European Network of
Transmission System Operators
for Electricity

OUTAGE PLANNING COORDINATION IMPLEMENTATION GUIDE

2021-06-16
APPROVED DOCUMENT
VERSION 1.5

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Revision History

Version	Release	Date	Comments
1	0	2017-09-20	First version
1	1	2019-09-25	Sequence diagrams were updated. New data exchanges between information receiver and System operator. Approved by SOC.
1	2	2020-11-04	New interesting and relevant status attributes were added to Registered Resource class in Ref_MarketDocument to state if an asset is interesting for a TSO or relevant as stated in Article 86 and Artcle 88 of the SO GL. New domain attribute is linked to RegisteredResource with cardinality 0..* in Ref_MarketDocument to make reference to the proper outage region. There is a new data exchange between Outage Planning Agent and RSC. An ACK is used to exchange a coordination message which allows to enable Outage Coordination via TSO local tools and Let's Coordinate tool, enable inter TSO coordination and enable outage coordination.
1	3	2021-01-26	Name of IG changed to Outage Planning Coordination A new PartnerCaseReference_Name is linked to Timeseries with cardinality 0..* in OutageSchedule market document. Local tools need a functionality which is able to automatically create the association between outages for tie-lines, this new attribute prevents an infinite loop by creating a new outage case in every data update cycle. The goal is to match the outages in tie-lines from the different TSOs A new Relevant_MarketParticipant.mRID is linked to Timeseries with cardinality 0..* in Network outage configuration document to export the TSOs who marked an element as relevant. Production unit code is included in the dependency tables of Ref and Outage market documents to properly import elements/outages for production or generation units from ENTSOE-E Transparency Platform.
1	4	2021-02-17	Comments from CIM EG members were included: It was noticed that there were 3 different names for the ESMP OPC document. One for the market document, another for the schema and another for the namespace. The current practice is to have only one name for all them to avoid misunderstandings. Ref_MarketDocument was renamed to OutageConfiguration market document. Outage Schedule keep the same naming. Namespaces of both OPC documents were modified to include the name of the corresponding market document. References to the updated versions of the schema documents were updated. Naming of the XSDs was updated along the IG. Approved by SOC.
1	5	2021-06-16	In confirmation document dependency table, reason codes A06, A07 and A08 were added to the reason attribute at header level. Reason codes A20, B06 and B65 were added to the reason attribute at time series level. In OutageConfiguration document dependency table, Domain (Linked to Registered Resource) is renamed to AssociatedDomain to be consistent with the XSD. Approved by SOC.

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1 Objective

SO GL requires TSOs to establish a common medium- and long-term outage planning process based on predefined standards with the following key objectives:

- ENTSO-E wide harmonization of regionally differing outage planning processes
- Harmonised data format for data exchange, which shall be an integral part of the ENTSO for Electricity operational planning data environment

2 References

2.1 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

- IEC 62325-301:2018, Framework for energy market communications – Part 301: Common information model (CIM) extensions for markets;
- IEC 62325-351:2016, Framework for energy market communications – Part 351: CIM European market model exchange profile;
- IEC 62325-450:2013, Framework for energy market communications – Part 450: Profile and context modelling rules;
- IEC 62325-451-1:2017, Framework for energy market communications – Part 451-1: Acknowledgement business process and contextual model for CIM European market;
- IEC 62325-451-2:2014, Framework for energy market communications - Part 451-2: Scheduling business process and contextual model for CIM European market

2.2 Other references

- The Harmonised Electricity Market Role Model;
- Outage configuration document UML model and schema v1.2
- Outage schedule document UML model and schema v1.2

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3 Abbreviations

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CC region	‘capacity calculation region’ means the geographic area in which coordinated capacity calculation is applied; (Regulation (EU) No 2015/1222)
CDSO	Closed Distribution System Operator
DSO	Distribution System Operator
FO	Facility Owner
SO GL	Guideline on electricity transmission system operation
NC	Network Code
NRA	National Regulatory Authority
OCR	Outage Coordination Region
OPA	Outage Planning Agent
OPDE	Operational Planning Data Environment
OPI	Outage Planning Incompatibilities
OPS	Operational Planning and Scheduling
OWN	owners of the relevant power generating modules and the relevant demand facilities
RSC	Regional Security Coordinator
RSCSP	Regional Security Coordinator Service Provider
SGU	Significant Generation Unit
SO	System Operator
TSO	Transmission System Operator

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4 Business process overview

Each TSO participates in the outage planning and coordination in accordance with the principles described in the OPS (SO GL) in order to monitor the availability status of its relevant assets and coordinate their availability plans to ensure the operational security of the transmission system.

The Outage Planning and Coordination process consists of the following steps:

- Definition of Outage Coordination Regions and relevant assets
- Development and update of availability plans of relevant assets
- Execution of availability plans

A brief description of the aforementioned steps of the Business Process is provided in the next table.

Table 1 – Steps of business process

STEPS	Brief Description
Definition of Outage Coordination Regions and relevant assets	In this step, TSOs ensure their participation in the outage planning of a specific outage coordination region. Within the Outage Coordination Region, a Regional Security Coordinator (RSC) is appointed and his role is to facilitate, coordinate and perform tasks and provide recommendations for the outage planning process. Next, all TSOs shall jointly develop a methodology at least per synchronous area for the assessment of relevant assets (if not available) and use it to define a common single list of relevant assets.
Development and update of availability plans of relevant assets	In this step, it shall first appoint Outage Planning Agents (OPA), with the task of planning the availability status of the relevant grid elements: each TSO shall act as the OPA for each relevant grid element it operates, for all other relevant assets, the owner shall appoint (or act as) the OPA. TSOs and OPAs shall then assess the indicative yearly availability plans and provide availability plans proposals for the relevant assets. Next, all TSOs shall assess whether outage planning incompatibilities (OPI) arise from the availability plans. In case of OPIs, all relevant parties should be informed and find a solution to eliminate the OPIs. Once no OPIs remain, the preliminary availability plans can be submitted, validated and then finalized (update in the time between the finalisation of the year-ahead outage coordination and before its real-time execution is also possible.)
Execution of availability plans	When it comes to the real-time execution of the availability plans all parties apply the outage planning. Postponement of outage is also possible in case of forced outages or in case a TSO identifies that an outage can lead the transmission system to a not secure state. Due to the change of the network condition forecasted previously.

A high level overview of the Coordinated Outage Planning Process is presented in chapter 13,Examples of Outages.

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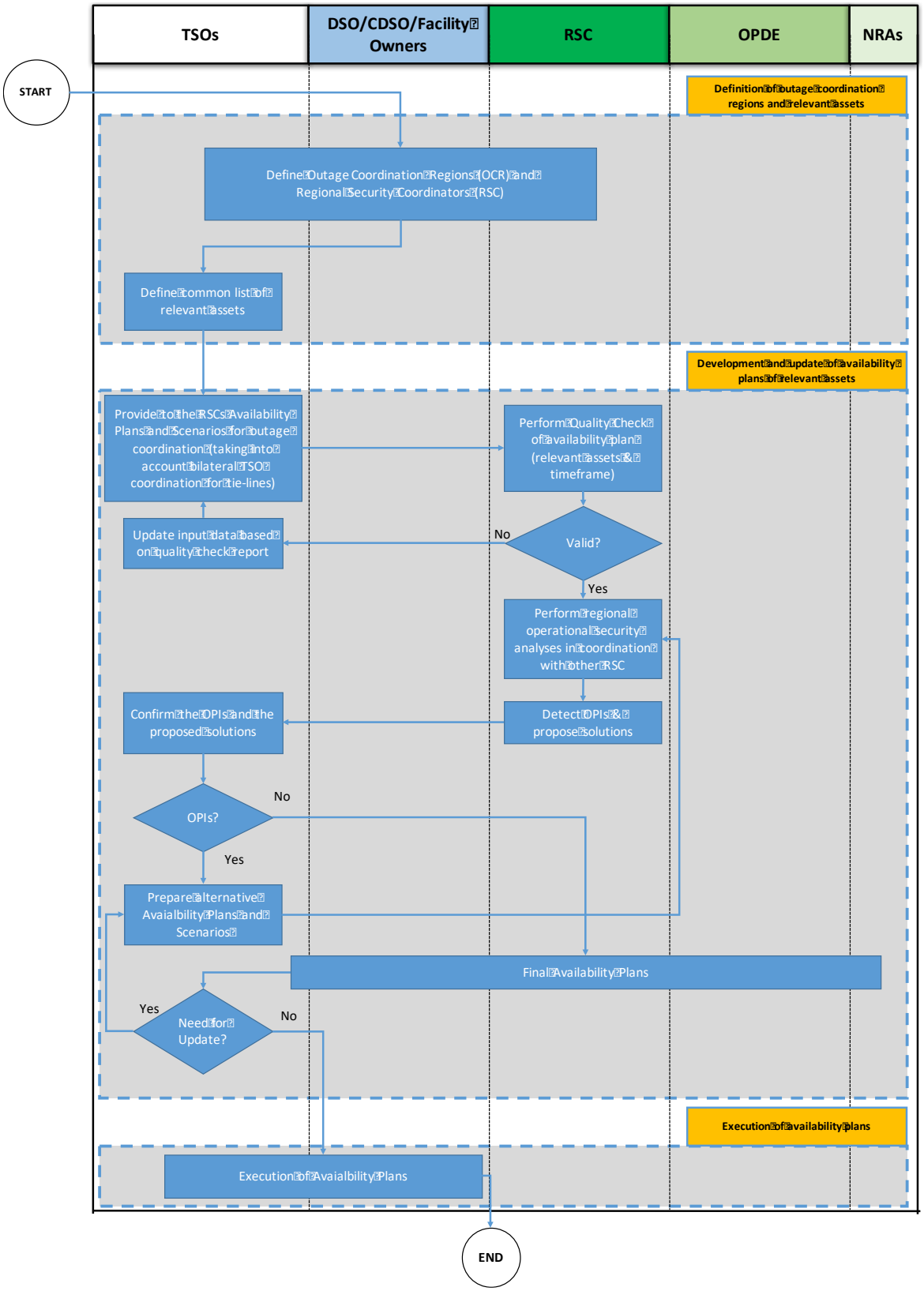

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5 Requirements from the OPS

Prior to the outage planning and coordination process, a series of necessary requirements from the OPS (SO GL) have to be fulfilled.

