EXPLANATORY NOTE

Explanatory note on the public consultation of the proposal of amendments to the T&C BSP FCR

ELIA, July 2025

Contents

Practical information

Purpose of this note

This note serves as an explanation for the current consultation on the **proposal for amendments to the Terms and Conditions for Balancing Service Providers for the Frequency Containment Reserve Service** (hereafter referred to as "T&C BSP FCR"). The purpose of this consultation is to obtain comments from the market parties. At the end of the public consultation, Elia will send a consultation report to the CREG and will then publish a non-confidential version of this report on its website.

Process

All responses to this public consultation will be made public on Elia's website, except the comments for which market parties ask to treat their contribution as confidential. However, all responses to this public consultation will be submitted to the relevant regulatory authorities in the context of the official approval procedure[1] for the T&C BSP FCR.

Timing to provide feedback and suggestions

Elia invites all stakeholders to submit any comments and suggestions they may have on the documents submitted for consultation. The consultation period runs from the 28th of May 2025 to the 30th of June 2025. All responses must be submitted via the online form on the Elia website. The proposal for amendments to the T&C BSP FCR is available for consultation on the Elia website.

[1] Article 6(3) of Regulation 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing

Explanatory note on the public consultation of the proposal of amendments of the T&C BSP FCR

1. Introduction

This proposal for amendments to the Terms and Conditions for Balancing Service Providers for the Frequency Containment Reserve Service (T&C BSP FCR) consists of:

- Amendments relative to the settlement and invoices processes; and
- Amendments relative to the introduction of a mandatory declarative baseline; and
- Amendments relative to Continuous monitoring; and
- Amendments relative to Continuous Activation Control & incentives; and
- Amendments relative to Error Attribution during combo delivery of FCR and aFRR; and
- Amendments relative to the Prequalification test; and
- Amendments relative to the migration of real-time communication requirements towards RTCP/Flexhub; and
- Amendments relative to the introduction of the CDSO declaration; and
- Amendments relative to the digital update of the Contact Details for the BSP; and
- Other amendments

Section 2 of this explanatory note provides more information related to the different amendments contained in the proposal for amendment of the T&C BSP FCR.

Section 3 provides more information related to the implementation planning of the different amendments proposed.

2. Proposed amendments

2.1. Amendments related to the settlement and invoices processes

Optimizing the settlement and invoicing process for Balancing Service Providers (BSPs) ensures faster payments for their services, positively impacting their required working capital. It also contributes to a faster feedback loop on the service and overall creates efficiencies in operating the processes. The advantage of faster payment to the BSPs will consequently help to remunerate their downstream grid users. Furthermore, by reducing payment timings, this improvement facilitates market access for new BSPs by lowering entry barriers and helps to increase competition among them. Performing settlement several months after actual delivery is outdated and deserves an upgrade. This revision enables the transition to more digitalization and contemporary functionalities like self-billing.

In CREG's decision (B)658E/89, an incentive is formulated to foster the above goals and improvements to the settlement processes and for Elia to develop the necessary solutions for the FCR, aFRR and mFRR services. This document provides the implementation plan, i.e., the first milestone of the balancing incentive. It serves as an outline of the scope, the improvements and the deadlines linked to the balancing incentive. Furthermore, it provides an overview on the process to reach the balancing incentive's goals, the impact on the processes and the planning of the go live(s).

The proposed changes have been discussed with stakeholders during 3 workshops, that took place on 05/12/2024, 13/02/2025 and 02/04/2025.

The changes in the settlement and invoicing process are common to the three balancing products: FCR, aFRR and mFRR. An important change is the introduction of the self-billing process, where ELIA will issue invoices and credit notes, in the name of and on behalf of the BSP.

The proposed process for settlement and invoicing is as follows:

1. Elia will publish all settlement reports together with the concerned data related to remuneration and control on EPIC and TraXes at the latest by the end of the month following the delivery provided ELIA has received all the necessary metering data for Delivery Points connected to the Public Distribution Grid, from the relevant DSO with sufficient time to generate the reports [2]. As an example, by the end of February Elia will have published all reports concerning remunerations and controls of January. BSPs will be informed of each specific settlement report by email to the relevant contact persons that it has been published on EPIC and TraXes.

[2] It may be the case that, for activation control in mFRR in particular, metering data of Low-voltage Delivery Points are not available on FlexHub early enough for allowing ELIA to publish the corresponding report on EPIC or TraXes at the end of the month following the delivery.

2. Following the publication and notification by email, the BSP has 25 calendar days to approve or reject the specific settlement report. If a BSP neither approves nor rejects the report within 25 calendar days of its publication on EPIC, the report will be considered implicitly approved.
3. An approval, either implicit or explicit, always triggers the self-billing process. For the different financial flows, Elia refers to Table 1 below. The self-bills, self-bill credit notes and Elia invoices will be issued and published within 10 calendar days after BSP approval, covering potential delays in non-standard scenarios. Note that as an approval by the BSP in EPIC normally triggers the automatic creation by Elia of the self-bills, self-bill credit notes and Elia invoices, these 10-calendar days delay offers time to solve issues related to the creation process.
4. The payment terms of the invoices and credit notes have been modified to 15 calendar days after the issuing of the self-bills, self-bill credit notes and Elia invoices, aligning with the terms proposed for BRPs which contrasts with the 30 calendar days following the day in which the invoice is received, prior to the changes. Note that the current version of the BRP contract does not foresee this change yet however public consultation on those contracts are foreseen for September 2025 onwards.

Secondly, Elia proposes the following approach in case of non-standard settlement.

1. If the BSP disagrees via EPIC within the 25-calendar day approval window, they will have to reject the settlement report. Then, a 60-calendar day negotiation period will commence from the day following the rejection. During this period, both parties (BSP and Elia) will negotiate to reach an agreement. If an agreement is reached within 60-calendar days, Elia will issue self-bills, self-bill credit notes and Elia invoices based on the agreed figures.
2. If no agreement is found however, Elia may inform the CREG of the failed negotiation and will issue self-bills, self-bill credit notes and Elia invoices based on the initial report figures. Elia will inform the CREG if it considers the negotiations are unreasonably taking too much time.
3. Negotiations will continue to further settle the matter ex-post.

Invoices and credit notes are replaced by respectively self-bills and self-bill credit notes except on two occasions. For activation remuneration, it is possible that Elia is to receive money from the BSPs due to downwards activations in combination with positive prices (and vice versa: upward activations with negative prices). For tax reasons, in such cases, Elia will have to provide an invoice to the BSP. The same logic applies for activation control in these specific cases. Table 1 below contains an overview of all changes related to the self-belling, structured by financial flow.

