Coreso and TSCNET monitoring report Central Europe SOR

EU 2019/943 Art. 46

YEAR 2023

TSCNET Services

coreso

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List of abbreviations

ACER	Agency for the Cooperation of Energy Regulators
BD	Business Day
CCC	Coordinated Capacity Calculation
CCC	Capacity Calculation Coordinator
CCCt	Core Capacity Calculation tool
CCM	Capacity Calculation Methodology
CCR	Capacity Calculation Region
CEP	Clean Energy Package
CGM	Common Grid Model
CGMES	Common Grid Model Exchange Standard
CorNet	A co-operation programme between Coreso and TSCNET
CROSA	Coordinated Regional Operational Security Assessment
CSA	Coordinated Security Analysis
DA	Day-Ahead
DACC	Day-Ahead Capacity Calculation
DACF	Day-Ahead Congestion Forecast
DC	Direct Current
DFP	Default Flow-Based Parameters
ECG	Electricity Coordination Group
EMF	European Merging Function
ENS	Energy Not Supplied
ENTSO-E	European Network of Transmission System Operators for Electricity
FB	Flow-Based
ICS	Incident Classification Scale

ID	Intra-Day
IDCC	Intra-Day Capacity Calculation
IGM	Individual Grid Model
IN	Italy North
IVA	Individual Validation Adjustment
KPI	Key Performance Indicator
LTA	Long Term Allocated
MEC	Maximum Entry Capacity
NRA	National Regulatory Authority
NRAO	Non-costly Remedial Action Optimiser
NTC	Net Transfer Capacity
OCR	Outage Coordination Region
OPC	Outage Planning Coordination
OPDE	Operational Planning Data Environment
OPI	Outage Planning Incompatibilities
PTDF	Power Transfer Distribution Factor
RA	Remedial Action
RAA	Regional Adequacy Assessment
RAM	Remaining Available Margins
RAO	Remedial Action Optimiser
RCC	Regional Coordination Centre
RCOP	Regional Coordination Operational Procedure
RIAR	Regional Incident and Analysis Reporting
RSC	Regional Security Coordinator
SDAC	Single Day-Ahead Coupling
STA	Short-Term Adequacy
SOR	System Operation Region

TS	Time Stamp
TSO	Transmission System Operator
TTC	Total Transmissible Capacity
TYNDP	Ten-Year Network Development Plan
UCTE DEF	Union for Co-ordination of Transmission of Electricity Data Exchange Format
WA	Week-Ahead
YA	Year-Ahead

1.

Introduction

Coreso and TSCNET have a long operational history in supporting the regional coordination of operational planning for their shareholders, the electricity Transmission System Operators (TSOs) in Europe. TSCNET and Coreso collaboration started over a decade ago as a voluntary cooperation of the TSOs. With the progress of the regulatory framework, Coreso and TSCNET were established formally as Regional Security Coordinators (RSCs). RSCs perform services for the TSOs, such as operational planning security analysis, outage planning coordination, coordinated capacity calculation, short-term and very short-term adequacy forecasts, and a common grid model with hourly updates.

In 2022, based on the Clean Energy Package (CEP), the RSCs evolved into **Regional Coordination Centres (RCCs)**. The RCCs shall **complement the role of TSOs** by performing the tasks of regional relevance assigned to them. The TSOs remain responsible for managing electricity flows and ensuring a secure, reliable, and efficient electricity system.

Coreso and TSCNET, the RCCs established in the Central Europe System Operation Region (Central Europe SOR), became regulated entities that will progressively have to meet the additional requirements set out in the European Regulation on the Internal Electricity Market (Regulation (EU) 2019/943). The geographical scope of the Central Europe SOR is visible in Figure 1.

According to Article 46 of the Regulation (EU) 2019/943, the RCCs monitor their own operational performance, coordinated actions issued, effectiveness and efficiency, and submit an annual report based on the outcome of this monitoring. This report, targeting the year 2023, is the second annual report prepared by Coreso and TSCNET.

The target audiences according to the legislation of this report are:

- European Network of Transmission System Operators for Electricity (ENTSO-E),
- European Union Agency for the Cooperation of Energy Regulators (ACER),
- National Regulatory Authorities of the Central Europe SOR (Central Europe SOR NRAs),
- Electricity Coordination Group (ECG),
- Other stakeholders as defined by Regulation (EU) 2019/943.

This report is also publicly available on the websites of Coreso and TSCNET. No confidential information is included.

Figure 1: Overview of the Central Europe SOR[1]

[1] *EirGrid and SONI participate in the Central Europe SOR, however, their obligations pertaining to the RCCs' tasks shall become effective only upon the start of operation of the Celtic Interconnector.*

2.

Regulatory Context

Article 46

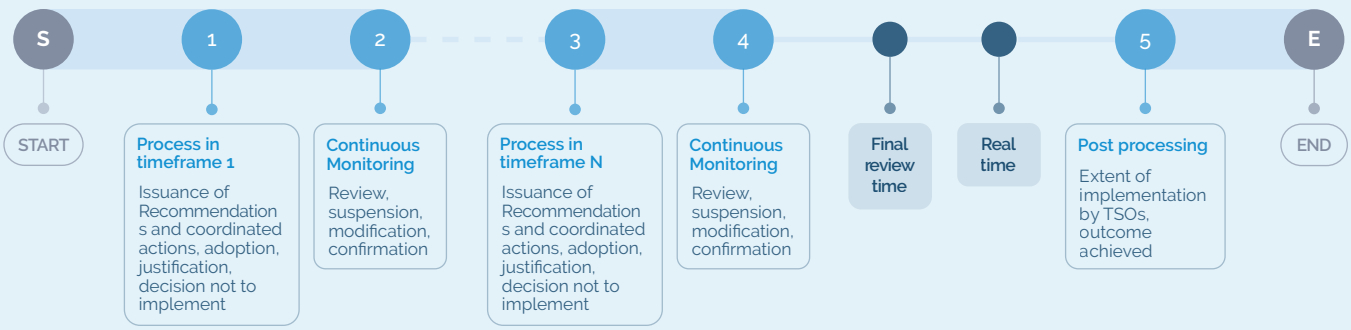
1. *Regional coordination centres shall establish a process for the continuous monitoring of at least:*
   - *(a) their operational performance;*
   - *(b) the coordinated actions and recommendations issued, the extent to which the coordinated actions and recommendations have been implemented by the Transmission System Operators and the outcome achieved;*
   - *(c) the effectiveness and efficiency of each of the tasks for which they are responsible and, where applicable, the rotation of those tasks.*
2. *Regional coordination centres shall account for their costs in a transparent manner and report them to ACER and to the regulatory authorities in the system operation region.*
3. *Regional coordination Centres shall submit an annual report on the outcome of the monitoring provided for in paragraph 1 and provide information on their performance to ENTSO-E, ACER, the regulatory authorities in the system operation region and the Electricity Coordination Group. .*
4. *Regional Coordination Centres shall report any shortcomings that they identify in the monitoring process under paragraph 1 to ENTSO-E, the regulatory authorities in the system operation region, ACER and the other competent authorities of Member States responsible for the prevention and management of crisis situations. Based on that report, the relevant regulatory authorities of the system operation region may propose measures to address the shortcomings to the regional coordination centres.*
5. *Without prejudice to the need to protect security and the confidentiality of commercially sensitive information, regional coordination centres shall make public the reports referred to in paragraphs 3 and 4.*

The present report offers information about the performance of our tasks in line with Regulation (EU) 2019/943 Article 46.1, 3, 4 and 5.

