European Network of
Transmission System Operators
for Electricity

ENTSO-E AUTOMATIC FREQUENCY RESTORATION RESERVE PROCESS

IMPLEMENTATION GUIDE

2024-02-08
APPROVED DOCUMENT
VERSION 1.2

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NOTE CONCERNING WORDING USED IN THIS DOCUMENT

The force of the following words is modified by the requirement level of the document in which they are used.

- SHALL: This word, or the terms “REQUIRED” or “MUST”, means that the definition is an absolute requirement of the specification.
- SHALL NOT: This phrase, or the phrase “MUST NOT”, means that the definition is an absolute prohibition of the specification.
- SHOULD: This word, or the adjective “RECOMMENDED”, means that there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications shall be understood and carefully weighed before choosing a different course.
- SHOULD NOT: This phrase, or the phrase “NOT RECOMMENDED”, means that there may exist valid reasons in particular circumstances when the particular behaviour is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behaviour described with this label.
- MAY: This word, or the adjective “OPTIONAL”, means that an item is truly optional. One vendor may choose to include the item because a particular marketplace requires it or because the vendor feels that it enhances the product while another vendor may omit the same item. An implementation which does not include a particular option MUST be prepared to interoperate with another implementation which does include the option, though perhaps with reduced functionality. In the same vein an implementation which does include a particular option MUST be prepared to interoperate with another implementation which does not include the option (except, of course, for the feature the option provides.).

43 # Revision History

Version	Release	Date	Paragraph	Comments
0.1	Draft A	2018-09-10		Initial adaption
0.2	Draft A	2019-04-18		Adaption after MC decisions
1.0				Approved by MC.
1.1	Draft B	2021-01-20		Adaption based on PICASSO SC decisions and CIM EG review Approved by MC.
1.2		2024-02-08		This new release focuses on the integration with the Capacity Management Module (CMM) and solves some typos and inconsistencies. Approved by ICTC.

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1 Introduction

This document was drafted based on IEC 62325 series. In particular, the IEC 62325-450 methodology was applied to develop the conceptual and assembly models.

2 Scope of the PICASSO project

The “Platform for the International Coordination of Automated Frequency Restoration and Stable System Operation” (PICASSO) is the establishment of a platform for the exchange of balancing energy from aFRR in the context of EBGL implementation. The PICASSO project is selected by All TSOs (in terms of EBGL) to be the reference project for such an establishment of an aFRR platform.

The aims of the project are to permit:

- The reduction of balancing costs through the introduction of an optimization based automatic frequency restoration process (aFRP);
- The increase of the available balancing energy for each TSO with positive impact on the security of supply and on the integration of renewable energy in the electric systems.
- A more efficient use of cross border interconnectors after intraday markets.

3 Scope of the IGCC project

The “International Grid Control Cooperation” (IGCC) is the establishment of a platform for the imbalance netting process (INP) in the context of EBGL implementation. The IGCC project is selected by All TSOs (in terms of EBGL) to be the reference project for such an establishment of an IN platform.

4 Scope of the Implementation Guide

According to real-time operational purposes, the aFRR cross-border activation process and the IN process are selected by All TSOs (in terms of EBGL) to be implemented by one common platform.

The aim of the Implementation Guide is to define normative references, dependencies and communication processes for the real-time and non-real-time electronic data interchanges between aFRR platform (including INP), respective TSOs systems and the external systems (e.g. ENTSO-E central Transparency platform).

This document is prepared by all transmission system operators (TSOs) involved in the PICASSO project and this document is only applicable for multilateral TSO-TSO model with common order list to exchange all balancing energy bids from all standard products for frequency restoration reserves with automatic activation in accordance with Article 21 of the EBGL regulation.

5 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 TS 61970-2, *Energy management system application program interface (EMS-API) –Part 2: Glossary*

164 IEC 62325-301, *Framework for energy market communications – Part 301: Common information*
165 *model (CIM) extensions for markets*

166 IEC 62325-351, *Framework for energy market communications – Part 351: CIM European*
167 *market model exchange profile*

168 IEC 62325-450, *Framework for energy market communications – Part 450: Profile and context*
169 *modeling rules*

170 IEC 62325-451-1, *Framework for energy market communications – Part 451-1:*
171 *Acknowledgement business process and contextual model for CIM European market*

172 IEC 62325-451-2, *Framework for energy market communications – Part 451-2: Scheduling*
173 *business process and contextual model for CIM European market*

174 IEC 62325-451-3*, Framework for energy market communications – Part 451-3: Transmission*
175 *capacity allocation business process (explicit or implicit auction) and contextual model for CIM*
176 *European market*

177 IEC 62325-451-4*, Framework for energy market communications – Part 451-4: Settlement and*
178 *reconciliation business process and contextual model for CIM European market*

179 IEC 62325-451-6*, Framework for energy market communications – Part 451-6: Transparency*
180 *business process and contextual model for CIM European market*

181 IEC 62325-451-7, *Framework for energy market communications – Part 451-7: Reserve*
182 *resource business process and contextual model for CIM European market*

183 *ENTSO-E RG CE scheduling reporting process implementation guide*

184 *ENTSO-E RG CE accounting and settlement process implementation guide*

185 *ENTSO-E Manual of Procedures for central Transparency Platform v3r1*

6 Terms and definitions

6.1 aFRP

Automatic frequency restoration process; process to regulate the Frequency Restoration Control Error (FRCE) to zero and thus restore the system frequency to the nominal value by the activation of aFRR

6.2 aFFR

Automatic frequency restoration reserves; active power reserves that may be automatically activated

6.3 aFFR IF

aFRR Implementation Framework

6.4 AOF

Activation Optimisation Function; as defined by EB GL article 2(39)

6.5 BSP

Balancing Service Provider, for the definition see Harmonised Electricity Market Role Model 2020-01

6.6 CBCL

Cross-border capacity limit

6.7 GCT

Gate closure time

6.8 CMOL

Common merit order list, contain all bids provided by all system operators

6.9 HVDC

High Voltage Direct Current

6.10 INP

Imbalance netting process; the INP is a real-time process of netting of aFRR Demands between the TSOs in order to avoid aFRR activation in opposite direction in each LFC area.

6.11 LMOL

Local merit order list, contain all bids provided by one system operator

6.12 MTU

Market Time Unit

7 The automatic frequency restoration reserve business process for standard products

7.1 General overview

The aFRR platform has a number of operational phases that are carried out throughout the day. Figure 1 gives an overview on the operational phases

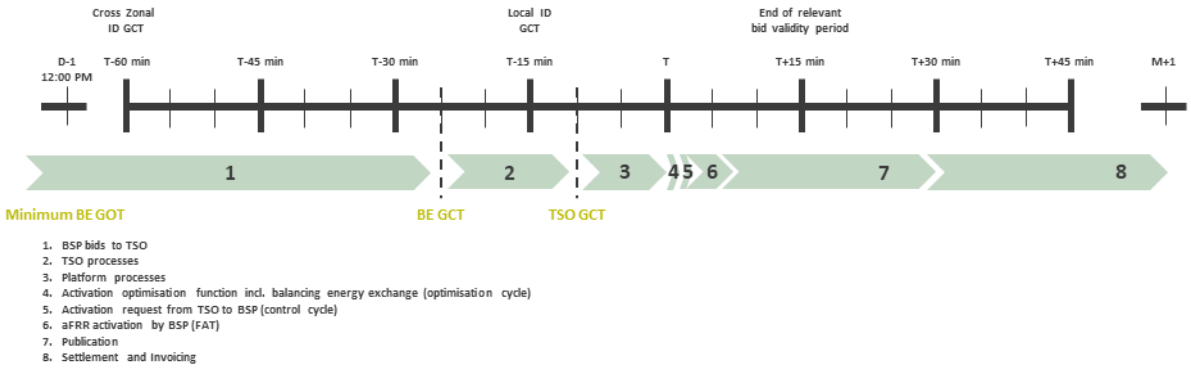

Figure 1: Automatic frequency restoration reserve process overview

The minimum balancing energy gate opening time (BEGOT) is at 12:00 pm the day before delivery (D-1). From this time on balancing service providers (BSP) may submit offers of balancing energy from aFRR to their local TSO. The TSO may define locally a BEGOT earlier than this time, according to local terms and conditions.

