FINGRID ENERGINET SVENSKA KRAFTNÄT Statnett

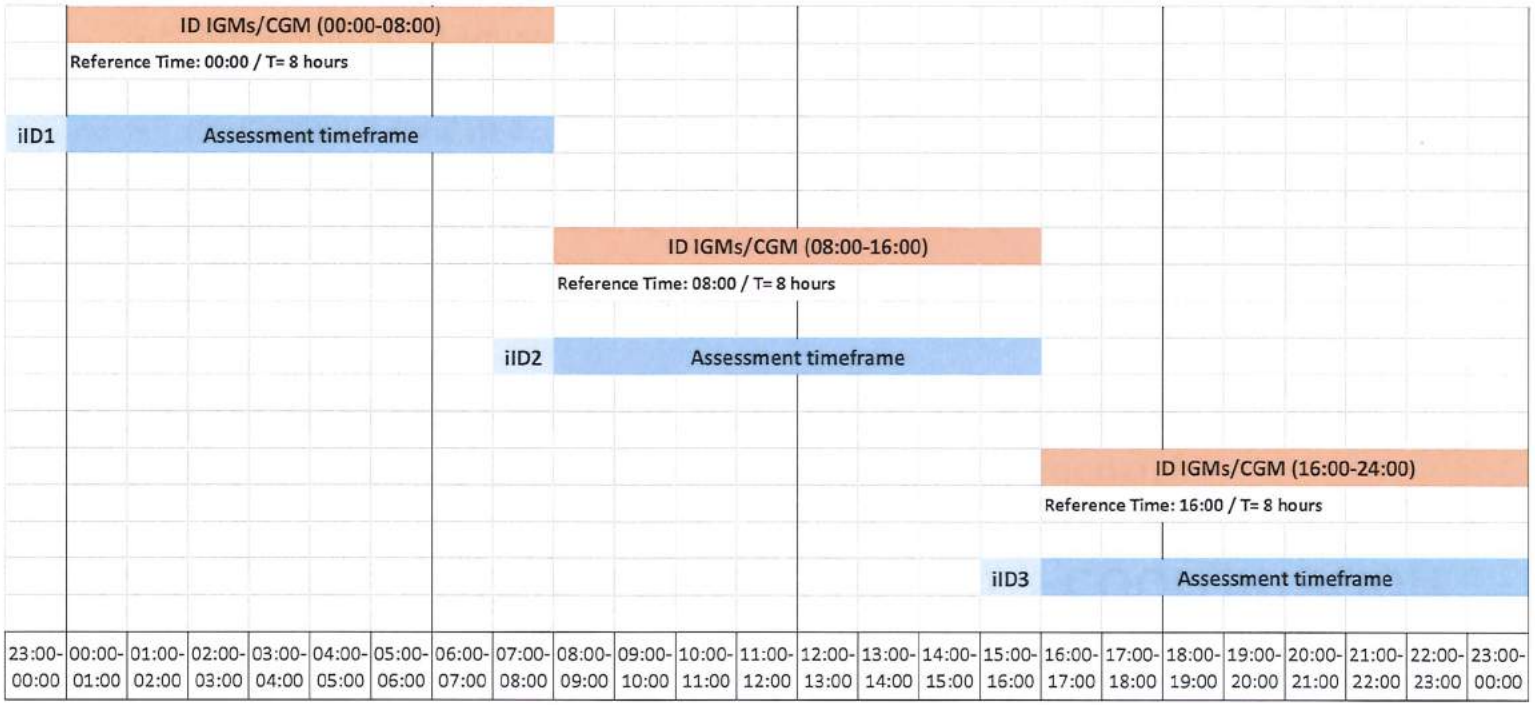
ID regional operational security coordination

Optional interim intraday regional operational security coordination process possible when one or several of the following conditions are met:

- Outage of a relevant asset
- Significant change of forecasted generation or load
- Significant changes in physical flows
- Congestions on CNEs
- Violation of operational security limits
- Small amount of remaining cross-zonal intraday capacity
- Upon request by a TSO

ID regional operational security coordination

Business process design of iID-ROSCP



FINGRID ENERGINET SVENSKA KRAFTNÄT Statnett

ID regional operational security coordination

Business process framework of enduring ID regional operational security coordination

