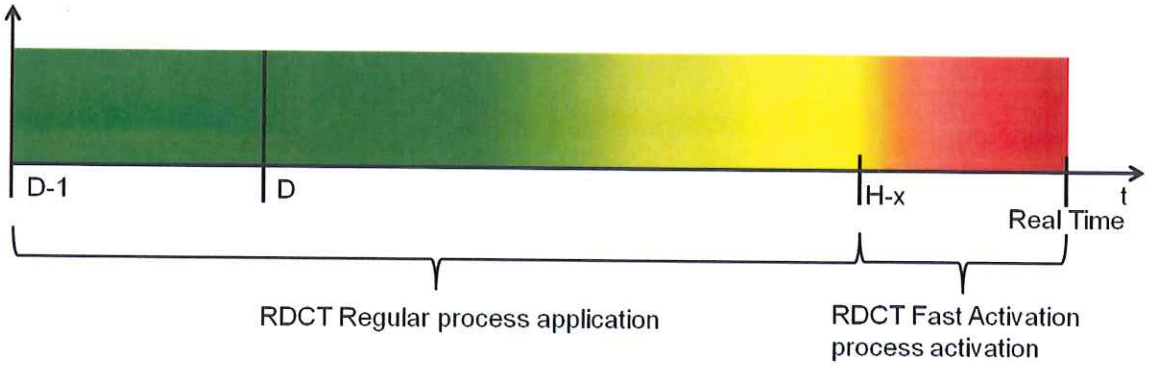


**** As soon as the Intraday Coupling Model proposal will be implemented for Italian Borders, the ID CCC methodology Proposal will be used to calculate the individual values for cross-zonal capacity offered to the complementary regional intraday auctions.**

In **Real Time**, the RDCT process described at paragraph 5 is executed for a time window which goes from the present till the next Intraday timeframe for RDCT application. Snapshots or IDCF models will be used and RDCT measures proposed by the process at this stage promptly activated.

In case of sudden critical situations (e.g. due to an unplanned outage in real time or unforeseen grid situations), which require very fast actions and which cannot be effectively and promptly treated with the regular process described at paragraph 5, the Fast Activation process described at paragraph 5.2 will be applied.

As an example the following timing sequence could be applied (i.e. the parameter "x" could be half an hour or one hour, depending on what is feasible to achieve with the Regular process):



The following chart describes how the Fast activation process catches up the regular ID process.

Fast Activation Process and C2RT Timeframes : CSA and CTRD

Coordinated Security Analysis (SOGL 76)

