

Balancing Report in Accordance with Article 60(1) of Commission Regulation (EU) 2017/2195 of November 2017 establishing a guideline on electricity balancing

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Legal framework

Article 60(1) of the Commission Regulation (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing, hereafter referred to as “EBGL” requires that at least once every two years, each TSO shall publish a report on balancing covering the previous two calendar years, respecting the confidentiality of information in accordance with Article 11.

This report is established by Elia Transmission Belgium SA (legal successor of Elia System Operation SA, both referred hereafter as “ELIA”) to comply with this legal requirement and covers the years 2020 and 2021. Article 60(2) of the EBGL specifies the content of the report, which determines the structure of this report:

a	information concerning the volumes of available, procured and used specific products, as well as justification of specific products subject to conditions pursuant to Article 26;
b	the summary analysis of the dimensioning of reserve capacity including the justification and explanation for the calculated reserve capacity requirements;
c	the summary analysis of the optimal provision of reserve capacity including the justification of the volume of balancing capacity;
d	an analysis of the costs and benefits, and the possible inefficiencies and distortions of having specific products in terms of competition and market fragmentation, participation of demand response and renewable energy sources, integration of balancing markets and side-effects on other electricity markets;
e	an analysis of the opportunities for the exchange of balancing capacity and sharing of reserves;
f	an explanation and a justification for the procurement of balancing capacity without the exchange of balancing capacity or sharing of reserves;
g	an analysis of the efficiency of the activation optimisation functions for the balancing energy from frequency restoration reserves and, if applicable, for the balancing energy from replacement reserves.

Note that this report is complementary to the report published by ENTSO-E following article 59 of the EBGL, in which ENTSO-E focusses on monitoring, describing and analyzing the implementation of the EBGL, as well as reporting on the progress made concerning the integration of balancing markets in Europe.

Report pursuant to article 60 of the EBGL

a) information concerning the volumes of available, procured and used specific products, as well as justification of specific products subject to conditions pursuant to Article 26;

Pursuant to Article 26 of the EBGL, following the approval of the implementation frameworks for the European platforms pursuant to Articles 19, 20 and 21 of the EBGL, each TSO may develop a proposal for defining and using specific products for balancing energy and balancing capacity:

- The Implementation Frameworks for the European platforms pursuant to Articles 20 (mFRR) and 21 (aFRR) were approved on 24 January 2020 by the Agency for the Cooperation of Energy Regulators, pursuant to Article 6(10)(b) of Regulation (EU) 2019/942 and Article 5(7) of the EBGL. Elia did not develop any proposals for defining and using specific products for balancing energy and balancing capacity
- The Implementation Framework for the European platform pursuant to Article 19 (RR) is not applicable to ELIA.

b) the summary analysis of the dimensioning of reserve capacity including the justification and explanation for the calculated reserve capacity requirements;

Reserve capacity requirements	2020		2021	
	positive	negative	positive	negative
FCR (symmetric)	78 MW		87 MW	
FRR	1037 MW	1022 MW	1040 MW	1010 MW
aFRR (symmetric)	145 MW		145 MW	
mFRR	892 MW	877 MW	895 MW	865 MW

Until February 3, 2020, the dimensioning methodology for the reserve capacity needs was specified in ELIA's LFC block Operational Agreement, hereafter referred to as LFCBOA. This proposal was approved by CREG with Decision (B)1912/2 of 27 May 2019¹ :

