Workshop
Combos on DPpg

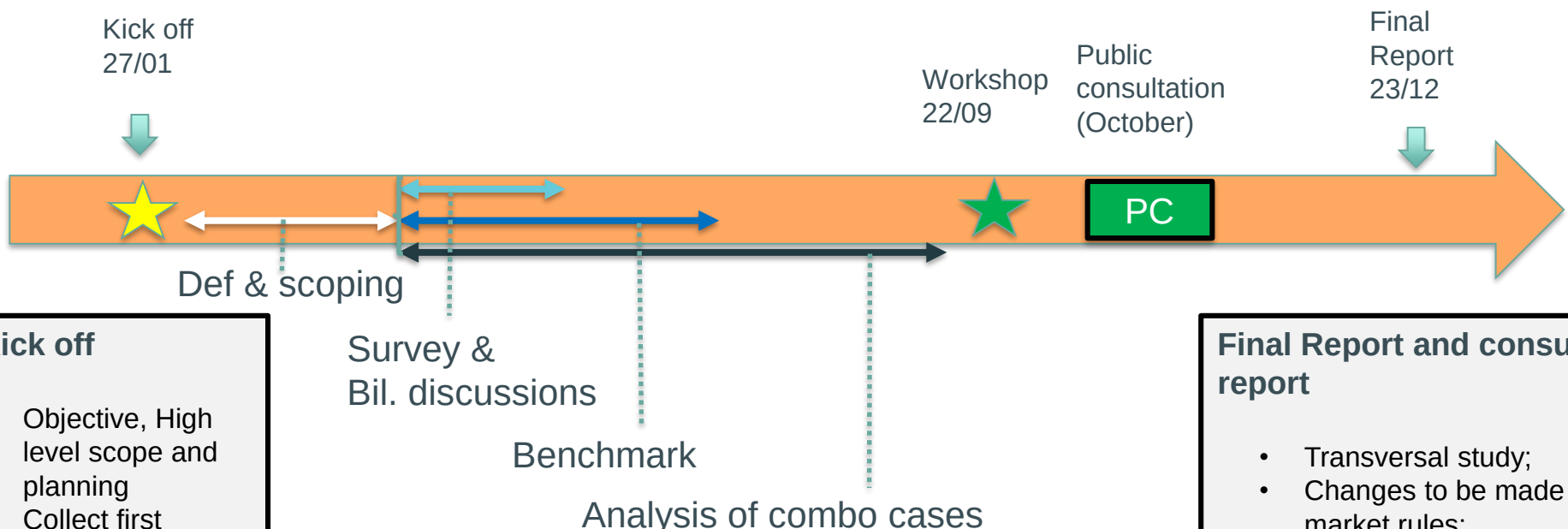
September 2022 | Thomas Oldenhove

Agenda

- Planning and status
- Introduction and scope of incentive
- Benchmark
- Combo FCR and aFRR
- Combo FCR and mFRR
- Combo aFRR and mFRR
- Combo mFRR and DA/ID with ToE
- Outcome of analysis
- Next steps

Planning and status

Planning and Status



Kick off

- Objective, High level scope and planning
- Collect first feedback

Final Report and consultation report

- Transversal study;
- Changes to be made to the market rules;
- Proposal for implementation plan.
- Consultation report

Introduction and scope

Scope of incentive

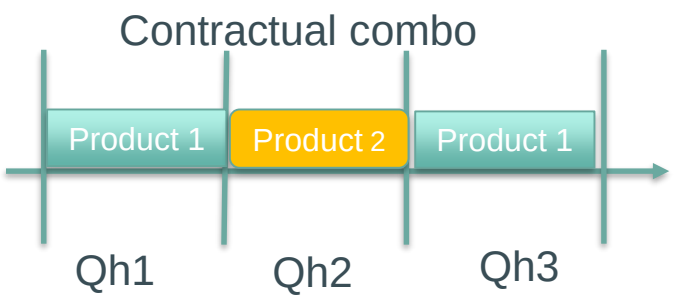
Incentive:

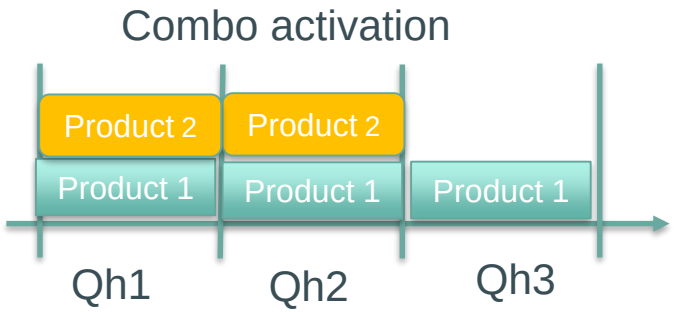
Analysis of the possibility to offer different types of balancing products and/or to combine the offer of balancing products (FCR/aFRR/mFRR) with the supply of energy in the DA/ID market through ToE for DPpg delivery points.

High level scope:

- Transversal study to assess the opportunity and technical feasibility of offering a combo on DPpg, based on existing baseline methodologies
- Assessment of the potential liquidity that these changes would bring
    - Experience feedback on delivery points participating in the different products
    - Survey of market participants
- Benchmarking with other European TSOs to identify if such possibilities are offered by these TSOs and their possible contribution to the liquidity of balancing markets

Contractual combo vs combo activation for a given DPpg





Elia distinguishes two ways of combinability of products, namely “contractual combo” and “ combo activation” as explained below

Contractual combination (“contractual combo”): the same Delivery Point DPpg can be part of the portfolio of the same BSP for multiple balancing products, however the DPpg cannot be offered or activated for a simultaneous delivery cross products for the same quarter hour.

Combination with simultaneous activation (“combo activation”): the DPpg is offered for the same quarter hour for multiple balancing products, allowing a simultaneous delivery on one Delivery Point cross product during the same quarter hour.

The contractual combos are possible for all products, including the Transfer of Energy in DA/ID markets (FSP Contract DA/ID). In contrast, combo activations are only allowed under certain conditions described in BSP contract for the same DP.

Challenges for combo activation

Elia identifies the following challenges for the calculation of the supplied/delivered volumes in case of a combo activation:

1) Elia needs to determine **methodology for calculating the volume delivered to each service** (sophisticated activation control)

2) In case of **ToE, the total volume delivered needs to be calculated** (and this volume should correspond to the sum of the volumes delivered for the different services)

3) **Risk of arbitrage should be prevented a.o.**

- **Manipulation of baseline**
- **Arbitrage opportunities** (e.g., in case of a global underdelivery, it should be avoided that the BSP can arbitrate between the penalties for both products)

Combinability activation on DPpg

Combo	Current status of combo	Market Interest from survey	Considered for the study
FCR and aFRR	Contractual combo: is allowed and is used Combo activation: is allowed if same BSP and is used		Elia wants to clarify the monitoring of this combo and to identify needs and propose improvements.
FCR and mFRR	Contractual combo: is allowed and is used Combo activation: is allowed if same BSP but is NOT used		Elia wants to analyze the monitoring and to confirm appropriateness of the existing design of this combo. Potentially identify needs for improvements.
aFRR and mFRR	Contractual combo: is allowed but NOT used Combo activation: is NOT allowed		Elia wants to identify the conditions for a possible framework for this combo and to develop a design to allow this combo.
FCR and DA/ID with ToE	Contractual combo: is allowed but NOT used Combo activation: is allowed if same BSP but is NOT used		As currently ToE DA/ID is not used, Elia proposes to keep as is situation (combo activation is allowed). Elia doesn't investigate this case further in the incentive.
aFRR and DA/ID with ToE	Contractual combo: is allowed but NOT used Combo activation: is NOT allowed		Case will not be studied in the framework of this incentive, as currently ToE DA/ID is not used and no ToE yet in aFRR.
mFRR and DA/ID with ToE	Contractual combo: is allowed but NOT used Combo activation: is NOT allowed		Elia aims to propose a design for this combo and to assess the priority for implementation of this proposed design. Starting point, will be an assessment of conclusions of 2019 study.