- Enduring intraday regional operational security coordination process (eID-ROSCP) takes place at least three times in intraday.
- Regional operational security assessment **at each market time unit in intraday timeframe for all remaining market time units of the day.**
- **Final intraday process has to be aligned with the pan-European processes and future amendment of CSAm**

FINGRID ENERGINET SVENSKA KRAFTNÄT Statnett

Cross-border impact assessment of RAs

- **Qualitative assessment based on influence factor (mandatory)**
  - All TSOs to consider remedial actions as cross-border impacting when the remedial action influence factor is higher than 5 % or higher than an agreed value or threshold.
- **Quantitative assessment based on influence factor (mandatory)**
  - All TSOs to define a commonly agreed threshold value for the remedial action influence factor other than the factor applied in accordance with the qualitative approach.
- **Quantitative assessment based on voltage change (optionally)**
  - TSOs to agree on the list of nodes where such assessment will take place.

Technical Aspects

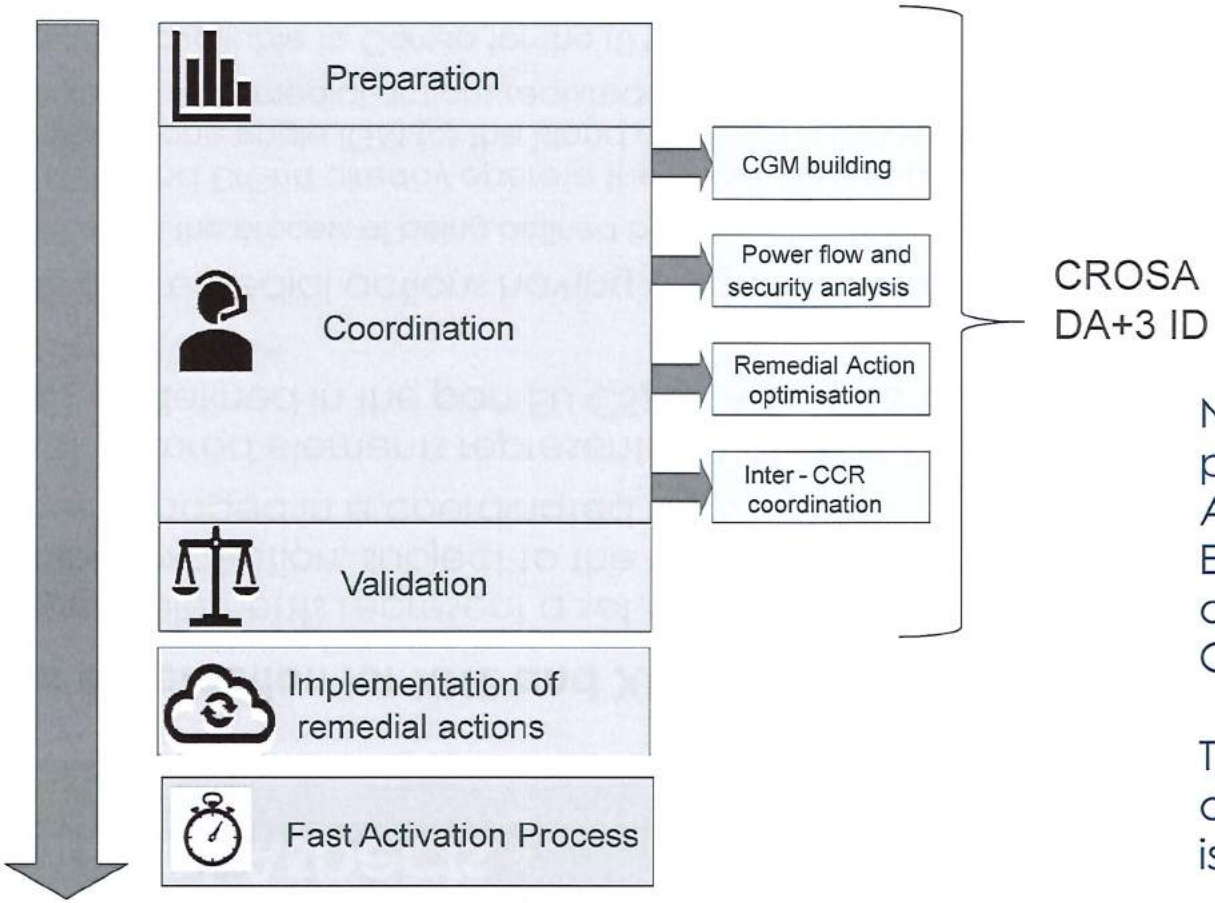
IU

Criteria of selection for XNE and XRA

- Secured elements represent a set of grid elements of IU TSOs of voltage level ≥ 132 kV, with possible exception, subject to the CROSA, on which operational security limits violations have to be managed in a coordinated way.
- Set of secured elements represents set of cross-border relevant network elements of IU CCR (XNE) as defined in the pan-EU CSAm Article 15.1 (includes all CNEs that were identified through CACM).
- XRAs are remedial actions having a significant influence on a XNE:
  - XRAs are in the process of being defined but expected to be limited
  - As SONI and EirGrid already operate the power system on the island of Ireland on an all-island basis and are providing one single IGM for the island on which a LPA will be carried out prior to submission to Coreso, there should be no remedial actions required related to the AC tie-line between SONI and EirGrid.
  - The XRAs available to Coreso for the IU CCR will likely be limited to remedial actions related to power flows on the two HVDC interconnectors (Moyle and EWIC) between the all-island system (SONI and EirGrid synchronous system) and National Grid ESO (as a separate synchronous system).
  - They will be determined based on qualitative assessment by the IU TSOs, with a quantitative approach used in the case of any disagreement.

Technical Aspects

IU



Note that SONI and EirGrid will perform Local Preliminary Assessment (LPA) for the SONI and EirGrid joint IGM (or synchronous area) in accordance with pan-EU CSAm Articles 21.3 and 21.4.

This is in line with current operational practise on the all-island system.

entsoe

Technical Aspects

IU

Optimisation principles

- Coordinated way considering all available remedial actions
- Time-coupled
- Aim at removing operational security limit violations on secured network elements
- Avoid additional security limits violation on scanned Network Elements
- Aim at minimizing direct costs
- Shall consider constraints on the remedial actions
