
Explanatory document
ENTSO-e proposal for
System Operation Regions
(SOR)

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1. Introduction

This paper accompanies the proposal described in the main paper in such a way to further explain the options and main criteria taken by ENTSO-E when defining the System Operation Regions (SORs).

2. Criteria for definition of SORs

Below is the main understanding of what the SOR definition stands for and the criteria followed by SOR PT to develop the proposal.

2.1. Requirements for the TSOs in SOR

The following describes the TSOs' common understanding of the legal requirements associated to Art. 36 of the Regulation on SOR Definition. Once the SOR is defined, in line with article 35 of Regulation 2019/943, the TSOs of the region shall submit another proposal for the establishment of RCCs to their NRAs. The subject matter of the current proposal is on SORs definition. The SOR Proposal takes into account the grid topology, including the degree of interconnection and of interdependency of the electricity system in terms of flow and size of the region, and it covers at least one capacity calculation region.

- In line with article 35 of Regulation 2019/943, TSOs of the region shall **clarify the cooperative process for the tasks carried out by RCCs in the entire region**. This implies providing to NRAs with the basis of the procedure for sharing the analysis and assessing the RCC proposals and up to the extend it is appropriate, for consulting with other RCCs or relevant stakeholders.
- In line with the text of article 35(1) of Regulation 2019/943:
 - o when establishing RCCs, TSOs of the SOR shall submit their proposal for cooperative processes to the concerned NRAs;
 - o the regulatory authorities of the SOR shall approve the proposal;
 - o because of the cooperative processes can directly affect the operation of borders adjacent to the SOR, operated by TSOs not within that SOR, the concerned NRAs shall be consulted on those cooperative processes, which has been specifically clarified in article 5 of the SOR Proposal.
- In line with article 37, those cooperative processes shall be in line with applicable CCR or other regional relevant methodologies.
- Establishing cooperative process by SOR does not mean that each SOR requires the establishment of one RCC. The CEP allows for:
 - o Large regions be coordinated by more than one RCCs
 - o One RCC coordinate more than one region
- In line with article 42(6) and in combination of article 35(1) of Regulation 2019/943, MS within the region NRAs within the region and those concerned (in case a BZ border or a transmission line spans over the control area of a TSO not part of the region) are required to assess and approve evolution of the cooperative processes, notably MS shall be involved in evolution of the decision-making procedure (towards potentially higher RCC empowerment and liability).

- In line with article 36(2), under specific conditions, TSOs can establish a coordination between two RCC.
- SOR Proposal is drafted taking into account the CCR framework as upper level in which the main aspects related to power exchanges coordination from market perspective are clarified. SOR Proposal takes into account also the evolutionary conditions and integrate, for the sake of clarity and representative information, a full list of borders including those that are soon to be clarified in the CCR framework since the border is under development in a medium term (when the coordination requirements in line with article 35, 38 and 42 are meant to be implemented).

2.2. Operational considerations

Critical considerations for the choices made in the SOR Proposal are:

- Regional specificities related to the physics;
- Ensuring continuity of the CEP implementation with Guidelines or Network Codes under implementation, therefore avoiding unnecessary risks associated to regulatory mismatch;
- Complexity associated to the amount of involved parties shall be manageable, allowing for feasible and effective governance.

The definition of SOR comes from the need for TSOs to establish the geographical scope of regional coordination centres and to describe the coordination between adjacent SORs. The TSOs in the SOR shall apply the approved operational procedures which are in line with the applicable CCR methodologies. As a result, consideration is needed for control areas of the TSOs affected by these decisions under the processes regionally coordinated, while respecting the agreed methodologies at CCR level. In this regard, some of the today's defined CCRs: Hansa and Channel, are considered interfaces between SOR and the capacity calculation methodologies for these CCRs shall be the legal framework for TSOs when developing operational procedures / cooperative processes required in line with art 42 and 38.

It should be noted that it is up to the TSOs in SOR to conclude on the possibility to have multiple methodologies aligned in the same armonised cooperative procedures per SOR. This is pertinent and necessary in case of methodologies which have to be harmonized in the long term, and in case of a SOR which is composed of multiple CCRs.

3. Interfaces between SORs

According to article 36 of the EU Regulation 2019/943, the SOR definition proposal shall specify which TSOs, BZs, BZ borders, CCRs and OCRs are covered by each of the SORs. Besides, for the BZ borders adjacent to SORs, the proposal shall specify how the coordination between RCCs for those borders is to take place. This is clarified in article 3 of the SOR Proposal.

