

Ensuring the Long-Term Adequacy of Balancing Capacity in Estonia

Concept document¹

The Problem

Baltic States joining Continental European synchronous area from 2025.

Estonia, Latvia and Lithuania are currently connected to and rely upon the Russian synchronous area for frequency management. From 2025 onwards, the Baltic States will separate from the Russian synchronous area and will, instead, join the continental European synchronous area.

From this point, the Baltic transmission system operators (TSOs) will need different frequency management processes that are in line with the European regulatory framework, specifically the provisions of Regulation (EU) 2019/943² of the European Parliament and of the Council on the internal market for electricity (the Regulation) and Commission Regulation (EU) 2017/2195³ establishing a guideline on electricity balancing (EBGL).

Adopting the European default arrangements without a transition poses challenges.

In anticipation of the switch in synchronous area, the Baltic TSOs have conducted analysis⁴, in line with European methodologies⁵, to assess reserve requirements. For Estonia, this identified the demand for around 400 MW of FRR upward capacity for 2030, assuming extensive reserve sharing with Latvia and Lithuania.

These requirements are based on normal operational conditions and presume no limitations on cross zonal sharing of capacity. Nevertheless, it is crucial to acknowledge that restrictions on sharing may exist, necessitating a consideration of requirements under more extreme operational conditions. The Baltic system needs to be capable of island mode operation in the event of temporary desynchronisation from the continental European synchronous area. The above means that actual reserve requirements in Estonia (when considered separately) may be higher than determined by assessment under the European methodologies.

The latest calculations, factoring in the Estonian renewables objective of generating sufficient renewable electricity to meet 100% of Estonian electricity consumption by 2030⁶, indicate reserve needs for 2030, as outlined above. Reserve requirements are dynamic and subject to change based on installed renewable capacity and other significant production or consumption factors.

In addition, there are indications that the existing thermal power plants in the Estonian system which are able to provide some reserves will have difficulty competing in the market. Given the carbon-intensive nature of much of the current generation capacity, increases in carbon prices bring their ongoing

¹ This concept was publicly consulted by Elering from December 8th, 2023, until January 19th, 2024. Based on the feedback received, Elering updated this concept.

² <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019R0943&qid=1699523636645>

³ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32017R2195&qid=1699523673675>

⁴ https://elering.ee/sites/default/files/2022-10/FRR_dimensioning_forecast_2024-2031_0.pdf

⁵ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32017R1485>

⁶ <https://kliimaministeerium.ee/media/9407/download>

operational viability, and, hence, their ability to contribute to meeting Estonia's reserve requirements, into question. The existing thermal fleet is ramping relatively slow, and the units will already need to be generating for them to offer reserves. With time this problem only exacerbates as thermal fleet ages and forecasting errors from the increasing amount of renewable production grows. The largest element in the Baltics remains an HVDC interconnector, which means that there must be enough reserves to compensate for the outage of 700 MW.

This context highlights that **new investments are needed** in the form of fast-ramping production units which are able to support reserve procurement, as supported by Baltic TSO's market test analysis. Possible restrictions on capacity sharing and the need to ensure stable operation in island mode increase this need further⁷. With the rapid development of renewable energy, it is further anticipated that the importance of interconnectors shall greatly increase in value in the context of accommodating energy flows (for example in the context of the day-ahead market). Therefore, it shall be more and more critical to ensure a certain amount of ancillary-service providing assets in the Estonian electrical system.

However, there is considerable **investment uncertainty**. The current absence of markets for FCR capacity, aFRR energy and capacity and mFRR capacity standard products in the Baltics means that investors do not have a view of potential revenues and returns from the provision of reserve services and practical experience on bidding strategy. Even in case these markets would be available, according to EU legislation they are short-term in their temporal scope and, therefore, won't give long-term investment certainty. Elering has received feedback from potential investors, regarding the need for long-term financial stability in order for projects to be bankable and proceed.

Solution Proposal – High-Level Design of the Mechanism

TSO goal is to ensure sufficient balancing reserve capabilities to enable electricity system reliability . The main obstacle identified with the day-ahead procurement of balancing reserves is the lack of investment certainty. The move towards day-ahead procurement and pricing is aimed at efficiency of short-term dispatch and offering a competitive market price. However, the conventional procurement mechanisms prevent the conclusion of long-term contracts, which would be a typical way of supporting investment certainty.

The proposed solution is a long-term contract for balancing capacity products, structured around the conventional European balancing reserve markets, in the form of a contract for difference (CfD). The Balancing Service Providers who enter the contract are paid the difference between the price stipulated in the contract and the day-ahead balancing capacity market price. As such, they have an incentive to participate in the day-ahead balancing capacity market to receive market payments and bid at short-term variable costs. Figure 1 illustrates the obligations and financial flows from Reserve provider perspective and Box 1 shows an example of how to settle a CfD contract.

⁷ These points are identified within market test analysis conducted by the Baltic TSOs, which is available at: <https://elering.ee/en/closed-consultations-april-2021#tab1>

Box 1

Let us assume that a Balancing Capacity provider has secured a CfD contract with a Strike Price of €5/MW/h for the provision of mFRR. Let us then suppose that the short run cost of provision for mFRR of this specific provider is €2/MW/h. The provider would be incentivised to participate in the balancing capacity market and bid its short run cost of provision (€2/MW/h).

