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**Explanatory document to the “All TSOs’ proposal of Nordic Capacity Calculation Region for regional operational security coordination in accordance with Article 76 and Article 77 of the “Commission Regulation (EU) 2017/1485 of 2 August 2017” establishing a guideline on electricity transmission system operation”**

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15 March 2019

**DISCLAIMER**

This document is released on behalf of all TSOs of the Nordic Capacity Calculation Region only for the purposes of the public consultation on operational security coordination in accordance with Articles 76 and 77 of the Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation. This version of the explanatory document for regional operational security coordination does not in any case represent a firm, binding or definitive TSOs’ position on the content.

This document may be subject to changes depending on the ACER decision on the proposal for a methodology for coordinating operational security analysis in accordance with Article 75 of SO GL (CSA methodology).

## 1. Introduction

The Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation (hereafter referred to as “**SO GL**”) was published in the official Journal of the European Union on 25 August 2017 and entered into force on 14 September 2017. The SO GL sets out guidelines regarding requirements and principles concerning operational security, as well as the rules and responsibilities for the coordination between TSOs in operational planning. To deliver these objectives, several steps are required.

One of these steps is the development of the proposal for Nordic regional operational security coordination for the Capacity Calculation Region Nordic (hereafter referred to as “**CCR Nordic**”) in accordance with Article 76(1) of SO GL (hereafter referred to as “**NROSC**” or “**Proposal**”). The Proposal shall also include common provisions concerning the organisation of regional operational security coordination in accordance with Article 77 of SO GL.

According to Article 6(3)(b) of SO GL, the Proposal shall be submitted by the TSOs to the national regulatory authorities (hereinafter “**NRAs**”) for approval by 3 months after the approval of the methodology for coordinating operational security analysis according Article 75(1) of SO GL (hereafter referred to as “**CSAM**”). NROSC is subject to public consultation in accordance with Article 11 of SO GL. According to Article 6(7) of SO GL the NRAs shall take a decision on CSAM within 6 months after submission of the proposal. Hence expected deadline for submission of this Proposal to NRAs is 14 June 2019. According to Article 6(6) of SO GL the Proposal needs to be submitted to ACER as well, who may issue an opinion on the Proposal if requested by the NRAs.

The Proposal has been developed by the Transmission System Operators (hereafter referred to as “**TSOs**”) of the CCR Nordic.

This explanatory document has been developed in recognition of the fact that the NROSC, which will become legally binding documents after NRAs’ approval, inevitably cannot provide the level of explanation, which some parties may desire. Therefore, this document aims to provide interested parties with the background information and explanations for the requirements specified in NROSC.

NROSC is also in relation with some other methodologies required by SO GL or the Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management (hereafter referred to as “**CACM**”):

- Methodology for coordinating operational security analysis in accordance with Article 75(1) of SO GL (CSAM)
- Proposal for a common methodology for coordinated redispatching and countertrading in accordance with Article 35 of CACM. The concerned methodology is the common methodology of the TSOs of Nordic CCR for coordinated redispatching a countertrading (hereafter referred to as “**CRC Methodology**”).
- Proposal for a common methodology for redispatching and countertrading cost sharing in accordance with Article 74 of CACM. The concerned methodology is the common methodology of the TSOs of Nordic CCR for coordinated redispatching a countertrading cost sharing (hereafter referred to as “**CRCCS Methodology**”).

This explanatory document provides explanations developed in the following chapters:

- Chapter 1 - Introduction
- Chapter 2 - Legal requirements and interpretation
- Chapter 3 - The existing situation
- Chapter 4 - Proposal for regional operational security coordination

- Chapter 5 - Organisation for regional operational security coordination
- Chapter 6 - Impact assessment
- Chapter 7 - Implementation
- Chapter 8 - Public consultation

## 2. Legal references and interpretation

### 2.1 SO GL requirements

Several articles in SO GL set out requirements which the Proposal must take into account. These are cited below.

