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ENTSO-E
AUTOMATIC FREQUENCY
RESTORATION RESERVE
PROCESS

IMPLEMENTATION GUIDE

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APPROVED DOCUMENT
VERSION 1.1

ENTSO-E Automatic Frequency Restoration Reserve Process
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VERSION 1.1

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

21   -   SHALL: This word, or the terms "REQUIRED" or "MUST", means that the definition is
22   an absolute requirement of the specification.

23   -   SHALL NOT: This phrase, or the phrase "MUST NOT", means that the definition is an
24   absolute prohibition of the specification.

25   -   SHOULD: This word, or the adjective "RECOMMENDED", means that there may exist
26   valid reasons in particular circumstances to ignore a particular item, but the full
27   implications shall be understood and carefully weighed before choosing a different
28   course.

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30   may exist valid reasons in particular circumstances when the particular behaviour is
31   acceptable or even useful, but the full implications should be understood and the case
32   carefully weighed before implementing any behaviour described with this label.

33   -   MAY: This word, or the adjective "OPTIONAL", means that an item is truly optional. One
34   vendor may choose to include the item because a particular marketplace requires it or
35   because the vendor feels that it enhances the product while another vendor may omit
36   the same item. An implementation which does not include a particular option MUST be
37   prepared to interoperate with another implementation which does include the option,
38   though perhaps with reduced functionality. In the same vein an implementation which
39   does include a particular option MUST be prepared to interoperate with another
40   implementation which does not include the option (except, of course, for the feature the
41   option provides.).

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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.

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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*

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

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

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

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

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

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

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

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

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

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

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

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

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187 ## 6 Terms and definitions

188 ### 6.1 aFRP
189 Automatic frequency restoration process; process to regulate the Frequency Restoration
190 Control Error (FRCE) to zero and thus restore the system frequency to the nominal value by
191 the activation of aFRR

192 ### 6.2 aFFR
193 Automatic frequency restoration reserves; active power reserves that may be automatically
194 activated

195 ### 6.3 aFFR IF
196 aFRR Implementation Framework

197 ### 6.4 AOF
198 Activation Optimisation Function; as defined by EB GL article 2(39)

199 ### 6.5 BSP
200 Balancing Service Provider, for the definition see Harmonised Electricity Market Role Model
201 2020-01

202 ### 6.6 CBCL
203 Cross-border capacity limit

204 ### 6.7 GCT
205 Gate closure time

206 ### 6.8 CMOL
207 Common merit order list, contain all bids provided by all system operators

208 ### 6.9 HVDC
209 High Voltage Direct Current

210 ### 6.10 INP
211 Imbalance netting process; the INP is a real-time process of netting of aFRR Demands
212 between the TSOs in order to avoid aFRR activation in opposite direction in each LFC area.

213 ### 6.11 LMOL
214 Local merit order list, contain all bids provided by one system operator

215 ### 6.12 MTU
216 Market Time Unit

217 ## 7 The automatic frequency restoration reserve business process for standard
218 products

219 ### 7.1 General overview
220 The aFRR platform has a number of operational phases that are carried out throughout the day.
221 Figure 1 gives an overview on the operational phases

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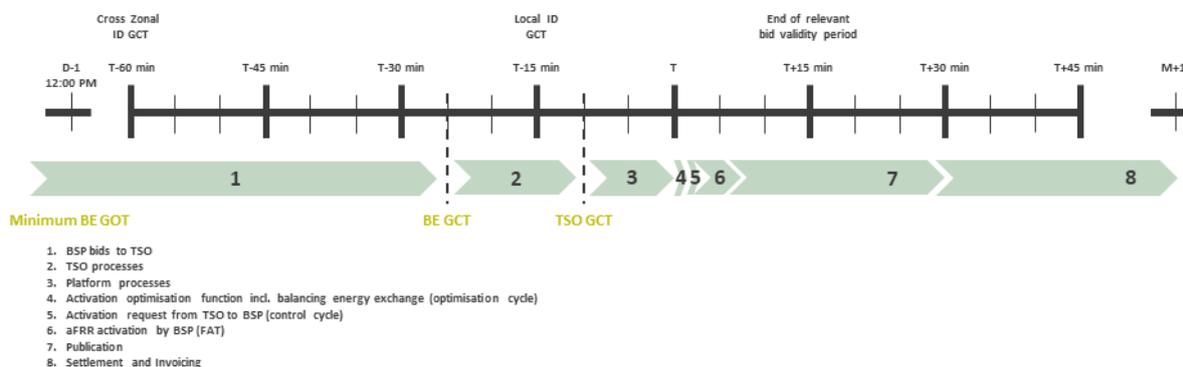
223

