Nordic System Operation Agreement (SOA) – Annex Operational Planning (OP)

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Table of contents

1 Introduction

1.1 Interaction with other agreements

This Annex is part of the System Operation Agreement. This Annex makes references to the requirements set up in:

- Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation (hereinafter referred to as "SOGL"); — SOGL
- Commission Regulation (EU) (EC) 2015/1222 establishing a guideline on capacity allocation and congestion management (hereinafter referred to as "CACM"); — CACM
- "Cooperation Agreement regarding Regional Security Coordination in the Nordic region, Nordic RSC" (hereinafter referred to as "Nordic RSC Agreement");
- Multilateral Agreement on Participation in Regional Security Coordination Initiatives" (hereinafter referred to as "MLA");
- All TSOs' proposal for a common grid model methodology in accordance with Articles 67(1) and 70(1) of Commission Regulation (EU) 2017/1485 of 02 August 2017 establishing a guideline on electricity transmission system operation (hereafter referred to as "CGMM-v3"); — SOGL 67/70
- Methodology for coordinating operational security analysis in accordance with Article 75 of Commission Regulation (EU) 51 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation (hereafter referred to as "CSAM"); — SOGL 75
- Nordic TSOs' common methodology 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 (hereafter referred to as "Nordic ROSC Methodology"); — SOGL 76/77
- Methodology for assessing the relevance of assets for outage coordination in accordance with Article 84 of Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation (hereafter referred to as "RAOCM"); — SOGL 84
- Nordic Operational Procedure for Outage Planning Coordination (Appendix to this Annex);
- Nordic Operational Procedure for Adequacy Assessment (Appendix to this Annex)

1.2 Background

The main principles of SOGL, Part III Operational Planning (hereinafter referred to as "OP") are to define data requirements for operational security analysis and to determine common system operation principles for operational planning data, regional operational security coordination, regional outage

planning coordination and regional adequacy assessment in order to ensure security of supply at all times. These principles are essential for the Nordic TSOs to manage their responsibilities for preparing a secure operation of the interconnected transmission systems with a high level of coordination, reliability, quality and stability.

In this Annex the Nordic TSOs agree upon the main principles and requirements for ensuring a coordinated preparation of system operation of the Nordic TSO's transmission systems.

1.3 This Annex

In this Annex the Nordic TSOs agree upon the main principles and requirements on OP for ensuring system security and to contribute to non-discrimination, effective competition and the efficient functioning of the internal electricity market.

SOGL, whereas (13)

This Annex shall be considered in addition to the principles, requirements and conditions included in the SOGL.

SOGL, part III

The Annex is also in addition to the methodologies that have been approved by the NRAs in accordance with articles 6(2) and 6(3) of the SOGL. This Annex includes references to these methodologies. Where NRAs approved an implementation date in future, this Annex describes the existing situation.

SOGL 6(2)
SOGL 6(3)

The Nordic TSOs anticipate regular updates in order to keep the agreements and methodologies in this Annex up to date. Consequently, this Annex includes mainly the agreements between the Nordic TSOs related to the existing situation. Changes shall be first approved by all Nordic TSOs, before the change will be implemented in the SOA at the latest when the change enters into force. The SOA maintenance group will follow the change agreed.

1.4 Geographic area

The geographical area to which the SOA/OP annex applies is the Nordic Capacity Calculation Region (hereafter referred to as "Nordic CCR").

1.5 Structure of this Annex

This Annex has the following structure:

- Chapter 2: Operational Planning Data
- Chapter 3: Coordinated Operational Security Analysis
- Chapter 4: Outage Planning Coordination
- Chapter 5: Adequacy Assessment
- Chapter 6: Ancillary Services for Reactive Power

1.6 Definitions

For the purpose of this Annex, the terms used shall have the meaning of the definitions included in article 3 of SOGL, article 2 of CACM, article 2 of CSAM, article 2 of Nordic ROSC Methodology and the other items of legislation referenced therein.

