



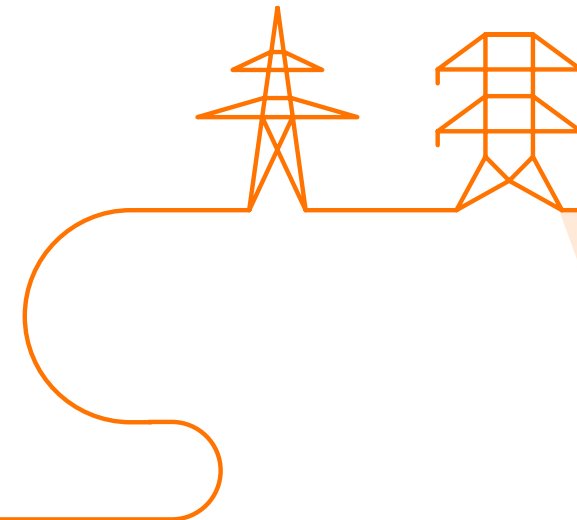
The Assessment plan for the imbalance price 2026 and first results on cap&floor

Interactive info session on imbalance price #1

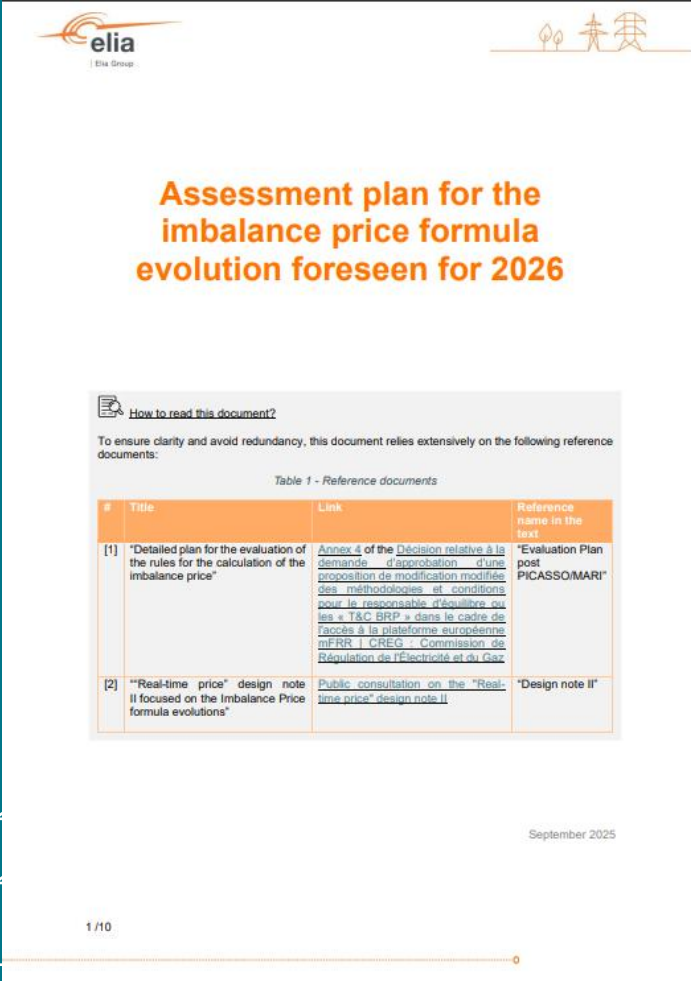
02/10/2025 | Elise AULANIER

Agenda

1. The Assessment plan for the imbalance price formula evolution foreseen for 2026
 - a. What is covered in the Assessment plan?
 - b. What to expect from the interactive info sessions?
2. First results from ongoing analyses on the cap&floor component
 - a. Recall: what are the cap&floor?
 - b. Update: what has happened since the cap&floor are in use?
 - c. Opening: evolution of the cap&floor value?
3. Next steps



The Assessment plan for the imbalance price formula evolution foreseen for 2026

**Assessment plan for the
imbalance price formula
evolution foreseen for 2026**

How to read this document?

To ensure clarity and avoid redundancy, this document relies extensively on the following reference documents:

Table 1 - Reference documents

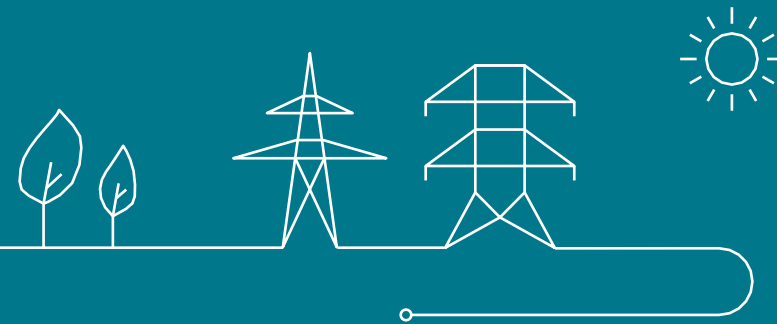
#	Title	Link	Reference name in the text
[1]	"Detailed plan for the evaluation of the rules for the calculation of the imbalance price"	Annex 4 of the Décision relative à la demande d'approbation d'une proposition de modification modifiée des méthodologies et conditions pour le responsable d'équilibre ou les « T&C BRP » dans le cadre de l'accès à la plateforme européenne mFRR CREG - Commission de Régulation de l'Électricité et du Gaz	"Evaluation Plan post PICASSO/MARI"
[2]	"Real-time price" design note II focused on the Imbalance Price formula evolutions"	Public consultation on the "Real-time price" design note II	"Design note II"

September 2025

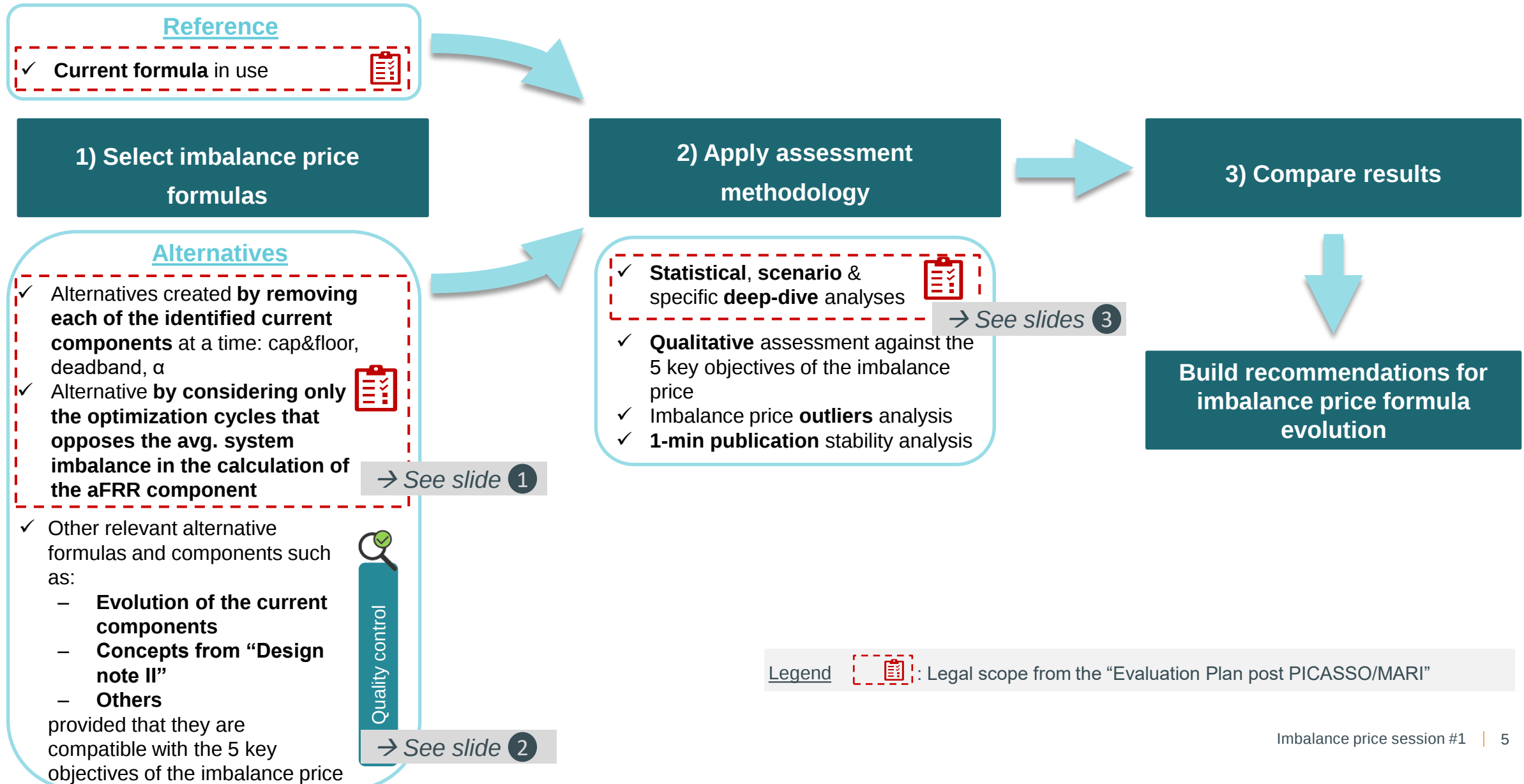
1 / 10

— Pre-read shared at the beginning of September

What is covered in the Assessment plan?