1. Article 76(1) of SO GL constitutes the legal basis of this Proposal. Article 76(1) has the following content:
  1. *By 3 months after the approval of the methodology for coordinating operational security analysis in Article 75(1), all TSOs of each capacity calculation region shall jointly develop a proposal for common provisions for regional operational security coordination, to be applied by the regional security coordinators and the TSOs of the capacity calculation region. The proposal shall respect the methodologies for coordinating operational security analysis developed in accordance with Article 75(1) and complement where necessary the methodologies developed in accordance with Articles 35 and 74 of Regulation (EU) 2015/1222. The proposal shall determine:*
    - (a) *conditions and frequency of intraday coordination of operational security analysis and updates to the common grid model by the regional security coordinator;*
    - (b) *the methodology for the preparation of remedial actions managed in a coordinated way, considering their cross- border relevance as determined in accordance with Article 35 of Regulation (EU) 2015/1222, taking into account the requirements in Articles 20 to 23 and determining at least:*
      - (i) *the procedure for exchanging the information of the available remedial actions, between relevant TSOs and the regional security coordinator;*
      - (ii) *the classification of constraints and the remedial actions in accordance with Article 22;*
      - (iii) *the identification of the most effective and economically efficient remedial actions in case of operational security violations referred to in Article 22;*
      - (iv) *the preparation and activation of remedial actions in accordance with Article 23(2);*
      - (v) *the sharing of the costs of remedial actions referred to in Article 22, complementing where necessary the common methodology developed in accordance with Article 74 of Regulation (EU) 2015/1222. As a general principle, costs of non-cross-border relevant congestions shall be borne by the TSO responsible for the given control area and costs of relieving cross-border-relevant congestions shall be covered by TSOs responsible for the control areas in proportion to the aggravating impact of energy exchange between given control areas on the congested grid element.*
2. Article 76(2) of SO GL constitutes the following:
  1. *In determining whether congestion have cross-border relevance, the TSOs shall take into account the congestion that would appear in the absence of energy exchanges between control areas.*

3. The Proposal shall also provide common provisions concerning the organisation of regional operational security coordination. Article 77 of SO GL has the following content:
  1. *The proposal of all TSOs of a capacity calculation region for common provisions for regional operational security coordination pursuant to Article 76(1) shall also include common provisions concerning the organisation of regional operational security coordination, including at least:*
    - (a) *the appointment of the regional security coordinator(s) that will perform the tasks in paragraph 3 for that capacity calculation region;*
    - (b) *rules concerning the governance and operation of regional security coordinator(s), ensuring equitable treatment of all member TSOs;*
    - (c) *where the TSOs propose to appoint more than one regional security coordinator in accordance with subparagraph (a):*
      - (i) *a proposal for a coherent allocation of the tasks between the regional security coordinators who will be active in that capacity calculation region. The proposal shall take full account of the need to coordinate the different tasks allocated to the regional security coordinators;*
      - (ii) *an assessment demonstrating that the proposed setup of regional security coordinators and allocation of tasks is efficient, effective and consistent with the regional coordinated capacity calculation established pursuant to Articles 20 and 21 of Regulation (EU) 2015/1222;*
      - (iii) *an effective coordination and decision making process to resolve conflicting positions between regional security coordinators within the capacity calculation region.*
  2. *When developing the proposal for common provisions concerning the organisation of regional operational security coordination in paragraph 1, the following requirements shall be met:*
    - (a) *each TSO shall be covered by at least one regional security coordinator;*
    - (b) *all TSOs shall ensure that the total number of regional security coordinators across the Union is not higher than six.*
  3. *The TSOs of each capacity calculation region shall propose the delegation of the following tasks in accordance with paragraph 1:*
    - (a) *regional operational security coordination in accordance with Article 78 [of SO GL] in order to support TSOs fulfil their obligations for the year-ahead, day-ahead and intraday time-frames in Article 34(3) and Articles 72 and 74 [of SO GL];*
    - (b) *building of common grid model in accordance with Article 79 [of SO GL];*
    - (c) *regional outage coordination in accordance with Article 80 [of SO GL], in order to support TSOs fulfil their obligations in Articles 98 [of SO GL] and 100 [of SO GL];*
    - (d) *regional adequacy assessment in accordance with Article 81 [of SO GL] in order to support TSOs fulfil their obligations under Article 107 [of SO GL].*
  4. *In executing its tasks, a regional security coordinator shall take account of data covering at least all capacity calculation regions for which it has been allocated tasks, including the observability areas of all TSOs in those capacity calculation regions.*
  5. *All regional security coordinators shall coordinate the execution of their tasks in order to facilitate the fulfilment of the objectives of this Regulation. All regional security coordinators shall ensure the harmonization of processes and, where duplication is not justified by reasons of efficiency or by the need to ensure continuity of service, the creation of joint tools to ensure efficient cooperation and coordination between the regional security coordinators.*

## 2.2 Interpretation and scope of the Proposal

Article 76 of SO GL includes two topics. Firstly, Article 76(1)(a) stipulates the conditions and frequency for intraday coordination including updates of the common grid model. Secondly, Article 76(1)(b)(i)-(v) requires the definition of a methodology for the preparation of remedial actions managed in a coordinated way.