- Propose a balanced set of RAs
- Remedial Action has to be effective
- Set of RAs should be robust to changes of forecast and market activities

Technical Aspects

[SWE]

Criteria of selection for XNE and XRA

- SWE TSOs agree that grid elements on which operational security limits violations have to be identified and solved are at minimum the critical network elements of SWE
- Hybrid approach: first qualitative assessment; if no agreement on certain RAs then a quantitative approach with influence factor-threshold of 5%.

Technical Aspects (I)

[SWE]

Process overview of the Regional Coordination Process in Day Ahead

- The day-ahead regional coordinated security analysis shall be performed by the SWE RSC according to the article 33 of the CSA Methodology

Process overview of the Regional Coordination Process in Intraday

- Three intraday regional coordinated security analysis have been defined.
- There will be one coordination run for each study
- Each study will cover the hours until the end of the day

Process overview of the Regional Coordination Process after the last RSC-supported Intraday coordination (if necessary)

- If necessary an additional "on request" intraday regional coordinated operational security analysis can be asked by any TSO from SWE
- A fast activation process is defined in case if RSC coordination deadline is exceeded without any suggestion from SWE RSC or if any SWE TSO detects an identified constraint after RSC coordination deadline

Technical Aspects (II)

[SWE]

Intraday timings and frequency

- Three intraday regional coordinated security analysis at the following reference hours:
  - 00:00
  - 08:00
  - 16:00

Technical Aspects

[SWE]

Optimisation principles

- To identify the most effective and economically efficient remedial action a Remedial Action Optimization will be used.
- The RAO shall consider and take into account in one and same step costly and non-costly remedial actions.
- The optimizer shall select first the non-costly sets of remedial action. If several solutions with non-costly sets of remedial action are found, the one with the highest margin shall be selected (the margin is defined as the difference between the maximum admissible flow and the measured values on the elements after a load flow simulation). If no solution is found with only non-costly remedial actions, the less costly efficient combination of remedial actions shall be selected by the optimizer.

Criteria of selection for XNE and XRA

- XNEs: Each TSO shall define the grid elements for which operational security violations shall be monitored during the day-ahead and intraday regional operational security processes. The Monitored Elements shall include at least the defined Critical Network Elements (CNEs)which are taken into account for capacity calculation procedures as well as other elements with cross border relevance.
- XRAs: Both options are possible

□ Qualitative assessment, for RAs that are quantifiable an influence factor will be used.

□ Quantitative assessment, for RAs that are quantifiable an influence factor will be used. This can be used in case no agreement can be reached using the qualitative approach.