In a period where the provider is 'cheaper' than the marginal unit of provision (let us assume this is €4/MW/h), the provider would capture:

- €4/MW/h from the participation in the capacity market, assuming it is selected for mFRR provision; and
- an additional $(€5/\text{MW/h} - €4/\text{MW/h}) = €1/\text{MW/h}$ from the settlement under the CfD.

In a period where the provider is more expensive than the marginal unit of provision (let us assume this is €1/MW/h), then the provider would be 'out of merit', and would only capture the difference payment $(€5/\text{MW/h} - €1/\text{MW/h}) = €4/\text{MW/h}$.

In a period where market price is above the strike price, say €7/MW/h, the provider will return the difference between market price and the Strike Price $(€5/\text{MW/h} - €7/\text{MW/h}) = -€2/\text{MW/h}$.

Ultimately a 2-way CfD would ensure some degree of price certainty without distorting bidding incentives. At the same time, it would also offer some protection for consumers given that the back payments under the CfD would ensure that any income above the Strike Price would be paid back.

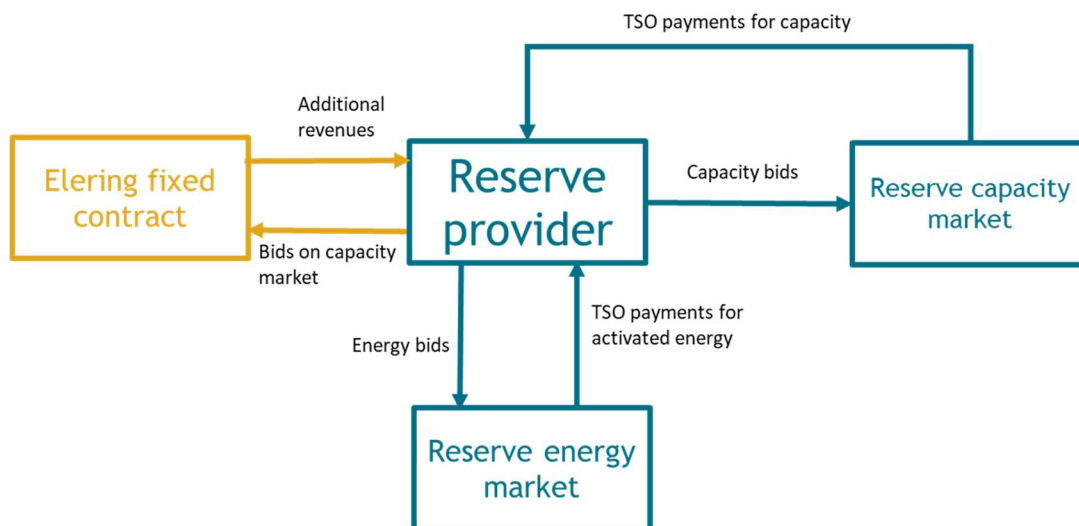


Figure 1 Obligations and financial flows from Reserve provider perspective.

In order to enable the long-term CfD contract, a temporary derogation is needed from the EU legislation. Such derogation is now under discussion in the Electricity Market Design Reform trilogues. Based on information available for Elering, the wording of derogation under discussion is as follows:

“By way of derogation from Article 6(9), (10) and (11), Estonia, Latvia and Lithuania, may conclude financial contracts for balancing capacity up to five years before the start of the provision of the balancing capacity. The duration of such contracts shall not extend beyond eight years after Estonia, Latvia and Lithuania have joined the continental European synchronous area.”

Proposed Procurement Parameters

Elering would procure technical capability to provide mFRR upward balancing capacity. The procurement object is megawatt of mFRR upward capacity bid on day-ahead balancing capacity market per market time unit (MTU), for which bidder bids a strike price per megawatt of mFRR capacity per MTU. Elering compensates the bidder the difference between the strike price and the mFRR capacity market price for a particular MTU.

- **Contract duration:** Proposal is delivery period until 2033.
- **Procurement deadline:** The award of the contract must take place long enough before the delivery dates to allow for the necessary construction works. Delivery must start up to five years after conclusion of the contract (before 2030). Contract duration is limited by EU legislation to 8 years starting from Baltic states synchronisation with continental European synchronous area. The sooner the commissioning, the longer the delivery period under the contract.
- **Procurement process:** Public procurement process with lowest price bid(s) to win to find the most economically advantageous solution. Procurement may be conducted in separate parts with different deadline for start of delivery.
- **Requirements specification:**
 - Proposal to procure 150-400 MW capability to provide mFRR bids towards up-regulation in the day-ahead balancing capacity market. Minimal bid unit is 25 MW, bid granularity 1 MW. Final amount of procured reserves will be decided after the results of procurement.
 - Minimal bid unit can be aggregated of multiple resources.
 - Resource must have capability to provide also aFRR bids at least in amount of 10% of total capability.
 - The technical characteristics of the resource shall follow the Baltic balancing capacity market rules according to methodology pursuant Article 33(1) and Article 38(1) of the Commission Regulation establishing a guideline on electricity balancing⁸ and must be able to complete the prequalification process⁹.
 - The resource must meet all environmental standards for ensuring higher compliance to more stringent emissions regulations in the future.
 - The resource should comply with other requirements for generators set in EU and Estonian legislation.
 - The resource shall be available for providing service at any time during the delivery period of the contract. As an exception, the resource does not have to be available for providing service during annual maintenance and during unplanned outages. Annual maintenance schedules shall be submitted to Elering for approval in November of the previous year. Elering has the right to make changes to the maintenance schedules in order to avoid excessive overlapping of maintenance schedules and their falling into critical time periods for the electricity system. Annual unavailability period shall not exceed 50 calendar days. However, the contract payments are only made for the periods the resource is available and a bid to capacity market is made.
- **Eligibility:** The process is open to investment in new generation asset across all possible resource types (production, storage and consumption). Eligibility is limited to resource connected to