- Annex 1 of the SAFA² which is the Policy on Load-Frequency Control and Reserves, determines amongst others the dimensioning rules for FCR.
- **Positive FRR needs** are determined on yearly basis as the required reserve capacity on FRR, as well as the ratio on aFRR and mFRR required covering the expected LFC block imbalances following forecast error risks and forced outage risks, within the ELIA LFC block. The dimensioning rules for the positive FRR needs are based on the principles described in Article 157 of the Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation (hereafter referred to as "SOGL"). ELIA (being the sole TSO in its LFC block) is required to have sufficient reserve capacity on FRR at any time in accordance with the dimensioning rules. The dimensioning rules for the FRR also determine the maximum sharing capacity which can be accounted in the dimensioning:
 - ELIA determines the positive FRR needs for the next year following the calculation based on a **probabilistic methodology**. This method ensures that the positive reserve capacity on FRR is sufficient to cover the expected positive LFC block imbalances (production shortages) for at least 99.0% of the time.
 - In addition, ELIA ensures that the positive FRR needs are not less than the positive dimensioning incident of the LFC block. The dimensioning incident is defined by Article 3 of the SOGL as the highest expected instantaneously occurring active power imbalance within a LFC block in both positive and negative direction.
- ELIA uses a probabilistic method to determine the **aFRR needs symmetrically (positive and negative)**, establishing a time series of one year of expected variations between quarter-hours of LFC block imbalances. This is based on the same time series of expected LFC block imbalances used for calculating positive FRR needs. The aFRR capacity is determined as the capacity that can cover 79% of the absolute variations of imbalances.
- **Negative FRR needs** are determined on daily basis and are based on the same principles as for the positive FRR reserve capacity needs. The main difference is that the calculation is conducted on a daily basis taking into account the predicted direction of the HVDC interconnector with Great-Britain. **The negative mFRR needs** are then determined as the difference between the FRR needs and the aFRR needs.

¹ <https://www.creg.be/sites/default/files/assets/Publications/Decisions/B1912-2NL.pdf>

² <https://transparency.entsoe.eu/system-operations-domain/operational-agreements-of-synchronous-areas/show>

As from February 4, 2020, the dimensioning methodology for the reserve capacity needs was specified according to Elia's LFC block Operational Agreement, hereafter referred to as LFCBOA, approved by CREG on December 6, 2019 (B)2025.

- Annex 1 of the SAFA³ which is the Policy on Load-Frequency Control and Reserves, determines amongst others the dimensioning rules for FCR.
- Elia dimensions the required reserve capacity on FRR on a daily basis in accordance with the minimum criteria set out in Article 157(2) SOGL on the basis of the maximum value resulting from:
 - a dynamic **probabilistic methodology** in line with Article 157(2)b of the SOGL. It is based on a convolution of two distribution curves, one representing the prediction risk and another representing the forced outage risk. This methodology has been designed to cover 99.0% of the LFC block imbalance risk. After the convolution, the new distribution is decomposed in a distribution of potential positive LFC block imbalances, and a distribution of potential negative LFC block imbalances. This calculation is conducted for each-quarter hour of the next day, and the 99.0% percentile of each probability distribution curve determines the minimum positive and negative required reserve capacity.
 - The probability distribution representing the prediction risk is based on historic LFC block imbalances. The LFC block imbalances are based on consecutive historical records with a resolution of 15 minutes and includes a period of two years, ending not before the last day of the second month before the month of the day for which the reserve capacity is calculated. The time series is filtered to remove periods with a forced outage of Nemo Link or generating units with a loss of power larger than 50 MW (until the end of the forced outage but limited to 8 hours after the start of the forced outage), periods with exceptional events (e.g. market decoupling) and periods with data quality problems (e.g. missing data). The prediction risk is modelled based on machine learning techniques for each quarter-hour of the next day based on the probability distribution of the LFC block imbalances.
 - To calculate the probability distribution representing the forced outages risk, a distribution curve is calculated representing the probability to face a shortage or surplus capacity following forced outages (including HVDC-interconnectors with Great Britain).
 - a dynamic **deterministic methodology** based on the dimensioning incident in line with Article 157(2)e and 157(2)f of the SOGL. For each-quarter hour of the next day Elia determines the required positive and negative reserve capacity on FRR in order that it is never less than the positive and negative dimensioning incident of the LFC block, as specified in Article 3 and Article 157(2)d of the SOGL.