The Assessment plan allows an efficient & objective comparison between proposals in order to define for the imb price formula for 2026



1

Alternatives built from the legal scope of evaluation “📋” look at the key components of the current formula

➤ $IP = \pm\alpha + \begin{cases} \text{deadband value} \\ \max(\text{floor}, \text{aFRR component}, \text{mFRR component}) \\ \min(\text{cap}, \text{aFRR component}, \text{mFRR component}) \end{cases}$

if $-25 \text{ MW} < SI(ISP) < 25 \text{ MW}$

if $SI(ISP) \leq -25 \text{ MW}$

if $SI(ISP) \geq 25 \text{ MW}$

✓ IP formula should not incentivize to aggravate the local SI → cap & floor with

$$\text{floor} = \max(VoAA_{up}, VoAA_{down})$$

$$\text{cap} = \min(VoAA_{down}, VoAA_{up})$$

✓ aFRR compo., as a volume-weighted avg. of aFRR Marginal Prices of all OCs, reflects the value of aFRR → $\frac{\sum_{oc} [(abs(aFRR SD_{oc,j})) \times CBMP_{oc,j}]}{\sum_{oc} (abs(aFRR SD_{oc,j}))}$

✓ mFRR component reflects the marginal value of mFRR →

max (res. Min) CBMP of mFRR satisfied demand in the relevant direction during the ISP

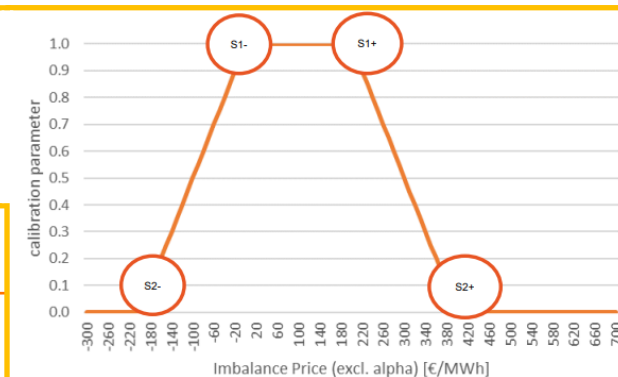
$$\text{mFRR component for MIP} = \max(CBMP_{SA}, CBMP_{upward DA in previous ISP}, CBMP_{upward DA in current ISP})$$

$$\text{mFRR component for MDP} = \min(CBMP_{SA}, CBMP_{downward DA in previous ISP}, CBMP_{downward DA in current ISP})$$

✓ IP formula should provide a neutral price signal in case Belgium is close to balance ($|SI| < 25 \text{ MW}$) → $\text{deadband} = \frac{\text{cap} + \text{floor}}{2}$

✓ The additional component α adds to the main IP component in case of large and persisting SI → if $|SI| > 150 \text{ MW}$, $\alpha = \left(a + \frac{b}{1 + e^{-\frac{(c-x)}{d}}} \right) * CP$

where $a=0 \text{ €/MWh}$; $b = 200 \text{ €/MWh}$;
 $c = 450 \text{ MW}$; $d = 65 \text{ MW}$;
 $x = \text{AVG}(|SI(ISP)| ; |SI(ISP-15')|)$ and CP :



Other relevant alternative formulas and components variations could be studied if they are compatible with the 5 key objectives of the imbalance price → “quality check”

- Some potential examples:

WEIGHTED
AVERAGE WITH
DYNAMIC WEIGHTS

$$IP = w_{mFRR} P_{mFRR,15'} + w_{aFRR} P_{aFRR,15'}$$



From the Design note II

aFRR simple average
price over all
optimization cycles

$$P_{aFRR,15'} = \frac{\sum_{oc=0}^{225} MP_{aFRR,4'}}{225}$$



Cap&floor kept but with a different value, e.g.:

$$\text{floor} = \max(VoAA_{up}, VoAA_{down}) = VoAA_{up} + VoAA_{down} / 2$$

$$\text{cap} = \min(VoAA_{down}, VoAA_{up}) = VoAA_{up} + VoAA_{down} / 2$$

Evolution of the current
components

Change the conditions when the current α applies, e.g.:
if $|SI| > 150 \text{ MW } 300 \text{ MW}$, $\alpha = \left(a + \frac{b}{1 + e^{\frac{(c-x)}{d}}} \right) * CP$

Others

If another good suggestion emerges
e.g. add a new component



3

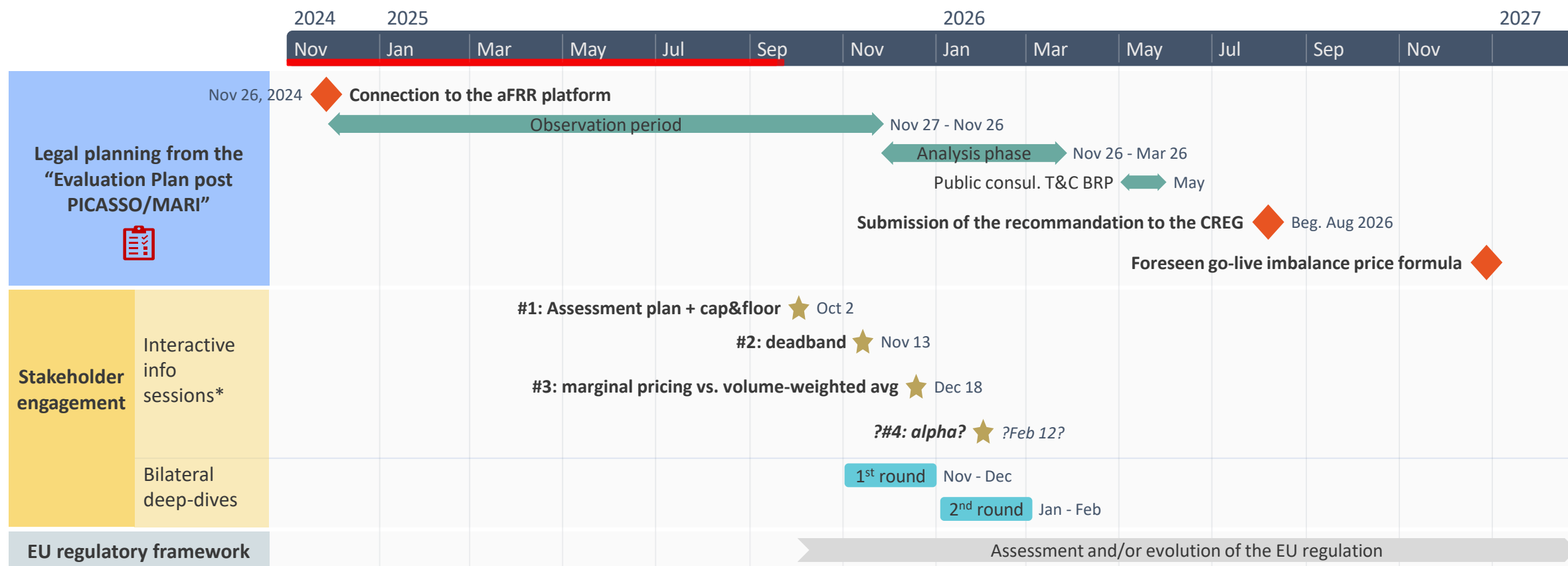
6 types of analysis were selected to address both mandatory requirements from legal scope “” and additional aspects considered as important (1/2)

Type	Focus
Statistical analysis	• Frequency [%] of use or application of each specific component identified within the imbalance price • Impact on the imbalance price value under the alternative formula/component vs. the reference (applicable metrics: mean, average, max, std dev, 75-90-95-99th percentiles, etc.)
Scenario analysis	• Average impact of applying alternative price formula/component on the reaction of BRPs Component-specifics: ○ <u>Cap&floor, deadband</u>: financial impact on BRPs contributing to the system imbalance ○ <u>Deadband</u>: correlation with renewable energy sources deviation ○ <u>Cap&floor</u>: associated congestion risks ○ <u>Alpha</u>: impact balancing capacity needs
Specific deep dives	Ad-hoc

6 types of analysis were selected to address both mandatory requirements from legal scope “” and additional aspects considered as important (2/2)

