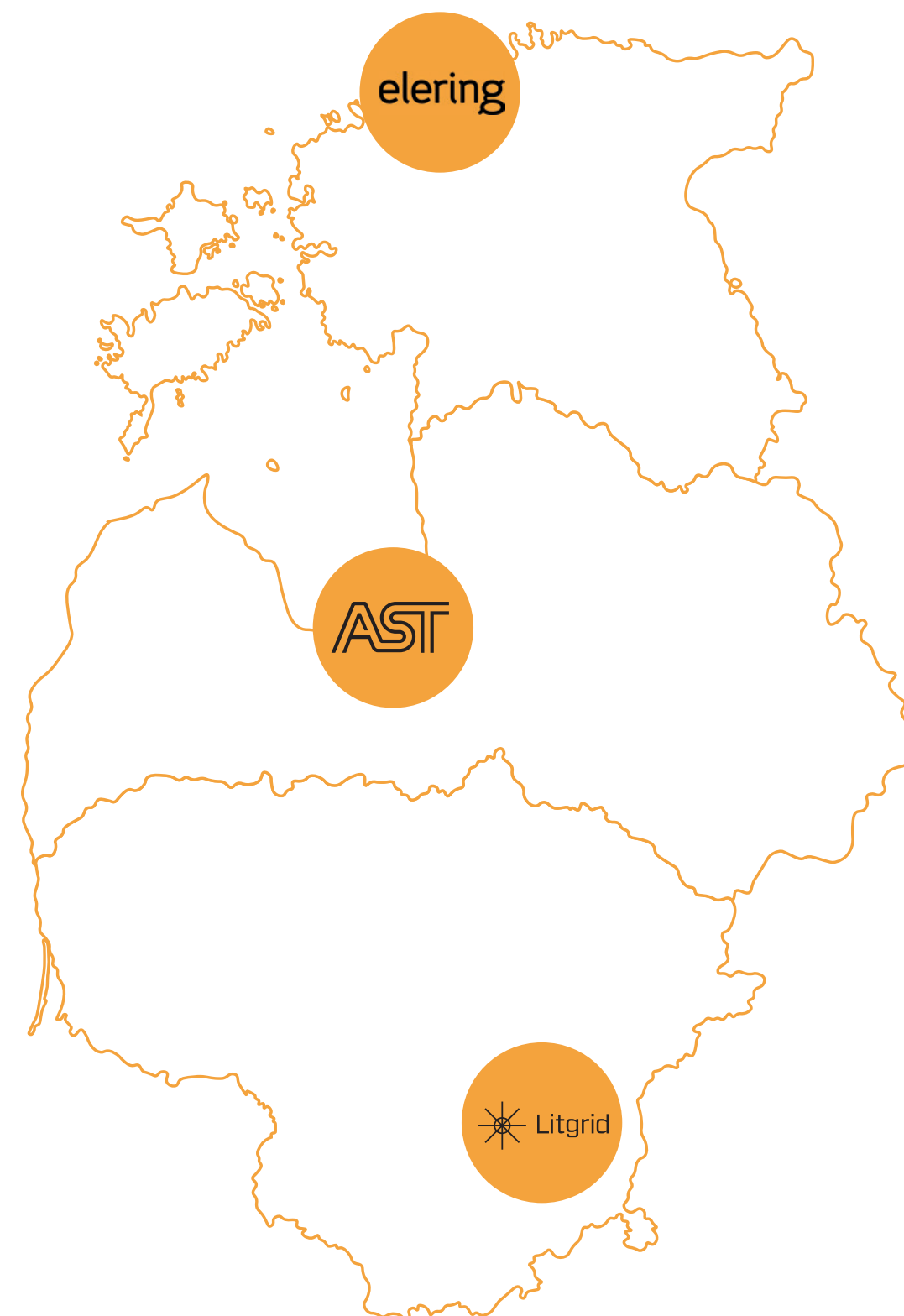


Baltic transmission system operators – Elering AS, AS “Augstsprieguma tīkls” and Litgrid AB (Baltic TSOs) are actively working on planned developments for Baltic balancing in accordance with commonly prepared Baltic Balancing Roadmap, which was initially published in October 2021.

