

Baltic Harmonised Imbalance Settlement Model Document

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1. Introduction

Following the public consultation on the harmonised Baltic imbalance settlement model, which took place from June 27th until August 15th, 2016, the Baltic TSOs have now reached a conclusive decision regarding imbalance settlement model which shall be adopted within the Baltics at the start of 2018. The model was developed taking into consideration present draft edition on the Guidelines on Electricity Balancing and the feedback received through the public consultation process.

The purpose of this document is to introduce to the stakeholders the Baltic TSOs final proposal for imbalance harmonisation model concept.

The new model includes updated views on the involvement of Baltic not netted ACE in the imbalance settlement mechanisms. As the decision regarding the treatment of ACE is intertwined with other settlement arrangements, changes have been made to the pricing model for imbalance and the balancing cost recovery model. Regarding imbalance pricing, the TSOs shall propose to implement pure single pricing meaning that the BRPs imbalance shortages and surpluses shall be settled with exactly the same price. Regarding balancing cost recovery, the TSOs have re-evaluated the additional cost recovery components and decided to drop the socialisation of costs through the taxation of consumption. Instead, the TSOs are proposing to pursue ACE cost recovery solely through a targeted component. While the targeted component aims at recovering the full cost balancing, and also to ensure that imbalances are settled more with the price that reflects the actual cost of balancing, the net financial proceeds or losses arising from the balance service through the application of the single imbalance price model shall be settled by a neutrality mechanism employed by the Baltic TSOs via common settlement budget.

2. Building Blocks

The following table consist of an overview of the building blocks, which were established as the foundations of the Baltic harmonised imbalance model. The middle column showcases the Baltic TSOs preliminary proposal as they were presented to the stakeholders under the public consultation. The third column displays the Baltic TSOs final view including the subsequent

alterations made to the building blocks on the basis of the feedback derived from the public consultation.

<i>Building block</i>	<i>TSOs preliminary proposal</i>	<i>TSOs final view</i>
<i>Balance responsibility</i>	<i>Full</i>	<i>Full</i>
<i>Cost coverage/base</i>	<i>Neutrality costs between balance service and grid service. Full cost of balancing.</i>	<i>Neutrality costs between balance service and grid service. Full cost of balancing.</i>
<i>Main imbalance price determination</i>	<i>Marginal</i>	<i>Marginal</i>
<i>Imbalance settlement period</i>	<i>60 minutes</i>	<i>60 minutes</i>
<i>Settlement model</i>	<i>Single portfolio model</i>	<i>Single portfolio model</i>
<i>Pricing model for ACE</i>	<i>Excluded</i>	<i>Included via targeted component</i>
<i>Pricing model for imbalance</i>	<i>Single reference pricing</i>	<i>Single pricing</i>
<i>Balancing cost recovery model</i>	<i>Hybrid</i>	<i>Neutrality component</i>

2.1. Single Portfolio Model

The Baltic TSOs propose to adopt a single portfolio model meaning that both production and consumption are dealt within the same portfolio. The concept of the single portfolio model is to give the right incentives for market participants to balance the system, based on transparency and sharing of information.

The calculation of imbalance for single portfolio consists of aggregated planned and measured data and imbalance adjustment trades per imbalance settlement period, whereas:

- Planned balance reflects the final net volume of commercial transactions for each imbalance settlement period on organised markets or between BRPs.
- Measured balance reflects the net volume of realized physical generation and consumption per imbalance settlement period over the connection points in which the BRP is responsible for.
- Imbalance adjustment reflects the activated mFRR balancing bids activated by order of the TSO, the resource of which belongs to the BRP’s balance area.

BRPs shall submit to the local TSO the planned balance in which there must be balance between production and purchases vs consumption and sales. The forecasted and/or systematic purchase or sale of imbalance electricity is not allowed.