The provisions of Article 46.1.b are based on the business process presented on Figure 2, showing the concepts used in this report.

The provisions of Article 46.2 are not considered in the present report. Coreso and TSCNET have individually submitted their cost report, which is the annual statutory report, to ACER and the NRAs of Central Europe SOR in 2024 in accordance with Belgian and German national regulations.

Figure 2: A high-level business process of the concepts used in this report. The terms used have the meanings defined in Articles 42 and 46 of the Regulation (EU) 2019/943



3.

Content of the report

Coreso and TSCNET jointly serve the Central Europe SOR by performing coordination tasks either on a rotational basis or by task repartition. The Regulation (EU) 2019/943 Article 37 describes 16 tasks to be performed by the RCCs. Six tasks originate from Network Codes and Guidelines as RSC responsibilities and are continued in Coreso RCC and TSCNET RCC as part of the transition.

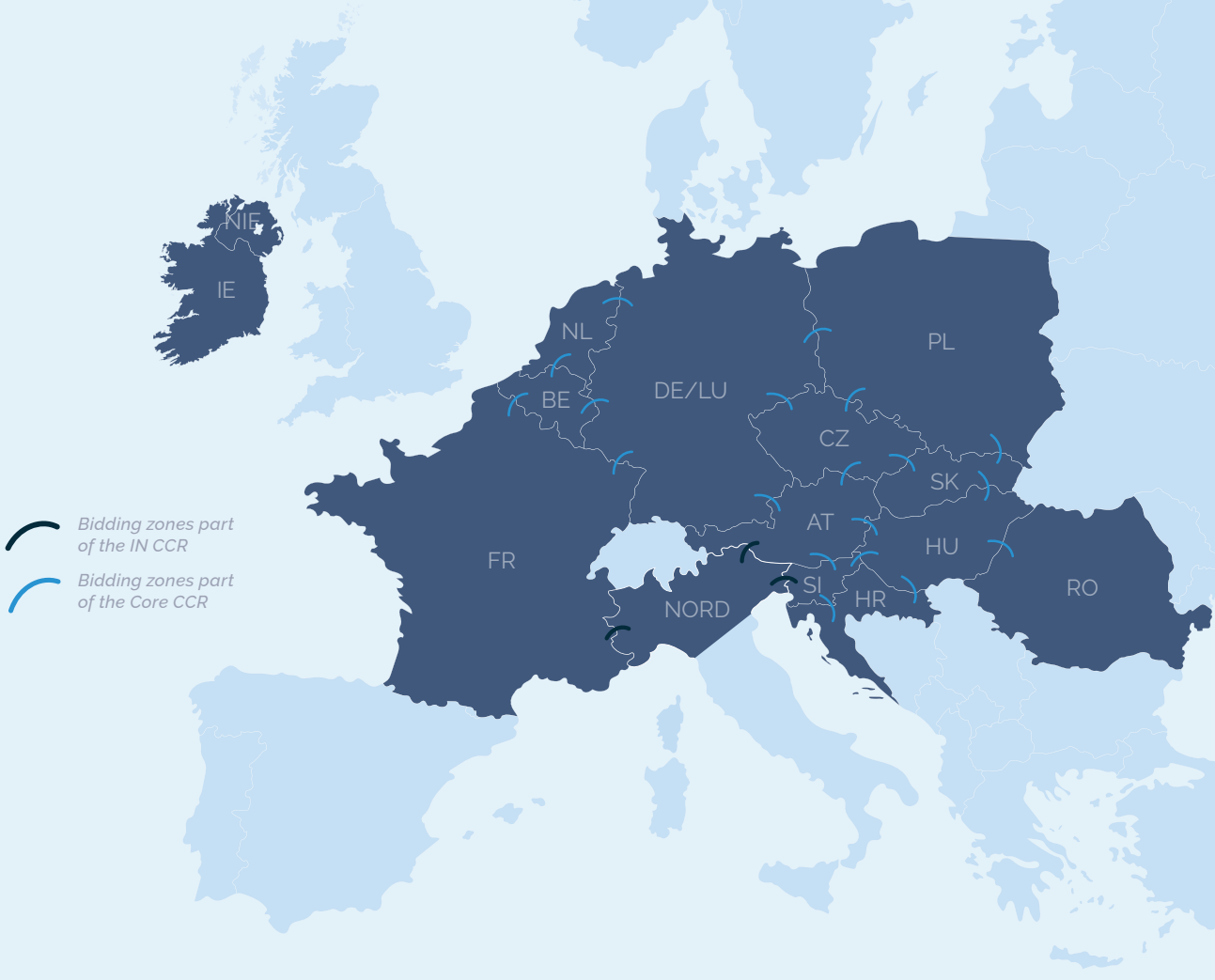


Figure 3: Bidding zones[2] that are part of the Central Europe SOR are indicated in dark blue and the additional bidding zones in light blue make up the Pan-EU region[3]

[2] Central SOR RCCs calculate capacities for the Capacity Calculation Regions (CCRs) of Core and Italy North (IN). The CCRs consist of bidding zones' borders.

[3] EirGrid and SONI participate in the Central Europe SOR, however, their obligations pertaining to the RCCs' tasks shall become effective only upon the start of operation of the Celtic Interconnector.

RCCs report on the monitoring of the operational performance and this report covers RCC tasks for the reporting year 2023.

The different tasks are implemented to varying degrees and are still being developed. During the reporting period we did not issue any Coordinated Actions or Recommendations.

ART. 37.1	SERVICE/TASK	BP STATUS / EXPECTED GO-LIVE DATE	RCC PERFORMING THE TASK
a	CCC DA CORE	In operation and under further development	TSCNET and Coreso
	CCC DA IN	In operation and under further development	Coreso
	CCC ID CORE	In operation and under further development / Go-live: 28.05.2024	TSCNET and Coreso
	CCC ID IN	In operation and under further development	TSCNET and Coreso
	CCC LT CORE	Under development / Go-live: Q4 2025	TSCNET and Coreso
	CCC LT IN	In operation	TSCNET and Coreso
b	CSA CORE[4]	Under development / Go-live CROSA DA: Q3 2025 Go-live CROSA ID: Q4 2025	TSCNET and Coreso
	CSA IN[4]	Under development / Go-live CROSA DA: 2026 Go-live CROSA ID: 2027	TSCNET and Coreso
c	CGM	In operation and under further development	TSCNET, Coreso, SCC, Baltic RCC and SEleNe CC
d	Defence and restoration plan	In operation / Go-live: Exercise every 5 years - next exercise in 2024-2025	TSCNET, Coreso, Nordic RCC, SCC, Baltic RCC and SEleNe CC
Not inc.	STA Pan-Eu	In operation and under further development	Coreso, Baltic RCC, Nordic RCC, SEleNe CC and SCC
e	STA Regional	In operation and under further development	TSCNET and Coreso[5]
Not inc.	OPC Pan-Eu	In operation and under further development	TSCNET, Baltic RCC, Nordic RCC, SEleNe CC and SCC
f	OPC Regional	In operation[6] and under further development	TSCNET and Coreso[7]
g	Training and certification of staff	In operation and under further development / Go-live process: 18.05.2024 Go-live certification: Q2 2026	TSCNET, Coreso, Nordic RCC, SCC, Baltic RCC and SEleNe CC
h	Regional restoration	Methodology under drafting / Go-live: Awaiting methodology approval	TBD
i	Post-operation and post-disturbances analysis and reporting	In operation	TSCNET, Coreso, Nordic RCC, SCC, Baltic RCC and SEleNe CC
j	Sizing	Under development / Go-live: Q3 2026	TSCNET and Coreso
k	Procurement	Under development / Go-live: Q3 2025	TSCNET and Coreso
l	Settlements	Cost sharing calculation: Under development / Go-live: latest 1 year after CROSA go-live	TSCNET and Coreso
m	Crisis scenario	Under development / Go-live: Exercise every 4 years - next exercise in 2024-2025	TSCNET, Coreso, Nordic RCC, SCC, Baltic RCC and SEleNe CC