With this update of the roadmap, Baltic TSOs provide information on deliverables, changes and details of the plans for developments.



INTRODUCTION

Since 1st of January 2018, Baltic TSOs operate a common model for balancing of power systems of Estonia, Latvia and Lithuania. To accommodate this, the common Baltic coordinated balancing area was introduced and the common Baltic balancing market for exchange of balancing energy in form of frequency restoration reserves with manual activation (mFRR) was established. In coming years significant changes in Baltic balancing model are foreseen in order for it to be compliant with the requirements of European regulations and ensure Baltic TSOs compliancy with Central European Synchronous Area (CESA) rules and agreements after synchronization with the network of CESA.

mFRR balancing energy market

The existing Baltic balancing model and balancing energy market will be changed at the point of time when Baltic TSOs will join the common European platform for exchange of mFRR energy (Manually Activated Reserve Initiative - MARI), which is foreseen in period from beginning of 2024 until second half of 2024. Derogation granted by regulatory authorities in Baltics sets deadline for the Baltic TSOs to join MARI platform, actual joining date will be aligned with the plans of Nordic TSOs to join MARI platform, but Baltic TSOs have to join MARI no later than 24th of July 2024. The main change to the Baltic balancing model when joining MARI platform will be introduction of separate balance control for each control area (Estonia, Latvia and Lithuania) and moving to a 15 minute balancing market time unit with respective changes in mFRR energy products as well as processes. Joining MARI platform will ensure that the Baltic balancing market will be an integral part of the European balancing market, allowing local balance service providers to participate in the European mFRR market. Resulting raise in market size will increase the power system security through more liquidity in energy reserves market utilizing available cross-zonal capacities with neighboring areas.

aFRR balancing energy market

In order to accomplish the successful synchronization of Baltics with CESA and ensure power system load and frequency control within 15 minute balance control period, frequency restoration reserve product with automatic activation (aFRR) along with corresponding processes will be introduced by Baltic TSOs. Implementation of aFRR will be aligned with the requirements of common European platform for exchange of aFRR energy (Platform for the International Coordination of Automated Frequency Restoration and Stable System Operation – PICASSO). The same as for mFRR, local aFRR providers will be able to participate in the European aFRR energy market, introduction of it is planned to be concluded by the end of 2024.

Additionally, Litgrid AB aims to perform aFRR pilot tests with Lithuanian BSPs during 2023 and until the introduction of aFRR balancing market in Lithuania. During the aFRR pilot tests there will not be an impact to the balancing prices but the demand for mFRR energy may be reduced.

Imbalance settlement period

In accordance with the European regulations, imbalance settlement period (ISP) shall be shortened to 15 minutes from existing 60 minutes in Baltics. Introduction of aFRR and change to 15 minute balance control period in Baltics are the key elements to ensure that 15 minute ISP can be properly implemented in compliance and spirit of European guideline on electricity balancing, and as described in implementation concept prepared by Baltic TSOs. Implementation of 15 minute ISP in Baltics is planned in 2024 and derogation from respective European requirements until then is granted by regulatory authorities in Baltics.

In order to provide possibility for the market participants to reduce their potential imbalances by allowing them to trade as close as possible to the operation time, Baltic TSOs in line with other European TSOs, will actively support 15 minute market time unit (MTU) introduction in day-ahead and intraday energy markets, which is also necessary to ensure 15 minute ISP implementation in Baltic balancing model. The day-ahead market transition to 15 minutes is planned commonly for the entire coupled European electricity market and conducted within a working group under the Single Day-ahead Coupling (SDAC) cooperation. The planned go-live date for the day-ahead market for the European common day-ahead market is beginning

of 2025. In intraday markets, countries have more flexibility and can start offering 15 minute products at their bidding zones at a suitable time. The Baltic countries plan to start offering 15 minute products in the 15 minute intraday market at the first half of 2024, when the cross zonal 15 minute intraday trading with Nordics are started.