2 Operational Planning Data

2.1 Objective

Operational planning data is an important objective for performing the regional operational planning in Nordic CCR. The individual grid models (hereinafter referred to as "IGM") provided by each TSO are merged to a common grid model (hereinafter referred to as "CGM"). CGM is a network model which allow Nordic TSOs and the Nordic RSC to calculate electrical values such as voltage, active and reactive power flows on elements of the electrical network. The CGMs for the different time frames are the basis for operational processes, such as coordinated regional operational security assessment and regional outage planning coordination.

2.2 Roles & Responsibilities

Each TSO shall prepare individual grid models in accordance with the common grid model methodology (CGMM-v3) referred to in Chapter 2.3.1 at least for each of the following timeframes:

- year-ahead
- D-2
- day-ahead
- intraday

SOGL 64

Where two or more TSOs consider it necessary, they shall define the principles for development of week-ahead and month-ahead individual grid models for the purpose of operational planning processes. Furthermore, TSOs shall develop a methodology for merging of the IGMs.

SOGL 69

All TSOs shall contribute to the development of a common list of year-ahead scenarios for the following year to assess the operation of the interconnected transmission system.

SOGL 65(1)

Each TSO shall determine and update the year-ahead individual grid models for each of the scenarios.
All TSOs shall coordinate the development and update of the year ahead IGMs. Nordic RSC shall support the TSO's coordination where necessary.

SOGL 66(1)
SOGL 68(1)

Nordic RSC shall support the TSOs in improving the quality of the IGMs for each time frame.

SOGL 79

2.3 Rules & Methodologies

2.3.1 Common Grid Model Methodology (CGMM-v3)

The TSOs agree that the document "*All TSOs' proposal for a common grid model methodology in accordance with Articles 67(1) and 70(1) of Commission Regulation (EU) 2017/1485 of 02 August 2017 establishing a guideline on electricity transmission system operation*", that has been approved by NRAs according to Article 6(2)(b) of SOGL on 11 June 2018, is accepted by all TSOs. SOGL 67 SOGL 70

2.4 Operational Procedures

Operational procedures for building and exchange of IGMs are described in MLA and more specifically for Nordic TSOs in the Nordic RSC Agreement.

3 Regional Operational Security Coordination

3.1 Objective

Coordinated operational security assessments and analyses are required in relevant time frames of the regional operational security coordination to ensure that system operation is within the normal operating state of the transmission system. Coordinated operational security assessments and analyses in day-ahead and intraday time frame, are important steps for a coordinated preparation and activation of remedial actions in real-time operation.

The TSO's day-ahead and intraday regional operational security coordination is defined in Nordic ROSC Methodology.

3.2 Roles & Responsibilities

Each TSO shall perform coordinated operational security analyses with support of Nordic RSC for at least the following timeframes: SOGL 72 SOGL 73 SOGL 74

- year-ahead
- day-ahead
- intraday

Where two or more TSOs consider it necessary, they shall define principles and procedures for regional operational security coordination for additional timeframes (such as but not limited to week-ahead). SOGL 69(1)

Each TSO shall perform operational security analyses and shall consider the planned outages when carrying out those analyses. SOGL 72(4)

Each TSO shall share the results of its operational security analysis with at least the TSOs whose elements are included in the TSO's observability area and are affected according to that operational security analysis, in order to allow those SOGL 72(5)

TSOs to verify that operational security limits are respected within their control areas.

When a TSO updates the year-ahead IGM which is significant for operational security analysis, the year-ahead common grid model shall be updated accordingly applying the methodology determined in accordance with Article 67(1) of SO GL with support of Nordic RSC. SOGL 68

3.3 Rules & Methodologies

3.3.1 Coordinated Security Analysis Methodology (CSAM)

The TSOs agree that the document "*Methodology for coordinating operational security analysis in accordance with Article 75 of Commission Regulation (EU) 51 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation*" that has been approved by ACER according to Article 6(2)(c) of SOGL on 19 June 2019, is accepted by all TSOs. SOGL 75

3.3.2 Nordic ROSC Methodology (NROSC)

NROSC is the common methodology of the Nordic TSOs which defines the principles for regional operational security coordination within Nordic CCR. SOGL 76 SOGL 77

The TSOs agree that the document "*Nordic TSOs' common methodology 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" (NROSC)*" that will be submitted to NRAs latest by 21 December 2019 and that is subject to NRA approval according to Article 6(3)(b) of SOGL, is accepted by all TSOs.

