Coreso and TSCNET monitoring report Central Europe SOR

EU 2019/943 Art. 46

TSCNET Services

coreso

Revised version - January 2024

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List of abbreviations

ACER	Agency for the Cooperation of Energy Regulators
BD	Business Day
CCC	Coordinated Capacity Calculation
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
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
KPI	Key Performance Indicator
NRA	National Regulatory Authority
NRAO	Non-costly Remedial Action Optimizer
NTC	Net Transfer Capacity
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
RSC	Regional Security Coordinator
RIAR	Regional Incident and Analysis Reporting
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 10 years 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 document is the first edition of this annual report.

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

- European Network of Transmission System Operators (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)

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

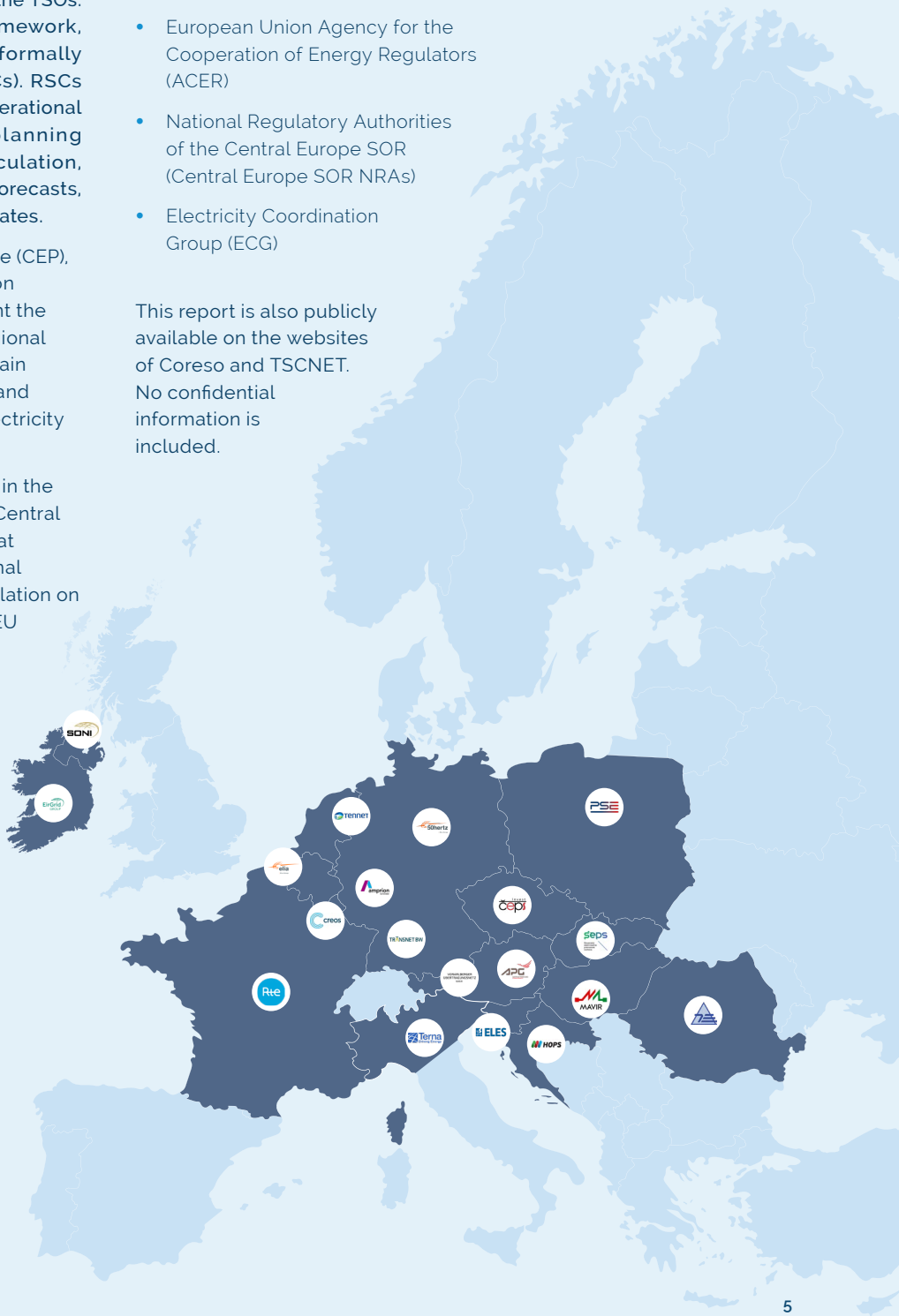


Figure 1: Overview of the Central Europe SOR

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.*

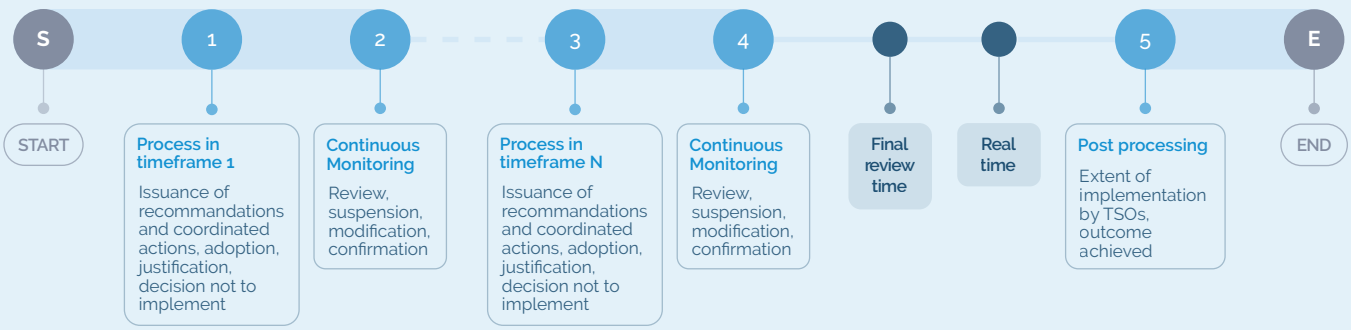
The present report offers information about the performance of our tasks in line with Regulation EU 2019/943 Article 46.1, 3, 4 and 5.

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 2023 in accordance with Belgian and German national regulations.

Furthermore, the Annual Regional Coordination Assessment Report (SO GL Art. 17) published by ENTSO-E includes Key Performance Indicators (KPIs) for the tasks provided by all Regional Coordination Centres (RCCs). On the other hand, this report specifically focuses on the RCC tasks performed by TSCNET and Coreso.

Figure 2: A high-level business process of the concepts used in this report. The terms used have the meanings defined in Art42 and 46.



3.

Content of the report

Coreso and TSCNET jointly serve the Central Europe SOR by performing tasks and providing services to various TSOs 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. 6 tasks originate from Network Codes and Guidelines as RSC responsibilities and are continued in Coreso RCC and TSCNET RCC as part of the transition.