Benchmark

Benchmark of the rules for combo's in neighboring countries (1/2)

TSOs	Contractual combo of balancing products	Combo activation of balancing products	Main Observations	Liquidity
50Hertz, Amprion, Tennet DE, Transnet	allowed	FCR/aFRR/ mFRR	The combo is supported by a very strict prequalification process and the use of a unique baseline methodology. From the TSOs' request for activation, the BSP must create the "target signal" to achieve the delivery of all products. German TSOs define strict rules concerning the activation control especially the sequential steps for the control of energy where the deviation is attributed to only one product.	Output of prequal process in Germany of technical units offering multiple products (% of total assets FCR/aFRR: 6% FCR/mFRR: 6% aFRR/mFRR: 50% FCR/aFRR/mFRR: 6%
RTE	allowed	FCR/aFRR/ mFRR	Combo activation is mainly used by large units in FR market and not by small units like DPpg.	Combos of balancing products are almost not used for small units in FR market.
TenneT NL	allowed	Only FCR/aFRR	Combo activation is only authorized in the NL for FCR/aFRR	No figures available

Benchmark of the rules for combo's in neighboring countries (2/2)

Contractual combos and Combo activations were developed in neighboring countries (FR, DE, NL).
Nevertheless, it is difficult to compare the mechanisms in those markets with the Belgian situation as :

-the overarching design may be different
-some combos activations have been facilitated by creating exceptions on ad hoc basis leading to very high complexity
-the concept of DPpg as such is not used in other countries

Combo FCR/aFRR

Context

AS IS situation

aFRR BSP contract: art 5.II (combinability conditions) *A Delivery Point providing aFRR Service can participate to a contract for FCR and/or a contract for mFRR at the condition that the BSP is the same party*

FCR BSP contract: art 4.II (combinability conditions) *A Delivery Point providing FCR Service can participate to a contract for aFRR and/or a contract for mFRR at the condition that the BSP is the same party.*

A Delivery Point can already today provide both the FCR and the aFRR Services during the same quarter-hour, provided that the same BSP provides the services.

Current situation for the FCR & aFRR activation controls

- There is today a global correction factor for FCR activation in the context of aFRR activation control, this value is sent by the BSP

- No similar correction is foreseen in the FCR product in case a DP is used in combo.

  Existing FCR activation control:

  - The activation control is performed by calculating the difference between the FCR Requested and the FCR Supplied for a maximum of 6 Frequency Variations for the month, and in the same way a maximum of 2 Frequency Variations per CCTU.
  - given current framework, the BSP may request another frequency variation in case the BSP can motivate this request by showing he was impacted by a rapid power change not related to the delivery of FCR

- Looking at the future evolution of FCR product by having a declarative FCR baseline (similar to aFRR), we can see that this evolution would improve the combinability of the products.
- a proposal for improvements of the controls of each product are presented in the next slides.

Impact on aFRR activation control

Analysis of influence of FCR on aFRR:

Today, a “FCR correction” in the activation control of aFRR already exists. BSP sends the FCR correction in case one or several DPs of the BSP offers the FCR Service

Extract from current aFRR contact

$$aFRR\ Supplied(ts) = \sum_{participating\ Delivery\ Points} [DP_{baseline}(ts) - DP_{measured}(ts)] - FCR\ correction(ts)$$

The FCR correction is a value (in MW) representing the FCR power delivered by the Delivery Points participating to the provision of the aFRR Service

To support a proper monitoring of combo between aFRR and FCR, with the evolution towards declarative FCR baseline, Elia would request to get from BSP the FCR correction per DP (disaggregated values); only for DP which is used in a combo

Recommendation:

Existing control for aFRR would be modified in case of FCR/aFRR combo

DP aFRR supplied = (DP baseline – DP measured) – DP FCR correction

Impact on FCR activation control

Analysis of influence of aFRR on FCR:

– Today no specific correction factor from other product is used in the FCR activation control

Considering the declarative FCR baseline (similar to aFRR) as explained before, then we can use the DP aFRR supplied as correction factor in the FCR activation control

Recommendation:

Elia's proposal is to have a correction factor linked to the **energy delivered for aFRR in the FCR activation control**:

$$\text{FCR supplied (UP)} = \max(P_{meas\ before} - P_{meas\ after}; 0)$$

$$P_{meas}(ts) = \Sigma\ (\text{DP measured}(ts) - \text{DP ch-dch}(ts) - \textbf{correction factor aFRR(ts)})$$

correction factor aFRR will be based on **DP aFRR supplied computed by Elia** in case of combo (see previous slide)