First of all, Outage Coordination Regions and Regional Security Coordinators have to be defined and established. This is indeed a requirement, however, is also part of the process itself in case there is the need to update and adjust the regions and the coordinators.

In addition, all TSOs and all other relevant roles, shall provide to the regional security coordinator all the information necessary to detect and solve regional outage incompatibilities. If necessary, regional security coordinator shall coordinate its analyses with other regional security coordinators.

Moreover, in order to achieve a regional coordination, all TSOs of an outage coordination region shall jointly develop a regional coordination operational procedure, aimed at establishing operational aspects for the implementation of the outage coordination in each region, which includes:

- frequency, scope and type of coordination for, at least, the year-ahead and week-ahead timeframes
- practical arrangements for the provision of the year-ahead relevant grid element availability plans by all TSOs of the outage coordination region.

Each TSO shall participate in the outage coordination process of its outage coordination region and apply the established regional coordination operational procedures.

To further facilitate the coordination, each TSO shall provide to the other TSOs, DSOs, facility owners from the same outage coordination region or regions all relevant information at its disposal on the infrastructure projects related to the transmission system, distribution system, closed distribution system, power generating modules, or demand facilities that may have an impact on the operation of the control area of another TSO, DSO, CDSO within the outage coordination region.

In order to achieve a common way of assessment, all TSOs shall jointly develop a methodology for each synchronous area, for assessing the relevance for the outage coordination of power generating modules, demand facilities, and grid elements located in a transmission system or in a distribution system, including closed distribution systems. The methodology shall be based on qualitative and quantitative aspects that identify the impact, on a TSO's control area, of the availability status of each relevant asset, and which are connected directly or indirectly to another TSO's control area. In particular, the methodology shall be based on:

- quantitative aspects based on the evaluation of changes of electrical values (such as voltages, power flows, rotor angle) on at least one grid element of a TSO's control area, due to the change of availability status of a potential relevant asset located in another control area. That evaluation shall take place on the basis of yearly common grid models.
- thresholds on the sensitivity of the electrical values above, against which the relevant assets will be assessed. The thresholds shall be harmonised at least per synchronous area.
- capacity of potential relevant power generating modules or demand facilities to qualify as SGUs;
- qualitative aspects such as, but not limited to, the size and proximity to the borders of a control area of potential relevant power generating modules, demand facilities or grid elements.
- systematic relevance of all grid elements located in a transmission system or in a distribution system which connect different control areas.

- systematic relevance of all critical network elements.

The availability status of a relevant asset shall be one of the following:

- "available" where the relevant asset is capable of and ready for providing service regardless of whether it is or not in operation
- "unavailable" where the relevant asset is not capable of or ready for providing service
- "testing"[1] where the capability of the relevant asset for providing service is being tested

The "testing" status shall only apply when there is a potential impact on the transmission system and for the following time periods:

- between first connection and final commissioning of the relevant asset
- directly following maintenance of the relevant asset

Finally, there are additional requirements that have to be fulfilled, like:

- communications channels to be used
- IT tools and infrastructures
- Interoperability issues among the data and files exchanged
- Legal issues regarding the availability and security of data, etc

However, these are out of the scope of this document and will be only tackled by the relevant parties within the whole project.

6 Roles and Responsibilities

The Outage Planning and Coordination process is a rather complex and time-consuming process in which more than one roles participate. A compilation of the relevant roles and their responsibilities, as these derive from the OPS (GSO GL, Articles 80 and 82-103), is presented below.

6.1 TSO(s)

One of the most crucial roles of the process, is the TSO(s). The TSOs own and operate most of the grid elements, while at the same time are responsible for the security of supply within their area of interest and action.

Within the Outage Planning and Coordination Process, their main responsibilities are:

- Setup of output coordination regions and regional security coordinators
- Develop a regional coordination operational procedure and perform outage coordination in their region
- Provide grid scenarios and availability plans of its relevant elements accordingly
- Share with other TSOs and other roles all the relevant information at its disposal on the infrastructure projects related to the transmission system, distribution system, closed

[1] could be also considered as a special switching state

distribution system, power generating modules, or demand facilities that may have an impact on the operation of the control area of another TSO and role within the outage coordination region

- Jointly develop a methodology for each synchronous area, for assessing the relevance for the outage coordination of power generating modules, demand facilities, and grid elements located in a transmission system or in a distribution system, including closed distribution systems.
- Jointly assess the relevance of grid assets and establish a single list, for each outage coordination region, of relevant assets.
- Inform all relevant roles about the single list of relevant assets (TSOs, DSOs, CDSOs, NRAs, ENTSO-E, OPDE, etc).
- Coordinate with (C)DSOs the outage planning of internal elements that are part of the (closed) distribution system
- Jointly assess the availability plans of the relevant assets and establish a final availability plan of relevant assets for each outage coordination region.
- Cope with the outage planning incompatibilities and coordinate to resolve them with the application of the proposed or other solutions (analysis provided by the regional security coordinators)
- Inform all relevant roles about the final availability plans of the relevant assets (TSOs, DSOs, CDSOs, NRAs, ENTSO-E OPDE, etc).
- Take care of the real time execution of the availability plans of its assets.
- Have the decision-making responsibility within Outage Planning and Coordination Process with the important support role of the RSC.

6.2 DSO/CDSO

Similar to TSOs, (C)DSOs also own and/or operate elements in the distribution grid, while at the same time are responsible of the security of supply within their area of interest and action.

Within the Outage Planning and Coordination Process, their main responsibilities are:

- Plan the availability status of the relevant grid assets for which they perform duties of outage planning agents and that are not interconnecting different control areas
- Coordinate with TSOs the outage planning of internal elements that are part of the distribution system
- Coordinate with TSOs and Outage Planning Agents to resolve any outage planning incompatibilities
- Take care of the real time execution of the availability plans of its assets.

6.3 Facility Owner

The facility owners are the ones who own the power generating and demand facilities, which are some of the key elements of the power grid.

Within the Outage Planning and Coordination Process, their main responsibilities are:

- Inform and coordinate with the TSOs and the Outage Planning Agents about the availability of their assets
- Take care of the real time execution of the availability plans of its assets.

6.4 Regional Security Coordinator

The regional security coordinator is performing tasks related to TSOs regional coordination, within a capacity calculation region.

Within the Outage Planning and Coordination Process, its main responsibilities are:

- Prepare an annual report and submit it to ENTSO for Electricity providing information about the number of outage incompatibilities detected during the regional outage coordination
- Perform regional outage coordination
- Coordinate with other Regional Security Coordinators
- Detect and solve regional outage incompatibilities by performing a security assessment and provide the TSOs of the outage coordination region with a list of detected outage planning incompatibilities and the proposed solutions to solve those outage planning incompatibilities

6.5 Outage Planning Agent

The outage planning agent is the entity responsible for planning the availability status of a relevant power generating module, a relevant demand facility or a relevant grid element

Within the Outage Planning and Coordination Process, its main responsibilities are:

- The TSO act as the outage planning agent for grid element it operates.
- Provide indicative availability plans for its relevant assets.
- Provide alternative availability plans for its relevant assets, if requested so by TSOs in case of Outage Planning Incompatibilities
- Coordinate with TSOs and DSOs to resolve any outage planning incompatibilities
- If needed, launch a procedure for the amendment of the final year-ahead availability plan in the time between the finalisation of the year-ahead outage coordination and before its real-time execution
- Provide to the TSOs detailed information about all its relevant assets which have a “testing” status
- Notify the forced outages of one or more of its relevant assets to the TSO and, if connected to a distribution system or to a closed distribution system, the DSO or the CDSO respectively, as soon as possible following the start of the forced outage (including the reason, the expected duration and if applicable the impact to availability plan of its other relevant assets)

6.6 NRAs

National regulatory authority is a national regulatory authority designated in accordance with Article 35(1) of Directive 2009/72/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in electricity.

Within the Outage Planning and Coordination Process, its main responsibilities are:

- Be informed of the single list of relevant grid assets
- Be informed of the availability plans of all relevant grid assets

7 High Level Business Process Description

An overview of the whole process is already presented in chapter 4, Business Process Overview. The individual steps are further described in the next paragraphs.

8 Definition of Outage coordination regions and relevant assets

In order to initiate the Outage Planning and Coordination within an outage coordination region, all the involved parties have to first define all the relevant assets that will take part in the process. The relevant activities are summarized in the following table.