All TSOs to consider remedial actions as cross-border relevant for RAs that are quantifiable when the remedial action influence factor is higher than 5 %

Process overview of the Regional Coordination Process in Day Ahead

- The process for coordination of XRAs for the day-ahead coordination procedure for all market time units of the delivery day shall start immediately after the day-ahead coordinated operational security analysis referred to in Article 76(1)(a) of the SO Regulation is finalized and physical congestions on the XNECs have been identified by RSC and SEE TSOs.

Process overview of the Regional Coordination Process in Intraday

- The process for coordination of XRAs for the intraday coordination procedure for the remaining market time units of the delivery day shall start immediately after the intraday coordinated regional operational security analysis referred to in Article 76(1)(a) of the SO Regulation is finalized and physical congestions on the XNECs have been identified by RSC and SEE TSOs. The intraday coordination procedure may be repeated several times within the period between the day-ahead coordination procedure and real-time.

Technical Aspects

SEE CCR

Process overview of the Regional Coordination Process after the last RSC-supported Intraday coordination (if necessary)

- A Fast Activation Process is foreseen to relieve physical congestion due to sudden critical situations (such as, but not limited to, an unplanned outage in real time or a relevant forecast error). In the fast activation process, each TSO may also activate XRAs in direct coordination with XRA affected TSO(s).
- Also, the fast activation process is defined as a process to relieve physical congestion where the detection of congestion occurs
  - (a) between coordinated security analysis and a fast activation is required because it cannot wait for the next coordinated security analysis
  - (b) after the last coordinated security analysis

Intraday timings and frequency

- Three fixed ID CROSA are foreseen at 00:00h, 08:00h, and 16:00h. An additional CROSA may be always performed on demand in case of unforeseen events that may endanger the secure operation of the grid and the resolution of which cannot wait for the CROSA performed at regular reference times

Optimisation principles

- SEE CCR is still in the drafting stage of SOGL Article 76/77 CSAm. However in line with the relevant SEE RSCT methodology, an optimization tool will be used.

- To determine the most economically efficient solution, the optimizer will look for combinations of both costly and non-costly remedial actions. The less costly efficient combination will be selected by the optimizer to relieve operational security limit violations on secured elements

Criteria of selection for XNE and XRA

- XRA : Qualitative approach on annual basis (or if significant change on the grid). In case of disagreement, quantitative approach is used (influence factor 5%).

- XNE : elements belonging to the ACI (parts of the grids of each TSO that are influenced by the flow in the HVDC interconnector and which are identified according to the process defined in the day-ahead and intraday capacity calculation methodology for GRIT Region)

Technical Aspects

[GRIT]

Process overview of the Regional Coordination Process in Day Ahead

- Appointed RSC run the process to secure the XNEs while minimizing the costs
- TSOs coordinate on RA selection and application

Process overview of the Regional Coordination Process in Intraday

- Similar to Day Ahead process without coordinated cross-regional operational security assessment

Process overview of the Regional Coordination Process after the last RSC-supported Intraday coordination (if necessary)

- Fast Activation Process can be triggered

Intraday timings and frequency

- 3 runs a day: reference times are 00:00, 08:00 and 16:00

Technical Aspects

[GRIT]

Optimisation principles

- Minimization of costs using all available remedial actions, including but not limited to PSTs, HVDC links or activation of redispatch and countertrading resources

Technical Aspects

Channel

- Smart copy-paste of the CORE principles

Criteria of selection for XNE and XRA

- XNE determination criteria:
  - Element is critical network element (CNE). [CNEs defined according to CACM];
  - Additional Criteria: Voltage level of 330 kV or above

- XRA determination criteria:
  - Both methods for identification - qualitative and quantitative are allowed; (to be discussed further in a regional WG)
  - Currently CT is only type of XRA;

Technical Aspects

Process overview of the Regional Coordination Process in Day Ahead

- Standard proposed timings from CSAM are used to define D1 process
- Provided high level description, detailed process sub steps will be agreed during implementation phase

Process overview of the Regional Coordination Process in Intraday

- Standard proposed timings from CSAM are used to define ID process
- Provided high level description, detailed process sub steps will be agreed during implementation phase

Process overview of the Regional Coordination Process after the last RSC-supported Intraday coordination (if necessary)

- Not relevant for Baltic CCR – no additional intraday's process phases are anticipated

Intraday timings and frequency

- Standard 3 timings for intraday. No additional timestamps.

