Baltic aFRR energy market concept

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I Objective and Scope

Commission regulation (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing (EB GL) sets requirements for target balancing markets and settlement in European Union. **Article 21(6) states that: By thirty months from the approval of the proposal for the implementation framework for a European platform for the exchange of balancing energy from frequency restoration reserves with automatic activation <…> all TSOs <...> shall implement and make operational the European platform for the exchange of balancing energy from frequency restoration reserves with automatic activation <…>.**

Eight European TSOs have signed the memorandum of understanding for the design implementation and operation of a new automatic frequency restoration reserve common platform - PICASSO. This name stands for "Platform for the International Coordination of the Automatic frequency restoration process and Stable System Operation".

All TSO have submitted the proposal for the implementation framework for European platform for the exchange of balancing energy from frequency restoration reserves with aFRR (aFRR proposal). ACER approved the updated aFRR proposal on 30.09.2022. This gives TSOs the legal deadline to implement and make PICASSO operational until Q4 2024.

This document is prepared by Baltic TSOs with the aim to present a concept model and main technical aspects in aFRR market operational arrangements in the Baltic in regard to the implementation of aFRR proposal in Baltic countries as required by EB GL, fallback for common European aFRR platform downtime and other balancing related processes until and after synchronization with CESA in 2025.

All definitions and abbreviations used in this document must be applied and used as defined EB regulation including following definitions:

aFRR pricing rules – All TSOs' proposal on methodologies for pricing balancing energy and cross-zonal capacity used for the exchange of balancing energy or operating the imbalance netting process pursuant to Article 30(1) and Article 30(3) of Commission Regulation (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing.

Bids – standard product. Both mandatory and voluntary.

CBMP – Cross Border Marginal Price.

EB Regulation - COMMISSION REGULATION (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing.

Voluntary bids – aFRR energy bids which can be provided by BSP voluntarily.

Host TSO – the TSO hosting the PICASSO platform.

Mandatory bids – aFRR energy bids which shall be provided by BSP as a result of balancing reserve capacities procurement.

MTU – means the 4 seconds time period of the AOF optimisation cycle. The first aFRR MTU starts at 00:00 market time. The aFRR MTUs shall be consecutive and not overlapping;

Validity period – means the period for which the bids are eligible for, the validity period shall be 15 minutes. The first validity period of each day shall begin at 00:00 market time. The validity periods shall be consecutive and not overlapping;

Working day – calendar day except Saturdays, Sundays, Christmas day (25th of December), New Year's day (1st of January), Easter Monday and Ascension Day.

Participating TSO – TSO participating in the PICASSO platform.

AFRC – automatic frequency restoration controller used to estimate Connecting TSO demand and to provide the activation orders to BSPs from the Connecting TSO.

II Baltic aFRR market framework

1. Baltic aFRR balancing energy market is part of European aFRR balancing energy market in accordance with article 21(6) of EB regulation.

2. Baltic aFRR energy market consists of bidding zone Lithuania, bidding zone Latvia and bidding zone Estonia.

3. In order to operate common Baltic aFRR balancing market and exchange balancing energy, Baltic TSOs shall apply TSO-TSO model pursuant to relevant European Commission regulations and guidelines, national legal framework of each Baltic country and mutual TSO-TSO agreements.

4. Each Baltic TSO is responsible for maintaining operational security of its control area.

5. Each Baltic TSO shall operate within Baltic aFRR market and minimize its local ACE.

6. Validity period for Baltic aFRR balancing market is 15 minutes, there are 4 validity periods within each hour, which coincide with each quarter of the hour: 0-15 minutes, 15-30 minutes, 30-45 minutes, 45-60 minutes.

7. TSO-BSP settlement is based on activation data consisting of corresponding MTUs and reported for each validity period.

8. Each Baltic TSO shall be responsible for:
   - 8.1. maintaining operational security of its control area;
   - 8.2. ensuring BSP's energy bid compliance with the Baltic aFRR market requirements;
   - 8.3. ensuring information exchange with BSPs within its bidding zone;
   - 8.4. ensuring information exchange with TSOs within the Baltic bidding zones.
   - 8.5. ensuring information exchange with European aFRR balancing energy platform.
   - 8.6. performing aFRR balancing settlement within each Baltic TSO's imbalance area.
   - 8.7. ensuring aFRR energy market operations as a fallback from European aFRR energy market.