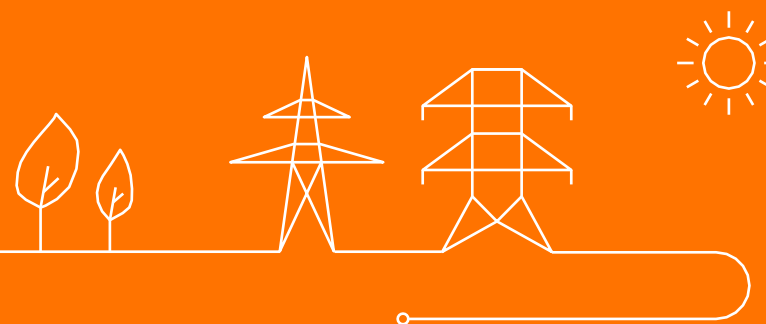
Type	Focus
Qualitative assessment against the 5 key objectives of the imbalance price	Given that the imbalance price shall: <u>Be representative of the average system conditions over the ISP:</u> ➤ Scenario of early and late contingency ➤ Scenario of perfect mFRR activation, undershoot, overshoot <u>Be targeted for assets that cannot participate explicitly:</u> ➤ Remuneration gap / average gains on imbalance price vs. participating in aFRR <u>Discourage intra-ISP oscillations due to real-time implicit reaction:</u> ➤ Asymmetry in the formula <u>Be future-proof as balancing strategy evolves:</u> ➤ Robustness of the formula if aFRR becomes dominant balancing means ➤ Robustness of the formula in the anticipated future changes in the market context e.g. impactful connection from neighboring countries to the balancing platforms <u>Be publishable close to real-time:</u> ➤ Dependency of the formula forecast on the performances of the System Imbalance forecaster ➤ Dependency of the formula on the European cross border context ➤ Implementation considerations for consistently ensuring the high quality and availability of imbalance price publications, e.g. the complexity and understandability of the formula, sensitivity to errors or inconsistencies in the input data
Imbalance price outliers analysis	• Percentage of outliers among total quarter-hours [%], which reflects the frequency of outliers • Average distance of outliers from the trend line, which represents the volatility of the outliers
1-min publication stability analysis	• Number of significant intra-ISP oscillations of the price

The timeline integrates stakeholder engagement with the legal planning

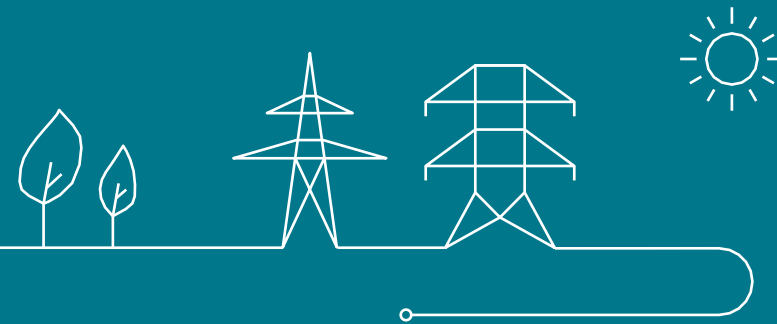


* The exact topics for the sessions are yet to be confirmed: the timeline above reflects the current tentative agenda

Q&A

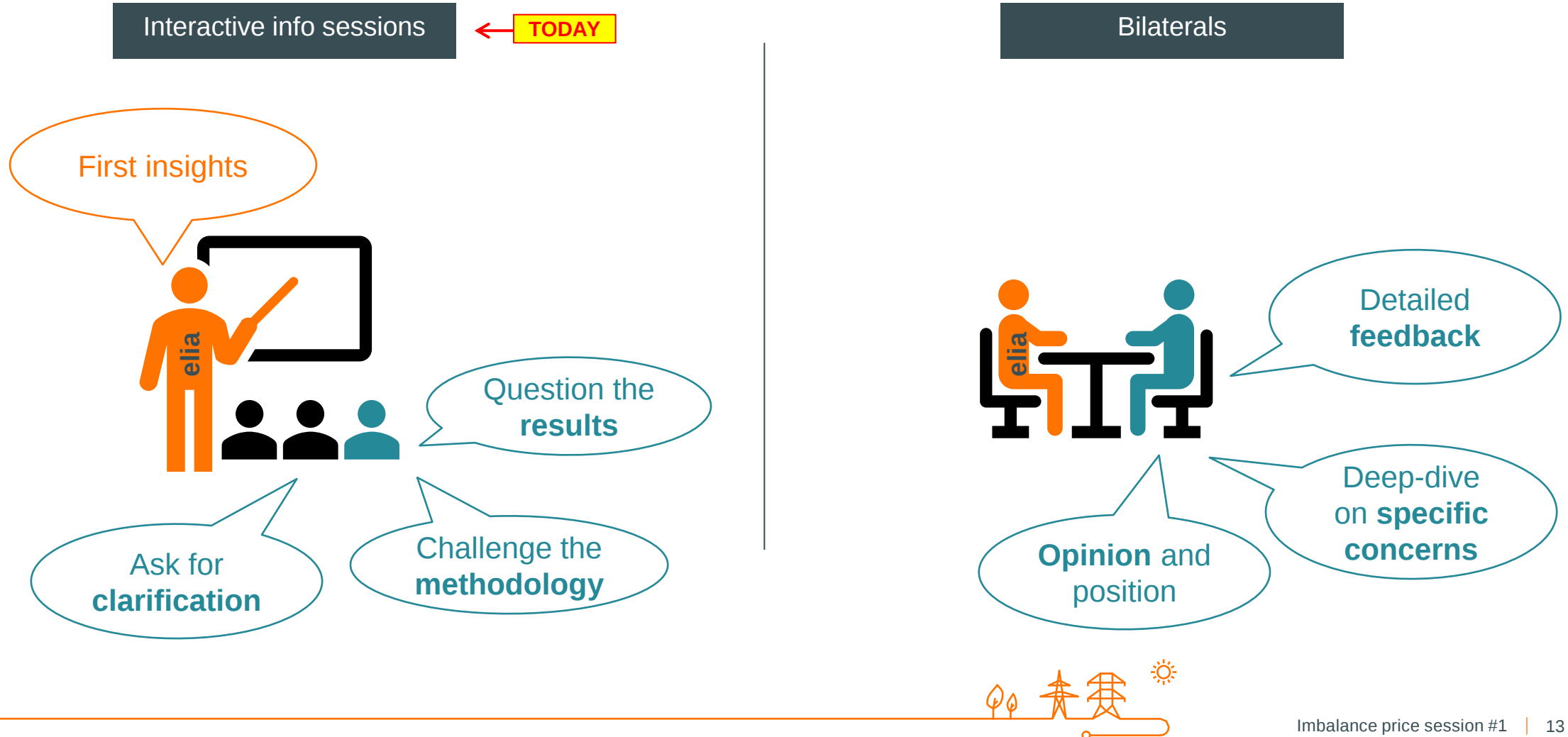


What to expect from the interactive info sessions?



An info session is the place to share first insights relevant for the journey of the imbalance price formula evolution and to discuss methodology

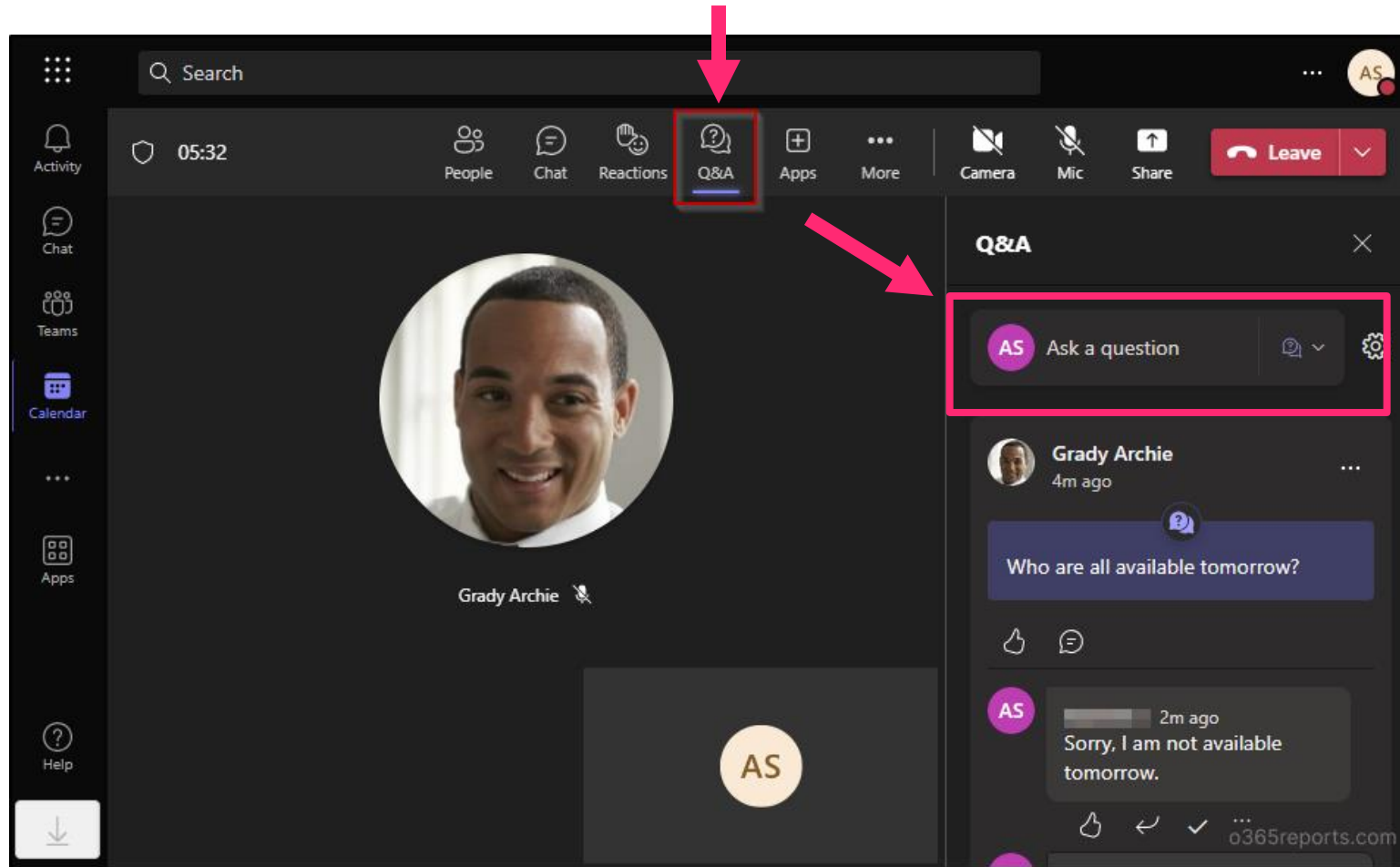
- 2 types of stakeholder interactions are foreseen:



Questions can be asked live at any time,
and dedicated times for Q&A is foreseen after each section →

orange slide

Questions can be submitted via the Teams “Q&A” on the fly



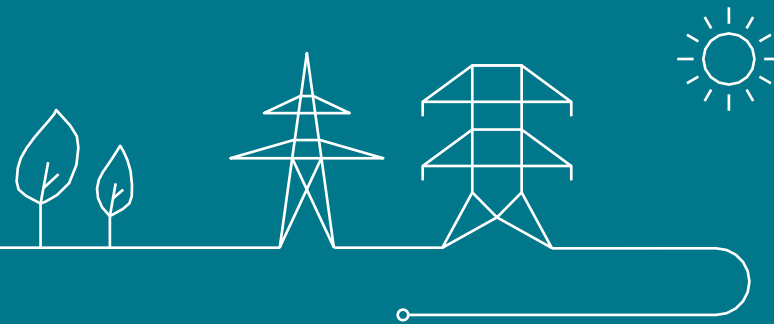
Question the
results

Challenge the
methodology

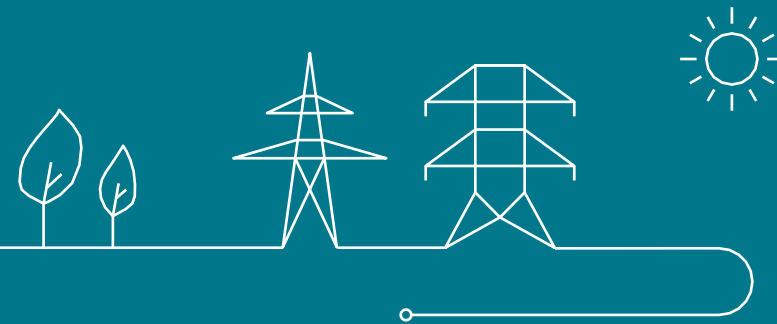
Ask for
clarification



First results from ongoing analyses on the cap&floor



Recall: what are the cap&floor?



Today's focus is on the cap and the floor component

➤ $IP = \pm\alpha + \begin{cases} \text{deadband value} \\ \max(\text{floor}, \text{aFRR component}, \text{mFRR component}) \\ \min(\text{cap}, \text{aFRR component}, \text{mFRR component}) \end{cases}$

if $-25 \text{ MW} < SI(ISP) < 25 \text{ MW}$

if $SI(ISP) \leq -25 \text{ MW}$

if $SI(ISP) \geq 25 \text{ MW}$

- ✓ IP formula should not incentivize to aggravate the local SI → cap & floor with

$$\text{floor} = \max(VoAA_{up}, VoAA_{down})$$

$$\text{cap} = \min(VoAA_{down}, VoAA_{up})$$

← TODAY

- ✓ aFRR compo., as a volume-weighted avg. of aFRR Markets

$$\sum_{oc} [(abs(aFRR_{SD,oc,i}) \times CBMP_{oc,i})]$$

with:

$$VoAA_{up} = \min(\text{price } 1^{st} \text{ local bid } aFRR_{up}, \text{price } 1^{st} \text{ local bid } mFRR_{up})$$

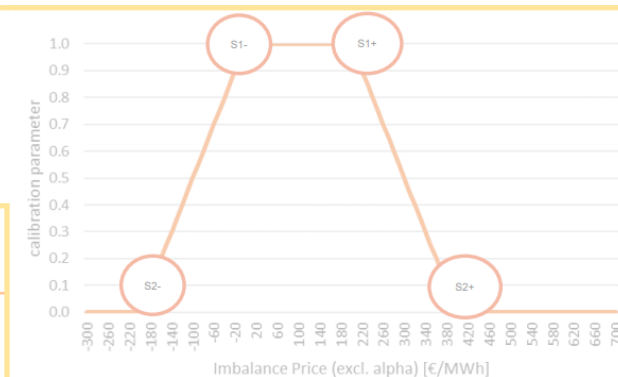
$$VoAA_{down} = \max(\text{price } 1^{st} \text{ local bid } aFRR_{down}, \text{price } 1^{st} \text{ local bid } mFRR_{down})$$

- ✓ mFRR component reflects the marginal value of mFRR

$$\text{mFRR component for MDP} = \min(CBMP_{SA}, CBMP_{downward DA in previous ISP}, CBMP_{downward DA in current ISP})$$

- ✓ IP formula should provide a neutral price signal in case Belgium is close to balance ($|SI| < 25 \text{ MW}$) → $\text{deadband} = \frac{\text{cap} + \text{floor}}{2}$

- ✓ The additional component α adds to the main IP component in case of large and persisting SI → if $|SI| > 150 \text{ MW}$, $\alpha = \left(a + \frac{b}{1 + e^{-\frac{(c-x)}{d}}} \right) * CP$ where $a=0 \text{ €/MWh}$; $b=200 \text{ €/MWh}$; $c=450 \text{ MW}$; $d=65 \text{ MW}$; $x = \text{AVG}(|SI(ISP)|; |SI(ISP-15')|)$ and CP :



What were the opinions on these cap&floors? (1/2)

BOP

BOP therefore calls for **reasonable floors and caps to the imbalance prices, to avoid significant price increases when connecting to the EU platforms.** Excessively high prices merely increase the risk for market actors (and thus increase the price for end-consumers), and do not necessarily incentivize new investments in flexible assets, as long-term asset investment decisions are not made on price spikes but on consistent averages.

- Answer to the public consultation T&C BRP (summer 2023)

The imbalance price formula outlined in the T&C BRP, reflecting a lengthy and debated compromise, seeks an equilibrium between coupling with European platforms, **mitigation measures for both TSOs (cap and floor, deadband) and BRPs (price cap and deadband) thereby circumventing undesirable effects due to still-incomplete market integration (including insufficient cross-border capacities within the balancing timeframe and the lack of liquidity of the Belgian FRR markets)**

- Answer to the public consultation T&C BRP (summer 2023)

Febeeg

centrica

Centrica believes that **applying the cap and floor when the Belgian and European systems are in the same direction is unnecessary and would result in an increase in the Imbalance Price.** We recommend a careful review and clarification of the rules to ensure that the cap and floor are appropriately applied.

[...]

However, we share concerns regarding the potential creation of new gaming opportunities. For example, BRPs with long positions may have an incentive to increase the floor through high dummy bids in the merit order.

- Answer to the public consultation T&C BRP (summer 2023)

What were the opinions on these cap&floors? (2/2)



Febeliec **fully supports the reasoning behind and the application of a cap and floor concept (to avoid perverse effects in imbalance price formation)**

- Answer to the public consultation T&C BRP (summer 2023)

La CREG ne peut pas accepter cette intervention dans la formation du prix de déséquilibre qui vise à éviter les réactions du BRP à un signal de prix européen. **Un prix de déséquilibre sans cap and floor génère un signal de prix européen si la capacité de transport transfrontalière est disponible.**

- Décision (B)2554 (May 2023)

Le cap & floor poussera **toujours Elia à facturer des coûts plus élevés (ou des revenus plus bas, selon le sens de la position du responsable d'équilibre) aux responsables d'équilibre** que les coûts réels (ou revenus) auxquels Elia est exposée.

- Décision (B)2688 (Nov 2023)

CREG

One major concern [with the removal of the cap&floor] is the **risk to stress the electrical grid and, more specifically, to create real-time congestions** in the Elia grid or in the grid of neighboring countries when **the BRPs are incentivized to aggravate the Belgian System Imbalance in an uncontrolled way.**

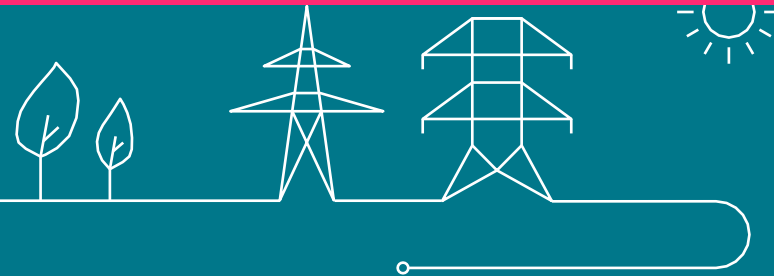
- Answer to CREG's public consultation regarding its proposal for amendment of the T&C BRP (Jan 2023)

[...] these caps and floors aim at **preventing uncontrolled implicit reactions that could jeopardize grid security and inflate costs**, while ensuring that the price signal provided to Belgian BRPs is moderate when cheaper flexibility can be imported from abroad.

