European balancing platforms frequently asked questions

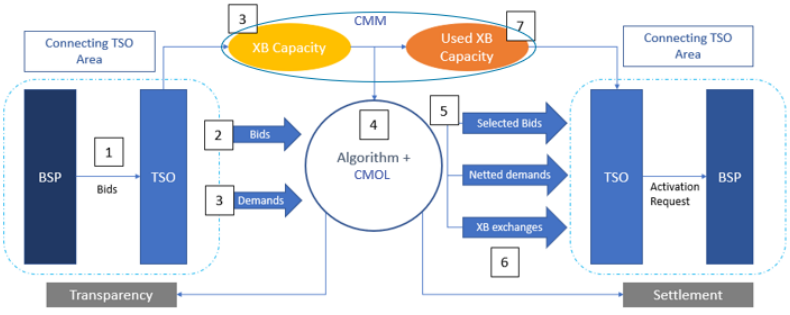
This document aims to answer some of the more frequently asked questions about the two balancing platforms developed under the Electricity Balancing Guideline – MARI and PICASSO. More comprehensive information on the platforms can be found on ENTSO-E web accordingly: [MARI] and [PICASSO] .

General questions referring to all balancing platforms

Questions and Answers

Question: What are the main similarities and differences between the MARI and PICASSO platforms?

Answer: Both MARI and PICASSO are European platforms developed under the Electricity Balancing Guideline to facilitate the cross-border exchange of balancing energy. They aim to ensure cost-efficient activation of balancing energy bids. Both platforms support asymmetrical collection of bids —upward and downward separately—and require BSPs to deliver contracted and non-contracted volumes within strict timeframes (12.5 minutes for mFRR in MARI, and 5 minutes for aFRR in PICASSO).



1. TSO receive bids from BSPs in local market balance area
2. Forward of coherent mFRR balancing products to mFRR platform
3. TSOs communicate their balancing demands via the balancing platform and the available XB transmission capacities (ATC) either directly or via CMM*.
4. Optimization of the clearing of balancing demands against BSPs bids
5. Communication of the accepted bids, satisfied demands and prices
6. Calculation of the commercial flow between market balancing areas and settlement of the expenditure and revenues between TSOs
7. The resulting XB schedules and remaining ATC are sent to the TSOs directly and to CMM (if configured).

The key difference lies in the type of reserves they manage and the activation mechanism. MARI handles manually activated Frequency Restoration Reserves (mFRR), where activation is either scheduled or direct, based on TSO requests. In addition, MARI facilitates several bid linking options and BSPs can submit to the TSO bids which are applicable only for scheduled activations or for both scheduled and direct activation. In contrast, PICASSO manages automatically activated Frequency Restoration Reserves (aFRR), which respond to real-time frequency deviations and Area Control Error (ACE) signals. PICASSO requires real-time continuous communication between TSOs and BSPs,, while MARI operates on individual activation requests.

Question: What is the role of the CSP?

Answer: The common service provider (CSP) operates the activation optimisation function and the TSO-TSO settlement function of a balancing platform on behalf of all project TSOs.

TransnetBW serves as CSP for PICASSO and IGCC. Amprion serves as CSP for MARI. The CSP for the Capacity Management Function is ČEPS. All CSPs are designated in accordance with the relevant articles about the Designation of Entities of the Implementation Frameworks.

Question: What roles do non-operational members have in the MARI and PICASSO project currently?
Answer: MARI and PICASSO are the European target model establishing a domestic market for mFRR and aFRR balancing energy, respectively. Non-operational members (i. e., TSOs, not countries) prepare their accession to the balancing platforms.

Question: Are the platforms fully automatic?
Answer: Platforms are running automatically in terms of processes and activation optimisation. However, the nature of reserve activation differs: in Automatic Frequency Restoration Reserve (aFRR), is fully automatic, triggered by the demand originating from the load frequency controller (LFC) of the participating TSOs. In contrast, Manual Frequency Restoration Reserve (mFRR) is activated based on the manual decision of each individual participating TSO, although the platform itself runs automatically to optimise the selection and activation of bids.