Activities	Responsible Party	Other Parties	Deadline/ Frequency	Relevant Articles SO GL
Definition of Outage Coordination Regions and Regional Security Coordinators	TSOs	RSC OPA[2]	-	80
Provision of single list of relevant assets	TSOs	NRA OWN DSO CDSO	3 months after the approval of the methodology for defining the relevant assets (PG CSAM)	85, 87
Update of single list of relevant assets	TSOs	NRA OWN DSO CDSO	Before 1st of July of each calendar year	86, 88

Table 2 - Main activities under the definition of outage coordination regions and relevant assets step

Definition of Outage Coordination Regions and Regional Security Coordinators

First of all, all TSOs of each capacity calculation region jointly setup a regional security coordinator and establish rules governing its operations or appoint another regional security coordinator to perform a series of tasks, among which the regional outage coordination. Next, the outage coordination regions

[2] The OPA can be either the TSO, or the (C)DSO, or the Facility Owner, or other. Based on the activity, different party can be assigned this role.

are defined. In principle, the outage coordination regions within which the TSOs proceed to outage coordination are at least equal to the capacity calculation regions. The TSOs of two or more outage coordination regions can agree to merge them into one unique outage coordination region.

Provision of single list of relevant assets

TSOs apply the commonly developed methodology for assets relevance evaluation and establish a single list, for each outage coordination region, of relevant assets for the outage coordination. TSOs make available the list of relevant elements of each outage coordination region on the ENTSO for Electricity operational planning data environment (OPDE) and notify at the same time their national regulatory authorities (NRAs). In addition, TSOs also inform all the owners of the elements in the list, such as DSOs, CDSOs, and other facility owners.

Update of single list of relevant assets

Before 1 July of each calendar year, all TSOs of each outage coordination region jointly re-assess, on the basis of the established methodology, the relevance for the outage coordination of grid elements located in a transmission system or a distribution system including a closed distribution system. Where necessary, all TSOs of an outage coordination region jointly decide to update the list of relevant grid elements of that outage coordination region before 1 August of each calendar year and make the updated list available in the ENTSO for Electricity operational planning data environment and inform all the involved parties.

The activities regarding the definition of outage coordination regions and regional security coordinators are presented in the next flowchart (Figure 2).

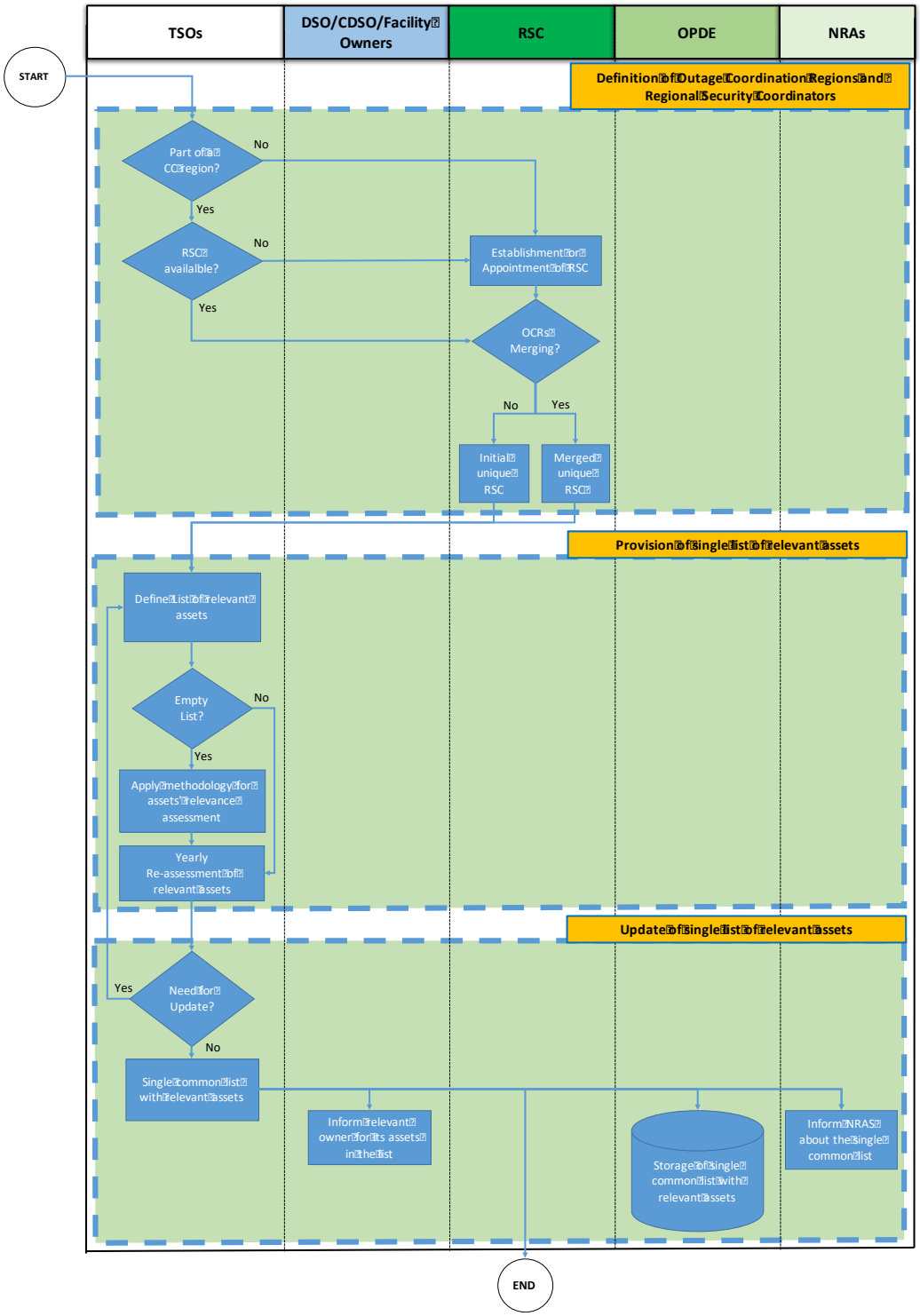


Figure 2: Step 1-Definition and Assessment of the relevant asset lists

9 Development and update of availability plans of relevant assets

Following the identification of the relevant elements in the outage planning and coordination process of an outage coordination region, the availability plans of all the relevant assets have to be submitted to the respective TSO(s) of that outage coordination region. The goal is to define the availability plans

of all the relevant elements that are considered in the outage planning and coordination for each outage coordination region. The actions to be taken are summarized in the following table.

Activities	Responsible Role	Other Roles	Deadline/ Frequency	Relevant Articles SO GL
Appointment of outage planning agents	TSOs	OPA, DSOs, CDOs, NRAs	Before the start of any regional Outage Coordination Every year (or more often)	89
Assessment of Long-Term Indicative Plans	TSOs	-	2 Years before the year-ahead Outage Coordination Repeated every 12 months	93 4,7,15 of Regulation (EU) No 543/2013
Provision of year-ahead availability plan proposals	OPA	TSOs	1st August-initial 1st December-update Every year	94
Assessment of the availability plans for Outage Planning Incompatibilities	TSOs	RSCs, OPA, DSOs, CDSOs, NRAs	- Every year between 1st August and 1st December	95,96
Provision of preliminary year-ahead availability plans	TSOs	OPA, DSOs, CDSOs	Before 1st November Every year	97
Validation of year-ahead availability plans	TSOs	RSCs, OPA, DSOs, CDSOs, NRAs	- Every year between 1st August and 1st December	80 98
Final year-ahead availability plans	TSOs	OPA, DSOs, CDSOs	Before 1st December Every year	99
Updates to the final year-ahead availability plans	OPA	RSCs, TSOs, DSOs, CDSOs	Before Real-Time execution	100

Table 3 - Main activities under the development and update of availability plans of relevant assets step

Appointment of outage planning agents

Each TSO acts as the outage planning agent for each relevant grid element it operates. For all other relevant assets, the owner appoints, or acts as, the outage planning agent for the concerned relevant asset and informs the respective TSO about that appointment.

Assessment of Long-Term Indicative Plans

Two years before the start of any year-ahead outage coordination, each TSO assesses the corresponding indicative availability plans for internal relevant assets, provided by the outage planning agents in accordance with Articles 4, 7 and 15 of Regulation (EU) No 543/2013, and provides its preliminary comments including any detected outage planning incompatibilities, to all affected outage planning agents. Each TSO carries out the assessment every 12 months until the start of the year-ahead outage coordination.

Provision of year-ahead availability plan proposals

Before 1 August of each calendar year, the outage planning agent (other than a TSO taking part in an outage coordination region, a DSO or a CDSO) submits to the TSO(s) taking part in an outage coordination region, and where relevant to the DSO or CDSO, an availability plan covering the following calendar year for each of its relevant assets.

In the period between 1 August and 1 December of each calendar year, the outage planning agent has the right to request the TSO(s) to amend the availability plan submitted. The TSO(s) examine the requests for amendment after the year-ahead outage coordination has been finalised:

- respecting the order in which the amendment requests were received
- following the procedure described in the activity “Updates to the final year-ahead availability plans”

Assessment of the availability plans for Outage Planning Incompatibilities

Each TSO assesses on a year-ahead timeframe whether outage planning incompatibilities arise from the availability plans. When a TSO detects outage planning incompatibilities, it performs the following actions:

- inform each affected outage planning agent of the conditions it shall fulfil to mitigate the detected outage planning incompatibilities
- the TSO may request that one or more outage planning agents submit an alternative availability plan fulfilling the aforementioned conditions
- the TSO repeats the assessment to determine whether any outage planning incompatibilities remain

Following a TSO’s request, if the outage planning agent fails to submit an alternative availability plan aimed at mitigating all outage planning incompatibilities, the TSO develop an alternative availability plan which:

- takes into account the impact reported by the affected outage planning agents as well as the DSO or CDSO where relevant

- limits the changes in the alternative availability plan to what is strictly necessary to mitigate the outage planning incompatibilities
- notifies its national regulatory authority, the affected DSOs and CDSOs if any, and the affected outage planning agents about the alternative availability plan, including the reasons for developing it, as well as the impact reported by the affected outage planning agents and, where relevant, the DSO or CDSO.