Article 77 of SO GL defines requirements with regard to the organisation of regional operational security coordination.

In addition to SO GL requirements, CSAM provides several requirements which shall be respected by the Proposal such as:

- Identifying which remedial actions need to be coordinated, i.e. remedial actions which cannot be decided alone by a TSO but need to be agreed by other affected TSOs;
- Identifying which congestions on which grid elements need to be solved at regional level under the coordination task delegated to a RSC, in accordance with Article 78 of SO GL;
- Identifying which rules need to be applied to ensure inter-RSC coordination when RSCs provide their tasks to the TSOs;
- Requesting a minimum number of intraday security analyses to be done by a TSO (or delegated to its RSC)

According Article 76(1)(a) the proposal shall determine the conditions and frequency of intraday coordination of operational security analysis and updates to the common grid model by the regional security coordinator. This requirement would basically leave the TSOs of the CCR Nordic the necessary freedom to determine their needs in terms of frequency and hours of regional operational security coordination in intraday.

In order to ensure a minimal common pan-European approach, Article 24 of CSAM includes a request for each TSO to run at least three coordinated operational security analyses for its control area in intraday. This value is based on a minimum obligation to update security analyses and is consistent with the fact that the CGM methodology developed pursuant to Article 70 of SO GL (hereafter referred to as “**CGMM**”) requests TSOs to update their individual grid models (hereafter referred to as “**IGMs**”) at least three times in intraday (0h, 8h, 16h covering the coming 8 hours) and RSCs to produce corresponding common grid models (hereafter referred to as “**CGMs**”). At regional level, additional frequency of IGM/CGM updates can be agreed upon in the Proposal. It is basically possible to extend these 3 updates for the whole remaining hours of the day, beyond the coming 8 hours, in order to improve the coordination process.

In day-ahead the synchronisation and respective timings for the different steps of the coordination are defined in Article 33 of CSAM. The process described in Article 33 of CSSAM is primarily inspired of the existing process applied by several TSOs and RSC on Continental Europe considering several improvements enhancing the inter-RSC coordination. The Proposal describes besides the intraday process also the day-ahead Nordic regional operational security coordination thereby considering the requirements of Article 33 of CSAM.

The methodology for the preparation of remedial actions managed in a coordinated way in accordance with Article 76(1)(b)(i)-(iv) shall define a procedure for exchanging information of the available remedial actions and the classification of constraints and the remedial actions. The methodology shall also define the process for identification of the most effective and economically efficient remedial actions in case of operational security violations. The methodology shall describe a process for preparation and activation of remedial actions. The methodology shall define provisions for sharing of the costs of remedial actions. Basically the cost sharing methodology in accordance with Article 76(1)(b)(v) shall complement the common methodology of the TSOs of Nordic CCR for coordinated redispatching a countertrading cost sharing (**CRCCS Methodology**).

The Proposal shall also provide common provisions concerning the organisation of regional operational security coordination. The primary focus is on the organisation within CCR Nordic but shall also consider organisation with adjacent CCRs in particular with CCR Baltic and CCR Hansa.

The objectives of the Nordic day-ahead and intraday regional operational security coordination is to identify the expected operational security limits violations on the interconnected system and the corresponding remedial actions, being preventive or curative, which must be designed, coordinated and agreed and then activated (at latest time compatible with needed time to implement the remedial action before the hour where it becomes necessary).

### **3. The existing situation**

The Nordic TSOs have defined operational routines as common routines of the Nordic TSOs and Nordic RSC. The Nordic RSC is the service provider for the Nordic TSOs and provides services in accordance with the Multilateral Agreement (MLA).

The operational routines are driven both by TSO needs for certain inputs for market hours and daily planning, and also by the common agreed ENTSO-E level activities. The operational routines define a set of rules for yearly, monthly, weekly and daily (D-2, day-ahead and intraday) activities. Some of the routines require coordination with the neighboring RSCs, especially with Baltic RSC and TSCNET Services. The main objective of the joint operational routines is to give a clear overview of the commonly performed business processes within Nordic RSC including a detailed timeline and task description.