Question: Do the local TSOs decide whether products mFRR and aFRR can be offered symmetrically or asymmetrically?
Answer: The mFRR and aFRR standard balancing energy products have been defined as asymmetrical products. Under special conditions, TSOs may define additional specific balancing energy products with deviating characteristics.

Question: Are the capacity tenders in countries with balancing capacity markets related to the energy bids submitted to PICASSO and MARI?
Answer: The bids procured in the capacity tenders are standard bids, they are submitted together with the free bids awarded to PICASSO and MARI. Based on Art. 16.4 EB GL: Each balancing service provider with a contract for balancing capacity shall submit to its connecting TSO the balancing energy bids or integrated scheduling process bids corresponding to the volume, products, and other requirements set out in the balancing capacity contract.

Question: What are the interfacing requirements for these platforms and are they the same with all country participants? Including time constraints?
Answer: There are no interfacing requirements for balancing service providers (BSPs) to connect to the balancing platforms. The European balancing platforms are established following the TSO-TSO model, which means a model for the exchange of balancing services where the balancing service provider provides balancing services to its connecting TSO, which then provides these balancing services to the requesting TSO (TSOs connect to/participate to the platform forwarding their demands and bids to the platform and bids are collected locally from the balancing service provider). Thus, national interfacing requirements continue to apply. The gate closure time for submitting balancing energy bids to the connecting TSOs is T-25.

Question: How much did the implementation of IGCC/PICASSO/MARI platforms cost?
Answer: Costs related to establishing and operating the balancing platforms are available in the Electricity Balancing Cost Report, e.g. Electricity Balancing Cost Report 2024 (link).

Question: Are all of the submitted bids made to the TSO submitted in the PICASSO/MARI platforms if the TSO is a platform operational member?
Answer: All bids for FRR standard products for balancing energy have to be forwarded to the respective platform. If a specific product for FRR balancing energy is used, the TSO may alternatively convert the bids into standard product bids (and forward the bids to the respective platform) or activate them locally without exchanging them. Note that there is no linking between aFRR bids to mFRR bids and vice versa. TSOs can mark a bid as unavailable if it is used for other purposes on national level.

Question: Is there a table of abbreviations used or a glossary available or even ENTSO-E published information in general? Could you please give a brief explanation or full pronunciation of the following abbreviations: XB (capacity), ATC, EnC, CSP?
Answer: ENTSO-E does not have a single glossary available. However, each ENTSO-E report (link) would have a glossary at the end with the main terms relevant to the context, e.g., you can refer to the Market Report 2023 or Balancing Report 2022 for the key terms on balancing. With regards to the abbreviations, those are: XB = cross-border; ATC = Available Transmission Capacity/Available Transfer Capability; EnC = Energy Community Country; CSP = Common Service Provider.

Question: Regarding high bid prices, how do you interpret the significant difference in bid price levels between TSO A and other TSOs (e. g., TSO B, C, D), both on the positive and negative sides?
Answer: Bidding behaviour is subject to individual balancing service providers' strategies as well as pricing mechanisms and market rules approved by ACER/NRAs.

Question: Where are activation volumes and cross-border marginal prices published for MARI and PICASSO?
Answer: On the ENTSO-E transparency platform here (Link to volumes) and (Link to prices) .

Question: What kind of ATC values are used in the balancing platforms?
Answer: Unless TSOs have specifically initiated a cooperation which allocates CZC for the exchange of balancing services, only leftover ATC from intraday trading is delivered to the balancing platforms. Then, the platforms use the ATC with the following logic: 1. mFRR (MARI) -> 2. aFRR (PICASSO) -> 3. IN (IGCC). On a "first-come-first-serve"-basis. The MARI AOF runs first, the ATCs are then adjusted with the mFRR flows and forwarded to PICASSO. The remaining ATCs are then used by the IGCC.