In case the BSP sends now	Elia will provide in the future
an invoice related to a ***capacity remuneration***	***a self-bill*** to the BSP, on behalf of the BSP
a credit note related to ***an availability control***	***a self-bill credit note*** to the BSP, on behalf of the BSP
an invoice related to ***activation remuneration (in case of positive amounts)***	***a self-bill*** to the BSP, on behalf of the BSP
a credit note related to ***activation remuneration (in case of negative amounts)***	***an invoice*** to the BSP (for tax reasons, in case of negative amounts, the financial flow is inverted)
a credit note related to ***an activation control (in case of positive amounts)***	***a self-bill credit note*** to the BSP, on behalf of the BSP
a credit note related to ***an activation control (in case of negative amounts for activation remuneration)***	***an invoice*** to the BSP (for tax reasons, in case of negative amounts for activation remuneration, the financial flow is inverted)

Table 1: Overview of changes with the introduction of self-billing.

In this context, the proposal for amendments of the T&C BSP FCR:

- Introduces the definitions of BSP-invoice, BSP-credit note and ELIA-invoice,
- Precises that ELIA will check every Month M the availability tests performed during **Month M-1** (instead of M-2), in **Art. II.13.8**
- Precises that ELIA will check every Month M the compliance of the FCR Supplied during **Month M-1** (instead of M-2), in **Art. II.14.1**
- Introduces the use of self-billing, in **Art. II.17.1**, and precises that the General conditions apply in that context in **Art II.17.2**.
- Describes the process of publication of the reports on remunerations and controls in **Art II.17.3**.
- Describes the process to approve or reject each of the reports in **Art II.17.4**
- Describes the process followed in case the BSP rejected one report in Articles **II.17.5 and II.17.6**
- Describes the process of invoicing of the remunerations and incentives in Articles **II.17.7, II.17.8 and II.17.9**
- Precises the payment delays in **Art. II.17.10**

As the roll-out of this process will be made in two waves, **a separate document is included in the public consultation to present the changes to the contract that will be applicable in the intermediary period.**
In the first wave, this process will be **only applicable for capacity remuneration.**
In the second wave, the process will be extended to controls and incentives.
For clarity, the applicable version of Article 18 between the two waves is shown in a separate file: “FCR Article18 interim.pdf”.

2.2. Amendments relative to the introduction of a mandatory declarative baseline

Currently, the Balancing Service Provider (BSP) does not communicate a baseline to Elia. Instead, the baselines in the prequalification test, availability tests and activation control are calculated by Elia, based on 20s averages of the power delivered before the trigger of the test.

- The baseline for the prequalification test is defined by taking the average $P_{meas}(ts)$ over the 20 seconds preceding the beginning of the test (TS0-19 to TS0)
- The baseline for the availability test is equal to the average power measured during the 20 seconds preceding the moment at which the test signal is sent by ELIA (period TS0-19 to TS0)
- The baseline for activation control, $P_{measbefore}$, is computed over the period of 20 seconds exactly preceding the Frequency Variation.

The study exploring the feasibility of offering various balancing products on DPpg has examined the simultaneous activation of FCR and the aFRR bids involving the same DPpg. The outcome of this study recommends implementing a declarative baseline for FCR to align it with the existing baseline methodology for aFRR. This adjustment is crucial for establishing an integrated activation control, enabling the simultaneous delivery of both FCR and aFRR.

In this regard, the proposal for amendment to the T&C BSP FCR consists of changes to several chapters:

2.2.1. Real-time communication requirement

An extra setpoint $DP_{Baseline}$ is to be sent by the BSP to Elia, 60s before the Time Step for which it applies. This is an additional requirement for real-time communication and the BSP is expected to communicate a baseline value per Time Steps (ts). The existing setpoint $DP_{CH\text{-}DCH}$ will be removed from the real-time communication requirements as its purpose will be replaced by the $DP_{Baseline}$. This leads to amendments in **Annex 11.E**.

2.2.2. Real-time baseline

To further align with the baseline methodology of aFRR, Elia has also introduced the possibility to request to use a real-time baseline for FCR. The process to submit this request has been introduced into a new **Annex 2.F.** Delivery Points that need to be included in an FCR Low-Voltage Delivery Point Group in accordance with Art. **Error! Reference source not found.** cannot make use of the possibility to use a real-time baseline.

2.2.3. Baseline test

This amendment describes the process used for baseline tests. The BSP must perform a baseline test with the delivery points participating in the prequalification test.

A baseline test is scheduled with Elia upon request of the BSP by e-mail to the contractual responsible. The BSP and ELIA agree on a Day D, during which the baseline test is performed. ELIA proceeds to the baseline test no later

than 10 Working Days after the reception of the BSP request. At the latest 10 Working Days after the baseline test has taken place, ELIA provides the results of the baseline test by e-mail to the contractual responsible of the BSP.

Furthermore, all previously prequalified delivery points must perform a baseline test after the entry into force of the T&C BSP FCR. These will be scheduled in communication between Elia and the BSP.

For a baseline test, the baseline quality is evaluated for Day D on the set of Delivery Points listed for participation to the baseline test. As with aFRR, the baseline test is compliant if the quality factor is higher or equal to 95%.

Compared to the current baseline test for aFRR Delivery Points, one change is made.
In the normalization factor of the quality factor, Elia now takes into account 50% of the sum of the $DP_{FCR,max}$ of the Delivery Points participating to the baseline test:

$$\text{quality factor(D)} = 1 - \frac{\sqrt{\frac{\sum_{\text{Time Steps}} \text{deviation(ts)}^2}{\text{N}}}}{\max\left(\text{reference baseline}; \mathbf{0.5} * \sum_{\boldsymbol{DPs}} \boldsymbol{DP_{FCR,max}}\right)}$$

This amendment was included to ensure the baseline test is more technology-neutral, as previously Delivery Points with a reference baseline closer to 0MW were assessed more strictly.

This leads to amendments in **Art. II.6** and the introduction of a **new Annex 6**

2.2.4. Baseline in prequalification and availability tests

As the new real-time data requirement is implemented, this declarative baseline will be introduced in the baseline calculation of the prequalification and the availability tests.

The new baseline for the prequalification test is the baseline value received for time step TS_0 at the start of the prequalification test:

$$Baseline = \sum_{\substack{All\ DP \in \\ Providing\ Group}} DP_{Baseline}\,(TS_0)$$

The new baseline for the availability test is the baseline value received for time step TS_0 at which the trigger of the availability test is sent by ELIA:

$$Baseline = \sum_{\substack{All\ DP \in \\ tested\ FCR\ Energy\ Bid(s)}} DP_{Baseline}\,(TS_0)$$

This leads to amendments in **Annex 7** and **Annex 12**.

2.2.5. Baseline in activation control

Activation control will be discussed in-depth in the following chapter of this document.