Cross Zonal ID GCT corresponds to the gate closure time of the Intraday cross-border market.

BSPs can submit bids to their local TSOs until the balancing energy gate closure for BSPs (BSP GCT), which is 25 minutes before delivery (T-25 min) time. Note that in case of central dispatch system BSP GCT could be earlier. After the BSP GCT each TSO creates a local merit order list (MOL) for each of its LFC areas. From this local MOL the respective TSO can flag bids for operational security reasons or for conditional aFRR bids depending on the state of activation of previous balancing processes. Each TSO submits at the TSO energy bid submission gate closure time (TSO GCT) for each of their LFC area the corresponding local MOL to the aFRR platform. The local MOL sent to the aFRR platform contains all the bids with their availability status (available or unavailable). The local MOL might be sent in anticipation and updated by the connecting TSO several times before the TSO GCT. In case of BSP failure or conditional bids, the local TSO may still modify the bid of its local MOL (volume, price, availability status of the bids) after the TSO GCT up to real time. In such a case, the complete local MOL or just the modified bids are resubmitted to the aFRR platform. By sending a local MOL it is ensured that the local MOL used in the load-frequency controller matches the bids used in the common merit order list. Together with the local MOL, the local TSO may submit additional information to the aFRR platform about commonly procured, shared or exchanged volume with other LFC areas or geographical region with whom the local TSO may have such procurement process in place. This additional information is needed by the aFRR platform to allocate appropriate priority to the bids.

Each TSO sends in real-time for each of the aFRR balancing borders the TSO is responsible for, the corresponding aFRR cross-border capacity limit (through a capacity management module when implemented). Additionally, each TSO sends in real-time for each control cycle the aFRR demand for each of its LFC areas, the sum of effective aFRR activation and/or the original FRCE without influence of aFRR and IN interchanges. By this the aFRR platform can deduce one of the three values in case the value is not available.

For operational security issue, other type of limits may be provided to the aFRR platform such as Profile limits or Flow monitoring limits. For Flow monitoring limits, a PTDF matrix is determined and submitted to the aFRR platform in advance.

Before delivery the aFRR platform reads in the local MOLs for each LFC area and merges the local MOLs to a common merit order list (CMOL). The CMOL can be updated even after the beginning of the relevant market time unit due to modification of bids over the validity period.

Once merged and each time the CMOL is updated, the aFRR platform sends back to local TSOs a Confirmation Document which contains information on the local MOL which is confirmed, whether the merge has been successful together with the mRIDs and version numbers of both the local MOL and the resulting CMOL. The complete CMOL is made available to local TSOs at TSO GCT, at the beginning of the validity period and each time the CMOL is updated during the validity period.

In real-time the aFRR platform optimizes sequentially the aFRR process and then the IN process. Firstly, the distribution of the aFRR demand is optimized based on the CMOL, and the aFRR cross-border capacity limits as well as profile limits and physical flow limits (if applicable). The result of the optimization is the automatic frequency restoration power interchange for each aFRR balancing border and one price for each LFC area. Secondly, the corrected aFRR demand is netted with the aFRR demands of the TSOs participating only to IN process, based on remaining cross-border capacity limits as well as profile limits and physical flow limits (if applicable). The result of the optimization is then the imbalance netting power interchange for each IN balancing border.

The aFRR platform also provides in each optimization cycle the resulting FRCE and the aFRR activation for local purpose for each LFC area (also called adjusted FRCE and adjusted aFRR), based on the distribution of aFRR demand and effective aFRR activation for each LFC area.

The aFRR platform sends each optimization cycle[1] a correction value for aFRR Process and a correction value for IN process to each load frequency controller of the participating TSOs.

Each LFC automatically activates locally the aFRR taking into account the received correction values.

At 30 minutes after the relevant market time unit, all the information required for transparency reporting purposes is provided by the aFRR platform.

7.2 Overall business context

This Implementation Guide provides the means of exchanging between all concerned parties the information necessary to satisfy automatic frequency restoration reserve requirements as outlined in paragraph 7.1. Figure 2 shows the sequence diagram of the PICASSO platform including the linked agents (e.g. BSPs).

[1] Optimization cycle is defined for the aFRR Platform and shall be defined between 1 and 10 seconds