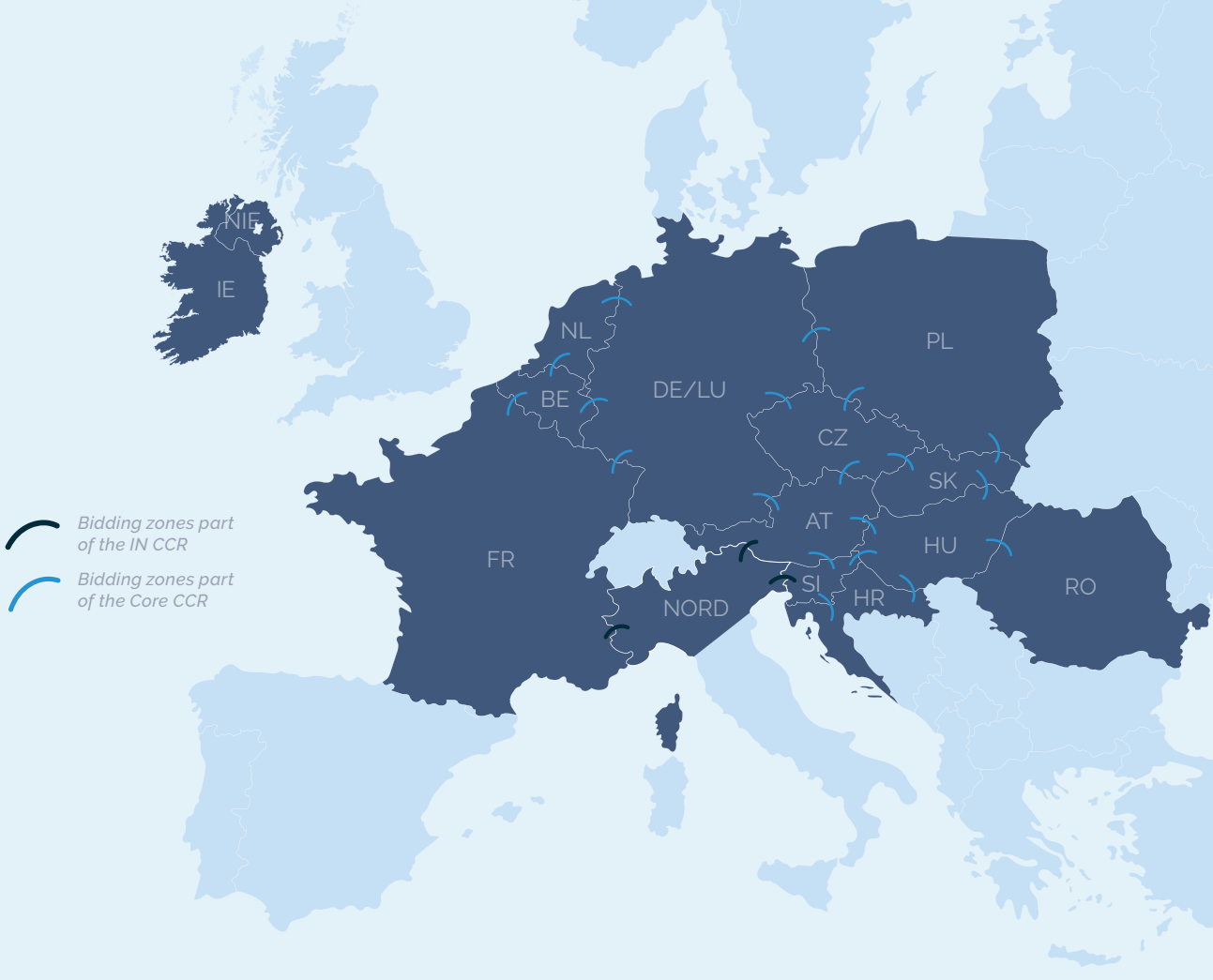


Figure 3: Map of bidding zones part of the Core CCR and IN CCR, part of the Central SOR. Bidding zones[1] that are part of the Central SOR are indicated in blue and the additional bidding zones in grey make up the Pan-EU region[2]

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

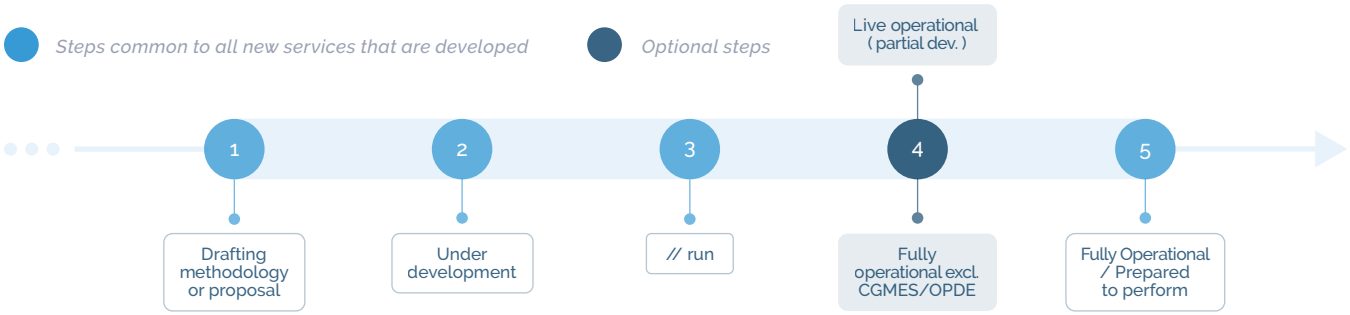
[2] EirGrid and SONI participate in the Central Europe SOR, however, their obligations pertaining to the RCCs' tasks shall become effective only upon the start of operation of the Celtic Interconnector.

Both Coreso and TSCNET transitioned from RSC to RCC on 1 July 2022 to comply with Regulation EU 2019/943, taking over the RSC services as well as taking on new tasks as regulated by the EU. After this legislation a new report that monitors the operational performance of the tasks of RCC has been requested.

The report covers RCC tasks and, since Coreso and TSCNET transitioned from RSC to RCC on 1 July 2022, marking the start of this new reporting obligation, this yearly report therefore exceptionally covers a reporting period from 1 July to 31 December 2022.

The different tasks are implemented to varying degrees and are still being developed. For some tasks no Coordinated Actions or Recommendations are issued yet, resulting in a limited ability to monitor these.

Figure 4: The different steps in the task implementation process



ART. 37	SERVICE/TASK	BP STATUS
a	CCC DA CORE	Live - operational (partial dev.)
	CCC DA IN	Live - operational (partial dev.)
	CCC ID CORE	Under development (//run)
	CCC ID IN	Live - operational (partial dev.)
b	CSA Inter-CCRs	Under development
	CSA CORE	Under development
	CSA IN	Under development
c	CGM	Live - operational (partial dev.)
d	Defence and restoration plan	Fully operational - Prepared to perform
Not inc.	STA Pan-Eu	Live-Operational (partial dev.)
e	STA Regional	Live-Operational (partial dev.)
Not inc.	OPC Pan-Eu	Fully operational excluding CGM in OPDE
f	OPC Regional	Fully operational excluding CGM in OPDE
g	Training and certification of staff	Under development