³ <https://transparency.entsoe.eu/system-operations-domain/operational-agreements-of-synchronous-areas/show>

- a **minimum threshold** based on the historic LFC block imbalances in line with Articles 157(2)h and 157(2)i of the SOGL. For each-quarter hour of the next day, ELIA determines the required positive and negative reserve capacity on FRR in order that it is sufficient to cover at least the positive and negative historic LFC block imbalances for 99.0% of the time in line with Articles 157(2)h and 157(2)i of the SOGL.
- ELIA uses a 'static' probabilistic method to determine the **aFRR needs symmetrically (positive and negative)**, based on a time series of two years of expected variations between quarter-hours of LFC block imbalances. The aFRR capacity needs are determined as the capacity that can cover 79% of the absolute variations of LFC block imbalances. It is determined as a fixed value at 151 MW. Elia plans to present in a next version of the LFC BOA a new methodology to assess the aFRR needs. While awaiting the implementation of this new methodology, Elia limited the symmetric aFRR needs at the same value as in 2019, i.e. 145 MW.
- Elia determines the required positive and negative reserve capacity on mFRR each day before 7 AM for every period of 4 hours of the next day as the difference between the required positive and negative reserve capacity on FRR (dynamic) and aFRR (static).

Note that a new version of the ELIA LFC block Operational Agreement⁴ was approved by CREG on February 10, 2022 including some incremental modifications to the FRR dimensioning method. This is specified in the latest version of the LFCBOA and corresponding explanatory note, and will also be described in the next version of this report.

c) the summary analysis of the optimal provision of reserve capacity including the justification of the volume of balancing capacity;

Average awarded balancing capacity	2020	2021
FCR	78 MW	87 MW
aFRR	145 MW (positive) 145 MW (negative)	146 MW (positive) 146 MW (negative)
Positive mFRR	659 MW with 566 MW of mFRR Standard	645 MW with 640 MW of mFRR Standard

⁴ <https://www.elia.be/en/electricity-market-and-system/system-services/keeping-the-balance>

Until February 4, 2020, the dimensioning methodology for the required balancing capacity was specified in ELIA's proposal "Dossier Volume 2019" approved by CREG with Decision (B)1808 of 18 October 2018 in which the reserve capacity and balancing capacity requirements are determined.

- For FCR, the balancing capacity equals the required FCR needs.
- For aFRR, taking into account the guaranteed availability of the aFRR balancing capacity products, the balancing capacity is determined to be equal to the required aFRR needs. This capacity is determined in line with Article 32 of the EBGL, taking into account that :
 - Elia did not have sharing agreements on aFRR with other TSOs.
 - As non-contracted balancing energy bids have a limited availability, no capacity can be guaranteed with acceptable availability on an annual basis. For this reason, ELIA cannot cover, even partially, its aFRR needs with non-contracted balancing energy offers.
- For positive mFRR, taking into account the guaranteed availability of the mFRR balancing capacity products in combination with the sharing of reserves with other TSOs, balancing capacity is determined at 844 MW. This balancing capacity is covered with a minimum of 314 MW of "mFRR standard". The rest of the capacity can be covered with "mFRR flex" and "mFRR standard" products.
 - As shared mFRR reserve capacity with neighboring TSOs can only be activated in exceptional circumstances, taking into account service availability and remaining cross-border capacity, ELIA can take into account 50 MW of FRR sharing to cover positive mFRR requirements.
 - As non-contracted balancing energy bids have a limited availability, no capacity can be guaranteed with acceptable availability on an annual basis. For this reason, ELIA cannot cover, even partially, its positive mFRR needs with non-contracted balancing energy offers.
- The negative mFRR requirements are covered with non-contracted balancing energy bids and mFRR reserve sharing. On the basis of an analysis of the availability of non-contracted balancing energy bids and the availability of mFRR sharing (based on the availability of the service and the available cross-border capacity on continental borders) no need to procure balancing capacity could be demonstrated. The coverage of the needs with available means is subject to a yearly analysis.

As from February 4, 2020, the dimensioning methodology for the required balancing capacity was specified in ELIA's LFC Means approved by CREG on December 6, 2019 (B) 2026 in which the balancing capacity requirements are determined (complementary to the LFCBOA in which the reserve capacity needs are determined). The modification of the above-mentioned approach entails the calculation of the positive mFRR balancing capacity.

- For positive mFRR, taking into account the guaranteed availability of the mFRR balancing capacity products in combination with the sharing of reserves with other TSOs, balancing capacity is determined dynamically

based on the mFRR reserve capacity needs. This balancing capacity is covered with a minimum of 490 MW of "mFRR standard". The rest of the capacity can be covered with "mFRR flex" and "mFRR standard" products. The minimum capacity was increased to 640 MW as from July 1, 2020.