224   **Figure 1: Automatic frequency restoration reserve process overview**

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

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

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

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

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

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

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

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

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

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

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

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

7.2   Overall business context

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

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

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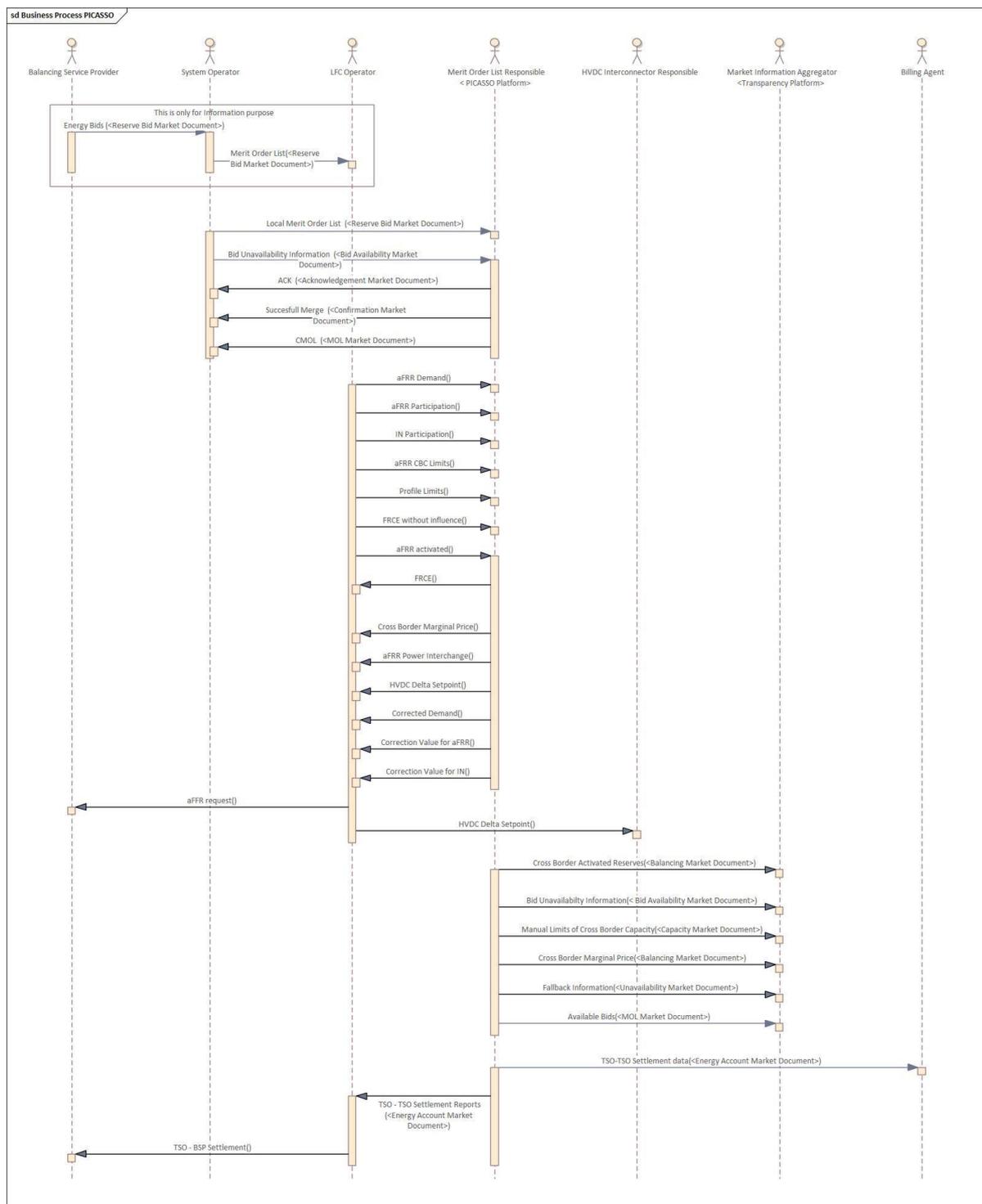
Figure 2: The automatic frequency restoration reserve process sequence diagram

292   The information flows are outlined in the following paragraphs.

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293 ### 7.2.1   aFRR participation status

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

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

299 ### 7.2.2   Imbalance netting participation status

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

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

305 ### 7.2.3   aFRR cross-border capacity limits

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

314 ### 7.2.4   Profile limits

315 In real-time (each control cycle) each LFC-Operator provides the profile limits for import and
316 export for each of the profile it manages to the aFRR platform as a data point. The range of the
317 profile limit is [0...inf].