Baltic Load-Frequency Control block

Synchronization of Baltic power systems synchronously with the network of CESA implies complex and fundamental changes in the operations of the power systems and requires completely new model of balancing in Baltics. For this purpose, Baltic TSOs plan to create Baltic load and frequency control (LFC) block consisting of three LFC areas – Estonia, Latvia and Lithuania. Main responsibility for balancing will be on the LFC area level. Along with aFRR and mFRR products, the frequency containment reserve (FCR) products will be introduced. Transmission system operators will use frequency containment and frequency restoration processes for ensuring the applicable load frequency control parameters. Baltic TSOs have commonly prepared LFC block concept document in order to highlight the key concepts, principles and actions as well as to describe the technical requirements and procedures for the future of Baltic load frequency control and market

setup to support it. Concept document describes LFC block structure, principles for reserve providers qualification, approach on capacity dimensioning and distribution, capacity sharing and exchange principles, capacity and energy standard products, capacity procurement process and activation process. Baltic LFC block is planned to be established by the end of 2024, and shall be implemented when synchronization with CESA takes place. Preliminary amounts of each type of reserves necessary for Baltic LFC block operation are determined, and it is estimated that 25 MW of FCR and 811 MW of FRR shall be ensured for upward activation and 702 MW of FRR for downward activation. It is also estimated that 134 MW of FRR shall be ensured as aFRR. Baltic TSOs have commonly prepared and published Baltic LFC block FRR dimensioning forecast 2024-2031 in order to inform about planned dimensioning methodology and its application. shall be ensured as aFRR. Baltic TSOs have commonly prepared and published Baltic LFC block FRR dimensioning forecast 2024-2031 in order to inform about planned dimensioning methodology and its application.

Balancing capacity markets

To ensure availability of necessary reserves for operation of Baltic LFC block, Baltic TSOs plan to procure reserves (FCR, aFRR, mFRR) in amount of dimensioned volumes determined in Baltic LFC block as capacity products. All Reserve Units providing LFC

reserves need to have a successful prequalification testing to participate in the Baltic balancing markets. Baltic TSOs developed harmonised principles for Baltic LFC reserve prequalification to ensure level playing field for Baltic Reserve Units. Following public consultations, Baltic TSOs in April 2022 published harmonized principles for Baltic LFC reserves prequalification.

To increase readiness of the Baltic power system for synchronization with network of CESA, Baltic TSOs envisage that up to levels of preliminary estimated amounts of FRR for Baltic LFC block operation shall be ensured in Baltics already starting from operation of the 15 minute imbalance settlement period, by the end of 2024. The final FRR capacity to be procured shall follow LFC block FRR dimensioning methodology that will be publicly consulted in the beginning of 2023.

Baltic TSOs have prepared and shall publish the common Baltic balancing capacity market proposal which foresees a common procurement of balancing capacity and cross-zonal allocation mechanisms to give the possibility for balance service providers in Baltics to compete in a common Baltic market, ensuring most efficient procurement of balancing capacities within the Baltic countries. According to the prepared methodologies, a significant part of the cross-zonal capacity between the Baltic countries may be allocated for cross-zonal trade of balancing capacity. The allocation of cross-zonal balancing capacity between the Baltic countries shall follow



the principle of economic benefit to consumers, thus increasing the allocated cross zonal balancing capacity in cases, if the calculation shows that allocation of the capacity to day-ahead market is less beneficial.

From the start of operation of the Baltic balancing capacity market, cross-zonal capacities will be allocated in accordance with the regional market-based methodology which is prepared by Baltic Capacity Calculation Region TSOs. But later, indicatively from the first half of 2026, the harmonized European methodology for cross-zonal capacity for the exchange of balancing capacity or sharing of reserves shall be implemented, which shall integrate the Baltic countries into the pan-European balancing capacity market.