Here below is an explanation on the criteria taken into account when defining the coordination between borders adjacent to SORs. The concept of “interface between SOR” has been introduced to help in the explanation. For instance, SOR can overlap when a bidding zone (BZ) is included in two SORs [e.g. GRIT-Central Europe or SWE-Central Europe], and in such a case the interface between the two SORs will be the overlapping BZ. In other cases the “interface” is defined by borders, which could overlap [IU-Central Europe, SEE-Central Europe] or not [Baltic-Nordic, Baltic-Central EU, Nordic-Central Europe, SEE-GRIT, ...].

Description of each specific interface to be consistent with the requirement ‘For the bidding zone borders adjacent to system operation regions, the proposal in paragraph 1 shall specify how the coordination between regional coordination centres for those borders is to take place’.

1. Interface Nordic / Baltic – ensemble of interconnectors, assigned to one SOR

The interface between SOR Baltic and SOR Nordic is in Baltic CCR control area. LT-SE4 and EE-FI bidding zones are interconnected only via HVDC links. RCC established in the Baltic region shall coordinate the tasks of regional relevance for the Baltic SOR pursuant to article 35(1)(e) of El.Regulation with regards to the EE-FI and LT-SE4 bidding zone borders and shall allow SvK and Fingrid to participate in the coordination of the borders through the Nordic RCC, which will have a contractual relationship with Baltic RCC.

Article 4.1 in Proposal specifies how the coordination between RCCs for the borders in this interface takes place, taking into account that:

- a. The two bidding zone borders are physically composed of HVDC links;
- b. Baltic states represent a relatively small region with low generation and quite high consumption of electricity;
- c. Those HVDC links are considered as having a high impact for ensuring the security of supply and adequacy within Baltics area as well as physical interdependency among operation of Baltic and Nordic borders.

2. Interface Baltic / Central –interconnector, assigned to one SOR

This interface is composed of only one border between PL and LT.

There is low physical interdependency between operation of this border and other PL borders. Contrary to the above there is significant interdependency of this border on the other side, i.e. towards other LT borders. Due to the above this interface (in practice PL-LT border) is proposed to be included in Baltic SOR. Thus Baltic RCC will coordinate all regional processes on this interface in the cooperation with PSE. PSE will do so being a shareholder of Central Europe RCC and having contractual relationship with Baltic RCC.

Such a set-up has already been applied to the process of coordinated capacity calculation in the framework of CACM implementation, methodology of which was developed and approved within Baltic CCR by TSOs (including PSE) and NRAs (including URE), respectively. Based on this methodology Baltic CCR TSOs (including PSE) agreed division of roles and responsibilities between themselves and Baltic RSC, who was nominated as Baltic Coordinated Capacity Calculator documented in relevant agreement.

It is assumed that any other RCC tasks on this interface will be handled the same way, i.e. relevant methodologies will be developed by Baltic CCR TSOs (for RCC tasks foreseen already in 3rd package) or all EU TSOs (for RCC tasks added in 4th package) and approved by Baltic CCR NRAs (for RCC tasks foreseen already in 3rd package) and ACER (for RCC tasks added in 4th package) and their operationalization will be subject of relevant agreement between Baltic RCC and PSE.

3. DK 1 in Nordic region and interface Nordic / Central - coordination between RCCs in line with methodologies and relevant agreements

DK 1 in Nordic region

Historically, there has been a strong and close cooperation between Energinet and the other Nordic TSOs, and between Energinet and Continental Europe (CE) TSOs, including TenneT (DE) as a close interconnected synchronous partner. In light of the proposed Nordic SOR configuration that includes DK1, it has been agreed between Energinet and TenneT:

- To maintain the close cooperation and collaboration between Energinet, CE and bilaterally with TenneT (DE and NL) in the same quality as is today and develop further for future needs
- To ensure the future bilateral needs Energinet will aim at developing rules and procedures in the Nordic SOR that will not be conflicting with the respective rules and procedures in the CE SOR
- All of Energinet's agreements (e.g. SAFA of the synchronous area Central Europe, LFC Block ...) towards the CE and TenneT will continue as agreed and Energinet commits to them to their full extent
- Notably, Energinet will keep providing all necessary data for the CE region (e.g. in terms of the needed data for the CSA-process and DSA analysis related to the security calculations).