318 ### 7.2.5   Local MOLs

319 Before TSO GCT the local bidding platforms provide for each of their LFC area(s) a local MOL
320 to the aFRR platform. The local MOL might be updated after the TSO-GCT due to operational
321 security reasons or conditional bids. The local MOL may contain additional information to the
322 aFRR platform about commonly procured, shared or exchanged volume with other LFC areas
323 or region for which the local LFC-Operator may have such procurement process in place. This
324 additional information is needed by the aFRR platform to guarantee prior access to local
325 reserves.

326 ### 7.2.6   aFRR demand

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

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

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336 **7.2.7 Activated aFRR**

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

341 Alternatively, the FRCE without the influence of cross-border aFRP and INP shall be provided
342 in real-time (each local control cycle) by the LFC-Operator for their LFC area(s) as a data point.

343 **7.2.8 Correction values**

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

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

351 **7.2.9 Cross Border Marginal Price**

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

355 The XBMP is also used for TSO-TSO settlement purpose.

356 **7.2.10 Automatic frequency restoration power interchange**

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

363 **7.2.11 Imbalance netting power interchange**

364 The aFRR platform sends in real-time (each optimization cycle) to each LFC area of the
365 participating LFC-Operator to the IN process the imbalance netting power interchanges of the
366 IN balancing borders adjacent to the respective LFC area. The sign convention is: negative
367 value where the IN power interchange is in the opposite of the defined direction of the respective
368 IN balancing border, positive value where the flow is in the same direction as the defined
369 direction of the respective IN balancing border.

370 **7.2.12 Adjusted aFRR power interchange**

371 The aFRR platform sends in real-time (each optimization cycle) to each LFC area of the
372 participating LFC-Operator the adjusted and netted aFRR power interchange to the respective
373 LFC area as a data point. The adjusted aFRR power interchange is the estimation of actual
374 import or export for the respective LFC area based on the activated aFRR. The sign convention
375 is: negative value where the LFC area imports power from the platform, positive value where
376 the LFC area exports power to the platform.

377 **7.2.13 Adjusted aFRR for local purpose**

378 The aFRR platform sends in real-time (each optimization cycle) to each LFC area of the
379 participating LFC-Operator the adjusted aFRR corresponding to the aFRR activation for local

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380 purpose of the LFC area(s). The sign convention is: positive value where upward aFRR is
381 activated for local purpose, negative value where downward aFRR is activated for local
382 purpose.

7.2.14 FRCE

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

7.2.15 Corrected demand

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

7.2.16 HVDC delta set-point

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

7.2.17 aFRR cross-border activated reserves

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

7.2.18 TSO-TSO settlement data

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

7.2.19 Transparency reporting

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

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

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

7.3 Business rules – Non-real-time

7.3.1 Dependencies governing the reserve bid document

421 The reserve bid document is used to provide the local merit order of each TSO to the platform.
422 Reserve bid documents can contain bids for one or multiple LFC areas for a single validity
423 period. Thus, for each LFC area, at least 96 reserve bid documents need to be provided for

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424   each day For each validity period a new common MOL document is then created as a merge of
425   the individual local TSO reserve bid documents of the same validity period.

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

430   Table 1 provides the dependencies for the reserve bid document.

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434 **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

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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

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	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_Measure_Unit. name	MWH = Megawatt hours	MWH	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_Measure_Unit.name	MWH = Megawatt hours.	Not Used	Not used	Conditional

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	This unit of measure is only provided in the case of a need where there is a price in the point class. Otherwise it is not used			
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.	May be 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_Measure_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

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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

437

438

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

439

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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

441

442

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443 **7.3.2   Dependencies governing the acknowledgement document**

444 For each reserve bid document which is sent to the aFRR platform, an acknowledgement
445 document is created and sent back to the sending TSO. The following table shows the
446 description of attributes of the acknowledgement document.
447

448 **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	

449
450

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

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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"	

