PROVISIONAL LIST OF UNION-WIDE HIGH-IMPACT AND CRITICAL-IMPACT PROCESSES

ENTSO-E's and EU DSO entity's provisional list of Union-wide high-impact and critical-impact processes in accordance with Article 48 of the Commission Regulation (EU) 2024/1366 of 11 March 2024 establishing a network code on sector-specific rules for cybersecurity aspects of cross-border electricity flows

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Introduction

This document provides a provisional list of Union-wide high-impact and critical-impact processes developed by ENTSO-E in cooperation with the EU DSO entity according to Article 48.4 of the Network Code for Cybersecurity (Hereafter referred to as NCCS Regulation).

Under the NCCS Regulation, the Union-wide cybersecurity risk assessment (Article 19) determines the scope of risk assessments at entity level. The Union-wide cybersecurity risk assessment will result a list of Union-wide high- and critical-impact processes. According to Article 26(4) of the NCCS Regulation, entities must perform a risk assessment on all assets supporting these processes. Hence, until entities have the list of processes, they do not know the scope of their risk assessment.

Some entities on the provisional list of high-impact and critical-impact entities, may however want to voluntarily fulfil the obligations in the NCCS Regulation before the Union-wide risk assessment is completed (see Article 48.3 of the NCCS Regulation). To support such entities, ENTSO-E in cooperation with the EU DSO entity have developed this *provisional* list of Union-wide high- and critical-impact processes. The provisional list contains Union-wide processes that ENTSO-E and the EU DSO entity expect will be identified as high-impact or critical-impact during the Union-wide cybersecurity risk assessment. Entities can then focus their entity-level risk assessment on these processes.

Note that the provisional list is not based on a Union-wide cybersecurity risk assessment. ENTSO-E and the EU DSO entity have followed the precautionary principle and have included only processes that seem obviously of high- or critical-impact for the EU electricity system. The expected impact of processes may be underestimated. The real list of Union-wide high-impact and critical-impact processes from the Union-wide risk assessment may hence differ from this provisional list.

The provisional list of processes is only meant as guidance to entities. Entities are not legally required to use it in their risk assessments.

Legal status of this document

This provisional list of Union-wide high-impact and critical-impact processes has been developed as **non-binding guidance** under Article 48 of the NCCS Regulation. It may be used by entities on the provisional list of high-impact and critical-impact entities that voluntarily decide to fulfil their obligations.

Approach

The provisional list of Union-wide high- and critical-impact processes has been prepared by analysing the processes required by all existing network codes:

- 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), referred to as "NC CACM" in this document.
- 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.

The expected impact if a process was compromised was estimated by experts from TSOs and DSOs. In estimating the impact, the experts took into account how much load and generation the process controls, both directly and indirectly. For processes that indirectly control load or generation, they considered if there were mitigating measures to reduce the impact if a cyber-attack would compromise the process. For instance, if a process for long term forecasting or planning is compromised, the impact can be mitigated through more real-time monitoring processes.

Provisional high-impact and critical-impact processes have been identified for all network codes above, except for the network codes on Demand Connection and on Forward Capacity Allocation. All processes in this code are related to long-term planning and have been excluded based on the criteria above.

Definitions

For the purposes of this document, the terms used shall have the meaning given to them in Article 3 of the NCCS Regulation, Article 6 of the NIS 2 Directive, Article 2 of the Risk Preparedness Regulation and Article 2 of the Electricity Regulation.

For each section in the provisional list below, the definitions from the relevant network code, as mentioned at the start of the section, apply.

The following definitions also apply:

- 'local service providers for congestion management' means service providers that deal with congestion issues or voltage in the transmission or distribution network within the same bidding zone, as opposed to the congestion management service providers defined in the CACM, which only deal with congestions between bidding zones.