Robustness of design against possible future evolutions

Evolution of the FCR baseline: declarative baseline from BSP (e.g. similar to aFRR baseline)

- In case the baseline is not calculated anymore by Elia but rather provided by the BSP, the contribution of each Balancing Service would be taken into account, facilitating the provision of the services by the same Delivery Point.
- This evolution improves the combinability of the Balancing Services, if there is a combined activation of FCR and an activation of aFRR

Evolution of the FCR activation control: continuous activation control instead of discrete control

- In case the FCR activation control is changed from discrete to continuous, **interaction aFRR activation will always impact** the activation control of the FCR Service. Therefore, the **evolution of the FCR baseline is necessary**, facilitating the provision of the combined services by the same Delivery Point.

Evolution of the aFRR activation method (control target or alternative)

- In case the aFRR activation method is implemented, it would require a correction in the FCR activation control.
- the proposed solution of introduction of correction factor in the FCR activation control is therefore consistent and is needed for both the combinability of the Balancing Services and the aFRR activation method.

Combo FCR/mFRR

Context

AS IS situation

- **FCR BSP contract**: art 4.II (combinability conditions) *A Delivery Point providing FCR Service can participate to a contract for aFRR and/or a contract for mFRR at the condition that the BSP is the same party.*
- **mFRR BSP contract**: art 5.II (combinability conditions) *A Delivery Point providing mFRR Service can participate to a contract for FCR and/or a contract for aFRR at the condition that the BSP is the same party*

A Delivery Point can already today provide both the FCR and the mFRR Services at the same time, provided that the same BSP provides the services.

Impact of mFRR on FCR

Context:

– FCR is considered as a pure capacity product while mFRR is an energy product

Existing FCR activation control:

– The activation control is performed by calculating the difference between the FCR Requested and the FCR Supplied for a maximum of 6 Frequency Variations for the month.
  – The probability of an activation control of FCR and an actual activation of mFRR at the same time is relatively low.
– given current framework, the BSP may request another frequency variation in case the BSP can motivate this request by showing he was impact by a rapid power change not related to the delivery of FCR

The activation dynamic is very different between the 2 balancing products; indeed FCR may fluctuate very quickly (on a second basis) while mFRR is activate on quarter hour basis.

Recommendation:

In the current framework, Elia proposes to keep the AS IS situation with no additional correction factor in the activation control of FCR.

Impact of FCR on mFRR

The **activation control** of the new mFRR design looks at the **energy delivery during the quarter hour of activation**. An FCR activation would only negatively impact the activation of mFRR if the FCR Request is on average opposite to the direction of mFRR activation.

It is proposed to not have a correction factor (due to FCR activation) in the mFRR activation control, given that :

- large frequency deviation leading to a significant FCR Request in the opposite direction of the mFRR activation is relatively rare.
- MWh volumes of FCR are relatively small compared to MWh volumes of mFRR

Recommendation:

Elia proposes to keep the AS IS situation with no additional correction factor in the activation control of mFRR.

Robustness of design against possible future evolutions

Evolution of the FCR baseline: declarative baseline from BSP (e.g. similar to aFRR baseline)

- In case the baseline is not calculated anymore by Elia but provided by the BSP, the contribution of each Balancing Service would be taken into account, facilitating the provision of the services by the same Delivery Point.
- The use of **a declarative FCR baseline would decouple the products by design and both products could be monitored separately**. This evolution improves the combinability of the Balancing Services

Evolution of the FCR activation control: continuous activation control instead of discrete control

- The evolution of **the FCR baseline is necessary for the continuous control**, facilitating the provision of the combined services by the same Delivery Point.
- The change of the activation control does not impact the combinability of the Balancing Services, as the FCR baseline will facilitate the identification of each service.