- As shared mFRR reserve capacity with neighboring TSOs can only be activated in exceptional circumstances, taking into account service availability and remaining cross-border capacity, ELIA can take into account 50 MW of FRR sharing to cover positive mFRR requirements.
- As non-contracted balancing energy bids have a limited availability, no capacity can be guaranteed with acceptable availability on an annual basis. For this reason, ELIA cannot cover, even partially, its positive mFRR needs with non-contracted balancing energy offers.

As from January 7, 2021, the positive sharing capacity included in the dimensioning was increased to 250 MW, following the latest version of the LFC Means approved on December 17, 2020 (B)2159 This increase followed an analysis of historic observations on available interconnection capacity at borders after the intra-day time frame.

The table below depicts per month the balancing capacity mFRR standard and mFRR flex procured by Elia in 2020-21.

Balancing capacity procured by Elia [MW]	2020			2021		
	mFRR standard	mFRR flex	total	mFRR standard	mFRR flex	total
January	469	375	844	668	27	695
February	497	354	851	640	15	655
March	495	354	849	640	11	651
April	491	354	845	642	11	653
May	494	350	844	641	8	649
June	499	317	816	639	1	639
July	641	193	834	630	0	630
August	646	189	835	638	0	638
September	667	164	830	639	2	642
October	729	119	847	643	4	647
November	739	108	847	649	4	653
December	747	108	855	650	5	655

d) Analysis of the costs and benefits, and the possible inefficiencies and distortions of having specific products in terms of competition and market fragmentation, participation of demand response and renewable energy sources, integration of balancing markets and side-effects on other electricity;

In absence of specific products for balancing energy and balancing capacity in 2020 and 2021 as explained in section a, this section is currently not applicable for ELIA's LFC block.

e) Analysis of the opportunities for the exchange of balancing capacity and sharing of reserves;

As from 2019, after the entry into force of the SOGL and the EBGL, ELIA applied the sharing of reserve concept for mFRR and the exchange of balancing capacity concept of FCR (based on the FCR Cooperation). Opportunities for the sharing of FCR and aFRR, as well as the exchange of aFRR balancing capacity and mFRR balancing capacity is discussed in Section f.

- **Exchange of FCR balancing capacity**

ELIA joined the FCR Cooperation in 2016. FCR Cooperation has developed a common process for the procurement of FCR with other TSOs, thus increasing the competition between BSPs and reducing the overall cost of procurement. ELIA procures since then a significant part of its FCR needs abroad.

The table below represents the volume of FCR provided by Belgian BSPs and the volumes of FCR that Elia contracted abroad, through the FCR Cooperation. Until 30th of June 2020, the procurement of part of the FCR capacity was jointly performed with aFRR capacity, through a local auction (the "FCR/aFRR auction"). At least the Core Share⁵ was covered through the FCR/aFRR auction and the remaining amount of FCR capacity was procured in the FCR Cooperation. As of the 1st of July 2020, the FCR Cooperation introduced a daily auction with 4h granularity product and Elia has procured its total FCR demand in the FCR Cooperation, ending the FCR/aFRR auction. The FCR Cooperation procurement rules ensure nevertheless that the Core Share is satisfied locally. Since the beginning of 2021, the volumes procured locally in excess of the Core Share have been extremely limited. Specific information on the prices and volumes of the FCR cooperation can be found on the website of the FCR Cooperation⁶.

⁵ Elia ensures that at least 30 % of their total combined initial FCR obligations is physically provided inside their LFC block, in line with Article 163 and Annex VI of the SOGL

⁶https://www.regelleistung.net/apps/datacenter/tenders/?productTypes=PRL&from=2019-07-01&to=2020-04-30&tid=PRL_20200522_D1

	2020		2021	
	Volume of FCR provided by Belgian BSPs [MW]	Imported volumes of FCR [MW]	Volume of FCR provided by Belgian BSPs [MW]	Imported volumes of FCR [MW]
January	46	32	28	59
February	45	34	33	54
March	43	36	28	59
April	39	39	28	59
May	41	37	29	58
June	44	34	28	59
July	56	22	28	59
August	55	23	28	59
September	55	23	28	59
October	55	23	28	59
November	56	22	28	59
December	56	22	27	60

- **Sharing of mFRR**

In line with Article 32(1) of the EBGL, ELIA takes into account the sharing of reserve capacity with neighbouring TSOs in the dimensioning of its balancing capacity.