Baltic TSOs will start to organize a prequalification process for balance service providers from 2023. Procurement of all three types of reserves via daily auctions will start at the end of 2024.

Considering the possibility of deficit of balancing reserves as concluded in the Baltic reserve capacity market study conducted by Baltic TSOs in 2021 and uncertainty brought by operation of Baltic power system in new conditions after synchronization with the network of CESA, in order to enhance security of supply and ensure secure and effective operation of the Baltic power system, as a temporary measure, Baltic TSOs will use TSOs' infrastructure for provision

of balancing reserves. Namely, Kiisa Power Plant (Kiisa PP) in Estonia, planned AST Battery Energy Storage System (AST BESS) in Latvia and planned resources of Battery storage operator in Lithuania (BSO) shall be used to cover part of the necessary balancing reserves as follows:

- Kiisa PP will be used to provide dimensioned share of Estonia for mFRR;
- AST BESS will be used to provide dimensioned share of Latvia for FCR and aFRR;
- BSO will be used to provide half of dimensioned share of Lithuania for FCR and aFRR.

Additionally, if the market does not offer sufficient amount of reserves to cover TSOs reserve requirements, as an emergency measure, TSOs will use Kiisa PP, AST BESS and BSO to provide the lacking reserves of the respective lacking products. TSOs and BSO will not be remunerated for providing reserves from their resources.

Baltic TSOs consider the temporary use of TSO and BSO resources as critical for ensuring secure and effective operation of Baltic power system at the start of operation of the new LFC Block balancing model. Temporary usage of TSOs' and BSO's resources will be regularly assessed by the national regulatory authorities.

As soon as assessment will show that the market is able to securely ensure TSOs reserve requirements and effective operation of Baltic power system balancing is cost efficient without TSO and BSO owned resources, these resources may be phased out gradually. Latvian TSO and BSO owned resources will not be used for balancing reserve provision by the end of 2028, the latest, and Estonian TSO owned resources will not be used for balancing reserve provision by 2030¹, the latest.

TSOs'/BSO's reserves are expected to be used (activated) only as a last-resort option in case of reserve deficit in the balancing energy market after all the market offers have been activated. This will be ensured by setting the price of TSOs'/BSO's energy bids higher than price of bids from the market participants. Methodology for setting the bid price of TSOs'/BSO will be harmonized among the Baltic countries.

¹In addition to uncertainties related to synchronization with CESA, the Estonian power system faces the challenge of possible phasing out of oil shale power plants during the same period. Oil shale power plants constitute almost all the dispatchable capacity in Estonia in 2022. TSO Resources are necessary to ensure the sufficiency of reserves and security of supply during beginning of the synchronous operation with Central Europe and cover lower reserve supply in case of oil shale power plant phase out.



Summary of the implementation timeline for different projects

Implementation timeline

Baltic TSOs are actively working on planning and introducing of necessary changes to the Baltic balancing model. Stakeholders are involved in development of all relevant documents and methodologies through the public consultations and consecutive discussions. More detailed information on planned changes can be found in:

Baltic balancing market rules (for operation with MARI)

Baltic 15 minute imbalance settlement period implementation Concept Document Baltic