The rules for measurement data exchange between TSO and network operators and rules for defining the balance area of BRPs shall be set individually per each price area. The algebra for a single balance portfolio is the following:

<i>Planned balance</i>	<i>Net balance schedule, whereas Production + Purchase = Consumption + Sale</i>
<i>Measured balance</i>	$\sum(P_{in}-P_{out})$ metered data in a BRP's portfolio
<i>Imbalance</i>	<i>Measured – Planned +/- portfolio's Imbalance Adjustment</i>

Imbalances will be settled in each direction. When a BRP's imbalance position is long i.e. its imbalance is at a surplus, it means that more electricity had been produced or less consumed than the BRP had initially contracted. When a BRP's imbalance position is short i.e. its imbalance is at a deficit, it means that less electricity had been produced or more consumed than the BRP had initially contracted. Therefore, the resulting imbalance calculated for the BRP's balance portfolio shall be either positive or negative, whereas positive imbalance indicates that the TSO has bought the surplus imbalance from a BRP and a negative imbalance conversely means that the TSO has sold imbalance to the BRP to cover its shortage.

The following is an example of imbalance calculation in a single portfolio model (MWh):

<i>I. NET POSITION (PLANNED BALANCE)</i>	<i>-5</i>
- <i>incl. Planned consumption (purchases from Power Exchange and/or through bilateral agreements)</i>	<i>10</i>
- <i>incl. Planned production (sale to Power Exchange and/or through bilateral agreements)</i>	<i>5</i>
<i>II. NET MEASURED BALANCE</i>	<i>-2</i>
- <i>incl. measured consumption (the sum of Pout values per metering points)</i>	<i>8</i>
- <i>incl. measured production (the sum of Pin values per metering points)</i>	<i>6</i>
<i>III. ACTIVATED IMBALANCE ADJUSTMENT (upward regulation)</i>	<i>1</i>
<i>IV. IMBALANCE VOLUME</i>	<i>2</i>

2.2. Single Pricing Model

The Baltic TSOs have decided to adopt a single price model meaning that BRPs shall receive exactly the same price regardless whether their imbalance position is at a surplus or deficit. The imbalance price shall be determined based on the direction of the Baltic ACE and the mFRR (manual frequency restoration reserve) balancing activations carried out to minimize Baltic ACE.

The imbalance prices shall be determined as follows:

<i>Imbalance price methodology</i>		<i>Baltic CoBA imbalance position</i>	
		<i>Short</i>	<i>Long</i>
<i>BRP imbalance</i>	<i>Short</i>	<i>mFRR reference price + targeted component (c)</i>	<i>mFRR reference price – targeted component (c)</i>
	<i>Long</i>		

- If the Baltic CoBA imbalance direction is short, the targeted component (c) shall be added to the marginal mFRR upward regulation price.
- If the Baltic CoBA imbalance direction is long, the targeted component (c) shall be deducted from the marginal mFRR downward regulation price.
- In the event the Baltic CoBA's imbalance is zero, thus meaning that there were no mFRR balancing bids activation and no trade of not netted ACE with open balance provider, the reference imbalance price in each balancing area shall be set with the respective day-ahead price of each area.
- In the event the Baltic CoBA imbalance direction is short, and no upward regulation activated, the reference price shall be the local day-ahead price with the addition of the targeted component (c);
- In the event the Baltic CoBA imbalance direction is long, and no downward regulation activated, the reference price shall be the local day-ahead price with the deduction of the targeted component (c).

2.2.1. mFRR Reference Price

The Baltic TSOs have agreed to implement a centralized balance control function starting from 2018. The TSOs will nominate a coordinator amongst themselves, who will be responsible for initiating the activation of balancing energy bids with the purpose of minimizing the Baltic total not netted ACE towards the Open balance provider.

The mFRR reference price shall be established for each balance area – EE, LV, and LT –, and determined based on the resulting activities carried out in the Baltic balancing market:

- mFRR marginal price for upward regulation shall be the most expensive activated upward regulation bid in the mFRR market during the hour for the purpose of balancing the Baltic CoBA;
- mFRR marginal price for downward regulation shall be the least expensive activated downward regulation bid in the mFRR market during the hour for the purpose of balancing the Baltic CoBA;
- In situations when there is no congestion between the cross-borders of the balance areas, the mFRR reference price shall be identical in all three Baltic balance areas.
- When congestion occurs, the balance areas obtain individual mFRR reference prices. If congestion occurs between two adjacent balance areas, the Baltic area will be split into two separate price areas. The balance areas unaffected by congestion shall still be treated as a single price area, and will therefore share the same mFRR reference price.