h	Regional restoration	Drafting methodology or proposal
i	Post-operation and post-disturbances analysis and reporting (from this point forward referenced as RIAR)	Fully operational - Prepared to perform
j	Sizing	Under development
k	Procurement	Under development
l	Settlements	N/A
m	Crisis scenario	Under discussion at ENTSO-E
n	Seasonal adequacy assessments	ENTSO-E does not delegate the task
o	MEC	Under development
p	Support TYNDP	Drafting methodology or proposal

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

STATUS	DEFINITION
Fully operational	Full development in line with the legal basis of the business process including the format if needed. There are no further functionalities to be added. This does not exclude the regular update and new releases. If there is no format needed, the business process will be considered also in this status.
Prepared to be performed	The task is not recurrent. Coreso and TSCNET are ready to perform the task when needed.
Fully operational excluding CGM in OPDE	Further development is needed to fully operate the task in the OPDE environment in the CGMES format. There are no further functionalities to be added. This does not exclude the regular update and new releases.
Live-operational (partial dev.)	The main outcome of the business process is used by the TSOs. It can be the first time of a go-live of the business process, however: • There are still further functionalities to be developed or at least foreseen in the regulations, • It also includes the intermediate solutions, • It does not include CGM in OPDE.
// run	The main outcome of the business process is in // run, meaning that the TSOs can see the outcome but do not use it.
Under development	The main outcome of the business process is being addressed within a project(s).
Drafting methodology or proposal	The methodology or proposal is under drafting or have been submitted, but not yet approved by the NRAs or ACER.
N/A	Coreso and TSCNET are not required to provide the business process either because ENTSO-E/TSOs did not delegate the task or is not involved in the rotational basis of a specific business process.