Provision of preliminary year-ahead availability plans

Before 1 November of each calendar year, each TSO provides to all other TSOs, via the ENTSO for Electricity operational planning data environment, the preliminary year-ahead availability plans for the following calendar year relative to all the internal relevant assets. Additionally, each TSO provides the DSO and/or CDSO the preliminary year-ahead availability plan for every internal relevant asset located in the distribution and/or closed distribution system

Validation of year-ahead availability plans

Each TSO analyses whether any outage planning incompatibility arises when taking into account all the preliminary availability plans on a year-ahead timeframe. If a TSO detects an outage planning incompatibility, the involved TSOs of the outage coordination region(s) concerned jointly identify a solution in coordination with the concerned outage planning agents, DSOs and CDSOs, using the means at their disposal, while respecting to the extent possible the availability plans submitted by outage planning agents (which are neither a TSO taking part in an outage coordination region, nor a DSO or a CDSO).

In case solution is identified, all TSOs of the concerned outage coordination region(s) update and validate the year-ahead availability plans for all relevant assets.

In case no solution is identified, each TSO takes the following actions:

- forces to “available” all the “unavailable” or “testing” statuses for the internal relevant assets involved in an outage planning incompatibility during the period concerned
- notifies the actions taken to the relevant national regulatory authorities, the affected DSOs or CDSOs, if any, and the affected outage planning agents of the actions taken including the rationale for such actions, the impact reported by affected outage planning agents and the DSO or CDSO where relevant

Consequently, all TSOs of the concerned outage coordination regions update and validate the year-ahead availability plans for all relevant assets

Final year-ahead availability plans

Before 1 December of each calendar year, each TSO:

- finalises the year-ahead outage coordination of internal relevant assets
- finalises the year-ahead availability plans for internal relevant assets and upload them on the ENTSO for Electricity operational planning data environment

At the same time each TSO provides to its outage planning agent, DSO and CDSO the final year-ahead availability plan for each internal relevant asset.

Updates to the final year-ahead availability plans

The outage planning agent and/or a TSO are able to launch a procedure for the amendment of the final year-ahead availability plan (for the assets they act as outage planning agent) in the time between the finalisation of the year-ahead outage coordination and before its real-time execution.

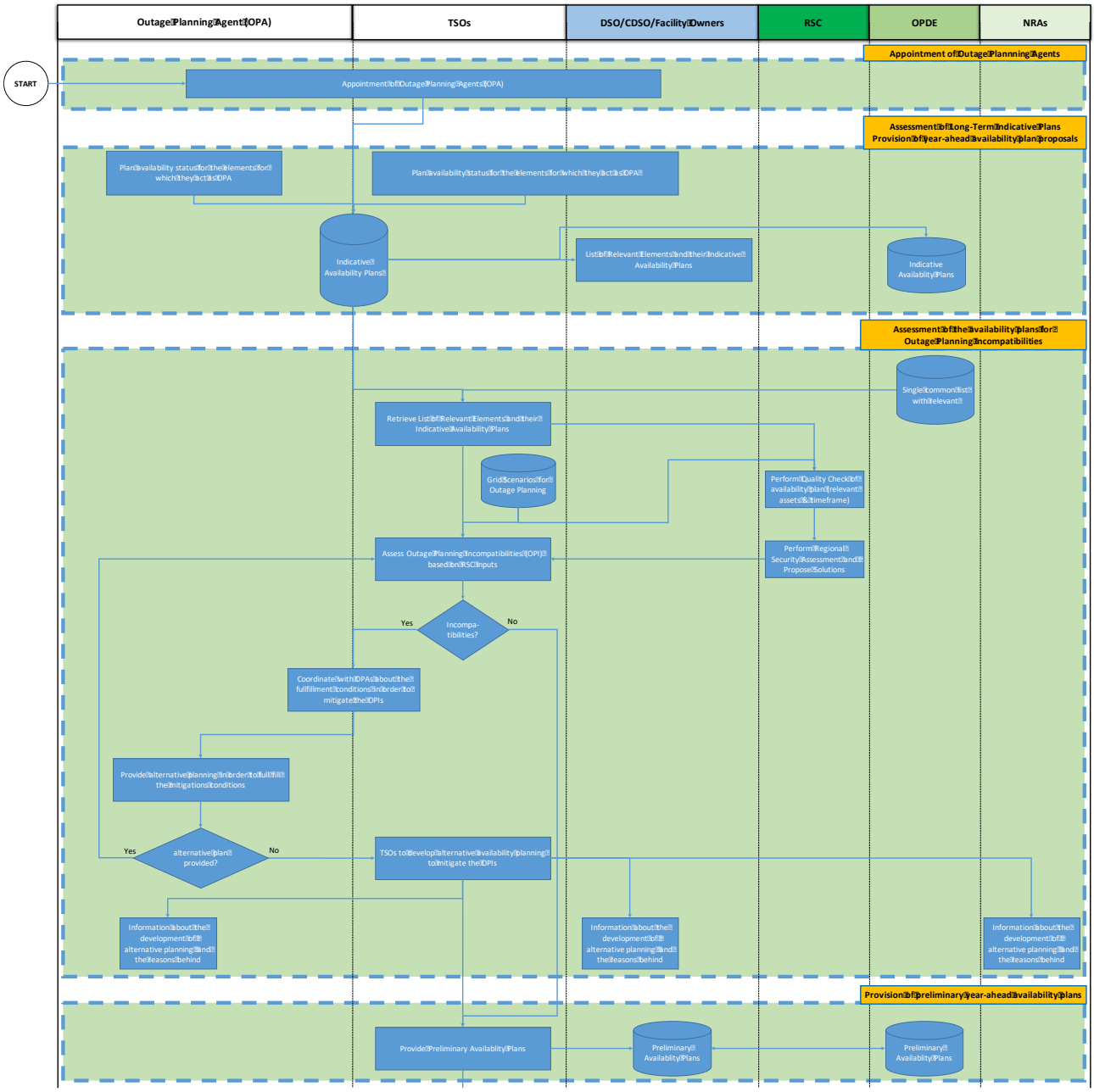
In case of a request for amendment by the outage planning agent, the following actions take place:

- the recipient TSO acknowledges the request and assesses as soon as reasonably practicable whether the amendment leads to outage planning incompatibilities
- in case outage planning incompatibilities are detected, the involved TSOs of the outage coordination region jointly identify a solution in coordination with the outage planning agents concerned and if relevant, the DSOs and CDSOs, using the means at their disposal
- in case no outage planning incompatibility has been detected or if no outage planning incompatibility remains after coordination among the relevant parties, the recipient TSO validates the requested amendment, and the TSOs concerned consequently notify all affected parties, and update the final year-ahead availability plan on the ENTSO for Electricity operational planning data environment
- in case no solution is found for outage planning incompatibilities the receiving TSO rejects the requested amendment.

In case of a request for amendment by a TSO, the following actions take place:

- the requesting TSO prepares a proposal for amendment to the year-ahead availability plan, including an assessment of whether it could lead to outage planning incompatibilities and submits its proposal to all other TSOs of its outage coordination region(s)
- in case outage planning incompatibilities are detected, the involved TSOs of the outage coordination region jointly identify a solution in coordination with the concerned outage planning agents and, if relevant the DSOs and the CDSOs, using the means at their disposal
- in case no outage planning incompatibility has been detected or if a solution to an outage planning incompatibility is found, the concerned TSOs validate the requested amendment and consequently they notify all affected parties and update the final year-ahead availability plan on the ENTSO for Electricity operational planning data environment.
- In case no solution to outage planning incompatibilities are found, the requesting TSO retracts the procedure for amendment

The activities regarding the development and update of availability plans of relevant assets are presented in the next flowchart (Figure 3).