2.3. Amendments relative to Continuous monitoring

To enhance the harmonization of monitoring within the FCR Cooperation, the TSOs have collaboratively developed a continuous monitoring algorithm, which is proposed as a best practice for the monitoring of FCR delivery for TSOs. This algorithm employs two methods to establish KPIs for evaluating the quality of service and performance of BSPs delivering FCR. These methods are:

- The Corridor Approach
- The Correlation Approach

Monitoring of FCR is seen as one tool to strive towards a high-quality FCR delivery to improve the activation quality of BSPs and contribute to a high level of security of supply and frequency stability. By implementing the continuous monitoring methodology, Elia hopes to improve the quality of monitoring. Output of the monitoring will be used for continuous activation control & incentives (chapter 2.4 of this document) and to help BSPs identify points of improvement in the delivery of the FCR Service.

2.3.1. The Corridor Approach

This approach to check whether the BSP satisfies the minimum delivery requirement is to create an envelope (a "corridor") which considers the frequency or change of frequency to determine the minimum delivery. Within this monitoring approach, only the lower bound (upper bound for downward activation) shall be monitored, as over delivery is tolerated for FCR for the time being.

The ideal and theoretical behaviour of a BSP would be an instantaneous response to any frequency deviation to preserve the system, but the physical reality of the assets requires to set up of minimal requirements.

There are three legal obligations defining the minimum FCR requirements:

- SOGL - Article 156 art. 7
- SOGL – Article 154 (7)
- Proposal on additional properties of FCR pursuant SOGL 154(2)

These three legal obligations form the appropriate activation behaviour that BSP should have in case of frequency deviation (see Figure 1). The reaction should ideally remain in the green area (expected standard) of the visualization. The steady state power response reaction should be proportional to the frequency deviation, for a given prequalified volume of FCR. There should be no artificial delay of FCR activation allowed for the technical units, unless the BSP can provide evidence that there is a strict technical requirement that justifies this delay.

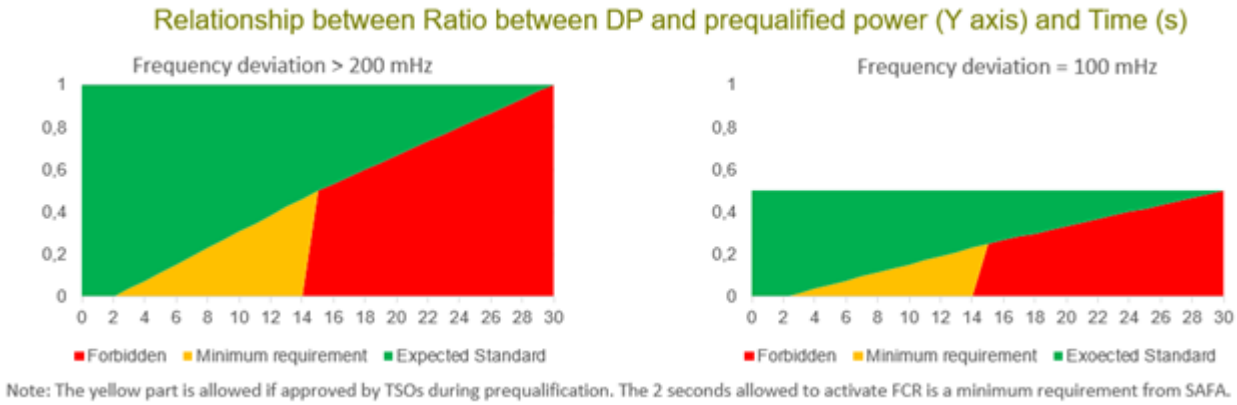
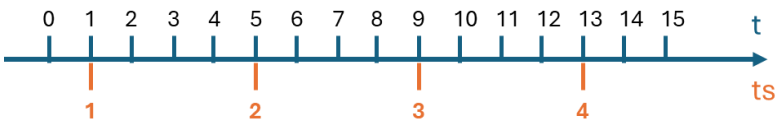


Figure 1:The accepted response of FCR Provider to change in frequencies

These requirements form the foundation for the corridor calculation. The calculation of the corridor leads to amendments in **Annex 13.B.**

2.3.1.1. Calculation of insensitivity limits

In the formulas from this section, it is to be understood as a duration of 1 second, while ts is a Time Step. In order to find the value for Time Step ts from t, the latest available value of t at Time Step ts is used. For example, for Time Step (ts = 2), Elia uses the value calculated at t = 5.



The corridor approach considers an insensitivity band of 5% of the awarded FCR volume around the FCR Requested.

- Lower Insensitivity Limit or $LIL(t) = FCR_{Req}(t) - 0.05 * FCR_{Obligation}(t)$
- Upper Insensitivity Limit or $UIL(t) = FCR_{Req}(t) + 0.05 * FCR_{Obligation}(t)$

This insensitivity band allows for the deadband of 10mHz around 50Hz to be respected and to take into account margins related to the quality of metering (4s sampling, small frequency difference on different locations etc.). The objective of the insensitivity band is not to tolerate 5% under delivery, BSPs should aim for a delivery equal to the requested FCR.

This leads to amendments in **Annex 14.B**.

2.3.1.2. Calculation of linear limits

Additional to the insensitivity limits, the corridor approach has limits computed based on the linear rise of the allowable reaction profile between 2s and 15s and between 15s and 30s.

For a point in time "t", there are 28 frequency measurements that create an allowed reaction profile that has an impact on t. We call each profile a delay τ, with τ = [3;30]. In other words, for every delay τ, the Frequency Deviation at instant $t-\tau$ implies a linear limit on the FCR that must be delivered at instant t to be compliant with the requirements above, see figures 2 and 3.

As FCR Delivery is checked at FCR Energy bid level, Delivery Points which have been granted derogation(s) from the contractual activation requirements, as specified in Art. **Error! Reference source not found.** or Art. **Error! Reference source not found.** of the T&C BSP FCR, should be offered in separate bids, as the corridor will be determined using the most strict requirements of the Delivery Points of the FCR Energy Bid. If the FCR Energy bid only includes Delivery Points which have been granted a derogation, the $LLL(t;\tau)$ and $ULL(t;\tau)$ for $3 \leq \tau < 15$ are equal to 0.

For each delay, we calculate the linear rise.