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)
- Regional Incident Analysis and Reporting (RIAR)
- Short-Term Adequacy (STA)

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.

4.

CCC – Core CCR

The Day-Ahead Capacity Calculation (DACC) process within Core CCR is performed by Coreso and TSCNET on a rotational basis and is live since 9 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.

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

To meet the requirements outlined in the Clean Energy Package, specifically the «70% requirement,» virtual capacities can be created. These virtual capacities ensure that a minimum percentage of maximum cross-zonal capacities is available for trading. This percentage variates 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 KPIs for DACC process within Core CCR focus on the merging and NRAO process steps. These two process steps are performed by RCC tools. Coreso is responsible of delivering merging packages containing the results from the merging process including the common grid models for D2CF. To display the operational performance for merging the total number of timestamps without default flow-based parameters (DFP) or spanning due to merging issues are displayed along with a percentage success rate. The KPIs focus exclusively on cases where no merging results were delivered due to errors in the merging tool e.g., errors caused by input data quality issues are not in scope as they are not considered related to RCC operational performance.

The NRAO process step is performed by both TSCNET and Coreso in parallel by each of the individual RCC RAO tools. To display the operational performance for NRAO, the total percentage success rate of the total number of timestamps with NRAO results applied is shown.

Merging

The table below shows the operational KPI value for merging for 2022 (considering the relevant reporting period for 2022, from 1 July until 31 December 2022).

OPERATIONAL PERFORMANCE KPI - MERGING	
Total percentage success rate (total number of timestamps without DFP/Spanning due to merging issues)	99,78%

Table 2: Core CCR Operational performance KPI for merging

The table below shows an overview of the Business Day (BD) / Timestamps (TS) and provides an explanation where no merging results were delivered due to errors in the merging tool.

MONTH	BD/TS WHERE MERGING RESULTS WERE NOT DELIVERED	EXPLANATION
November	07.11. (7 TS) (DFP)	Merging server configuration error
December	22.12. (1 TS) (Spanning)	Load flow failure due to high total imbalance in the CGM
	25.12. (1 TS) (DFP)	Merging failure caused by a Base Case Improvement (a step in the process)

Table 3: Core CCR Operational performance KPI for merging

NRAO

The table below shows the Operational KPI value for NRAO for 2022 (considering the relevant reporting period for 2022, from 1 July until 31 December 2022).

OPERATIONAL PERFORMANCE KPI - NRAO	
Total percentage success rate (total number of timestamps with NRAO results applied)	96,14%

Table 4: Core CCR Operational performance KPI for NRAO

In accordance with Article 26.4 from the Core Day-Ahead Capacity Calculation methodology: in case the minimum value (ambition level) of any of the defined data quality indicators is not met on average on a monthly basis, detailed reasons for the failure as well as a corrective action plan for past failures and the prevention of future failures shall be published[3]. During the reporting period the TSCNET NRAO tool has failed due to an issue with the starting procedure of an NRAO application component. This issue was corrected by implementing a correct application component starting procedure. In addition, both Coreso and TSCNET updated the hardware resources along with a deployment of an updated version of application to resolve IT-infrastructure limitations.

4.2 Coordinated actions and recommendations

There were no coordinated actions issued in the region.

Coreso and TSCNET will report on coordinated actions and recommendations once the coordinated validation methodology is approved and the confirmation procedure as per Art. 13 para. 2 "RCC Establishment Provisions" is implemented. The implementation of the coordinated validation will be done according to an implementation plan which will be submitted together with the amendment of the Capacity Calculation Methodology (CCM) DA for Core by the Core TSOs to Core NRAs before December 8th, 2023.

[3] *The action plan can be found on the JAO webpage (https://www.jao.eu/monthly-reports)*

4.3 Effectiveness and efficiency

In the CORE DACC process, Coreso is responsible for the merging step and the effectiveness KPIs display timestamps for which the merging tool successfully delivered merging results and in addition the success rate of when fallbacks were not applied.

In contrast to operational performance KPIs, which evaluate the merging tool's performance based on the quality of the delivered CGM and treat CGM issues leading to Spanning or DFPs as failures, effectiveness KPIs focus solely on the total number of timestamps where merging results were delivered. These are considered successful cases, provided that the merging request was initiated from the Core Capacity Calculation tool (CCCt), and the merging was executed successfully, resulting in the submission of merged data with an acknowledgment file received. Cases where subsequent process steps failed due to merging result issues are not categorized as failures because the CGMs were merged and submitted to the CCCt.