[4] Legacy Security Assessment is currently in operation at Coreso and TSCNET for their shareholders. The expected go-live dates are referring to the future ROSC.

[5] Regional STA task is split between Coreso and TSCNET. TSCNET performs the task for TSCNET shareholders, while Coreso performs the task for Coreso shareholders.

[6] This refers to the legacy process. Regional Coordination Operational Procedure for OPC task is currently being developed.

[7] Regional OPC task is split between Coreso and TSCNET. TSCNET performs the task for TSCNET shareholders, while Coreso performs the task for Coreso shareholders.

ART. 37.1	SERVICE/TASK	BP STATUS / EXPECTED GO-LIVE DATE	RCC PERFORMING THE TASK
n	Seasonal adequacy assessments	Not requested by TSOs or not delegated by ENTSO-E / Go-live: -	N/A
o	MEC	In operation and under further development / Go-live: December 2023	TSCNET and Coreso
p	Support TYNDP	Methodology under drafting / Go-live: Awaiting methodology approval	TBD

Table 1: Status overview of the RCC tasks in Central Europe SOR[8]

STATUS	DEFINITION
In operation	The task is developed and implemented in line with the legal basis. There are no further functionalities to be added. The status includes recurrent tasks and tasks on demand.
In operation and under further development	The task is developed and implanted in a step wise implementation. Therefore, further developments are still ongoing.
Under development	The methodology is approved, and the development and implementation of the tasks are ongoing.
Methodology under drafting	The methodology or proposal is under drafting or has been submitted, but not yet approved by the NRAs or ACER.
Not requested by TSOs or not delegated by ENTSO-E	The RCCs are not required to provide the business process either because ENTSO-E/TSOs did not delegate the task, or the task is not involved in the rotational basis of a specific business process.

Table 2: Different statuses in task implementation process with descriptions

As not all tasks are implemented, monitoring is only possible for those tasks (partially) live. This operational report therefore analyses the following tasks:

- Coordinated Capacity Calculation (CCC),
- Common Grid Model (CGM),
- Outage Planning Coordination (OPC),
- Short-Term Adequacy (STA),
- Post-operation and post-disturbance analysis and reporting.

Each task is first described followed by the outcome of the monitoring and identified shortcomings. The outcome of the monitoring follows the obligations in Article 46.1 on (a) operational performance, (b) issuance and implementation of coordinated actions/recommendations, and (c) effectiveness and efficiency. The identified shortcomings follow the obligations in Article 46.4.

[8] *The provided go-live dates are accurate as of 17 September 2024 but may be subject to change.*

4.

CCC – Core CCR

The Day-Ahead Capacity Calculation (DACC) process within Core CCR is overseen by Coreso and TSCNET in their role as Capacity Calculation Coordinator (CCC) on a rotational basis and is live since 8 June 2022. The CCC task within the Day-Ahead timeframe is provided in the Core region as described in the latest version of the methodology approved by Core NRAs on 21 February 2019.

The DACC process is under continuous monitoring by Coreso and TSCNET operators, who track and report incidents in real time. Additionally, computation files are stored in the Core Capacity Calculation tool (CCCt) database, allowing to perform post-operational analysis and compute historical KPIs.

For the Day-Ahead (DA) timeframe, the method used to calculate cross-zonal capacities is the flow-based (FB) approach. This approach determines the available energy capacity that can be exchanged between Core bidding zones based on power transfer distribution factors (PTDF) and the remaining available margins (RAMs) of critical network elements. PTDF values indicate how changes in the net position (imports or exports) of each bidding zone affects the power flow on critical network elements.

To meet the requirements outlined in the CEP, specifically the «70% requirement», capacities shall be increased when necessary. These increased capacities ensure that a minimum percentage of maximum cross-zonal capacities is available for trading assuming that remedial actions are available for mitigating eventual security violations. This percentage varies among TSOs, and it is aligned with derogations or action plans targeting for the implementation of the 70% rule from CEP. Subsequently, the market coupling algorithm seeks to optimize energy exchanges within the Single Day-Ahead Coupling (SDAC) process.

4.1 Operational Performance

The Operational performance KPI for DACC process within Core CCR focuses on successful computation of the final cross-border capacities and delivering the results to participating TSOs within the agreed delivery deadlines. To display the operational performance of the process, the total number of timestamps successfully delivered (even if fallback procedures are applied), are divided by the total number of possible timestamps for the reporting period.

The table below shows the operational KPI value of the process as defined above, for the reporting period (year 2023).

OPERATIONAL PERFORMANCE KPI	
Successful execution (total number of successfully computed and delivered final cross-border capacities)	100%

Table 3: Core CCR Operational performance KPI for cross-border capacities execution

4.2 Coordinated actions and recommendations

There were no coordinated actions or recommendations issued in the Core region.

Coreso and TSCNET will report on coordinated actions and recommendations once the coordinated validation methodology is approved and the confirmation procedure as per Article 13 para. 2 "RCC Establishment Provisions" is implemented. The implementation of the coordinated validation will be done according to an implementation plan which is described in the amendment of the Capacity Calculation Methodology (CCM) DA for Core. The amendment of the Capacity Calculation Methodology (CCM) DA for Core is subject to approval by Core TSOs and NRAs in August 2024.

4.3 Effectiveness and efficiency

In contrast to Operational Performance KPI, which evaluates the overall number of timestamps where capacity results were delivered, the following KPIs focus on the quality of the delivered results. In this way, not only the availability of results is studied, but also the effectiveness and efficiency of the process to deliver results according to the defined methodology.

Firstly, the Effectiveness KPI analyses if any fallback procedure was applied in the calculation process in order to deliver the capacity results. Two fallback procedures are considered: Spanning and Default Flow-Based Parameters (DFP). On the other hand, the Efficiency KPI tracks the number of number of BD for which the Capacity results were delivered before target end time.

4.3.1 Effectiveness

This section contains the overview of results related to the KPI monitoring of the capacity calculation process in Core CCR. The table below shows the operational KPI values from 1 January until 31 December 2023, displaying the number and percentage of timestamps for which the CCC tool successfully performed the computation of the final cross-border capacities and delivered the computed capacities per border to all the participating TSOs within the agreed delivery deadlines without any fallback procedure divided by the total number of possible timestamps for the reporting period (hereinafter referred to as "Total computation rate").