Using the provisional list

The provisional list of Union-wide high-impact and critical-impact processes is meant to support entities on the provisional list of high-impact and critical-impact entities, as determined according to Article 48.3 of the NCCS Regulation. Such entities may choose to voluntarily fulfil the obligations in the NCCS Regulation. If they do so, they can use the provisional list to determine which assets are to be included in their first cybersecurity risk assessment at entity level. Based on this assessment, they can then determine the provisional high-impact and critical-impact perimeters inside their entity where the measures in the NCCS Regulation apply.

To use this provisional list, entities are recommended to follow the steps in the cybersecurity risk assessment at entity level described in Article 26 of the NCCS Regulation. The provisional list can be used in the step described in Article 26.4(a)(i) of NCCS Regulation to determine all assets supporting the Union-wide high-impact and critical-impact processes as follows:

1. Entities identify all business processes inside the entity related to the Union-wide processes using the process descriptions provided in this document.
2. Entities perform a business impact assessment of the business processes from step 1 using the provisional ECII and thresholds (published in a separate provisional document).
3. Entities identify the assets supporting the business processes assessed as high- or critical-impact in step 2. In this step, they can use the commonly used supporting assets described for each process below.

Generic supporting assets

Besides these process-specific supporting assets, entities should, for each process on the provisional list, consider if the following supporting assets are relevant to the process:

- Telecommunications networks used for communication between control centres or with substations, field devices, or other remote locations.
- The IT and OT infrastructure underlying the process's primary applications, such as servers, databases, virtualisation platforms, and cloud platforms.
- Systems used to maintain the process's primary IT and OT systems through all stages of the lifecycle, including installation, updates, configuration changes during operations, and decommissioning. These include:
    - Laptops or workstations used by engineers or administrators
    - Systems storing information used for maintenance, including documentation, credentials, configurations, and software
    - Systems used for remote access

As these supporting assets are relevant for most of the processes below, they are not repeated for each process.

Critical ICT service providers

Critical ICT service providers should be considered as an entity involved in each of the processes below. Examples of critical ICT service providers that could be high-impact or critical-impact entities are:

- Suppliers of SCADA systems.
- Parties with remote access to high- or critical-impact assets.
- Hosting providers or cloud providers hosting high-impact or critical-impact applications.
- Software-as-service providers for high-impact or critical-impact applications.

Provisional list of high-impact and critical-impact processes

Below is the provisional Union-wide list of high- and critical-impact processes, organized by the network code on which they are based.

Operational security processes for the transmission system

The following processes are for the operational security of the transmission system, and have been identified based on Part II of the SO GL.

Transmission system monitoring and control

Description	This process concerns the continuous monitoring and control of the transmission system from the central control rooms of the TSO and locally from substations. The process includes TSOs: • Collecting from field devices real-time information on the state of the electricity system, such as electrical measured values, current switching states, status data of equipment, warning and fault messages. • Collecting real-time information on the state of the electricity system from neighbouring stations in the observability area of other TSO. • Controlling switchgear at substations. • Monitoring the system state and taking remedial actions against operational security violations according to the SO GL, Part II, Title 1, Chapter 1. • Voltage control and reactive power management according to the SO GL, Part II, Title 1, Chapter 2. • Short-circuit current management according to the SO GL, Part II, Title 1, Chapter 3. • Power flow management according to the SO GL, Part II, Title 1, Chapter 4. The process includes the monitoring and control of connections to offshore generation through AC-connections. Monitoring and control of HVDC connections is considered a separate process.
Expected impact	Critical
Entities involved	• TSOs (see Article 2 (1) (a) of the NCCS Regulation)
Supporting assets involved	• TSO SCADA system • TSO substation automation systems • Backup communication channels such as satellite phone or radio

Transmission system protection against faults

Description	This process concerns the protection of the transmission system against faults according to the SO GL, Part II, Chapter 6. Each TSO operates its transmission system with protection and backup protection equipment in order to automatically prevent the propagation of disturbances that could endanger the operational security of its own transmission system and of the interconnected systems.
Expected impact	Critical
Entities involved	• TSOs
Supporting assets involved	• Protection systems inside substations • Telecommunications networks used for instance for distance and differential protection

Operational security processes for the distribution system

The following processes are for the operational security of the distribution system.