To further assess the effectiveness, the total number of timestamps without fallbacks applied is monitored, displaying the success rate presented as a percentage. Instances where the CCCt did not deliver the RAO request are not considered in the KPI monitoring of fallbacks applied.

4.3.1 Effectiveness

This section contains the overview of results related to the KPI monitoring merging and fallbacks.

Merging

The table below shows the operational KPI values for merging from 1 July until 31 December 2022, displaying the number and percentage of timestamps where the merged results were successfully delivered to the CCCt given that a merging request was provided by the CCCt.

EFFECTIVENESS KPI - MERGING	
Total percentage success rate (total number of timestamps where merged files were delivered)	99,93%

Table 5: Core CCR Effectiveness KPI for merging

The table below shows an overview of the BD and number of TS where no merging results were delivered.

MONTH	BUSINESS DAY (BD)/TIMESTAMP (TS) WHERE MERGING RESULTS WERE NOT DELIVERED	EXPLANATION
August	24.08 (1 TS)	Merging server configuration error
December	22.12 (1TS) 25.12 (1TS)	Load flow failed due to high total imbalance in the CGM

Table 6: Overview of the BD/TS where no merging results were delivered and explanation

Fallbacks

The table below shows the effectiveness KPI values for successful TSs for 2022 (considering the relevant reporting period for 2022, from 1 July until 31 December 2022).

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 fallbacks in the Core DACC process:

- Spanning: the capacity values for the missing timestamp(s) are covered with a properly calculated value from a neighbouring timestamp, assuming that the operational situation does not change too much from one timestamp to another.
- Default Flow-Based Parameters (DFP): the capacity values for the missing timestamp(s) are replaced with a default value.

EFFECTIVENESS KPI - FALLBACKS	
Total percentage success rate (total number of timestamps without fallback applied)	99,72%

Table 7: Core CCR Effectiveness KPI for fallbacks

In accordance with Article 26.4 from the Core Day-Ahead Capacity Calculation methodology: in case the minimum value (ambition level) of any of the defined data quality indicators is not met on average on a monthly basis, detailed reasons for the failure as well as a corrective action plan for past failures and the prevention of future failures shall be published. During the reporting period the following two issues lead to DFPs. First the FB computation failed in the CCCt due to exceeding the DC imbalance threshold. As a mitigation a quality check has been introduced in the Coreso local communications tool to enable operators to detect a similar issue. In addition, an improvement of the merging tool, which can prevent a similar issue, has been planned for deployment. The second issue leading to DFPs for on TS was known and accepted before go-live and an update which has corrected this known issue was deployed in April 2023.

4.3.2 Efficiency

For the DACC process within Core CCR the efficiency KPI is focusing on the efficiency of NRAO by analysing the amount of TS where local reductions were not applied.

The table below shows the efficiency KPI values for 2022 (considering the relevant reporting period for 2022).

EFFICIENCY KPI - NRAO	
Total percentage success rate (total number of timestamps without local reductions applied)	70,19%

Table 8: Core CCR Efficiency KPI for NRAO

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 performed by Coreso and TSCNET appointed by the Central Europe SOR as Regional Coordination Centre since 1 July 2022. The process is jointly performed between those TSO's of the Central SOR which are part of the IN CCR and additionally the Swiss TSO, Swissgrid, also resulting in CC for the IN-Swiss borders. The CC task is provided to IN region as described in the latest version of the DA and ID methodologies approved by IN NRAs.

The process to determine the cross-border capacities for both the day-ahead and intraday timeframe 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 current live process in the region, is modelled towards maximum import in the direction of Italy from all the borders of the region at the same time. 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 TTC calculation to the NTC calculation and delivery. IDCC process consists in calculation for 4TS at each business day but delivery of NTCs for 12TS thanks to an interpolation process, resulting in a total amount of 2208TS. The performance KPI of 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 in 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 1472TS. 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 100% of timestamps. For DACC process Coreso has achieved 96,40% KPI result, which implies that for 3,6% of timestamps the additional fallback procedures according to methodology had to be applied by Terna.

PERFORMANCE KPI	DACC	IDCC
% of process successful delivery	96,4%	100,00%

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

5.2 Coordinated actions and recommendations

A Coordinated Action (CA) 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 CCR region. 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 CCR IN is merged with the CCR Core, 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 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 initial 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.

Same responsibility of the process timeframe for both RCCs from section 5.1 applies for the effectiveness and efficiency KPIs 3 & 4 below which show the Q3 & Q4 effectiveness and efficiency KPIs respectively for both the intraday and day-ahead timeframes. The combined effectiveness rate of 50.41% for Q3 and Q4 2022 in the intraday computation of capacities between TSCNET and CORESO implies that in 49.59% of the reported period, the use of fallback procedures was necessary to ensure that coordinated capacities were delivered successfully to the TSOs. For the reporting period, 30.95% of the fallback procedures triggered within the IDCC process were due to missing or invalid inputs from the TSOs and 18.64% of the fallback procedures triggered were due to IT issues on RCC's tools side and cases where no secure TTC was found due to grid constraints.