EFFECTIVENESS KPI	
Total computation rate (total number of timestamps where the final cross-border capacities were delivered without any fallback procedures applied, neither DFP nor spanning)	99.95%

Table 4: Core CCR Effectiveness KPI

The total computation rate indicates successful computation of CCC tool without any fallback procedure per year based on each timestamp. In the Core capacity calculation process, fallback scenarios are applied when the process is not able to deliver capacity values for the market in time. Applying fallbacks is part of the agreed business process.

There are 2 types of fallback procedures in the Core DACC process, as described in the Article 22 of the DA CCM for Core:

- Spanning: the spanning calculation for the failed timestamp(s) is based on the intersection of previous and subsequent available flow-based domains.
- Default Flow-Based Parameters (DFP): the capacity values for the missing timestamp(s) are replaced with a default value for which the basis is the Long Term Allocated (LTA) capacity.

The general KPI above considers both fallback procedures combined, but in the table below the individual values for DFP and Spanning can be seen:

FALLBACK PROCEDURE	YEARLY INCIDENTS (TS)
Spanning	3
DFP	1

Table 5: Fallback values on yearly basis

A detailed description of the TS with fallback applied can be found in the Core DA CC Annual Report – Annex 2, and in JAO website under the Monthly Report section (link).

4.3.2 Efficiency

For the DACC process within Core CCR, the efficiency KPI is focusing on the efficiency of the process by analysing the amount of business days (BDs) for which the capacity results were delivered before the target end time.

In Core DACC process, there are two different end-time definitions for each step of the process:

- **Target end time**: Time limit to finish the process step and deliver the required documents, in a well-functioning situation. Any capacity calculation participant can deliver files at any time within the target end time with no further consideration.
- **Critical end time**: Additional time to mitigate unexpected situations that can be handled quickly. The process does not wait until critical end time if it is not needed and proceeds to the following step as soon as the blocking issue is solved. In this time window, the CCCt logic may unexpectedly close the gate for input files upload or update, if the process can already proceed to the following step without those files.

After Critical end time, the process continues regardless of the missing input files, applying fallback solutions if needed.

This KPI considers the timings defined for the pre-coupling capacity calculation process as defined in the Core Capacity Calculation tool (CCCt). These timings may differ from the market parties' internal process timings.

EFFICIENCY KPI	
Percentage of BD for which the Capacity results were delivered before target end time	95.03%

Table 6: Core CCR Efficiency KPI

4.4 Shortcomings

There are no shortcomings identified for the reported period.

5.

CCC – Italy North CCR

The Coordinated Capacity Calculation (CCC) process for Italy North (IN) CCR is jointly performed by Coreso and TSCNET. The process for Italy North CCR also includes the Swiss TSO, Swissgrid.

The process to determine the cross-border capacities for both the DA and ID timeframes is based on the coordinated Net Transfer Capacity (NTC) methodology. According to the DA and ID methodologies approved by IN NRAs, import and export scenarios of NTC allocation for each border within the CCR are to be computed as the outcome of the CCC process. The import scenario for all computed timestamps, which is the live process in 2023 for the DACC in the region, is modelled towards maximum import in the direction of Italy from all the borders of the region at the same time. For the IDCC process, the full import scenario was upgraded in accordance with the IN CCM to consider capacities in the export direction with the go-live of the Export Corner computation on 29 November 2023. The Export Corner go-live for the DACC process went live on 19 June 2024. To be compliant with the "70% requirement" described in the Clean Energy Package, capacities can be increased in the limit of redispatch potential to ensure that a minimum capacity of 70% of the max cross-zonal capacity is made available for trading.

5.1 Operational Performance

The operational performance KPI is defined as the total number of timestamps RCCs successfully computed the final cross-border capacities and delivered them to the participating TSOs within the agreed delivery deadlines, divided by the total number of possible timestamps for the reporting period (even if fallback procedure had to be applied).

Both Coreso and TSCNET are responsible for the IDCC process from the total transmissible capacity (TTC) calculation to the NTC calculation and delivery. The IDCC process consists of calculation for 4 timestamps (TS) at each business day but calculation of NTCs is performed for 12TS thanks to an interpolation process, resulting in a total amount of 4380TS for the entire 2023 reporting period. The performance KPI for IDCC represents the percentage of TS where RCCs were able to deliver the NTC calculation results, within expected fallbacks.

The DACC process, performed by Coreso only, consists of the TTC calculation phase. The NTC calculation and associated fallbacks are applied externally (Terna). 8TS are calculated at each business day by Coreso during the TTC calculation phase, which amounts to a total of 2880TS in 2023. The performance KPI of DACC represents the percentage of TS where Coreso delivered the calculated capacities or the appropriate fallbacks with the available inputs. In other words, the performance KPI represents the percentage of timestamps where no IT issues were faced by Coreso during the TTC calculation phase.

The table below demonstrates that for IDCC process both RCCs were able to successfully deliver NTC or to apply fallbacks in 96,99% of timestamps, which implies that for 3,01% of the timestamps, backup NTC values was used by the TSOs, due to failure of the tool to deliver capacities to the TSOs – such failure occurs when a mandatory input file for the process is missing or an IT related issue that impacts either the RCC or one of the TSOs. For DACC process, Coreso achieved 93,80% KPI result, which implies that for 6,20% of timestamps the additional fallback procedures according to methodology had to be applied by Terna.

PERFORMANCE KPI	DACC	IDCC
Total number of successfully delivered TS (including TS where fallback procedures had to be applied)	93,80%	96,99%

Table 7: Italy North CCR Operational Performance KPI for DA and ID timeframes

5.2 Coordinated actions and recommendations

A Coordinated Action for CC has been defined as a measure for reducing cross-zonal capacities that may be issued by RCCs to TSOs when minimum capacity requirements cannot be secured.

Not providing minimum capacity requirements in case of insufficient available RAs is currently required by the methodologies and hence yet implemented in the operational processes. Therefore, it is correct to state that the final objective of Coordinated Actions is already fulfilled in the IN CCR. However, there are currently no explicit Coordinated Actions issued by RCCs as the existing operational process and methodology do not require this. Potentially, this missing feature of coordinated actions will be implemented once IN CCR is merged with the Core CCR, and the Coordinated validation process will be applied by all TSOs of the IN CCR.

Additionally, no recommendations were issued for the reported period.

5.3 Effectiveness and efficiency

The Effectiveness KPI is defined as the ratio of the total number of timestamps for which the RCCs' CCC tools successfully performed the computation of the final cross-border capacities and delivered the computed capacities per border to all the participating TSOs within the agreed delivery deadlines, to the total number of possible timestamps for the reporting period (without applying of any fallback procedure).

For the effectiveness KPI calculation, we use the timestamps when no fallback or backup procedures had to be applied because the CCC tools performed the computation effectively. The fallbacks include cases where the TTC calculation could not be performed or delivered because of missing/invalid TSO inputs or failure of RCC tools.

The Efficiency KPI is defined as the ratio of the total number of timestamps for which the TSOs used the computed TTC by the RCC without reduction to the total number of computed timestamps in the reporting period. The capacity reduction process could be triggered by any of the TSOs during the local validation step of the process; either as a bilateral reduction at a given border or as a global capacity reduction for the entire CCR. The local validation step occurs after the adjustment for minimum margins and the Low TTC threshold application and so the TTCs without reduction are also including TTCs fixed by those 2 process steps.