Distribution system monitoring and control

Description	This process concerns the continuous monitoring and control of the distribution system from the central control rooms of the DSO and locally from substations. The process includes real-time connections from the DSO to its TSO, including the real-time data exchange required by Article 44 of the SO GL.
Expected impact	Critical
Entities involved	• DSOs (see Article 2 (1) (a) of the NCCS Regulation)
Supporting assets involved	• DSO SCADA system • DSO EMS and (A)DMS systems, including systems for power flow calculations • DSO substation automation systems • DSO distribution automation systems • Backup communication channels such as satellite phone or radio • Weather forecast systems • Load forecast systems

Distribution system protection against faults

Description	This process concerns the protection of the distribution system against faults. Each DSO operates its distribution system with protection and backup protection equipment in order to automatically prevent the propagation of disturbances that could endanger the operational security of its own distribution system and of the interconnected systems.
Expected impact	Critical
Entities involved	• DSOs
Supporting assets involved	• Protection systems inside substations • Telecommunications networks used for instance for distance and differential protection

Operational planning processes for the transmission system

The following processes are for the operational planning of the transmission system, and have been identified based on Part III of the SO GL.

Transmission system operational security analysis

Description	This process concerns the operational security analysis performed for the transmission system according to SO GL Part III, Title 2. Each TSO performs operational security analyses to detect possible constraints and to prepare and activate remedial actions in coordination with any other concerned TSOs and, if applicable, affected DSOs or SGUs. Operational security limits of transmission system elements include voltage limits, short-circuit current limits and current limits in terms of thermal rating including the transitory admissible overloads. To ensure the N-1 security principle, each TSO simulate in the N-Situation each contingency from its contingency list and verify that, in the (N-1)-situation, the operational security limits are not exceeded in its control area. When performing close to real-time operational security analysis in its observability area, each TSO uses state estimation. Each regional security coordinator performs a coordinated regional operational security assessment on the basis of grid models, the contingency list and the respective operational security limits, provided by each TSO. Coordinated Security Analysis (CSA) activities encompass the time frames of the Day-ahead Congestion Forecast (DACF) and the Intraday Congestion Forecast (IDCF) process. The results will be delivered to the TSOs and where constraints are detected,

	a recommendation for remedial actions are discussed with the concerned TSOs.
Expected impact	High
Entities involved	• TSOs • RCCs (see Article 2 (1) (i) of the NCCS Regulation) • ENTSO-E (see Article 2 (1) (e) of the NCCS Regulation)
Functional areas involved	• SCADA • Tools for state estimation and operational security analysis • OPDE platform at ENTSO-E

Transmission system outage planning and coordination

Description	This process concerns the outage planning and coordination for the transmission system performed according to SO GL Part III, Title 3. Each TSO acts as an outage planning agent for each relevant grid element it operates and coordinates outage requests from relevant asset owners, the year-ahead availability plans, check for outage incompatibilities and handles forced outages. The RCCs perform regional operational security analyses within an outage coordination region in order to detect any outage planning incompatibility. The RCCs provide all TSOs of the outage coordination region with a list of detected outage planning incompatibilities and the solutions it proposes to solve those outage planning incompatibilities.
Expected impact	High
Entities involved	• TSOs • RCCs • ENTSO-E
Supporting assets involved	• Tools for outage planning • OPC/STA application at ENTSO-E • OPDE platform at ENTSO-E

Transmission system adequacy analysis

Description	This process concerns the adequacy analysis process at TSOs as described in SO GL Part III, Title 4. The TSOs perform short term control area adequacy analysis in a day-ahead and intraday timeframe. The process

	assesses the sum of generation within its control area and cross-border import capabilities to meet the total load within its control area under various operational scenarios, taking into account active power for load frequency control. Each RCC performs adequacy assessments on the basis of the information provided by the relevant TSOs with the aim of detecting situations where a lack of adequacy is expected in any of the control areas or at regional level, taking into account possible cross-border exchanges and operational security limits. The results are delivered together with proposed actions to reduce risks to the TSOs of the capacity calculation region.
Expected impact	High
Entities involved	• TSOs • RCCs • ENTSO-E
Supporting assets involved	• Tools for adequacy analysis • OPDE platform at ENTSO-E • OPC/STA application at ENTSO-E