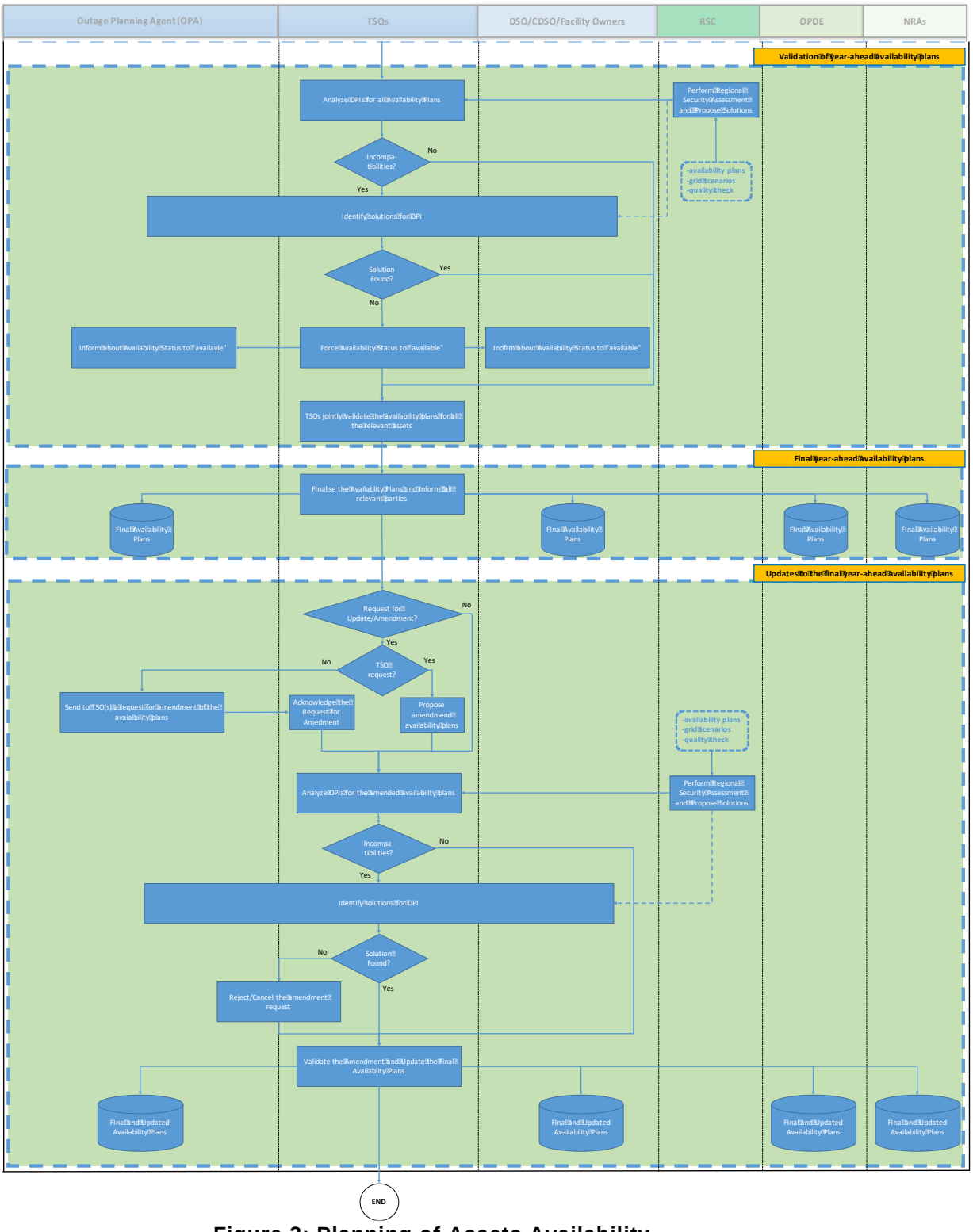


Figure 3: Planning of Assets Availability

***Note 1**: overlapping of process boxes means that more than one roles are involved in the respective process*

***Note 2**: RSCs may be involved in the activities of OPI detection, therefore highlighted with a dashed line*

10 Execution of availability plans

In this final step the goal is the execution of the availability plans of all the relevant elements that were considered in the outage planning and coordination for each outage coordination region. The actions to be taken to are summarized in the following table. It is important to mention that all of the details regarding the execution of availability plans are directly taken from the OPS (SO GL) and it is up to TSOs to align on a common interpretation and level of detail for the requested activities.

Activities	Responsible Role	Other Roles	Deadline/ Frequency	Relevant Articles SO GL
Information about the elements with "testing" status	OPA	TSOs, DSOs, CDSOs, Facility Owners	At least one month before the execution of the availability plans	101
Handling of Forced Outages	TSOs, OPA	DSOs, CDSOs, Facility Owners, NRAs,	During the execution of availability plans	102
Real-time execution of the availability plans	All	-	During the execution of availability plans	103

Table 4 - Main activities under the execution of availability plans step

Information about the elements with "testing" status

The outage planning agent of a relevant asset the availability status of which has been declared as "testing" provides the TSO, and if connected to a distribution system including closed distribution systems, the DSO or the CDSO within one month before the start of the "testing" status with:

- a detailed test plan
- an indicative generation or consumption schedule if the concerned relevant asset is a relevant power generating module or a relevant demand facility
- changes to the topology of the transmission system or distribution system if the concerned relevant asset is a relevant grid element

The outage planning agent updates this information soon as it is subject to any change. The TSO of a relevant asset, the availability status of which has been declared as "testing", provides the information received by the outage planning agent to all other TSOs of its outage coordination region(s), upon their request. In case the relevant asset is a relevant grid element interconnecting two or more control areas, the TSOs of the concerned control areas agree on the information to be provided.

Handling of Forced Outages

Each TSO assesses the cases where a forced outage endangers its operational security and makes sure that the “available” or “unavailable” status of other relevant assets in its control area can be changed to “unavailable” or “available” respectively. This is valid only where no agreement is reached with outage planning agents regarding solutions to forced outages. The TSO notifies then the national regulatory authority accordingly.

The outage planning agent notifies the forced outage of one or more of its relevant assets to the TSO and, if connected to a distribution system or to a closed distribution system, the DSO or the CDSO respectively, as soon as possible following the start of the forced outage.

When notifying the forced outage, the outage planning agent provides the following information:

- the reason for the forced outage
- the expected duration of the forced outage
- where applicable, the impact of the forced outage on the availability status of other relevant assets for which it is the outage planning agent.

In case a TSO detects that one or several forced outages could lead the transmission system out of the normal state, it informs the affected outage planning agent(s) about the time-limit at which operational security can no longer be maintained unless their relevant asset(s) in forced outage returns to “available” status. The outage planning agents inform the TSO whether they are capable of respecting that time-limit and provide reasoned justifications where they are unable to respect that time-limit.

In case of any amendments to the availability plan due to forced outages, the concerned TSO updates the ENTSO for Electricity operational planning data environment (OPDE) with the most recent information.

Real-time execution of the availability plans

When it comes to the real-time execution of the availability plans all parties make sure that the availability plans of their assets are fulfilled. However, in case a TSO identifies that executing an "unavailable” or “testing” status of a relevant asset leads or could lead the transmission system to go out of normal state, it instructs the owner of the relevant asset when it is connected to the transmission system, or the DSO or CDSO if connected to a distribution system or to a closed distribution system, to delay the execution of that "unavailable" or “testing” status of that relevant asset according to its instructions and to the extent possible while respecting the technical and safety limits.

The activities regarding the execution of availability plans are presented in the next flowchart (Figure 4: Execution of Availability Plans).

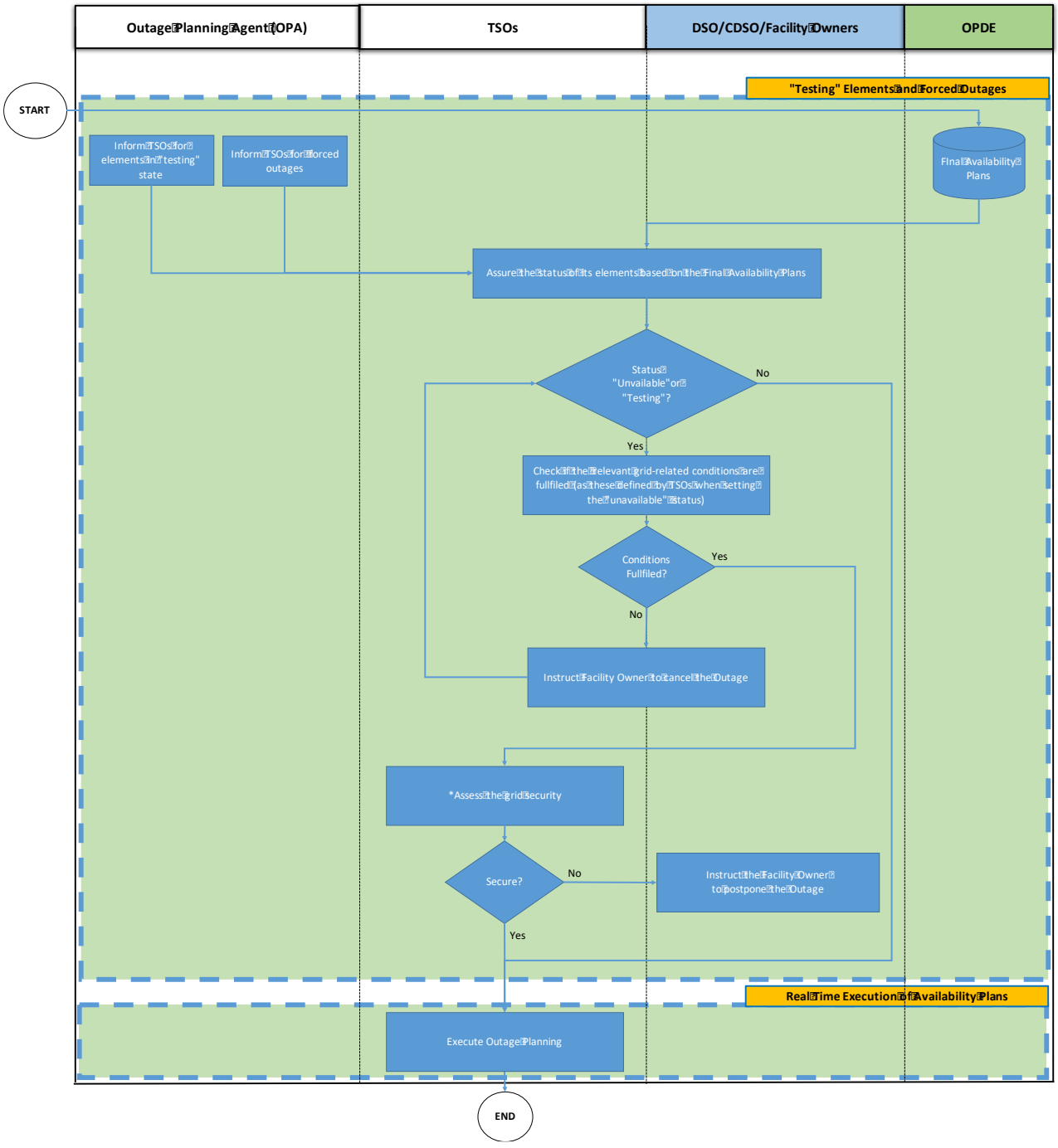


Figure 4: Execution of Availability Plans

Notes:

- overlapping of process boxes means that more than one roles are involved in the respective process

the grid security assessment could be also assigned to RSC

11 Applicable ESMP documents

This implementation guide assumes the use of the following ESMP documents and contextual and assembly models (also referred to as XSD or schema versions):

ESMP document	version
Outage configuration document	urn:iec62325.351:tc57wg16:451-n:outageconfigurationdocument:1:3
Outage schedule document	urn:iec62325.351:tc57wg16:451-n:outagescheduledocument:1:3
Confirmation document	urn:iec62325.351:tc57wg16:451-2:confirmationdocument:5:1
Acknowledgement document	urn:iec62325.351:tc57wg16:451-1:acknowledgementdocument:8:1

12 Sequence diagram for planned/unplanned unavailabilities

The following sequence diagram shows the submission process for planned/unplanned unavailabilities:

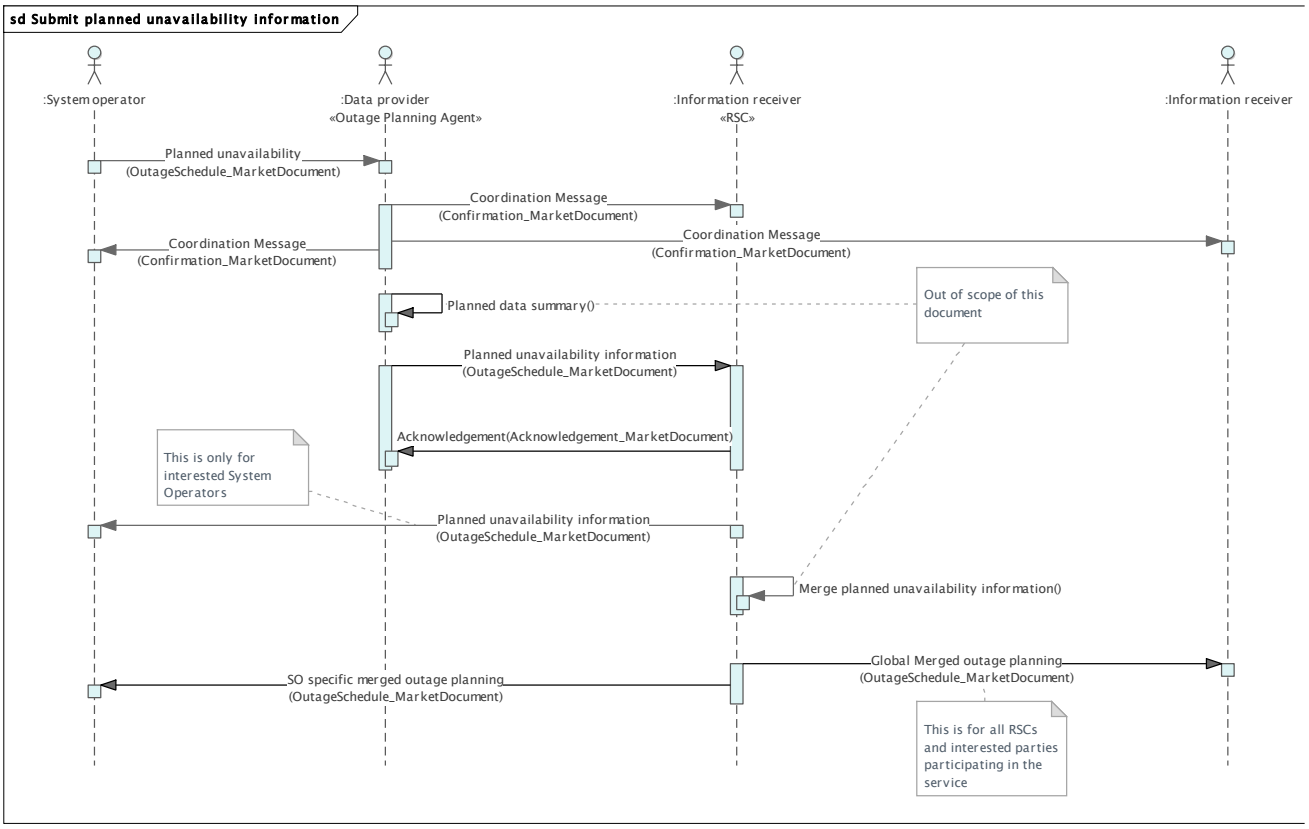


Figure 5: submission process for planned/unplanned unavailabilities

System Operator (SO) role may represent following entities:

1. TSO,
2. DSO,
3. CDSO,
4. FO,
5. OPA

Initial outage planning data is provided by System operators to their Data Providers (Outage Planning Agent) which submit data to their RSCSP.

Whenever Data Provider (Outage Planning Agent) sends updates in planned unavailability information, the RSCSP will provide to the interested System Operator (for this particular element) the updated planned unavailability information.

After that a coordination message is exchanged between Data Provider (Outage Planning Agent) and Information Receiver (RSC) The purpose of the coordination message is to enable TSOs to coordinate outages within OPC service, replacing email communication.

The messages to be exchanged shall be related with specific outages, where coordination is needed (outages for relevant assets).
Example messages are:
"TSO A request to modify outage timeframe";
"TSO B approves the outage";
"TSO C requests to change the restitution time from 4 hours to 2 hours";

In the next step the RSCSP will merge all the most up to date unavailability plans (Out of scope of this Implementation Guide) and will provide to all the System Operators participating in the service, the specific TSO merged outage planning with only the information for the elements flagged as interested for each TSO. Apart from this, the RSCSP will also publish a global merged outage planning for RSCSPs and all the interested parties. The global merge includes all the planned unavailability information for all the elements included in the service.

13 Outage Schedule document

Outage Schedule is defined as unavailability information which is exchanged upon the Network Elements.

RSC or interested parties willing to receive the global merged outage planning will have to subscribe to the service of the EIC code function.

Each outage schedule document contains fields as described in Table below:

Class	Attribute	Remarks
OutageSchedule_MarketDocument	mRID	Unique ID
	revisionNumber	Consecutive number
	type	A76 = Load unavailability A77 = Production unavailability A78 = Transmission unavailability, A80 = Generation unavailability
	process.processType	codelist StandardProcessTypeList A31 = week ahead, A32 = month ahead, A33 = year ahead A36 = Creation A37 = Modification A39 = Synchronisation process (to be used for request for report from market participant or for all non-weekly, non-monthly- non-yearly report answers)
	sender_MarketParticipant.mRID	EIC code of sender
	sender_MarketParticipant.marketRole.type	A04 = SO A44=RSC
	receiver_MarketParticipant.mRID	EIC code of receiver
	receiver_MarketParticipant.marketRole.type	A04 = SO A44=RSC
	createdDateTime	The creation Time of the document AAAA-MM-DDTHH:MM:SSZ
	Schedule_Period.timeInterval	The start and end of the unavailable day as AAAA-MM-DDTHH:MMZ
	domain.mRID	EIC Code of region
TimeSeries	mRID	Unique ID
	Description	Cause of request
	businessType	B81 Outage (OUT) B82 Special switching state (SSS), B83 Testing (TEST), ---------- B84 AUX (Auxiliary busbar operation), B85 AR (Automatic reclosing), B86 Bbprot (Busbar protection)