Same responsibility of the process timeframe for both RCCs from section 5.1 applies for the effectiveness and efficiency KPIs on the right side which show the effectiveness and efficiency KPIs respectively for both the intraday and day-ahead timeframes.

The combined effectiveness rate of 62,24% for 2023 in the IDCC between TSCNET and Coreso implies that in 37.76% of the reported period, the use of fallback or backup procedures was necessary to ensure that coordinated capacities were delivered successfully to the TSOs. For the reporting period, 22.15% of the fallback procedures triggered within the IDCC process were due to missing or invalid inputs from the TSOs and 15.61% of the fallback procedures triggered were either due to IT issues on RCC's or TSO's tools and cases where no secure TTC was found due to grid constraints.

The DACC robustness is represented by 89,00% in effectiveness, and only in 11,00% of the cases Coreso was not able to provide any computed results. For the DACC process, 4.60% of the fallback procedures triggered were due to missing or invalid inputs from the TSOs, and 6,20% were due to IT issues on RCC's tools side. The remaining corresponds to TS where No Secure TTC could be computed, which is dependent on grid situations.

The combined efficiency rate of 61.60% for 2023 in the IDCC between TSCNET and Coreso implies that for 38.40% of the reported period we had at least one of the TSOs requesting for a capacity reduction of the initially computed capacity for the region, either bilaterally between a relevant border or for the entire region, due to a relevant security issue on their local grid from the initial computed value.

For the day-ahead computation, we observe that in 32.64% of TS TSOs used the validation phase to reduce the TTC calculated. The initial computed capacity was used in 47,88% of cases, while the Low TTC (minimum applied when comparing TTC planned and TTC calculated) was applied in 18.06% of cases. In 1.42% of cases, the final TTC was determined by adjusting to reach 70% of the minimum margin for cross-zonal trading.

EFFECTIVENESS KPI	DACC	IDCC
Total number of successfully delivered TS (excluding TS where fallback procedures had to be applied)	89,00%	62,24%

Table 8: Italy North CCR Effectiveness KPI for DA and ID timeframes

EFFICIENCY KPI	DACC	IDCC
Share of TS when no reduction by the TSOs was needed	67,36%[9]	61,60%

Table 9: Italy North CCR Efficiency KPI for DA and ID timeframes

5.4 Shortcomings

For the reported period, 22.15% of the fallback and backup procedures triggered within the IDCC process were due to missing or invalid inputs from the TSOs, and 15.61% of the fallback and backup procedures triggered were either due to IT issues on RCC's or TSO's tools and cases where no secure TTC was found due to grid constraints. Compared to the reported cases for 2022, it shows an improvement in the effectiveness and robustness of the tools up to 11.83%. Both RCCs and the TSOs of the region will continue to actively investigate how to further improve this KPI.

In May 2023, Coreso decommissioned the capacity calculation tool and replaced it with a more recent technology to achieve better computation performance (avoid failures due to computation time) and to receive more reactive support on the issues arising.

For the day-ahead computation, we observe that in 32.64% of TS TSOs used the validation phase to reduce the TTC calculated. The efficiency of 67,36% of the DA TTC calculation process is expected to be improved by 2 separate process updates. First, the Low TTC application is being updated in the methodology to provide a lower minimum. Secondly, the reference exchange hypothesis for Italy North TSOs is to be improved using a Net Position Forecast (against a reference calendar logic). This should improve the accuracy of Coreso's final TTC proposal and thus diminish the amount of reduction proposed by TSOs during the validation phase. NPF usage is expected to start in 2024.

[9] The DACC efficiency KPI over the year 2022 was equal to 55,03% but cannot be compared to the 2023 KPI because the TS which TTC were determined by Low TTC application or adjustment for minimum margins were considered inefficient.

6.

CGM

Merging the individual grid models (IGMs) of the TSOs is a well-known process to create the common grid model (CGM) of the interconnected grid of Europe. For the everyday operational procedures, it was first introduced two decades ago, when the Day-Ahead Congestion Forecast (DACF) procedure was introduced by the TSOs of the Continental Europe synchronous area. That process was focused on exchanging IGMs in the UCTE DEF and merging them into common grid models in UCTE DEF, to take the influence of the neighbouring networks into account. This format still serves as the basis for the legacy operational security assessment processes, provided by Coreso and TSCNET to their shareholder TSOs. These processes support regional coordination until the legally mandated tasks according to the CEP, Network Codes and Guidelines go-live.

The UCTE DEF, however, does not provide enough flexibility to efficiently model the wide range of assets used in the European Grid. To fulfil the needs to model complex equipment and support the wide range of operational planning tasks, the TSOs and RCCs are working on the migration to the more advanced grid model format called Common Grid Model Exchange Standard (CGMES) in the operational process. The CGM in business process will serve as the main data input for performing further analysis through the processes in the STA, OPC, CSA and CCC tasks.

The first step was the go-live of the CGM building process in CGMES format at the end of 2021. The pan-European CGM is created by merging the IGMs of the European TSOs, which was started in January 2022. CGMs are created for different timeframes (in 2023 in two days-ahead and intraday timeframes, and partially in day-ahead and yearly timeframes) based on an agreed rotational principle of the involved European RCCs and RSC (Baltic RCC, Coreso, SCC, SEleNe CC and TSCNET). Due to the manual data quality intervention and incomplete implementation of the substitution and replacement strategy, the resulting CGMs may not model all parts of the network (partial CGMs). These CGMs have not been used in any regional operational process during the reporting period by Coreso and TSCNET.

The CGMs are created by the RCCs based on an agreed rotational principle. According to this principle, the CGM creation task is organised in groups (based on timeframes, e.g. Group1 takes care of the D-1 and D-2 timeframes while Group 2 takes care of the ID timeframe) and roles (Main and Backup role). At a time, one RCC takes one role of one group and performs the CGM creation accordingly. The rotation takes place on every four weeks, when each RCC takes the next rotational step, according to the agreed schedule. The Main and Backup roles mean, that for the same timeframe, there are two RCCs in parallel creating CGMs. The agreed rotational calendar and handover templates ensure that the process remains efficient, and no extra efforts are wasted.

ENTSO-E and the RCCs are working closely together to provide an overview about the progress of CGM creation task. The main platform of such information exchange is the System Operation Coordination Group. The group consists of representatives from ACER, NRAs, ENTSO-E and European Commission. In quarterly meetings, the representative CGM OPDE TT presents the actual progress with the implementation of the CGM creation tasks. Besides that, twice a year ENTSO-E presents the External Regulatory Report to the regulators and ACER, providing detailed report about the progress of task implementation using the OPDE environment and CGMs. These reports are prepared in close collaboration with the RCCs.

In the rest of the CGM paragraph, any reference to the CGM building process or CGM used in any process shall refer to the CGM created based on the CGMES format.

6.1 Operational Performance

During the reported period, the RCCs built CGMs in the following timeframes, based on the number of published CGMs during the data collection phase of this report, accounting as successful also CGMs published after gate closure time, with the implementation of manual data quality intervention:

- Year-ahead (only performed on one selected scenario, as explained in the following paragraph),
- D-2 (1 run of CGM building process to provide 24 models for each day[10]),
- D-1 (1 run of CGM building process to provide 24 models for each day[11]),
- ID (Q1 and Q2 2023: 3 runs of CGM building process to provide 24 models for each day[12]; Q3 and Q4 2023: 24 ID processes per day, each of which covers the remaining hours from the next target time to the end of the relevant calendar day).