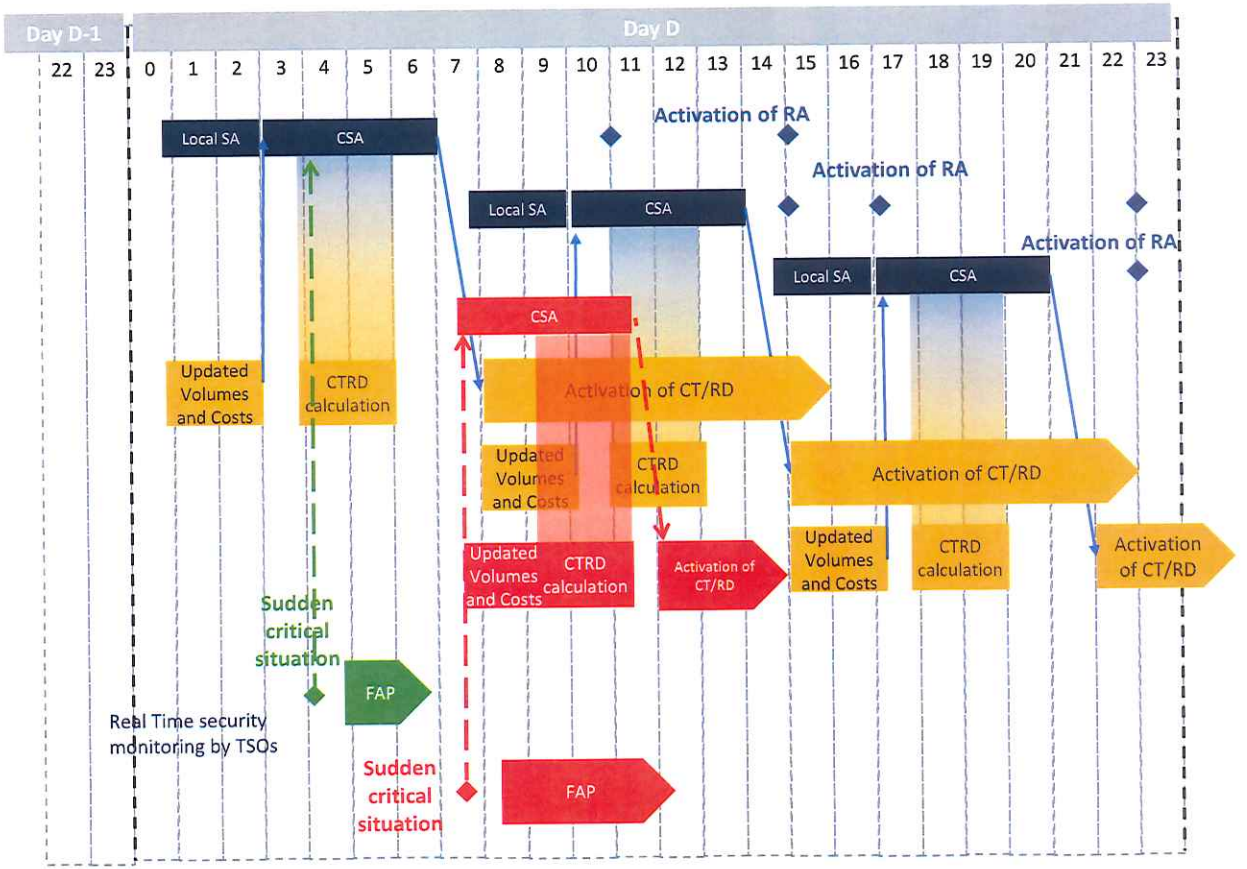
Timings,Frequency and processes are CRR-dependant. As the work on Art 76 has not begun yet on NIB, windows are given as example

CTRD Methodology (CACM 35)

Timeframes and Frequency are linked to the CSA, therefore, windows are given as example

Real time & Emergencies**

Fast activation process (FAP)



CSA can be sequenced or event-triggered, it depends on CCR.

Fast activation process runs as long as it takes to reach the result of the next regular process.

During FAP, activated resources come from the Balancing market as the sudden critical situation occurs in real time after GCT.

Sudden critical situation occurs:

- within a running CSA and can be implemented into CTRD calculation (green situation);
- or outside a CSA and it triggers a new CSA (red situation).

** RDCT in emergency situations replaces current procedures (e.g. Pentalateral/Trilateral)

7. Involved parties and roles

The framework of the methodology for RDCT (see paragraph 5) relies on two main activities:

1. **Coordinated security monitoring of the ACI for RDCT application**[4]: this step includes the ACI security definition, monitoring and the selection of coordinated non-costly remedial actions.
2. **RDCT measures calculation and selection**: this step is triggered once the need of RDCT is identified and it includes the selection of the RDCT measures and the calculation of their total cost.

The parties involved in the processes are TSOs and CCC and their roles are specified in the next paragraphs.

A more detailed list of tasks and responsibilities is provided in

[4] This security monitoring is only intended for RDCT purposes and doesn't replace the usual security monitoring on the whole TSO grids which is part of TSOs activities and required by OH Handbook and guideline on System Operation.

Annex 2 List of tasks and responsibilities).