- Explanatory note of the public consultation T&C BRP (summer 2023)

Update: what has happened since the cap&floor are in use?

Disclaimer: we share preliminary results from ongoing analyses, to open the early discussions given the tight planning. This does not replace the analyses required for the Assessment plan, which will be completed according to the legal timeline.



Cap&floor apply in similar proportion, setting the imbalance price during ~1/3 of all quarter-hours since our connection to PICASSO

Occurrence = 33%

	% of qh
Main component = Cap	16%
Main component = Floor	17%

Imbalance price set by Floor	Spread [€/MWh]
Mean	42,49
MEDIAN	38,05
Max	365,19
Std deviation	31,33
75th percentile	58,91
90th percentile	80,16
95th percentile	94,73
99th percentile	138,88

Imbalance price set by Cap	Spread [€/MWh]
Mean	40,28
MEDIAN	27,97
Max	2490,23
Std deviation	63,71
75th percentile	52,71
90th percentile	84,12
95th percentile	106,45
99th percentile	189,73

- On average, the spread of the imbalance price with/without cap&floor is ~ 40 €/MWh
- 10% of time (when the imbalance price is set by cap&floor), the spread is > 80 €/MWh

Today's first insights on the assessment of the cap&floor:

Congestion risks

Arbitrage imbalance price vs. intra-day

BRP portfolios impact

Remuneration gap imbalance price vs. aFRR

Congestion risks	Arbitrage vs. intra-day
BRP portfolios impact	Remuneration gap vs. aFRR

Data since PICASSO from 11/2024 until 06/2025 (18,384 QHs)

								DOWN		MW								
										ATC<25	25<ATC<50	50<ATC<100	100<ATC<250	250<ATC<500	ATC>500			
		Residual ATCs for import									0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	IP spread>200	EUR/MWh
										0.0%	0.0%	0.0%	0.0%	0.1%	0.7%	200>IP spread>100		
										0.2%	0.0%	0.0%	0.1%	0.2%	2.6%	100>IP spread>50		
										1.0%	0.1%	0.2%	0.6%	0.8%	9.1%	IP spread<50		
	UP	MW																
		ATC>500	250<ATC<500	100<ATC<250	50<ATC<100	25<ATC<50	ATC<25	68.1%	IP spread=0									
	IP spread<50	4.9%	1.8%	1.1%	0.4%	0.3%	1.8%											
EUR/MWh	100>IP spread>50	3.0%	0.9%	0.6%	0.2%	0.1%	0.4%											
	200>IP spread>100	0.4%	0.1%	0.0%	0.0%	0.0%	0.0%											
	IP spread>200	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%											
											Residual ATCs for export							

Corresponding to, for QHs for which cap/floor set the imbalance price: about **2.5%** “major risk” and **15%** “moderate risk”

Legend ■: major risk ■: moderate risk ■: minor risk

For each QH, calculation of:

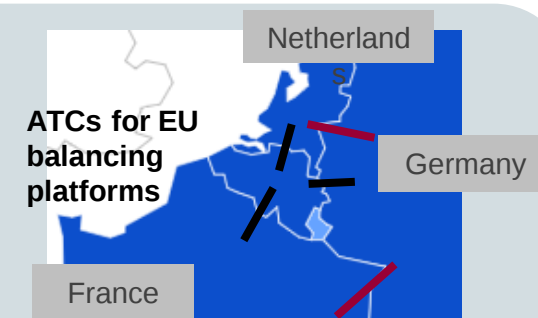


Methodology

- **Residual ATCs = Leftover ATCs after ID – MARI use – PICASSO use**

Considering the direction of the SI in our 3 neighboring countries + our 3 borders + the possible pathways via NL-DE & FR-DE borders provided that the NL-DE or FR-DE ATCs are not saturated (→ *details in Appendix*)

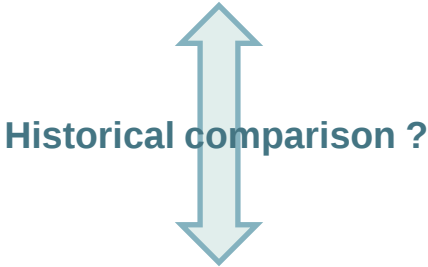
- **IP spread = imbalance price without cap&floor - actual imbalance price**
- **Risks categorized as major/moderate/minor**, based on our *current* understanding of implicit market responses, incl. price thresholds and average volumes → an *updated methodology is under dvlpt* and will be used & shared transparently in the Assessment plan to be delivered at the beg. 2026. This real-time congestion matrix will be updated, although we do not anticipate major changes



Congestion risks	Arbitrage vs. intra-day
BRP portfolios impact	Remuneration gap vs. aFRR

These increased risks would put higher pressure on grid operations. However, it is hard to determine if they will materialize

→ Since PICASSO connection, *among all QHs*:
about 1% “**major risk**” and 5% “**moderate risk**” in the absence of the cap&floor



Actual real-time congestion cases in 2023

Only 3 cases of “real-time” redispatching were reported (defined by the fact that activation was not planned in advance because N-1 Loading in D-1, ID and close to real-time were < 100%)

→ **Removing the cap&floor could substantially increase the need of real-time actions from operators** (and hence increase related costs reflected in tariff) **if these risk materialized**

However, it is difficult to quantify in which proportion these risks will materialize, since we cannot efficiently estimate the **risks** of real-time congestion in 2023 to use as a basis for comparison:

- *Before the connection of PICASSO*, there were no real-time XB flows linked to balancing activities; *real-time congestion risks were therefore assessed using ATC after the intraday market*. However, over the past 2 years, *significant changes in the intraday market* have led to increased ATC usage
- As a result, simply comparing ATC after intraday from before PICASSO with ATC after intraday since PICASSO is biased since it already indicates a much higher real-time congestion risk → **not usable**

The cap&floor help to incentivize BRPs to close their position before the real-time

Congestion risks

Arbitrage vs. intra-day

BRP portfolios impact

Remuneration gap vs. aFRR

Arbitrage imbalance vs. intraday price risk occurrences [% of QH]

		Risk up direction (Belgium short)	Risk down direction (Belgium long)
Since PICASSO (11/24-06/25)	Actual IP	13%	11%
	IP without cap&floor	19%	15%
Before PICASSO (05/24-11/24)	Actual IP	10%	5%

- The cap&floor help mitigate the risk associated with intraday arbitrage opportunities, which have increased since the connection to PICASSO → support safe grid operations



Methodology

- For each QH, calculation of the **sign of the difference between the imbalance price and the “intraday price”, depending on the Belgian system imbalance direction**
- No reliable one “intraday price” exists → the price of the most recent 1-hr trade in continuous trading from EPEX, was considered as the most reliable indicator during tense periods. Using other price intraday price index for this analysis is considered for the future, but pending improved liquidity in the Belgian local intraday market

Impact of the cap&floor on BRPs' invoices is significant

Congestion risks

Arbitrage vs. intra-day

BRP portfolios impact

Remuneration gap vs. aFRR

Price impact on BRPs' invoices			
Data since PICASSO from 11/2024 until 06/2025			
	Applying the IP spread to the system imbalance by QH [k€]	BRP costs [k€]	Financial impact [%]
Per month	880	10,500	8.3%

- The cap&floor have a significant impact on the financial settlement of BRPs
- With the cap&floor: (→ see illustration on next slide)
 - BRPs **helping** the Belgian system are **more remunerated**
 - BRPs **aggravating** the Belgian system are **more penalized**
- Overall, because the system imbalance consists of more BRPs that aggravate the imbalance than those that help correct it, removing the cap&floor from the imbalance price formula would generally provide a positive financial effect for BRPs



Methodology

- For each QH in the period of data, calculation of the **IP spread = imbalance price without cap&floor - actual imbalance price**, which is then applied to the total system imbalance of the QH
- Then, we compare it to the imbalance invoices of BRPs for the same data period. The resulting ratio gives **the financial impact the IP spread would have had on the invoices**. (NB. BRP settlements are influenced by more factors than just the imbalance price formula)

Example illustrating the financial impact of removing the floor on BRPs helping vs. BRPs aggravating the Belgian system

Congestion risks

Arbitrage vs. intra-day

BRP portfolios impact

Remuneration gap vs. aFRR

QH: 2025-06-05 T23:15:00

- SI BE: **-203 MW**
- SI uncongested area (BE perspective): **579 MW** (congested with FR only)

$IP = \max(\text{floor}, \text{aFRR component}, \text{mFRR component})$ if SI BE < - 25 MW

IP reduction by removing the floor = **43 EUR/MWh**

€/MWh



$IP_{\text{actual}} = \text{floor} + \alpha = 100 + 1 = 101 \text{ EUR/MWh}$

$IP_{\text{without floor}} = \text{aFRR} + \alpha = 57 + 1 = 58 \text{ EUR/MWh}$

If the floor was removed:

- BRP₁ : Imbalance = 10 MW (helping Belgian system)
 - IP reduction leads to lower remuneration of BRP₁
- BRP₂ : Imbalance = -20 MW (aggravating Belgian system)
 - IP reduction leads to lower penalty of BRP₂