⁸ https://elering.ee/sites/default/files/2022-10/Baltic%20Proposal%20to%20Baltic%20Balancing%20capacity%20market%20rules%20in%20accordance%20with%20EBGL%20Article%2033%281%29%20and%2038%281%29_CLN.docx

⁹ Prequalification process descriptions for aFRR and mFRR <https://elering.ee/en/load-frequency-reserves>

Estonian electricity system either certified open distribution grid or transmission grid to ensure the preservation of the security of the system in event of islanding from a wider synchronous area.

- Any generator unit with specific CO₂ emissions 550 kg/MWh or lower may apply.
- Location: the participating assets must be located in Republic of Estonia and connected to the Estonian power system to be eligible.
- In order to participate in the procurement a bidder must present detailed description of planned unit with location, planned connection point in Estonian electricity grid, construction timeline, proof of the unit meeting mFRR and aFRR up-regulation requirements and proof of the unit being able to meet EU- and national environmental goals.
- In order to participate in the procurement a bidder must deposit a security in sum of 2500 € per offered MW of mFRR in Elering's bank account or present a bank warranty in same amount. The deposit will be released for unsuccessful bidders after announcing of the winning bidder and for successful bidders after signing the contract.
- In case of successful contracted bidder(s) fail to fulfil the agreed construction schedule or already contracted bidder(s) fail to be available on the market longer than stipulated in the yearly maintenance/allowed unplanned outage periods a fine in sum of 300 € per contracted MW per calendar day the commissioning of the unit exceeds the schedule will be imposed.
- Procurement may also include financial capability criteria for the bidders.
- It is only allowed to participate in the procurement with new power-generating facility or with added new capacity to power-generating facility in terms of "Standard terms and conditions of connection to the electricity transmission system of Elering AS"¹⁰
 - The device is considered new if it has not given electricity to the system before 15.02.2025.
 - The beginning of electricity production is defined as the day when approved power-generating module or storage unit gives the electricity to the distribution grid.
 - Generating or storage device is not considered new if existing generating or storage unit is replaced or some but not all components (i.e. generator, turbine, inverter, kettle, PV-element, wind turbine) have been replaced.
 - If a power generating module is additional to the existing powerplant, separate metering for the unit must be possible.
 - Power-generating facility or added capacity to power-generating facility is not considered new, if some, but not all, components (for example, generator, turbine, inverter, boiler, solar panel, wind turbine, etc.) have been replaced with new components.
- A resource that has entered a long-term contract must be able to provide balancing energy at least for 24 consecutive hours and if more than 6 hours have elapsed since the previous activation, the reserve capacity must be ready to provide balancing energy again for at least 24 consecutive hours.
- **Payment:** Successful CfD-contract bidders are paid based on the bid price (strike price) €/MW/MTU capacity fee on monthly basis during the delivery period. Payments for particular MTU are only made to the bidder that has participated in the balancing capacity market and has also made bids to the balancing energy market. The payment for a particular MTU is the difference between the strike price and the mFRR capacity market price for a particular MTU.

¹⁰ <https://elering.ee/en/connection-conditions>

- **Operation of the day-ahead balancing capacity reserve market:** Elering, with neighbouring TSOs, would organize day-ahead balancing capacity markets for procurement and payment of balancing capacity products (FCR, aFRR and mFRR)¹¹. It is not mandatory for the holder of long-term contract to participate (submit bid) in the day-ahead capacity market and energy market, but the CfD compensation payments are only made in case of participation.
- **Restrictions to bidding price to day-ahead balancing capacity reserve market:** Successful CfD-contract bidder, if one chooses to participate in day-ahead balancing capacity reserve market, is obliged to bid in sum of one's short run cost.
- **Participation in the day-ahead balancing capacity market:** a resource that has entered a long-term contract participates in the normal processes of the day-ahead balancing capacity market.

Balancing capacity reserves long-term procurement is used as a transitional measure to create a bridge for the period of synchronisation with Central-European area and closing of several Estonian generation resources. This means that after conclusion of long-term contracts only short-term (day-ahead) balancing capacity markets will remain.

¹¹ <https://elering.ee/sagedusreservide-turg>