Consequently, Energinet and TenneT will at the expected approval of the SOR-proposal draft a written agreement in order to secure a legal basis for the best way forward for the cooperation. TenneT and Energinet assume that keeping these commitments by Energinet will not constitute a conflict with the legislation and/or any existing contractual framework.

Interface Nordic / Central - not assigned to a SOR

The Electricity Regulation Art. 36 (1) does not require all BZs to be attributed to a SOR, but only that the SORs need to specify which BZ borders are to be included.

It needs to be clarified how the various interface borders shall be coordinated. As specified in EU Regulation 2019/943 §36.2 *"For the bidding zone borders adjacent to system operation regions, the proposal in paragraph 1 shall specify how the coordination between regional coordination centres for those borders is to take place."*

Below we describe why it is preferred and proposed for Hansa to not include the BZ borders in neither of the SORs, but rather coordinate them amongst the two relevant RCCs.

CCR Hansa consists of radial connections between the Nordic area and Continental Europe, and are for the most part HVDC connections. CCR CORE has appointed TSCNET and CORESO as their CCC/RSC and CCR Nordic has appointed RSC Nordic as their CCC/RSC. There is already a close cooperation between the Nordic TSOs and RSC Nordic and the Continental TSOs and TSCNET, and we aim to further develop these relationships in CCR Hansa. CCR Hansa has appointed both TSCNET and RSC Nordic as CCC/RSCs for the CCR. All CCR Hansa methodologies have been developed in coordination with the adjacent regions to avoid duplicating processes, identifying efficient solutions for cases where CNEs are shared and avoiding any ex ante splitting of capacities. This is done by Hansa focusing on the interconnector assets only, and leaving supervision of the adjacent AC grids to respectively CCR Nordic and CORE. Therefore CCR Hansa can be considered to be an "interface" between CCR CORE and CCR Nordic. It is therefore a sound solution to let the SORs coordinate through their RCCs

4. Interface IU / Central – ensemble of interconnectors, assigned to one SOR

This interface is composed of the borders between GB and the continent, i.e. GB-FR, GB-BE and GB-NL borders. Although there is no strong physical interdependency between electrical flows in RTE, Elia and TTN's control areas and electrical flows in NGESO's control area, the networks of all connected TSOs are directly and significantly affected by the transfers on the interconnectors.

Channel bidding zone borders are physically composed of HVDC interconnectors. In the IU SOR part, Channel interconnectors are operated by independent interconnector parties and the transmission over the interconnectors can change throughout each day as a result of capacity allocation, which uses specific auctions run by those interconnector parties in the IU SOR part. Besides applicable CCR methodologies, the operation of the interconnectors in Channel is ruled under specific trilateral operating protocols detailing the coordination between onshore TSOs and the certified interconnector-TSO and taking into account market participants trading. Coordination between SOR will be ensured by onshore TSOs and relevant RCCs with due regards to those applicable methodologies and protocols, in order to ensure the secured operation of the interconnected system as well as the consistency of the different process (secure cross-border trade allocation, emergency management, reserve sharing, etc.).

The interconnector parties play a defined role in CACM and FCA and independently provide interconnector schedules as well as take remedial actions where requested by the network TSOs. With this in mind it is clear that the interconnector parties play a distinct albeit limited role and, as a consequence, it is important that the physical interconnectors are included within a System Operation Region. The interconnector parties are certified TSOs under the GB NRA although their role is restricted by the GB NRA and has limited scope. Although the legal proposal does not include the interconnector parties as forming part of the management board of the regional co-ordination centre it does include them as named relevant stakeholders who will be consulted along with the Central RCC, Elia, Tennet, RTE and associated NRAs in the development the co-operative processes associated to Article 37 and Article 38.

In light of the above and taking into account that the GB network is a much smaller synchronous area than the Central European, this interface is proposed to be included in the IU SOR. However, coordination of all regional processes on this interface will be ensured by the RCC established by TSOs in IU SOR, in close cooperation with the Central SOR, RTE, Elia, TTN and the interconnector parties. This coordination will be supported by the implementation of several legal requirements: RCCs established for a SOR have to coordinate with the other RCCs of the bidding zone borders adjacent to SOR (EU Regulation 2019/943 article 36), have to establish clear cooperative processes with their TSOs, other RCCs and relevant stakeholders (EU Regulation 2019/943 article 37) and have to develop consultation procedure with other RCCs, relevant stakeholders and NRAs when required (EU Regulation 2019/943 article 40).