Question: TSOs keep part of the interconnector capacities as margin for technical safety reasons. Is this margin used for MARI/IGCC/PICASSO balancing?
Answer: No, unless TSOs have allocated cross-border capacity in a joint balancing capacity market, based on the Implementation framework, only the capacities that are left over after the previous markets, or calculated by the BTCC have to be used.

Question: Is information about available ATC (used for PICASSO AOF) published?
Answer: There is a publication on ENTSO-E Transparency of the capacities used in the previous market time frames, this forms the basis of the ATC used in PICASSO. In case a TSO changes this ATC (due to operational security reasons), the adapted ATCs are published here (Data view).

Question: How are cross-border transport capacities managed? Do these capacities present significant limitations to the impact of MARI and PICASSO or are they generally abundant?
Answer: The cross-border capacity situation between TSOs accessed to the balancing platforms varies from region to region. In some regions we do not see any significant restrictions coming from XB transfer capacity due to limited volumes and probabilities of activation, in some regions the market-based allocation is used to ensure sufficient cross-border capacity for mFRR and aFRR activations and in some regions the cross-border capacities can be a restricting factor often due to relatively large activation volumes.

Question: Can a Balancing Platform also ask for FRR standard balancing bid activation, if there is no balancing border between the countries involved?
Answer: The balancing platforms facilitate the possibility of ATC sharing by a country that lies in between two countries who have accessed a balancing platform. This is done, taking also into account local operational processes, solely on a national scrutiny basis.

Question: Are the AOF Volumes used to compile the imbalance price, or the LFC-Volumes?
Answer: The AOF Volumes directly affect the LFC Volumes (balancing energy that would need to be activated to tackle the imbalance is optimized) and the Imbalance price can thus be affected both directly (there is less LFC-Volumes due to netting of imbalances) and indirectly (by balancing energy that was exported and imported). However, imbalance pricing is regulated via local terms and conditions following the imbalance settlement harmonization methodology.

Question: In the future, do you foresee a potential risk of "competition" between European common balancing markets like MARI/PICASSO and national balancing markets, considering they might not be entirely substituted by the European ones?
Answer: Standard mFRR and aFRR product bids submitted on the national level must be forwarded to the European balancing platforms. National specific products might still exist locally and are subject to the approval of the competent NRA. Specific products may be converted into a standard mFRR and aFRR products and submitted to the platform, if applicable.

Question: Are there price limits to the bids?
Answer: According to ACER's decision No 09/2024 of July 2024 on the second amendment to the methodology for pricing balancing energy and cross-zonal capacity used for the exchange of balancing energy or operating the imbalance netting, the maximum/minimum technical price limit is currently 15,000 €/MWh and -15,000 €/MWh for both aFRR and mFRR nergy bids.

Question: Are the qualification/prequalification criteria to participate to MARI and PICASSO platforms the same across countries participating to the balancing platforms?
Answer: The European balancing platforms are established as so-called TSO-TSO model, i. e., TSOs connect to/participate to the platform forwarding their demands and bids to the platform. Bids are collected locally from the balancing service providers (BSP). Consequently, the European balancing platforms do not aim at the harmonisation of (pre-)qualification requirements. However, potential harmonisation in this field is discussed under the Framework for harmonisation of terms and conditions as defined in the mFRR IF, aFRR IF, and in the Network Code Demand Response.

Question: In countries with mFRR capacity markets, how do TSOs submit energy bids? Must BSPs submit energy bids if they win capacity tenders?

Answer: BSPs awarded in the balancing capacity markets have to submit (at least) the volume of the awarded balancing capacity in the balancing energy market via their respective TSO.

Question: If a TSO uses balancing energy from another area, and this area now requires the volumes for itself, will the cost be locally allocated, or will it be first come, first served based on product price for the TSOs?
Answer: For PICCASO and scheduled activation in MARI, all balancing energy bids and all demands from all areas are considered (subject to available cross-zonal capacity) to determine the optimal activation. For direct activation, all balancing energy bids of all areas and the direct demand of a TSO are considered (subject to available cross-zonal capacity) to determine the optimal activation.