The CGMES version 2.5 is to include grid-element properties making dynamic simulations possible on the CGM. Furthermore, Power Transfer Corridors (PTCs), System Integrity Protections Schemes (SIPs) and Transitory Admissible Transfer Loading values (TATLs), among others, will be part of the new standard (CGMES 2.5). This will widen the possibility range for studies at the Nordic RSC regarding the service Coordinated Security Analysis (CSA).

The operational routines for day-ahead regional operational security coordination will become fully operational in Q4/2019.

The operational routines for intraday regional operational security coordination will become fully operational in accordance with Article 31 "Timescale for implementation" of the NRSOC Proposal.

## **4. Proposal for regional operational security coordination**

### **4.1 Introduction**

In the long-term (year-ahead up to week-ahead), operational security analyses are mainly focused on the outage planning process to ensure that these outages will be compatible with a secure system operation and on the evaluation on general assessment of the expected security of the system in terms of expected congestion and adequacy. SOGL provides requirements to do these activities in a coordinated way. In the short-term (day-ahead and intraday), operational security analyses mainly deal with the identification of operational security limits violations, finding the appropriate remedial actions and ensuring the coordination of these remedial actions.

A very important step to assess security is at the end of D-1. This requires a well-coordinated process amongst the TSOs. The process includes regional coordination within CCR Nordic, but also cross-regional coordination by RSC coordination (Nordic RSC with RSCs of adjacent CCRs). The process will allow designing of remedial actions in a coordinated way at regional level and to identify and to elaborate on cross-regional effects of remedial actions and ensure agreement by all affected TSOs. The results of the D-1 process will consist in security assessment results and agreed remedial actions which will be taken as a reference basis for intraday regional operational security analyses.

## 4.2 Day-ahead and intraday coordination process

CSAM introduces in Article 33 requirements for a cross-regional day-ahead coordinated operational security assessment. The principles of Article 33 of CSAM are considered in the business process design of the Nordic day-ahead regional operational security coordination process. It was agreed amongst the Nordic TSOs to include the day-ahead process in the Proposal in order to complement and specify Article 33 of CSAM to Nordic needs. The scope of day-ahead and intraday regional operational security coordination process is within CCR Nordic.

The TSOs consider the critical network elements (CNE) as the minimum set of grid elements in CCR Nordic on which operational security limits will be identified. The power transfer corridors (PTC), which are a set of several transmission lines or other grid components imposing a MW limit for operational security reasons, are also classified as CNEs.

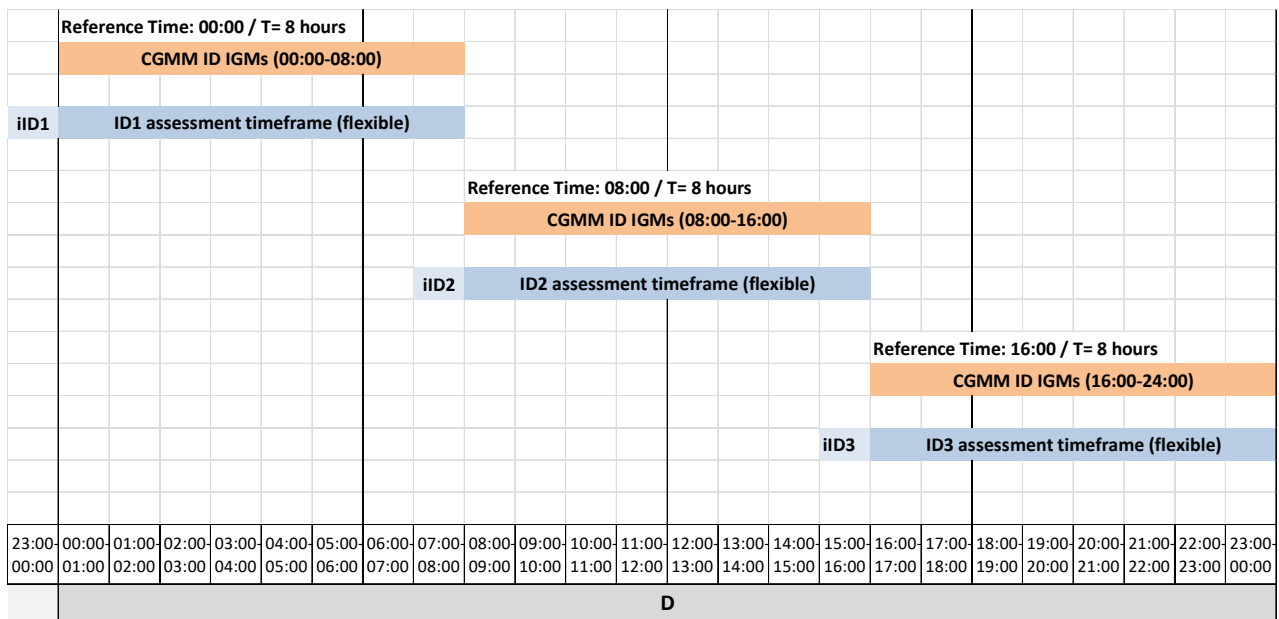
Main pre-requisite for the Nordic day-ahead and intraday regional operational security coordination process is the generation and exchange of day-ahead and intraday individual grid models in CGMES format. The individual grid models will be merged to the Nordic day-ahead common grid model.