Furthermore, once the SOR and associated RCC is established it is expected that Channel CCR will continue to exist and Elia, RTE and Tennet NL will remain strongly involved in the Channel CCR, having the right to propose, amend and draft the relevant methodologies to coordinate this area. Therefore, it is assumed that all regional tasks on this interface will be handled following the methodologies required by SOGL, NCER, CACM, and FCA and designed for the Channel CCR when relevant. The other tasks will be performed as standard inter RCC ones according to relevant EU Regulation 2019/943 requirements.

5. Interface GRIT / Central – two sets of bidding zone borders, assigned distinctly to two SORs

This interface is composed of the bidding zone IT NORD, being BZ borders of Italy North CCR, and the border Italy NORD – Switzerland (IT NORD-CH) covered only by Central Europe SOR and IT NORD-IT CNORD border being covered by GRIT SOR.

BZ IT NORD is strongly influenced by electrical flows coming from northern neighbouring countries (including Switzerland) and also between other countries part of Central Europe (especially Germany). This influence is expected to increase in the future with new interconnections in development that will require coordinated actions among all the involved TSOs in order to grant both electricity market efficiency and secure, reliable power operations.

On the other hand, BZ IT NORD grid represents also a large portion of Italian TSO's control area which is also entirely included in GRIT SOR. Moreover the operation in this area really needs specialized and well targeted expertise requiring a holistic national approach, especially for what concerns internal cross-zonal tasks as well as those related to adequacy and reserves. Besides, since some reserves are coordinated by Terna at BZ level (RR) when other reserves are coordinated at control area level (FRR), the integration of BZ IT NORD in both Central and GRIT represent the most efficient solution to grant a cost effective sizing and sharing of reserves for TERNA. A close coordination is then needed between Central and GRIT SORs to maximize the use of cross-border capacities for reserves and ensure the optimization between the reserves.

The reasons explained above justify our proposal to include it in both Central Europe and GRIT SORs. Thus coordination of regional processes relevant for this interface will be ensured by RCC that will be appointed in Central Europe and GRIT SORs, in close cooperation with Terna, which may participate in both RCCs.. All regional tasks on this interface will be handled in accordance with the methodologies developed pursuant to SOGL, NCER, CACM, FCA for the CCRs in which this interface is involved regarding the tasks already in the scope of the third Energy package.

In the light of the low interdependency between Central Europe and the peninsular Italian power system, both in terms of flows and operation differences, no harmonization of methodologies to manage capacity calculation and coordinated security processes for Central Europe and GRIT SORs are foreseen. The other tasks will be performed as standard inter RCC ones according to articles 35.1.b and 38 of Regulation 2019/943 requirements.

6. Interface GRIT / South East – ensemble of interconnectors, assigned to one SOR

The interface between SOR GRIT and SOR SEE is the border between IT and GR belonging to GRIT CCR and the coordination is ensured by GR TSO as it is part of both SEE and GRIT SORs.

Italy SUD-Greece border is composed of a single HVDC link and there are low physical interdependencies regarding internal flow in Italy and Greece control area. The HVDC link is operated in coordinated way by both Italian and Greece TSOs, that shall be involved in GRIT SOR. Such a setup has already been applied, among others, to the methodology for coordinated capacity calculation approved by the NRAs for GRIT CCR in the framework of CACM implementation.

All regional tasks on this link will be handled according to the same criteria, i.e. relevant methodologies will be developed by GRIT TSOs (for services foreseen already in 3rd package) or all EU TSOs (for RCC tasks added in 4th package) and approved by GRIT CCR NRAs (for services foreseen already in 3rd package) and ACER (for RCC tasks added in 4th package).

The interface will integrate also the border Italy CSUD-Montenegro, adjacent to GRIT and SEE SORs, radially connected to single HVDC link inside Terna system, that entered into operation in December 2019. The HVDC link is operated in a coordinated way through established bilateral and coordinated procedures aiming to ensure the operational security and market efficiency.

The involved parties are currently evaluating the more efficient technical solution with the objective to integrate the border only in GRIT SOR, in line with the position expressed from Energy Community Regulatory Board in the light of the similarities with Italy-Greece border, or both in GRIT and SEE SORs. It is proposed as a temporary solution to not include the border in any of the SORs while ensuring that the coordination is performed according to bilateral agreements and procedures between Terna and CGES.

7. Interface South West / Central – two sets of bidding zone borders, assigned distinctly to two SORs

This interface is composed of the bidding zone FR, BZ border FR-ES being covered only by SWE SOR and other BZ borders of FR being covered by Central Europe SOR.