Question: Can a non-EnC TSO apply for access to Balancing Platforms? Are there any legal blocking requirements?
Answer: The requirements to apply for access to Balancing Platforms is to adopt and transpose the "Electricity legislation Package".

Question: Can a TSO from a country with a member status within the Energy Community, that is not physically connected with any other Energy Community Country, apply for access to Balancing Platforms?
Answer: The requirements to apply for access to Balancing Platforms is to adopt and transpose the "Electricity legislation Package" (Decision 2022/03/MC-EnC, adopted 15 December 2022). Any legal obligations stemming from this Decision shall be further clarified with the Energy Community Secretariat.

Questions about the PICASSO platform

Questions and Answers

Question: What is PICASSO?
Answer: The Platform for the International Coordination of Automated Frequency Restoration and Stable System Operation (PICASSO) is the European solution for the exchange of balancing energy from automatically activated Frequency Restoration Reserves (aFRR). It enables Transmission System Operators (TSOs) to coordinate the activation of aFRR across borders in real time, based on frequency deviations and Area Control Error (ACE) signals. Balancing Service Providers (BSPs) must be capable of delivering the full contracted aFRR volume within 5 minutes of receiving an activation signal from their connecting TSO.

PICASSO ensures that aFRR activation is optimised across Europe by selecting the most cost-efficient bids from BSPs, regardless of national origin. This centralised approach enhances system stability, supports market integration, and improves the efficiency of balancing operations. By harmonising activation processes and enabling real-time coordination among TSOs, PICASSO contributes to a more resilient and economically sound electricity system across participating member states.

Question: How often and how fast does the optimisation cycle take place?
Answer: The optimisation is done every 4 s and takes below 1 s of computation time.

Question: Is there an option of also doing LMP in the future?
Answer: No, Local Marginal Price (LMP) is not foreseen, but only Cross Border Marginal Price (CBMP). The only case LMP is foreseen is when a TSO forms an uncongested area individually, with no ATC available, or no neighbour TSO participating, thus CBMP=LMP. However, balancing energy price and imbalance price are determined by each TSO following local pricing methodologies.

Question: What happens with the unsatisfied demand, if there is any, when applying elastic demand for aFRR?
Answer: The unsatisfied demand that might occur when applying elastic demand is not satisfied and remains as ACE in the respective LFC-area. In consequence, the unsatisfied demand has an influence on the frequency and results in activated FCR until the TSO takes other measures to balance its system (e. g. activating mFRR).

Question: What is the full netting price used for if there are no activations?
Answer: It is required by the IF to have a CBMP at all points in time. Also, among other reasons, local activation can differ from platform selection, so CBMP still can be needed; it can also affect the imbalance price. In case there is no balancing energy activated for this connecting TSO, then the value of avoided activation of balancing energy calculated in accordance with ISHM Article 10, shall be the lower bound for the imbalance price.

Question: Why is there a difference between the corrected demand and the LFC output?
Answer: The differences of the corrected demand (which serves as an LFC input) and the LFC output is the effect of the local LFC controller, these controllers operate as a PID controller. The difference between the LFC output and the aFRR activation then reflects the dynamic behaviour of the BSP.

Question: If in the future all TSOs connected to the IGCC platform will be also connected to the PICASSO platform, will the IGCC be redundant and thus dismissed?
Answer: Yes, if all TSOs are connected to the PICASSO platform, the IGCC as a separate process is no longer necessary as this imbalance netting process will take place on PICASSO. As we are still in the accession project phase of PICASSO, this has not been elaborated on in detail, so far.

Question: What is the difference between Imbalance Netting via PICASSO and via IGCC?
Answer: Netting in PICASSO is performed implicitly with the goal to maximize the economic surplus. Thus, the netting is performed in a way that prevents the activation of the least competitive bids. As the IGCC does not have any information on bid prices, it distributes netting potential proportionally to the demand, which does usually increase the economic surplus without maximizing it. For this reason, PICASSO has priority access to transmission capacities over the IGCC.