The maximum shared volume for positive and negative reserve on mFRR that can be taken into account is specified in the LFCBOA, in accordance with Article 157(2)(j) and Article 157(2)(k) of the SOGL. A TSO in the Continental Europe area may reduce the positive (or negative) reserve capacity on FRR if limited to the difference, if positive, between the size of the positive dimensioning incident and the reserve capacity on FRR required to cover the positive (or negative) LFC block imbalances during 99 % of the time. The reduction of the positive reserve capacity shall not exceed 30 % of the size of the positive dimensioning incident.

As explained in LFCBOA, ELIA had at disposal in 2020 and 2021 reserve sharing agreements on mFRR with all neighbouring TSOs. It is however to be stressed that these contracts are voluntary, and can be subject to modifications on request of the counter-party. Pursuant to Article 157(2)(g) of the SOGL, and Article 10(3) of the LFCBOA, ELIA takes into account the restrictions defined in the mFRR sharing agreements due to possible violations of operational security and the mFRR availability requirements as specified in Article 157(2)b and Article 4 of the LFC Means:

- these reserves are subject to service availability and may only be activated under exceptional conditions described in the operational agreements governing the sharing of the mFRR reserve to maintain the balance in the LFC block for a limited number of hours and thus cover part of the mFRR needs. They are generally activated after using all the other available balancing services (the non-contracted balancing energy bids and the contracted balancing capacity);

- these reserves are never guaranteed as the availability of cross-border capacity is not ensured and are therefore subject to the availability of interconnection capacity at borders, as well as internal network operating constraints such as congestions.

Taking into account the above-mentioned constraints, and following a reduction in the reliability rate for covering the expected LFC block imbalances (as specified in Article 8 of the LFCBOA, from 99.9% (in 2018) to 99.0% (in 2019), ELIA determined as an act of prudence and in order to limit the planned activations in accordance with the contracts until January 6, 2021 (following the version of the LFC Means approved on December 6, 2019):

- the positive sharing capacity included in the dimensioning to 50 MW;
- the negative sharing capacity included in the dimensioning to 350 MW.

As from January 7, 2021, the positive sharing capacity included in the dimensioning is increased to 250 MW, following the latest version of the LFC Means approved on December 17, 2020. This increase followed an analysis of historic observations on available interconnection capacity at borders after the intra-day time frame.

f) an explanation and a justification for the procurement of balancing capacity without the exchange of balancing capacity or sharing of reserves;

Where the previous section already discusses the opportunities of exchange of balancing capacity for FCR, and sharing of mFRR, this section focuses on the exchange of balancing capacity and sharing of reserves which are currently not implemented.

- As FCR is dimensioned on regional basis by ENTSO-E, i.e. for Continental Europe, the sharing of FCR reserve capacity for ELIA's LFC block is not applicable.
- Considering the automatic, local character of the activation of aFRR, it has been considered very complex to share aFRR reserve capacity or exchange aFRR balancing capacity before the European balancing platform for aFRR is established. In addition, the existing gaps between the local market designs would likely hinder such exchange.
- In ELIA's view, the exchange of mFRR balancing capacity would have required the reservation of cross-zonal capacity for this purpose. This was not expected to be beneficial to the market, as it would have reduced trading opportunities in day-ahead and intraday. It would also have required to establish with neighbouring TSOs complex processes to be able to activate the reserve contracted abroad frequently.

g) Analysis of the efficiency of the activation optimisation functions for the balancing energy from frequency

restoration reserves and, if applicable, for the balancing energy from replacement reserves.

As the implementation of the balancing energy exchange platforms according to Articles 20 and 21 of the EBGL were not implemented in 2020 and 2021, this chapter is not yet relevant for ELIA's LFC block.