7.1. Coordinated security monitoring of the ACI for RDCT application

For RDCT purposes one or more **CCC[5] monitor the security of the ACI** in the operational planning phase on behalf of the TSOs. This security monitoring is only intended for RDCT purposes and doesn't replace the usual security monitoring on the whole TSO grids which is part of TSOs activities and required by OH Handbook and guideline on System Operation. When CCC detect a security violation in the ACI, they inform TSOs about the constraints and **propose coordinated non-costly RAs** within the available ones. In case of different results, the worst one is considered as reference for next steps. For security monitoring and coordination of RAs, CCC could take advantage from the experience gained and the tools developed for the Capacity Calculation processes (e.g. D2CC, IDCC). **TSOs have the possibility to validate and adjust the proposals of CCC and the right to block the process at this stage** if they deem it as not necessary (e.g. the violation of the element of the ACI is not considered as critical because of bad modelling of the system, there are additional available RAs not considered). A proposal for a detailed validation methodology will be designed during the implementation phase, in line with the methodology required by art 76 of SOGL. In case the RDCT procedure triggering is confirmed by TSOs and RDCT measures need to be activated, the resources, their duration and quantities are calculated according by the tool mentioned at paragraph 7.2 (RDCT measures calculation and selection).

In case of any relevant event for the ACI (e.g. unplanned outage, line back in service before scheduled), the responsible TSO has to promptly inform the CCC and the other TSOs in order to update the models used for RDCT process.

7.2. RDCT measures calculation and selection

In order to guarantee the maximum transparency and consistency for RDCT activation, the calculation of the needed resources will be performed with a common tool which will be jointly specified and developed by the TSOs and CCC involved. Depending on what will be considered as feasible and economic during the specification phase, this tool could be automatic or executed manually. In the latter case the tool could be run by TSOs and/or CCC on a rotating basis.

TSOs have the possibility to validate and adjust the proposed quantities in a coordinated way (e.g. in case of the resources are expected to be overestimated). A proposal for a detailed validation methodology will be defined during the implementation phase, in line with the methodology required by art 76 of SOGL.

In case the Fast Activation process for sudden critical situation is applied (see paragraph 5.2), the calculation could be performed using internal tools of TSOs, without necessarily using the common tool, and one TSO could play a central role (e.g. in case of security violations due to the Italian import, Terna could perform the calculation).

[5] Except in sudden critical situations (see paragraph 6).

8. Dataset and tools

8.1. Grid models

Coordinated security monitoring of the ACI will be performed using the latest available Common Grid Models (CGMs) depending on the time of the application (e.g. DACF for day ahead, IDCF for intraday, Snapshots for real time). The data used will be the merged CGM produced by the ENTSOE European Merging Function.

8.2. Dataset for ACI definition

The input data necessary to detect the ACI will be provided via ad hoc files. The required data are:

1. The lists of critical elements defined as combinations of tripping elements and elements to be monitored.
2. The GSK for filtering the above mentioned lists according to sensitivity factors.

Formats and contents of these files will be defined and detailed during the implementation phase. As an example, the CRAC and GSKs files of the Capacity Calculation processes could be considered.

8.3. RDCT resources

The RDCT resources could be declared by each TSO via GSK files delivered for each time frame using the latest available information (e.g. for Intraday purposes, the GSK files could be updated at each market gate closure; in Real Time CRAC and GSKs could be updated in case of unpredicted outages of grid elements/generation units). The GSK files will include information on generations and loads available for RDCT purposes and the corresponding prices.

CT resources could be defined via a list of units whose contribution to the total shift is proportional to a predefined parameter (e.g. actual active power, reserve margin). In any case, the units selected for CT are not binding.

As stated at paragraph 8.2, format and content of the GSKs files will be defined and detailed during the implementation phase. As an example, the GSKs files of the Capacity Calculation processes could be considered with the addition of the prices.

Coordination with other processes that use the same resources as RDCT (especially capacity and merit order list) has to be addressed: for instance, Intraday gate closures, TERRE, IGCC shall be harmonized.

Resources which are not used in the timeframe for which they are declared shall not be considered available for a different timeframe.

8.4. Non-costly remedial actions

Non-costly remedial actions are usually grid topology modifications (e.g. opening of lines or busbar couplers) and changing of PSTs taps. These remedial actions will be communicated via an ad hoc file. When the availability of a RA changes, the pertaining TSO has to communicate it as soon as possible.

Formats and contents of these files will be defined and detailed during the implementation phase. As an example, the CRAC of the Capacity Calculation processes could be considered.