The DACC robustness is represented by 91.24% in effectiveness, and only in 8.76% of the cases Coreso is not able to provide any computed results. For the DACC process, 4.76% of the fallback procedures triggered were due to missing or invalid inputs from the TSOs, and 4.00% were due to IT issues on RCC's tools side.

The combined efficiency rate of 67.03% for the reporting period in 2022 in the intraday computation of capacities between TSCNET and Coreso implies that for 32.97% of 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 44.97% of the time the initial computed capacity is not followed.

EFFECTIVENESS KPI	DACC	IDCC
% of effective process delivery	91,24%	50,41%

Table 10: Italy North CCR Effectiveness KPI for DA and ID timeframes

EFFICIENCY KPI	DACC	IDCC
% of efficient process delivery	55,03%	67,03%

Table 11: Italy North CCR Efficiency KPI for DA and ID timeframes

5.4 Shortcomings

For the reported period, 30.95% of the fallback procedures triggered within the IDCC process were due to missing or invalid inputs from the TSOs and 18.64% of the fallback procedures triggered were due to IT issues on RCC's tools side and cases where no secure TTC was found due to grid constraints. Both RCCs and the TSOs of the region are actively investigating how to further improve this KPI.

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

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 format and merging them into common grid models in UCTE DEF format, 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 format, 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 introduction of the more advance grid model format called Common Grid Model Exchange Standard (CGMES) in the operational process.

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 2022 we delivered CGM in the yearly, two days-ahead, day-ahead and intraday timeframes) based on an agreed rotational principle of the involved European RCCs and RSC (Baltic RCC, Coreso, SCC and TSCNET). These CGMs have not been used in operational processes during 2022.

6.1 Operational Performance

During the reported period, the RCCs built CGMs in the following timeframes [3]:

- D-2 (1 run of CGM building process to provide 24 models for each day) [4]
- D-1 (1 run of CGM building process to provide 24 models for each day) [5]
- ID (3 runs of CGM building process to provide 24 models for each day) [6]

The operational performance was monitored based on the successful submission (i.e. building of CGM by the RCCs' tools) compared to the expected number of CGMs, and publication (i.e. successful validation of the CGM based on the Quality Assurance Portal) compared to the number of submitted CGMs.

DEFINITION	TIME-HORIZON			RCC
	D-2	D-1	ID	
% of submitted CGMs/due CGMs (as main or backup RCC)	99,92%	99,96%	99,96%	TSCNET
	99,95%	99,31%	98,71%	Coreso
% of published CGMs/submitted CGMs (as main or backup RCC)	98,83%	100%	98,96%	TSCNET
	97,62%	96,4%	83,17%	Coreso

Table 12: CGM Building process Operational Performance KPIs

The high share of submitted CGMs show, that the RCCs are capable to perform the process, however, manual data quality interventions are needed (resulting in exclusion of IGMs blocking the merge process). Furthermore, the manual interventions take time and these CGMs are published after gate closure time. The high share of published CGMs show, that these CGMs could pass the validation on the common platform. Regarding the ID CGMs on Coreso side, the lower share of 83.17% of publication is caused by multiple reasons such as data quality, European Merging Function (EMF) Tool readiness and mainly due to no manual data quality intervention after CGM publication Gate Closure Time.

[3] 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.

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

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

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

6.2 Coordinated actions and recommendations

The RCCs do not issue recommendations for the CGM task.

6.3 Effectiveness and efficiency

Based on the experiences gained in the first year of the CGM task in December 2021, the community of TSOs and RCCs gained a lot of operational experience regarding the most critical points to perform this task effectively and efficiently. Based on these experiences, the inclusion of IGMs available in the CGM and the timely delivery of the CGMs are the key topics and the metrics to monitor effectiveness and efficiency. During the reported period 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 reach convergence and be able to submit the CGM (see chapter 6.4).

Throughout the reported period, the tendency of IGM inclusion was regularly aligned among the RCCs on a weekly basis. The inclusion of IGMs is also reported on pan-EU level by ENTSO-E, to the national NRAs and ACER.

Based on the outcome of this monitoring, improving the quality of the CGMs (i.e. increase the number of IGMs included) was considered as the highest priority by the TSOs and RCCs.

To monitor the effectiveness and efficiency of the CGM process, the following monitoring processes are planned to be implemented at Coreso and TSCNET:

Effectiveness of the CGM process was defined as:

- Percentage of IGMs included in the merged CGM based on the number of IGMs (validated by the OPDE platform) available before the merge
- Percentage of IGMs included in the merged CGM based on the number of IGMs (validated by the EMF tool on RCC side) available before the merge.

Efficiency of the CGM process was defined as:

- Ratio of the time it should take to deliver the CGM and to the time it took to deliver the CGM (including the validation, considering all CGM)
- Ratio of the time it should take to deliver the CGM and to the time it took to deliver the CGM (excluding the validation, considering all CGM)
- Ratio of the time it should take to deliver the CGM and to the time it took to deliver the CGM (including the validation, considering the published CGM only)
- 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 of its equipment is a challenging task for all involved parties. All involved RCCs and TSOs are working together to reach high quality pan-European CGMs. It seems, that further harmonization of technical details among the parties is needed to work towards this goal. 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 seems that successfully validated IGMs cannot be used in the merged grid models. The reason behind varies on TSO and RCC level – there is no single explanation, and the issues needs to be investigated case by case. To solve this situation, the TSOs and RCCs established a 'Modelling Group' at ENTSO-E to align on the technical details and propose updated validation rules, where needed.