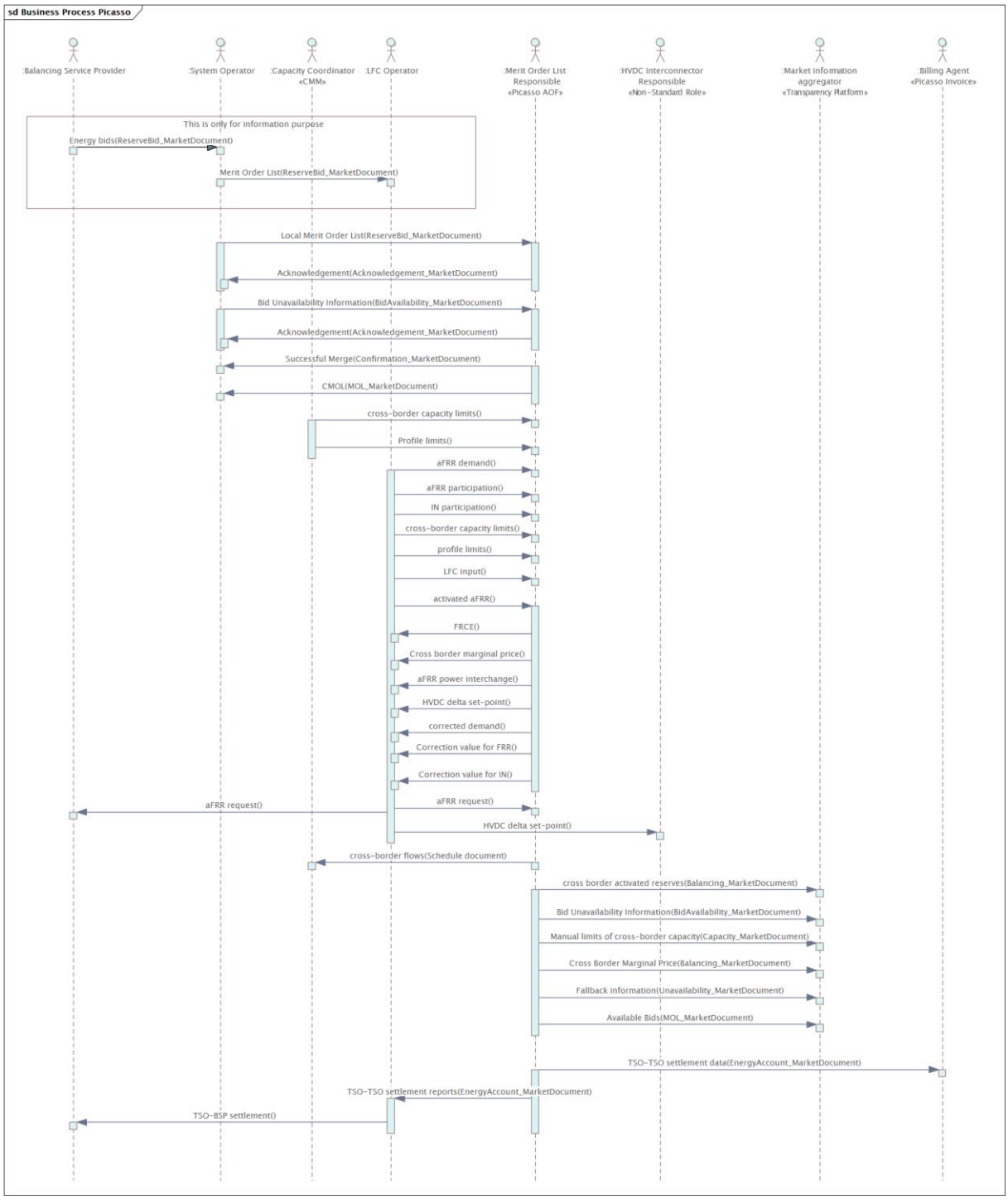

Figure 2: The automatic frequency restoration reserve process sequence diagram

The information flows are outlined in the following paragraphs.

7.3 Local Merit Order List

Before TSO GCT the local bidding platforms provide for each of their LFC area(s) a local MOL to the aFRR platform. The local MOL might be updated after the TSO-GCT due to operational

security reasons or conditional bids. The local MOL may contain additional information to the aFRR platform about commonly procured, shared or exchanged volume with other LFC areas or region for which the local LFC-Operator may have such procurement process in place. This additional information is needed by the aFRR platform to guarantee prior access to local reserves.

7.3.1 aFRR participation

The participating LFC-Operators provide in real-time (on each change of state) to the aFRR platform the aFRR participation request as a message. This information will be used in each optimization cycle to determine which of the TSOs will be considered in the optimization step for aFRR.

Note: in return the aFRR Platform provides the status of online service of aFRR Process.

7.3.2 Imbalance netting participation

The participating LFC-Operators provide in real-time (on each change of state) to the aFRR platform the imbalance netting participation request as a message. This information will be used in each optimization cycle to determine which of the LFC-Operators will be considered in the optimization step for aFRR.

Note: in return the aFRR Platform provides the status of online service of IN Process.

7.3.3 aFRR cross-border capacity limits

The participating LFC-Operators and the capacity management module (if available) provide in real-time (each control cycle[2]) to the aFRR platform the aFRR cross-border capacity limits (CBCL) for each of the aFRR balancing border the TSO is responsible for, as the export and the import limit. For each limit one data point. The range of values is [0 ... inf]. This information will be used in each optimization cycle for the calculation of the automatic frequency restoration power interchange. aFRR balancing borders are defined positive in either North-South- or East-West-direction depending on geographical orientation. The default aFRR cross-border capacity limit for each border is given by the IT limitation, which is set by the IT system.

7.3.4 Profile limits

In real-time (each control cycle) each LFC-Operator and the capacity management module (if available) provide the profile limits for import and export for each of the profile it manages to the aFRR platform as a data point. The range of the profile limit is [0...inf].

7.3.5 aFRR demand

In real-time (each local control cycle) each LFC-Operator provides the aFRR demand of each of their LFC area(s) to the aFRR platform as a data point. The aFRR demand is defined as the sum of the already activated aFRR and the FRCE without the influence of the intended exchange of balancing energy resulting from the cross-border aFRP or INP. The sign convention for aFRR demand is: negative value where the LFC area is in power surplus and indicates that downward aFRR balancing energy needs to be activated; and positive value where the LFC area is in power deficit and indicates that upward aFRR balancing energy needs to be activated. For avoidance of doubt, all aFRR demands are aFRR inelastic demands. The range for the aFRR demand is [-inf...inf].

[2] Local control cycle may differ from the optimization cycle

7.3.6 Activated aFRR

In real-time (each local control cycle) each LFC-Operator provides the activated aFRR of each of their LFC area(s) to the aFRR platform as a data point. The sign convention for activated aFRR is: negative value where the LFC area activates downward aFRR, positive value where the LFC area activates upward aFRR.

7.3.1 LFC input

In real-time (each local control cycle) each LFC-Operator provides the LFC input to the aFRR platform as a data point. The sign convention for the LFC input is: negative value where the LFC shall activated downward aFRR, positive value where the LFC shall activate upward aFRR.

7.3.2 Correction values

The aFRR platform sends in real-time (each optimization cycle) to each LFC area of the participating LFC-Operator one correction value for aFRR and one correction value for IN of the respective LFC area. The sign convention for the correction values is: negative value where the LFC area imports power from the platform, positive value where the LFC area exports power to the platform.

Note: the aFRR platform may also send the position component of the aFRR correction value split into 4 positions between upward and downward, import and export of aFRR.

7.3.3 Cross Border Marginal Price

The aFRR platform sends in real-time (each optimization cycle) to each LFC area of the participating LFC-Operator the cross-border marginal price applicable for the respective LFC area(s). The CBMP is used to remunerate the BSP for activating aFRR.

The CBMP is also used for TSO-TSO settlement purpose.

7.3.4 Automatic frequency restoration power interchange

The aFRR platform sends in real-time (each optimization cycle) to each LFC area of the participating LFC-Operator the automatic frequency restoration power interchanges of the aFRR balancing borders adjacent to the respective LFC area. The sign convention is: negative value where the aFRR power interchange is in the opposite of the defined direction of the respective aFRR balancing border, positive value where the flow is in the same direction as the defined direction of the respective aFRR balancing border.

7.3.5 FRCE

The aFRR platform sends in real-time (each optimization cycle) to each LFC area of the participating LFC-Operator the FRCE to the respective LFC area as a data point. The sign convention is: positive value where the LFC area is in power surplus and indicates that negative aFRR balancing energy needs to be activated; and negative value where the LFC area is in power deficit and indicates that positive aFRR balancing energy needs to be activated.

7.3.6 Corrected demand

The aFRR platform provides in real-time (each optimization cycle) the respective corrected demand to the corresponding LFC area. The sign convention is: negative value where the LFC area is in power surplus and indicates that downward aFRR balancing energy needs to be activated; and positive value where the LFC area is in power deficit and indicates that upward aFRR balancing energy needs to be activated. The corrected demand might be used in local LFC-Operator system for dynamic limitation of the LFC output.

7.3.7 HVDC delta set-point

The aFRR platform send in real-time (each optimization cycle) a HVDC delta set-point for each HVDC to the responsible participating LFC-Operators as a data point. The sign convention is: negative value where the aFRR power interchange is in the opposite of the defined direction of the respective aFRR balancing border, positive value where the flow is in the same direction as the defined direction of the respective aFRR balancing border.

7.3.8 aFRR cross-border activated reserves

The correction values for aFRR and for IN are directly used by the LFC-Operator to determine intended aFRR cross-border exchanges through the usage of virtual tie lines. aFRR energy exchanges are matched according to common standard accounting and settlement process. TSO-TSO settlement data.