Questions about the MARI platform

Questions and Answers

Question: What is MARI?
Answer: The Manually Activated Reserves Initiative (MARI) is the European platform for the exchange of balancing energy from manually activated Frequency Restoration Reserves (mFRR). It enables Transmission System Operators (TSOs) across Europe to optimise the activation of mFRR by selecting the most cost-efficient bids submitted by Balancing Service Providers (BSPs). Activation can be either scheduled (SA), occurring at a predefined time, or direct (DA), which may happen at any point within the 15-minute interval following the scheduled activation. BSPs must be capable of delivering the full contracted mFRR volume within 12.5 minutes of receiving an activation request.
The MARI platform plays a key role in harmonising the activation of mFRR across participating European countries. By centralising the exchange of balancing energy, it enhances transparency, market efficiency, and cross-border cooperation among TSOs and BSPs. The platform supports the secure operation of the power system by ensuring that manual reserves are activated in a cost-effective and timely manner, contributing to the overall stability and reliability of the European electricity grid.
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Question: Are there any technology-specific guidelines outlining the requirements for participating in the mFRR market, such as batteries?
Answer: The requirements/guidelines for participating in the mFRR market are defined at the national level by the respective TSO by local Terms and Conditions, which must be in line with the platform rules and standard product definitions outlined in the implementation framework Requirements of Guideline Electricity Balancing are explicitly technology neutral.

Question: What proportion of mFRR demand, managed by the TSOs, is handled through the ENTSO-E platform compared to national balancing? Is there a minimum national core share?
Answer: There is no core share for the mFRR standard product for balancing energy to be activated locally. Subject to approval of the competent NRA, a TSO may additionally procure specific products. If applicable, these products will be converted into standard products and submitted to the mFRR platform.

Question: Have you performed any analysis on how the frequency imbalance occurrences change when a “smaller” balancing area, such as Austria, joins a “larger” European common balancing market? Raise in frequency unbalances have been noticed already when the Danish or Belgian systems joined the European common FCR system.
Answer: It is important to notice that there is no link between the Frequency deviations and common procurement of Frequency Containment Reserve (FCR). Consequently, joining the mFRR balancing platform is assumed not to have any relevant impact on frequency.

Question: Can you provide insights into the impact that MARI would have had on prices in the past if all the members joining MARI in the next year had been participating historically? For instance, could you share a file containing price data as it would have been under MARI for the last four years?
Answer: As bidding strategies change based on the applied pricing rules, an ex-post analysis is not feasible (for example, as pay-as-bid pricing has been applied historically in some countries).

The social welfare enabled by cross-border balancing energy activation can be observed in the annual Market Report published by ENTSO-E: [LINK] .

Question: If a TSO activates a bid for 50 € from another area, and then this area activates a bid for 75 €, will the local area get the cost of 50 €, or do they need to take the 75 € cost for their needed volume?
Answer: In the case of scheduled activation, then joint optimization – one price for all. If thereafter, a direct activation comes in, the price is at least as high as for scheduled activation. However, for each direct activation demand submitted, a different price can form, meaning in case a single TSO submits two direct activation demands in a short time, the TSO can pay different price for both orders.

Question: Can you clarify the difference between the direct (DA) and scheduled activations (SA) and give an example? Why does the share differ per TSO?
Answer: SA is scheduled separately for every quarter of each hour, with fixed starting time and demand submission deadlines. DA can be initiated also within a QH with no fixed starting time – DA then lasts from the quarter hour within which it was initiated in until the end of the following quarter hour.
For each quarter hour, one SA algorithm run is initiated, taking into account all SA demands from all TSOs. For each DA demand, a separate algorithm run is conducted to fulfil the specific DA demand.
TSOs apply different strategies to balance the system. TSOs procuring more aFRR tend to use more scheduled activated mFRR, while TSOs with limited aFRR available rely more on direct activated mFRR.

Question: What is the time window for TSOs to submit their demand for SA to be activated for the following quarter hour interval?
Answer: According to the explanatory document to the mFRR implementation framework article 3.1.1 the submission of TSO mFRR demands to the mFRR Platform happens 10 minutes before the beginning of the following quarter hour at the latest.