8.5. Common platform

All data will be provided and archived on a common platform which can be used also for ex-post analysis, reporting and cost sharing purposes.

8.6. Common tool

As stated at paragraph 7.2, a common tool will be developed in order to guarantee the maximum transparency and consistency for RDCT activation.

9. Actual costs calculation

The RDCT methodology does not really depend on how the prices are defined and how the actual costs are calculated and shared. Prices definition shall be defined during the implementation phase and the cost calculation will be performed as detailed in the Cost Sharing Methodology pursuant to CACM article 74. The tool which is foreseen to be implemented in the framework of this RDCT methodology and the methodology itself will not be influenced by the rules defined to deal with prices definition and costs calculation.

10. Connection between RDCT and Capacity Calculation processes

RDCT procedures and Capacity Calculation (CC) processes have to be harmonized in order to avoid contradictory results endangering the security and efficiency of the interconnected system (e.g. RDCT process leads to countertrading which reduces the import of Italy while the following IDCC run calls for an increase of the IT import schedule for the same or the immediately following hour). In this light, following links between consequential process should be enforced:

1. The results of CC processes (NTC values of future hours, Preventive and Curative RAs) have to be available for the RDCT processes. As an example, the RAs used during the preceding CC process could be used for the security monitoring and coordination phases of the RDCT methodology and low results of CC could be early warnings for RDCT.
2. The results of RDCT processes have to be made available for the following IDCC process. As an example, if for a future hour CT has to be activated and the schedules of one or more borders have to be curtailed, this info could be taken into account during the CC process by setting an upper limit to the capacity.

11. Transparency

The involved parties commit to guarantee the transparency of the results of RDCT processes. The criteria for input data definition will be shared and a common tool will be used to calculate the costs and for the resources commitment.

Transparency of input data will be realized by:

- Using CGMs as datasets (transparency guarantee at ENTSOE level);
- Using shared and agreed criteria for ACI definition;

- Providing inputs in advance on a common platform.

Each TSO must also share the criteria it will use to define the prices of its resources. These prices have to be based on the actual market prices and/or have to reflect the effective costs incurred by the TSO (CACM c.3 a.35).

12. Implementation roadmap

The entry into force of this RD and CT Methodology is subject to:

1. Regulatory approval of this RD and CT Methodology in accordance with Article 9 of the CACM Regulation;
2. Regulatory approval of Redispatching and Countertrading Cost Sharing Methodology required by Article 74 of the CACM Regulation in accordance with Article 9 of the CACM Regulation;
3. Regulatory approval of Common Coordinated Capacity Calculation Methodology required by Article 20 of the CACM Regulation in accordance with Article 9 of the CACM Regulation;
4. Development and implementation of the systems required to support the RD and CT Methodology;
5. Considering the interrelation with articles 75 and 76 of SO GL, the TSOs of the Italy North CCR shall subject the implementation of this RD and CT Methodology to the approval of the methodologies according to articles 75 and 76 of SO GL in order to have harmonized methodologies and processes.

After the approval of the proposed methodology for coordinated redispatching and countertrading the TSOs of the Italy North CCR shall start a dedicated project for its implementation. A detailed roadmap will be defined in the framework of this project.

The TSOs of Italy North region shall implement the proposed coordinated redispatching and countertrading methodology no later than 24 months after the conditions specified in paragraph 12 points 1 to 5 are fulfilled and provide a more detailed description of the cost minimization algorithm within the first 12 months.

13. Guiding principles for agreements with Technical Counterparties

With respect to this Coordinated Redispatching and Countertrading methodology proposal and Coordinated Redispatching and Countertrading cost sharing proposal, Technical Counterparties from third countries shall sign an agreement with TSOs of the Italy North CCR, based on the following principles:

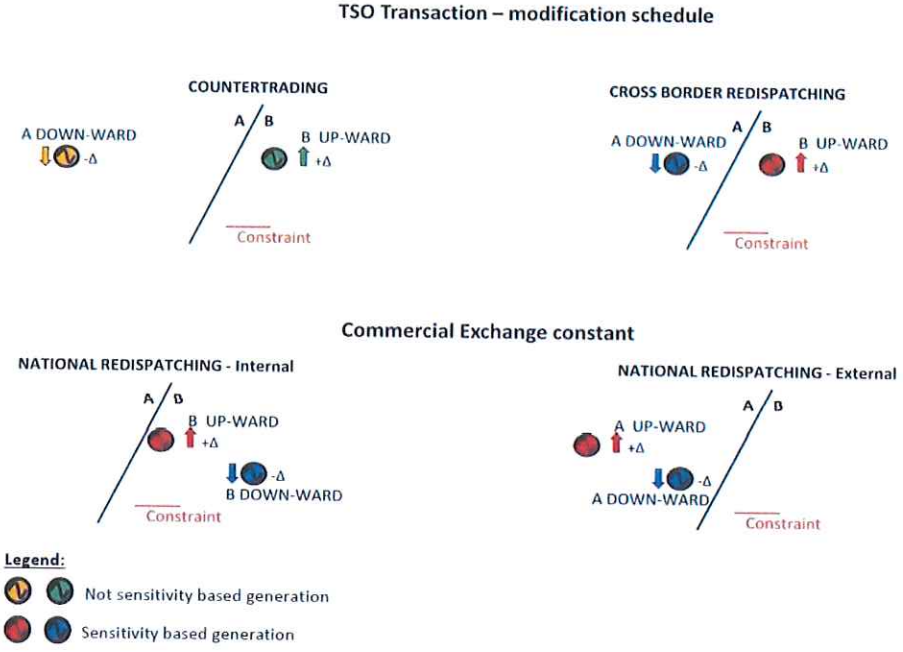
- The Technical Counterparty shall enter in a separate agreement which is aligned with the wording of this Redispatching and countertrading methodology proposal.
- The Technical Counterparty shall have equal rights, obligations and responsibilities as other TSOs of the Italy North CCR with respect to this Coordinated Redispatching and Countertrading methodology.
- The Technical Counterparty shall offer and receive non-costly and costly remedial actions

available in its control area for the needs of Coordinated Redispatching and Countertrading process in the Italy North CCR.

- The Technical Counterparty shall participate in the cost sharing methodology proposal, which will be developed by the TSOs of the Italy North Region. It being understood that this methodology proposal will be a balanced, fair and equal cost sharing method which is in line with the objective of the EU Regulations to share redispatching & countertrading costs on equal terms and such treatment and principles extend to the Technical Counterparty via the aforementioned contracts concluded with TSOs of Italy North Region.

Annex 1 Redispatching and Countertrading measures summary table

	Shift TSO A	Shift TSO B	Location dependence	Modification of schedule
Countertrading	Increasing/decreasing	Decreasing/increasing by the same volume	Independent method (economical merit order)	YES
Internal Redispatching	Increasing and decreasing by the same volume	---	Geographical dependent method (sensitivity factor)	NO transaction between control areas
External Redispatching	---	Increasing and decreasing by the same volume	Geographical dependent method (sensitivity factor)	NO transaction between control areas
Cross Border Redispatching	Increasing/decreasing	Decreasing/increasing by the same volume	Geographical dependent method (sensitivity factor)	YES



Picture 1: Redispatching and Countertrading examples

Annex 2 List of tasks and responsibilities

This chapter summarizes and describes the main tasks which are to be performed during the RDCT process within Italy North CCR.

I. Local Security Analysis

All TSOs are constantly monitoring their transmission grids and perform security Assessment of the overall national transmission grids, irrespectively to the RDCT process. However, if TSO during their regular monitoring of their transmission grids notice a risk of security violation on ACI elements, they will immediately notify CCC and other TSOs of the Italy North CCR

Responsibility with: TSOs of Italy North CCR

II. Coordinated Security Analysis

Coordinated Security analysis is performed by CCC with processes which are harmonized with the methodology required by the article 76 of SOGL. CCC will regularly perform the CSA on the best available grid models and monitor ACI for the remaining hours of the running day and 24 hours of the following day after DACF models become available. In case CCC notice security violation on the ACI, they will immediately notify all TSOs of the Italy North CCR and initiate coordinated optimization of non-costly remedial actions.