- the Lower Linear Limit (LLL):

$$LLL(t;\tau) = \begin{cases} LL(t-\tau) + \frac{\tau-2}{13} * 0.5 * \left(\min_{0\leq k\leq \tau}\left[FCR_{Req}(t-k)\right] - LL(t-\tau)\right) & \text{if } 3 \leq \tau < 15 \\ LL(t-\tau) + \frac{\tau}{15} * 0.5 * \left(\min_{0\leq k\leq \tau}\left[FCR_{Req}(t-k)\right] - LL(t-\tau)\right) & \text{if } 15 \leq \tau \leq 30 \end{cases}$$

$$LLL(t) = \max_{3\leq\tau\leq 30}\left(LLL(t;\tau)\right)$$

- the Upper Linear Limit (ULL):

$$ULL(t;\tau) = \begin{cases} UL(t-\tau) + \frac{\tau-2}{13} * 0.5 * \left(\max_{0\leq k\leq \tau}\left[FCR_{Req}(t-k)\right] - UL(t-\tau)\right) & \text{if } 3 \leq \tau < 15 \\ UL(t-\tau) + \frac{\tau}{15} * 0.5 * \left(\max_{0\leq k\leq \tau}\left[FCR_{Req}(t-k)\right] - UL(t-\tau)\right) & \text{if } 15 \leq \tau \leq 30 \end{cases}$$

$$ULL(t) = \min_{3\leq\tau\leq 30}\left(ULL(t;\tau)\right)$$

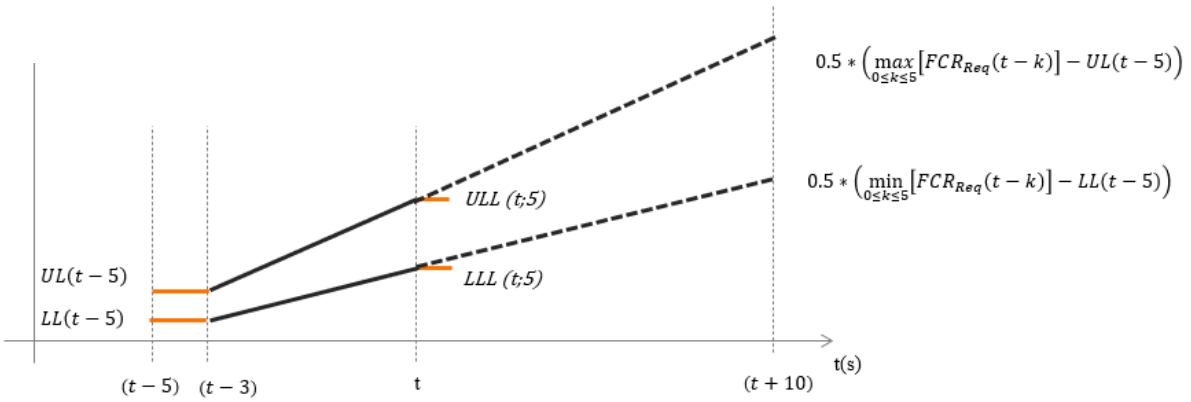


Figure 2: Illustration of the linear rise for τ = 5

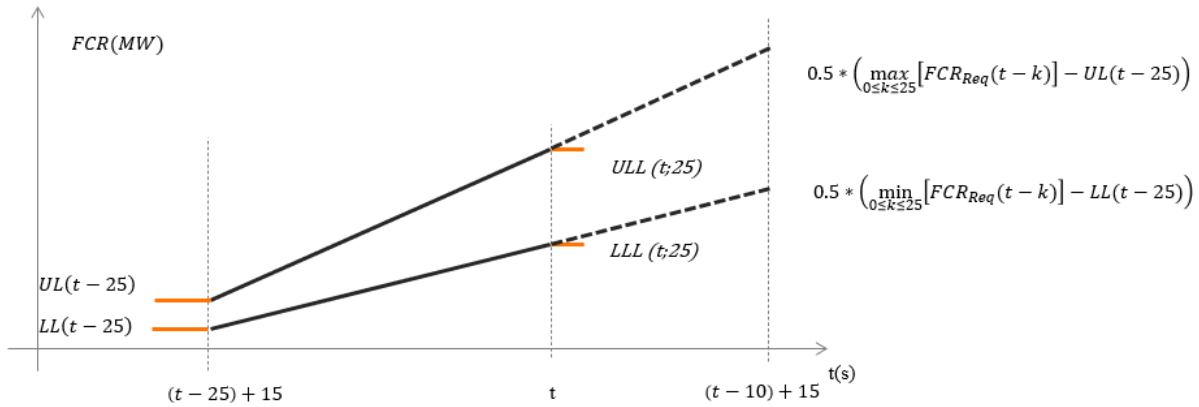


Figure 3: Illustration of the linear rise for τ = 25

These values are defined as such for the following reasons:

- The Lower Linear Limit $LLL(t)$ is defined as the maximum value of $LLL(t;\tau)$ with values of τ ranging from 2 to 30 seconds, showing that the BSP must satisfy the requirements for all delays τ up to 30 seconds. The maximum value of $LLL(t;\tau)$ is the strictest Lower Linear Limit.
- The Upper Linear Limit $ULL(t)$ is defined as the minimum value of $ULL(t;\tau)$ with values of τ ranging from 2 to 30 seconds, showing that the BSP must satisfy the requirements for all delays τ up to 30 seconds. The minimum value of $LLL(t;\tau)$ is the strictest Upper Linear Limit.
- In the determination of the lower linear limit $LLL(t;\tau)$, the factor $\min_{0\le k\le\tau}\left[FCR_{Req}(t-k)\right] - LL(t-\tau)$ means that, for a given delay τ:
    - the BSP should have delivered at least $LL(t-\tau)$ at instant $t-\tau$. This is the starting point for the linear profile as can be seen in figures 2 and 3.

- only the least constraining value of FCR_{Req} in the interval $[t-\tau; t]$ is considered. This is implied by the minimization of $FCR_{Req}(t-k)$ with values of k between 0 and τ. We select the least constraining value of FCR_{Req} to provide the BSP with the maximum freedom.

- In the determination of the upper linear limit $LLL(t;\tau)$, the factor $\max_{0\le k\le\tau}\left[FCR_{Req}(t-k)\right] - LL(t-\tau)$ means that, for a given delay τ:
  - the BSP should have delivered at most $UL(t-\tau)$ at instant $t-\tau$. This is the starting point for the linear profile as can be seen in figures 2 and 3.
  - only the least constraining value of FCR_{Req} in the interval $[t-\tau; t]$ is considered. This is implied by the maximization of $FCR_{Req}(t-k)$ with values of k between 0 and τ. We select the least constraining value of FCR_{Req} to provide the BSP with the maximum freedom.

- The linear limits $LLL(t;\tau)$ and $ULL(t;\tau)$ are defined by parts to take into account the two linear rises, from 2 to 15 seconds, and from 15 to 30 seconds respectively.

This leads to amendments in **Annex 14.B**.

2.3.1.3. Determination of the FCR Lower and Upper Limits

Since the BSP must comply with all the limits of the delays, the strictest limits are selected for the lower and upper limit of Time Step "ts":

- the Lower Limit (LL):

$$LL(t) = \min\left(\max[LL(t-1); LLL(t)]; \min_{0\le\tau\le2} LIL(t-\tau)\right)$$

- and the Upper Limit (UL):

$$UL(t) = \max\left(\min[UL(t-1); ULL(t)]; \max_{0\le\tau\le2} UIL(t-\tau)\right)$$

There are two side conditions impacting the selection of the Lower and Upper Limit:

1. If the lower (higher) limit from the previous time step exceeds the Linear Lower (Upper) Limit, the limit from the previous time step is chosen.
2. When determining the insensitivity limits, a reaction time is factored in to mitigate abrupt changes caused by frequency volatility.