Transmission system ancillary services

Description	This process concerns the procurement, monitoring and use of ancillary services by TSOs according to SO GL Part III, Title 5. These services include active and reactive power services.
Expected impact	High
Entities involved	• TSOs • Ancillary service providers (see Article 2 (1) (a) of the NCCS Regulation)
Supporting assets involved	• Tools for procuring and activating ancillary services

Transmission system schedule management

Description	This process concerns the scheduling process at TSOs according to SO GL Part II, Title 6. Each TSO operating a scheduling area checks day-ahead whether the generation, consumption, external commercial trade

	schedules and external TSO schedules in its scheduling area are in sum balanced. Furthermore, it is checked whether all aggregated netted external schedules between all scheduling areas within the synchronous area are balanced.
Expected impact	High
Entities involved	• TSOs
Supporting assets involved	• Tools for schedule management

Load-frequency control, reserves, and balancing processes

The following processes are for load frequency control and the procurement of balancing reservices. The processes have been identified based on Part IV of the SO GL, and on the electricity balancing network code.

Procurement of balancing services

Description	This process concerns the procurement of balancing services according to Title III of the Electricity Balancing code. The process includes: • Balancing energy bids as defined in Title III, Chapter 1 of the Electricity Balancing Code • Analysis on optimal provision of reserve capacity as defined in Title III, Chapter 2 of the Electricity Balancing Code • Definition of rules for procurement of balancing capacity as defined in Title III, Chapter 2 of the Electricity Balancing Code. • The procurement of upward and downward balancing capacity as defined in Title III, Chapter 2 of the Electricity Balancing Code. • Exchange of balancing capacity as defined in Title III, Chapter 2 of the Electricity Balancing Code
Expected impact	High
Entities involved	• TSOs • ENTSO-E
Supporting assets involved	• Tools for procuring balancing reserves • MARI and PICASSO platforms

Load-frequency control

Description	This process concerns the load-frequency control performed by TSOs as described in Part IV of the SO GL. Load-frequency control includes the activation of frequency containment and restoration reserves. The TSO of each load frequency control area has implemented an automatic frequency restoration process ('aFRP') and a manual frequency restoration process ('mFRP') to regulate the frequency restoration control error (FRCE) towards zero. The aFRP is operated in a closed-loop manner where the FRCE is an input and the setpoint for automatic FRR activation is an output. The setpoint for automatic FRR activation is calculated by a single frequency restoration controller operated by a TSO within its LFC area. The mFRP is operated through instructions for manual FRR activation by the TSO in order to restore the frequency
Expected impact	Critical
Entities involved	• TSOs • Producers, aggregators, or balancing responsible parties if acting as balancing service providers (see Article 2 (1) (k) of the NCCS Regulation)
Supporting assets involved	• Tools for activating the aFRP and mFRP

Emergency and restoration processes

The following processes are for emergency and restoration processes and have been identified based on Emergency and Restoration network code.

Transmission system defence

Description	This process concerns the activities that TSOs perform for system defence according to Chapter II of the Emergency and Restoration network code. The transmission system defence process will be carried out if the system is in emergency state and there are no remedial actions available to restore the system to the normal state or based on the operational security analysis, the operational security of the transmission system requires the activation of a measure of the system defence plan. System defence is performed according to a system defence plan defined on Chapter II of the Emergency and Restoration code. It includes the following technical measures: • automatic over- and under-frequency control scheme