Responsibility with: CCC

III. Coordinated optimization and validation of Non-Costly remedial actions

Non-costly remedial actions will be analyzed by CCC and in case there are possible non-costly solutions to the security violation, CCC will present those solutions to the TSOs of the Italy North CCR as soon as possible. In a coordinated way, which is still to be established and defined (for example a video conference or teleconference), TSOs will jointly agree on a set of non-costly remedial actions and approve their activation.

If, for whatever reasons, non-costly remedial actions are not sufficient or TSOs cannot approve their activation, CCC will start a RDCT procedure.

Responsibility with: CCC and TSOs

IV. Calculation and proposing of costly RDCT actions

In case Coordinated Security Analysis identified a security violation on the ACI and non-costly remedial actions are not sufficient, CCC or TSOs will launch the tool for the optimization of RDCT actions. The optimization procedure will have the cost minimization as an optimization criteria. Optimization domain will be based on volumes and costs of available RDCT resources submitted by TSOs.

After the optimization procedure is finished, CCC will propose a set of possible costly actions to be approved by TSOs.

Responsibility with: CCC and TSOs

V. Validation of proposed costly RDCT actions

In a coordinated way, which is still to be established and defined (for example a video conference or teleconference), TSOs will jointly agree on a set of costly remedial actions and approve their activation. After the joint validation of the costly RDCT measure, TSOs will execute agreed actions within their transmission grid areas.

TSOs can jointly agree to postpone a decision on the activation of the proposed costly remedial action when later calculating sessions are expected for the same timeframe;in that case CCC will perform

another calculation with updated models and at the predefined time before the delivery of the concerned hours.

Responsibility with: TSOs

VI. Postponing of RDCT actions activation which were identified already during D-1

If TSOs agree, in a coordinated way which is still to be defined (for example a video conference or teleconference), that higher quality of data is foreseen (e.g. updated and more accurate grid models) which would allow a more careful decision on the activation of costly RDCT actions, and if available time until the hour with violated security within ACI allows decision postponing, a decision on the activation of the costly RDCT action will be postponed until the following timeframe for CSA/RDCT calculations.

Decision can be postponed if TSOs agree that there are justify reasons which indicate that inputs for CSA/RDCT calculations will change.

Decision cannot be postponed in case there is insufficient time between the following CSA/RDCT timeframe and the delivery of the hour with violated security within ACI.

Responsibility with: TSOs

VII. Submission of volumes and costs for countertrading

Each TSO of the Italy North CCR will submit to CCC the latest available countertrading volumes and prices for upwards and downwards direction as soon as CCC identifies security violation within the ACI.

Each TSO of the Italy North CCR will submit to CCC the latest available redispatching volumes and prices for upwards and downwards direction as soon as CCC identifies security violation within the ACI. This information will contain particular nodal information of the source.

Responsibility with: TSOs

VIII. Fast activation procedure

Fast activation procedure is outside of the regular RDCT process. Fast activation procedure is triggered by one or more TSOs who detect ACI security violations during the real time monitoring activities on their own grid. This procedure will be activated in case there is no sufficient time for running regular RDCT procedure and if fast action, without optimization, is necessary.

TSO which identifies violation on the ACI elements and validates the need for fast activation procedure will, in coordination with other TSOs, select available remedial action without optimization performed by CCC.

Responsibility with: TSOs which identify security violation on the ACI elements

Annex 3 Involvement of Swissgrid as Technical Counterparty

Safe operation of all cross border relevant elements in the Italy North CCR is crucial for guaranteeing the safe grid operation and security of supply in Italy. Application of a Countertrading & Redispatching regime with only four countries (FR, AT, SI and IT) could lead to situations in which congestions are not manageable at all without optimized application of Swissgrid's remedial actions in full coordination of all five TSOs.

Countertrading and re-dispatching actions, which need to ensure safety of the grid in the Italy North CCR, cannot be efficiently executed without remedial actions available in Switzerland. RDCT procedure which would not take into account available remedial actions in Switzerland would be inefficient and costly.