7.3.1 aFRR request

Each LFC-Operator sends in real-time (each control cycle) the aFRR request to the Balancing Service Providers connected to its LFC. The aFRR request is the setpoint for the activation of frequency restoration reserves. The aFRR request is also sent to the aFRR platform. The sign convention for the aFRR request is: negative value where the downward aFRR shall be activated, positive value where upwards aFRR shall be activated,

7.3.2 TSO-TSO settlement data

The aFRR platform provides the relevant information for invoicing of the TSOs to the billing agent that will carry out the financial clearing between the TSOs for aFRR process and IN process.

7.3.3 Transparency reporting

The aFRR platform submits clearing prices, all energy balancing bids and an aggregation of all energy balancing bids to the ENTSO-E central transparency platform for publication.

Adjustments to CBCLs and technical profiles due to operational security reasons are reported as required by articles 4.3 and 4.4 of the aFRR IF. Disconnections of a LFC-Operator and unavailability or failure of the aFRR platform are reported based on the aFRR IF article 3.10.

Detailed reasons for changing to bid unavailability are reported as required by article 9.8. of the aFRR IF.

7.4 Business rules – Non-real-time

7.4.1 Dependencies governing the reserve bid document

The reserve bid document is used to provide the local merit order of each TSO to the platform. Reserve bid documents can contain bids for one or multiple LFC areas for a single validity period. Thus, for each LFC area, at least 96 reserve bid documents need to be provided for each day For each validity period a new common MOL document is then created as a merge of the individual local TSO reserve bid documents of the same validity period.

It is up to the TSOs to decide when to provide the reserve bid document to the platform. Depending on local processes this may e.g. be done D-1 or just before TSO GCT. TSOs may update single LMOLs by submitting updated reserve bid documents, containing either incremental changes (type A37) or a updated complete set of bids (type B40).

Table 1 provides the dependencies for the reserve bid document.

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421 **Table 1 - Local MOL export interface description**

		Use	XSD requirements
ReserveBid_MarketDocument			
mRID	Unique identification of the Bid Document. Updates of previous submissions can either use a new mRID or the same mRID and an increased revisionNumber	Used	Mandatory
revisionNumber	- Initial revision number has to be higher than 0 and revisionNumber of new submission with same mRID has to be higher than revisionNumber of previous submission - <nnn>, maximum 3 characters	Used	Mandatory
type	A37 = Reserve Bid document (used when submitting only incremental updates of previous LMOL) B40 = Complete set of bids (used when previous LMOL shall be replaced by new LMOL in its entirety)	Used	Mandatory
process.processType	A51 = automatic frequency restoration reserves (aFRR)	Used	Conditional
sender_MarketParticipant.mRID	EIC of the transmitting TSO	Used	Mandatory

sender_MarketParticipant.marketRole.type	A04 = System Operator	Used	Mandatory
receiver_MarketParticipant.mRID	EIC of aFRR platform = 10X1001C--00010W	Used	Mandatory
receiver_MarketParticipant.marketRole.type	A35 = MOL responsible	Used	Mandatory
createdDateTime	Date and time of document creation	Used	Mandatory
reserveBid_Period.timeInterval	Validity period start time & validity period end time. The duration of the delivery period (initially 15 minutes)	Used	Mandatory
domain.mRID	EIC of PICASSO region = 10Y1001C--00090V	Used	Mandatory
subject_MarketParticipant.mRID	EIC of the transmitting TSO	Used	Mandatory
subject_MarketParticipant.marketRole.type	A04 = System Operator	Used	Mandatory

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BidTimeSeries		Use for Offers	Use for Shared or exchanged volume	XSD requirements
mRID	Unique identification of the bid assigned by the transmitting TSO	Used	Used	Mandatory
businessType	B74 = Offer C21 = Exchanged balancing reserve capacity C22 = Shared balancing reserve capacity	B74 = Offer	C21 = Exchanged balancing reserve capacity C22 = Shared balancing reserve capacity	Mandatory
divisible	A01 = quantity may be reduced to the minimum activation quantity by increments of the StepIncrementQuantity A02 = No reduction possible on the quantity	A01	A01	Mandatory
linkedBidsIdentification	The identification used to associate bids that are to be linked together. If one bid is accepted then all others with the same identification must also be accepted. If the bid is not linked then the attribute is not used.	Not used	Not used	Conditional
multipartBidIdentification	The identification used to associate multipart bids. If bid with flowDirection.direction=A01 (Up) is accepted then all associated bids with inferior price must also be accepted. If bid with flowDirection.direction=A02 (Down) is accepted then all associated bids with superior price must also be accepted.	Not used	Not used	Conditional

	If the bid is not multipart then the attribute is not used.			
exclusiveBidsIdentification	The identification used to associate exclusive bids. If bid is accepted then all others with same identification shall be ignored. If the bid is not exclusive then the attribute is not used.	Not used	Not used	Conditional
blockBid	Not used. Redundant due to the existence of Divisible attribute.	Not used	Not used	Optional
status	A06 = Available A11 = Unavailable Associated multipart, linked and exclusive bids must have the same status.	Used	Not used	Conditional
priority	A sequential number indicating the priority of the bid in relation to other bids	May be used	Not used	Optional
stepIncrementQuantity	Not used. For divisible offers the input step increment has been harmonised to 1 MW.	Not used	Not used	Conditional
energyPrice_Measurement_Unit.name	MWH = Megawatt hours	Used	Not used	Conditional
connecting_Domain.mRID	For offers it corresponds to the EIC identification of the sending TSO's LFC area providing the reserves. For shared/exchanged volume it corresponds to EIC identification of the sending TSO's LFC area or region the reserve volume is connected to.	Used	Used	Mandatory
price_Measurement_Unit.name		Not Used	Not used	Conditional

minimum_ConstraintDuration.duration	Not used	Not used	Not used	Conditional
currency_Unit.name	EUR = Euro. This currency is only provided in the case of a need where there is a price in the point class. Otherwise it is not used.	Used	Not used	Conditional
marketAgreement.type	The type of the market agreement	Not used	Not used	Conditional
marketAgreement.mRID	Identification of the agreement with the resource provider	Not used	Not used	Conditional
marketAgreement.createdDateTime	Time stamp used to identify the date and time that a specific offer was received	Not used	Not used	Conditional
provider_MarketParticipant.mRID	The balance service provider (BSP) identification. The BSP identification can be anonymized but must be identical per BSP and validity period	Used	Not used	Conditional
acquiring_Domain.mRID	For offers it corresponds to the EIC identification of the PICASSO region For shared/exchanged volume it corresponds to EIC identification of the receiving TSO's LFC area or region the reserve volume is shared/exchanged to	region	TSO's LFC area, or LFC Block or common exchanged or shared region	Mandatory
quantity_Measurement_Unit.name	MAW = Megawatts	Used	Used	Mandatory
resting_ConstraintDuration.duration	Not used	Not used	Not used	Conditional
maximum_ConstraintDuration.duration	Not used	Not used	Not used	Conditional

registeredResource.mRID	The identification of the resource used to provide the reserves	Not used	Not used	Conditional
activation_ConstraintDuration.duration	Not used	Not used	Not used	Conditional
flowDirection.direction	A01 = UP A02 = DOWN Note: Refer to Table 7 for use in relation to price.	Used	Used	Mandatory
Auction.mRID	It identifies that the bid refers to the auction specifications for an aFRR tender (e.g. AUCTION-aFRR).	Used	Used	Mandatory
validity_Period.timeInterval	The period when the bid can be activated	Not used	Not used	Optional
standard_MarketProduct.marketProductType	Used when the bid refers to a standard product or a specific product that has been converted into a standard product: A01 = Standard product	Used	Not used	Conditional
original_MarketProduct.marketProductType	Used when the bid refers to a specific product or a specific product that has been converted into a standard product: A02 = Specific product A03 = Integrated scheduling process	May be used	Not used	Conditional