	• automatic scheme against voltage collapse • frequency and voltage deviation management • power flow management procedures • assistance for active power procedures • manual demand disconnection procedure
Expected impact	High
Entities involved	• TSOs • DSOs • Producers, aggregators, or balancing responsible parties if acting as defence service providers (see Article 2 (1) (k) of the NCCS Regulation)
Supporting assets involved	• Tools for system defence actions

Transmission system restoration

Description	This process concerns the activities to restore the transmission system when it is in an emergency or blackout state. The affected TSOs activate pre-defined and coordinated bottom-up or top-down restoration plans together with impacted DSOs, SGUs and restoration services provider. Fundamental actions to restore the grid transmission system in the restoration plan are: • the re-energisation procedure defined in Chapter III, Section 2 of the Emergency and Restoration code; • frequency management as defined in Chapter III, Section 3 of the Emergency and Restoration code; and • the resynchronisation procedure defined in Chapter III, Section 4 of the Emergency and Restoration code.
Expected impact	Critical
Entities involved	• TSOs • DSOs (if identified by TSOs in the restoration plans) • Producers, aggregators, or balancing responsible parties if acting as restoration service providers (see Article 2 (1) (k) of the NCCS Regulation)
Supporting assets involved	• Tools for restoration actions

European awareness system

Description	This process concerns the European Awareness System (EAS) platform that allows transmission system operators to exchange information in real-time. All operators input a number of measurements including frequency and cross border exchange. These measurements are then merged to provide an overall European view of each TSO on the platform. Procedures are in place to avoid system disturbances and especially large frequency deviations with the risk of uncoordinated disconnection of customers or generation. TSOs with the role of synchronous area monitor (SAM) are responsible for performing these procedures. The SAM continuously monitors the system frequency. In case of large frequency deviations, they inform all TSOs via the European Awareness System (EAS) and launch procedures for frequency deviations to coordinate countermeasures in a fast and effective manner in order to stabilize the system.
Expected impact	High
Entities involved	• ENTSO-E • TSOs in the role of synchronous area monitor (SAM)
Supporting assets involved	• EAS platform • Communication systems and networks used to connect EAS to TSO control rooms

Capacity allocation & congestion management

The following processes are for capacity allocation and congestion management and have been identified based on the Capacity Allocation & Congestion Management (NC CACM) network code.

Creation of the Common Grid Model

Description	This process concerns the creation of a Common Grid Model (CGM), a Union-wide data set agreed between various Transmission System Operators (TSOs) describing the main characteristic of the power system (generation, loads and grid topology) and rules for changing these characteristics during the capacity calculation process, as stated by Article 2(2) of the Regulation establishing a Guideline on Capacity Allocation and Congestion Management – the CACM Regulation (Regulation on market coupling). CGM is not only used for operational tasks but also for market and asset management and grid planning activities like operational security calculations, capacity calculations, and outage coordination.

	RCCs are responsible for merging the different grid models of the TSOs and issuing common grid models, which are then shared with the TSOs in order for them to adapt their operational planning with this new regional information. CGM relies upon the OPDE for data transfers.
Expected impact	High
Entities involved	• RCCs • TSOs • ENTSO-E
Supporting assets involved	• OPDE platform at ENTSO-E

Transmission system congestion management

Description	This process concerns the congestion management for the transmission system. Each TSOs performs forecast calculates of possible congestion situations, e.g., due to limited line ratings. Based on the forecast results, preventive redispatching or countertrading measures are coordinated by the affected TSOs to relief the congestions und reduce the risk for operational limit violations. TSOs may also procure local services through local market operators, and coordinate with local markets operated by DSOs. Redispatching and countertrading measures are defined in Title II, Chapter 3 of the Capacity allocation & Congestion management code.
Expected impact	Critical
Entities involved	• TSOs • RCCs • DSOs • Aggregators, producers, and balancing responsible parties if acting as congestion management service providers under the NC CACM or as local service providers for congestion management. • Electricity undertakings if acting as operators of markets for local congestion management services (see Article 2 (1) (a) of the NCCS Regulation) • Organized markets if acting as markets for congestion management services under the NC CACM (see Article 2 (1) (c) of the NCCS Regulation)
Supporting assets involved	• Tools for congestion forecast and management • Power Control Systems, Energy Management Systems or any other equipment installed on a system user's site enabling to exchange

	information (input or output) with a third party, or command, control or monitor technical resources on a system user premises • Any third party or device intermediating between a local service provider for congestion management and any other devices or systems they use to control load or generation.