Combo aFRR/mFRR

AS IS situation

BSP Contract aFRR:

- art II.5 (combinability conditions) *A Delivery Point providing aFRR Service can participate to a contract for FCR and/or a contract for mFRR at the condition that the BSP is the same party*
- Annex 9: [..] Any Delivery Point DP_{PG} included in an aFRR Energy Bid for a certain quarter-hour cannot be included in a mFRR energy bid or supporting mFRR Providing Group for the same quarter-hour;

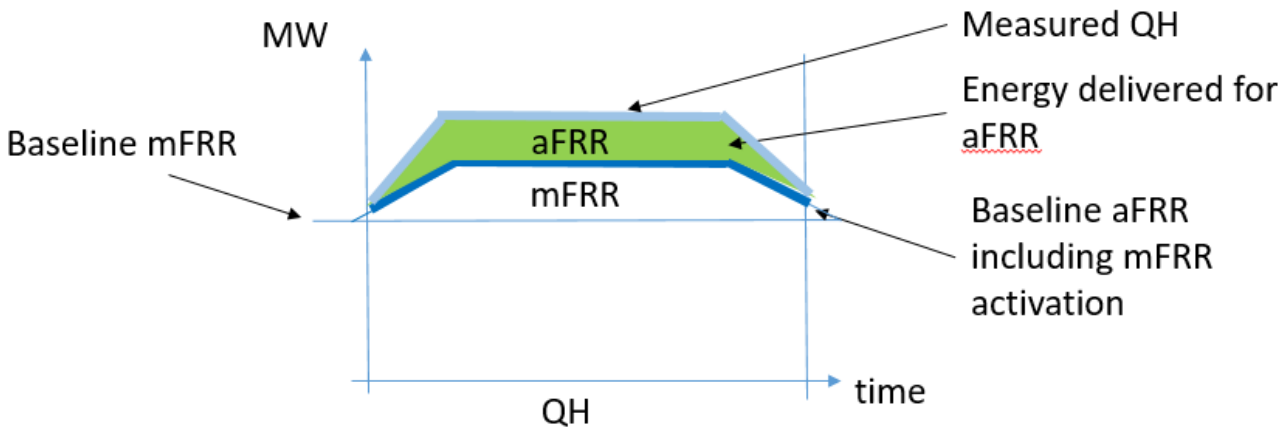
BSP contract mFRR:

- art II.5 (combinability conditions) *A Delivery Point providing mFRR Service can participate to a contract for FCR and/or a contract for aFRR at the condition that the BSP is the same party*
- *Annex 9: [..] If one Delivery Point DP_{PG} is included in a mFRR Energy Bid for a certain quarter-hour, the concerned Delivery Point cannot be included in an aFRR energy bid for the same quarter-hour;*

Other Requirements applicable today:

- Same contractual regime applies cross-product per DP (opt-out or pass-through) (cfr. Section 9 of the ToE Rules)

Impact on aFRR activation control



Context

DP aFRR baseline is sent 1 min in advance

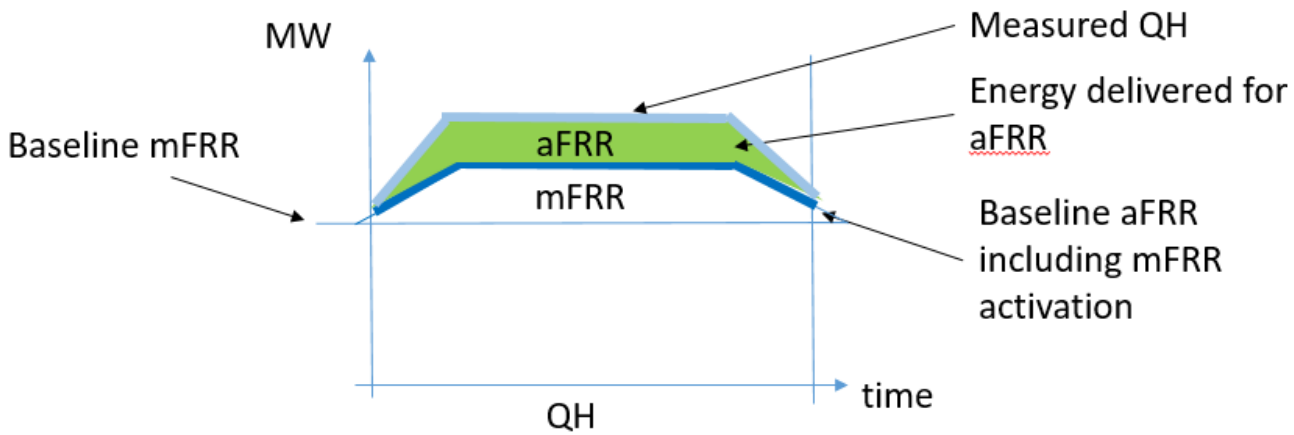
Analysis of influence of mFRR on aFRR:

- The BSP will adapt its aFRR declarative baseline taking into account the activation of mFRR on the same quarter hour as aFRR (i.e., the aFRR baseline reflects the offtake/injection in case no aFRR activation would have taken place but the mFRR activation does take place)
- No dependency on mFRR data to properly control the aFRR delivery

Recommendation:

Existing control for aFRR is sufficient to control the supplied energy in case of combo with mFRR

Impact on mFRR activation control



Analysis of influence of aFRR on mFRR:

The mFRR baseline for DPpg (Last Qh or High X of Y) reflects the offtake/injection in case no activation would have taken place at all (i.e., no aFRR and no mFRR activation)

Currently, DP mFRR Supplied is calculated as DP baseline – DP measured and would hence reflect the total volume delivered so including aFRR

Recommendation:

Elia proposes to correct the DP mFRR supplied by the energy supplied for aFRR :

DP mFRR supplied = (corrected DP baseline mFRR - DP Measured) – $\Sigma_{(ts)}$ DP Energy delivered for aFRR**

The correction with the volume of aFRR supplied by a DPpg follows the rules described in the aFRR activation control:

DP Energy delivered for aFRR (ts) = [DPaFRR] * (DP baseline aFRR – DP Measured)

(*) The proposal works also in case the DP used for a combo is part of both a pool for delivery of mFRR and a different pool for the delivery of aFRR
(**) in case of combo, DP baseline mFRR is corrected with DP aFRR supplied in the same QH

Example Combo aFRR and mFRR

Case A : Same direction (Injection)

		aFRR	mFRR
aFRR/mFRR $_{requested}$		5 MW	10 MW
Baselines aFRR / Baselines mFRR	DP1	-10	0
Power Measured by Elia	DP1	-15	
Volumes allocated to the different services (power supplied)	DP1(*)	(-10-(-15))= 5	(0-(-15))-(-10-(-15))= 10
Control		OK	OK

Case B: opposite direction

		aFRR	mFRR
aFRR/mFRR $_{requested}$		5 MW	-10 MW
Baselines aFRR / Baselines mFRR	DP1	10	0
Power Measured by Elia	DP1	5	
Volumes allocated to the different services (Supplied)	DP1(*)	(10-(5)) = 5	(0-5) - (10-(5)) = -10
Control		OK	OK

(*) applying the rule to determine the allocation of aFRR/mFRR supplied

Note: sign convention from the contract is used

Transfer of Energy: recap

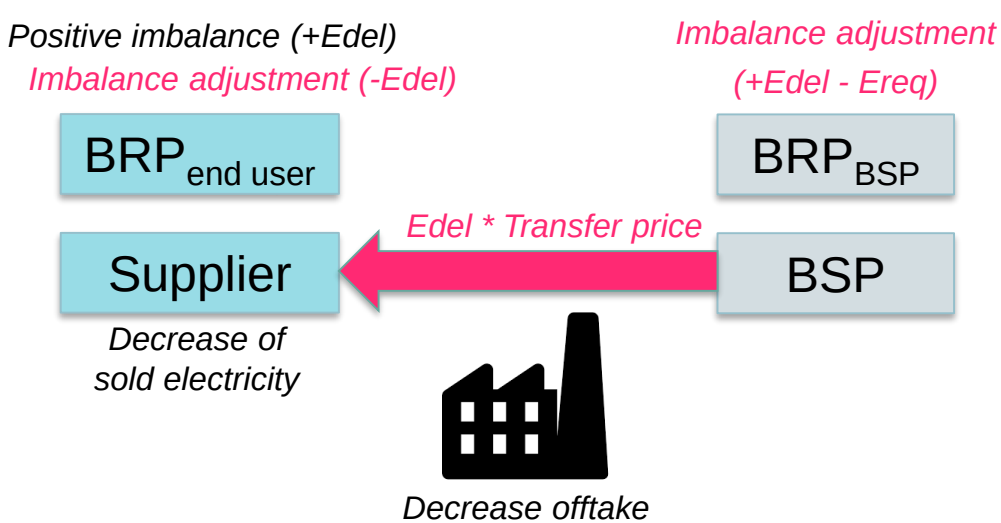
Transfer of Energy is a **centralized and regulated compensation framework to "transfer energy" between the BSP and the Supplier** (and their corresponding BRPs)