Period				
timeInterval	A time interval within the validity period.	Used	Used	Mandatory
resolution	PT15M	Used	Used	Mandatory

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Point				
position	Position within the time interval	Used	Used	Mandatory
quantity.quantity	Quantity offered or needed with 1 MW precision.	Quantity offered	Quantity shared or exchanged	Mandatory
minimum_Quantity.quantity	Required if divisible = A01. Precision is 1 MW.	Not used	Not used	Conditional
price.amount	Not used	Not used	Not used	Conditional
Energy_Price.amount	The price of the activated energy product. Precision is 0.01. Note: Refer to Table 7 table for establishing who is paid.	Used	Not used	Conditional

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7.4.2 Dependencies governing the acknowledgement document

For each reserve bid document which is sent to the aFRR platform, an acknowledgement document is created and sent back to the sending TSO. The following table shows the description of attributes of the acknowledgement document.

Table 2 – Acknowledgement Market Document interface description

Acknowledgement_MarketDocument		
Attribute name	Description	Comment
mRID	Unique identification of the Document	- may not exceed 60 characters
createdDateTime	Date and time of document creation yyyy-mm-ddThh:mm:ssZ	
sender_ MarketParticipant.mRID	EIC of aFRR platform = 10X1001C--00010W	
sender_ MarketParticipant.marketRole.type	A35 = MOL responsible	
receiver_ MarketParticipant.mRID	EIC of the receiving TSO	
receiver_ MarketParticipant.marketRole.type	A04 = System Operator	
Received_MarketDocument.mRID	mRID of reserve bid document to be acknowledged	
Received_MarketDocument.revisionNumber	revisionNumber of reserve bid document to be acknowledged	
Received_MarketDocument.type	not used	
Received_MarketDocument.title	not used	
Received_MarketDocument.createdDateTime	not used	

Reason	
Attribute name	Description
Reason.code	A01 - Message fully accepted A02 - Message fully rejected

Reason.text	Text string based on result of the platform checking the incoming reserve bid document e.g. "F08_TSO_validityperiod_version: Mandatory attribute in Header is missing"

7.4.3 Dependencies governing the merging CMOL notice

For each valid reserve bid document which is sent to the aFRR platform, a merging process is triggered by the platform in order to create CMOLs containing all bids of the respective validity period. The Confirmation Document is used to inform the sender of the reserve bid document about the success of the merging process and the mRID and revision number of the updated CMOLs. The following table shows the description of attributes of the confirmation document.

Table 3 – Confirmation Document interface description

Confirmation_MarketDocument		
Attribute name	Description	Comment
mRID	Unique identification of the document	- may not exceed 60 characters
type	Merged MOL notice = B41	
process.processType	A51 = automatic frequency restoration reserves (aFRR)	
sender_ MarketParticipant.mRID	EIC of aFRR platform = 10X1001C--00010W	
sender_ MarketParticipant.marketRole.type	A35 = MOL responsible	
receiver_ MarketParticipant.mRID	EIC of the receiving TSO	
receiver_ MarketParticipant.marketRole.type	A04 = System Operator	
createdDateTime	Date and time of document creation	
schedule_Period.timeInterval	The duration of the delivery period (15 minutes)	
domain.mRID	EIC of PICASSO region = 10Y1001C--00090V	
confirmed_ MarketDocument.mRID	mRID of reserve bid document for which merging is confirmed	

confirmed_ MarketDocument.revisionNumber	revision number of reserve bid document for which merging is confirmed	
related_MarketDocument.mRID	mRID of the MeritOrderList_MarketDocument containing the CMOLs which result from successful merging	
related_MarketDocument.revisionNumber	revision number of the MeritOrderList_MarketDocument containing the CMOLs which result from successful merging	
subject_MarketParticipant.mRID	EIC that sent the reserve bid document for which merging is confirmed	
subject_MarketParticipant.marketRole.type	A04 = System Operator	

Reason	
Attribute name	Description
code	MOL merging successful = B53 MOL merging failed = B54
text	Optional text string

7.4.4 Dependencies governing the MOL document

For each validity period a new MOL document is created by the platform, containing the CMOLs for positive and negative aFRR as a merge of the individual local TSO reserve bid documents of the same validity period. The following table shows the description of attributes of the MOL document.

Table 4 - CMOL export interface description

		Use	XSD requirements
MeritOrderList_MarketDocument			
mRID	Unique identification of the document, valid for one validity period	Used	Mandatory
revisionNumber	<nnn>: incremental number of the CMOL version created for one validity period	Used	Mandatory

Type	A43 = MOL document	Used	Mandatory
process.processType	A51 = automatic frequency restoration reserves (aFRR)	Used	Conditional
sender_MarketParticipant.mRID	10X1001C--00010W = EIC of aFRR platform	Used	Mandatory
sender_MarketParticipant.marketRole.type	A35 = MOL responsible	Used	Mandatory
receiver_MarketParticipant.mRID	10V000000000008F = Generic Information Receiver	Used	Mandatory
receiver_MarketParticipant.marketRole.type	A04 = System Operator A32 = Market information Aggregator	Used	Mandatory
createdDateTime	Date and time of document creation	Used	Mandatory
Period.timeInterval	The duration of the delivery period (15 minutes)	Used	Mandatory
domain.mRID	EIC of PICASSO region = 10Y1001C--00090V	Used	Conditional

455

BidTimeSeries			
marketAgreement.mRID	Identification of the offer or the need as defined in the receiving TSO submission.	Used	Mandatory
MarketAgreement_createdDateTime	The timestamp of when the bid was received	Not used	Conditional
priority	A sequential number indicating the priority of the bid in relation to other bids.	Not used	Conditional
resourceProvider_MarketParticipant.mRID	The balance service provider (BSP) identification.	Not used	Conditional
registeredResource.mRID	The identification of the resource used to provide the reserves.	Not used	Conditional

acquiring_Domain.mRID	For offers it corresponds to the EIC identification of the region.	Used	Mandatory
connecting_Domain.mRID	For offers it corresponds to the EIC identification of the receiving TSO's LFC area providing the reserves. for needs it corresponds to the EIC identification of the region providing the reserves	Used	Mandatory
auction.mRID	Identification of auction as defined in the reserve bid document.	Used	Mandatory
businessType	B74 = Offer	Used	Mandatory
bid_Period.timeInterval	The duration of the delivery period (15 minutes)	Used	Mandatory
quantity_Measure_Unit.name	MAW = Megawatts	Used	Mandatory
currency_Unit.name	EUR = Euro	Used	Conditional
price_Measurement_Unit.name	MWH = Megawatt hours	Used	Conditional
energyPrice_Measurement_Unit.name	MWH = Megawatt hours	Not used	Conditional
direction	A01 = UP A02 = DOWN Note Refer to Table 7 for use in relation to price.	Used	Mandatory
minimumActivation_Quantity.quantity	The minimum quantity that can be activated	Not used	Conditional
stepIncrement_Quantity.quantity	Not used	Not used	Conditional
marketObjectStatus.status	A06 = Available (the offer has not been required) A11 = Unavailable or restricted or filtered shall be created	Used	Mandatory