[10] Or 23/25 timestamps due to Daylight saving time.

[11] Or 23/25 timestamps due to Daylight saving time.

[12] Or 23/25 timestamps due to Daylight saving time.

Year-ahead (Y-1) is further away from operational as compared with other time frames and is still under test phase. The Year-Ahead merging process for the reporting period was performed only on Winter Peak I scenario, based on the 3rd Wednesday of January year 2023, 18.01.2023 10:30 CET.

This compares the successful publication, based on the number of published CGMs during the data collection phase of this report, accounting as successful also partial CGMs published after gate closure time, with the implementation of manual data quality intervention, (i.e. successful validation of the CGM based on the Quality Assurance Portal) to the expected number of CGMs. However, in this report, the KPI was calculated only for TSCNET and Coreso.

The high share of submitted published CGMs shows that the RCCs are capable to perform the process. However, this high share does not reflect that manual data quality interventions are necessary and, to some extent, result in the exclusion of IGMs blocking the process. Furthermore, the manual interventions take time and these partial CGMs are accounted as successful even when published after the Gate Closure Time (GCT). Furthermore, for ID, the quality metrics are measured on one delivery per timestamp.

The high share of published CGMs shows that these CGMs could pass the validation checks on the common platform. Regarding the ID CGMs on Coreso side, the lower share of 89.15% of publication is caused by multiple reasons. The recurrent ones being IT issues (either on RCC side, or on ENTSO-E central component side) and, overall, no manual data quality intervention after Gate Closure Time for CGM submission.

In 2023 for the year-ahead time-horizon, TSCNET was in rotation as the backup RCC to create the year-ahead CGM for the calendar year 2024 (Coreso was out of rotation for this time horizon in 2023).

Additional merges were performed to include as many IGMs as possible and ensure that resulting CGMs are as meaningful as possible from a business standpoint.

DEFINITION	TIME-HORIZON				
	Y-1	D-2	D-1	ID	RCC
% of published CGMs/due CGMs (as main or backup RCC)	100%	99.97%	99.88%	98.51%	TSCNET
	N/A	95.66%	95.74%	89.15%	Coreso

Table 10: CGM building process Operational performance KPIs

SCENARIO NAME	IGMS INCLUDED IN THE FIRST MERGE	IGMS INCLUDED IN THE LAST MERGE
Winter I peak	35.00%	52.50%

Table 11: Year-Ahead Scenarios

6.2 Coordinated actions and recommendations

The RCCs do not issue recommendations formally for the CGM task yet. However, RCCs currently provide proposals to TSOs concerning the data quality.

6.3 Effectiveness and efficiency

Based on the expertise acquired since the go-live of the CGM task in December 2021, the community of TSOs and RCCs has refined its approach, consistently improving its capacity to execute this task with enhanced effectiveness and efficiency. Presently, the key topics are the number of IGMs included in the CGM, the timely delivery of the CGMs, and the metrics to monitor the process performances. Indeed, for the period covered by this report, the RCCs observed that the CGM building process can fail without manual data quality interventions. These interventions often mean that certain IGMs – even if these were successfully validated - need to be excluded from the CGM, in order to be able to create the CGM (see chapter 6.4).

Effectiveness of the CGM process in the current report is defined based on the data collected by ENTSO-E and metrics monitored by RCCs to keep the reports consistent in the community, and is illustrated by IGMs inclusion status defined as follows:

- the percentage of total published IGMs needed by the pan-European CGM process, that were included in the corresponding CGMs (metric M09 from ENTSO-E CGM Building dashboard).

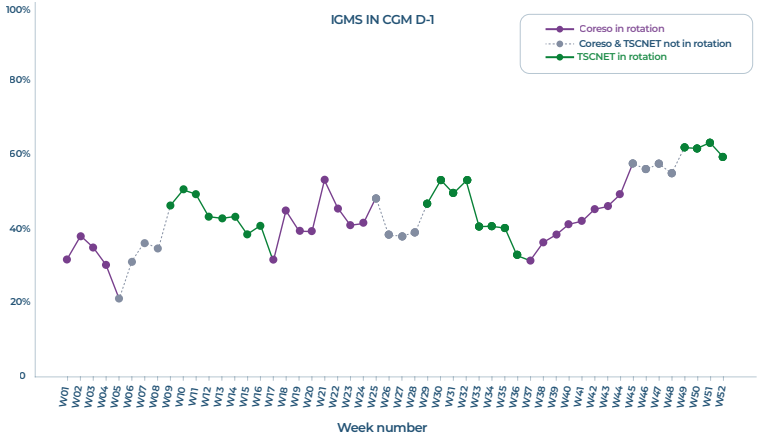


Figure 4: Percentage of IGMs included in CGM for D-1 timeframe

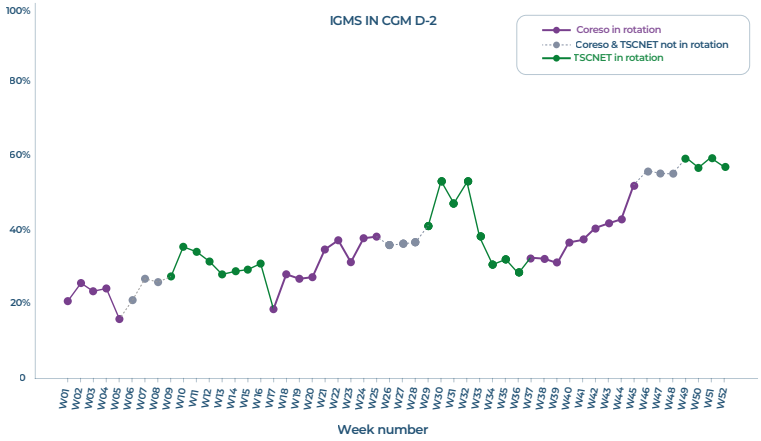


Figure 5: Percentage of IGMs included in CGM for D-2 timeframe

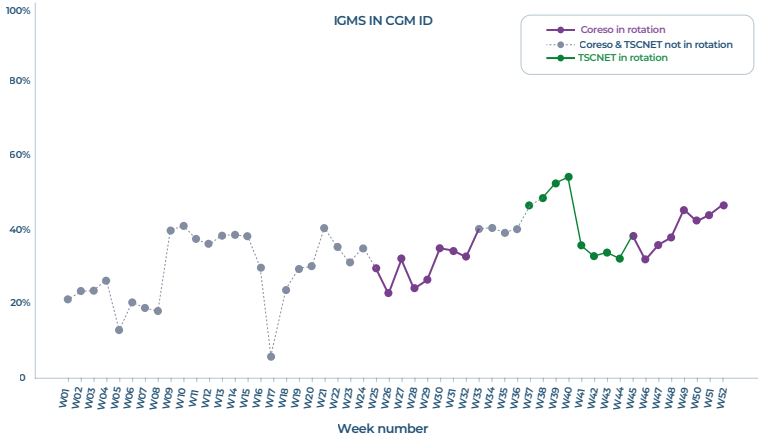


Figure 6: Percentage of IGMs included in CGM for ID timeframe

DEFINITION	TIME-HORIZON			RCC
	D-2	D-1	ID	
M09	39.77%	47.37%	41.78%	TSCNET
	31.33%	39.59%	34.71%	Coreso

Table 12: CGM Effectiveness KPI

The process of monitoring the efficiency of the merging process is planned to be implemented with the following metrics:

- Ratio of the time it should take to create and submit the CGM and to the time it took to create and submit the CGM (excluding the validation, considering all CGM),
- Ratio of the time it should take to deliver the CGM and the time it took to deliver the CGM (excluding the validation, considering the published CGM only).