Distribution system congestion management

Description	This process concerns the congestion management for the distribution system. DSOs actively manage the load or generation on the distribution system to ensure that the power on the grid stays within the capacity. This includes the use of demand response or curtailment of generation. While solving their congestion DSOs coordinate with other DSOs or TSO. Operators of local markets for congestion management coordinate with operators of other local or balancing market The process includes the maintenance of the involved technical resources, controllable units, grid edge devices and DER devices, including: • Solar inverters • Wind park controllers • Batteries Note that congestion management through EV charging stations is considered as part of the smart charging process below.
Expected impact	High
Entities involved	• DSOs • Aggregators, producers, and balancing responsible parties if acting as local service providers for congestion management. • Electricity undertakings if acting as operators of markets for local congestion management services.
Supporting assets involved	• DSO SCADA • Systems used for curtailment and flexible connection agreements • Market systems of organized markets for congestion management services • Central management systems for DER, such as Distributed Energy Management Systems (DERMS) • Central monitoring system for domestic Solar inverters and batteries • Power Control Systems, Energy Management Systems or any other equipment installed on a system user's site enabling to exchange information (input or output) with a third party, or command, control or monitor technical resources on a system user premises • Any third party or device intermediating between a local service

	provider for congestion management and any other devices or systems they use to control load or generation. Technical resources for demand response • Smart metering systems if used for congestion management

Transmission system capacity calculation

Description	This process concerns the transmission system capacity calculation defined in Title II, Chapter 1 of the Capacity allocation & Congestion management code. The TSOs calculate the possible amount of transmission capacity to exchange power with neighbouring TSOs. The coordinated capacity calculator (CCC) calculates the cross zonal capacity for each relevant Capacity Calculation Region (CCRs). This process is based on a merged data set from individual grid models, network constraints, remedial actions, Generation and Load Shift Keys delivered by TSOs. After calculation of the cross-zonal capacity, the results and proposed remedial actions will be validated and agreed by the TSOs. The results are published for Day-ahead and Intraday allocation to NEMOs.
Expected impact	High
Entities involved	• TSOs • RCCs • ENTSO-E
Supporting assets involved	• Tools for capacity calculation • OPDE platform at ENTSO-E

Single day-ahead coupling (SDAC)

Description	This process concerns the single day-ahead coupling (SDAC), which creates a single pan-European cross zonal day-ahead electricity market. The process allocates scarce cross-border transmission capacity in the most efficient manner by coupling wholesale electricity markets from different regions through a common algorithm simultaneously considering cross-border transmission constraints. It is a legal requirement under Article 80 of the Commission Regulation (EU) 2015/1222 of 24 July 2015 – CACM Regulation, Capacity Allocation and Congestion Management. The process consists of the following subprocesses:

	• *Pre-coupling:* collection of cross-zonal capacity from TSOs and orders book from market participants; • *Coupling:* collection of each NEMO's orders book in the PCR (Price Coupling of Regions) Matcher and Broker, running algorithm, accepting results, applying portfolio allocation, and dispatching results; • *Post-coupling:* shipping agent tasks, congestion income collection and sharing. The process is managed by a joint Nominated Electricity Market Operators (NEMOs) and TSOs governance structure.
Expected impact	High
Entities involved	Pre-coupling subprocess: • NEMOs (see Article 2 (1) (b) of the NCCS Regulation) • TSOs • Market participants (see Article 2 (1) (c) of the NCCS Regulation) Coupling subprocess: • NEMOs Post-coupling subprocess: • NEMOs • TSOs • Delegated parties (see Article 2 (1) (k) of the NCCS Regulation)
Supporting assets involved	Pre-coupling subprocess: • NEMO local trading systems Coupling subprocess: • PCR (Price Coupling of Regions) Matcher and Broker • Euphemia • NEMO local and regional systems Post-coupling subprocess: • Depends on region and involved entities

Single Intraday Coupling (SIDC) – Intraday continuous trading

Description	This process concerns the continuous trading for the single intraday coupling (SIDC).