456

457

Period			
timeInterval	A time interval of the length of the delivery period (initially 1 hour)	Used	Mandatory

resolution	PT15M	Used	Mandatory

458

459

Point			
position	Position within the time interval	Used	Mandatory
quantity.quantity	Quantity offered or needed	Used	Mandatory
price.amount	The price for activating the product	Not used	Conditional
Energy_Price.amount	The price of energy	Used	Conditional
activated_Quantity.quantity	Quantity activated	Not used	Conditional

460

461

Reason (associated with time series)		May be used	Conditional
code	A95 = Complementary information	Used	
text	Textual information provided by the TSO	Not used	

7.4.5 Dependencies governing the Balancing_MarketDocument

The balancing market document covers requirements for transmission of the clearing prices per aFRR market time unit from the common platform to TSOs and the ENTSO-E transparency platform. The same document will also be used for transmitting to the ENTSO-E transparency platform the aggregated balancing energy bids.

Table 5 provides the dependencies for the balancing market document when the common platform sends clearing prices to the ENTSO-E transparency platform.

Table 5 - Balancing market document dependency table (submission of clearing prices to transparency platform)

		Use	XSD requirements
Balancing_MarketDocument			
mRID	Unique identification of the balancing market Document	Used	Mandatory
revisionNumber	Initial transmission shall equal "1"	Used	Mandatory
type	A84 = activated balancing price	Used	Mandatory
process.processType	A16 = Realised	Used	Mandatory
sender_MarketParticipant.mRID	10X1001C--00010W = EIC of aFRR platform	Used	Mandatory
sender_MarketParticipant.marketRole.type	A35 = MOL responsible	Used	Mandatory
receiver_MarketParticipant.mRID	10X1001A1001A450 = EIC of the ENTSO-E transparency platform	Used	Mandatory
receiver_MarketParticipant.marketRole.type	A32 = Market information aggregator	Used	Mandatory
createdDateTime	Date and time of document creation	Used	Mandatory
docStatus	A01 = Intermediate A02 = Final	Not used	Conditional
controlArea.Domain.mRID	Scheduling area described by the document	Used	Conditional
Period.timeInterval	The duration of the delivery period covered by the document.	Used	Mandatory
allocationDecision_DateAndOrTime	Date and time when the decision on allocation was made	Not used	Optional

TimeSeries			
mRID	Unique identification of the time series	Used	Mandatory
businessType	A12 = secondary control	Used	Mandatory
curveType	A01 = Sequential fixed block A03 = Variable Fixed Block	Used	Conditional
cancelledTS	If the data for a time series has been cancelled this	Not used	Conditional

	attribute shall be specified with A02 = Yes		
quantity_Measure_Unit.name	MAW = Megawatts	Not used	Conditional
mktPSRType.psrType	Identification of the source type of the reserve	Not used	Conditional
acquiring_Domain.mRID		Not used	Conditional
price_Measure_Unit.name	MWH= Megawatt hours	Used	Conditional
connecting_Domain.mRID		Not used	Conditional
currency_Unit.name	EUR = Euro	Used	Conditional
flowDirection.direction	A01 = Up A02 = Down A03 = Up and Down	Used	Conditional
type_MarketAgreement.type	Identification of the procurement time unit.	Not used	Conditional
standard_MarketProduct.marketProductType	Used when the reported quantities refer to standard products: A01 = Standard product	Used	Conditional
original_MarketProduct.marketProductType	Used when the reported quantities refer to specific products: A02 = Specific product	Not used	Conditional

471

Series_Period			
timeInterval	A time interval equivalent to the delivery period	Used	Mandatory
resolution	PT15M or PT1M (or PT1S if optimization cycle data shall be provided)	Used	Mandatory

Point			
position	Position within the time interval	Used	Mandatory
quantity	The accepted offer quantity identified for a point.	Used	Conditional
secondaryQuantity	The activated quantity	Not used	Conditional
activation_Price.amount	The activation price for the quantity of reserve.	Used	Conditional
procurement_Price.amount	The procurement price for the quantity of reserve.	Not used	Conditional
min_Price.amount	The minimum price for the reserve	Not used	Conditional
max_Price.amount	The maximum price for the reserve	Not used	Conditional
imbalance_Price.amount	The imbalance price for the quantity of reserve.	Not used	Conditional

imbalance_Price.category	Identification whether the imbalance price is due to excess or insufficient balance.	Not used	Conditional
flowDirection.direction		Not used	Conditional
unavailable_Quantity	The unavailable quantity	Not used	Conditional

Financial_Price (associated with Point)		**Not used**	**Conditional**
amount		Not used	Mandatory
Direction		Not used	Conditional

472

473

7.4.6 Dependencies governing the EnergyAccount_MarketDocument

The energy account document is used by the common platform to provide the invoicing financial information to the billing agent and to all LFC operators for validation. The document is used

1. To provide the financial settlement of the aFRR interchange per aFRR balancing border; for fiscal reasons, financial settlement amounts have to be separated per direction and per sign of the energy price (intended energy exchange with positive and negative price).

2. To provide the congestion income, separated per sign. Negative congestion income is considered as financial compensation.

The following table provides the dependencies for the energy account market document.

Table 6 - Energy account market document dependency table

		Use	XSD requirements
EnergyAccount_MarketDocument			
mRID	Unique identification of the Energy Account market Document	Used	Mandatory
revisionNumber	Initial transmission shall equal "1"	Used	Mandatory
Type	A12 = Imbalance report	Used	Mandatory
docStatus	A02 = Final	Used	Mandatory
process.processType	A51 = automatic frequency restoration reserves (aFRR)	Used	Mandatory
process.ClassificationType	A01 = Detail type	Used	Mandatory
sender_MarketParticipant.mRID	10X1001C--00010W = EIC of aFRR platform	Used	Mandatory
sender_MarketParticipant.marketRole.type	A35 = MOL responsible	Used	Mandatory
receiver_MarketParticipant.mRID	EIC of the settlement billing agent	Used	Mandatory
receiver_MarketParticipant.marketRole.type	A10 = Billing agent	Used	Mandatory
createdDateTime	Date and time of document creation	Used	Mandatory
Period.timeInterval	The duration of the settlement period	Used	Mandatory
domain.mRID	EIC of the region	Used	Conditional

TimeSeries			
mRID	Unique identification of the time series	Used	Mandatory
businessType	B10 = Congestion income; B77 = Financial compensation or penalties	Used	Mandatory

	C48 = Intended energy with positive price C49 = Intended energy with negative price		
product	8716867000016 = Active power	Used	Mandatory
objectAggregation	A01 = Area; refers to a border Area	Used	Mandatory
area_Domain.mRID	EIC identification of the respective border area	Used	Mandatory
MarketParticipant.mRID	identification of TSO responsible for the border area	Not Used	Conditional
marketAgreement.mRID	Identification of the reserve contract	Not used	Conditional
Measurement_Unit.name	MWH = Megawatts hours	Used	Mandatory
currency_Unit.name	EUR = Euro	Used	Conditional
marketEvaluationPoint.mRID	Identification of an accounting point	Not used	Conditional
curveType	A01 = Sequential fixed size block	Used	Mandatory

486

Series_Period			
timeInterval	A time interval of the settlement period	Used	Mandatory
resolution	PT15M	Used	Mandatory

Point			
position	Position within the time interval	Used	Mandatory
In_Quantity.quantity	Quantity going into an area	Used	Mandatory
In_Quantity.quality	The quality of the quantity	Not used	Conditional
out_Quantity.quantity	Quantity going out of an area	Used	Mandatory
Out_Quantity.quality	The quality of the quantity	Not used	conditional
price.amount	settlement amount. This represents the total financial value for the point in respect to the time series businessType. The value may be negative.	Used	Conditionel

487 Note: The in quantity and out quantity represent a netted value consequently one of the values
488 must always be equal to zero.