BZ FR is at the crossroad of cross-zonal electrical flows coming from the western part of Central Europe and heading to South West Europe and vice-versa : on one hand, French grid is strongly influenced by commercial exchanges with its neighbours, and also by commercial exchanges between these neighbours (for instance between The Netherlands and Germany or between Germany and Switzerland). On the other hand, French grid is also strongly influenced by commercial exchanges with Spain. This influence will increase with the coming development of new interconnections and will be spread as far as centre of France. Those large amount of cross-zonal flows exchanged on all FR BZ borders reflect the functioning European market and are transmitted through the BZ France thanks to a strongly meshed grid. That is why, in spite of the lack of interdependency between flows in BZ border FR-ES and the rest of French BZ borders and the peninsular character of Iberian system with few synchronous link compared to the total capacity, it is necessary to ensure a holistic approach of the coordinated processes to ensure operational security of the whole BZ FR.

Even if a harmonization of methodologies to manage all FR BZ borders in the capacity calculation and coordinated security processes is not required neither technically justified, with larger available capacities for cross-zonal trades foreseen with the Clean Energy Package and the development of new interconnections, those flows and mutual influences will increase in the future, necessitating consistent coordination between the Central Europe and SWE SOR especially for the processes associated to adequacy and reserves as well as in case of electricity crisis.

In France, there is only one market for congestion management and balancing : the balancing market. Therefore, activation of countertrading and redispatching have an impact on balancing resources and balancing issues impact the volume available for countertrading. Countertrading, frequently used in the ES-FR border as a mean to secure and maximise cross-border capacities, requires to identify what are the more economically efficient resources in the whole BZ. The integration of BZ France in both adjacent SOR will allow a better coordination of countertrading and redispatching resources within the BZ between the different French borders in close cooperation with RTE.

Then, it makes sense for the BZ France to be part of both SOR, Central Europe and SWE, and that's why we propose to include the BZ FR in both.

All regional tasks on this interface will be handled in accordance with the methodologies developed pursuant to SOGL, NCER, CACM, FCA for the CCRs in which this interface is involved regarding the tasks already in the scope of the third Energy package. The other tasks will be performed as standard inter RCC ones according to articles 35.1.b and 38 of Regulation 2019/943.

8. Interface South East / Central – ensemble of interconnectors, assigned to one SOR and further evolution of regional agreements

This interface is composed of the border between RO and BG, part of the SEE CCR and the borders of Balkan power system and Central SOR.

Border RO-BG is assigned to SEE SOR, thus coordination of relevant regional processes on this border will be ensured by SEE RCCs.

The coordination between the borders of Balkan countries and Central SOR will be established in line with the existent agreements and making best use of ENTSSOE structures and projects.

9. Interface Nordic / IU – included but to be clarified in the future

This interface will relate to a HVDC link between Norway (NO2) and GB, under construction. Such interface is subject to a future CCR and SOR allocation. The interface will be managed in accordance with the applicable methodologies.

4. Relationship between SORs and CCRs

System Operation Regions are understood as the geographical scope for technical cooperation and they shall be compatible with progress towards a competitive and efficient internal market for electricity (El. Regulation recital number 42). In this sense, there is a need to underline the technical character of the cooperative processes to be submitted by TSOs of SOR to concerned NRAs (articles 38 and 42 of EU Regulation 2019/943) when establishing RCCs (art 35). Those cooperative processes shall be totally in line with applicable methodologies at CCR level or others as applicable (e.g. SAOA or SAFA agreements). In line with this, and in consistency with the legal requirement, a SOR shall cover at least one CCR.

EU Regulation 2019/943 states that a SOR shall cover at least one CCR. Hence a SOR does not replace a CCR. Notably, for capacity calculation (CC) and coordinated security analysis (CSA), as well as for the rest of tasks described in NCs and GLs implementing EU Regulation 2009/714, the legal and technical framework given by the CCR has to be followed since the EU Regulation 2019/943 states that for each SOR, the RCC has to carry out CC according to the methodologies developed under CACM and CSA according to the methodologies under SOGL. Those methodologies are all developed per CCR.

The understanding is that if a SOR covers more than one CCR, the methodologies of each CCR shall apply and there is no obligation for harmonization. Besides, for the CCRs being an interface between two SORs, those methodologies are a strong legal framework to design the coordination between SORs.