3.4 Operational Procedures

Operational procedures for coordinated operational security analysis are described in MLA and more specifically for Nordic TSOs in the Nordic RSC Agreement.

4 Outage Planning Coordination

4.1 Objective

Outages of at least relevant assets, such as grid elements, power generating modules and demand facilities, need to be planned and coordinated amongst the Nordic TSOs timely in advance for securing grid operation. Nordic TSOs perform with the support of Nordic RSC outage planning coordination in order to monitor the availability status of at least the relevant assets and coordinate the availability plans to ensure the operational security of the Nordic transmission system.

4.2 Roles & Responsibilities

All TSOs agree, that the Nordic outage coordination region shall be equal to Nordic CCR. SOGL 80(1)

All TSOs shall apply regional outage planning coordination in accordance with the "*Operational Procedure for Outage Planning Coordination*" referred to in chapter 4.4.1. SOGL 83(2)

4.3 Rules & Methodologies

4.3.1 Relevant Asset Outage Coordination Methodology (RAOCM)

The TSOs agree that the document *"Methodology for assessing the relevance of assets for outage coordination in accordance with Article 84 of Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation"*, that has been approved by ACER according to Article 6(3)(c) of SOGL on 19 June 2019, is accepted by all TSOs. SOGL 84

4.4 Operational Procedures

4.4.1 Operational Procedure for Outage Planning Coordination

The TSOs agree that the *"Operational Procedure for Outage Planning Coordination"*, which is an appendix to this Annex, is accepted by all TSOs. SOGL 83(1)

5 Adequacy Assessment

5.1 Objective

Adequacy deals with the ability of a power system to supply the demand in all the steady states that the power system may face. It is a function of the topology of the grid as well as the generation and demand, both directly and indirectly connected to it. Basically, adequacy is about balancing generation and consumption and transmission through congestion.

Nordic TSOs perform with the support of the Nordic RSC, Nordic adequacy assessment and forecast in order to ensure the operational security of the Nordic transmission system.

5.2 Roles & Responsibilities

All TSOs agree that the Nordic adequacy coordination region shall be equal to Nordic CCR. SOGL 81

All TSOs shall apply Nordic adequacy assessment in accordance with the *"Operational Procedure for Nordic Adequacy Assessment"* referred to in chapter 5.3.1

5.3 Operational Procedures

5.3.1 Operational Procedure for Adequacy Assessment

The TSOs agree that the *"Operational Procedure for Nordic Adequacy Assessment"*, which is an appendix to this Annex, is accepted by all TSOs. | SOGL 81

6 Ancillary services for Reactive Power

6.1 Objective

Ancillary services for reactive power enable the TSOs to operate the transmission system in a secure and reliable way. In managing the transmission systems, the TSOs must be able to deal with unexpected changes of generation capacity, interconnector flows or system demand. This is accomplished by maintaining a sufficient level of active and reactive power ancillary services.

The TSOs agree that ancillary services for active power are covered by Annex LFCR.

For reactive power, the TSOs must maintain a voltage balance across the transmission systems in order to maintain a secure and stable power system and to avoid damage to connected equipment. To maintain the balance, the appropriate level of reactive power is required at appropriate locations in the transmission system. Generally, reactive power must be provided close to the location where it is required.

6.2 Roles & Responsibilities

All TSOs shall monitor and assess the availability of reactive power ancillary services in order to maintain the operational security of the transmission system. | SOGL 109(1) SOGL 109(2)

Each TSO shall inform the neighbouring TSOs in case the level of reactive power ancillary services is not sufficient for maintaining operational security. | SOGL 109(3)

Within each TSO's control area, there shall be a reserve of reactive power which is constituted in such a way with regard to size, regulation capability and localization that dimensioning faults will not entail a system collapse. | Appendix 2, chapter 4.4 of previous SOA