The impact of cap&floor on the remuneration gap is noticeable, with more opportunities in implicit

Congestion risks

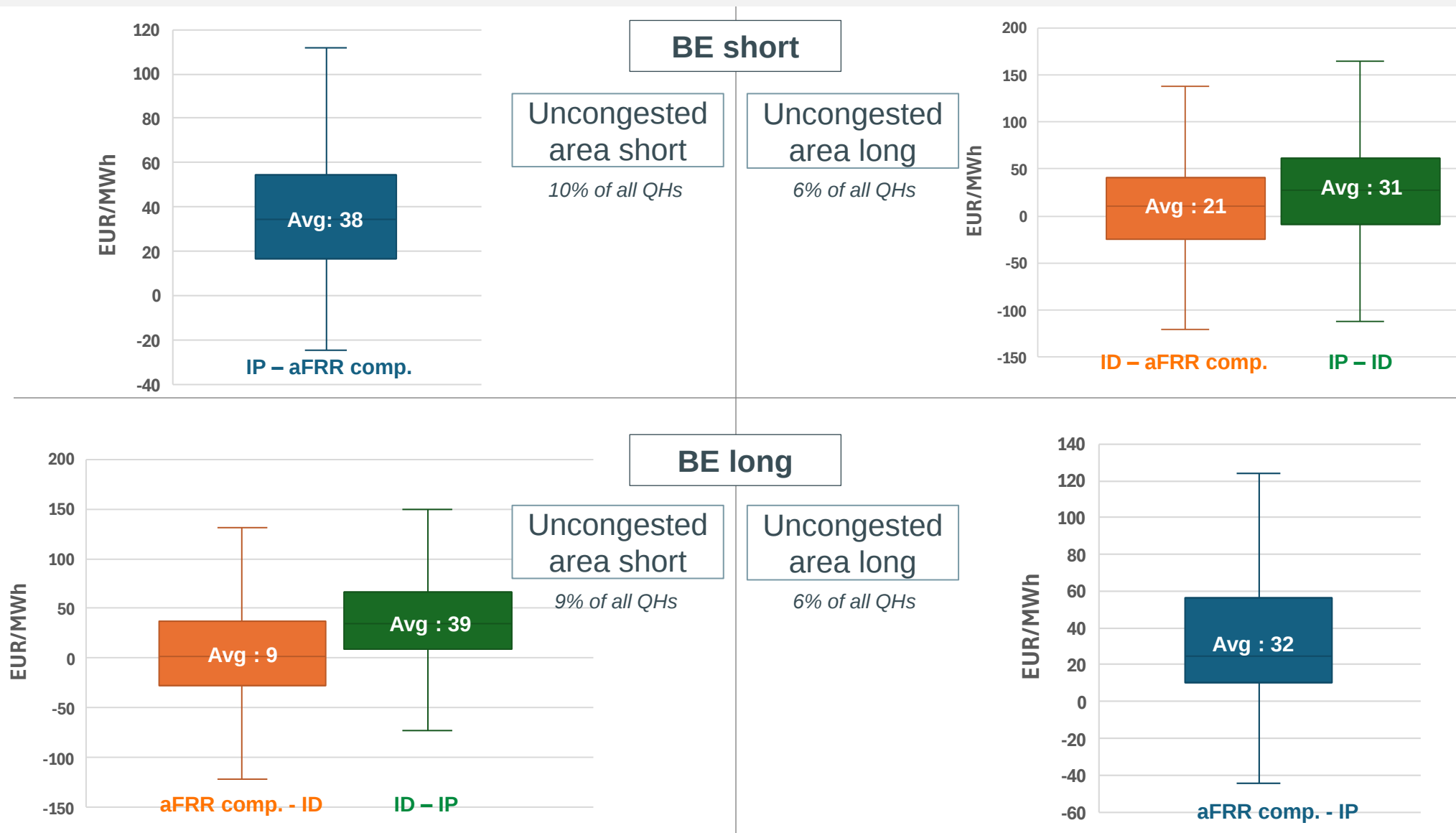
Arbitrage vs. intra-day

BRP portfolios
pact

Remuneration gap
vs. aFRR

Box plots of the remuneration gap implicit vs. aFRR [€/MWh] for QHs where IP is set by cap&floor

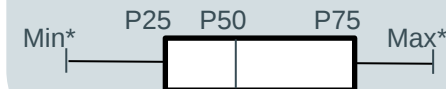
Data since PICASSO from 11/2024 until 06/2025



Methodology

- When BE and the area are in the *same direction*, BRP and BSP opportunities are in the same direction → **remuneration gap = IP - aFRR component**
- When BE and the area are in *opposite directions*, BRP and BSP opportunities correspond to different actions taken by the asset → to compare these opportunities, calculation of **the delta between the last IntraDay price and IP or aFRR compo resp.**

Box plot :



*except outliers

Due to low liquidity in the Belgian LMOL, BRPs can benefit from opportunities that are not similarly accessible to BSPs

Congestion risks

Arbitrage vs. intra-day

BRP portfolios impact

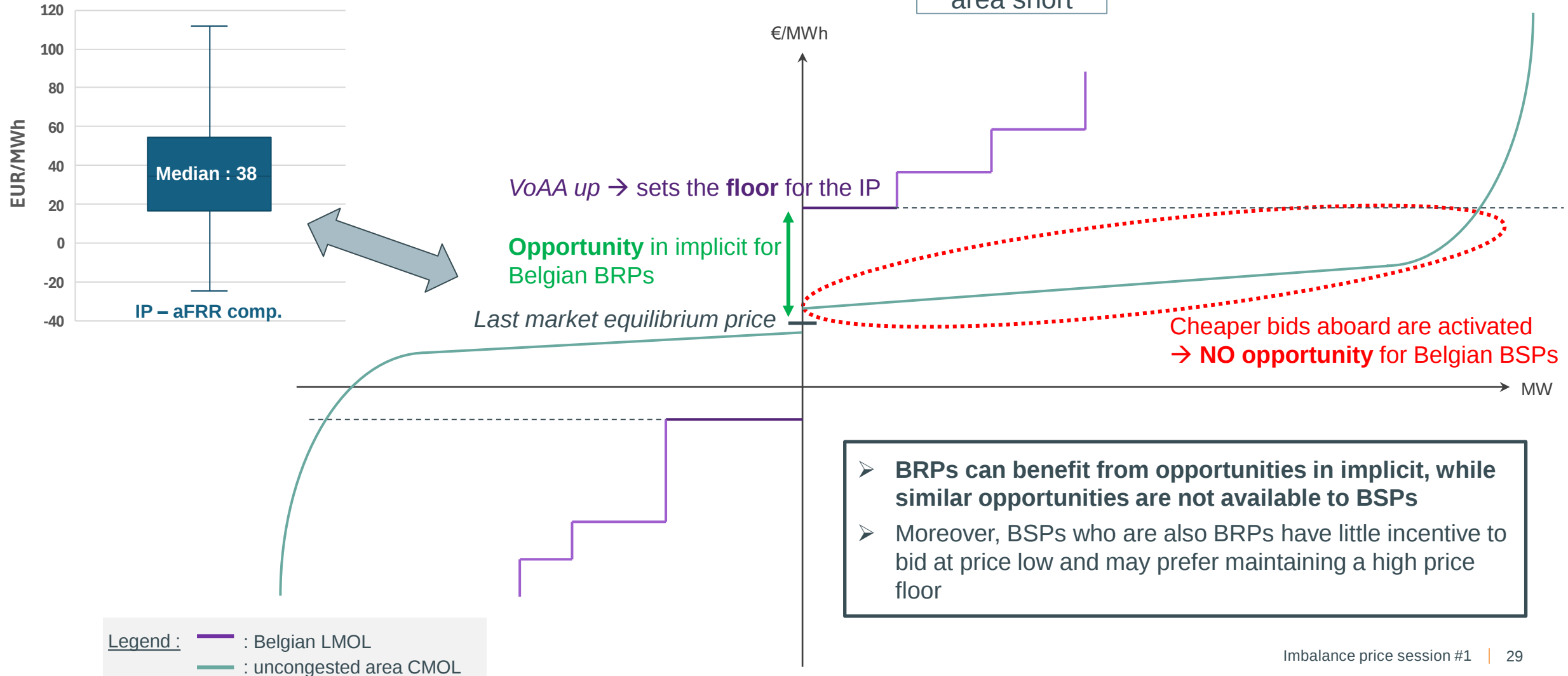
Remuneration gap vs. aFRR

Illustration when the floor sets the imbalance price and

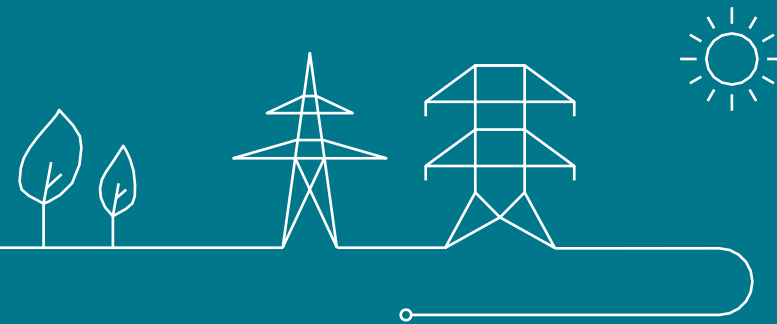
BE short

&

Uncongested area short



Opening: evolution of the cap&floor value?