7. 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. 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 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). In order to resolve the adequacy identified and mitigate the risk of it, the RCC of the affected 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.

7.1 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, 196 calculations are triggered and only one calculation failed. On the other hand, no regional adequacy assessment is triggered.

ART.46 CENTRAL SOR		TIME-HORIZON	REGION
PROCESS	DEFINITION	WA	
Pan-EU STA	% of process successes	99.49%	Pan-EU

Table 13: Pan-EU STA Operational performance KPI

7.2 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.

7.3 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 an input data issues at the pan-European level. During the monitored period of 184 days, an additional run was triggered 12 times.

ART.46 CENTRAL SOR		TIME-HORIZON	REGION
PROCESS	DEFINITION	WA	
Pan-EU STA	% of days without the need of additional run	93.48 %	Pan-EU

Table 14: Pan-EU STA Efficiency KPI

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

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 RAA trigger:

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.

7.4 Shortcomings

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

8.

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, in 2022 two regional OPC processes were performed, one by Coreso and one by TSCNET, based on the technical requirements agreed with the respective shareholder TSOs. 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 methodology approved by the Central SOR NRAs.

8.1 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 2022, all pan-European OPC processes were successfully performed (but not always withing the defined deadlines – see KPI 3.A).

ART.46 CENTRAL SOR			TIME-HORIZON		REGION
ID	PROCESS	DEFINITION	WA	YA	
1	OPC	% of process successes	100,00%	100,00%	Central SOR

Table 16: OPC Operational performance KPI

8.2 Coordinated actions and recommendations

For the pan-European OPC process there are no recommendations issued.

8.3 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.

ART.46 CENTRAL SOR			TIME-HORIZON		REGION
ID	PROCESS	DEFINITION	WA	YA	
3.A	OPC	% of result delivery within defined deadlines	97,16%	100,00%	Central SOR
3.B	OPC	% of consistent tie-line outages	95,07%	93,00%	Central SOR
3.C	OPC	% of correctly mapped assets between OPC & CGM	90,28%	92,89	Central SOR

Table 17: OPC Effectiveness and Efficiency KPIs

To further support the effective performance of the processes, TSCNET and Coreso supports 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.

In the reported period for Central SOR TSOs, 3 out of 104 merges failed during week-ahead OPC process due to tool issues. The failed 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.

8.4 Shortcomings

There are no shortcomings identified for the reported period.

9. RIAR

On 31 March 2022, the post-operation and post-disturbances analysis and reporting methodology[8] 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 ICS Expert Panel established for the investigation of incidents on scale 2 and scale 3 in accordance with the ICS Methodology[9]. 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 validates 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 6.

Recommendations issued by the RCC subgroup will be tracked in a dedicated database and updated by each RCC for their respective SOR (Art. 46 (3)). For the Central SOR region, this will be detailed in this report.