	The SIDC creates a single EU cross-zonal intraday electricity market. In simple terms, buyers and sellers of energy (market participants) are able to work together across Europe to trade electricity continuously on the day the energy is required. The process allocates scarce cross-border transmission capacity in the most efficient manner by coupling wholesale electricity markets from different regions through a common algorithm simultaneously considering cross-border transmission constraints. It is a legal requirement under Article 80 of the Commission Regulation (EU) 2015/1222 of 24 July 2015 – CACM Regulation, Capacity Allocation and Congestion Management. The intraday continuous trading process within the SIDC consists of the following subprocesses: • *Capacity management module:* update of the capacity in the capacity module during trading, information for update coming both from TSOs and from trading results; • *Shared order book module:* orders submitted to local NEMO order books are transmitted to shared order book where trades are matched, and the results come back to the NEMO order book' • *Shipping module:* for each one of the concluded trades, shipping modules calculates the best trajectory for shipping the traded energy among different bidding zones. The process is managed by a joint Nominated Electricity Market Operators (NEMOs) and TSOs governance structure.
Expected impact	High
Entities involved	• NEMOs • TSOs • Producers
Supporting assets involved	• Market platform

Single Intraday Coupling (SIDC) – Intraday auction

Description	This process concerns the intraday auction for the single intraday coupling (SIDC). The SIDC creates a single EU cross-zonal intraday electricity market. In simple terms, buyers and sellers of energy (market participants) are able to work together across Europe to trade electricity continuously on the day the energy is required. The process allocates scarce cross-border transmission capacity in the most efficient manner by coupling wholesale electricity markets from different regions through a common algorithm simultaneously considering cross-border transmission constraints. It is a legal requirement under Article 80 of the Commission Regulation (EU)

	2015/1222 of 24 July 2015 – CACM Regulation, Capacity Allocation and Congestion Management. The intraday auction functions similarly to the SDAC and consists of the following subprocesses: • *Pre-coupling:* collection of cross-zonal capacity from TSOs and orders book from market participants; • *Coupling:* collection of each NEMO's orders book in the PCR (Price Coupling of Regions) Matcher and Broker, running algorithm, accepting results, applying portfolio allocation, and dispatching results; • *Post-coupling:* shipping agent tasks, congestion income collection and sharing. The process is managed by a joint Nominated Electricity Market Operators (NEMOs) and TSOs governance structure.
Expected impact	High
Entities involved	Pre-coupling subprocess: • NEMOs • TSOs • Market participants Coupling subprocess: • NEMOs Post-coupling subprocess: • NEMOs • TSOs • Delegated parties
Supporting assets involved	Pre-coupling subprocess: • NEMO local trading systems Coupling subprocess: • PMB • Euphemia • NEMO local and regional systems Post-coupling subprocess: • Depends on region and involved entities

Smart metering processes

The following processes are related to smart metering.

Disconnecting or reducing load of customers through smart metering

Description	Disconnecting customers from the distribution system by the DSO or reducing the maximum load they can use, for instance when a customer asks to change a contract or is not paying their bills. The disconnection or reduction can be done locally by an engineer or remotely through the smart metering system. The process also includes maintenance of smart metering systems at DSOs, including head-ends, meter data management systems, and smart meters. The process includes all stages of the lifecycle, including installation, updates, configuration changes during operations, and decommissioning. It also includes maintenance to the underlying infrastructure, such as servers, databases, and virtualization platforms.
Expected impact	Critical
Entities involved	• DSOs • Electricity suppliers (see Article 2 (1) (a) of the NCCS Regulation)
Supporting assets involved	• DSO smart metering systems, including head-ends systems (HES) and meter data management systems (MDMS) • Systems used to store smart meter keys, such as HSMs

Operational processes for producers

The following processes are for the operations of producers. The have been identified based on the SO GL, the Requirements for Generators, and the Electricity Balancing network code.