- ToE guarantees the ability to valorize the flexibility independent of Supplier and BRP of the end user
  - Impact on Supplier and BRP $_{\text{end user}}$ is neutralized and hence no agreement between BSP and Supplier/BRP$_{\text{end user}}$ is needed
  - BRP$_{\text{BSP}}$ takes on balance responsibility for the delivery of the requested volume

In case of a combo activation, the total volume of energy delivered would need to be determined

Main steps in ToE process

1. Calculation of the **<u>volume of energy effectively delivered</u>**:
   - Edel = Baseline – measured offtake/injection
2. Correction of perimeters with the delivered volume
3. Determining the transfer price (performed by the CREG)
4. Data exchange to enable the BSP and the Supplier to perform their settlement



Robustness of the design in case of Transfer of Energy (or an alternative mechanism)

Current situation

DP_{PG} participating to both aFRR and mFRR operate under an Opt-out or Pass-through Regime considering that:

- there is **no Transfer of Energy for aFRR**
- A single regime applies per Delivery Point (for all the services to which the point participates)

The proposed solution for the mFRR activation control (cfr. previous slides) is sufficient to enable an activation combo for DPs not operating under a ToE Regime

Robustness with introduction ToE/EoEB

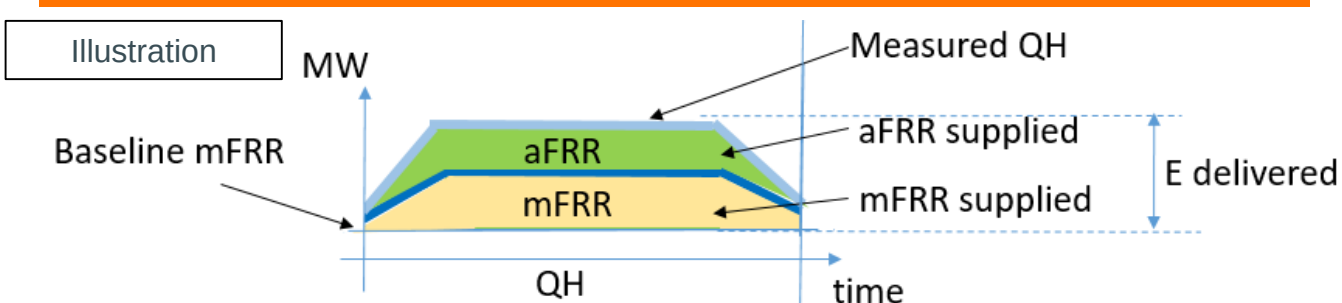
- As presented during the CCMD workshops, Elia intends to develop an alternative solution to ToE for aFRR based on local corrections (via Exchange of Energy Blocks)
- With ToE/EoEB, there is a **need to calculate the total volume delivered per DPpg** (e.g., to perform the perimeter corrections)
- In case of an activation combo mFRR-aFRR, the **total volume delivered can be calculated as**:

Edel = DP Baseline mFRR – DP Measured

=* DP mFRR Supplied + DP aFRR Supplied

- The **proposed solution** for the mFRR activation control **also works for ToE/EoEB**
- **The additional complexity of related to ToE/EoEB seems limited**

Illustration



* In case the proposed correction is applied in the calculation of the $mFRR_{Suppli}$

Combo mFRR/DA-ID with ToE

Recall – 2019 study on ToE for DA/ID markets an go-live of ToE DA/ID in 2021

Scope of the 2019 study

- The main focus of the study was on the **design of a Transfer of Energy mechanism ("ToE") for the participation to the DA and ID markets** and an assessment of the market interest and potential for this market segment
- The study additionally performed an analysis **on the necessary design adaptations to enable a combined activation of DP_{PG} to the DA/ID market** on the one hand and the **different balancing products** (FCR, aFRR or mFRR) on the other hand