451 **7.3.3   Dependencies governing the merging CMOL notice**

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

457

458 **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	

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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	

459
460

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

461 **7.3.4   Dependencies governing the MOL document**

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

466
467 **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

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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

468

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

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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

469

470

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

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resolution	PT15M	Used	Mandatory

471

472

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

473

474

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

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475 **7.3.5   Dependencies governing the Balancing_MarketDocument**

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

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

482 **Table 5 - Balancing market document dependency table (submission of clearing prices**
483 **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

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	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

484

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

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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

485

486

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487 **7.3.6   Dependencies governing the EnergyAccount_MarketDocument**

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

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

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

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

497 **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

498

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

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	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
measure_Unit.name	MWH = Megawatts hours	Used	Mandatory
currency_Unit.name	EUR = Euro	Used	Conditional
marketEvaluationPoint.mRID	Identification of an accounting point	Not used	Conditional

499

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

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

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

503
504 **Table 7 - Financial amount table**

Price.amount	Settlement amount	>0	<0

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Which party pays		TSO	common platform

505 **7.3.7 Dependencies governing the Capacity_MarketDocument**

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

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

510 **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

511

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

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auction.category	The category under which capacity is classified	Not used	Conditional
curveTpye	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

512

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

513

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

514

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

515

7.3.8   Dependencies governing the BidAvailability_MarketDocument

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

Table 9 – bid availability market document dependency table

		Use	XSD requirements
BidAvailability_MarketDocument			
mRID	Unique identification of the bid availability market document	Used	Mandatory

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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	A13 = Withdrawn Only used in case a document has been submitted by mistake	May be Used	Conditional
time_Period.timeInterval	EIC of the region	Used	Mandatory

523

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	Used	Mandatory
requestingParty_MarketParticipant.name	Populated when Requesting Party is a DSO or BSP	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	Used	Conditional

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	C44 = Current limit C45 = Short-circuit current limits C46 = Dynamic stability limit		
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

524

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: Bgg = Insufficiency of required reserve capacity Bhh = 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

525

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

526   Note: One or several instances of RegisteredResource shall be associated with the
527   BidTimeSeries when Business Type is Thermal Limit = C41 and
528   requestingParty_MarketParticipant.marketRole.type is A04 (System Operator).
529   RegisteredResource shall not be populated for any other Business Types.

530   **7.3.9   Dependencies governing the Unavailability_MarketDocument**

531   The common platform uses the unavailability document to submit the information of the
532   disconnection of a TSO or the decoupling of an area, as well as unavailability or failure in the

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533 common platform to the central transparency platform. Updates to a disconnection, decoupling
534 or unavailability will be reported in a higher version of the original document.

535

536 **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

537

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	Used	Mandatory

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	A54 = Unplanned outage		
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

538

7.4 Business rules – Real-time

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

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

543 The communication speed is at least 9600 bit/s.

544 The platform supports the following protocols:

545 • IEC 60870-5-101

546 • IEC 60870-5-104

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547   • IEC 60870-6 TASE.2

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

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

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

552   **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, transmission 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.

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

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

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

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

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

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

7.4.2   Process Data Exchange via IEC 60870-5-101

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

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

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

7.4.3   Process Data Exchange via IEC 60870-5-104

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

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

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

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

579

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580 8 Contextual and assembly models

581 8.1 Reserve bid document

582 The contextual and assembly models for the reserve bid document shall be based on the
583 equivalent models as defined in urn:iec62325.351:tc57wg16:451-7:reservebiddocument:7:2.

584 8.2 MOL document

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

587 8.3 Acknowledgement document

588 The contextual and assembly models for the acknowledgement document shall be based on the
589 equivalent models as defined in urn:iec62325.351:tc57wg16:451-
590 1:acknowledgementdocument:8:1.

591 8.4 Merging CMOL notice

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

594 8.5 Energy account market document

595 The contextual and assembly models for the energy account market document shall be based
596 on the equivalent models as defined in urn:iec62325.351:tc57wg16:451-
597 4:energyaccountdocument:4:0.

598 8.6 Balancing market document

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

601 8.7 Capacity market document dependency table

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

604 8.8 Bid Availability Market Document

605 The contextual and assembly models for the balancing market document shall be based on the
606 equivalent models as defined in urn:iec62325.351:tc57wg16:451-n:bidavailabilitydocument:1:0.

607 8.9 Unavailability Market Document

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

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610 **9 XML schema**

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