	project_Name.name	ProjectID, unique
	caseReference_Names.name	Reference CaseID (mRID)
	partnerCaseReference_Names.name	Reference Case ID (mRID) of TSO partner for outage matching.
	outage_Period.timeInterval	The start and end of the planned outage as AAAA-MM-DDTHH:MMZ
	lastChange_MarketAgreement.createdDateTime	The lastChange Time of the CaseID AAAA-MM-DDTHH:MM:SSZ
	positiveOffset_ConstraintDuration.duration	P[yY][mM][dD][T[hH][mM][s[.s]S]
	negativeOffset_ConstraintDuration.duration	P[yY][mM][dD][T[hH][mM][s[.s]S]
	noRestitution_ConstraintDuration.type	String “N”
	maximumRestitution_ConstraintDuration.duration	P[yY][mM][dD][T[hH][mM][s[.s]S]
	dayTimeRestitution_ConstraintDuration.duration	P[yY][mM][dD][T[hH][mM][s[.s]S]
	nightTimeRestitution_ConstraintDuration.duration	P[yY][mM][dD][T[hH][mM][s[.s]S]
	weekEndRestitution_ConstraintDuration.duration	P[yY][mM][dD][T[hH][mM][s[.s]S]
	marketObjectStatus.status	A35 = preliminary A36 = planned A09 = cancelled (CAN)
	coordination_MarketObjectStatus.status	A29 = Pre processed (requested) A34 = rejected A37 = confirmed
	measurement_Unit.name	MAW
	unavailableCapacity_Quantity.quantity	The quantity value.
	day_MarketObjectStatus.status	A03 = deactivate / permanent A05 = active / daily (Usage day_MarketObjectStatus.status A05 means daytime/daylight day_MarketObjectStatus.status A03 means permanent)
	week_MarketObjectStatus.status	A03 = deactivate A05 = active
	saturday_MarketObjectStatus.status	A03 = deactivate A05 = active
	sunday_MarketObjectStatus.status	A03 = deactivate A05 = active
Reason	reason.code	A95 =Complementary information B29 = Special Condition
	reason.text	remarks and Special condition
RegisteredResource	mRID	maxLength 60 codingScheme= "A01" - EIC
	name	longname
	pSRType.psrType	A01 = TIE (tieline), A02 = LINE (internal OHL or cable), A04 = GEN (generating unit), A05 = LOAD (consumption unit), A08 = BUB (busbar), A09 = CAP (capacitor), A10 = IND (inductor), A11 = PPL (Power plant connection) A13 = Production unit B22 = DCL (DC-Link), B23 = SUB (Substation), B24 = TRA (Transformer),
	pSRType.powerSystemResources.highVoltageLimit	([0-9] + ((\. [0-9] *)) unit always "KVT"
	pSRType.powerSystemResources.lowVoltageLimit	([0-9] + ((\. [0-9] *)) unit always "KVT"
Alternative_RegisteredResource	mRID	EIC or CGM code of the alternative grid element.
SwitchedBack_ Period	timeInterval	The start and end where the gridelement is online during the outage as AAAA-MM-DDTHH:MMZ

Table 5 - OutageSchedule Market Document

14 Examples of outages

For better overview in the following tables only the information which is relevant for the process is described in the examples:

Class	Attribute	Remarks
OutageSchedule_MarketDocument	mRID	5bf2f5131d69-4f20-b96a-8f9637caf45
	revisionNumber	1
	type	A78 = Transmission unavailability,
	process.processType	A36 = Creation
	sender_MarketParticipant.mRID	10XAT-APG------Z
	sender_MarketParticipant.marketRole.type	A04 = SO
	receiver_MarketParticipant.mRID	10X1001A1001A450
	receiver_MarketParticipant.marketRole.type	A44=RSC
	createdDateTime	The creation Time of the document AAAA-MM-DDTHH:MM:SSZ
	domain.mRID	10YAT-APG------L
TimeSeries	mRID	AT__15000768
	Description	maintenance
	businessType	B81 = OUT
	project_Name.name	AT_ProjectID001
	caseReference_Names.name	AT__15000700
	outage_Period.timeInterval	2015-12-18T06:00:00Z / 2015-12-23T16:00:00Z
	lastChange_MarketAgreement.createdDateTime	2015-11-19T07:47:00Z
	positiveOffset_ConstraintDuration.duration	PoD
	negativeOffset_ConstraintDuration.duration	PoD
	noRestitution_ConstraintDuration.type	N
	maximumRestitution_ConstraintDuration.duration	PoD
	dayTimeRestitution_ConstraintDuration.duration	PoD
	nightTimeRestitution_ConstraintDuration.duration	PoD
	weekEndRestitution_ConstraintDuration.duration	PoD
	marketObjectStatus.status	A36 = planned
	coordination_MarketObjectStatus.status	A37 = confirmed
	measurement_Unit.name	MAW
	unavailableCapacity_Quantity.quantity	0
	day_MarketObjectStatus.status	A05 = daily (Usage)
	week_MarketObjectStatus.status	A05 = active
	saturday_MarketObjectStatus.status	A03 = deactivate
	sunday_MarketObjectStatus.status	A03 = deactivate
Reason	reason.code	A95 =Complementary information
	reason.text	Umbau Mastausleger, Seilzug und Reckzeit
RegisteredResource	mRID	10T-AT-CH-00002V codingScheme " A01"
	name	Słupsk-Starno HVDC
	registeredResource.pSRType.psrType	A01 = TIE (tieline),
	pSRType.powerSystemResources.highVoltageLimit	400 unit always "KVT"
Alternative_RegisteredResource	mRID	10T-AT-CH-00001X
SwitchedBack_ Period	timeInterval	2015-12-19T06:00Z / 2015-12-19T16:00Z

Table 6 - create planned outage

Table 6 describes a planned unavailability of TSO APG for one element in the transmission grid.

Class	Attribute	Remarks	
OutageSchedule_MarketDocument	mRID	034486f72ba6-4d20-9eb9-f66b8f39a808	
	process.processType	A37 = Modification	
	createdDateTime	2015-11-20T11:11:11Z	
	Schedule_Period.timeInterval	Start	2015-12-18T06:00Z
		End	2015-12-22T16:00Z
	domain.mRID	10YAT-APG------L	
TimeSeries	mRID	AT__15000768	
	outage_Period.timeInterval	Start	2015-12-18T06:00Z
		End	2015-12-22T16:00Z
	lastChange_MarketAgreement.createdDateTime	2015-11-20T11:11:11Z	
	marketObjectStatus.status	A36 = planned	
	coordination_MarketObjectStatus.status	A37 = confirmed	
Period	timeInterval	Start	2015-12-19T06:00Z
		End	2015-12-19T12:00Z

Table 7 - modification planned unavailability

Table 7 illustrates a modification („A37“) of Case ID „AT__15000768“.

Example files can be requested from the OPC Project group

15 Confirmation document

Class	Attribute	Remarks
Confirmation_MarketDocument	mRID	Unique ID
	type	A18 = Confirmation,
	createdDateTime	The creation Time of the document AAAA-MM-DDTHH:MM:SSZ
	sender_MarketParticipant.mRID	EIC code of sender
	sender_MarketParticipant.marketRole.type	A04 = SO A44=RSC
	receiver_MarketParticipant.mRID	EIC code of receiver
	receiver_MarketParticipant.marketRole.type	A04 = SO A44=RSC
	schedule_Period.timeInterval	The start and end of the unavailable day as AAAA-MM-DDTHH:MMZ
	confirmed_MarketDocument.mRID	ID of the confirmed market document
	confirmed_MarketDocument.revisionNumber	Revision number of the confirmed market document
	domain.mRID	EIC Code of region
	subject_MarketParticipant.mRID	Not used
	subject_MarketParticipant.marketRole.type	Not used
	process.processType	A37: Modification
Reason (Linked to Confirmation_MarketDocument)	Reason.code	A06: Schedule accepted A07: Schedule partially accepted. A08: Schedule rejected.
	Reason.text	May be used
Confirmed_TimeSeries	mRID	Unique ID of Timeseries
	version	Version of timeseries
	businessType	Business type of the
	product	8716867000016: Active power
	objectAggregation	A06: Resource object
	in_Domain.mRID	Not used
	out_Domain.mRID	Not used
	marketEvaluationPoint.mRID	Not used
	in_MarketParticipant.mRID	Not used
	out_MarketParticipant.mRID	Not used
	marketAgreement.type	Not used

	marketAgreement.mRID	Not used
	connectingLine_RegisteredResource.mRID	Not used
	measure_Unit.name	MAW: Megawatt
	curveType	Not used
Reason (Linked to Confirmed_TimeSeries)	reason.code	A20: Time series fully rejected B06: Time series accepted B65: Time series partially accepted.
	reason.text	Reason text

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16 Element information (OutageConfiguration_MarketDocument)

Element information is sent by System Operator to the Data Provider who submits information to RSCI (using OutageConfiguration_MarketDocument).

Network element is considered as part of the grid treated as relevant or non-relevant asset (defined in GLSO) on which the unavailability information is exchanged between Parties within Outage Schedule document.

Whenever Data Provider (Outage Planning Agent) sends element updates information, the RSCSP will provide to the interested System Operator (for this particular element) the updated element list information.

In the next step the RSCSP will merge all the most up to date element updates information (Out of scope of this Implementation Guide). Apart from this, the RSCSP will also publish a global merged outage element list for RSCSPs and all the interested parties. The global merge list includes all the merged elements included in the service.

The following sequence diagram shows the submission process for element update information.