5. Coordinated tasks at SOR, EU or other geographical scope

According to art. 37 of Clean Energy Package (CEP or 4th package) each Regional Coordination Centre shall perform tasks of regional relevance in the entire system operation region where it is established.

Tasks defined in article 37(1) letters “a”-“f” and “n” are already being developed by RSCs and ENTSOE based on 3rd EU package network nodes and guidelines (SOGL, NCER, CACM, and FCA).

The other tasks are the new ones required by Clean Energy Package.

Regional coordination centres shall issue so called coordinated actions to the transmission system operators in the framework of coordinated capacity calculation and coordinated security analysis. For all other tasks Regional coordination centres shall issue recommendations to the transmission system operators, unless the RCCs are granted with the capability to issue coordinated actions for those tasks, in line with article 42(6).

In the opinion of ENTSO-E TSOs some of the tasks listed in article 37 allocated by CEP to each RCC can be realized much more efficiently in the different set up, i.e. by one RCC on behalf of all EU TSOs or even by another entity. The best example of such process realized already now in one place in preparation of seasonal adequacy assessment (task “n” in article 37.1 of Electricity Regulation) which has been run for years by all TSOs within the working structure of ENTSO-E and there is no generalised need for all regions to regionalize it. One can even say that in case of its regionalization much more complex process would need to be developed in order to keep the current quality of its results (in the sense of interdependencies between the regions).

It is also worth to mention here, that ongoing implementation of CGM, OPC and STA processes is based on development of pan-European IT hardware and software tools within ENTSO-E working structure, which will be owned or licensed by ENTSO-E. Indirectly this refers to CCC and CSA processes, once they are based on CGM IT tools (temporarily they can be run in some CCRs without them). This means that operation of these tools, once they are implemented, might also be more efficient if done differently than by each RCC in its own SOR. This obviously shall be decided later on based on actual experiences.

Looking at the new CEP tasks it is clear that identification of regional electricity crisis scenarios (task ‘m’ in art 37.1 of Electricity Regulation) also shall be run in one place in order to ensure inter regional compatibility of this process. It is already written in the relevant methodologies required by Risk Preparedness Regulation that this task is to be run by all TSOs in the working structure of ENTSO-E. The same, although for other reasons (mainly efficiency, including using existing structures) refers to optimization of inter-transmission system operator compensation mechanisms (task ‘l’ in article 37.1 of Electricity Regulation), which is efficiently organised. Finally also the calculation of the maximum entry capacity available for the participation of foreign capacity in capacity mechanisms (task ‘o’ in article 37.1 of Electricity Regulation) and the identification of needs for new transmission capacity, for upgrade of existing transmission capacity or their alternatives (task ‘p’ in article 37.1 of Electricity Regulation) seem to be good candidates for realization by one dedicated team, not necessarily within any of RCC – maybe within working structure of ENTSO-E as it is done already know in case of TYNDP.

Summarizing, due to the above mentioned reasons ENTSO-E TSOs believe that it is more efficient to allocate realization of some tasks listed for RCC in CEP to other entities or to be done in some SORs by other RCCs than the hosting one. Thus ENTSO-E TSOs propose ACER to keep this allocation open and flexible for the time being and, in order to be able to adopt the most efficient solutions. Relevant decision in the future per each task during implementation of relevant methodologies and the coordination process between RCCs to be established pursuant to Article 38 and/or Art. 30.1.e of the Electricity Regulation.

6. Inclusion of ENTSO-E Non-EU TSOs in ENTSO-E SOR Proposal

The European electricity network evolves with the primary goal of ensuring stability of the system and security of supply while enabling the integration of the EU energy markets and fulfilling the ambitious RES deployment objectives of the EU. The Continental Europe synchronous area has the most meshed transmission network in the world, making a seamless coordination between all European TSOs (EU and non-EU) crucial to achieve these objectives, in particular to continue to maintain the security of the European transmission system. This is only possible if all relevant operational processes are coordinated and applied by all TSOs (EU and non-EU TSOs) in Europe.

System operation tasks require non-discriminatory coordination among all the transmission system operators which are connected to the same synchronous area in Europe. Numerous past examples of close coordination among TSOs demonstrate its important role in how major crises were avoided.

Besides, the Continental power system is linked, synchronously or non-synchronously and with different degrees of interdependency in terms of flows, with other power systems, some of them are control areas of EU-TSOs.