Producer monitoring and control

Description	This process concerns the monitoring and control of power generating units by producers. The process includes the monitoring and control that is needed to keep the power generating units within the operational requirements defined in the NC RfG, and to meet its balance responsibilities as defined in Article 17 of the Electricity Balancing network code. The process also includes real time connections from producers to TSOs and DSOs, in particular: • the real-time data exchange from the producer to the TSO or DSO according to Articles 47 and 50 of the SO GL;

	• the control of active power output by a TSO or DSO through interface provided by the producer according to the NC RfG, Article 13(6) and Article 14(2).
Expected impact	Critical
Entities involved	• Producers • TSOs • DSOs
Supporting assets involved	• Producer's SCADA system • Power Control Systems, Energy Management Systems or any other equipment installed on a system user's site enabling to exchange information (input or output) with third party, or command, control or monitor technical resources on a system user premises, or perform firmware or software updates • Technical resources used for demand response • Any third party or device intermediating between a local service provider for congestion management and any other devices or systems they use to control load or generation.

Producer protection against faults

Description	This process concerns the electrical protection to protect the power-generating module and the network according to Articles 13, 14, and 15 of the RfG. The protection schemes are agreed between the system operator and the producer, and they take precedence over operational controls.
Expected impact	Critical
Entities involved	• Producers
Supporting assets involved	• Protection systems at generating units.

Processes for operators of recharging points

The following processes are for the operators of recharging points.

Remote control of recharging points

Description	This process concerns the remote control of recharging points by the operator. This includes remote control to perform charging transactions and configure and maintain the charging stations.
Expected impact	Critical
Entities involved	• Operators of recharging points (see Article 2 (1) (h) of the NCCS Regulation)
Supporting assets involved	• Charging Station Management System (CSMS) • Charging stations

Smart charging

Description	This process concerns the control of the load used by recharging points to support the operation of the electricity system. This includes controlling the load to support in balancing, or in congestion management for the distribution or transmission grid. Note that this process can be seen as a special case of the transmission and distribution system congestion management processes, and the load-frequency control process where services for these processes are provided through charging stations.
Expected impact	High
Entities involved	• Operators of recharging points • TSOs • DSOs
Supporting assets involved	• TSO and DSO SCADA • Charging Station Management System (CSMS) • Charging stations • Power Control Systems, Energy Management Systems or any other equipment installed on a system user's site enabling to exchange information (input or output) with third party, or command, control or monitor technical resources on a system user premises or perform firmware or software updates. • Technical resources used for demand response. • Any third party or device intermediating between a balancing service provider or a (local) congestion management service provider.

High Voltage Direct Current processes

The following processes are for the high voltage direct current connections and have been identified based on High Voltage Direct Current Connections code.

Monitoring, control, and protection of HVDC connections

Description	This process concerns the monitoring, control, and protection of high-voltage direct current (HVDC) connections according to Title II of the HVDC connections code. The process includes the information exchange and coordination required by Title IV of the HVDC connections code.
Expected impact	Critical
Entities involved	• TSOs
Supporting assets involved	• TSO SCADA system • Protection, automation and control systems for HVDC connections

Monitoring, control and protection of DC-connected power park modules and remote-end HVDC converter stations

Description	This process concerns the monitoring, control and protection of DC-connected power park modules, and remote-end HVDC converter stations according to Title III of the HVDC connections code. The process includes the information exchange and coordination required by Title IV of the HVDC connections code.
Expected impact	Critical
Entities involved	• TSOs • Producers
Supporting assets involved	• TSO SCADA system • Protection, automation and control systems for at the power park modules and converter stations