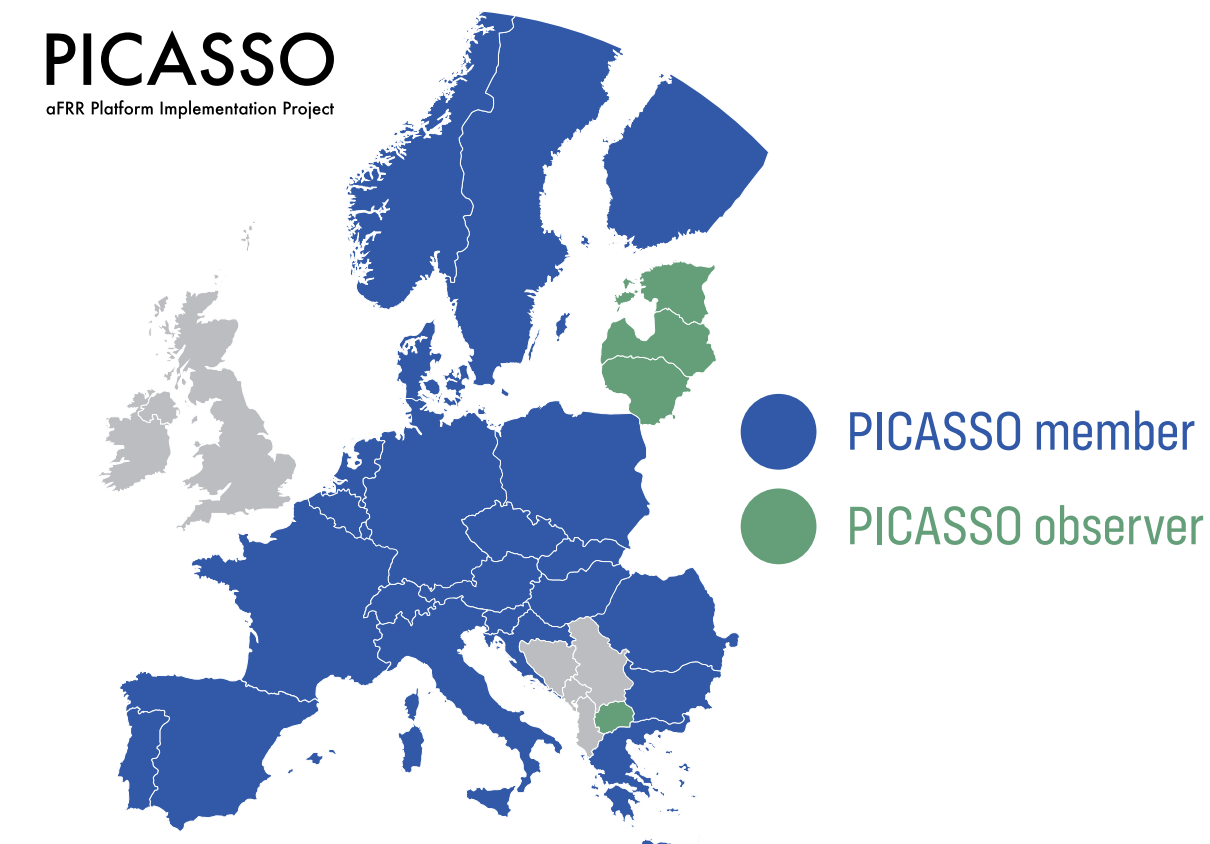
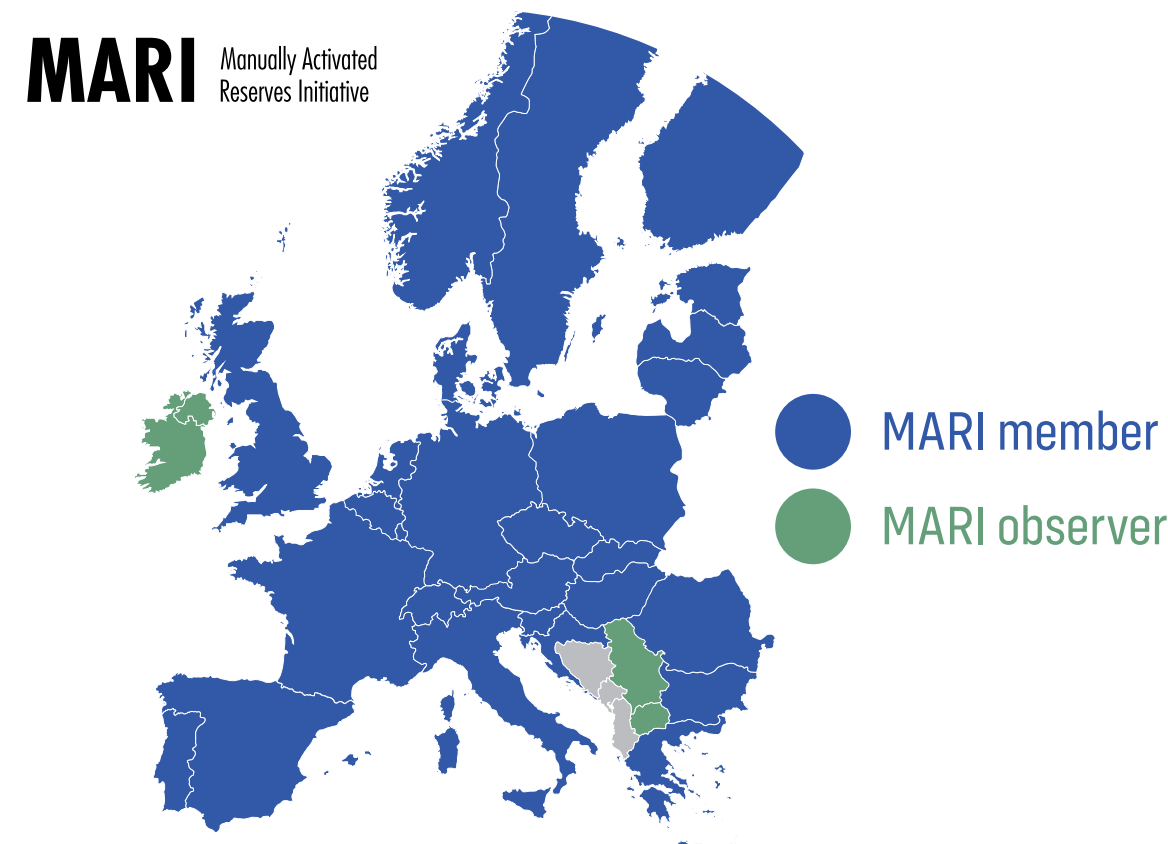
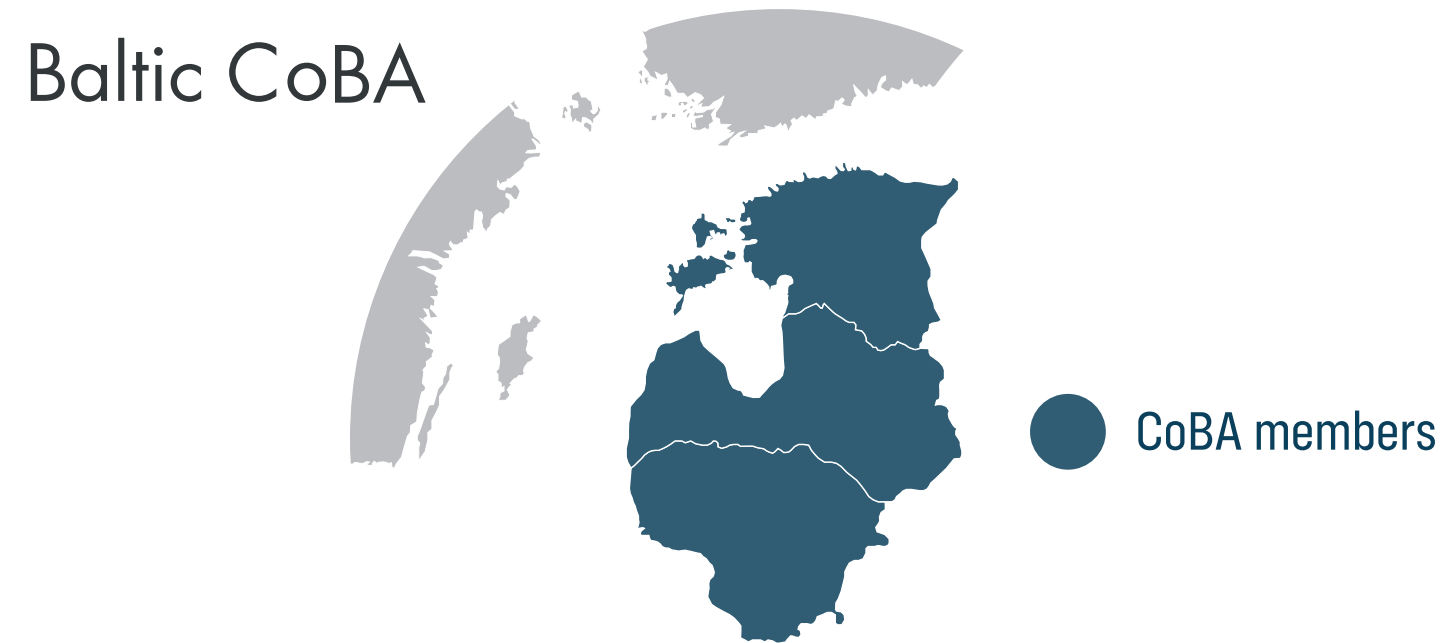
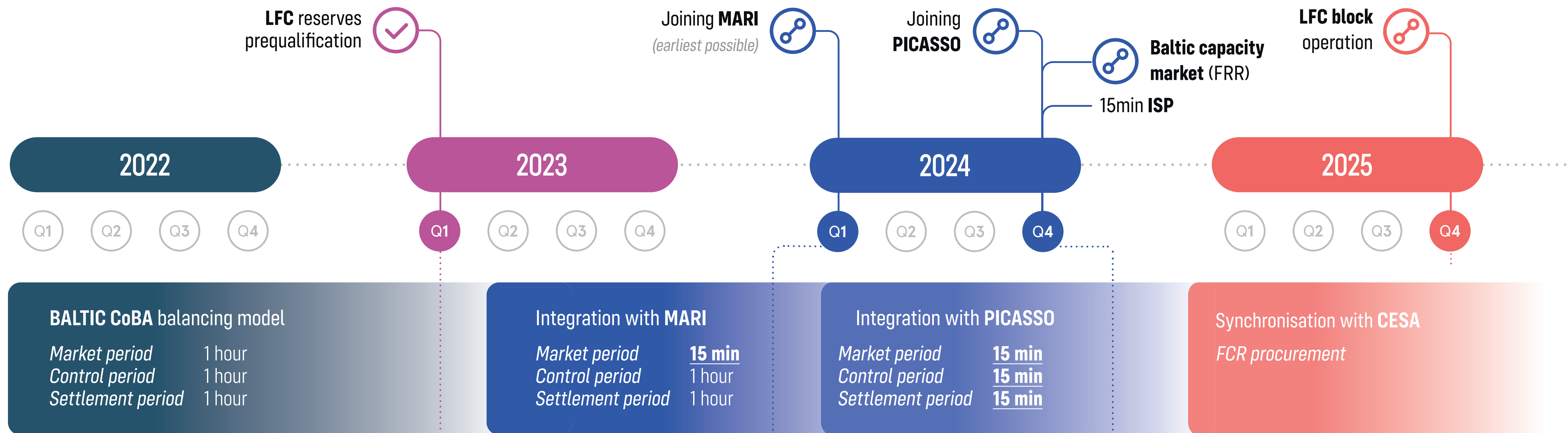
Baltic Load-Frequency Control block concept document

Harmonised principles for Baltic LFC reserve prequalification

Baltic LFC block FRR dimensioning forecast 2024-2031

Baltic capacity market proposal

Foreseen developments and changes until 2025*



*The above milestones and deadlines indicate the best estimate of dates and are elaborated in the Baltic balancing roadmap text.