III Baltic aFRR products

9. All Baltic TSOs shall use the Baltic aFRR standard product from BSPs within Baltics that is defined in accordance with aFRR implementation framework

10. Baltic aFRR standard products shall comply with the requirements set out in Table 1.

Table 1. Baltic aFRR standard product characteristics

Parameter	Baltic aFRR standard product
Mode of activation	Automatic SCADA signals are used for communication of activation orders.
Direction	Upward or downward
Full activation time ("FAT")	No longer than 5 minutes
Minimum quantity	1 MW
Bid granularity	1 MW
Maximum quantity	9,999 MW
Minimum duration of delivery period	None - No minimum delivery period
Price resolution	0.01 €/MWh
Price	in €/MWh and in accordance to aFRR pricing rules
Validity Period	15 minutes
Bidding zone	Bidding zone of the reserve providing unit or reserve providing group
Reserve Object	Additional identification of the reserve providing unit or reserve providing group based on the terms and conditions for BSP-s
Divisibility	All bids shall be fully divisible with activation step of 0.1 MW
Linking	No linking of bids is allowed
Preparation Period	0 minutes
Ramping Period	Not higher than 5 minutes
Deactivation Period	Not higher than 5 minutes
Maximum duration of delivery period	15 minutes
Minimum duration between the end of deactivation and the following activation	None

IV aFRR energy bid submission and MOL creation

11. In order to participate in the aFRR energy market, BSP's resources must have successfully completed the prequalification procedure in accordance to Baltic prequalification rules and local terms and conditions in each Baltic country. Only bids representing prequalified resources can be submitted to the Baltic aFRR energy market.

12. Characteristics of the bids submitted to the aFRR energy market are subject to restrictions set upon the reserve object/unit during the prequalification process.
13. BSP must submit aFRR bids in the volume which is procured as aFRR capacity in balancing capacity market. These bids shall be considered Mandatory bids and must be submitted by the BSP in accordance to balancing capacity market rules.
14. BSP may submit bids to aFRR energy market on voluntary basis. These bids shall be considered as Voluntary bids.
15. Mandatory bids have no priority over Voluntary bids in the bid activation procedure. The aFRR balancing energy bid merit order list (MOL) is formed based on bid price only.
16. BSP submits bids to its Connecting TSO.
17. BSPs submit and update aFRR standard balancing energy bids with static characteristics on location (Bidding zone and Reserve Object) in accordance with Table 1 requirements.
18. BSPs submit and update aFRR standard balancing energy bids with following variable characteristics in accordance with Table 1 requirements:
    18.1. Quantity;
    18.2. Direction: upward or downward;
    18.3. Price;
    18.4. Validity period.
19. Balancing energy gate closure time for a BSP to submit bids for the respective validity period is 25 minutes before the start of validity period. After balancing energy gate closure time all submitted balancing energy bids become firm and no further bid updates are allowed.
20. If an aFRR standard product bid becomes unavailable due to technical issues, BSP shall inform its connecting TSO without undue delay but not later than 5 minutes before possible activation time. The connecting TSO without undue delay shall indicate all such bids as unavailable.
21. Connecting TSOs verify all bids (aFRR standard products) received from BSPs regarding standard aFRR energy products and prequalification results:
    21.1. if the bid is accepted, the connecting TSO shall include the bid in the respective aFRR balancing energy merit order list (MOL);
    21.2. if the bid is rejected, the connecting TSO shall inform respective BSP without undue delay in accordance with standard terms and conditions of balancing service provider contract.
22. Each Baltic TSO shall submit all aFRR standard balancing energy bids received from BSPs to the PICASSO in accordance with aFRR implementation framework.
23. Baltic TSOs shall cooperate to ensure regional aFRR activations in case of PICASSO unavailability.

V aFRR bid activation in Baltics

24. Bid activation in Baltic bidding zones will be performed in accordance with the results from AOF correction signal of the PICASSO and in accordance with the provisions as defined in the aFRR Implementation Framework.
25. TSO local aFRR activation is the sum of local aFRR demand submitted to PICASSO and the PICASSO AOF correction signal provided to the TSO. PICASSO AOF correction signal can reduce or increase the local aFRR activation.
26. aFRR activation process is constant loop of data exchange and calculations. The frequency of this loop is equal to MTU.