When implementing EU Regulation 2009/714, in line with their responsibility to maintain system reliability by ensuring operational security and supporting security of supply, in an efficient way, TSOs within ENTSO-E have contributed to the establishment of network codes and guidelines, which constitute today a harmonized power system operation framework with cross-regional and pan-European geographical coverage. The need to strengthen and deepen coordination between technical parties was highlighted and enforced by current Network Codes and Guidelines, notably by EU Regulation 2017/1485 on electricity transmission system operation and EU Regulation 2017/2196 on electricity emergency and restoration.

In line with EU Regulation 2017/1485 on electricity transmission system operation: *‘The Union, Member States and TSOs should aim for secure system operation inside all synchronous areas stretching on the Union. They should support third countries in applying similar rules to those contained in this Regulation. ENTSO-E should facilitate cooperation between Union TSOs and Third-country TSOs concerning secure system operation’.*

It is of relevance to clarify that, when facilitating cooperation between TSOs aiming for secure system operation, ENTSO-E distinguishes between:

- Cooperation at technical level of all ENTSO-E member TSOs¹, in line with ENTSO-E Statutes, ToR and Internal Regulations.

In consistency, the SOR Proposal integrates the ENTSO-E member TSOs.

- Technical cooperation with third country TSOs that are not ENTSO-E member, so far clarified in line with December 2016 recommendations approved by ACER and published by ENTSO-E² when implementing EU Regulation 2009/714.

Therefore, the SOR Proposal does not integrate non-full ENTSOE member TSOs, and it is understood that the technical cooperation with them can be clarified by specific agreements.

Due to interconnectivity and influence in terms of flows, to maintain operational security of the pan-European power system TSOs rely as much as possible on established operational procedures. Those procedures are the technical layer of implementation of methodologies pursuant to network codes and guidelines agreed at the relevant regional level (Capacity Calculation Region, Synchronous Area agreements, ...), which are

¹ The non-EU ENTSO-E members include different groups: (1) TSO belonging to countries with no general agreement with the EU, (2) TSOs belonging to contracting parties to the EEA Agreement and (3) TSOs belonging to contracting parties to the Energy Community Treaty.

² <https://docstore.entsoe.eu/Documents/Publications/SOC/Recommendations on Coordination of Technical Cooperation with Third Country TSOs - Web Version.pdf>

intended to allow the highest level of exchanges and efficiency of the IEM, while ensuring operational security.

In this context, it is of relevance to state the **technical character of the requirements in article 35 of EU Regulation 2019/943, related to the description by TSOs at SOR level of the cooperative processes, in line with articles 38 and 42 of EU Regulation 2019/943, when establishing RCCs.**

Third Package implementation led to the establishment of RSCs, which cover the coordination of important processes across Europe and provide corresponding services to all (EU and non-EU) TSOs to ensure system security. Any exclusion of certain areas from the corresponding methodologies and coordination processes could pose a risk to the European transmission system, especially when remedial actions are not properly coordinated.

This cooperation framework is further developed in the Clean Energy Package (Article 34 and 35 of the Regulation), eventually leading to the replacement of the existing RSCs by RCCs, with an additional number of services to be provided. These RCC tasks need to take into account the interdependency of the electricity system and their corresponding flows, regardless of national boundaries between member states and non-EU countries. Article 36 of the Regulation requires ENTSOE to take into account the reality of the system when putting in place those RCCs: the corresponding System Operation Regions "... shall take into account the grid topology, including the degree of interconnection and of interdependency of the electricity system in terms of flows and the size of the region which shall cover at least one capacity calculation region."

In short, RCCs will be the level where all system operation relevant processes (RCC tasks) will be coordinated. As highlighted, it is crucial to coordinate those processes between all concerned TSOs (EU or non-EU) in order to ensure the overall system security. It is therefore essential to include non-EU TSOs in the relevant SORs defining the relevant geographic scope for the RCCs.

Technical arguments

In addition to the general arguments given above, specific technical drivers for the need to include relevant non-EU TSOs can be detailed:

The increasing amount of intermittent RES and distributed flexibilities introduce additional complexity in operational planning and real-time operation because of potentially large and unpredictable forecast errors and the increasing need of coordination with DSOs. The increasing number of complex devices such as PSTs and HVDC links further necessitates appropriate and comprehensive coordination. Upon the implementation of the requirement of the recast Electricity Regulation, that 70% of the transmission capacity of network elements should be available for cross-zonal trade, the amount of unscheduled flows is expected to increase. It should be noted that for some countries in Continental Europe unscheduled flows already pose significant threats to regional security of supply nowadays. Only through an impartial coordination before real-time operation can unscheduled flows be much more efficiently reduced and mitigated.