Only those balancing mFRR balancing bids shall affect the Baltic mFRR marginal pricing, which have been activated for the purpose of balancing the Baltic CoBA. Bids activated by the request of neighbouring systems such as the Nordics, Poland or Russia/Belarus or due to congestion management shall not participate in the forming of the Baltic mFRR marginal pricing.

2.2.2. Targeted Component

The targeted component (*c*) shall be established for the Baltic CoBA not netted ACE residual and other costs/revenues related with trade of balancing energy recovery. The targeted

component will consist of a €/MWh value predetermined prior to the forthcoming settlement month. The component shall be the same for each balance area in the Baltics as the Baltic TSOs will share the common settlement budget for all trades related to Baltic balance management. The targeted component will be aimed at capturing the full cost of balancing, and calculated taking into account the actual ACE and other costs/revenues related with trade of balancing energy for the second previous settled month.

The application of the targeted component shall be determined based on the imbalance direction of the Baltic CoBA.

Here are a couple of example cases on how imbalance prices in the Baltic CoBA shall be determined:

<i>Example I</i>				
	<i>Estonia</i>	<i>Latvia</i>	<i>Lithuania</i>	
<i>NordPool Day-Ahead Price €/MWh</i>	45 €/MWh	45 €/MWh	45 €/MWh	<ul style="list-style-type: none"> • <i>Baltic CoBA imbalance position is short;</i> • <i>no congestion between the price areas – same balancing price in all balance areas;</i> • <i>mFRR balancing bids are activated in Latvia (60 €/MWh) and Estonia (80 €/MWh);</i> • <i>all balance areas share the same marginal mFRR reference price of 80 €/MWh;</i> • <i>targeted component for the month is set at 10 €/MWh;</i> • <i>all Baltic price areas share the same imbalance price of 90 €/MWh</i>
<i>Activated mFRR Price €/MWh</i>	80 €/MWh	60 €/MWh	-	
<i>mFRR balancing price for upward regulation €/MWh</i>	80 €/MWh			
<i>Targeted Component €/MWh</i>	10 €/MWh			
<i>Imbalance Price €/MWh</i>	90 €/MWh			

<i>Example II</i>				
	<i>Estonia</i>	<i>Latvia</i>	<i>Lithuania</i>	
<i>NordPool Day-Ahead Price €/MWh</i>	45 €/MWh	50 €/MWh	50 €/MWh	<ul style="list-style-type: none"> Baltic CoBA imbalance position is short; congestion occurs between EE and LV balance areas - EE shall have different balancing price than LV and LT; mFRR balancing bid is activated in Lithuania (70 €/MWh); EE mFRR reference price is set equal to day-ahead price of 45 €/MWh. LV and LT shall share the same marginal upward regulation price of 70 €/MWh; targeted component for the month is set at 10 €/MWh; EE area imbalance price shall be 55 €/MWh; LV and LT areas shall share the same imbalance price of 80 €/MWh;
<i>Activated mFRR Price €/MWh</i>	-	-	70 €/MWh	
<i>mFRR balancing price for upward regulation €/MWh</i>	45 €/MWh	70 €/MWh		
<i>Targeted Component €/MWh</i>	10 €/MWh			
<i>Imbalance Price €/MWh</i>	55 €/MWh	80 €/MWh		

2.3. Neutrality Charge

A common cost recovery mechanism for imbalance settlement shall be established within Baltic States to reflect the actual costs of power system balancing. The principle of cost reflectiveness is relevant – costs for balancing are paid by the BRPs while any cost for grid operation should be paid through the grid tariff. The Baltic TSOs have agreed on the cost-base philosophy displayed in the following table.