489 Table 5 indicates the party that should pay the amount indicated.

Table 7 - Financial amount table

Price.amount	Settlement amount	>0	<0
Which party pays		TSO	common platform

7.4.7 Dependencies governing the Capacity_MarketDocument

The capacity market document is used to provide the cross-border capacity limits and technical profiles during one or several MTU periods.

The capacity document will be used to submit cross-border capacity limits and technical profiles to the transparency platform if they are limited due to operational security limits.

Table 8 – Capacity market document dependency table

		Use	XSD requirements
Capacity_MarketDocument			
mRID	Unique identification of the Capacity Market Document	Used	Mandatory
revisionNumber	Initial transmission shall equal "1"	Used	Mandatory
Type	A31 = Agreed capacity	Used	Mandatory
process.processType	A51 = automatic frequency restoration reserves (aFRR)	Used	Mandatory
sender_MarketParticipant.mRID	EIC of the common platform Operator 10X1001C--00010W	Used	Mandatory
sender_MarketParticipant.marketRole.type	A35 = MOL responsible	Used	Mandatory
receiver_MarktParticipant.mRID	EIC of the central transparency platform: 10X1001A1001A450	Used	Mandatory
recceiver_MarketParticipant.marketRole.type	A04 = System Operator	Used	Mandatory
createdDate.Time	Date and time of document creation	Used	Mandatory
Period.timeInterval	The duration of the delivery period (15 minutes)	Used	Mandatory
domain.mRID	EIC of the region	Used	Mandatory

TimeSeries			
mRID	Unique identification of the time series	Used	Mandatory
businessType	A26 = ATC	Used	Mandatory
product	8716867000016 = Active power	Used	Mandatory
in_Domain.mRID	EIC identification of the area where the power is being put.	Used	Mandatory
out_Domain.mRID	EIC identification of the area where the power is coming from.	Used	Mandatory

measure_Unit.name	MAW = Megawatts	Used	Mandatory
auction.mRID	Identification of the reserve contract	Not used	Conditional
auction.category	The category under which capacity is classified	Not used	Conditional
curveType	A01 = Sequential fixed size block	Used	Mandatory
connectingLine_RegisteredResource.mRID	The identification of a set of lines that connect two areas together. This is only used when specific tie lines have to be identified.	May be used	Conditional

499

Series_Period			
timeInterval	A time interval of the same length as the Period.timeInterval	Used	Mandatory
resolution	PT15M	Used	Mandatory

500

Point			
position	Position within the time interval	Used	Mandatory
quantity	Quantity of limit with 1 MW precision	Used	Mandatory

501

Reason (associated with header)			
Code	B47 = Operational security constraints	Used	Mandatory
Text	May be populated to provide additional explanation or justification in free text format	May be used	Conditional

502

503 7.4.8 Dependencies governing the BidAvailability_MarketDocument

504 The bid availability market document is used to provide the detailed reasons for changes to the
505 availability of bids or the offered volumes. Whenever a TSO modifies a bid either before or after
506 energy bid gate closure at T-10, it must submit the detailed reasons to the common platform.
507 The common platform will distribute this information to the central transparency platform no
508 later than T+30.

509 **Table 9 – bid availability market document dependency table**

	Use	**XSD requirements**
BidAvailability_MarketDocument		

mRID	Unique identification of the bid availability market document	Used	Mandatory
revisionNumber	Initial transmission shall equal "1"	Used	Mandatory
Type	B45 = bid availability	Used	Mandatory
process.processType	A51 = automatic frequency restoration reserves (aFRR)	Used	Mandatory
sender_MarketParticipant.mRID	EIC of the transmitting TSO EIC of the common platform Operator 10X1001C--00010W	Used	Mandatory
sender_MarketParticipant.marketRole.type	A04 = System operator A35 = MOL responsible	Used	Mandatory
receiver_MarketParticipant.mRID	EIC of the common platform operator 10X1001C--00010W EIC of the ENTSO-E transparency platform: 10X1001A1001A450	Used	Mandatory
receiver_MarketParticipant.marketRole.type	A35 = MOL responsible A32 = Market information aggregator	Used	Mandatory
createdDateTime	Date and time of document creation	Used	Mandatory
docStatus		Not Used	Conditional
time_Period.timeInterval	Time period covered by the document.	Used	Mandatory

510

BidTimeSeries			
mRID	Identification of the bid time series	Used	Mandatory
bidDocument_MarketDocument.mRID	Bid document that contained the bid time series	Used	Mandatory
bidDocument_MarketDocument.revisionNumber	Version number of the bid document	Used	Mandatory
requestingParty_MarketParticipant.mRID	EIC code of Party requesting update of bid Not populated when requesting party is a BSP	May be Used	Mandatory
requestingParty_MarketParticipant.name	Populated when Requesting Party is a DSO	May be Used	Conditional
requestingParty_MarketParticipant.marketRole.type	A49 = Transmission System Operator A46 = Balancing Service Provider A50 = Distribution System Operator	Used	Mandatory

businessType	C40 = Conditional bid C41 = Thermal limit C42 = Frequency limit C43 = Voltage limit C44 = Current limit C45 = Short-circuit current limits C46 = Dynamic stability limit	Used	Conditional
domain.mRID	EIC code of LFC-area from which bid originates	Used	Mandatory
operationalLimit_Quantity.quantity		Not Used	Conditional
limit_Measurement_Unit.name		Not Used	Conditional

511

Reason (associated with bid time series)			
Code	When business type = C40 the following reason only applies: B16 = Tender unavailable in MOL list When business type = C41 or C44 the following reason only applies: B46 = Internal congestion When business type = C42 one of the following reasons apply: B58 = Insufficiency of required reserve capacity B59 = Technical unavailability of specific reserve providing unit(s) When business type = C43, C45 or C46 one of the following reasons apply: B18 = Failure B46 = Internal congestion B47 = Operational security constraints B60 = Unavailability of automatic protection systems	Used	Mandatory
Text	May be populated to provide additional explanation or justification in free text format	May be used	Conditional

512

Registered Resources (associated with BidTimeSeries)	see note below		
mRID	EIC code of the concerned network element	Used	Mandatory

513 Note: One or several instances of RegisteredResource shall be associated with the
514 BidTimeSeries when Business Type is Thermal Limit = C41 and

515 requestingParty_MarketParticipant.marketRole.type is A04 (System Operator).
516 RegisteredResource shall not be populated for any other Business Types.

517 ### 7.4.9 Dependencies governing the Unavailability_MarketDocument

518 The common platform uses the unavailability document to submit the information of the
519 disconnection of a TSO or the decoupling of an area, as well as unavailability or failure in the
520 common platform to the central transparency platform. Updates to a disconnection, decoupling
521 or unavailability will be reported in a higher version of the original document.