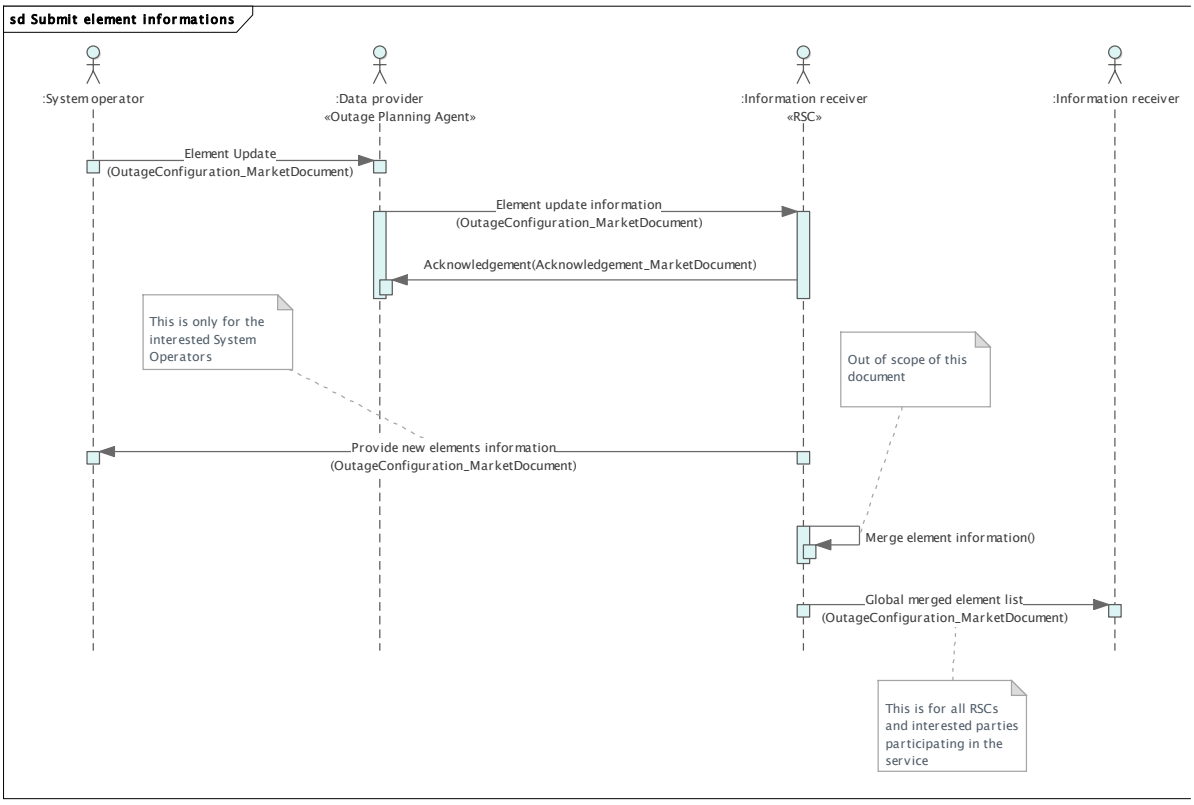

Figure 6: submission process for element update information

OutageConfiguration_MarketDocument contain following fields:

Class	Attribute	Remarks
OutageConfiguration _MarketDocument	mRID	Unique ID
	type	A95 - ConfigurationDocument,
	sender_MarketParticipant.mRID	EIC code of sender
	sender_MarketParticipant.marketRole.type	A04 = SO A44 = RSC
	receiver_MarketParticipant.mRID	EIC code of receiver
	receiver_MarketParticipant.marketRole.type	A04 = SO A44 = RSC
	createdDateTime	The creation Time of the document AAAA-MM-DDTHH:MM:SSZ
	process.processType	A36 (Creation), A37(Modification), A38(Deactivation process), A39(Synchronisation process).
TimeSeries	registeredResource.mRID	EIC or CGM code of the gridelement
	registeredResource.name	String - global Element longname
	registeredResource.location.name	free text,200 letters, no restrictions
	registeredResource.pSRType.psrType	A01 = TIE (Tieline), A02 = LINE (OHL), A04 = GEN (Generation), A05 = LOAD (consumption unit), A08 = BUB (busbar), A09 = CAP (capacitor), A10 = IND (inductor), A11 = PPL (powerplant-Line) A13 = Production uni B22 = DCL (DC-Link), B23 = SUB (Substation), B24 = TRA (Transformer),
	registeredResource.pSRType.powerSystemResources .highVoltageLimit	Voltage Level ([0-9]+((\.[0-9]*)), unit always "KVT"
	registeredResource.pSRType.powerSystemResources .lowVoltageLimit	Voltage Level ([0-9]+((\.[0-9]*)), unit always "KVT"
	Relevant_MarketObjectStatus	A64: Relevant (Only used if an asset is relevant)
	Interesting_MarketObjectStatus	A63: Interesting (Only used if an asset is interesting)
	Associated_Domain (Linked to Registered Resource)	EIC-Y code of the regional outage area
	CancelledTS	Not used
	description	String - local Element longname
	owner_MarketParticipant.mRID	Responsible TSO, EIC code of the TSO
	startLifetime_DateAndOrTime.date	YYYY-MM-DD
	endLifetime_DateAndOrTime.date	YYYY-MM-DD
	implementation_DateAndOrTime.date	YYYY-MM-DD
	active_Measurement_Unit.name	MAW
	installedGeneration_Quantity.quantity	value
	installedConsumption_Quantity.quantity	value
	installedReactive_Quantity.quantity	value
	reactive_Measurement_Unit.name	MAW
	Multipod_RegistredResource.mRID	Element EIC which is used for the unique identification of the multipod
Domain	mRID	EIC code of the Planning Region
Coordination_MarketParticipant	mRID	EIC code of the TSO
Interested_MarketParticipant	mRID	EIC code of the TSO who marked the element as interesting
Relevant_MarketParticipant	mRID	EIC code of the TSO who marked the element as relevant.
Specific_RegisteredResource	mRID	EIC or CGM code of the specific grid element

Table 8 - OutafeConfiguration_MarketDocument

17 Examples element information

In the following tables only the information which is relevant for the process is described including examples:

Class	Attribute	Remarks
OutageConfiguration_MarketDocument	mRID	d29e3d9f2e63-4752-9b68-283c975bd739
	type	A95
	sender_MarketParticipant.mRID	10XPL-TSO------P
	sender_MarketParticipant.marketRole.type	A04
	receiver_MarketParticipant.mRID	10X1001A1001A450
	receiver_MarketParticipant.marketRole.type	A44
	createdDateTime	2016-01-14T10:55:00Z
	process.processType	A36
TimeSeries	registeredResource.mRID	10T-PL-SE-000016
	registeredResource.name	Słupsk-Starno HVDC
	registeredResource.location.name	“locationname”
	registeredResource.pSRType.psrType	A01
	registeredResource.pSRType.powerSystemResources .highVoltageLimit	400
	Relevant_MarketObjectStatus	A64: Relevant
	Interesting_MarketObjectStatus	Not used
	Associated_Domain (Linked to Registered Resource)	EIC-Y code of the regional outage area
	description	Słupsk-Starno HVDC
	owner_MarketParticipant.mRID	10XPL-TSO------P
	startLifetime_DateAndOrTime.date	2016-01-04
	endLifetime_DateAndOrTime.date	2099-12-31
	implementation_DateAndOrTime.date	2016-01-04
	active_Measurement_Unit.name	MAW
	installedGeneration_Quantity.quantity	0.0
	installedConsumption_Quantity.quantity	0.0
	installedReactive_Quantity.quantity	0.0
	reactive_Measurement_Unit.name	MAW
	Multipod_RegistredResource.mRID	not used
Domain	mRID	10YPL-AREA-----S
Coordination_MarketParticipant	mRID	10XPL-TSO------P
Interested_MarketParticipant	mRID	10XAT-APG------Z, 10XCH-SWISSGRIDC, 10XCZ-CEPS-GRIDE, 10XDE-EON-NETZ-C, 10XDE-ENBW--TNGX, 10XDE-RWENET---W, 10XDE-VE-TRANSMK, 10XHR-HEP-OPS--A, 10X1001A1001A329, 10X1001A1001A361, 10XRO-TEL------2, 10XPL-TSO------P, 10XSI-ELES-----1.
Relevant_MarketParticipant	mRID	10XCH-SWISSGRIDC, 10XCZ-CEPS-GRIDE, 10XDE-EON-NETZ-C, 10XDE-ENBW--TNGX,
Specific_RegisteredResource	mRID	Not used yet

Table 9 - illustrates creation of a new element by TSO PSE.

Example files can be requested from the OPC Project group

Class	Attribute	Remarks
OutageConfiguration_MarketDocument	mRID	6c6241978036-4d30-959f-3ac00ea365ec
	createdDateTime	2016-01-20T08:04:00Z
	process.processType	A37
TimeSeries	registeredResource.mRID	10T-PL-SE-000016
	endLifetime_DateAndOrTime.date	2016-31-12

Table 10 - update / modification of the Elements

Table 10 illustrates deactivation of an element by using „A37-Modification" and changing the "endLifetime_Datum" for specific time in future.
Changes of elements can only be applied by element owning TSO except field "Interesting_MarketObjectStatus " where each TSO may use A63 for marking element as interesting for his TSO. This attribute shall not be populated in case that an element is marked as non- interesting for his TSO.

Class	Attribute	Remarks
OutageConfiguration_MarketDocument	mRID	339eb1f19145-4b74-93d8-b6b7a0c804b5
	type	A95
	sender_MarketParticipant.mRID	10X1001A1001A361
	sender_MarketParticipant.marketRole.type	A04
	receiver_MarketParticipant.mRID	10X1001A1001A450
	receiver_MarketParticipant.marketRole.type	A44
	createdDateTime	2016-01-15T10:55:00Z
	process.processType	A39
TimeSeries	registeredResource.mRID	10T-PL-SE-000016
	registeredResource.name	Słupsk-Starno HVDC
	registeredResource.pSRType.psrType	A01
	registeredResource.pSRType.powerSystemResources.highVoltageLimit	400
	owner_MarketParticipant.mRID	10XPL-TSO------P
	startLifetime_DateAndOrTime.date	2016-01-04
Domain	mRID	10YPL-AREA-----S

Table 11 - delete "interesting for" Information TSO TenneT NL

Table 11 illustrates how TSO TenneT NL marks element with registeredResource.mRID = 10T-PL-SE-000016 by sending process.processType = A39 (Synchronisation) and not using Interesting_MarketObjectStatus which means "non-interesting for" for TenneT NL.

Example files can be requested from the OPC Project group