This leads to amendments in **Annex 14.B**.

2.3.1.4. Determination of the FCR Inner Limit

FCR Inner Limit (t) = the minimum amount of energy (in absolute value) that should be delivered.

If the upper bound and lower bound have the same sign, the inner limit corresponds to the lower bound if the activation is positive and the upper bound if the activation is negative.

When the upper & lower bound have a different sign, the inner limit corresponds to 0.
The lower and upper limit are determined as follows:

$$FCR_{Inner\ Limit}(t) = \begin{cases} UL(t) & \text{if } LL(t) < UL(t) \leq 0 \\ 0 & \text{if } LL(t) < 0 < UL(t) \\ LL(t) & \text{if } 0 \leq LL(t) < UL(t) \end{cases}$$

This leads to amendments in **Annex 14.B**.

2.3.1.5. KPIs defined by the Corridor Approach

Through this approach, the following KPIs are defined:

- **Time Out of Bound**

The Time Out of Bound (under delivery) corresponds to the percentage of timestamps when there is an under delivery. If the frequency deviation is positive, an under delivery occurs when the activated FCR is greater than the FCR Inner Limit. If the frequency deviation is negative, then the under delivery occurs when the activated FCR is less than the Inner Limit.

- **FCR Underdelivery / FCR Inner Limit**

This ratio represents the energy underdelivered divided by the energy expected (FCR Inner Limit). It allows to compare the missing energy that a BSP has not provided with respect to the minimum acceptable FCR energy needed to avoid under delivery. In the ideal case, the ratio is equal to zero.

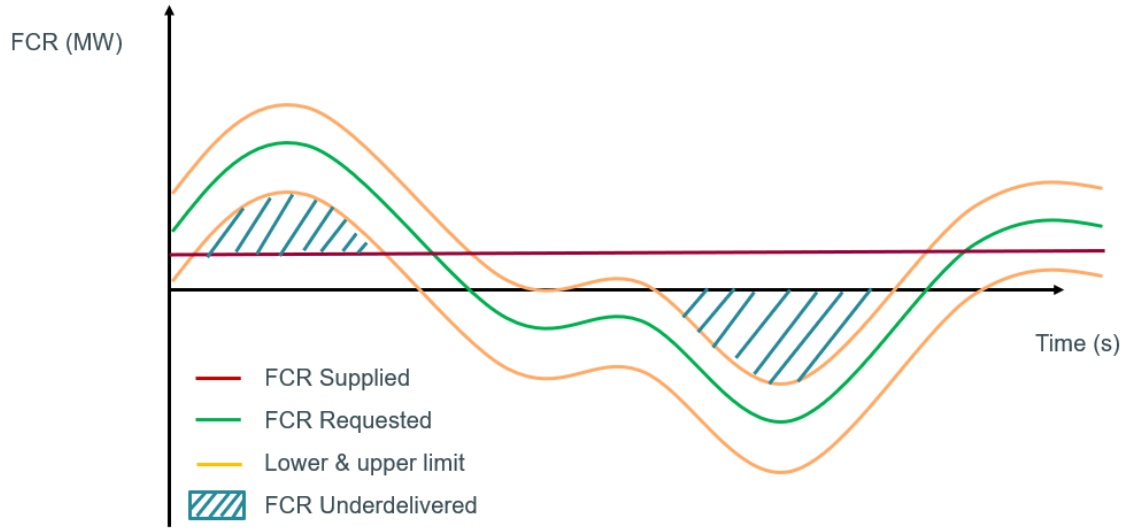


Figure 4: Graphical illustration of FCR Underdelivery (This graph is for illustrative purposes only and is not an accurate representation of the corridor)

- **Normalized Root Mean Square Error**

The Normalized Root Mean Square Error shows the deviation between activated energy FCR and corridor boundaries. This KPI shows the quality of the FCR provision and provides an insight of the under delivery within a given time frame. The RMSE is normalised using the mean awarded capacity. However, this KPI has no impact on the T&C.

2.3.2. The Correlation Approach

The second approach to check whether the BSP satisfies the minimum delivery requirement is to fit a linear regression between the actual FCR and the frequency. The linear regression allows some KPIs to be defined, and these can be used as a reference to evaluate the behaviour of the BSPs. However, as these KPIs have no impact on the T&C, they will not be discussed in this explanatory note.

2.4. Amendments relative to Continuous Activation Control & incentives

2.4.1. Activation control

The current activation control mechanism consists in selecting a sample of frequency deviations for each delivery period and verifying the supplier's portfolio response to that frequency deviation.

The proposal for amendments includes a shift towards continuous activation control based on the KPIs calculated by the Corridor Approach, described in chapter 2.3.1.

The ratio FCR Underdelivery / FCR Inner Limit compares the missing energy that a BSP has not provided with respect to the minimum acceptable FCR energy needed to avoid under delivery. This will be used as a KPI for activation control.

The calculation of FCR Underdelivered is performed as follows:

$$FCR\ Underdelivery\ (ts) = \begin{cases} |FCR_{Inner\ Limit}(ts) - FCR\ Supplied(ts)| & \text{if } |IL(ts)| > |FCR\ Supplied(ts)| \text{ and } IL(ts) * FCR\ Supplied(ts) > 0 \\ 0 & \text{if } |IL(ts)| \leq |FCR\ Supplied(ts)| \text{ and } IL(ts) * FCR\ Supplied(ts) > 0 \\ |FCR_{Inner\ Limit}(ts)| & \text{if } IL(ts) * FCR\ Supplied(ts) \leq 0 \end{cases}$$

FCR Inner limit (or IL(ts) for presentation purposes) is described in chapter 2.3.1. and FCR Supplied calculated as follows:

$$\text{FCR Supplied (ts)} = P_{\text{Baseline}}(ts) - P_{\text{meas}}(ts)$$

The FCR Supplied is determined based on the contribution of all Delivery Points.
Therefore:

$$P_{\text{meas}}(ts) = \sum_{\substack{\text{All DP} \in \\ \text{FCR Energy Bid(s)}}} [DP_{\text{measured}}\ (ts)]$$

$$P_{\text{Baseline}}(ts) = \sum_{\substack{\text{All DP} \in \\ \text{FCR Energy Bid(s)}}} [DP_{\text{Baseline}}\ (ts)]$$