6.4 Shortcomings

The accurate modelling of the very complex transmission network with all its equipment is a challenging task for all involved parties. All involved RCCs and TSOs are working together to reach high-quality CGMs.

The following issue was identified as a shortcoming: currently, the performance (timely delivery of CGM by RCCs) and quality requirements (IGM inclusion) are hard to meet at the same time during the CGM building process. It has been observed that successfully validated IGMs cannot always be included in the merged grid models. There exists no regional operational process currently live at Coreso or TSCNET based on the CGM. There is no single explanation for the root cause, and each of the issues needs to be investigated separately. In response to this, the TSOs and RCCs established a 'Modelling Group' linked to ENTSO-E to align on issues, root causes and agree with TSOs on adequate solutions. Furthermore, the Modelling Group started to perform individual data quality assessment with the involvement of all RCCs in rotation and the affected TSOs. This approach allowed the resolution of a part of the issues that prevented the inclusion of certain IGMs.

On 24 April 2024, ENTSO-E's System Operation Committee approved the CGM Action Plan addressing various measures to improve the business process for the CGM creation, including the data quality.

7. OPC

The OPC task is performed at two levels: pan-European and regional. The pan-European process is performed by the RCCs on a rotational basis, using an ENTSO-E tool. The main purpose of this task is to harmonize the outage plans across Europe.

Due to historical reasons, two regional OPC processes were performed in 2023, one by Coreso and one by TSCNET, based on the technical requirements agreed with the respective shareholder TSOs. Currently, the regional OPC process is performed based on shareholder relationships, but it will be changed to Outage Coordination Region (OCR), which equals to CCR. During these processes, the RCCs propose solutions to solve OPIs towards the TSOs in the form of outage cancellations. These processes are not included in this report as they are not performed based on a commonly agreed Regional Coordination Operational Procedure (RCOP) between TSOs of the respective outage coordination region in accordance with Article 83.1 of SOGL.

7.1 Operational Performance

Operational performance is generally considered as the percentage of processes triggered (irrespective of deadline) compared to the processes expected to be triggered. For the reported period in 2023, all pan-European OPC processes were successfully performed (but not always within the defined deadlines – see KPI 2.A).

ART.46 CENTRAL SOR			TIME-HORIZON		REGION
ID	PROCESS	DEFINITION	WA	YA	
1	OPC	% of process successes	100%	100%	Pan-EU[13]

Table 13: OPC Operational Performance KPI

[13] *TSCNET provides the pan-EU OPC process for all concerned TSOs in the Central Europe SOR (both Coreso and TSCNET shareholder TSOs).*

7.2 Coordinated actions and recommendations

The issued recommendations in the OPC process are not included in this report because the RCOP is not available and is not implemented.

7.3 Effectiveness and efficiency

We measure the effective performance of the process from the perspective of a timely delivery of the results for the TSOs, so these can be used as input for further processes. The late delivery could cause delays and fallback procedures, resulting in lower effectiveness of the operational planning.

To further support the effective performance of the processes, TSCNET and Coreso support the TSOs with tie-line outage inconsistency checking and feedback on the correct mapping of the outages between the OPC format and the grid model used for the regional OPC calculation.

ART.46 CENTRAL SOR			TIME-HORIZON		REGION
ID	PROCESS	DEFINITION	WA	YA	
2.A	OPC	% of result delivery within defined deadlines	98.56%	100%	Pan-EU
2.B	OPC	% of consistent tie-line outages	95.40%	95.31%	Pan-EU
2.C	OPC	% of correctly mapped assets between OPC & CGM	94.94%	97.23%	Pan-EU

Table 14: OPC Effectiveness and Efficiency KPIs

In the reported period for pan-EU TSOs, 3 out of 208 merges were delayed during the week-ahead OPC process due to tool issues. The delayed merges do not have a significant impact on the final regional coordination, because regional coordination calls are performed on weekly and yearly basis and manual backup procedures are available in case of failure of the automated processes.

7.4 Shortcomings

The pending development of the RCOP and the subsequent reporting of activities from RCCs towards the TSOs as part of the regional OPC process is considered a shortcoming. The development of this procedure is required under collaboration of the RCC and their delegated OCR.

8. STA

To ensure a good balance between supply and demand, the role of the STA service consists, in the D-1 to D-7 timeframe of both pan-European and regional adequacy assessments.

The goal of the pan-European adequacy assessment is to detect situations where a lack of electricity adequacy is expected in any of the control areas or at regional level (pan-European view), considering the cross-border exchange limits. The pan-European assessment is performed using two different approaches, namely the deterministic and probabilistic approach. The deterministic approach performs the assessment based on the best forecast from TSOs, whereas the probabilistic approach considers variations in generation, load and transmission asset availabilities. The pan-European assessment is performed by a central tool managed by ENTSO-E based on a rotational principle among RCCs.

Regional adequacy assessment is conducted in the relevant adequacy region which is defined by a matrix showing the TSOs to be included in the assessment depending on the control area/region having the adequacy issue. This assessment is triggered either by the results of STA Cross-Regional assessment or upon TSO request (for instance, in case of regional scarcity issue or insufficient cross-zonal capacities). To resolve the adequacy identified and mitigate the risk of it, the RCC of the affected shareholder TSO/region will then propose remedial actions to the associated TSOs and coordinate them with other RCCs depending on the geographic region identified for the assessment.

8.1 Operational Performance

Operational performance is based upon the successfully completed executions of the STA calculations. Pan-European STA is triggered once a day regularly and in case of a request from a TSO, a second run is also performed. For the monitored period at the pan-European level, 389 calculations were triggered and only 4 calculations failed. On the other hand, no regional adequacy assessment was triggered.

ART.46 CENTRAL SOR		TIME-HORIZON	REGION
PROCESS	DEFINITION	WA	
Pan-EU STA	% of process successes	98,97%	Pan-EU[14]

Table 15: Pan-EU STA Operational Performance KPI

8.2 Coordinated actions and recommendations

Proposal of remedial actions (RAs) are only relevant to the regional adequacy assessments. For the monitored period, no regional adequacy assessment was triggered for the TSOs of the Central SOR region. Therefore, no recommendation was given to the TSOs.

8.3 Effectiveness and efficiency

An efficiency KPI is defined as the percentage of days without the need of additional STA calculation which is generally triggered in case of input data issues at the pan-European level. During 2023, an additional run was triggered 27 times. Reasons for second run are either data quality inconsistency (e.g. missing TSO input data or required update) or an application issue (e.g. calculation failure in the first run).

ART.46 CENTRAL SOR		TIME-HORIZON	REGION
PROCESS	DEFINITION	WA	
Pan-EU STA	% of days without the need for additional run	92,60 %	Pan-EU

Table 16: Pan-EU STA Efficiency KPI

[14] Coreso provides the pan-EU STA process for all concerned TSOs in the Central Europe SOR (both Coreso and TSCNET shareholder TSOs).