27. Activation signals are submitted to BSPs by the connecting TSO. The AFRC sends 'activation setpoints' to the BSPs of aFRR in order to activate their bids. An activation setpoint shall be considered by the BSP as an addition to its commercial setpoint and will never exceed the offered power value.
28. A bid can be activated fully or partially during the timespan of the validity period to which the bid applies.
29. Balancing energy bids will be activated in minimum quantity of 0.1 MW and in incremental steps of 0.1 MW up to the maximum quantity of the bid.
30. PICASSO – Connecting TSO correction signal are executed with respect to:
    30.1. available cross-zonal capacity calculated by the CMM - balancing energy bids can only be optimized, if there is available cross-zonal capacity within the balancing timeframe and activation of these bids does not create a congestion;
    30.2. submitted bid characteristics for the validity period –bid activation follows most advantageous price criteria.
    30.3. available balancing energy bids for activation for relevant validity period at point in time of signal for activation.
31. Connecting TSO – BSP activations are executed with respect to:
    31.1. submitted bid characteristics for the validity period, bid activation follows most advantageous price criteria.
    31.2. available balancing energy bids for activation for relevant validity period at point in time of signal for activation.
32. When correction value is received from PICASSO, Connecting TSO will form and send activation signal for bids in MOL to BSP:
    32.1. available aFRR standard balancing energy bid with the lowest price for upward activation;
    32.2. available aFRR standard balancing energy bid with the highest price for downward activation;
33. All available bids with the same price in accordance with pro-rata principle (proportionally to the volume of the bid) for cases when the most advantageous price criterion is fulfilled by multiple bids in MOL. Baltic TSO constantly monitors and stores the amount of aFRR energy that it activates per bid per MTU. The BSP is also expected to keep an own record of the activated power.
34. In case aFRR energy is not delivered in accordance with the activation signal, it shall be considered as breach of aFRR market rules and Connecting TSO may issue warning or apply penalties in form of withheld payments, fines, suspension of qualification or termination of contract. Overdelivered or underdelivered energy shall be accounted in the imbalance settlement of respective BSP's BRP.
35. If the BSP receives activation orders exceeding the sum of aFRR energy submitted to the market for the respective validity period, and as a result is unable to perform the requested aFRR activation, the BSP shall inform the connecting TSO of any such occurrences. It is the TSO's responsibility to correct the activation signal sent to the BSP resulting from such erroneous activations.
36. Baltic TSOs shall develop fallback procedure in case PICASSO becomes unavailable for one or multiple Baltic TSOs. In fallback scenario TSOs shall use their control area resources as the first priority. In addition, Baltic TSOs shall develop technical capability for imbalance netting within Baltic TSOs and to exchange aFRR activations to all Baltic

TSOs in case an area or areas are lacking necessary aFRR. Description of the fallback solutions shall be described in Baltic aFRR balancing energy market rules.

VI Cross-zonal capacity within the balancing timeframe

37. Calculation of cross-zonal capacity within the balancing timeframe is performed for cross-borders Estonia-Finland, Estonia-Latvia, Latvia-Lithuania, Lithuania-Poland and Lithuania-Sweden by taking into account Net Transmission Capacities of the designated cross-border interconnections, already allocated capacities, volume of cross-zonal capacity allocated for the exchange and sharing of balancing capacity and planned physical flows on these interconnections.

38. Cross-zonal capacities within the balancing timeframe are calculated separately for each cross-border and for each direction in accordance with Baltic Capacity Calculation Region methodology pursuant to Article 37.3 of EB regulation.

39. Volume of cross-zonal capacity allocated for the exchange and sharing of balancing capacity is determined by cross-zonal capacity allocation optimisation algorithm according to proposal following Article 33(1) and Article 38(1) of EB regulation. The cross-zonal capacities allocated as a result of the capacity procurement process are made available for the FRR energy markets.

40. Cross-zonal capacities within the balancing timeframe are used as an input for balancing platforms, including aFRR energy exchange platform PICASSO. Allocations on each platform are taken into account in the subsequent activation processes. The capacity that is available for these processes is changed accordingly.