<i>Balance Service Costs Included in the Imbalance Service</i>	<i>Share</i>	<i>Cost Recovery Mechanism</i>
<i>System not netted ACE</i>	100%	<i>Imbalance price and neutrality charge</i>
<i>mFRR for Baltic CoBA balancing purposes</i>	100%	
<i>Imbalance energy traded with the BRPs</i>	100%	
<i>Administrative costs related to balance management</i>		<i>Individual per price area</i>

Based on GL EB each national regulatory authority (NRA) shall ensure that all TSOs under their competence do not incur economic gains or losses with regard to the financial outcome

of the settlement pursuant to balancing and each TSO may develop a proposal for a settlement mechanism separate to settle the full cost of balancing.

The principle of financial neutrality enables TSOs to collect income through imbalance settlement that would cover all costs related to trade of balancing energy incurred while performing balancing operations. While the targeted component aims at recovering the full cost of balancing, and also to ensure that imbalances are settled more with the price that reflects the actual cost of balancing, the net financial proceeds or losses arising from the balance service through the application of the single imbalance price model shall be settled by a neutrality mechanism employed by the Baltic TSOs via common settlement budget. This shall guarantee that no costs related to balancing shall be carried on out to the next month, but will instead be settled in the same month. Neutrality charge for the settlement month shall apply per imbalance volume for BRPs during each month settlement. The neutrality charge would be derived taking into account all the actual revenues and costs related to balancing the Baltic system – mFRR balancing energy trades for balancing the Baltic system, trade of not netted ACE with open balance provider and imbalance energy trades with BRPs by all three Baltic TSOs. Baltic TSOs have agreed to perform monthly based neutrality by aggregating all the costs and revenues related to balance service commonly via monthly based neutrality account.

The Baltic TSOs choose a Settlement Coordinator among themselves that carry out TSO-TSO settlement between the Baltic TSOs. Via TSO-TSO settlement the Settlement Coordinator aggregate all trades related to Baltic balance management and calculate monthly based netting statements as the financial clearing between TSOs by taking into account all the trades related to Baltic's balance service incl.:

- Baltic's not netted ACE traded between Baltic's Settlement Coordinator and Open Balance Provider;
- Balancing (mFRR and ER mFRR) trade between connected TSO and BSP;
- Imbalance trade between connected TSO and BRPs;
- Neutrality mechanism between connected TSO and BRPs.

Therefore, all trades related to Baltic's balance management shall be shared and settled between Baltic TSOs equally based on the following principles:

- Each connected TSO shall be responsible for carrying out settlement (report and financial settlement) within their balance area and for settling the activated mFRR and ER mFRR trades with the BSPs/TSOs and imbalance settlement trades with BRPs;
- Each TSO shall be responsible for submitting to other TSOs the settlement data for imbalance trades with BRPs and balancing trades with BSPs activated for Baltic balance purposes;
- Settlement Coordinator shall aggregate all trades related to Baltic balance management and calculate monthly based financial result for Baltic TSOs.

<i>Total Revenues from Balancing Trades, EUR</i>	<i>Total Costs from Balancing Trades, EUR</i>
<i>Sale of not netted imbalance (ACE)</i>	<i>Purchase of not netted imbalance (ACE)</i>
<i>Sale of mFRR trade for balancing purposes</i>	<i>Purchase of mFRR and ER mFRR trade for balancing purposes</i>
<i>Sale of imbalance energy for BRPs</i>	<i>Purchase of imbalance energy from BRPs</i>

The neutrality charge could be positive or negative based on actual cost/revenues of balancing trades compared with revenues from targeted component (c) that was included to imbalance price.

The following shows an example of how the neutrality charge would be calculated:

	Purchase of Baltic CoBA Not Netted ACE €	Sale of Baltic CoBA Not Netted ACE €	Purchase of mFRR balancing trades to balance Baltic CoBA €	Sale of mFRR balancing trades to balance Baltic CoBA €	Purchase of imbalance power from BRPs based on H+1 imbalance prices €	Sale of imbalance power to BRPs based on H+1 imbalance prices €	Baltic TSOs Preliminary Net Position €	Baltic BRPs Total Imbalance Volume, MWh	Baltic TSO's Neutrality Charge €/MWh
00 - 01	0	30	-3 750	0	-1 700	5 100	-320	110	0,56
01 - 02	-500	0	0	0	-2 250	3 500	750	125	0,56
02 - 03	-4 500	0	-5 850	0	0	9 000	-1 350	150	0,56
03 - 04	-7 200	0	-5 525	0	0	9 750	-2 975	160	0,56
04 - 05	0	30	0	800	-1 500	1 000	330	280	0,56
05 - 06	-4 000	0	0	0	-1 700	6 600	900	110	0,56
06 - 07	0	90	0	1 400	-900	0	590	140	0,56
07 - 08	-2 000	0	-5 000	0	-400	8 800	1 400	120	0,56
SUM	-18 200	150	-20 125	2 200	-8 450	43 750	-675	1 195	-