522

523 **Table 10 – unavailability market document dependency table**

		Use	XSD requirements
Unavailability_MarketDocument			
mRID	Unique identification of the unavailability market document	Used	Mandatory
revisionNumber	Initial transmission shall equal "1"	Used	Mandatory
Type	A53 = Outage publication document	Used	Mandatory
process.processType	A51 = automatic frequency restoration reserves (aFRR)	Used	Mandatory
sender_MarketParticipant.mRID	EIC of the common platform Operator 10X1001C--00010W	Used	Mandatory
sender_MarketParticipant.marketRole.type	A35 = MOL responsible	Used	Mandatory
receiver_MarketParticipant.mRID	EIC of the ENTSO-E transparency platform: 10X1001A1001A450	Used	Mandatory
receiver_MarketParticipant.marketRole.type	A32 = Market information aggregator	Used	Mandatory
createdDateTime	Date and time of document creation	Used	Mandatory
docStatus	A01 = Intermediate A02 = Final A09 = Cancelled A13 = Withdrawn A09 is used when a future dated outage, decoupling or disconnection is cancelled. A13 may be used to withdraw erroneously communicated outage	May be Used	Conditional
Unavailablity_Time_Period.timeinterval	The validity periods affected by the unavailability	Used	Mandatory

524

TimeSeries			
mRID	Unique identification of the time series	Used	Mandatory

businessType	C47 = Disconnection C50 = Decoupling A83 = Auction cancellation (used in case no solution found or algorithm failure) A53 = Planned maintenance A54 = Unplanned outage	Used	Mandatory
biddingZone_Domain.mRID	EIC of the LFC area when businessType = C47 EIC of decoupled area when businessType = C50 10Y1001C--00090V = EIC code of PICASSO region when businessType = A83, A53 or A54	Used	Mandatory
in_Domain.mRID		Not used	Conditional
out_Domain.mRID		Not used	Conditional
start_DateAndOrTime.Date	start date of the first affected validity period	Used	Mandatory
start_DateAndOrTime.Time	start time of the first affected validity period	Used	Mandatory
end_DateAndOrTime.Date	end date of the first affected validity period	Used	Mandatory
end_DateAndOrTime.Time	end time of the first affected validity period	Used	Mandatory
curveType	A03	Used	Mandatory
Reason (associated with time series)			
Code	B11 = Cooperating area problem (when area decoupled) B13 = Communication status currently inactive (when TSO disconnects) B18 = Failure (in platform) B19 = Foreseen Maintenance B27 = Calculation process failed (when algorithm failed) A99 = Auction cancelled (when no solution found by algorithm)	Used	Mandatory
Text	May be populated to provide additional explanation or justification in free text format	May be used	Conditional

7.5 Business rules – Real-time

Real-time communication is done via dedicated communication lines. Each TSO has to build at least two independent lines. One to the main site and one hot standby to the backup site.

Real-time communication via COMO network is being to be investigated.

The communication speed is at least 9600 bit/s.

The platform supports the following protocols:

- IEC 60870-5-101
- IEC 60870-5-104
- IEC 60870-6 TASE.2

The TSO may choose only one of those three protocol for exchanging information with the aFRR platform.

7.5.1 Process Data Exchange via IEC 60870-6 TASE.2

The system must support the TASE.2 conformance blocks listed in Table 3Table 11:

Table 11 – TASE.2 conformance blocks

Conformance block	Description
Block 1	Basic services DataValue, DataSet and DataSet-TransferSet-items
Block 2	Enhanced status monitoring Allows sending of data points from the server to the client on change ('Report-by-Exception')
Block 4	Messages Sends freely definable data blocks from the server to the client This block is not needed for exchanges of data between TSO and aFRR Platform. This block might be used for internal operation of the Platform.
Block 5	Device control General interface for setting commands and set point specification (e.g. device occupancy with timeout monitoring 'Select-before-Operate') This block might be needed for HVDC operations.
Block 8	Plans, matrices Tables as data type, special types for delivery scheduling, transmis-sion links etc. This block is not needed for exchanges of data between TSO and aFRR Platform. This block might be used for internal operation of the Platform.

It is possible to determine whether the system works as master or slave for each partner control centre.

The partner control centres are redundantly connected via both system locations.

Connection to redundant structures of the partner control centre must be possible.

For direct file exchange, the platform allows the transfer of larger amounts of information using block 4 (splitting and joining).

The parametrisation of the data to be exchanged via this interface takes place at a central point.

Secured communication in accordance with IEC 62351 must be possible for the IEC 60870-6 TASE.2 protocol.

7.5.2 Process Data Exchange via IEC 60870-5-101

The system supports the IEC 60870-5-101 slave protocol, which allows the reception of data from IEC 60870-5-101 substations or external systems via a dedicated serial line.

The system supports the IEC 60870-5-101 master protocol, which allows data to be sent to external systems via a dedicated serial line.

The system supports the IEC 60870-5-101 dual mode, which allows data to be sent to and the reception of data via the same serial line.

7.5.3 Process Data Exchange via IEC 60870-5-104

The system supports the IEC 60870-5-104 slave protocol, which allows the reception of data from IEC 60870-5-101 substations or external systems via a dedicated serial line.

The system supports the IEC 60870-5-104 master protocol, which allows data to be sent to external systems via a dedicated serial line.

For incoming telegrams, it is checked whether the telemetry address matches the IP address of the sending components or the sending system. Otherwise, the telegram is discarded and a message generated.

Secured communication in accordance with IEC 62351 for the IEC 60870-5-104 protocol is used.

8 Contextual and assembly models

8.1 Reserve bid document

The contextual and assembly models for the reserve bid document shall be based on the equivalent models as defined in urn:iec62325.351:tc57wg16:451-7:reservebiddocument:7:4.

8.2 MOL document

The contextual and assembly models for the MOL document shall be based on the equivalent models as defined in urn:iec62325.351:tc57wg16:451-7:moldocument:7:3.

8.3 Acknowledgement document

The contextual and assembly models for the acknowledgement document shall be based on the equivalent models as defined in urn:iec62325.351:tc57wg16:451-1:acknowledgementdocument:8:1.

8.4 Merging CMOL notice

The contextual and assembly models for confirming CMOL merging shall be based on the equivalent models as defined in urn:iec62325.351:tc57wg16:451-2:confirmationdocument:5:2.

8.5 Energy account market document

The contextual and assembly models for the energy account market document shall be based on the equivalent models as defined in urn:iec62325.351:tc57wg16:451-4:energyaccountdocument:4:1.

8.6 Balancing market document

The contextual and assembly models for the balancing market document shall be based on the equivalent models as defined in urn:iec62325.351:tc57wg16:451-6:balancingdocument:4:1.

8.7 Capacity market document dependency table

The contextual and assembly models for the balancing market document shall be based on the equivalent models as defined in urn:iec62325.351:tc57wg16:451-3:capacitydocument:8:0.

8.8 Bid Availability Market Document

The contextual and assembly models for the balancing market document shall be based on the equivalent models as defined in urn:iec62325.351:tc57wg16:451-n:bidavailabilitydocument:1:1.

8.9 Unavailability Market Document

The contextual and assembly models for the balancing market document shall be based on the equivalent models as defined in urn:iec62325.351:tc57wg16:451-6:outagedocument:4:0.

9 XML schema

All XML schemas for the automated frequency restoration reserve process are available for download from the ENTSO-E website.