DSO ENTITY
DSOs FOR EUROPE

European Network of
Transmission System Operators
for Electricity

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Supporting document for the methodologies for the provisional list of Union-wide high-impact and critical-impact processes

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1 Introduction

Under the Network Code for Cybersecurity (NCCS), the European Network of Transmission System Operators for Electricity (ENTSO-E) in cooperation with the EU DSO entity has developed a provisional list of Union-wide high- and critical-impact processes. This supporting document has been developed jointly by ENTSO-E and the EU DSO entity to accompany this provisional list. It provides all interested parties with information about the rationale for them.

1.1 Legal status of this document

This document accompanies the provisional list of Union-wide high-impact and critical-impact processes and is provided for information purposes only. Consequently, this document is not legally binding.

2 Derivation of the process list

The provisional high-impact and critical-impact processes have been derived from the network codes that are currently in force:

- The Emergency and Restoration Code (Commission Regulation (EU) 2017/2196).
- The Guideline on Electricity Transmission System Operation (Commission Regulation (EU) 2017/1485), referred to as “SO GL” in this document.
- The Network Code on Forward Capacity Allocation (Commission Regulation (EU) 2016/1719).
- The Electricity Balancing Guideline (Commission Regulation (EU) 2017/2195).
- The Guideline on Capacity Allocation and Congestion Management (Commission Regulation (EU) 1222/2015).
- The Demand Connection Code (Commission Regulation (EU) 2016/1388).
- The Network Code on High Voltage Direct Current Connections (HVDC) (Commission Regulation (EU) 2016/1447).
- The Network Code on Requirements for Generators (Commission Regulation (EU) 2016/631), referred to as “RfG” in this document.

These codes define rules and requirements for system operations, connection to the grid, and market operation.

Processes were only included in the provisional list of high-impact and critical-impact processes if they are used for close to real-time monitoring, control or decision making. Long-term planning processes that are used for decision making more than a day ahead have been excluded in the provisional list. The rationale is that if the information used in such a process is compromised, the compromise will still be detected and corrected by the close to real-time processes. The long-term processes will be further analysed in the Union-wide risk assessment to determine if they may still be of high- or critical-impact.

Separate processes have been created if they involve different types of entities. For instance, there are separate processes for congestion management for the transmission and distribution system, as for the first process TSOs are the main responsible entity while for the second process DSOs are. Separating processes in this way, should make it easier for entities to identify which processes are relevant to them.

2.1 Processes from the System Operation Guideline (SO GL)

For the SO GL generally one process per title of the code has been identified. For Title 1, two different processes have been defined since they rely on different supporting assets. For Title 2, multiple processes have been identified since it describes the communication requirements between different types of entities, and therefore, this communication is part of different

processes for different stakeholders. For the titles where no process is derived, no real-time processes are described in the SO GL.

Table 1: Provisional high- and critical-impact processes derived from the SO GL.

	SO GL title	Provisional high- or critical-impact process
Part II	**Operational security**	
Title 1	Operational security requirements	Transmission system monitoring and control Transmission system protection against faults
Title 2	Data exchange	Transmission system monitoring and control Distribution system monitoring and control Generator monitoring and control
Title 3	Compliance	
Title 4	Training	
Part III	Operational planning	
Title 1	Data for operational security analysis in operational planning	Common grid model
Title 2	Operational security analysis	Transmission system operational security analysis
Title 3	Outage coordination	Transmission system outage planning
Title 4	Adequacy	Transmission system adequacy analysis
Title 5	Ancillary services	Transmission system ancillary services
Title 6	Scheduling	Transmission system schedule management
Title 7	ENTSO for electricity operational planning data environment	
Part IV	Load-frequency control and reserves	
Title 1	Operational agreements	Procurement of balancing services
Title 2	Frequency quality	
Title 3	Load-frequency control structure	Load-frequency control

Title 4	Operation of load-frequency control	Load-frequency control
Title 5	Frequency containment reserves	Load-frequency control
Title 6	Frequency restoration reserves	Load-frequency control
Title 7	Replacement reserves	Load-frequency control
Title 8	Exchange and sharing of reserves	
Title 9	Time control process	
Title 10	Cooperation with DSOs	
Title 11	Transparency of information	

2.2 Processes from the Electricity Balancing Network Code

For the Electricity Balancing Network Code one process has been identified for each title of the code. The titles with no process identified do not define real-time processes or are not relevant to the entities in scope of the NCCS.

Table 2: Provisional high- and critical-impact processes derived from the Electricity Balancing Network Code.

	Electricity balancing code title	**Provisional high- or critical-impact process**
Title I	General Provisions	
Title II	Electricity Balancing Market	Generator monitoring and control
Title III	Procurement Of Balancing Services	Procurement of balancing services
Title IV	Cross-Zonal Capacity For Balancing Services	
Title V	Settlement	
Title VI	Algorithm	
Title VII	Reporting	
Title VIII	Cost-Benefit Analysis	
Title IX	Derogations And Monitoring	
Title X	Transitional And Final Provisions	

2.3 Processes from the Emergency and Restoration Network Code

For the Emergency and Restoration Network Code one process has been identified for each chapter of the code. Chapter V defines communication requirement for the different processes defined in the previous chapters. The chapters with no process identified do not define real-time processes or are not relevant to the entities in scope of the NCCS.