Optimisation principles

Currently, only XRA for Baltic CCR is counter trading. Therefore there are only two possible optimisation principles:

- Predicted cost;
- Technical effectiveness – impact coefficient;

To apply these optimisation principles is challenging, because it is very hard to predict in planning phase which power plants will be online and what is the price for regulation power.

Consistency between SOGL 76 and CACM 35/74

Consistency between SOGL 76 and CACM 35/74

Any coordinated Ordered RA resulting from CROSA and fast activation process in accordance with this Core ROSC Methodology is subject to the cost sharing principles in accordance with Core Cost Sharing Methodology.

Consistency between SOGL 76 and CACM 35/74 [Italy North]

Which RAs are taken into account for cost sharing?

- Countertrading and Redispatching

Are there additional cost sharing principles defined in SOGL 76 proposal wrt to the RD/CT methodology?

- Cost sharing on costly RA activated for elements that do not belong to Area of Common Interest (=subset of the CNE(C)s of the CC process which are sensitive to RDCT resources): Requester payer's principle
- Allocation of costs of non-coordinated actions : TSO(s) that activate(s) the non-coordinated action pay(s) the induced costs.

Consistency between SOGL 76 and CACM 35/74

Which RAs are taken into account for cost sharing?

- Cross-boarder impacting
- Costly

Are there additional cost sharing principles defined in SOGL 76 proposal wrt to the RD/CT methodology?

- The cost sharing principles of Hansa ROSC complement the cost sharing principles of CCR Hansa methodology pursuant Article 74 of the CACM Regulation (RCCSM)
- Cost for guarantying capacity are added RCCSM
- Cost share is performed according to the same principles as RCCSM

Consistency between SOGL 76 and CACM 35/74

IU

Which RAs are taken into account for cost sharing?

- Specific RAs are in the process of being defined.
- Applied for cross-border impacting RAs.
- RA requiring coordinated Redispatch and Countertrading as per CACM 74 will be cost shared according to IU RD & CT Cost sharing methodology.
- Where RA Affected TSO and RA Implementing TSO are both SONI and EirGrid, and there are no RD or CT on Interconnectors connecting to NGESO's control grid, the RA will be instructed as a balancing action in the I-SEM and costs assigned according to the market rules.

Are there additional cost sharing principles defined in SOGL 76 proposal wrt to the RD/CT methodology?

- No additional cost sharing principles defined in IU CSAm over and above what is defined in the IU CT & RD methodology.

Consistency between SOGL 76 and CACM 35/74 [SWE]

Which RAs are taken into account for cost sharing?

- Countertrading
- Redispatching when the methodology for CACM 35 will be amended...

Consistency between SOGL 76 and CACM 35/74

SEE CCR

Which RAs are taken into account for cost sharing?

- CACM Art. 74 methodology for the SEE CCR is currently under development . The concept is that the cost sharing rules to follow the CACM Art 74 proposals. In the day ahead and intraday coordination procedure, the RSC in coordination with the TSOs shall coordinate the use of all XRAs by performing a regional optimization of XRAs with the objective to address all congestions on all XNECs with minimum estimated cost for the TSOs. This regional optimization shall include also other remedial actions not considered as XRAs in accordance with the SEE RDCT cost sharing methodology, but still considered as cross border relevant.
- Fast activation process will also be considered. Currently, there are no additional/different rules identified and introduced in the methodology for this process
- The costs which will be shared are the ones coming from costly RAs activated to solve overloads on the elements as defined in the relevant cost sharing SEE RDCT methodology

Consistency between SOGL 76 and CACM 35/74

[GRIT]

Which RAs are taken into account for cost sharing?

- Countertrading and Redispatching

Are there additional cost sharing principles defined in SOGL 76 proposal wrt to the RD/CT methodology?

- No

Consistency between SOGL 76 and CACM 35/74

Channel

Any coordinated Ordered RA resulting from CROSA and fast activation process in accordance with this Core ROSC Methodology is subject to the cost sharing principles in accordance with Core Cost Sharing Methodology.

Consistency between SOGL 76 and CACM 35/74

Baltic CCR

Which RAs are taken into account for cost sharing?

- Counter trading according to Articles 35/74 of CACM

Are there additional cost sharing principles defined in SOGL 76 proposal wrt to the RD/CT methodology?