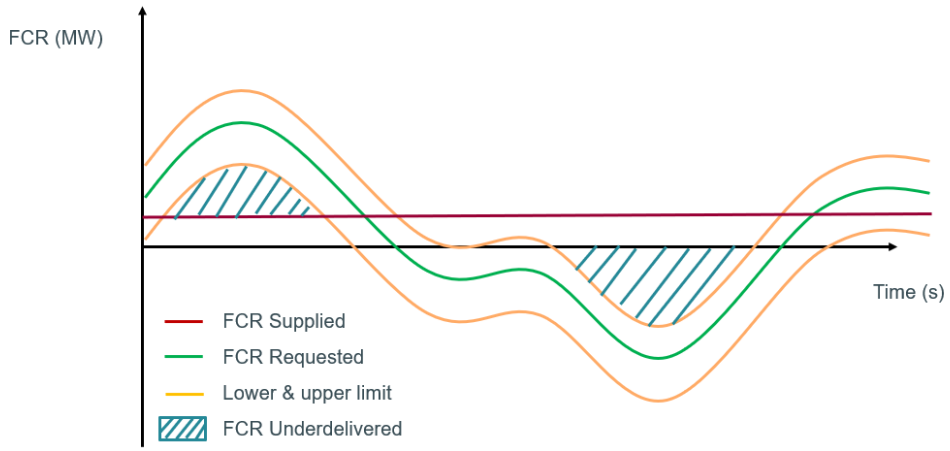


Figure 5: Illustration of Continuous activation control and FCR underdelivery

This leads to amendments in **Art. II.14** and **Annex 13.**

2.4.2. Incentives for Activation control

The proposed financial incentive linked to continuous activation control is based on the performance of the BSP on the KPI "FCR Underdelivery / FCR Inner Limit" per CCTU and the monthly incentive is the sum of the received financial incentives of each CCTU of the month.

$$P_{Month} = \sum_{\substack{all\ CCTU\ s \\ of\ Month\ M}} [1{,}2 * Underdelivery\ factor * Remuneration\ (CCTU)]$$

$$Underdelivery\ factor = \max\left\{\frac{FCR\ Underdelivered\ (CCTU)}{FCR\ Inner\ Limit\ (CCTU)}; 0\right\}$$

Where:

$Remuneration\ (CCTU)$ is the total remuneration for the FCR Awarded, determined in accordance with Art. II.15.1, for the relevant CCTU.

$$FCR\ Underdelivered\ (CCTU) = \sum_{\substack{all\ CCTU\ s \\ of\ Month\ M}} \left[\frac{FCR\ underdelivered(ts)}{900}\right]$$

$$FCR\ Inner\ Limit\ (CCTU) = \sum_{\substack{all\ CCTU\ s \\ of\ Month\ M}} \left[\frac{FCR\ Inner\ Limit(ts)}{900}\right]$$

The factor of 1.2 in the calculation of the financial incentive is a fixed calibration factor. Energy bids that are involved in an availability test are not subject to activation control for the duration of this availability test.

There is no change in the cap for financial incentives. This remains capped by the monthly remuneration of the FCR Awarded.

Aside of financial incentives, Elia also holds the possibility to suspend a Delivery Point for 30 calendar days if the Delivery Points has had a positive FCR Underdelivery for at least 20% of the Time Steps during the month for which the last report on Activation Control is available.

This leads to amendments in **Art. II.16, Art. II.17** and **Annex 14.E.**

2.5. Amendments relative to Error Attribution during combo delivery of FCR and aFRR

Following the incentive study on "Analysis of the possibility to offer different types of balancing products on DPpg[3]" Elia has proposed recommendations for the improvement of the simultaneous delivery of FCR and aFRR:

- The introduction of a declarative FCR baseline similar to the aFRR baseline. As explained in chapter **Error! R eference source not found.** of this document.
- The introduction of continuous activation control in FCR. As explained in chapter **Error! Reference source n ot found.** of this document.
    - Avoid, when possible, the possibility of arbitrage between penalties of different products through the use of a declarative value (e.g. FCR correction) received from the BSP.

In order to avoid the possibility of arbitrage through the declarative FCR Correction value, Elia must introduce a methodology to allocate the error between FCR and aFRR for a Delivery Point providing both services.

The proposed concept is a best practice set by the FCR Cooperation. The concept is quite simple, if a Delivery point is activated in both FCR and aFRR (a Combo Delivery Point) , FCR delivery is assumed as perfect, and the error is allocated to aFRR.

However, in a scenario in which only a part of an FCR providing group is delivering FCR, the volume the "Combo Delivery Points" can provide to FCR and aFRR is limited by DPFCR,max, DPaFRR,max,up and DPaFRR,max,down of those Delivery Points. Consequently, the error that is allocated to aFRR is limited to the maximum errors possible for the Delivery Points supplying both products.

2.5.1. Tetris algorithm

If not all of the Delivery Points included in the FCR Providing Group are delivering both FCR and aFRR simultaneously, the "tetris algorithm" is used to allocate the correct volume between the two products.
The Tetris algorithm uses the following steps:

1. Determination of the delivered volume per DP
2. The volume delivered by the "pure" FCR DPs is summed. Pure FRC DPs are DPs only supplying FCR, not aFRR.
3. The pure FCR volume(being equal to the total volume of FCR delivered by the "pure" FCR DPs) is compared to the FCR Inner Limit, to determine the missing pure FCR volume.
4. The missing pure FCR volume is fulfilled by the Combo DPs. The available volume is limited by the $DPFCR,max$ and $DP_{aFRR,max,up}$ or $DP_{aFRR,max,down}$ of the combo Delivery Points.

[3] **20221010_Public consultation on an analysis of the possibility to offer different**

5. The FCR Supplied of a Time Step is calculated by summing up the FCR Supplied of the pure and combo Delivering Points.

Some examples can be found in the Annex of the explanatory note.
This leads to the introduction of **Annex 13.C**

2.6. Amendments relative to the Prequalification Test Phase 2

Elia's ambition with its prequalification test is to verify the following requirements:

Phase 1: The linearity of the FCR reaction & reaction time constraint

To verify linearity, ELIA fixes intermediate steps before a BSP has to reach full delivery. Each step corresponds to a frequency deviation block of 50 mHz and the BSP will each time deliver an additional FCR volume of minimum 90 % for at least 2 minutes before going to the next step.

The response time to switch from one step to another is 7.5 seconds (+5 seconds authorized reaction delay[4]). This response time comes directly from rules fixed by ENTSO-e in the System Operation Guideline (art.154) whereas linear reaction and response time principle of 15 seconds to frequency deviation of 100 mHz and 30 seconds to frequency deviation of 200 mHz are also fixed. The response time of 7.5 seconds to a frequency step of 50 mHz therefore provides evidence the Providing Group has a sufficiently high ramp rate. While an analysis of the FCR Supplied during each step, provides evidence of the capacity of the Providing Group. The proposal for amendments includes some changes for phase I, linked to the change in data granularity to 4s, which will be discussed in Article 2.7.1.