Most of the dangerous volatile and "free-floating" power flows happen on cross-border lines on the Swiss-Italian border. Other Italian cross-border lines (with Austria, Slovenia and France) are equipped with phase-shifting transformers (PST) and therefore not endangered during operation. It is pointless to solve congestions on cross-border lines which are equipped with PSTs and the only congestions of cross-border transmission lines which are solvable by the RDCT are congestions on the Swiss-Italian cross-border lines. A RDCT procedure which would exclude cross-border lines on the Swiss-Italian border would fail to observe the most important grid elements for security of the Italy North CCR, which is not in line with expectations of the CACM and SOGL regulation.

Analysis of congestions in the Italy North CCR during 2017 and 2018 shows that 97% of congestions happened on Swiss-Italian cross-border elements, which proves that a RDCT process which would disregard Swiss-Italian cross border lines would be useless in 97% of critical grid situations.

Solving of congestions in a coordinated way on all cross-border relevant elements, including the Swiss elements, is of the paramount importance for ensuring the safe operation of transmission grids of TSOs of the Italy North CCR. A RDCT process which comprises remedial actions and cross-border relevant grid elements of only four TSOs (TERNA, RTE, ELES and APG) is insufficient to maintain grid security of the Italy North CCR.

A coordinated RDCT process which incorporates all five TSOs (TERNA, RTE, ELES, APG and Swissgrid) is necessary for the fulfillment of targets of grid security, CACM and SOGL. Swissgrid has to be part of the joint RDCT proposal of all TSOs of the Italy North CCR because:

Grid security of the Italy North CCR will not be at the sufficient level without the coordinated RDCT process of all five TSOs.

Activation of RDCT remedial actions without Swissgrid's participation and without remedial actions from Switzerland will be inefficient and costly.

The optimization procedure, run by RSCs, will observe the whole ACI of the Italy North CCR and include Swissgrid's remedial actions into the optimization procedure. TERNA, ELES, APG and RTE will conclude agreements with Swissgrid which will be based on this Countertrading and Redispatching methodology. Such agreements will govern mutual obligations and responsibilities of Swissgrid with TERNA, ELES, APG and RTE in relation to the RDCT procedure on all elements of the ACI. Agreements will ensure availability of Swissgrid's costly and non-costly remedial actions in the optimization procedure as well as participation of Swissgrid in the cost sharing of RDCT costs for solving congestions on the ACI.

The Common Grid Modell used for the optimization of RDCT activations in the Italy North CCR will

include Swissgrid's individual grid model.

Participation of Swissgrid in the RDCT is not forbidden by the CACM and SOGL. CACM forbids only participation of Swissgrid in the day-ahead and intraday market coupling with the Union. Since RDCT has nothing to do with market coupling and it is a purely a technical procedure for ensuring security of the grid of the Italy North CCR, there are no legal barriers for participation of Swissgrid in the RDCT procedure and for inclusion of the full ACI in the RDCT process.

When participating in the RDCT process, Swissgrid will make available the following resources:

- For countertrading, Swissgrid will use resources which will be available on the Swissgrid's integrated market platform for re-dispatching and tertiary energy management. Pricing on the integrated platform will be market based with the merit order of offers. The integrated market platform is expected to become operational in 2019.
- For re-dispatching, Swissgrid will use available re-dispatching capacity of redispatchable power plants with which Swissgrid has respective contracts and which offer their re-dispatching capacity for RDCT of the Italy North CCR. Available re-dispatching capacity of the power plant is calculated based on the production schedule, technical available capacity and reserve providing obligations of the power plant. Pricing of the re-dispatching energy should be defined by the merit order of the integrated market platform for re-dispatching and tertiary energy management by simulating activation of the certain predefined volume on the platform. Pricing regulation is subject to changes and is still to be defined.

Re-dispatching and countertrading resources and pricing are subject to changes in line with applicable national regulations and operational guidelines. Available volume of resources will be offered up to the limit which ensures sufficient remaining availability of reserve within Swiss control area and safe operation of the local transmission grid.