The design of the intraday regional operational security coordination process was driven by several considerations:

- Go-Live of day-ahead Common Grid Model (D-1 CGM) is scheduled for end of September 2019.
- Go-Live of day-ahead regional operational security coordination is planned for Q4/2019. Operational experience of day-ahead business process is not available for development of the intraday process.
- Concept development and implementation of intraday individual grid model (ID IGM) and common grid model (ID CGM) are main prerequisites for the intraday business process.
- Hourly intraday regional operational security coordination requires a fully automatized business process and security calculations.

Hence the TSOs have agreed on a stepwise implementation of intraday regional operational security coordination process. The stepwise implementation is defined by an interim and enduring process. The intraday regional operational security coordination process starts with the interim solution. Providing a stable operation of the interim process for a period of at least 12 month, the interim process will be replaced by the enduring solution.

The following picture illustrates the interim intraday regional operational security coordination process:



The Nordic TSOs and Nordic RSC perform the interim intraday process at the following obligatory hours:

- First intraday process starting at 23:15 (CET)
- Second intraday process starting at 07:15 (CET)
- Third interim intraday process starting at 15:15 (CET)

In principal all market time units (MTU)

- between 00:00 (CET) and 08:00 (CET) during first intraday process,
- between 08:00 (CET) and 16:00 (CET) during second intraday process, and
- between 16:00 (CET) and 24:00 (CET) during third intraday process

will be assessed. The concrete MTUs subject to assessments within the several processes will be agreed upon during the process.

The major enhancements of enduring intraday regional operational security coordination process are:

- intraday process will be performed at each market time unit in intraday timeframe i.e. currently at least hourly;
- the assessment applies for each (hourly) intraday process on the remaining market time units of the day (e.g. intraday process starting at 15:15 (CET) will assess all MTUs between 16:00 (CET) and 24:00 (CET).

Besides the obligatory assessment runs in interim and enduring intraday process, the TSOs and Nordic RSC can perform assessments when defined conditions become effective such as outage of significant grid elements or upon a request of a TSO.

### 4.3 Individual and common grid model

A main pre-requisite for the regional operational security coordination processes is the preparation of individual grid models (IGMs). The IGMs will be prepared by each TSO and will be made available to the Nordic RSC. The IGMs will already consider cross-border and cross-CCR impacting remedial actions which have been agreed upon during the coordination process.



Nordic RSC has several important obligations concerning the processing of the IGMs. One of them is to check the consistency of the individual grid models provided by the TSOs. Another one is the merging of the IGMs to the Nordic common grid model (CGM). Nordic RSC is also obliged to monitor the correct inclusion of agreed remedial actions in the IGMs.

#### **4.4 Exchanging information on constraints and contingencies**

In order to detect operational security violations on grid elements, the TSOs will generate a list of monitored elements (Monitored Elements). The Monitored Elements will be shared with the Nordic RSC. The Nordic RSC will consider the Monitored Elements in the security assessment. The Monitored Elements include at least the critical network elements. Furthermore the TSOs will define and share a list of contingencies (Contingency List). The Monitored List and Contingency List will be evaluated and updated regularly by TSOs in cooperation with Nordic RSC.

#### **4.5 Remedial actions**

For the determination of remedial actions the TSOs have defined several approaches. For the time being the TSOs will apply the qualitative method with a remedial action influence factor  $>5\%$ . Nordic RSC will support the TSOs in determining cross-border and cross-CCR impacting remedial actions.

The determined remedial actions to be considered in regional operational security coordination process will be exchanged between the TSOs and Nordic RSC. If necessary, remedial action information will also be shared with TSOs and RSCs of adjacent TSOs.