- Yes, the cost sharing principles are under discussion at Baltic CCR TSOs WG.
- In situation when security limits violation occurred on cross-border relevant element XNE from relevant TSOs control areas and violation is caused by any reason that occurred outside of relevant to cross-border TSOs control areas or some other unknown reason, the costs of XRAs to relieve XNE shall be divided equally between relevant to cross-border TSOs;
- In situation when security limits violation occurred on cross-border relevant element XNE from relevant TSOs control areas and violation is caused due to the trip of an network element inside one of the relevant TSOs control areas, the costs of XRAs to relieve XNE shall be covered by that relevant TSO in which control area that event took place;
- In incurred situations by activation of non-XRAs, the costs of RAs shall be covered by TSO in that control area where the violations of the grid elements were relieved.

Allocation of Tasks to more than one RSC

Allocation of Tasks to more than one RSC

In accordance with article 77(3) of SO Regulation all Core TSOs delegate the following tasks to CORESO and TSCNET:

a) Regional operational security coordination in accordance with article 78 of SO Regulation in order to support Core TSOs fulfil their obligations for the year-ahead, day-ahead and intraday timeframes in articles 34(3), 72 and 74 of SO Regulation;

b) Building of common grid model in accordance with article 79 of SO Regulation;

c) Regional outage coordination in accordance with article 80 of SO Regulation, in order to support TSOs fulfil their obligations in articles 98 and 100 of SO Regulation;

d) Regional adequacy assessment in accordance with article 81 of SO Regulation in order to support TSOs fulfil their obligations under article 107 of SO Regulation.

Allocation of Tasks to more than one RSC [Italy North]

Principle of allocation of tasks

- Appointment of CORESO and TSCNet to perform the tasks listed in article 77(3) of SO Regulation

Allocation of Tasks to more than one RSC

CCR Hansa

- Two RSC are utilised in CCR Hansa to carry out the RSC tasks; TSCNET and Nordic RSC
- These RSC are chosen as they also are RSC in CCR Core and Nordic to facilitate a closer cooperation and coordination between the two parts of the CCR
- Allocation of task is ongoing (future: on rotational basis)
- Interim solution :
  - TSCNET will carryout the task for Hansa TSO also apart of Core
  - Nordic RSC will carryout the task for Hansa TSO also apart of Nordic

FINGRID ENERGINET SVENSKA KRAFTNÄT Statnett

Delegation of tasks to Nordic RSC

Delegation of task	Specific tasks
Regional operational security coordination	Specific tasks as defined in NROSC (such as): ▪ Recommendation of remedial actions ▪ Facilitation of the coordination process ▪ Coordination with other RSCs
Building of common grid model	▪ Assuring quality of individual and common grid model ▪ Performing pre-alignment service for predicting the upcoming operational situation ▪ Building common grid model ▪ Facilitating the respective coordination process amongst all TSOs ▪ Coordinating with other RSCs
Regional outage coordination	▪ Detecting and analysing of outage planning incompatibilities ▪ Proposing solutions for resolving outage planning incompatibilities ▪ Preparing an annual report on outage planning incompatibilities ▪ Facilitating the regional outage planning coordination process ▪ Coordinating with other RSCs.
Regional adequacy assessment coordination	▪ Performing cross-regional adequacy assessment ▪ Detecting absence of adequacy and proposing solutions to mitigate/solve adequacy issues ▪ Develop and provide reports on adequacy assessment results ▪ Facilitating regional adequacy assessment coordination process ▪ Coordinating with other RSCs

Allocation of Tasks to more than one RSC

[GRIT]

Principle of allocation of tasks

- Only one RSC is expected to be appointed in the Region

Allocation of Tasks to more than one RSC

Channel

In accordance with article 77(3) of SO Regulation all Core TSOs delegate the following tasks to CORESO and TSCNET:

a) Regional operational security coordination in accordance with article 78 of SO Regulation in order to support Core TSOs fulfil their obligations for the year-ahead, day-ahead and intraday timeframes in articles 34(3), 72 and 74 of SO Regulation;

b) Building of common grid model in accordance with article 79 of SO Regulation;

c) Regional outage coordination in accordance with article 80 of SO Regulation, in order to support TSOs fulfil their obligations in articles 98 and 100 of SO Regulation;

d) Regional adequacy assessment in accordance with article 81 of SO Regulation in order to support TSOs fulfil their obligations under article 107 of SO Regulation.