NEUTRALITY CHARGE EUR/MWh

Accounts for all trades EUR / BRPs total imbalance volumes in Baltic areas:

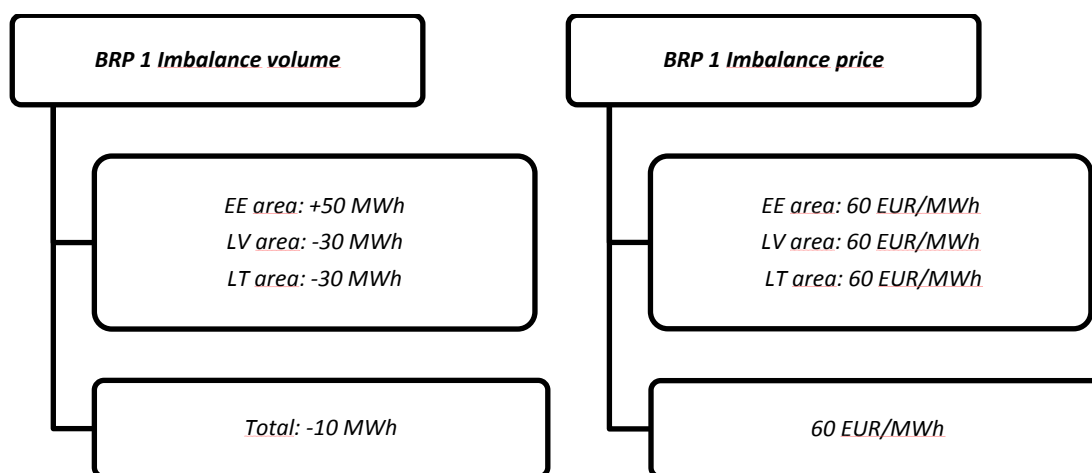
- if the neutrality account per month is positive, TSOs will be net payers to BRPs
- if the neutrality account per month is negative, BRPs will be net payers to TSOs

The imbalance prices shall remain as published, but the neutrality charge shall be acquired from or redistributed to the BRPs when actual settling of accounts between the BRP and its local TSO occurs.

2.4. Benefits of Single-Single Model

Single-single model offers numerous benefits. For example:

- Single pricing is strongly advocated by the Guidelines on Electricity Balancing as the preferred pricing model for imbalance;
- Provides incentive for BRPs to focus on system imbalance. With single pricing, imbalances are settled with exactly the same price irrespective of the final imbalance position of the market participant. With dual pricing, the imbalances supporting the system overall balance will usually be rewarded with a price limited to the day-ahead price, or even lower.
- As supporting balances reduce the volume of balancing actions carried out by TSOs, the market participants whose imbalances reduce the overall system imbalance shall be rewarded with the price more accurately representing the cost of actual balancing efforts;
- The single-single settlement model better positions the Baltics to integrate new technologies such as demand-side response;
- Single pricing provides hedging opportunities. In most hours, the imbalance price shall be the same in all three Baltic price areas so the BRPs could decrease additional imbalance costs by hedging;
- Supports Baltic's electricity markets integration by merging the portfolios via imbalance pricing.



For single pricing to be effective, participants must also be given access to accurate real-time information regarding the direction of the system imbalance and access to imbalance prices. The TSOs aim to publish imbalance prices H+1. In addition, the TSOs shall publish information regarding mFRR balancing bids – offered, accepted, activated –, cross-border capacities for the exchange of mFRR balancing H+30, incl. the Baltic system’s ACE current status as close to real time as possible.