The increasing number of market transactions and complex interactions between electricity markets players and system operators require all TSOs to coordinate all system operation relevant tasks. Many of them will be performed within each SOR by RCC(s). Exchange or application of insufficient or incomplete information (e.g. incomplete network models for a highly meshed network) and partial coordination (e.g. the exclusion of specific TSOs in some specific operational processes) among TSOs would not just reduce the efficiency of system operation for the whole region, but also introduce additional operational risks. This is because potentially critical network violations cannot be detected and mitigated in a coordinated and timely manner. Secure system operation can only be achieved, when there is a common, systematic and synchronized technical framework (e.g. processes, platforms, etc.) for the computation and application of the results. With such a coordination framework, contingencies which might happen close to or at real-time can be managed with likely more available resources (e.g. remedial actions) for TSOs during real-time operation, reducing the likelihood of a regional brown-out or even a blackout.

Legislative support

The need to coordinate the different processes between all affected (EU or non-EU) TSOs and the risks associated with a lack of coordination has been widely acknowledged, including in existing EU legislation:

- Point 3.1. of Annex I to Regulation (EC) No 714/2009
- ACER decision 06/2016 (17.11.2016)³.
- Regulation (EC) 2017/2195 (EBGL) Art. 1.6, 1.7 (for the special case of Switzerland) and
- Regulation (EU) 2017/1485 (SOGL) Art. 13 and Regulation (EU) 2017/2196 (NCER) Art. 10

These items explicitly recognise the need for coordination concerning secure system operation between EU and non-EU TSOs.

The Clean Energy Package continues to recognise the need for seamless coordination between EU and non-EU countries when it comes to system security:

- The cooperation at national level is foreseen in the Recast Regulation, in the Whereas section, paragraph (70): “Member States, the Energy Community Contracting Parties and other third countries which apply this Regulation or are part of the synchronous area of Continental Europe should closely cooperate on all matters concerning the development of an integrated electricity trading region and should take no measures that endanger the further integration of electricity markets or security of supply of Member States and Contracting Parties.”
- The cooperation at ENTSO-E level, in the Regulation Article 30.1(d): “The ENTSO for Electricity shall [...] adopt recommendations relating to the coordination of technical cooperation between Union and third-country transmission system operators;”

To conclude, coordination between EU and non-EU TSOs for tasks pertinent to system operation is essential to ensure seamless system operation and security. The need for this coordination has been widely acknowledged by TSOs, regulators and EU legislators and is in line with the CEP requirements. The inclusion of non-EU TSOs in the geographical scope of SORs fulfils the need and constitutes the basis of such coordination.

The composition of the SORs reflects the interconnection and interdependency of the electricity system in Europe, including the technical needs for covering both the EU and non-EU, and it facilitates implementation at an early stage. Both the technical and regulatory needs are described in the previous section.

³ ACER Decision, 5.3. (55), page 12:

“[...] Further, pursuant to point 3.1. of Annex I to Regulation (EC) No 714/2009, capacity allocation at an interconnection shall be coordinated and implemented using common allocation procedures by the TSOs involved in cases where commercial exchanges between two countries (TSOs) are expected significantly to affect physical flow conditions in any third country. Regulatory authorities and TSOs shall ensure that no congestion-management procedure with significant effects on physical electric power flows in other networks is devised unilaterally.”

ACER Decision, 5.7. (73), page 16:

“In that context, it is to be noted that point 3.1. of Annex I to Regulation (EC) No 714/2009 requires that ‘[i]n cases where commercial exchanges between two countries (TSOs) are expected to affect physical flow conditions in any third-country (TSO) significantly, congestion-management methods shall be coordinated between all the TSOs so affected through a common congestion-management procedure.’”

ACER Decision, 5.7. (78), page 17/18:

“[...] It is therefore essential that these remedial actions are fully coordinated and optimised within a common region and involve all TSOs and networks which are potentially affected. The coordination requirement stipulated by point 3.1. of Annex I to Regulation (EC) No 714/2009 should in this case apply not only to exchanges between Member States, but also to exchanges between and within TSO areas (13).”

(13: I.e. in cases where commercial exchanges within a TSO or between two TSOs are expected to affect physical flow conditions in any third TSO significantly, congestion-management methods shall be coordinated between all the TSOs so affected through a common congestion-management procedure.)