Adjusting the cap&floor value could lower the drawbacks while keeping the safeguard benefits compared to current design

For instance, illustration with a simple change consisting in setting the cap&floor value to the deadband value, i.e. $\frac{VoAA_{up} + VoAA_{down}}{2}$

- Similar real-time congestion risk occurrence matrix, with some minor different price spreads

Congestion risks

- Slightly less “protective” than the current cap&floor

Arbitrage imbalance price vs. intra-day

BRP portfolios impact

Remuneration gap imbalance price vs. aFRR

- Lower impact on BRPs’ invoices than current cap&floor

- Mitigate the undesirable remuneration gap between BRP and BSP remuneration → See next slide

Price impact on BRPs’ invoices

Current cap&floor
vs. removing completely

Cap&floor = $(VoAA_{up} + VoAA_{down})/2$
vs. removing completely

8.3%

3.3%

A value closer to the intraday price reduces the undesirable opportunity in implicit in case of netting or arbitrage with ID

Congestion risks

Arbitrage vs. intra-day

BRP portfolios

Remuneration gap vs. aFRR

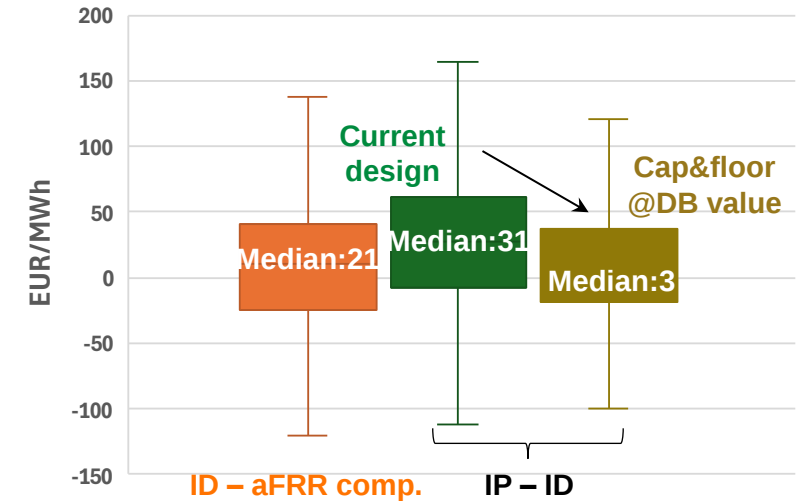
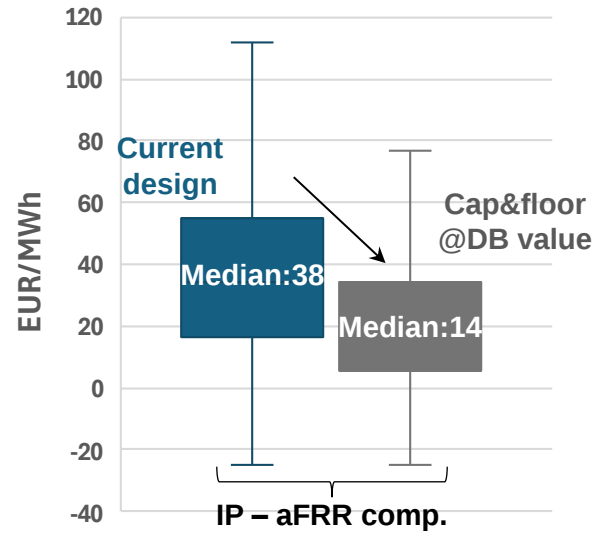
Box plots of the remuneration gap implicit vs. aFRR [€/MWh] for QHs where IP is set by cap&floor

Data since PICASSO from 11/2024 until 06/2025

BE short

Uncongested area short
10% of all QHs

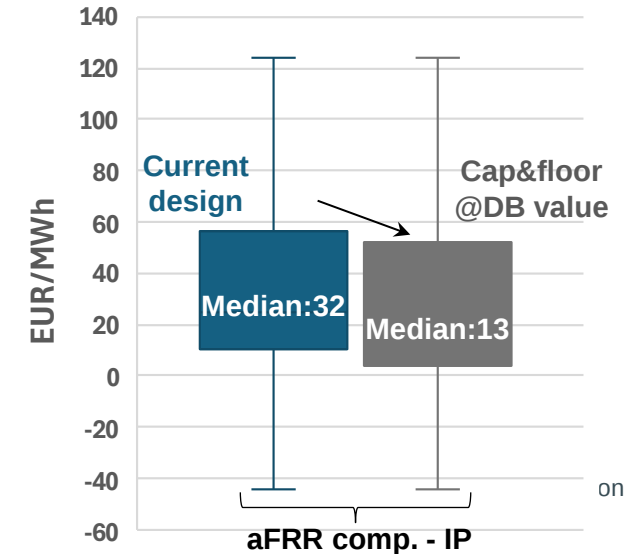
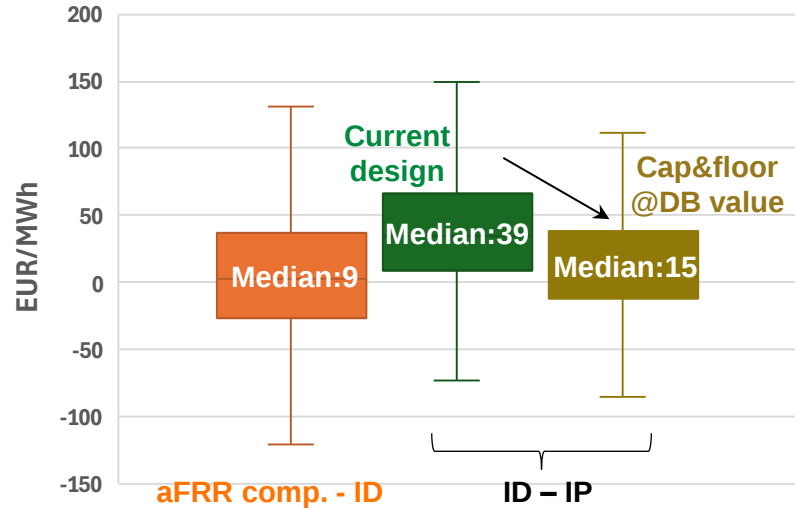
Uncongested area long
6% of all QHs



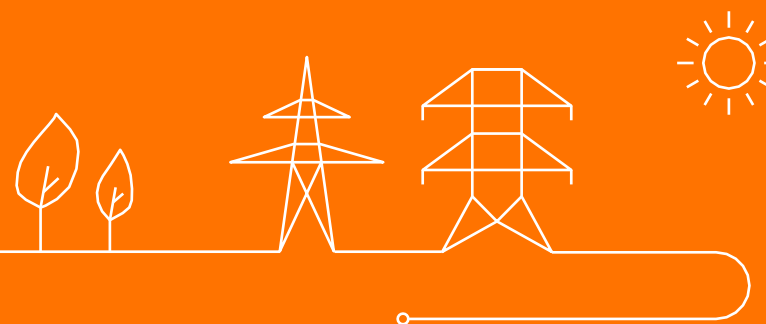
BE long

Uncongested area short
9% of all QHs

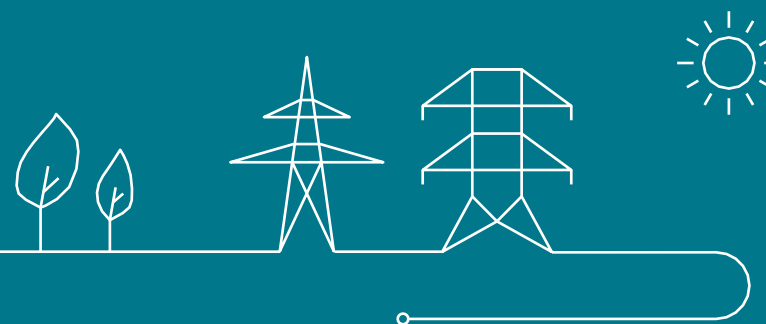
Uncongested area long
6% of all QHs



Q&A



Next steps



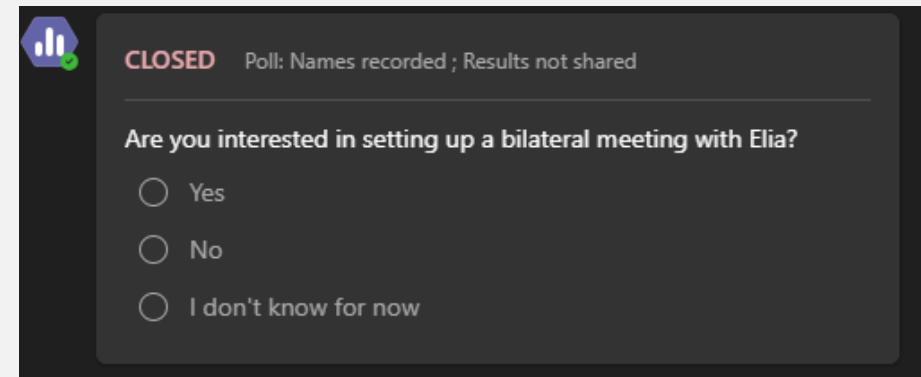
Next interactive info session on 13/11, then bilateral meetings will start