On the other hand, an effectiveness KPI is defined by the capability of the process to provide a resolution to the adequacy issue identified at the regional level. Following information will be delivered in the future versions of the report per each Regional Adequacy Assessment (RAA) triggered:

NO	DATE OF ASSESSMENT	DATE OF EVENT	RCC LEADER	NO. OF CONCERNED TSOS	INADEQUACY DURATION	ENS [MWH]	PROPOSED MITIGATION ACTION	RESOLUTION STATUS
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 17: KPIs for Regional STA Triggers (sample). No values are available as no regional process was initiated.

Date of Assessment: date when the pan-European STA is assessed.

Date of Event: date and timestamp of the case for which Regional STA process is triggered.

RCC leader: RCC responsible for leading the Regional STA process.

No. of concerned TSOs: No. of TSOs participating in the Regional STA process, main affected TSO (for which ENS is detected) and their neighbours that can have an impact on the main affected TSO (determined based on Dynamic matrix).

Inadequacy duration: number of timestamps in the week-ahead time frame for which the main affected TSO is in inadequacy situation (each timestamp corresponds to one hour).

ENS [MWh]: amount of 'Energy Not Supplied' in the timestamp assessed during the Regional STA process.

Proposed mitigation action: list of RAs considered as a solution to the lack of adequacy (this can be one or multiple actions depending on the case assessed).

Resolution Status: status of the resolution of the adequacy issue identified.

8.4 Shortcomings

No shortcomings are reported as there was no regional process triggered.

9.

Post-operation and post-disturbances analysis and reporting

On 31 March 2022, the post-operation and post-disturbances analysis and reporting methodology was approved by ACER in accordance with the regulation. The task according to this methodology went live on 1 October 2022. In the everyday operations, this task is often referred to as Regional Incident Analysis and Reporting (RIAR). The RCCs' process to carry out the post-operation and post-disturbances analysis and reporting interacts with the existing process run by the ENTSO-E Incident Classification Scale (ICS) Expert Panel established for the investigation of incidents on scale 2 and scale 3 in accordance with the ICS Methodology. After the incident threshold of scale 2 or 3 is triggered, a factual and final report shall be prepared by an expert panel. An RCC Investigation Subgroup is created within the ICS Expert Panel. This group supports the assessment of whether the RCC Investigation Threshold defined in Article 5.1 is met and leads the subsequent investigation relating to RCC activities. A chapter pertaining to RCC activities will be prepared by the RCC subgroup and included in the final report. Details of the interactions and activities led by the ICS Expert Panel and the RCC subgroup are shown in figure 7.

Recommendations issued by the RCC subgroup will be tracked in a dedicated database and updated by each RCC for their respective SOR (Article 46.3). For the Central SOR region, this will be detailed in this report.

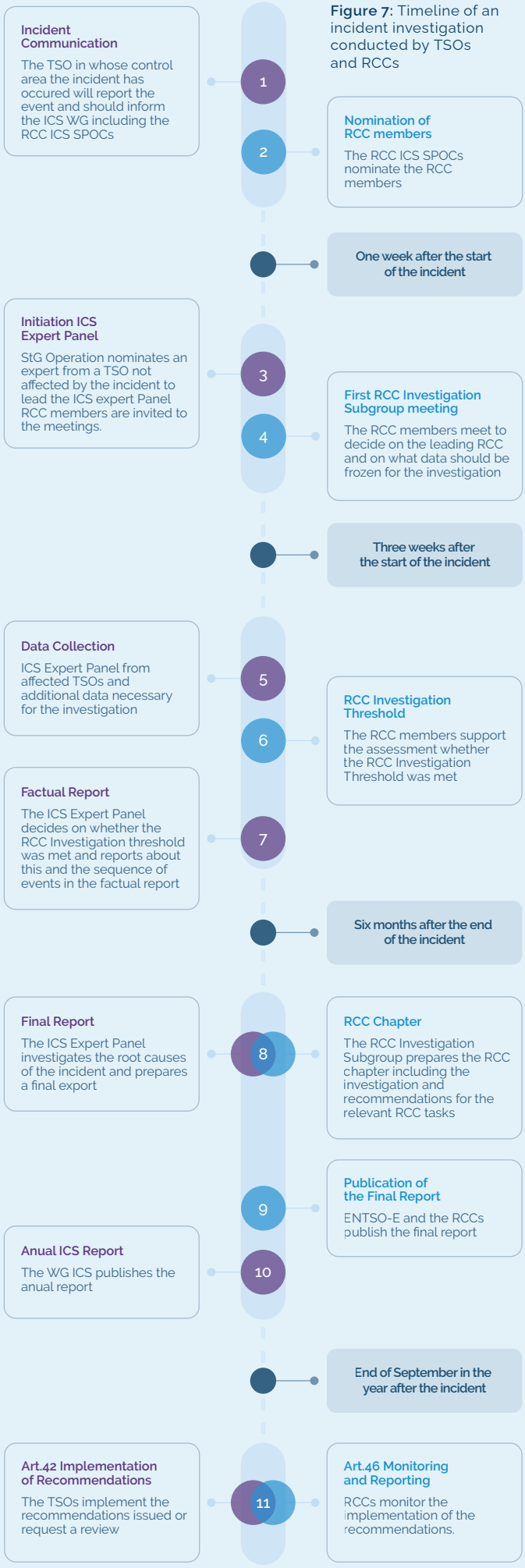


Figure 7: Timeline of an incident investigation conducted by TSOs and RCCs

9.1 Operational Performance

In 2023, an incident initially suspected to be classified as scale 2 was reported to RCCs. On 19 September 2023, RCCs were informed about an incident that had occurred in Montenegro on 28 May 2023. According to the methodology, a nomination should have been made within one week of the incident. By 22 September 2023, all RCCs had nominated their main and backup members in accordance with Article 3 of the RIAR methodology. After a thorough review by the ICS Expert Panel, the incident was ultimately classified as scale 1, meaning it did not meet the threshold for an RCC investigation, and no further investigation was initiated.

9.2 Coordinated actions and recommendations

No recommendations were made during the year 2023, since no incidents were above the RCC investigation threshold.

9.3 Effectiveness and efficiency

Effectiveness of this task has been defined as:

- Nomination and communication of the RCC members within one week after the incident occurred,
- Publication of the final report, including the RCC chapter by the end of September in the year after the incident.

A nomination until 4 June 2023 for the incident on 28 May 2023 was not possible since RCCs became only aware of the incident on 19 September 2023. Once the RCCs became aware of the incident, they nominated and communicated RCC members within 3 days.

No final reports were published since no incident was above the threshold.

Efficiency of this task can be assessed based on published reports in case of the RCC investigation threshold being met. Reducing this down to a one number KPI is not possible since each incident case is unique and difficult to compare with the other cases.

In 2023, TSCNET and Coreso spent 160 hours each on the task for the improvement of training material for certifying additional investigators.

9.4 Shortcomings

We see further progress potential for the communication during the incident occurred in 2023 towards RCCs – specifically to allow for timely resource allocation in case of need. Independent of the fact that the incident was later classified as scale 1, timely communication optimally allows RCCs to nominate members within the foreseen timeframe of one week and ensure that data can be collected for the investigation.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