Outcomes of the 2019 study

- A design for ToE for DA/ID markets has been developed and subsequently implemented in 2021
- A **design for the combo of mFRR and DA/ID has been proposed**
- **Elia recommended not to implement this combo functionality** at that study considering that:
    - The combo adds significant complexity (both for the mFRR activation control and for the Transfer of Energy calculations).
    - The combo was considered to bring theoretical benefits, but the effective usage and economic viability of the combo was highly uncertain:
        - The participation to DA/ID markets in general was uncertain.
        - The experience with non-contracted mFRR provided indications of a limited interest to offer volumes in absence of a capacity payment
            - Elia had received almost no non-contracted mFRR energy bids related to DP_{PG}
            - Volumes not (fully) awarded in the mFRR capacity auctions were not offered as non-contracted mFRR energy bids

Reassessment of the conclusions of the 2019 study

- The **proposed design for enabling the combo mFRR and DA/ID using ToE** was based on:
  - The use of the High X of Y* Baseline as the master baseline for the calculation of the total volume of energy delivered during Combo activations.
  - An algorithm to allocate this total volume delivered to DA/ID and mFRR based on a priority list (first allocation to DA/ID, remaining volume allocated to mFRR)

- Following a re-assessment within this incentive “combo”, the **design proposed in the 2019 study is still considered the best option for this combo**

- **Elia** however **maintains its recommendation not to proceed with the implementation of this combo functionality** considering that recent experiences indicate an absence of participation of DP_{PG} to DA/ID markets (and products without capacity payment in general):
  - More than 1 year after the go-live of ToE DA/ID, and despite high electricity prices, no DPs have yet been registered for participation to the DA/ID segment
  - In the last years, Elia has not received any non-contracted mFRR Energy bids from DP_{PG}

Outcome of analysis

Combinability activation on DPpg (1/2)

Combo activation	Market Interest from survey	Considered for the study	Outcome of analysis
FCR and aFRR		Elia wants to clarify the monitoring of this combo and to identify needs and propose improvements.	• A design to have a robust framework for this combo has been proposed . • Moreover, new design would be needed for the possible future evolutions in FCR. • Elia would like a clear confirmation of the interest for this combo and corresponding volumes from the market parties.
FCR and mFRR		Elia wants to analyze the monitoring and to confirm appropriateness of the existing design of this combo. Potentially identify needs for improvements.	A design was analyzed but no concrete improvements is proposed at this point and Elia would not propose any changes in the current design.
aFRR and mFRR		Elia wants to identify the conditions for a possible framework for this combo and to develop a design to allow this combo.	• A design has been proposed to enable this combo • Elia considers that enabling this combo might have a positive impact on liquidity in both market segments but would like a clear confirmation of the concrete interest and corresponding volumes from the market parties

Combinability activation on DPpg (2/2)

Combo activation	Market Interest from survey	Considered for the study	Outcome of analysis
FCR and DA/ID with ToE		As currently ToE DA/ID is not used, Elia proposes to keep as is situation (combo activation is allowed). Elia doesn't investigate this case further in the incentive.	Elia would not propose any changes in the current design and would keep existing situation.
aFRR and DA/ID with ToE		Case will not be studied in the framework of this incentive, as currently ToE DA/ID is not used and no ToE yet in aFRR.	Elia would not propose any changes in the current design at this point.
mFRR and DA/ID with ToE		Elia aims to propose a design for this combo and to assess the priority for implementation of this proposed design. Starting point, will be an assessment of conclusions of 2019 study.	• A design has been proposed to enable this combo • Elia proposes not to proceed with the implementation of the design at this point

Next steps

Next steps:

- Elia welcomes **feedback on the design** presented in this workshop and would be pleased to receive from stakeholders **quantitative input on potential additional liquidity** if a new combo activation would be allowed

  Please include the contact person for design (Thomas Oldenhove) and your KAM energy (Amandine Leroux/Arno Motté) in all communication.

- Elia will finalize the study considering feedback and additional input received during/following this workshop and prepare the consultation material.
- **Public consultation** will be launched in the beginning of October. Feedback on the consultation will be given in a WG Balancing.
- **Final study**, consultation report and implementation plan to be delivered to CREG at the end of December and subsequently published.

Thank you.