Table 3: Provisional high- and critical-impact processes derived from the Electricity Emergency and Restoration network code.

	Emergency and restoration code chapter	**Provisional high- or critical-impact process**
Chapter II	System Defence Plan	Transmission system defence
Chapter III	Restoration Plan	Transmission system restoration
Chapter IV	Market Interactions	
Chapter V	Information Exchange And Communication, Tools And Facilities	Transmission system defence Transmission system restoration
Chapter VI	Compliance And Review	
Chapter VII	Implementation	
Chapter VIII	Final Provisions	

2.4 Processes from the Capacity Allocation and Congestion Management Network Code

For the Capacity Allocation and Congestion Management Network Code one process has been identified for each chapter of the code. Two processes have been derived from Chapter 1 since they are distinct and entail different supporting assets. The chapters with no process identified do not define real-time processes or are not relevant to the entities in scope of the NCCS.

Table 4: Provisional high- and critical-impact processes derived from the Capacity Allocation and Congestion Management Network Code.

	Capacity allocation and Congestion Management Code chapter	**Provisional high- or critical-impact process**
Title I	General Provisions	
Title II	Requirements For Terms, Conditions And Methodologies	

	Concerning Capacity Allocation And Congestion Management	
Chapter 1	Capacity calculation	Common Grid Model Transmission system capacity calculation
Chapter 2	Bidding zone configuration	
Chapter 3	Redispatching and countertrading	Transmission system congestion management
Chapter 4	Algorithm development	
Chapter 5	Single day-ahead coupling	Single day-ahead coupling (SDAC)
Chapter 6	Single intraday coupling	Single Intraday Coupling (SIDC)
Chapter 7	Clearing and settlement for single day-ahead and intraday coupling	
Chapter 8	Firmness of allocated cross-zonal capacity	
Title III	Costs	
Title IV	Delegation Of Tasks And Monitoring	
Title V	Transitional And Final Provisions	

2.5 Processes from the Requirements for Generators Network Code (RfG)

For the RfG two processes have been identified for Title II of the code because these are two distinct processes with different supporting assets. The titles with no process identified are because they do not require real-time information.

	Requirements for generators code	**NCCS Critical/high processes**
Title I	General Provisions	
Title II	Requirements	Generator monitoring and control Generator protection against faults
Title III	Operational Notification Procedure For Connection	
Title IV	Compliance	

Title V	Derogations
Title VI	Transitional Arrangements For Emerging Technologies
Title VII	Final Provisions

2.6 Processes from the High Voltage Direct Current Connections code

For the High Voltage Direct Current (HVDC) Connections Network Code a process has been identified for each title of the code. The distinction of the two processes comes from the stakeholders involved. The process defined from Title II involves only TSOs, whereas the process defined from Title III involves TSOs and producers. Title IV covers the information exchange requirements for both processes. The titles with no process identified do not require real-time information.

	High Voltage Direct Current Connections	**NCCS Critical/high processes**
Title I	General Provisions	
Title II	General Requirements For HVDC Connections	Monitoring, control and protection of HVDC connections
Title III	Requirements For Dc-Connected Power Park Modules And Remote-End HVDC Converter Stations	Monitoring, control and protection of DC-connected power park modules and remote-end HVDC converter stations
Title IV	Information Exchange And Coordination	Monitoring, control and protection of HVDC connections Monitoring, control and protection of DC-connected power park modules and remote-end HVDC converter stations
Title V	Operational Notification Procedure For Connection	
Title VI	Compliance	
Title VII	Derogations	
Title VIII	Final Provisions	

2.7 Processes from the Demand Connection Network Code

For the Demand Connection Network Code, no processes have been identified.

2.8 Processes from the Network Code on Forward Capacity Allocation

For the Network Code on Forward Capacity Allocation no processes have been identified.

2.9 Other processes

Some processes are not part of any network code but have nonetheless been identified as important to ensuring cross-border electricity flows. Thus, they have been added to the provisional list of high-impact and critical-impact processes. These processes are:

- *Distribution system monitoring and control* and *Distribution system protection against faults.* The responsibilities for DSOs for these processes are not explicitly described in a European network code, except for requirements on real-time data exchange with TSOs. Nonetheless, cyber-attacks on such processes could affect large amounts of load and distributed generation and have a serious impact on the electricity system.
- *Disconnecting or reducing load of customers through smart metering.* Smart metering processes are not directly described in a network code. But if a cyber-attack disconnects customers from the grid on a large scale through their smart meters, this can cause large imbalances by a reduction of load.
- *European Awareness System (EAS).* Many TSOs are relying on this system in their control rooms to coordinate in real-time with other TSOs. A disruption through a cyber-attack could significantly hinder the TSO monitoring and control processes.
- *Remote control of recharging points* and *Smart charging*. Recharging points are increasingly present in the European grid. Their connection to the grid can contribute to overloading the grid. Operators of a certain size could even disrupt the cross-border electricity flow. Therefore, remote control of recharging points and smart charging will become essential processes to keep the grid balanced and manage congestion. Recharging point operators are a fairly new party to the electricity market, and therefore, no requirements are explicitly set for them in the previous network codes. The NCCS adds them to the scope of the regulation, and therefore, these two processes have been included in the provisional list.