VII aFRR settlement principles

41. TSO-PICASSO settlement:
    - 41.1. During real-time, the PICASSO AOF determines the volumes of aFRR interchanges and the CBMP for each MTU and each bidding zone and submits the data to the Participating TSO.
    - 41.2. During the next working day, the Host TSO and the Participating TSO perform matching of volumes resulting from the aFRR interchanges:
        - 41.2.1. In the event of differences exceeding the bilaterally agreed threshold, an investigation shall take place.
        - 41.2.2. The data of the Participating TSO shall be used only in instances when the data of the Host TSO is clearly incorrect.
    - 41.3. Before the 3rd working day of the next month, the Host TSO shall submit to Participating TSO settlement amounts for:
        - 41.3.1. Balancing energy per the Participating TSO's bidding zone borders from aFRR interchange separately for imports and exports, calculated as the product of the aFRR interchange between the respective bidding zones and the CBMP.
        - 41.3.2. Congestion income per the Participating TSO's bidding zone borders, calculated as the product of the aFRR interchange between the respective bidding zones and CBMP price difference of the importing and exporting bidding zones.

41.3.3. Participating TSO shall receive the total settlement amounts (€), volumes (MWh) and weighted average prices (€/MWh) aggregated on a 15-minute basis. The arithmetic precision for volumes is three (3) decimals, for settlement amounts and prices, two (2) decimal places.

41.4. During the 3rd and 5th working day of the month, the Participating TSO can object the calculated settlement amounts before data is submitted to invoicing.

42. Connecting TSO-BSP settlement:

42.1. During real-time, the Connecting TSO shall submit the activation signal to the respective BSP per bid for each MTU in accordance with point 26.

42.2. During the next working day, the Connecting TSO shall submit a preliminary report to the respective BSP that includes the activated balancing energy, weighted average of the activated balancing energy price and the settlement amount for balancing energy per direction and for each validity period of the respective day or days. The arithmetic precision for volumes is three (3) decimals, for settlement amounts and prices, two (2) decimal places.

42.2.1. The activated balancing energy volume shall be calculated based on the requested power.

42.2.2. The balancing energy price shall be calculated per bid as follows:

42.2.2.1. For upward balancing energy, pay-as-bid, but not less than the CBMP calculated by the PICASSO AOF for the respective MTU;

42.2.2.2. For downward balancing energy, pay-as-bid, but not more than the CBMP calculated by the PICASSO AOF for the respective MTU;

42.2.3. The settlement amount shall be calculated as the product of the activated balancing energy and the balancing energy price.

42.3. Until 5th working day of the month, the BSP can object the calculated settlement amounts before data is submitted to invoicing.

42.3.1. Should the BSP dispute the data:

42.3.1.1. the BSP must provide the volume of activated balancing energy on Validity period level in a format stipulated by the TSO;

42.3.2. the TSO shall perform investigation on whether the discrepancy on Validity period level between TSO data and BSP data stays or exceeds the agreed threshold (shall be defined in aFRR market rules) to be harmonised between Baltic TSOs. In case of the former, BSP request is ignored. In case of the latter, TSO performs further investigation by checking the data the AFRC had provided to the BSP in accordance with point 39.1. If as a result the TSO deems its data incorrect, TSO shall recalculate settlement amount for Validity period as the product of activated energy proposed by the BSP and the balancing energy price calculated by Connecting TSO for the respective bidding zone.

VIII Market information and transparency

43. Baltic TSOs ensure that all information regarding aFRR operations is complete and publicly available on Baltic transparency dashboard and/or Baltic TSOs websites and on the central ENTSO-E information transparency platform as required by the EBGL and

national legislations and other legislations related to the transparency of the data.

IX Implementation

44. The following implementation roadmap is foreseen for aFRR market implementation:

Year	2023	2024				2025
Quarter	Q4	Q1	Q2	Q3	Q4	Q1
Baltic aFRR market rules concept						
Public consultation						
Assessment of PC results						
Harmonized Baltic balancing energy market						
Preparation of market rules						
Public consultation						
Assessment of PC results						
National terms and conditions for BSPs						
Preparations of T&C						
Public consultation of T&C						
NRA approval of T&C						
Preparation for prequalification tests for BSPs						
IT implementation						
AFRC development						
BMS development						
PICASSO accession tests						
PICASSO operation						