Phase 2: The continuous activation while frequency is in normal mode constraint

In this phase, the BSP will follow the actual measured frequency for 4 consecutive hours, as if he was selected for service delivery after an auction. This test will give to ELIA the guarantee that the BSP can cope with the continuous obligation to deliver FCR while frequency remains in normal mode.

ELIA monitors the FCR reaction of the FCR providing group doing the prequalification over a period of 4h. As said, during these 4 hours, the BSP will react to frequency locally measured as if he was selected to deliver the FCR service to ELIA. Due to the new monitoring approaches as described in chapter **Error! Reference source not found.**, Elia can improve the monitoring of phase 2 of the prequalification test.

[4] This delay will be removed in this proposal for amendments (See chapter 2.6.1)

2.6.1.1. Phase 2: As-is

During the 4h period, ELIA analyzes each frequency deviation superior to 40 mHz and apply the principles valid for its activation control to confirm that at least the delivered reaction was equal or above the expected (theoretical) reaction.

If, following to an activation control, it appears the supplier did not deliver at least the expected FCR reaction then ELIA lowers the maximal FCR value prequalified on the concerned portfolio by a volume corresponding to the difference between expected (theoretical) reaction and lowest FCR delivered. The following factor is used to decrease the maximum prequalified volume:

$$\Delta FCR\max\ \_PG\_FRF = \min(\frac{Psup\_act}{Preq\_act}; 1)$$

2.6.1.2. Phase 2: New proposal

In the new proposal, ELIA analyzes each Time Step of the 4h block and applies the principles valid for its activation control (see chapter 2.4) to confirm that at least the delivered reaction (FCR Supplied) was equal or above the expected (theoretical) reaction (FCR Inner limit). For this, Elia will use the KPI “Time Out of Bounds” as described in chapter 2.3.1.

If, following to an activation control, it appears the supplier did not deliver at least the expected FCR reaction during more than 180 Time Steps (5% of the total Time Steps), Elia will declare the prequalification test as failed, and no volume is prequalified.

A Time Step is defined as non-compliant if there is FCR Underdelivery, which is determined as follows:

$$FCR\ Underdelivery\ (ts) = \begin{cases} |FCR_{Inner\ Limit}(ts) - FCR\ Supplied(ts)| & \text{if } |IL(ts)| > |FCR\ Supplied(ts)| \text{ and } IL(ts) * FCR\ Supplied(ts) > 0 \\ 0 & \text{if } |IL(ts)| \leq |FCR\ Supplied(ts)| \text{ and } IL(ts) * FCR\ Supplied(ts) > 0 \\ |FCR_{Inner\ Limit}(ts)| & \text{if } IL(ts) * FCR\ Supplied(ts) \leq 0 \end{cases}$$

Where:

- The FCR Inner Limit (ts) is determined as described in chapter 2.2.1, with the FCR Requested determined by the $FCR_{max,\ synthetic\ profile}$ determined by phase 1.
- The FCR Supplied (ts) is determined as described in chapter 2.4.1, where the DPs are all Delivery Points listed for participation in the prequalification test.

In case the compliancy criteria are not satisfied, the prequalification test is failed and, as a consequence, the FCR_{max} cannot be updated. To this purpose, a new prequalification test should be performed.

This leads to amendments in **Annex 7.**

2.7. Amendments relative to the migration of real-time data exchange to RTCP/Flex-hub & change in data granularity

Elia proposes the change of the real-time communication requirements to lower the barriers of participation to FCR. The current ICCP/TASE2 requirement would be removed and replaced by RTCP/Flexhub. The T&C BSP FCR do not describe the communication requirements for the FCR services in detail. This is described in a complementary document "FCR Communication requirements"[5]. The amendments concerning the migration of real-time communication will therefore be made in this complementary document. However, in addition to the migration to RTCP/Flex-hub, some changes are made in the real-time data requirements as described in the T&C.

Currently, the data granularity of the measurement data provided by the Measurement Device at the Delivery point is set to 2 seconds. Elia proposes to change the data granularity from 2 seconds to 4 seconds to improve alignment between balancing products. This leads to amendments in **Annex 3.**

To optimize the process of prequalification and availability testing, the formulas will be slightly adapted to accommodate for the new data granularity.

2.7.1. Amendments to Prequalification test phase I

2.7.1.1. As-is

In phase 1 of the synthetic profile, for each frequency step of 50mHz, the corresponding FCR Power to be delivered must be reached in 12,5 seconds (7,5 seconds of required activation time as per Art. II.10.3 and 5 seconds of authorized delay). This FCR Power should then be maintained for 2 minutes. As the 5 first seconds of each frequency step are not considered to calculate FCR_{max}, the first AV_{Pmeas} of each frequency step is calculated as follows:

$$First\ AV_{Pmeas} = \frac{1}{15} * \sum_{5th\ second}^{20th\ second} Pmeas(s)$$

For each step, the FCR Power supplied is calculated based on 10s averages.

In the upward direction,

$$FCR\ Power\ supplied\ (10s\ window) = \max\begin{Bmatrix} baseline - AV_{Pmeas}(10s\ window); \\ 0 \end{Bmatrix}$$

In the downward direction,

$$FCR\ Power\ supplied\ (10s\ window) = \max\begin{Bmatrix} AV_{Pmeas}(10s\ window)\ - baseline; \\ 0 \end{Bmatrix}$$

[5] **https://www.elia.be/en/electricity-market-and-system/system-services/technical-documentation-concerning-the-provision-of-ancillary-services**

With

$$AV_{Pmeas}(10s\ window) = \frac{1}{10} * \sum_{t-9}^{t} Pmeas(t)$$

2.7.1.2. To-be

To facilitate 4s data granularity, Elia proposes to utilize 12s averages.

In the upward direction,

$$FCR\ Power\ supplied\ (10s\ window) = \max\begin{Bmatrix} baseline - AV_{Pmeas}(12s\ window); \\ 0 \end{Bmatrix}$$

In the downward direction,

$$FCR\ Power\ supplied\ (10s\ window) = \max\begin{Bmatrix} AV_{Pmeas}(12s\ window)\ - baseline; \\ 0 \end{Bmatrix}$$

With

$$AV_{Pmeas}(12s\ window) = \frac{1}{12} * \sum_{t-11}^{t} Pmeas(t)$$

Additionally, Elia proposes to remove the 5 seconds of tolerance as it is not part of the legal requirement as per Art. II.10.3, and therefore allows for a reaction incompliant to regulation. For each frequency step of 50mHz, the corresponding FCR Power to be delivered must be reached in 7,5 seconds as per Art. II.10.3.