2.5. Administrative Cost Recovery

The imbalance price shall not include a component for covering administrative costs. Furthermore, the administrative costs shall also be independent from the monthly financial neutrality settlement. Instead the mechanisms applied for covering administrative costs shall be set individually by each TSO and be subject to NRA approval. A neutrality component for all network users will be in line with the current draft edition of the GL EB, according to which each TSO may set up a proposal for an additional settlement mechanism to cover administrative costs.

The Baltic TSOs initial proposals for administrative cost recovery:

	<i>Proposal for administrative cost component</i>
ELERING	<i>0,0X €/MWh for consumption and production (monthly based data)</i>
AST	<i>Fixed fee + charge for sold/purchased imbalance volume €/MWh</i>
LITGRID	<i>Charge for sold/purchased imbalance volume €/MWh</i>

2.6. Settlement Items to be Harmonised by 2018

The following table presents an overview of the items, which are included in the current harmonisation package. All of these shall be included in the standard terms and conditions, which the TSOs aim to publish in the 4th quarter of 2017.

	<i>Settlement items to be harmonised by 2018</i>
<i>Imbalance price publication</i>	<i>As soon as possible (targeted H+1)</i>
<i>Balance report</i>	<i>Monthly based</i>
<i>Initial balance report for BRP</i>	<i>By 10th calendar day of next month</i>
<i>Data exchange formats</i>	<i>Excel or Xml</i>
<i>Imbalance settlement model</i>	<i>Common Baltic principles</i>
<i>Imbalance price calculation methodology</i>	<i>Common Baltic principles</i>

Annex I Definitions

Balance Responsible Party (BRP) means a market-related entity or its chosen representative responsible for its imbalances.

Balancing means all actions and processes, on all timelines, through which TSOs ensure, in a continuous way, to maintain the system frequency within a predefined stability range, and to comply with the amount of reserves needed per frequency containment process, frequency restoration process and reserve replacement process with respect to the required quality.

Balancing Market means the entirety of institutional, commercial and operational arrangements that establish market-based management of balancing.

Balancing Service Provider (BSP) means a market participant with reserve providing units or reserve providing groups able to provide balancing services to TSOs.

Baltic Not Netted ACE means the Baltic's not netted imbalance towards Russia, which is settled through the trade of imbalance energy with the open balance provider of the Baltic system.

Connecting TSO means the TSO which operates the control area in which balancing service providers and balance responsible parties shall be compliant with the terms and conditions related to balancing.

Imbalance means an energy volume calculated for a balance responsible party and representing the difference between the allocated volume attributed to that balance responsible party, and the final position of that balance responsible party and any imbalance adjustment applied to that balance responsible party, within a given imbalance settlement period.

Imbalance Adjustment means an energy volume representing the balancing energy from a balancing service provider and applied by the connecting TSO for an imbalance settlement period to the concerned balance responsible parties, for the calculation of the imbalance of these balance responsible parties.

Imbalance Price means the price, positive, zero, or negative, in each imbalance settlement period for an imbalance in each direction.

Imbalance Settlement means a financial settlement mechanism aiming at charging or paying balance responsible parties for their imbalances.

Imbalance Settlement Period (ISP) means time units for which balance responsible parties' imbalance is calculated.

mFRR (Manual Frequency Restoration Reserves) means the active power reserves activated manually to restore system frequency to the nominal frequency and for synchronous area consisting of more than one LFC area power balance to the scheduled value.

Marginal Pricing means a principle according to which the price of the last activated balancing energy offer following merit order applies to all activated bids during the particular imbalance settlement period.

Position means energy volume representing the sum of scheduled commercial transactions of a balance responsible party, on organised electricity markets or between balance responsible parties, for the calculation of imbalance, or, where appropriate, means an energy volume representing scheduled injections, scheduled withdrawals or the sum of scheduled injections and withdrawals of a balance responsible party, for the calculation of the imbalance of that balance responsible party.

Single Portfolio means grid injection and offtake volumes are netted into a single balance responsibility account.

Single Pricing means a single imbalance price for system shortage and a single imbalance price for system surplus.