Next interactive info sessions

- Proposed topic: deadband; *the exact topic of the session will be confirmed later*

Organizing bilaterals

- Please answer to the poll in Teams (*results not shared*)



CLOSED Poll: Names recorded ; Results not shared

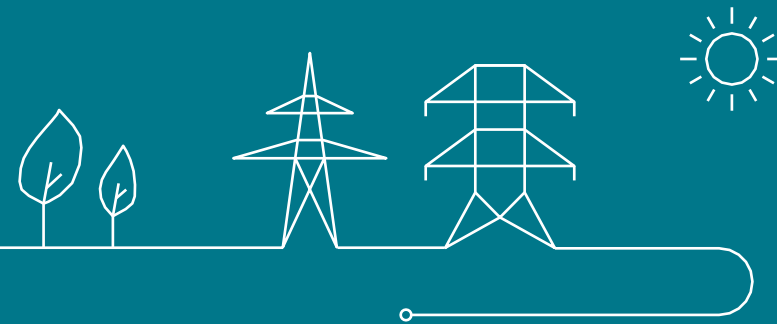
Are you interested in setting up a bilateral meeting with Elia?

- ☐ Yes
- ☐ No
- ☐ I don't know for now

For any comments / questions, **please do not hesitate to reach out to your KAM**
Especially, if have any feedback or suggestions that could help us shape the next steps?

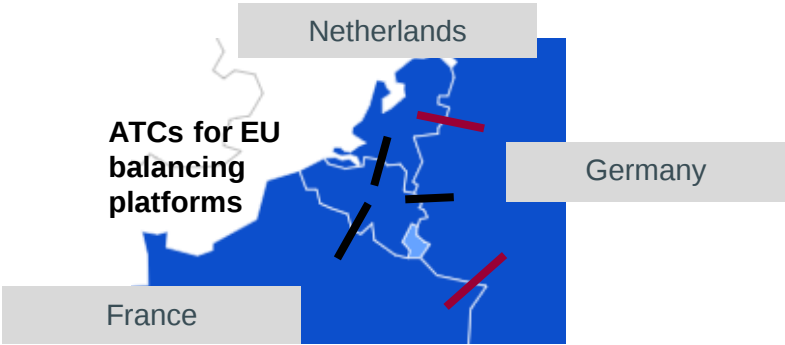
Appendix

Details on the calculation of residual ATCs after MARI & PICASSO use for each QH, used in the congestion risks analysis



Residual ATC calculation – step 1

Congestion risks	Arbitrage vs. intra-day
BRP portfolios impact	Remuneration gap vs. aFRR



For each of the 5 above ATC:

Residual ATC = Leftover after ID – MARI use – PICASSO use

EMS for our 3 borders EMS for our 3 borders EMS for all 5 ATCs

Sources

ETP for NL-DE & FR-DE Nothing for NL-DE & FR-DE

<https://newtransparency.entsoe.eu/market/allocation/continuous/offeredCapacity> Since NL & FR aren't connected to MARI yet

- It is important to consider the NL-DE & FR-DE ATCs as well to consider the different possible “pathways”
- Therefore, different cases are considered to reflect the different “pathways”, as illustrated in the table in the next slide

Residual ATC calculation – step 1

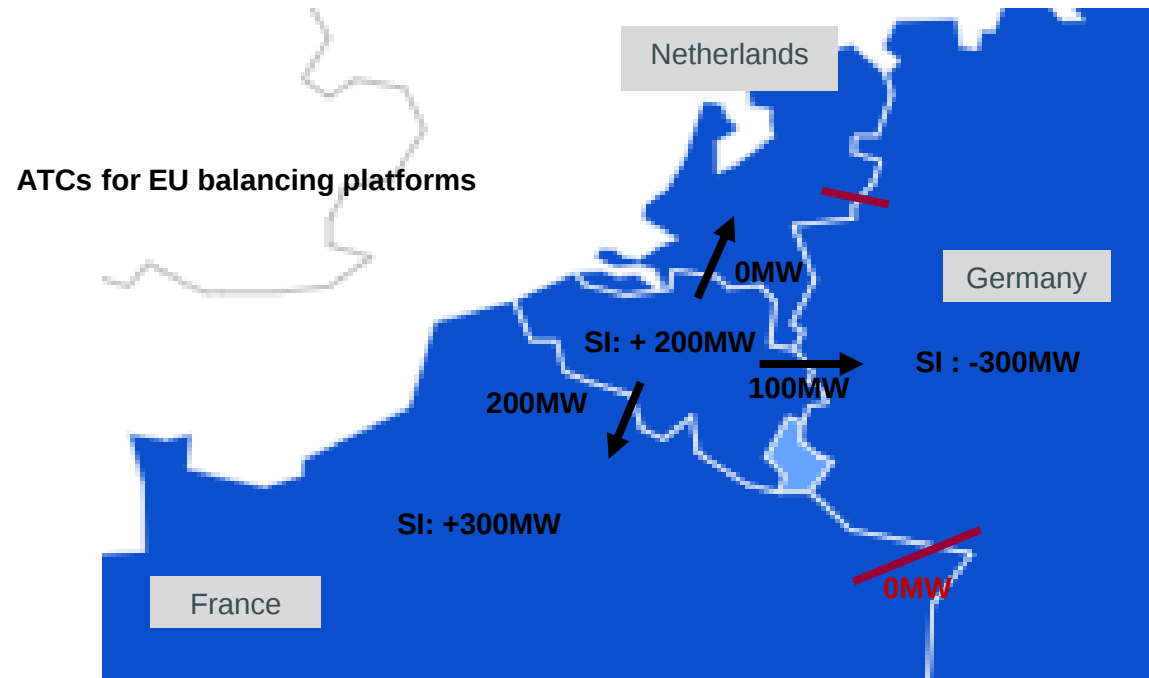
Congestion risks

Arbitrage vs. intra-day

BRP portfolios impact

Remuneration gap vs. aFRR

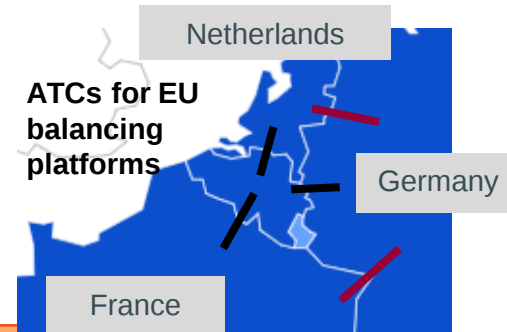
Example:



- In this example, we cannot consider the ATC between BE and FR because it would create congestions

Residual ATC calculation – step 2

- Creation of a table to reflect the different “pathways” for the summation of residual ATCs



Case	FRR demand BE	FRR demand DE	FRR demand FR	FRR demand NL	Consider ATC BE-DE ?	Consider ATC BE-FR ?	Consider ATC BE-NL ?
1	Export	Export	Export	Export	Yes (export)	Yes (export)	Yes (export)
2	Export	Import	Export	Export	Yes (export)	Only if FR-DE not saturated	Only if NL-DE not saturated
3	Export	Export	Import	Export	Only if DE-FR not saturated	Yes (export)	Only if NL-DE & DE-FR not saturated
4	Export	Import	Import	Export	Yes (export)	Yes (export)	Only if NL-DE not saturated
5	Export	Export	Export	Import	Only if DE-NL not saturated	Only if DE-NL & FR-DE not saturated	Yes (export)
6	Export	Import	Export	Import	Yes (export)	Only if FR-DE not saturated	Yes (export)
7	Export	Export	Import	Import	Only if DE-NL or DE-FR not saturated	Yes (export)	Yes (export)
8	Export	Import	Import	Import	Yes (export)	Yes (export)	Yes (export)
9	Import	Export	Export	Export	Yes (import)	Yes (import)	Yes (import)
10	Import	Import	Export	Export	Only if NL-DE or FR-DE not saturated	Yes (import)	Yes (import)
11	Import	Export	Import	Export	Yes (import)	Only if DE-FR not saturated	Yes (import)
12	Import	Import	Import	Export	Only if NL-DE not saturated	Only if NL-DE & DE-FR not saturated	Yes (import)
13	Import	Export	Export	Import	Yes (import)	Yes (import)	Only if DE-NL not saturated
14	Import	Import	Export	Import	Only if FR-DE not saturated	Yes (import)	Only if DE-NL & FR-DE not saturated
15	Import	Export	Import	Import	Yes (import)	Only if DE-FR not saturated	Only if DE-NL not saturated
16	Import	Import	Import	Import	Yes (import)	Yes (import)	Yes (import)

For cases with “only if X not saturated” :
 Work with maximums of 2 simultaneous ATCs
 Ex for case 2:
 max (ATC BE-FR; ATC FR-DE) to consider ATC BE-FR (for export)
 max (ATC BE-NL; ATC NL-DE) to consider ATC BE-NL (for export)

Thank you