Nordic RSC plays an important role in the recommendation of remedial actions. In case of detected operational security limit violation, the Nordic RSC will recommend on the basis of the security assessment appropriate remedial actions to the TSOs. The TSOs has the possibility to reject a recommended remedial action. The TSOs is then obliged to provide an explanation for the rejection to the affected TSOs and Nordic RSC.

The identification of the most effective and economically efficient remedial actions is an important part of the coordination process. TSOs will provide relevant information on technical effectiveness and costs of a remedial actions. The information provided by the Nordic RSC will be considered in the assessment of the Nordic RSC. An important result of this process is the preparation of a list of the most effective and economically efficient remedial actions.

The agreed remedial actions will be activated in real-time operation. It is possible to decline the activation of an agreed remedial action, if such remedial actions become unnecessary. In that case the declining TSO has to provide an explanation for its decision.

Besides the coordination of Nordic TSOs and Nordic RSC, the coordination with TSOs and RSCs of adjacent CCRs is an important part of the cross-CCR coordination process. Nordic RSC is mandated by the TSOs to coordinate with RSCs of adjacent CCRs, when necessary. Since the scope of NROSC is primarily on the coordination within CCR Nordic, details of cross-CCR coordination could be defined in operational procedures between the TSOs of the concerned CCRs.

#### **4.6 Cost sharing**

The cost sharing principles complement the document “All TSOs’ of the Nordic Capacity Calculation Region for a coordinated redispatching and countertrading cost sharing methodology in accordance with Article 74 of Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity

allocation and congestion management” (CRCCS Methodology) that has been approved by NRAs according to Article 9(7)(h) of CACM on 10 January 2019.

## **5. Organisation for regional operational security coordination**

### **5.1 Introduction**

The Nordic TSOs have established the Nordic RSC on the basis of the “Cooperation Agreement regarding Regional Security Coordination in the Nordic region, Nordic RSC” (Nordic RSC Agreement). Nordic RSC is the service provider of all TSOs in CCR Nordic. The Nordic RSC is located in Copenhagen.

### **5.2 Appointment and governance of the regional security coordinator**

The Nordic TSOs appoint Nordic RSC as the regional security coordinator of CCR Nordic. The governance and operation of the Nordic RSC is defined in the Nordic RSC Agreement.

### **5.3 Delegation of tasks**

The TSOs delegate several tasks to Nordic RSC with regard to building of common grid model, regional operational security coordination, regional outage coordination and regional adequacy assessment coordination.

Nordic TSOs in cooperation with Nordic RSC have already developed operational procedures related to the tasks delegated to Nordic RSC and subject to coordination within CCR Nordic.

### **5.4 Coordination with adjacent CCRs and RSCs**

Nordic RSC is mandated by the TSOs to coordinate with RSCs of adjacent CCRs, when necessary. Since the scope of NROSC is primarily on the coordination within CCR Nordic, details of cross-CCR coordination related to the tasks delegated to Nordic RSC could be defined in operational procedures between the TSOs of the concerned CCRs.

## **6. Impact assessment**

The Proposal generally contributes to and does not in any way hamper the achievement of the objectives of Article 4 of the SO Regulation. In particular, the Proposal serves the objectives to:

- Article 4(1)(a) determining common operational security requirements and principles;
- Article 4(1)(b) determining common interconnected system operational planning principles;
- Article 4(1)(d) ensuring the conditions for maintaining operational security throughout the Union (and Norway);
- Article (1)(f) promoting the coordination of system operation and operational planning;
- Article (1)(g) ensuring and enhancing the transparency and reliability of information on transmission system operation; and
- Article (1)(h) contributing to the efficient operation and development of the electricity transmission system and electricity sector in the Union (and Norway).

The Proposal contributes to these objectives by specifying common provisions for regional operational security coordination and the organisation of regional operational security coordination.

## **7. Implementation**

The implementation of the interim intraday regional operational security coordination process will take place 6 months after approval of the Proposal. With regard to on-going CSAM decision implementation deadline will be August/September 2020. The implementation of enduring intraday regional operational security coordination process is dependent on the successful operation of the interim process. Time horizon for implementation of the enduring solution is March – September 2022.

## **8. Public consultation**

Article 11 of the SO Regulation states that: *“TSOs responsible for submitting proposals for terms and conditions or methodologies or their amendments in accordance with this Regulation shall consult stakeholders, including the relevant authorities of each Member State, on the draft proposals for terms and conditions or methodologies listed in Article 6(2) and (3). The consultation shall last for a period of not less than one month.”*

This Proposal will be consulted in the period 15 March 2019 to 15 April 2019.