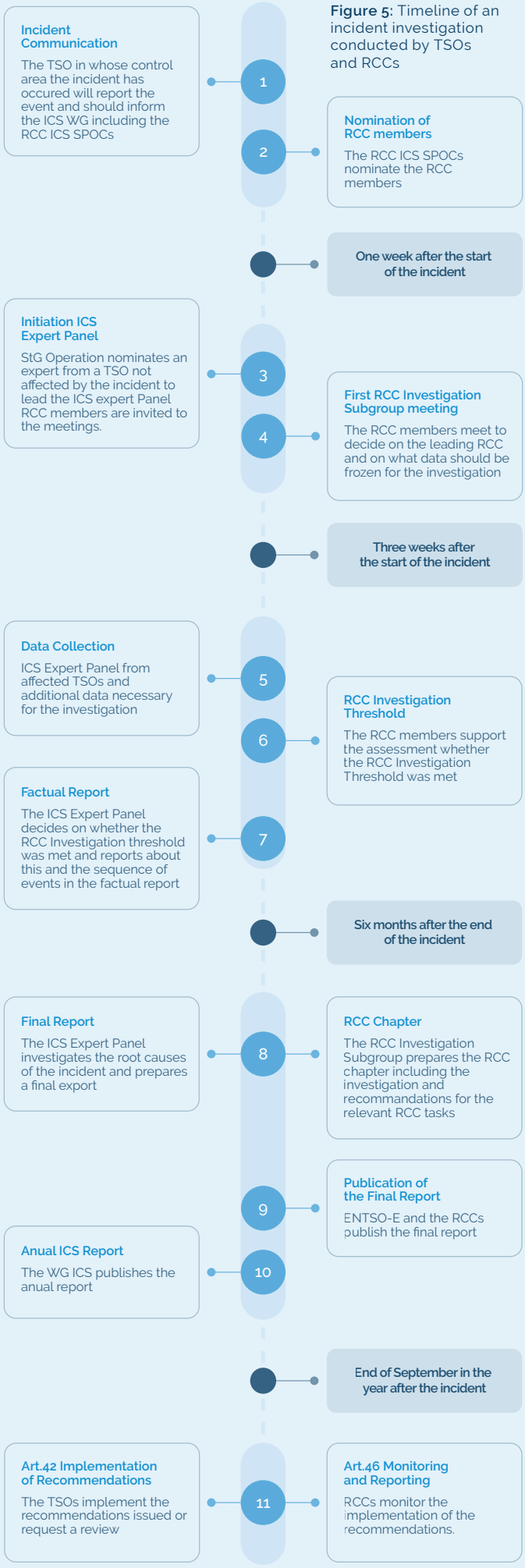


Figure 5: Timeline of an incident investigation conducted by TSOs and RCCs

[8] *https://www.acer.europa.eu/sites/default/files/documents/Individual%20Decisions_annex/ACER%20Decision%2004-2022%20on%20the%20RCC%20Post-Operation%20Post-Disturbances%20Methodology%20-%20Annex%201_0.pdf*

[9] *https://eepublicdownloads.entsoe.eu/clean-documents/SOC%20documents/Incident_Classification_Scale/200629_Incident_Classification_Scale_Methodology_revised_and_in_use_as_of_2020.pdf*

9.1 Operational Performance

During the year 2022, and since the go-live of the task 'Post-Operation and Post-Disturbances Analysis and Reporting', no incident investigations were triggered through the Working Group ICS. Therefore, there were no investigations to be reported on for the year 2022.

9.2 Coordinated actions and recommendations

No recommendations were made during the year 2022, since no incidents triggered the RCC Threshold. For reference all recommendations are stored in the recommendation database, maintained by the RCC ICS SPOCs.

9.3 Effectiveness and efficiency

Effectiveness of this task has been defined as:

- Nomination and communication of the RCC members within one week of the start of the scale 2 or 3 incident
- Publication of the final report, including the RCC chapter by the end of September in the year after the incident

Efficiency of this task has been defined as:

- The number of hours spent on the Post-Operation and Post-Disturbances Analysis and Reporting task (process implementation, training and certification, recommendation follow-up)
- The number of hours spent per incident triggering the ICS or RCC Threshold

9.4 Shortcomings

For the monitored period, there are no shortcomings to be reported.

Article 37
of the EU Internal Electricity Market Regulation 2019/943

TASK — a

Coordinated Capacity Calculation

Calculate the available cross-zonal transmission capacities that can be allocated to the electricity market. Provide improvement proposals to TSOs to optimise available capacities.

TASK — b

Coordinated Security Analysis

Perform security analysis to detect potential operational security violations on the grid, at a regional level. Recommend and coordinate remedial actions for TSOs to solve them.

TASK — c

Common Grid Model

Create a pan-European overview of the interconnected European grid by collecting, checking the quality, and merging the Individual Grid Models provided by TSOs.

TASK — d

Defence and Restoration Plans

Review of TSOs' defence and restoration plans (to be implemented in case of an emergency restoration state) to identify potential incompatibilities. Propose mitigation actions.

TASK — e

Short-Term Adequacy

Perform adequacy assessments to detect situations where a lack of electricity adequacy is expected in any of the control areas (pan-European) or at regional level, taking possible cross-border exchanges and operational security limits into account. Propose and coordinate solutions for TSOs to ensure generation meets consumption.

TASK — f

Outage Planning Coordination

Identify tie-line inconsistencies and outage planning incompatibilities between relevant grid assets, with cross-border impact at pan-European and regional level. Propose and coordinate solutions for TSOs to solve these incompatibilities.

TASK — g

Training and Certification

Train and certify staff working for RCCs. Put in place an internal structure to train and certify operators before operating any service while allowing traceability and transparency.

TASK — h

Regional Restoration

Support the coordination and optimisation of regional restoration as requested by TSOs. Task definition still in discussion at European level while RCC involvement needs to be determined.

TASK — i

Post-Operation Analysis

Carry out post-operation and post-disturbances analysis and reporting. Investigate and prepare reports on incidents strongly affecting the European Transmission Network, to support the European expert panel for further analysis.

TASK — j

Sizing

Regional sizing of reserve capacity. Task definition still in discussion at European level.

TASK — k

Procurement

Facilitate the regional procurement of balancing capacity. Task definition still in discussion at European level.

TASK — l

Settlement

Support TSOs, at their request, in the optimisation of inter-transmission system operators' settlement.

TASK — o

Maximum Entry Capacity

Calculate the value for the maximum entry capacity available for the participation of foreign capacity in capacity mechanisms for the purpose of issuing a recommendation.

TASK — p

Supporting Ten-Year Network Development Plan

Carry out tasks related to supporting TSOs in the identification of needs for new transmission capacity, the upgrade of existing transmission capacity or their alternatives. Task definition still in discussion at European level.

Note that task m.(crisis scenario's) and n. (seasonal adequacy assessment) are not delegated to ENTSO-E and not included in the overview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