As a result, the first AV_{Pmeas} will therefore no longer be an exception and be calculated based on a 12s average.

$$First\ AV_{Pmeas}(12s\ window) = \frac{1}{12} * \sum_{t-11}^{t} Pmeas(t)$$

This leads to amendments in **Annex 7.**

2.7.2. Amendments to Availability tests

2.7.2.1. As-is

A capacity availability test is compliant if the following conditions are simultaneously satisfied:
less than 3 values of the 10 second average FCR Power supplied, $AV_{FCR\ Power\ supplied,test}\ (10s\ window)$, are inferior to the FCR Capacity Requested for the phase of provision of the FCR Capacity Requested upward (i.e phase ii);
less than 3 values of the 10 second average FCR Power supplied, $AV_{FCR\ Power\ supplied,test}\ (10s\ window)$, are inferior to the FCR Capacity Requested for the phase of provision of the FCR Capacity Requested downward (i.e phase v);
An energy availability test is compliant if less than 26 values of the 10 second average FCR Power supplied, $AV_{FCR\ Power\ supplied,test}\ (10s\ window)$, are inferior to the FCR Capacity Requested for the phase of provision of the FCR Capacity Requested (i.e phase ii).

$$AV_{FCR\ Power\ supplied}(10s\ window) = \frac{1}{10} * \sum_{ts}^{ts+9} FCR\ Power\ supplied_{test}\ (ts)$$

2.7.2.2. To-be

The proposed amendment changes the calculation of the $AV_{FCR\ Power\ supplied,test}$ to a 12 second average:

$$AV_{FCR\ Power\ supplied}(12s\ window) = \frac{1}{12} * \sum_{ts}^{ts+11} FCR\ Power\ supplied_{test}\ (ts)$$

This also impacts the conditions for compliancy:

A capacity availability test is compliant if the following conditions are simultaneously satisfied:

less than 3 values of the 12 second average FCR Power supplied, $AV_{FCR\ Power\ supplied,test}\ (12s\ window)$, are inferior to the FCR Capacity Requested for the phase of provision of the FCR Capacity Requested upward (i.e phase ii);

less than 3 values of the 12 second average FCR Power supplied, $AV_{FCR\ Power\ supplied,test}\ (12s\ window)$, are inferior to the FCR Capacity Requested for the phase of provision of the FCR Capacity Requested downward (i.e phase v);

An energy availability test is compliant if less than 22 values of the 12 second average FCR Power supplied, $AV_{FCR\ Power\ supplied,test}\ (12s\ window)$, are inferior to the FCR Capacity Requested for the phase of provision of the FCR Capacity Requested (i.e phase ii).

This leads to amendments in **Annex 12.**

2.7.3. Amendments to Activation control

Activation control is discussed in-depth in Chapter **Error! Reference source not found.** of this document.

2.8. Amendments relative to the introduction of the CDSO declaration

In alignment with the T&C BSP mFRR, a CDSO declaration is included in the T&C BSP FCR. It is precised that, in the Procedure for Delivery Point Acceptance, the BSP must provide a CDSO declaration for Delivery Points DP_{PG} within a CDS.

This leads to amendments in **Art. II.3, Annex 2.B and Annex 2.G**.

2.9. Amendments relative to the digital update of the Contact Details for the BSP

With the development of the EPIC digital customer portal, BSPs will be able to update their list of contacts through the EPIC portal, instead of by exchanging e-mails.

In addition, ELIA has updated the list of roles to include in the contact details list.

This leads to amendments in **Art. II.20 and Annex 17**.

2.10. Other amendments

In order to further improve alignment between balancing services and to improve efficiency of processes, Elia has aligned the concepts of Virtual Delivery Point for FCR and the concept of Low-Voltage Delivery Point Group (LVDPG) for aFRR. Therefore, the concept of Virtual Delivery Point was removed from the T&C BSP FCR and replaced with the concept of Low-Voltage Delivery Point Group. As a result, the volume limit of 1.5 MW previously in place for Virtual Delivery Points is removed, as no volume limit exists for LVDPG.

This leads to amendments in **Art.II.1, Art.II. 3, Art.II.8, and Annex 4.D.**

Due to the requirements for frequency measurements being linked to the concept of Virtual Delivery Points, this amendment also required changes in **Annex 3.C.**

3. Implementation planning

The amendments of the T&C BSP FCR may enter into force at different moments:

a) The amendments relative to the settlement and invoicing processes for capacity remuneration (wave 1), which are highlighted in turquoise, will enter into force at the earliest 1 month after approval by CREG of the concerned version of the T&C BSP FCR, and not after December 2025.

b) The amendments relative to the settlement and invoicing processes for controls and incentives (wave 2), which are highlighted in green, will enter into force at the earliest 1 month after approval by CREG of the concerned version of the T&C BSP FCR, and not after June 2026.

c) Amendments relative to the digital update of the Contact Details for the BSP and amendments relative to the introduction of the CDSO agreement, which are highlighted in yellow, will enter into force at the same time as a).

d) All other amendments of the T&C BSP FCR will enter into force at the earliest 1 month after approval by CREG of the concerned version of the T&C BSP FCR. The exact date will be fixed taking into account the completion of the development of the necessary IT systems in order for Elia to implement the balancing service for Frequency Containment Reserve.

Annex 1: Error attribution examples

Example 1:

FCR Inner Limit	FCR Supplied pure DPs	Pure FCR Missing
25MW	5MW	**20**

Combo DPs	Volume Supplied	FRC max	aFRR max (both directions)
DP1	2	3	4
DP2	-8	8	10
DP3	0	3	4

				FCR combo Supplied	aFRR combo supplied
Sum of Combo DPs	**-6**	**14**	**18**	12	-18

Example 2:

FCR Inner Limit	FCR Supplied pure DPs	Pure FCR Missing
15MW	5MW	**10**

Combo DPs	Volume Supplied	FRC max	aFRR max (both directions)
DP1	2	3	4
DP2	15	8	10
DP3	9	3	4

				FCR combo Supplied	aFRR combo supplied
Sum of Combo DPs	26	**14**	**18**	10	16

Example 3:

FCR Inner Limit	FCR Supplied pure DPs	**Pure FCR Missing**
25MW	5MW	**10**

Combo DPs	Volume Supplied	FRC max	aFRR max (both directions)
DP1	5	7	3
DP2	-5	5	5
DP3	-5	3	6

				FCR combo Supplied	**aFRR combo supplied**
Sum of Combo DPs	**-5**	**15**	**14**	9	-14

Example 4:

FCR Inner Limit	FCR Supplied pure DPs	**Pure FCR Missing**
-10MW	-5MW	**-5**

Combo DPs	Volume Supplied	FRC max	aFRR max (both directions)
DP1	0	3	4
DP2	-5	8	10
DP3	10	3	4

				FCR combo Supplied	**aFRR combo supplied**
Sum of Combo DPs	5	**14**	**18**	-5	10